MAGNETIC PRODUCTS

Soft Ferrites

1998

Data Handbook MA01

PHILIPS

Let's make things better.

QUALITY ASSURED

Our quality system focuses on the continuing high quality of our components and the best possible service for our customers. We have a three-sided quality strategy: we apply a system of total quality control and assurance; we operate customer-oriented dynamic improvement programmes; and we promote a partnering relationship with our customers and suppliers.

PRODUCT SAFETY

In striving for state-of-the-art perfection, we continuously improve components and processes with respect to environmental demands. Our components offer no hazard to the environment in normal use when operated or stored within the limits specified in the data sheet.

Some components unavoidably contain substances that, if exposed by accident or misuse, are potentially hazardous to health. Users of these components are informed of the danger by warning notices in the data sheets supporting the components. Where necessary the warning notices also indicate safety precautions to be taken and disposal instructions to be followed. Obviously users of these components, in general the set-making industry, assume responsibility towards the consumer with respect to safety matters and environmental demands.

All used or obsolete components should be disposed of according to the regulations applying at the disposal location. Depending on the location, electronic components are considered to be 'chemical', 'special' or sometimes 'industrial' waste. Disposal as domestic waste is usually not permitted.

Soft Ferrites

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PRODUCTS AND CORES
MAINLY FOR EMI-SUPPRESSION APPLICATIONS:

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

PRODUCT STATUS DEFINITIONS

STATUS	INDICATION	DEFINITION
Prototype	prot	These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in	des	These products are recommended for new designs.
Preferred		These products are recommended for use in current designs and are available via our sales channels.
Support	sup	These products are **not** recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.

THE NATURE OF SOFT FERRITES

Composition

Ferrites are dark grey or black ceramic materials. They are very hard, brittle and chemically inert. Most modern magnetically soft ferrites have a cubic (spinel) structure.

The general composition of such ferrites is $MeFe_2O_4$ where Me represents one or several of the divalent transition metals such as manganese (Mn), zinc (Zn), nickel (Ni), cobalt (Co), copper (Cu), iron (Fe) or magnesium (Mg).

The most popular combinations are manganese and zinc (MnZn) or nickel and zinc (NiZn). These compounds exhibit good magnetic properties below a certain temperature, called the Curie Temperature (T_C). They can easily be magnetized and have a rather high intrinsic resistivity. These materials can be used up to very high frequencies without laminating, as is the normal requirement for magnetic metals.

NiZn ferrites have a very high resistivity and are most suitable for frequencies over 1 MHz, however, MnZn ferrites exhibit higher permeability (μ_i) and saturation induction levels (B_s) and are suitable up to 3 MHz.

For certain special applications, single crystal ferrites can be produced, but the majority of ferrites are manufactured as polycrystalline ceramics.

Manufacturing process

The following description of the production process is typical for the manufacture of our range of soft ferrites, which is marketed under the trade name 'Ferroxcube'.

Raw materials

The raw materials used are oxides or carbonates of the constituent metals. The final material grade determines the necessary purity of the raw materials used, which, as a result is reflected in the overall cost.

Proportions of the composition

The base materials are weighed into the correct proportions required for the final composition.

Mixing

The powders are mixed to obtain a uniform distribution of the components.

Pre-sintering

The mixed oxides are calcined at approximately 1000 °C. A solid state reaction takes place between the constituents and, at this stage, a ferrite is already formed.

Pre-sintering is not essential but provides a number of advantages during the remainder of the production process.

Milling and granulation

The pre-sintered material is milled to a specific particle size, usually in a slurry with water. A small proportion of organic binder is added, and then the slurry is spray-dried to form granules suitable for the forming process.

Forming

Most ferrite parts are formed by pressing. The granules are poured into a suitable die and then compressed. The organic binder acts in a similar way to an adhesive and a so-called 'green' product is formed. It is still very fragile and requires sintering to obtain the final ferrite properties.

For some products, for example, long rods or tubes, the material is mixed into a dough and extruded through a suitable orifice. The final products are cut to the required length before or after sintering.

Sintering

The 'green' cores are loaded on refractory plates and sintered at a temperature between 1150 °C and 1300 °C depending on the ferrite grade. A linear shrinkage of up to 20% (50% in volume) takes place. The sintering may take place in tunnel kilns having a fixed temperature and atmosphere distribution or in box kilns where temperature and atmosphere are computer controlled as a function of time. The latter type is more suitable for high grade ferrites which require a very stringent control in conditions.

Finishing

After sintering, the ferrite core has the required magnetic properties. It can easily be magnetized by an external field (see Fig.2), exhibiting the well-known hysteresis effect (see Fig.1). Dimensions are typically within 2% of nominal due to 10- 20% shrinkage. If this tolerance is too large or if some surfaces require a smooth finish (e.g. mating faces between core halves) a grinding operation is necessary. Usually diamond-coated wheels are used. For high permeability materials, very smooth, lapped, mating surfaces are required. If an air-gap is required in the application, it may be provided by centre pole grinding.

Magnetism in ferrites

A sintered ferrite consists of small crystals, typically 10 to 20 μm in dimension. Domains exist within these crystals (Weiss domains) in which the molecular magnets are already aligned (ferrimagnetism). When a driving magnetic field (H) is applied to the material the domains progressively align with it, as shown in Fig.2.

During this magnetization process energy barriers have to be overcome. Therefore the magnetization will always lag behind the field. A so-called hysteresis loop (see Fig.1) is the result.

If the resistance against magnetization is small, a large induced flux will result at a given magnetic field. The value of the permeability is high. The shape of the hysteresis loop also has a marked influence on other properties, for example power losses.

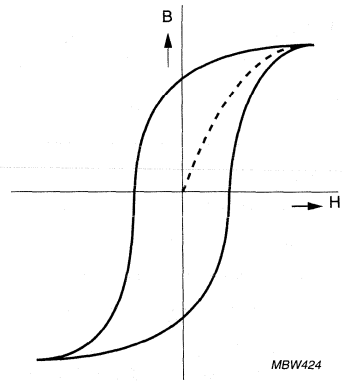


Fig.1 Hysteresis loop.

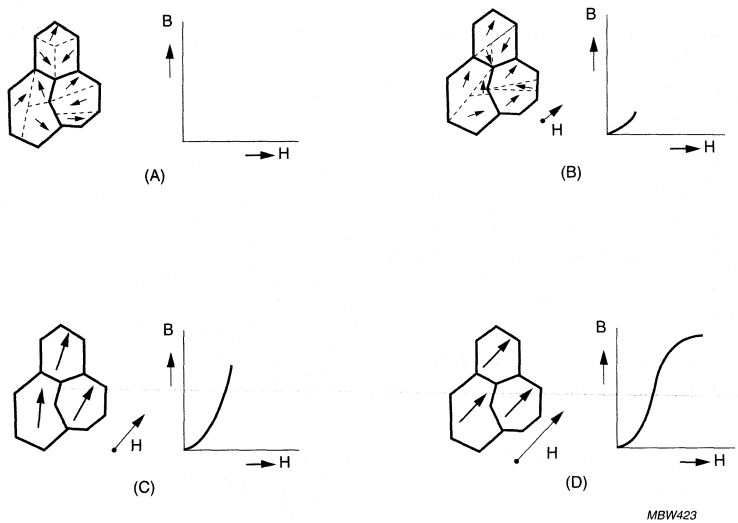


Fig.2 Alignment of domains.

EXPLANATION OF TERMS AND FORMULAE

Symbols and units

SYMBOL	DESCRIPTION	UNIT
A_e	effective cross-sectional area of a core	mm^2
A_{min}	minimum cross-sectional area of a core	mm^2
A_L	inductance factor	nH
B	magnetic flux density	T
B_r	remanence	T
B_s	saturation flux density	T
$\hat{B}$	peak flux density	T
C	capacitance	F
D_F	disaccomodation factor	–
f	frequency	Hz
G	gap length	μm
H	magnetic field strength	A/m
H_c	coercivity	A/m
$\hat{H}$	peak magnetic field strength	A/m
I	current	A
l_e	effective magnetic path length	mm
L	inductance	H
N	number of turns	–
P_v	specific power loss of core material	kW/m^3
Q	quality factor	–
T_c	Curie temperature	°C
V_e	effective volume of core	mm^3
α_F	temperature factor of permeability	K^{-1}
$\frac{\tan\delta}{\mu_i}$	loss factor	–
η_B	hysteresis material constant	T^{-1}
μ	absolute permeability	–
μ_o	magnetic constant ($4\pi \times 10^{-7}$)	Hm^{-1}
μ_s'	real component of complex series permeability	–
μ_s''	imaginary component of complex series permeability	–
μ_a	amplitude permeability	–
μ_e	effective permeability	–
μ_i	initial permeability	–
μ_r	relative permeability	–
μ_Δ	incremental permeability	–
ρ	resistivity	Ωm
Σ(l/A)	core factor (C1)	mm^{-1}

Definition of terms

PERMEABILITY

When a magnetic field is applied to a soft magnetic material, the resulting flux density is composed of that of free space plus the contribution of the aligned domains.

$$B = \mu_0 H + J \quad \text{or} \quad B = \mu_0 (H + M) \tag{1}$$

where $\mu_0 = 4\pi.10^{-7}$ H/m, J is the magnetic polarization and M is the magnetization.

The ratio of flux density and applied field is called absolute permeability.

$$\frac{B}{H} = \mu_0\left(1 + \frac{M}{H}\right) = \mu_{absolute} \tag{2}$$

It is usual to express this absolute permeability as the product of the magnetic constant of free space and the relative permeability (μ_r).

$$\frac{B}{H} = \mu_0 \mu_r \tag{3}$$

Since there are several versions of μ_r depending on conditions the index 'r' is generally removed and replaced by the applicable symbol e.g. μ_i, μ_a, μ_Δ etc.

INITIAL PERMEABILITY

The initial permeability is measured in a closed magnetic circuit (ring core) using a very low field strength.

$$\mu_i = \frac{1}{\mu_0} \times \frac{\Delta B}{\Delta H} \quad (\Delta H \rightarrow 0) \tag{4}$$

Initial permeability is dependent on temperature and frequency.

EFFECTIVE PERMEABILITY

If the air-gap is introduced in a closed magnetic circuit, magnetic polarization becomes more difficult. As a result, the flux density for a given magnetic field strength is lower.

Effective permeability is dependent on the initial permeability of the soft magnetic material and the dimensions of air-gap and circuit.

$$\mu_e = \frac{\mu_i}{1 + \frac{G \times \mu_i}{l_e}} \tag{5}$$

where G is the gap length and l_e is the effective length of magnetic circuit. This simple formula is a good approximation only for small air-gaps. For longer air-gaps some flux will cross the gap outside its normal area (stray flux) causing an increase of the effective permeability.

AMPLITUDE PERMEABILITY

The relationship between higher field strength and flux densities without the presence of a bias field, is given by the amplitude permeability.

$$\mu_a = \frac{1}{\mu_0} \times \frac{\hat{B}}{\hat{H}} \tag{6}$$

Since the BH loop is far from linear, values depend on the applied field peak strength.

INCREMENTAL PERMEABILITY

The permeability observed when an alternating magnetic field is superimposed on a static bias field, is called the incremental permeability.

$$\mu_\Delta = \frac{1}{\mu_0}\left[\frac{\Delta B}{\Delta H}\right]_{H_{DC}} \tag{7}$$

If the amplitude of the alternating field is negligibly small, the permeability is then called the reversible permeability (μ_{rev}).

COMPLEX PERMEABILITY

A coil consisting of windings on a soft magnetic core will never be an ideal inductance with a phase angle of 90°. There will always be losses of some kind, causing a phase shift, which can be represented by a series or parallel resistance as shown in Figs 3 and 4.

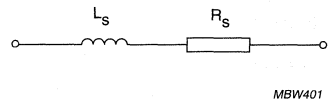


Fig.3 Series representation.

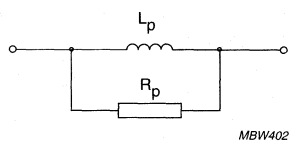


Fig.4 Parallel representation.

For series representation

$$\underline{Z} = j\omega L_s + R_s \quad (8)$$

and for parallel representation,

$$\underline{Z} = \frac{1}{1/(j\omega L_p) + 1/R_p} \quad (9)$$

the magnetic losses are accounted for if a resistive term is added to the permeability.

$$\mu = \mu_s' - j\mu_s'' \quad \text{or} \quad \frac{1}{\mu} = \frac{1}{\mu'_p} - \frac{1}{\mu''_p} \quad (10)$$

The phase shift caused by magnetic losses is given by:

$$\tan\delta_m = \frac{R_s}{\omega L_s} = \frac{\mu''_s}{\mu'_s} \quad \text{or} \quad \frac{\omega L_p}{R_p} = \frac{\mu'_p}{\mu''_p} \quad (11)$$

For calculations on inductors and also to characterize ferrites, the series representations is generally used (μ'_s and μ''_s). In some applications e.g. signal transformers, the use of the parallel representation (μ'_p and μ''_p) is more convenient.

The relationship between the representations is given by:

$$\mu'_p = \mu'_s\left(1 + \tan\delta^2\right) \quad \text{and} \quad \mu''_p = \mu''_s\left(1 + \frac{1}{\tan\delta^2}\right) \quad (12)$$

LOSS FACTOR

The magnetic losses which cause the phase shift can be split up into three components:

1. Hysteresis losses
2. Eddy current losses
3. Residual losses.

This gives the formula:

$$\tan\delta_m = \tan\delta_h + \tan\delta_f + \tan\delta_r \quad (13)$$

Figure 5 shows the magnetic losses as a function of frequency.

Hysteresis losses vanish at very low field strengths. Eddy current losses increase with frequency and are negligible at very low frequency. The remaining part is called residual loss. It can be proven that for a gapped magnetic circuit, the following relationship is valid:

$$\frac{(\tan\delta_m)_{gapped}}{\mu_e - 1} = \frac{\tan\delta_m}{\mu_i - 1} \quad (14)$$

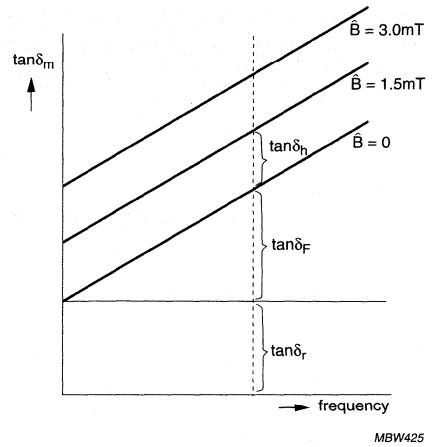


Fig.5 Magnetic losses ($\tan\delta_m$) as a function of frequency.

Since μ_i and μ_e are usually much greater than 1, a good approximation is:

$$\frac{(\tan\delta_m)_{gapped}}{\mu_e} = \frac{\tan\delta_m}{\mu_i} \quad (15)$$

From this formula, the magnetic losses in a gapped circuit can be derived from:

$$(\tan\delta_m)_{gapped} = \frac{\tan\delta_m}{\mu_i} \times \mu_e \quad (16)$$

Normally, the index 'm' is dropped when material properties are discussed:

$$(\tan\delta)_{gapped} = \frac{\tan\delta}{\mu_i} \times \mu_e \quad (17)$$

In material specifications, the loss factor ($\tan\delta/\mu_i$) is used to describe the magnetic losses. These include residual and eddy current losses, but not hysteresis losses.

For inductors used in filter applications, the quality factor (Q) is often used as a measure of performance. It is defined as:

$$Q = \frac{1}{\tan\delta} = \frac{\omega L}{R_{tot}} = \frac{\text{reactance}}{\text{total resistance}} \quad (18)$$

The total resistance includes the effective resistance of the winding at the design frequency.

HYSTERESIS MATERIAL CONSTANT

When the flux density of a core is increased, hysteresis losses are more noticeable. Their contribution to the total losses can be obtained by means of two measurements, usually at the induction levels of 1.5 mT and 3 mT. The hysteresis constant is found from:

$$\eta_B = \frac{\Delta \tan\delta_m}{\mu_e \times \Delta\hat{B}} \qquad (19)$$

The hysteresis loss factor for a certain flux density can be calculated using:

$$\frac{\tan\delta_h}{\mu_e} = \eta_B \times \hat{B} \qquad (20)$$

This formula is also the IEC definition for the hysteresis constant.

EFFECTIVE CORE DIMENSIONS

To facilitate calculations on a non-uniform soft magnetic cores, a set of effective dimensions is given on each data sheet. These dimensions, effective area (A_e), effective length (l_e) and effective volume (V_e) define a hypothetical ring core which would have the same magnetic properties as the non-uniform core.

The reluctance of the ideal ring core would be:

$$\frac{l_e}{\mu \times A_e} \qquad (21)$$

For the non-uniform core shapes, this is usually written as:

$$\frac{1}{\mu_e} \times \Sigma\frac{l}{A} \qquad (22)$$

the core factor divided by the permeability. The inductance of the core can now be calculated using this core factor:

$$L = \frac{\mu_0 \times N^2}{\frac{1}{\mu_e} \times \Sigma\frac{l}{A}} = \frac{1.257 \times 10^{-9} \times N^2}{\frac{1}{\mu_e} \times \Sigma\frac{l}{A}} \text{(in H)} \qquad (23)$$

The effective area is used to calculate the flux density in a core,

for sine wave:

$$\hat{B} = \frac{U\sqrt{2} \times 10^9}{\omega A_e N} = \frac{2.25U \times 10^8}{fNA_e} \text{(in mT)} \qquad (24)$$

for square wave:

$$\hat{B} = \frac{0.25\hat{U} \times 10^9}{fNA_e} \text{(in mT)} \qquad (25)$$

where:

A_e is the effective area in mm^2.

U is the voltage in V

f is the frequency in Hz

N is the number of turns.

The magnetic field strength (H) is calculated using the effective length (l_e):

$$\hat{H} = \frac{IN\sqrt{2}}{l_e} \text{(A/m)} \qquad (26)$$

If the cross-sectional area of a core is non-uniform, there will always be a point where the real cross-section is minimal. This value is known as A_{min} and is used to calculate the maximum flux density in a core. A well designed ferrite core avoids a large difference between A_e and A_{min}. Narrow parts of the core could saturate or cause much higher hysteresis losses.

INDUCTANCE FACTOR (A_L)

To make the calculation of the inductance of a coil easier, the inductance factor, known as the A_L value, is given in each data sheet (in nano Henry). The inductance of the core is defined as:

$$L = N^2 \times A_L \text{ (nH)} \qquad (27)$$

The value is calculated using the core factor and the effective permeability:

$$A_L = \frac{\mu_0\mu_e \times 10^6}{\Sigma(l/A)} = \frac{1.257\mu_e}{\Sigma(l/A)} \text{ (nH)} \qquad (28)$$

MAGNETIZATION CURVES (H_C, B_R, B_S)

If an alternating field is applied to a soft magnetic material, a hysteresis loop is obtained. For very high field strengths, the maximum attainable flux density is reached. This is known as the saturation flux density (B_S).

If the field is removed, the material returns to a state where, depending on the material grade, a certain flux density remains. This the remanent flux density (B_r).

This remanent flux returns to zero for a certain negative field strength which is referred to a coercivity (H_c).

These points are clearly shown in Fig.6.

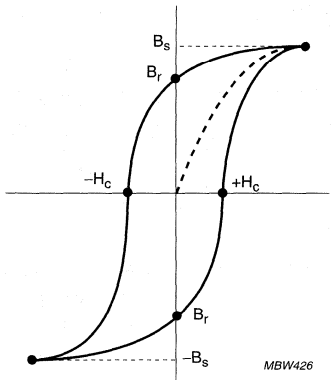


Fig.6 Typical BH curve showing points B_s, B_r and H_c.

TEMPERATURE DEPENDENCE OF THE PERMEABILITY

The permeability of a ferrite is a function of temperature. It generally increases with temperature to a maximum value and then drops sharply to a value of 1. The temperature at which this happens is called the Curie temperature (T_c). Typical curves of our grades are given in the material data section.

For filter applications, the temperature dependence of the permeability is a very important parameter. A filter coil should be designed in such a way that the combination it forms with a high quality capacitor results in an LC filter with excellent temperature stability.

The temperature coefficient (TC) of the permeability is given by:

$$TC = \frac{(\mu_i)_{T2} - (\mu_i)_{T1}}{(\mu_i)_{T1}} \times \frac{1}{T_2 - T_1} \qquad (29)$$

For a gapped magnetic circuit, the influence of the permeability temperature dependence is reduced by the factor μ_e/μ_i. Hence:

$$TC_{gap} = \frac{\mu_e}{(\mu_i)_{T1}} \times \frac{(\mu_i)_{T2} - (\mu_i)_{T1}}{(\mu_i)^2_{T1}} \times \frac{1}{T_2 - T_1} = \mu_e \times \alpha_F \qquad (30)$$

So α_F is defined as:

$$\alpha_F = \frac{(\mu_i)_{T2} - (\mu_i)_{T1}}{(\mu_i)^2_{T1}} \times \frac{1}{T_2 - T_1} \qquad (31)$$

Or, to be more precise, if the change in permeability over the specified area is rather large:

$$\alpha_F = \frac{(\mu_i)_{T2} - (\mu_i)_{T1}}{(\mu_i)_{T1} \times (\mu_i)_{T2}} \times \frac{1}{T_2 - T_1} \qquad (32)$$

The temperature factors for several temperature trajectories of the grades intended for filter applications are given in the material specifications. They offer a simple means to calculate the temperature coefficient of any coil made with these ferrites.

TIME STABILITY

When a soft magnetic material is given a magnetic or thermal disturbance, the permeability rises suddenly and then decreases slowly with time. For a defined time interval, this 'disaccommodation' can be expressed as:

$$D = \frac{\mu_1 - \mu_2}{\mu_1} \qquad (33)$$

The decrease of permeability appears to be almost proportional to the logarithm of time. For this reason, IEC has defined a disaccommodation coefficient:

$$d = \frac{\mu_1 - \mu_2}{\mu_1 \times \log(t_2/t_1)} \qquad (34)$$

As with temperature dependence, the influence of disaccommodation on the inductance drift of a coil will be reduced by μ_e/μ_i.

Therefore, a disaccommodation factor D_F is defined:

$$D_F = \frac{d}{\mu_i} = \frac{\mu_1 - \mu_2}{\mu_1^2 \times \log(t_2/t_1)} \qquad (35)$$

The variability with time of a coil can now be predicted by:

$$\frac{L_1 - L_2}{L_1} = \mu_e \times D_F \qquad (36)$$

RESISTIVITY

Ferrite is a semiconductor with a DC resistivity in the crystallites of the order of 10^{-3} Ωm for a MnZn type ferrite, and about 30 Ωm for a NiZn ferrite.

Since there is an isolating layer between the crystals, the bulk resistivity is much higher: 0.1 to 10 Ωm for MnZn ferrites and 10^4 to 10^6 Ωm for NiZn and MgZn ferrites.

This resistivity depends on temperature and measuring frequency, which is clearly demonstrated in Tables 1 and 2 which show resistivity as a function of temperature for different materials.

Table 1 Resistivity as a function of temperature of a MnZn-ferrite (3C80)

TEMPERATURE (°C)	RESISTIVITY (Ωm)
−20	≈10
0	≈7
20	≈4
50	≈2
100	≈1

Table 2 Resistivity as a function of temperature of a NiZn-ferrite (4C6)

TEMPERATURE (°C)	RESISTIVITY (Ωm)
0	$\approx 5.10^7$
20	$\approx 10^7$
60	$\approx 10^6$
100	$\approx 10^5$

At higher frequencies the crystal boundaries are more or less short-circuited by heir capacitance and the measured resistivity decreases, as shown in Tables 3 and 4.

Table 3 Resistivity as function of frequency for MnZn ferrites

FREQUENCY (MHz)	RESISTIVITY (Ωm)
0.1	≈2
1	≈0.5
10	≈0.1
100	≈0.01

Table 4 Resistivity as function of frequency for NiZn ferrites

FREQUENCY (MHz)	RESISTIVITY (Ωm)
0.1	$\approx 10^5$
1	$\approx 5.10^4$
10	$\approx 10^4$
100	$\approx 10^3$

PERMITTIVITY

The basic permittivity of all ferrites is of the order of 10. This is valid for MnZn and NiZn materials. The isolating material on the grain boundaries also has a permittivity of approximately 10. However, if the bulk permittivity of a ferrite is measured, very different values of apparent permittivity result. This is caused by the conductivity inside the crystallites. The complicated network of more or less leaky capacitors also shows a strong frequency dependence.

Tables 5 and 6 show the relationship between permittivity and frequency for both MnZn and NiZn ferrites.

Table 5 Permittivity as a function of frequency for MnZn ferrites

FREQUENCY (MHz)	PERMITTIVITY (ε_r)
0.1	$\approx 2.10^5$
1	$\approx 10^5$
10	$\approx 5.10^4$
100	$\approx 10^4$

Table 6 Permittivity as a function of frequency for NiZn ferrites

FREQUENCY (MHz)	PERMITTIVITY (ε_r)
0.001	≈100
0.01	≈50
1	≈25
10	≈15
100	≈12

QUALITY

Quality standards

Our ferrite cores are produced to meet constantly high quality standards. High quality components in mass production require advanced production techniques as well as background knowledge of the product itself. The quality standard is achieved in our ferrite production centres by implementation of a Quality Assurance System based on ISO9001 and our process control is based on SPC techniques.

To implement SPC, the production is divided in stages which correspond to production steps or groups of steps. The output of each stage is statistically checked in accordance with MIL STD 414 and 105D.

The obtained results are measured against built-in control, warning and rejects levels. If an unfavourable trend is observed in the results from a production stage, corrective and preventive actions are immediately taken. Quality is no longer "inspected-in" but "built-in" by continuous improvement.

The system is applicable for the total manufacturing process including,

- Raw material
- Production of process
- Finished products.

All our production centres are complying with the ISO 9000 quality system.

Aspects of quality

When describing the quality of a product, three aspects must be taken into account:

- Delivery quality
- Fitness for use
- Reliability

DELIVERY QUALITY

After production, the ferrite components are tested once again for their main characteristics. Tests are conducted in accordance with the guidelines specified by IEC367. A sampling system, in accordance with IEC 410 is used, and the Acceptable Quality levels (AQL's) are set for different classes of defects, major defects having lower AQL's than minor defects.

Customers may follow the same system to carry out incoming inspections. If the percentage of defects does not exceed the specified level, the probability that the batch will be accepted is high (>90%), but rejection is still possible.

If the reject level is much lower than specified, quality complaints will disappear. We aim at very low reject levels to eventually allow any customers to dispose with incoming inspection.

FITNESS FOR USE

This is a measure of component quality up to the point where the component has been assembled into the equipment and is quoted in parts per million (PPM). After assembly, the component should function fully. The PPM concept covers the possibility of failures that occur during assembly. It includes line rejects that may occur for any reason.

For ferrite cores, co-operation between the component supplier and the customer is a very important aspect. The core is generally a building block for a wound component and many things can go wrong during the assembly process, but the core is not always the problem. A mutual quality control programme can be established to minimize line rejects for a specific application. For some product lines, levels of 30 PPM have already been realized.

RELIABILITY

Ferrite cores are known for their reliability. Once the assembly process has been successfully concluded, no real threats for the life of the ferrite are known.

Reliability is mainly governed by the quality of the total assembly of the wound component. Extreme thermal shocks should be avoided. Some data are available for RM cores assembled with the recommended Philips bobbins and clips.

Vibration test, IEC 68-2-6 (test Fc):

- No failures
- Less than 0.1% drift of inductance value.

Bump test, IEC 68-2-29 (test Eb)

- No failures
- Less than 0.03% drift of inductance value.

Classification defects

If a component does not comply with the specification published in this handbook, it is considered to be defective. Defects are divided into two classes,

- Major defects
  These defects lead to malfunction of the finished wound components.
- Minor defects
  These defects do not have a severe influence on the function of the wound component. Often, they have a negative effect on the visual appearance of the end product, or they slightly disturb the assembly process.

Classification of defects per product line

CORE TYPE	CLASSIFICATION OF FAILURES	
	MAJOR	MINOR
RM; P; X; EP; H; PH; RM/I; P/I; PQ; PT; PTS	A_L; critical dimensions	power loss; secondary dimensions
E; planar E; EFD; ETD/ER; EC; U; I	A_L; critical dimensions	power loss; secondary dimensions
ring cores rods tubes beads wideband chokes bobbin cores cup and mushroom cores	A_L; critical dimensions; Z_{min}	A_{Lmax}; power loss; dielectrical strength of coating; secondary dimensions

Classification of defects per product line

Tighter AQL levels can be agreed upon for customized products. Also ppm agreements with customers are encouraged.

CORE TYPE	APPLICATION AREA	CLASSIFICATION OF FAULT				
		FAULT TYPE	MAJOR		MINOR	
			AQL	LEVEL	AQL	LEVEL
P; RM; X	filters	electrical	1%	(I)	2.5%	(S3)
		mechanical	0.65%	(I)	4%	(S3)
P; RM; X; EP; H	general purpose transformers	electrical	1.5%	(S4)	4%	(S3)
		mechanical	0.65%	(I)	4%	(S3)
E; EFD; ETD/ER; EC; U;I	power transformers	electrical	1%	(I)	4%	(S3)
		mechanical	1%	(I)	4%	(S3)
ring cores rods, tubes beads chokes	EMI-suppression	electrical	0.4%	(II)	2.5%	(II)
		mechanical	0.4%	(II)	2.5%	(II)

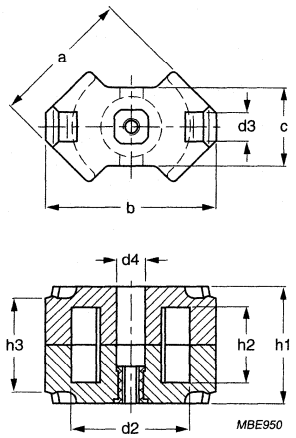


Fig.1 RM core.

Classification of mechanical defects

CORE TYPE	FIGURE	FAULT CLASSIFICATION	
		MAJOR	MINOR
RM	1	$h_2$min	a
		h_3	b
		$d_2$min	c
		$d_3$max	h_1
		d4	$h_2$max
			$d_2$max
			$d_3$min

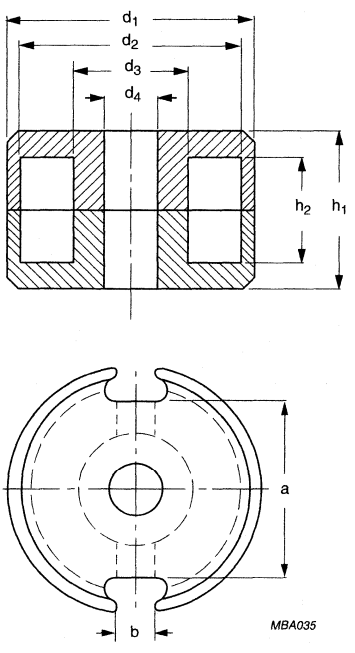


Fig.2 P core.

Classification of mechanical defects

CORE TYPE	FIGURE	FAULT CLASSIFICATION	
		MAJOR	MINOR
P; P/I; PT; PTS;	2	$h_2$min	a
		$d_2$min	b
		$d_3$max	h_1
		$d_1$max	$h_2$max
		d_4	$d_2$max
			$d_3$min
			$d_1$min

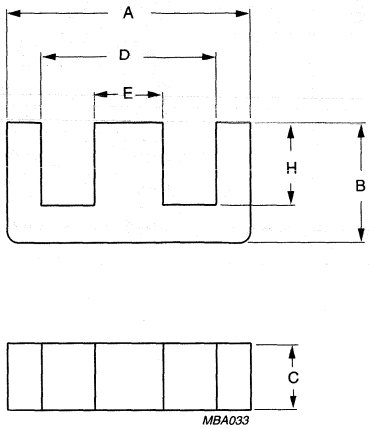


Fig.3 E core.

Classification of mechanical defects

CORE TYPE	FIGURE	FAULT CLASSIFICATION	
		MAJOR	MINOR
E; Planar E	3	Amax	Amin
		Bmax	Bmin
		Cmax	Cmin
		Dmin	Dmax
		Emax	Emin
		Hmin	Hmax

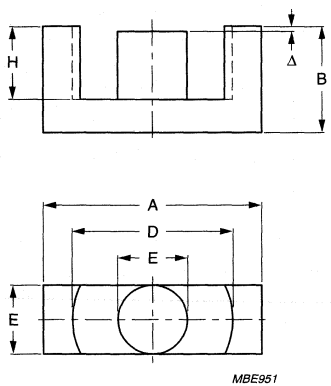


Fig.4 ETD core.

Classification of mechanical defects

CORE TYPE	FIGURE	FAULT CLASSIFICATION	
		MAJOR	MINOR
ETD/ER EFD	4	Amax	Amin
		Bmax	Bmin
		Cmax	Cmin
		Dmin	Dmax
		Emax	Emin
		Hmin	Hmax

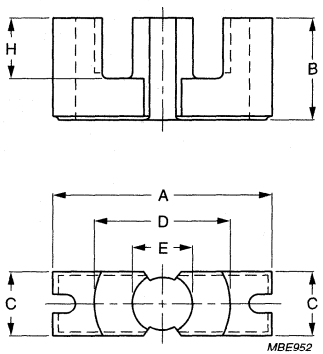


Fig.5 EC core.

Classification of mechanical defects

CORE TYPE	FIGURE	FAULT CLASSIFICATION	
		MAJOR	MINOR
EC	5	Amax	Amin
		Bmax	Bmin
		Cmax	Cmin
		Dmin	Dmax
		Emax	Emin
		Hmin	Hmax

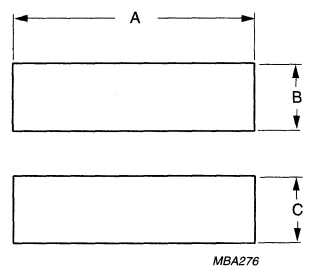


Fig.6 I core.

Classification of mechanical defects

CORE TYPE	FIGURE	FAULT CLASSIFICATION	
		MAJOR	MINOR
I	6		A
		Bmax	Bmin
		Cmax	Cmin

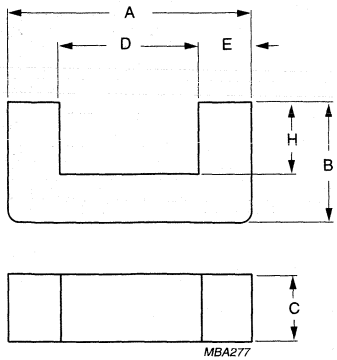


Fig.7 U core.

Classification of mechanical defects

CORE TYPE	FIGURE	FAULT CLASSIFICATION	
		MAJOR	MINOR
U	7		A
			B
		Cmax	Cmin
		Dmin	
		Emax	Emin
		Hmin	

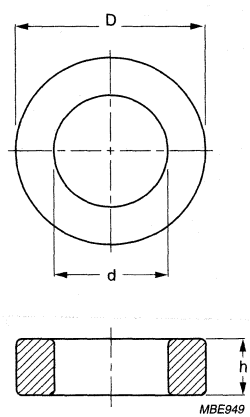


Fig.8 Ring cores.

Classification of mechanical defects

CORE TYPE	FIGURE	FAULT CLASSIFICATION	
		MAJOR	MINOR
ring cores	8	hmax	hmin
		Dmax	Dmin
		dmin	dmax

Classification of mechanical defects

CORE TYPE	FIGURE	FAULT CLASSIFICATION	
		MAJOR	MINOR
rods; tubes; beads; multi-hole tubes	9	Dmax	Dmin
		dmin	dmax
			L
			H

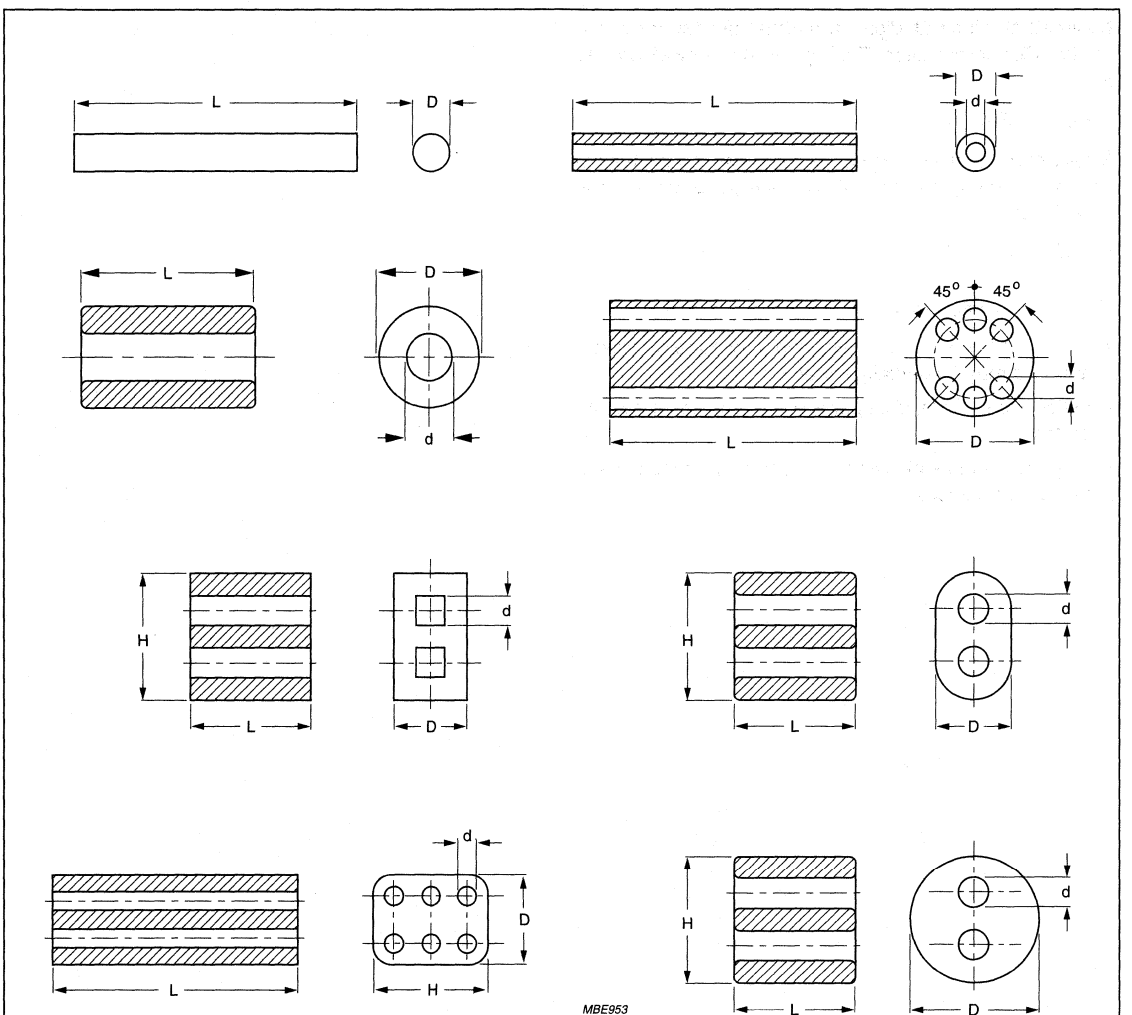


Fig.9 Rods, tubes, beads, multi-hole tubes.

ENVIRONMENTAL ASPECTS OF SOFT FERRITES

Our range of soft ferrites has the general composition $MeFe_2O_4$ where Me represents one or several of the divalent transition metals such as manganese (Mn), zinc (Zn), nickel (Ni), or magnesium (Mg).

To be more specific, all materials starting with digit 3 are manganese zinc ferrites based on the MnZn composition

Their general chemical formula is:

$Mn_\delta\ Zn_{(1-\delta)}\ Fe_2\ O_4$

Materials starting with digit 4 are nickel zinc ferrites based on the NiZn composition. Their general chemical formula is:

$Ni_\delta\ Zn_{(1-\delta)}\ Fe_2\ O_4$

Materials starting with digit 2 are magnesium zinc ferrites based on the MgZn composition. Their general chemical formula is:

$Mg_\delta\ Zn_{(1-\delta)}\ Fe_2\ O_4$

General warning rules

- With strong acids, the metals iron, manganese, nickel and zinc may be partially extracted.
- In the event of fire, dust particles with metal oxides will be formed.
- Disposal as industrial waste, depending on local rules and circumstances.

ORDERING INFORMATION

The products in this handbook are identified by type numbers. All physical and technical properties of the product are expressed by these numbers. They are therefore recommended for both ordering and use on technical drawings and equipment parts lists.

The 11-digit code, used in former editions of this data handbook, also appears on packaging material.

Smallest Packaging Quantities (SPQ) are packs which are ready for shipment to our customers. The information on the barcoded label consists of:

Barcode information

Technical information:

- type number
- 11-digit code number
- delivery and/or production batch numbers

Logistic information:

- 12-digit code number
- quantity
- country of origin
- production week
- production centre

The Philips 12-digit code used on the packaging labels, provides full logistic information as well.

During all stages of the production process, data are collected and documented with reference to a unique batch number, which is printed on the packaging label. With this batch number it is always possible to trace the results of process steps afterwards and in the event of customer complaints, this number should always be quoted.

Products are available troughout their lifecycle. A short definition of product status is given in the table "Product status definitions".

Product status definitions

STATUS	DEFINITION
Prototype	These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in	These products are recommended for new designs.
Preferred	These products are recommended for use in current designs and are available via our sales channels.
Support	These products are **not** recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.
Obsolete	These types are obsolete.

APPLICATIONS

Introduction

Soft ferrite cores are used wherever effective coupling between an electric current and a magnetic flux is required. They form an essential part of inductors and transformers used in today's main application areas:

- Telecommunications
- Power conversion
- Interference suppression.

The function that the soft magnetic material performs may be one or more of the following:

FILTERING

Filter network with well defined pass-band.

High Q-values for selectivity and good temperature stability.

Material requirements:

- Low losses
- Defined temperature factor to compensate temperature drift of capacitor
- Very stable with time.

Preferred materials: 4C6, 3D3, 3H1, 3H3, 3B7.

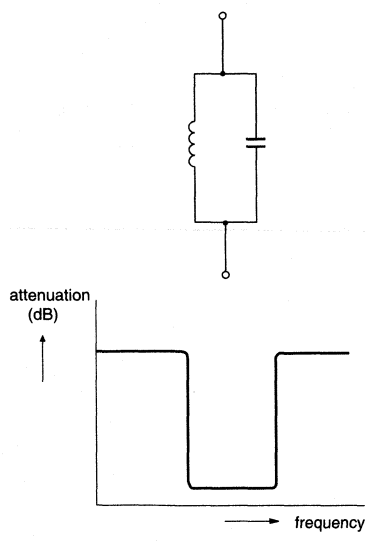


Fig.1 Filter application.

INTERFERENCE SUPPRESSION

Unwanted high frequency signals are blocked, wanted signals can pass. With the increasing use of electronic equipment it is of vital importance to suppress interfering signals.

Material requirements:

- High impedance in covered frequency range.

Preferred materials: 3S1, 4S2, 3S3, 3S4, 4C65, 4A11, 4A15, 3B1, 4B1, 3C11, 3E25, 3E5.

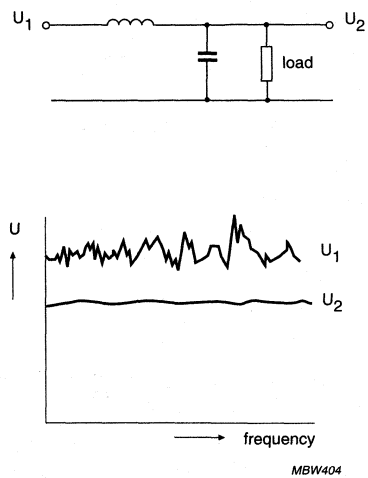


Fig.2 Suppression application.

DELAYING PULSES

The inductor will block current until saturated. Leading edge is delayed depending on design of magnetic circuit.

Material requirements:

- High permeability (μ_i).

Preferred materials: 3E25, 3E5, 3E6, 3E7.

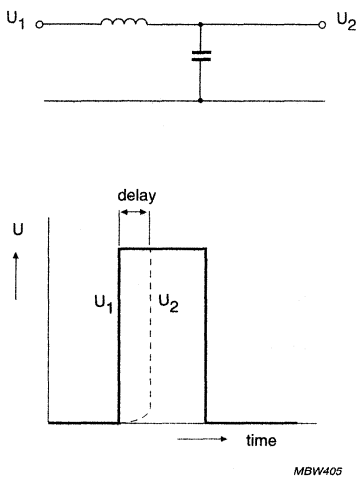


Fig.3 Pulse delay application.

STORAGE OF ENERGY

An inductor stores energy and delivers it to the load during the off-time of a Switched Mode Power Supply (SMPS)

Material requirements:

- High saturation level (B_s).

Preferred materials: 3C15, 3C30, 3C85, 3C90, 2P-iron powder.

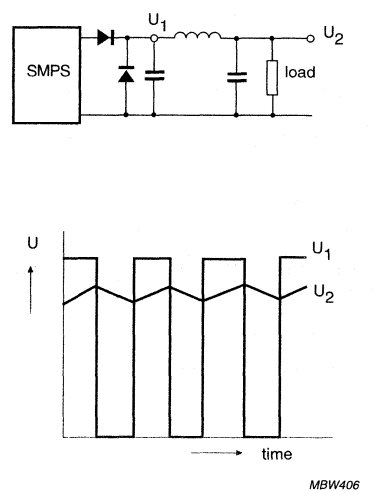


Fig.4 Smoothing/storage application.

PULSE TRANSFORMERS/GENERAL PURPOSE TRANSFORMERS

Pulse or AC signals are transmitted and if required transformed to a higher or lower voltage level.Also galvanic separation to fulfil safety requirements and impedance matching are provided.

Material requirements:

- High permeability
- Low hysteresis factor for low signal distortion
- Low DC sensitivity.

Preferred materials: 3B7, 3B8, 3C81, 3H1, 3H3, 3E1, 3E4, 3E25, 3E5, 3E6.

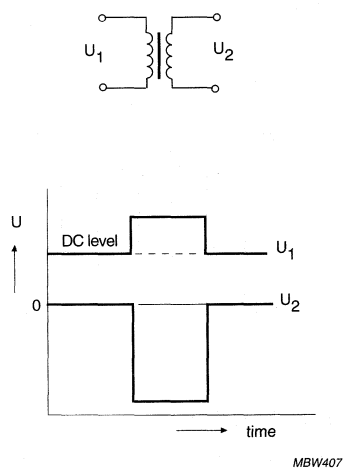


Fig.5 Pulse and general purpose transformer.

POWER TRANSFORMERS

A power transformer transmits energy, transforms voltage to the required level and provides galvanic separation (safety).

Material requirements:

- Low power losses
- High saturation (B_s).

Preferred materials: 3C15, 3C30, 3C81, 3C85, 3C90, 3F3, 3F4, 4F1.

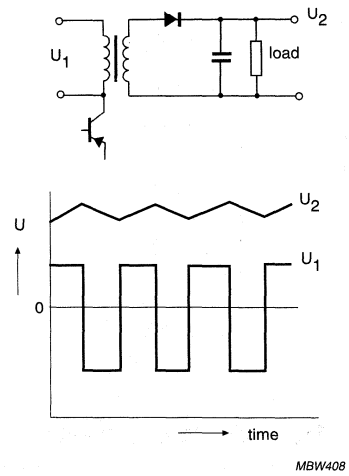


Fig.6 Power transformer application.

TUNING

LC filers are often used to tune circuits in audio, video and measuring equipment. A very narrow bandwidth is often not wanted.

Material requirements:

- Moderate losses up to high frequency
- Reasonable temperature stability.

Preferred materials: 3D3, 4A11, 4B1, 4D2, 4E1, 1P-iron powder grades.

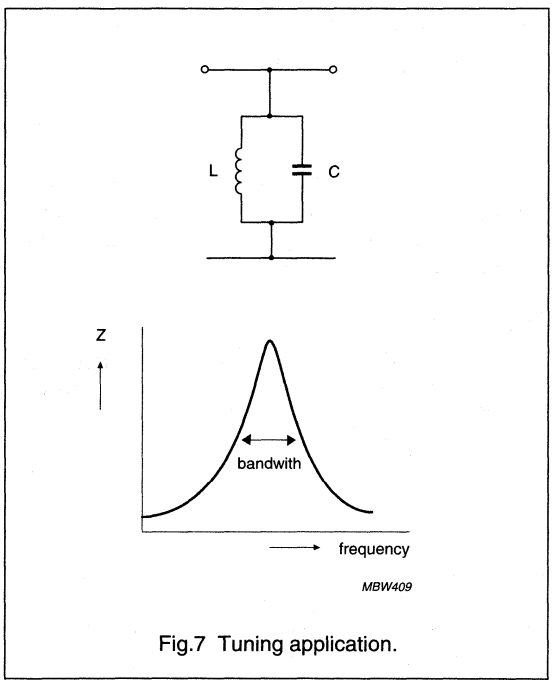


Fig.7 Tuning application.

Ferrites for telecommunication

Telecommunications is the first important branch of technology where ferrites have been used on a large scale. Today, against many predictions, it still is an important market for ferrite cores.

Most important applications are in:

- Filter inductors
- Pulse and matching transformers.

FILTER COILS

P cores, RM cores and X cores have been developed specially for this application.

The P core is the oldest design. It is still rather popular because the closed shape provides excellent magnetic screening.

RM cores are a later design, leading to a more economic usage of the surface area on the PCB. X cores also have this advantage plus more room to get the leads out of the coil.

For filter coils, the following design parameters are important:

- Precise inductance value
- Low losses, high Q value
- High stability over periods of time
- Fixed temperature dependence.

Q VALUE

The quality factor (Q) of a filter coils should generally be as high as possible. For this reason filter materials such as 3H1, 3B7, 3B9, 3H3, 3D3 and 4C6 have low magnetic losses in their frequency ranges (100 kHz, 2MHz and 10 MHz respectively).

Losses in a coil can be divided into:

- Winding losses, due to: the DC resistance of the wire eddy-current losses in the wire electric losses in insulation
- Core losses, due to: hysteresis losses in the core material eddy-current and residual losses in the core material.

Losses appear as series resistances in the coil.

$$\frac{R_{tot}}{L} = \frac{R_0}{L} + \frac{R_{ec}}{L} + \frac{R_d}{L} + \frac{R_h}{L} + \frac{R_{e+r}}{L} \quad (\Omega/H) \qquad (1)$$

As a general rule, maximum Q is obtained when the sum of the winding losses is made equal to the sum of the core losses.

DC resistive losses

The DC resistive losses in a winding are given by:

$$\frac{R_0}{L} = \frac{1}{\mu_e} \cdot \frac{1}{f_{Cu}} \cdot \text{constant} \quad (\Omega/H) \qquad (2)$$

The space (copper) factor f_{Cu} depends on wire diameter, the amount of insulation and the method of winding.

Eddy-current losses in the winding

Eddy-current losses in a winding are given by:

$$\frac{R_{ec}}{L} = \frac{C_{wCu} V_{Cu} f^2 d^2}{\mu_e} \quad (\Omega/H) \qquad (3)$$

Where C_{wCu} is the eddy-current loss factor for the winding and depends on the dimensions of the coil former and core, and V_{Cu} is the volume of conductor in mm^3, d is the diameter of a single wire in mm.

Dielectric losses

The capacitances associated with the coil are not loss free. They have a loss factor which also increases the effective coil resistance:

$$\frac{R_d}{L} = \omega^3 LC\left(\frac{2}{Q} + \tan\delta_c\right) \quad (\Omega/H) \qquad (4)$$

Hysteresis losses

The effective series resistance due to hysteresis losses is calculated from the core hysteresis constant, the peak flux density, the effective permeability and the operating frequency:

$$\frac{R_h}{L} = \omega \eta_B \hat{B} \mu_e \quad (\Omega/H) \qquad (5)$$

Eddy-current and residual losses

The effective series resistance due to eddy-current and residual losses is calculated from the loss factor:

$$\frac{R_{e+r}}{L} = \omega \mu_e (\tan\delta/\mu_i) \quad (\Omega/H) \qquad (6)$$

INDUCTOR DESIGN

The specification of an inductor usually includes:

- The inductance
- Minimum Q at the operating frequency
- Applied voltage
- Maximum size
- Maximum and minimum temperature coefficient
- Range of inductance adjustment.

To satisfy these requirements, the designer has the choice of:

- Core size
- Material grade
- A_L value
- Type of conductor (solid or bunched)
- Type of adjuster.

FREQUENCY, CORE TYPE AND MATERIAL GRADE

The operating frequency is a useful guide to the choice of core type and material.

- Frequencies below 20 kHz:
  the highest Q will be obtained with large, high inductance-factor cores of 3B7, 3H1 or 3H3 material. Winding wire should be solid, with minimum-thickness insulation

  Note: high inductance factors are associated with high temperature coefficients of inductance
- Frequencies between 20 kHz and 200 kHz:
  high Q will generally be obtained with a core also in 3B7, 3H1 or 3H3. Maximum Q will not necessarily be obtained from the large-size core, particularly at higher frequencies, so the choice of inductance factor is less important. Bunched, stranded constructors should be used to reduce eddy-current losses in the copper. Above 50 kHz, the strands should not be thicker than 0.07 mm
- Frequencies between 200 kHz and 2 MHz:
  use a core of 3D3 material. Bunched conductors of maximum strand diameter 0.04 mm are recommended
- Frequencies between 2 MHz and 12 MH:
  use a core of 4C6. Bunched conductors of maximum strand diameter 0.04 mm are recommended for frequencies up to 5 MHz. Solid conductors should be used at frequencies between 5 MHz and 12 MHz.

SIGNAL LEVEL

In most applications, the signal voltage is low. It is a good practice wherever possible to keep the operating flux density of the core below 1 mT, at which level the effect of hysteresis is usually negligible. At higher flux densities, it may be necessary to allow for some hysteresis loss and inductance change.

The following expression for third harmonic voltage U_3 may be used as a guide to the amount of distortion.

$$\frac{U_3}{U_1} = 0.6 \tan\delta_h \qquad (7)$$

For low distortion, materials with small hysteresis loss factors should be used (e.g. 3H3).

DC POLARIZATION

The effect of a steady, superimposed magnetic field, due to an external field or a DC component of the winding current is to reduce the inductance value of an inductor. As with other characteristics, the amount of the decrease depends on the value of the effective permeability. The effect can be reduced by using a gapped core or by choosing a lower permeability material

A_L VALUE

Since the air-gap in ferrite cores can be ground to any length, any value of A_L can be provided within the limits set by the core size. In practice, the range of A_L values has been standardized with values chosen to cover the majority of application requirements.

If a core set is provided with an asymmetrical air-gap, this air-gap is ground in the upper half. This half is marked with the ferrite grade and A_L value.

Most pre-adjusted cores are provided with an injection-moulded nut for the adjuster.

Continuously variable adjusters can be supplied for pre-adjusted cores of most A_L values. These are specially recommended for filter coils. Maximum adjustment range is 10% to 30%, depending on core type and adjuster.

The A_L factor is the inductance per turn squared (in nH) for a given core.

$$L = N^2 \times A_L \quad (nH) \qquad (8)$$

The measured A_L value of a core will depend slightly on the coil used for this measurement.

For very low A_L values (e.g. 16 to 25) the contribution of the stray inductance will be quite high, resulting in a

marked influence of the position of the coil in the core and its number of turns.

INDUCTANCE ADJUSTERS

A major feature of a filter core assembly is its adjustment mechanism. It allows the cores to be set to a very accurate value (0.1%).

The inductance adjustment is achieved by inserting a tube or cylinder, manufactured from ferrite or carbonyl-iron powder into the central hole of the core. This acts as a partial magnetic shunt across the air-gap. The adjuster consists of this tube moulded into a thermoplastic carrier which has been threaded at one end. This screws into a nut which is injection moulded or cemented into the lower half of the core. The magnetic tubes are centreless ground to give very close diameter tolerances.

INDUCTANCE STABILITY

The stability of a correctly assembled inductors depends mainly on the stability of the ferrite's permeability.

The permeability of a ferrite material may change with temperature, time, mechanical pressure, magnetic polarization and other factors. The most important changes affecting the inductance stability of the assembly are:

- Variation of permeability with temperature (temperature coefficient)
- Variation of permeability with time (disaccomodation)

Changes in inductance may also occur due to:

- Movement of the adjuster after final setting
- Movement of the coil former
- Relative movement of the core halves
- Movement of the mechanical components of the assembly.

Small movements of this kind are usually caused by changes in temperature, mechanical vibration or shock.

The achievement of acceptable long-term inductance stability is mainly a matter of careful assembly and suitable stabilizing treatment before final adjustment. If the inductor is to be used in a critical circuit, it should be artificially aged by temperature cycling. The long-term change in inductance of an assembly so treated should not be greater than 500. 10^{-6}, assuming an ambient temperature between 25°C and 40 °C that does not vary by more than 15 °K.

The change in inductance of an RM core assembly using clips with earth pins when subjected to IEC 68-2-6, test F_c (vibration conditions) is less than 1000.10^{-6}. Such severe conditions are unlikely to be encountered in practice.

Bump tests of RM-core assemblies with earth pins (IEC 68-2-29, test Eb) have also been carried out. The observed change in the inductance of RM6-R cores of 3H1 material was less than 300.10^{-6}.

Fig.8 shows the principle outline of a typical adjuster.

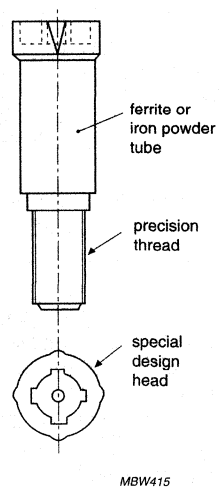


Fig.8 Inductance adjuster outline.

The data sheets include lists of recommended adjusters for the A_L values in various grades. The table also lists the maximum inductance variation. In some cases, the choice of adjuster is optional and depends on the application. For that reason, a suggestion is given for minimum, average and maximum inductance variation where applicable.

Fig.9 shows a typical curve of a specified adjuster in a core set, pre-adjusted on A_L.

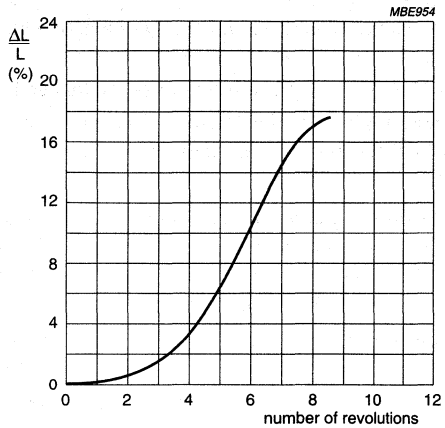


Fig.9 Typical curve of a specified adjuster in a core set, pre-adjusted on A_L.

Dependent on size, the screw-head of the adjuster is suited for tools of M1.4, M1,7 and M2,6. An adjusting tool, combining M1.4 and M1.7 is available (catalogue number 4322 058 0326) as well as a tool combining M2 and M2.6 (catalogue number 43222 058 9327). For customers who wish to make the adjuster tool themselves, the four outlines are depicted in Fig.10

The thread of both the nut and the adjuster have close tolerances (4H) to allow smooth rotation without backlash or friction.

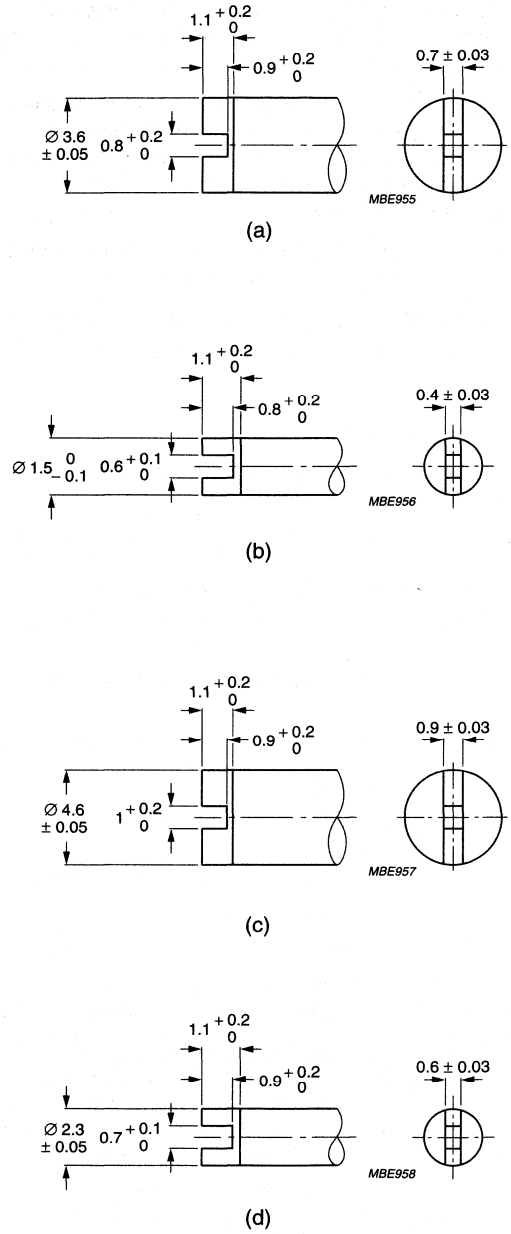


Fig.10 Dimensions of tools for adjusters.

PULSE AND SIGNAL TRANSFORMERS

Pulse and signal transformers, also known as wideband transformers, are frequently used in communication systems, including modern digital networks such as, for example ISDN.

They provide impedance matching and DC isolation or transform signal amplitudes. Signal power levels are usually low. In order to transmit analogue signals or digital pulses without much distortion, good wideband characteristics are needed.

The principal function of the transformer core is to provide optimum coupling between the windings.

The general equivalent circuit of a signal transformer is shown in Fig.11.

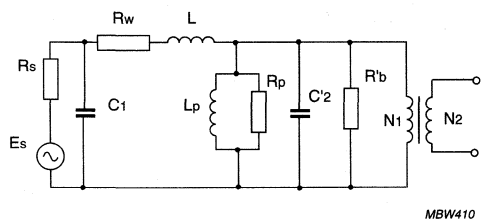


Fig.11 Simplified equivalent circuit of a transformer.

The elements of the circuit depicted in Fig.11 may be defined as follows:

E_s = source voltage

R_s = source resistance

R_w = total winding resistance = $R_1 + R_2'$ where R_1 is the primary winding resistance and R_2' is the secondary winding resistance referred to the primary

L = total leakage inductance = the primary inductance with the secondary shorted

L_p = open circuit inductance

R_p = the shunt loss resistance representing the core loss

N_1, N_2' = the primary and refereed secondary self or stray capacitance respectively

R_b' = load resistance referred to the primary = turns ratio

A high permeability core with polished pole faces results in a large flux contribution, improving the coupling. Open circuit inductance will be high, leakage inductance is kept low compared to this main inductance.

Ring cores are very suitable since they have no air-gap and make full use of the high permeability of the ferrite.

The frequency response of a practical transformer is shown in Fig.12.

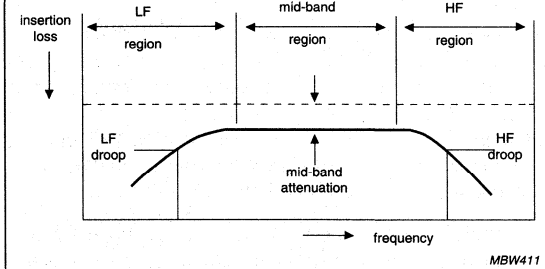


Fig.12 Transmission characteristic of a wideband transformer.

The corresponding distortion of a rectangular pulse by the same circuit is shown in Fig.13.

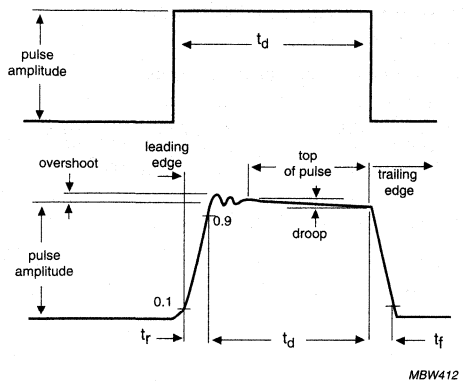


Fig.13 An ideal rectangular pulse and the main pulse distortions that may be introduced by a transformer.

The shunt inductance (L_p) is responsible for the low frequency droop in the analogue transformer since its reactance progressively shunts the circuit as the frequency decreases. In the case of the pulse transformer, the shunt inductance causes the top of the pulse to droop because, during the pulse, the magnetizing current in L_p rises approximately linearly with time causing an increasing voltage drop across the source resistance.

The winding resistance is the main cause of the mid-band attenuation in low frequency analogue transformers. In a pulse transformer, it attenuates the output pulse but usually has little effect on the pulse distortion.

The high frequency droop of an analogue transformer may be due to either the increasing series reactance of the leakage inductance or the decreasing shunt reactance of the self-capacitances, or a combination of both as the frequency increases. In a pulse transformer, the leakage inductance, self-capacitances and the source or load resistance combine to slow down, or otherwise distort the leading and trailing edge responses.

Suitable core types for this application are:

- P cores
- RM cores
- EP cores
- Ring cores
- Small ER cores
- Small E cores.

in the material grades 3E25, 3E1, 3E4, 3E5 and 3E6.

If the signal is superimposed on a DC current, core saturation my become a problem. In that case, a lower permeability material grade such as 3H1, 3B7, 3B8, 3C81 or 3C85 is recommended.

Ferrites for power conversion

Power conversion is a major application area for modern ferrites. Originally designed for use as line output transformers in television receivers, power cores are now being used in a wide range of applications. The introduction of Switched Mode Power Supplies (SMPS) has stimulated the development of a number of new ferrite grades and core shapes to be used in the manufacture of power transformers, output chokes and input filters.

Power transformers and inductors generally operate under loss or saturation limited conditions which require special power ferrites with high saturation levels and low losses.

Output chokes must tolerate high DC currents; this means a gapped magnetic circuit or a special material with very high saturation level such as iron powder.

Input chokes prevent mains pollution generated by the SMPS. Therefore grades are used which provide maximum blocking impedances at the switching frequencies.

SWITCHED MODE POWDER SUPPLY CIRCUITS

The basic arrangement of a Switched Mode Power Supply (SMPS) is shown in Fig.14.

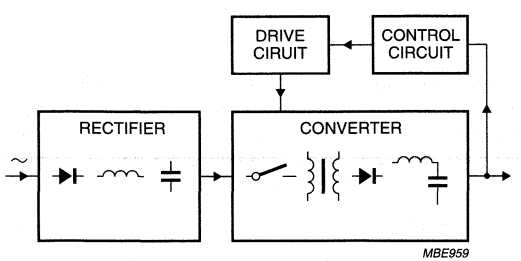


Fig.14 Block diagram of a Switched Mode Power Supply.

In this configuration, the power input is rectified and filtered, and the resulting DC voltage is chopped by a switch at a high frequency. The chopped waveform is applied to the primary of a transformer and the secondary output is rectified and filtered to give the required DC output. The output voltage is sensed by a control circuit which supplies a correction signal to the drive circuit to vary the ON-OFF time of the switched waveform and compensate for any change at the output.

Numerous circuit designs can be used to convert DC input voltage to the required DC output voltage. The requirements for the transformer or inductor depend largely on the choice of this circuit technology.

If the circuits are analyzed in this way, three basic converter designs can be distinguished, based upon the magnetic converting device.

These are:

- Flyback converters
- Forward converters, and
- Push-pull converters.

FLYBACK CONVERTER

Fig.15 shows the basic circuit of a flyback converter and its associated waveforms.

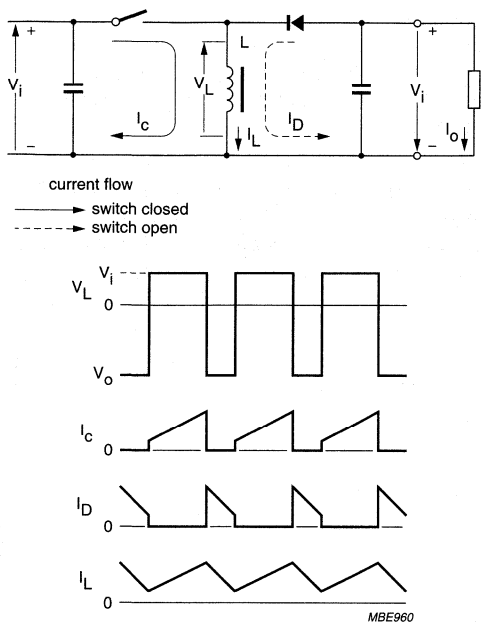


Fig.15 Basic circuit of a DC to DC flyback converter with associated waveforms.

When the switch is closed (transistor conducts), the supply voltage is connected across the inductor and the output diode is non-conducting. The current rises linearly, storing energy, until the switch is opened. When this happens, the voltage across the inductor reverses and the stored energy is transferred into the output capacitor and load. By varying the conduction time of the transistor at a given frequency the amount of energy stored in the inductor during each ON cycle can be controlled. This allows the output of the SMPS to be controlled and changed.

This basis circuit can be developed into a practical circuit using an inductor with two windings (see Fig.16).

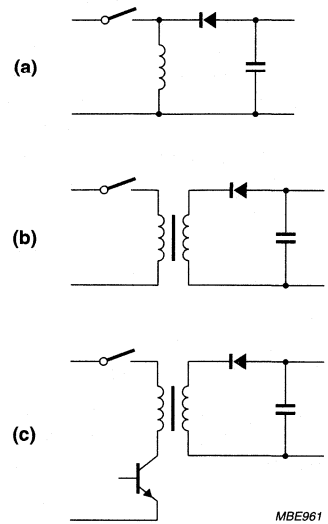


Fig.16 Practical flyback converter circuit.

In a flyback converter, all the energy to be transferred to the output capacitor and load is, at first, stored in the inductor. It is therefore possible to obtain line isolation by adding a secondary winding to the inductor (although an inductor with more than one winding appears in schematic diagrams as a transformer, it is referred to as an inductor in accordance with its function).

Another advantage of the flyback converter is that no smoothing choke is required in the output circuit. This is important in high-voltage supplies and in power supplies with a number of output circuits (see Fig.17).

A disadvantage of this type of converter is that the output capacitor is charged only during the transistor's OFF cycle. Hence the output capacitor ripple current is high when compared with the other types of converters.

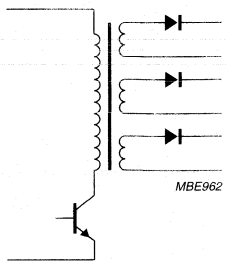


Fig.17 Multiple output flyback converter circuit.

Another disadvantage of the flyback converter concerns the energy stored in the inductor. The inductor is driven in one direction only; this requires a larger core in a flyback design than for an equivalent design using a forward or push-pull converter.

FORWARD CONVERTER

The basic circuit of the forward converter, together with its associated voltage and current waveforms is shown in Fig.18.

When the switch is closed (transistor conducts), the current rises linearly and flows through the inductor into the capacitor and the load. During the ON cycle, energy is transferred to the output and stored in the inductor 'L'. When the switch is opened, the energy stored in the inductor causes the current to continue to flow to the output via the diode.

As with the flyback converter, the amount of energy stored in the inductor can be varied by controlling the ON-OFF cycles. This provides control of the output of the forward converter.

A more practical forward converter circuit with a line-isolation transformer is shown in Fig.19.

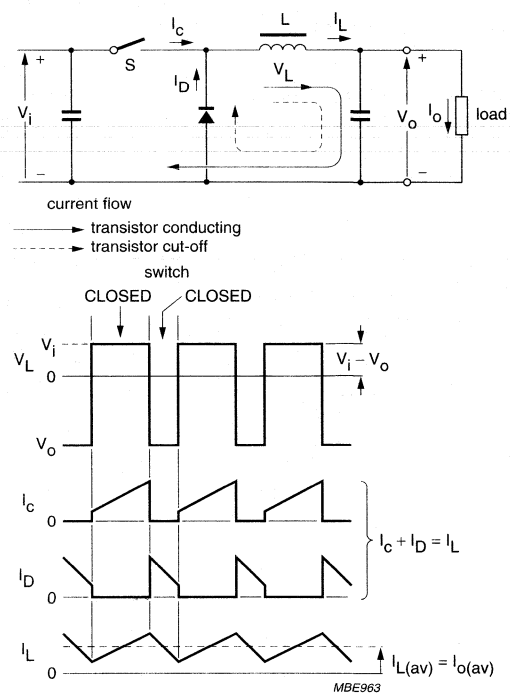


Fig.18 Basic circuit of a DC to DC forward converter with associated waveforms.

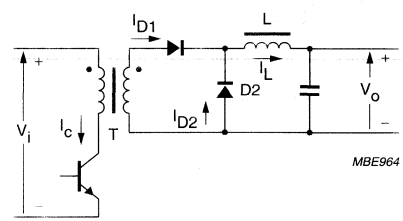


Fig.19 Forward converter with line isolation.

PUSH-PULL CONVERTER

The basic circuit of the push-pull converter, with voltage and current waveforms is shown in Fig.20.

The push-pull converter is an arrangement of two forward converters operating in antiphase (push-pull action). With switch S_1 closed (Fig.20a.) diode D_2 conducts and energy is simultaneously stored in the inductor and supplied to the load. With S_1 and S_2 open (Fig.20b), the energy stored in the inductor continues to support the load current via the parallel diodes D_1 and D_2, which are now acting as flywheel diodes. When switch S_2 closes (Fig.20c), diode D_1 continues to conduct, diode D_2 stops conducting and the process repeats itself.

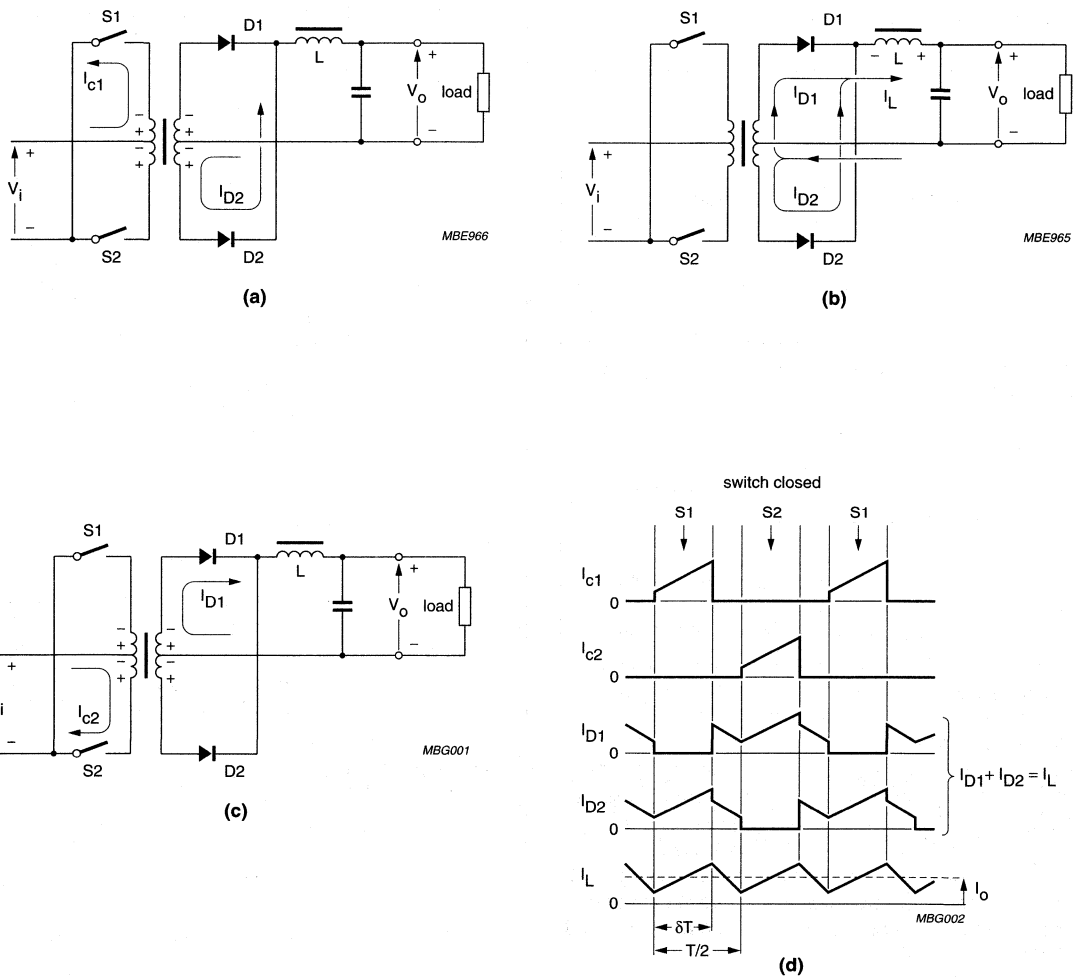


Fig.20 Basic circuit of a DC to DC push-pull converter with associated waveforms.

A push-pull converter circuit doubles the frequency of the ripple current in the output filter and, therefore, reduces the output ripple voltage. A further advantage of the push-pull operation is that the transformer core is excited alternately in both directions in contrast to both the forward and flyback converters. Therefore, for the same operating conditions and power throughput, a push-pull converter design can use a smaller transformer core.

Multiple outputs can be constructed by using several secondary windings, each with its own output diodes, inductor and smoothing capacitor.

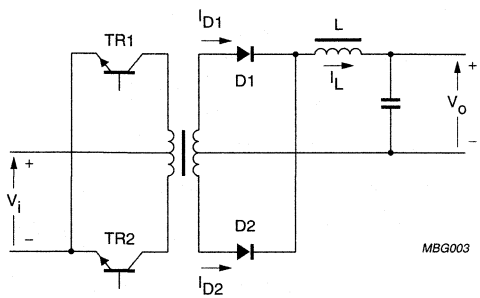


Fig.21 Conventional push-pull converter circuit.

CONVERTER SELECTION

In each of the three basic converter designs there are several different circuit possibilities. In the flyback and forward converters, single and two-transistor designs can be used. If two transistors are used, they will switch simultaneously. This type of circuit preference is determined by the allowable collector-emitter voltage and collector current of the transistor. In push-pull converter designs, the primary of the transformer can be connected in several ways (see Fig.22).

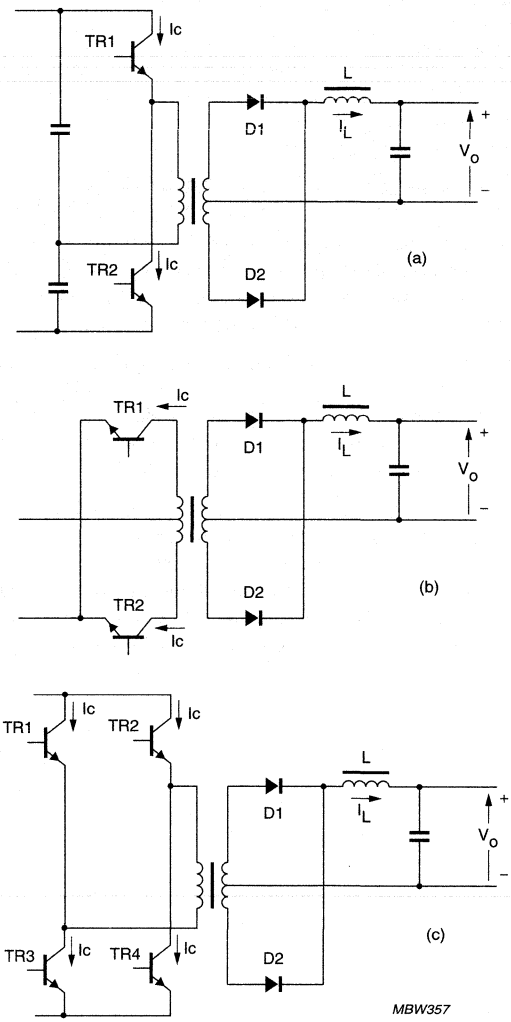


Fig.22 Several push-pull converter circuits.

Depending upon how the transformer primary is driven, it is possible to differentiate between single-ended (see Fig.22a), push-pull (see Fig.22b) and full-bridge circuits (see Fig.22c). Decisions on circuit details are determined by the transistor capabilities.

For a practical converter design, the first selection that should be considered is the type of converter circuit to use. To aid in this initial converter circuit selection, Fig.23 offers a rough guide to the type of converter, its output voltage and power capability. This selection has to be considered along with other requirements, including line isolation, ripple content, overall efficiency, multiple outputs, etc.

"Converter design selection chart (I)" summarizes the most significant properties of a converter design. It shows the relative strengths and weaknesses of the three types of converters with regard to these characteristics.

For a high performance, high power, single output supply, where ripple is well below 1%, the push-pull design is the obvious choice. For smaller power versions of this type of supply, the forward, or double-forward converter provides a useful alternative to push-pull converter.

In high-voltage supplies, the flyback converter is the most suitable circuit and should be considered as a preference. In multiple-output supplies, the flyback converter is again normally the first choice because it avoids the necessity of providing a number of output windings on the inductor, together with a single diode and capacitor for each.

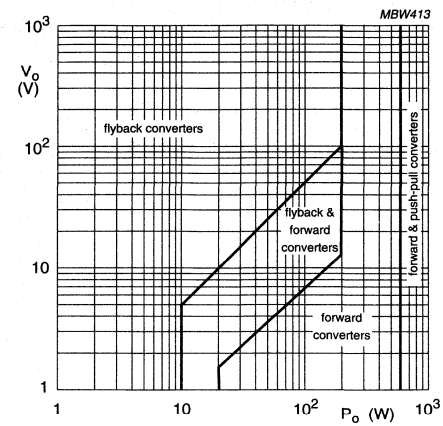


Fig.23 Converter circuit selection as a function of output voltage and throughput power.

Converter design selection chart (I)

FUNCTION	TYPE OF CONVERTER CIRCUIT(1)		
	FLYBACK	FORWARD	PUSH-PULL
Circuit simplicity	+	0	–
Number of components	+	0	–
Drive circuitry	+	0	–
Output ripple	–	0	+
Choke volume	not required	0	+
Transformer volume	–	0	+
Mains isolation	+	–	+
High power	–	0	+
High voltage	+	0	0
Multiple outputs	+	0	0

Note

1. "+" = Favourable; "0" = Average; "-" = Unfavourable.

CORE SELECTION

"Converter design selection chart(II)" shows which core type could be considered suitable for the different types of converter design.

Converter design selection chart(II)

FUNCTION	TYPE OF CONVERTER CIRCUIT[1]		
	FLYBACK	FORWARD	PUSH-PULL
E cores	+	+	0
Planar E cores	–	+	0
EFD cores	–	+	+
ETD cores	0	+	+
EC cores	–	0	+
U cores	+	0	0
RM cores	0	+	0
EP cores	–	+	0
P cores	–	+	0
Ring cores	–	+	+

Note

1. "+" = Favourable; "0" = Average; "-" = Unfavourable.

The power-handling capability of a given core is determined by frequency and material grade, its geometry and available winding area, and by other factors which depend on the specific application.

Operating frequency

The preferred operating frequency of a Switched Mode Power Supply is greater than 20 kHz to avoid audible noise from the transformer. With modern power ferrites the practical upper limit has shifted to well over 1 MHz.

Ambient temperature

Ambient temperature, together with the maximum core temperature, determines the maximum temperature rise, which in turn fixes the permissible total power dissipation in the transformer. Normally, a maximum ambient temperature of 60°C has been assumed. This allows a 40°C temperature rise from the ambient to the centre of the transformer for a maximum core temperature of 100°C. There is a tendency however towards higher temperatures to increase power throughput.

Flux density

To avoid saturation in the cores the flux density in the minimum cross-section must not exceed the saturation flux density of the material at 100°C. The allowable total flux is the product of this flux density and the minimum core area and must not be exceeded even under transient conditions, that is, when a load is suddenly applied at the power supply output, and maximum duty factor occurs together with maximum supply voltage. Under steady-state conditions, where maximum duty factor occurs with minimum supply voltage, the flux is reduced from its absolute maximum permissible value by the ratio of the minimum to maximum supply voltage (at all higher supply voltages the voltage control loop reduces the duty factor and keeps the steady-state flux constant).
The minimum to maximum supply voltage ratio is normally taken as 1:1.72 for most applications.

SELECTING THE CORRECT CORE TYPE

The choice of a core type for a specific design depends on the design considerations and also on the personal preference of the designer. "Power throughput for different core types (at 100 kHz switching frequency)" gives an overview of core types as a function of power throughput, and this may be useful to the designer for an initial selection.

Power throughput for different core types (at 100 kHz switching frequency)

POWER RANGE (W)	CORE TYPE
<5	RM4; P11/7; R14; EF12.6; U10
5 to 10	RM5; P14/8
10 to 20	RM6; E20; P18/11; R23; U15; EFD15
20 to 50	RM8; P22/13; U20; RM10; ETD29; E25; R26/10; EFD20
50 to 100	ETD29; ETD34; EC35; EC41; RM12; P30/19; R26/20; EFD25
100 to 200	ETD34; ETD39; ETD44; EC41; EC52; RM14; P36/22; E30; R56; U25; U30; E42; EFD30
200 to 500	ETD44; ETD49; E55; EC52; E42; P42/29; U37
<500	E65; EC70; U93; U100

Each of the core types has been developed for a specific application, therefore they all have advantages and drawbacks depending on, for example, converter type and winding technique.

Choice of ferrite grade for powder transformers

For a more detailed choice we have developed a computer selection program. It is available for the designer as part of the "Soft Ferrite Design Tools" disc (ordering code: 9398 402 12011). Also on this disc are programs for a complete initial winding design for the selected cores.

A complete range of power ferrites is available for any application.

3C15:

Low frequency material with improved saturation level. Suitable for flyback converters e.g. Line Output Transformers

3C30:

Medium frequency material with improved saturation level. Suitable for flyback converters e.g. Line Output Transformers

3C85:

Medium frequency (<200 kHz) material for industrial use.

3C90:

Medium frequency (<200 kHz) material for industrial use. Lower losses than 3C85

3F3:

High frequency material (up to 700 kHz). Top material for modern high frequency designs.

3F4:

High frequency material (up to 3 MHz). Specially recommended for resonant supplies.

4F1:

High frequency material (up to 10MHz). Specially recommended for resonant supplies.

Performance factor of power ferrites

The performance factor (f.B) is a measure of the power throughput that a ferrite core can handle at a loss level of 300 mW/cm^3. This level is considered to be acceptable for a good medium size transformer design. From the graph it is clear that for low frequencies there is not much difference between the grades, because the cores are saturation limited. At higher frequencies, the differences between the grades increase. There is an optimum operating frequency for each material grade. It is evident that in order to increase power throughput or power density a high operating frequency and a better ferrite should be chosen.

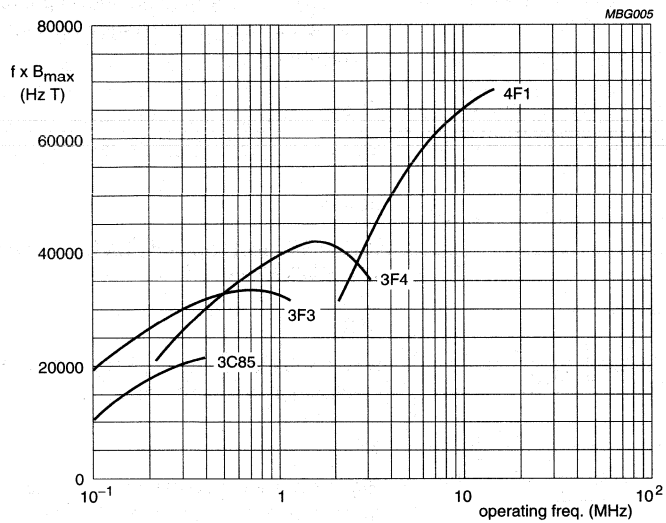


Fig.24 Performance factor ($f \times B_{max}$) as a function of frequency for material grades 3C80, 3C85, 3F3, 3F4 and 4F1.

OUTPUT CHOKES

Output chokes for Switched Mode Power Supplies have to operate with a DC load causing a bias magnetic field H_{DC}.

In a closed ferrite circuit, this can easily lead to saturation. Power ferrites such as 3C80, 3C85 or 3F3 start saturating at field strengths of about 50 A/m. Permeability drops sharply, as can be seen in the graphs of the material data section. The choke loses its effectiveness.

There are two remedies against this effect:

- The use of gapped ferrite cores
- The use of a material with allow permeability and high saturation.

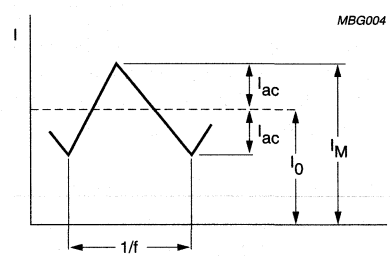


Fig.25 Choke waveform.

GAPPED CORE SETS

The effect of an air-gap in the circuit is that a much higher field strength is needed to saturate a core.

For each operating condition an optimum air-gap length can be found. In a design, the maximum output current (I) and the value of inductance (L) necessary to smooth the ripple to the required level are known. The product I^2L is a measure of the energy which is stored in the core during one half cycle.

Using this I^2L value and the graphs given for most core types, the proper core and air-gap can be selected quickly at a glance. There is a choke design program on the disc "Soft Ferrite Design Tools" (9398 402 12011) for a more detailed design, including the required number of turns. This program also covers design of inductors on open magnetic circuits like bobbin cores and rods.

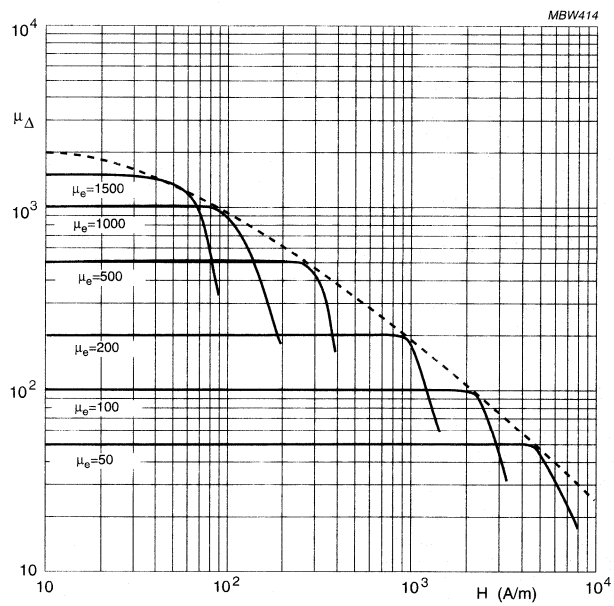


Fig.26 Effect of increased gap length.

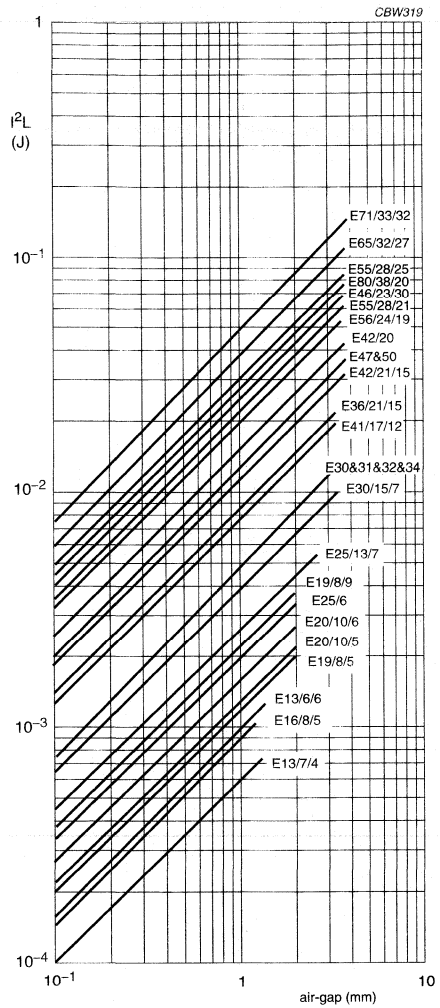


Fig.27 I^2L graph for E cores.

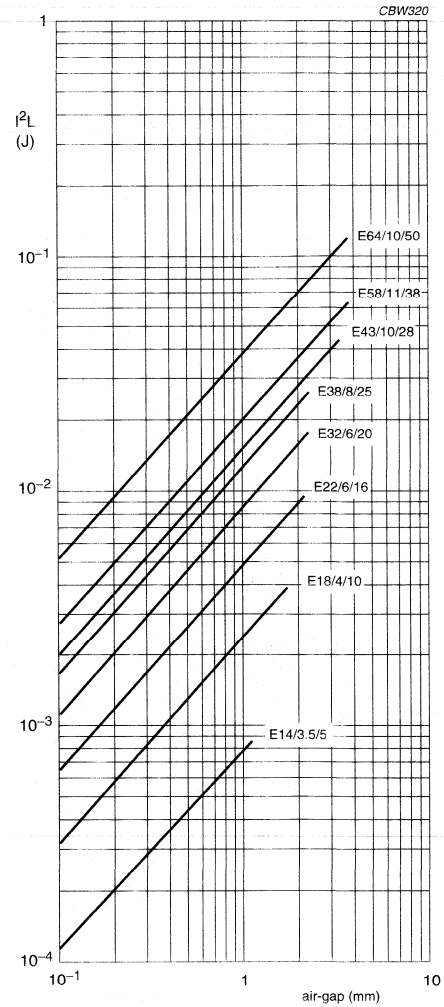


Fig.28 I^2L graph for planar E cores (valid for E + E and E + PLT combinations).

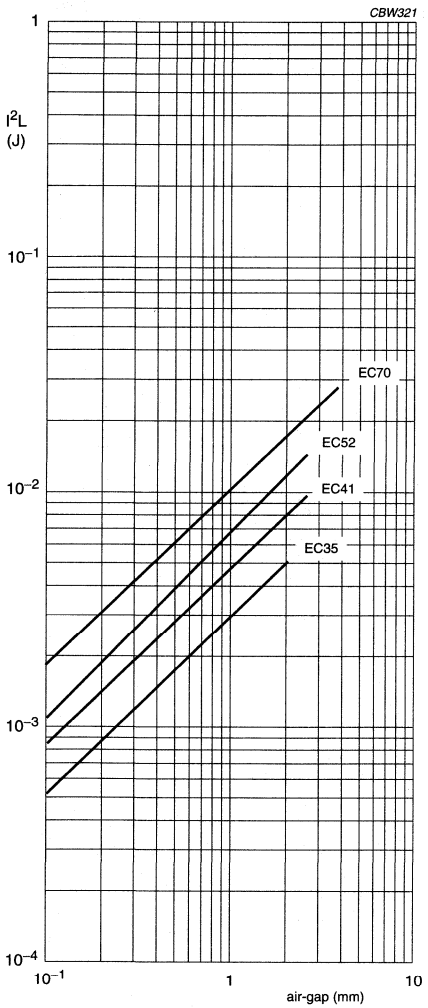


Fig.29 I^2L graph for EC cores.

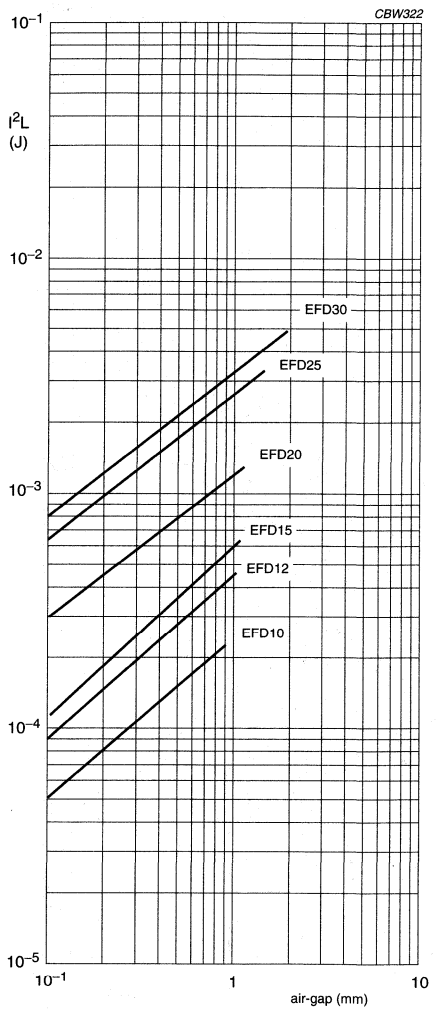


Fig.30 I^2L graph for EFD cores.

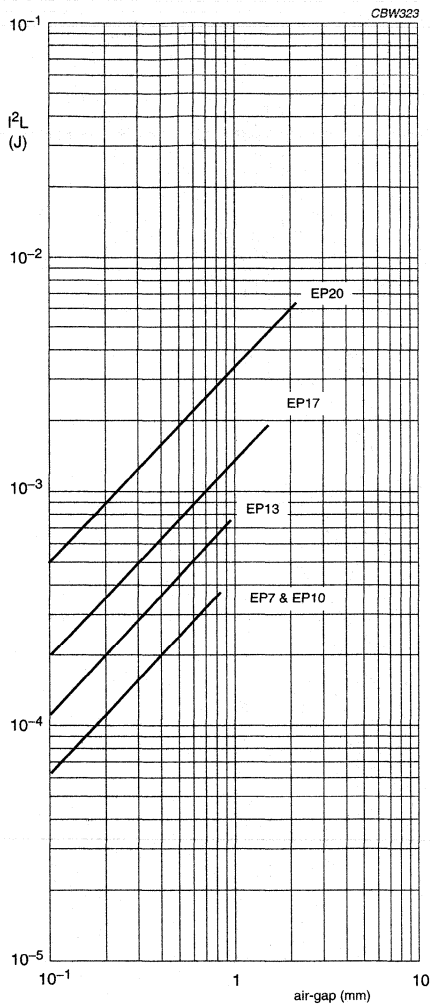


Fig.31 I^2L graph for EP cores.

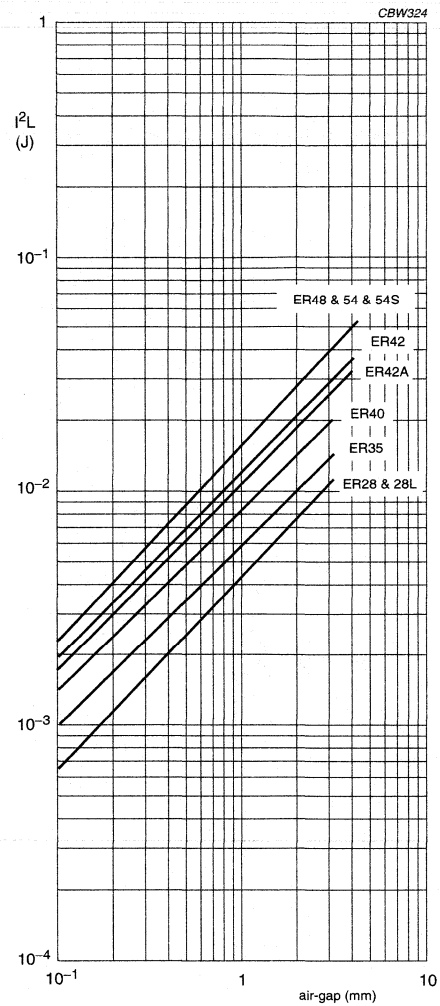


Fig.32 I^2L graph for ER cores.

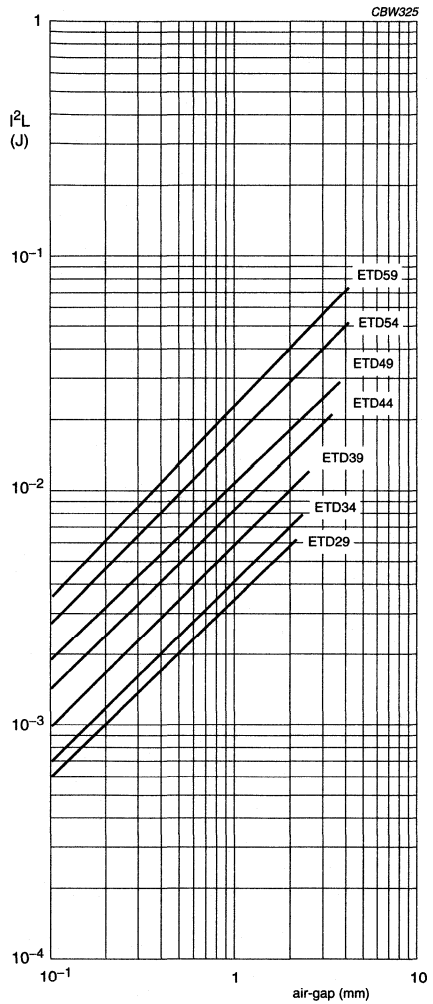


Fig.33 I^2L graph for ETD cores.

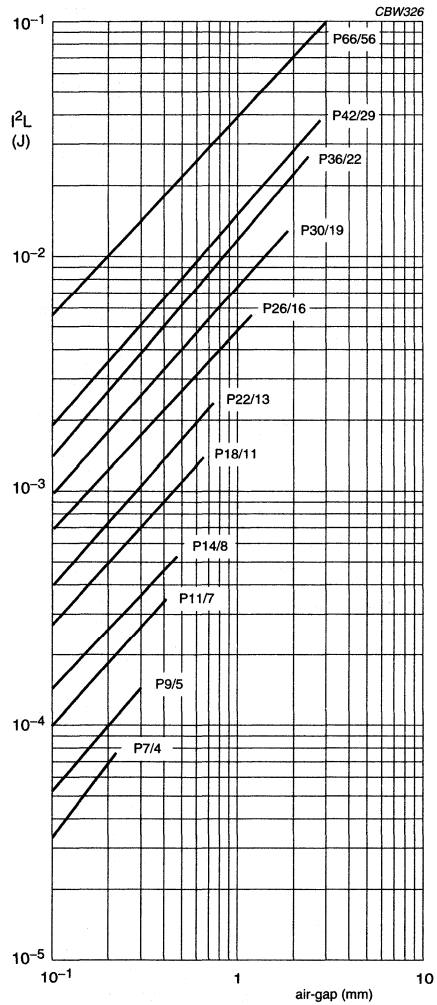


Fig.34 I^2L graph for P cores.

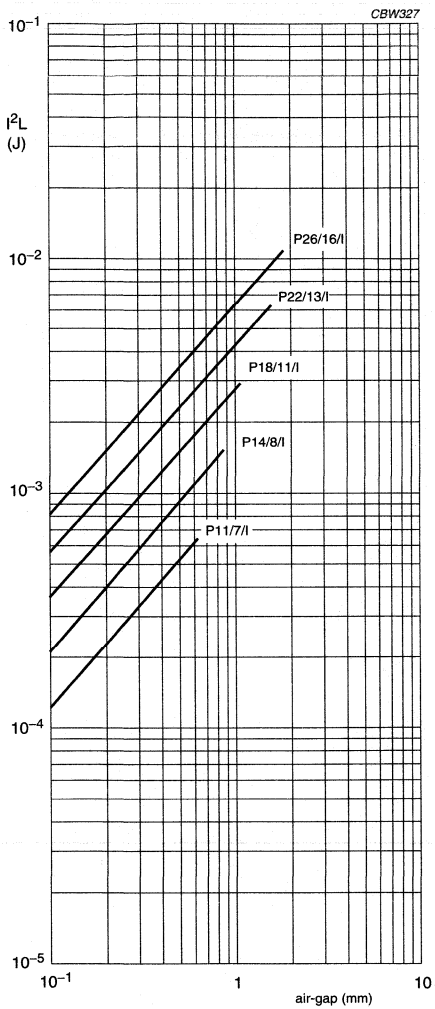


Fig.35 I^2L graph for P/I cores.

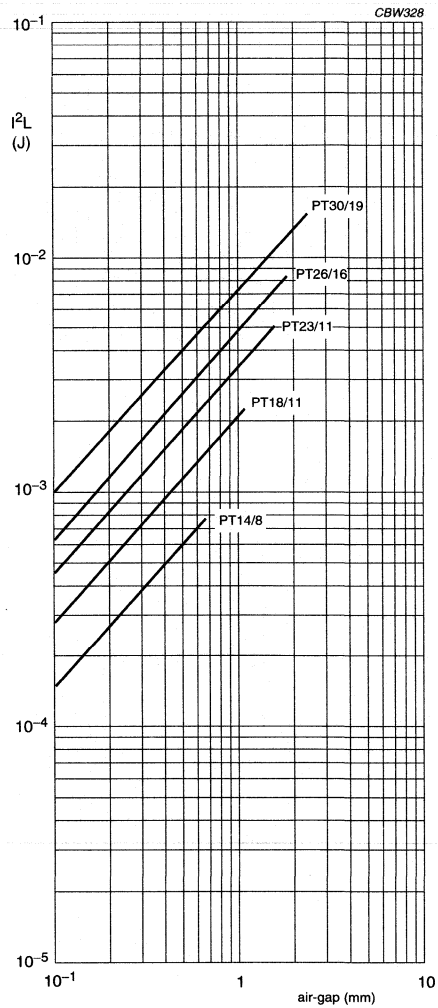


Fig.36 I^2L graph for PT cores.

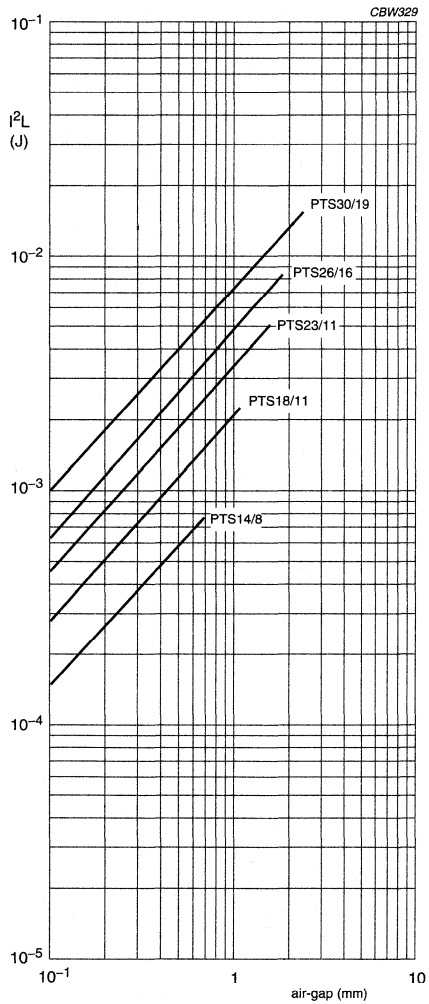


Fig.37 I^2L graph for PTS cores.

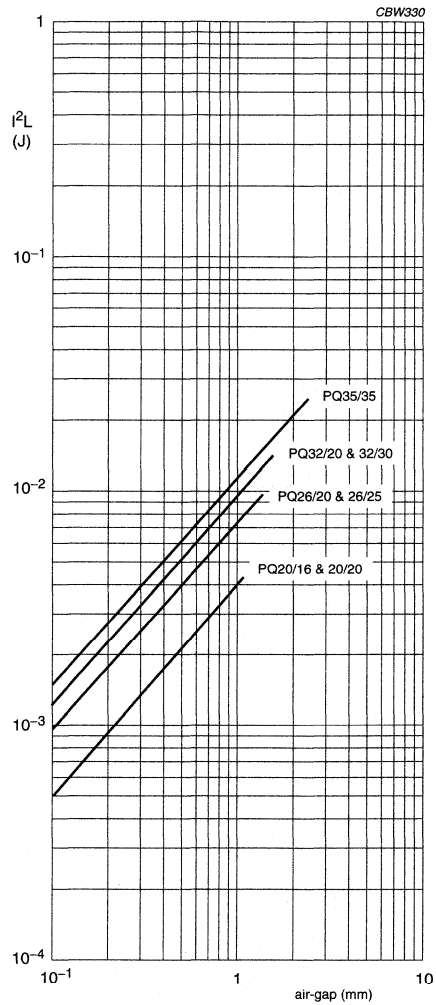


Fig.38 I^2L graph for PQ cores.

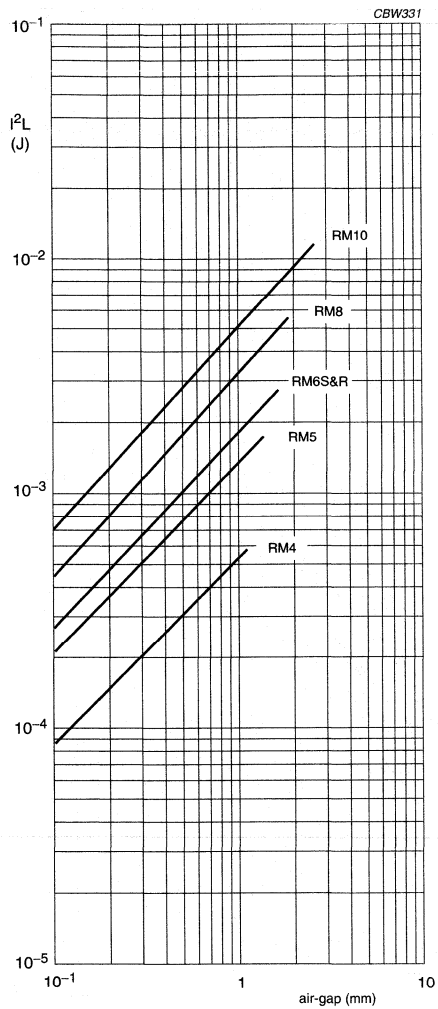


Fig.39 I^2L graph for RM cores.

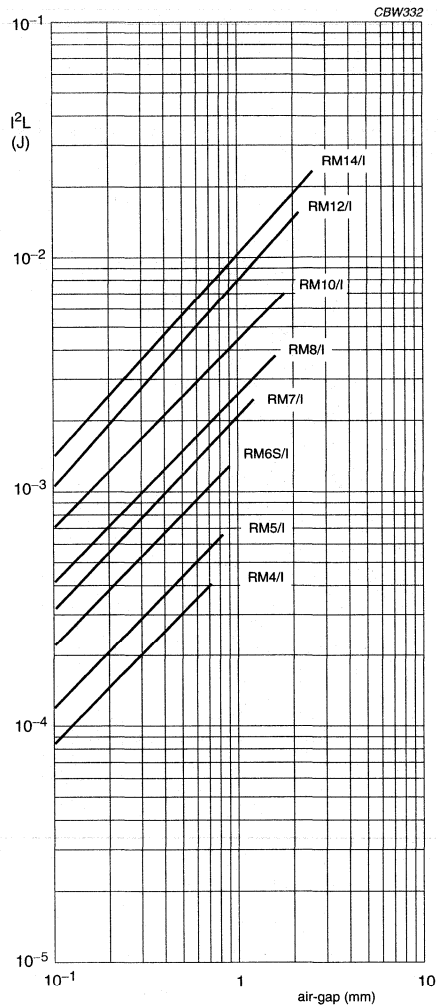


Fig.40 I^2L graph for RM/I cores.

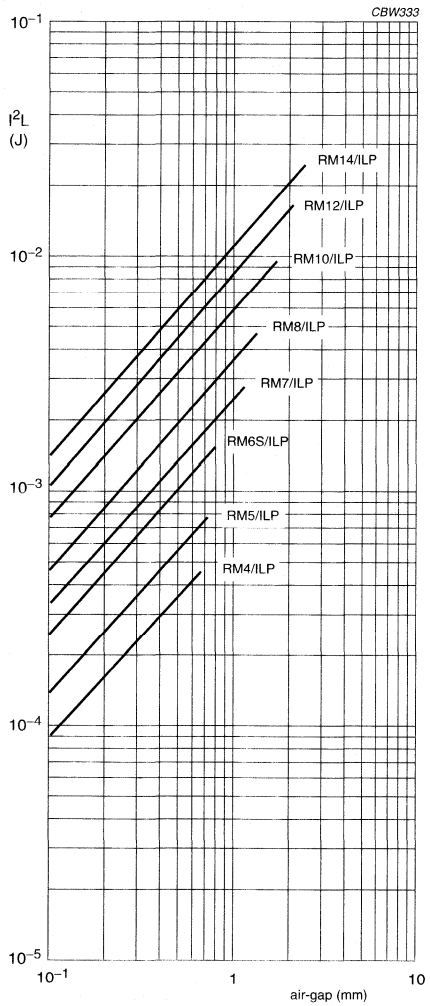


Fig.41 I^2L graph for RM/ILP cores.

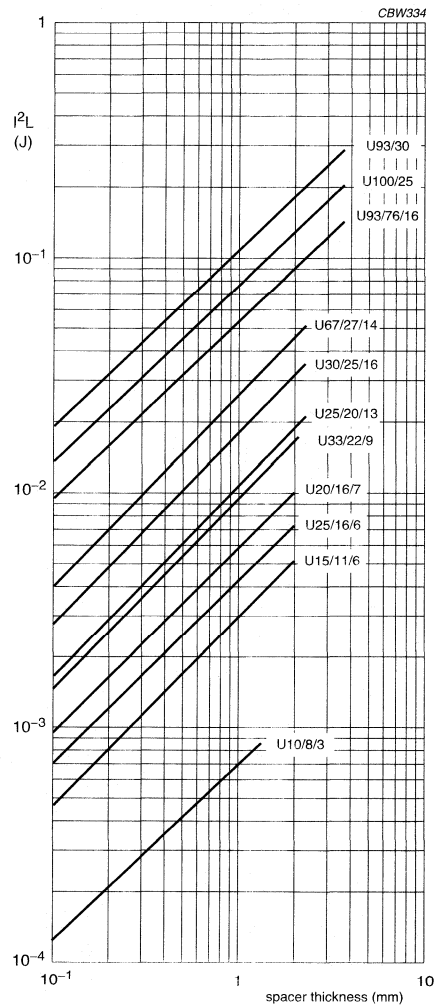


Fig.42 I^2L graph for U cores.

IRON POWDER RING CORES

Ring cores made from compressed iron powder have a rather low permeability (max. 90) combined with a very high saturation level (up to 1500 mT). The permeability is so low because the isolating coating on the iron particles acts as a so called distributed air-gap. Therefore, our 2P ring core range can operate under bias fields of up to 2000 A/m.

INPUT FILTERS (COMMON MODE CHOKES)

To avoid the conduction of switching noise from a SMPS into the mains, an input filter is generally necessary. The magnetic circuit in these filters is usually a pair of U cores or a ring core.

Since the noise signal is mainly common mode, current compensation can be used to avoid saturation.

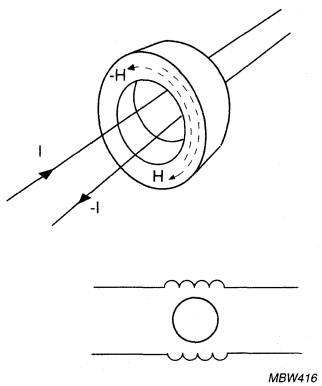


Fig.43 Common mode choke.

Two separate windings on the core cause opposing magnetic fields when the load current passes through them (current compensation). The common mode noise signal however, is blocked by the full inductance caused by the high permeability ferrite.

If, for some reason, current compensation is not complete or impossible, high permeability grades will saturate. In that case one of the power grades may be a better compromise. Another important factor in the design process is the frequency range of the interference signal.

High permeability ferrites have a limited bandwidth as can be seen from Fig.44.

These materials only perform well as an inductor below the frequency where ferromagnetic resonance occurs. Above this cut-off frequency, a coil will have a highly resistive character and the Q-factor of the LC filter circuit will be limited an thus, also the impedance. A better result could have been obtained with a grade having a lower permeability. Fig.45 provides a quick method of choosing the right ferrite for the job. A design program for a complete current-compensated input filter is provided on our "Soft Ferrite Design Tools" disc (9398 402 12011).

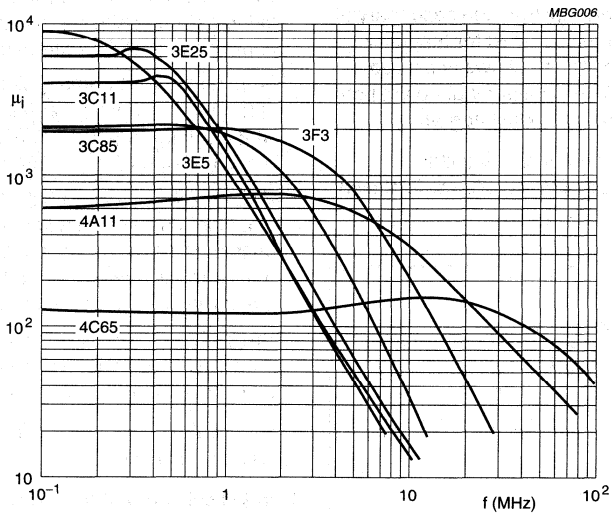


Fig.44 Permeability as a function of frequency of different materials.

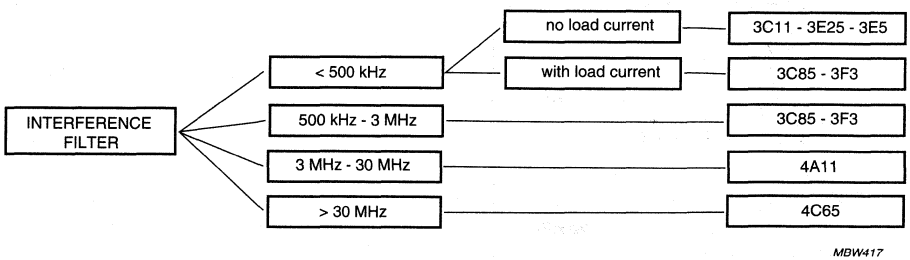


Fig.45 Selection chart for materials used in input filters.

MAGNETIC REGULATORS

Saturable inductors provide a means of efficiently regulating several independent outputs in a SMPS by blocking varying amounts of energy from the secondary of the transformer. This eliminates the need for feedback between secondary and primary and allows improved isolation of input and output. The circuits required are both simple and economic and can be easily integrated.

A schematic of a saturable inductor circuit (without regulation) together with associated waveforms is shown in Fig.46.

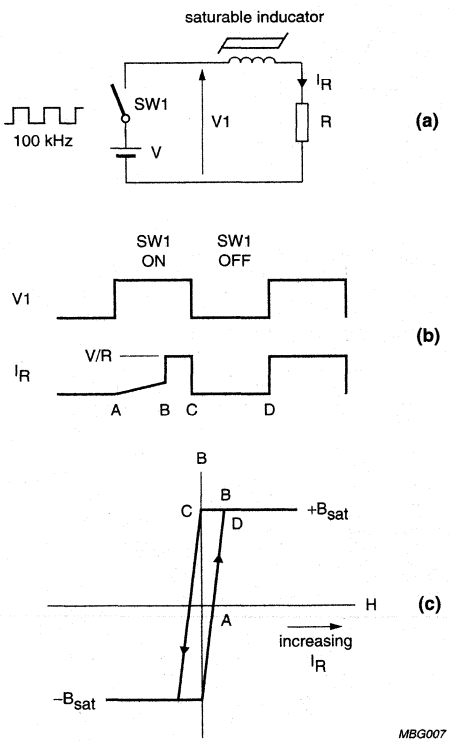


Fig.46 Schematic of a saturable inductor and associated waveforms (without regulation).

TYPICAL CYCLE CHARACTERISTICS

During a typical cycle:

- Switch SW1 is closed (point A on timing diagram), the inductance of the saturable inductor limits the rate of current rise until the core becomes saturated
- With the core saturated (point B), the only impedance to current flow is the very small resistance of the inductor, which can be regarded as a short circuit with power being transferred unimpeded to the load resistor
- Switch SW1 is opened (C). Because the saturable inductor has a rectangular B-H loop, the flux remains unchanged even when H has fallen to zero. Since there has been no change in flux, there is no inductance and the current can fall instantaneously
- Switch SW is re-closed. As the flux in the core is still saturated and remains unchanged, there is no resistance to the current flow to the load.

A schematic of a regulated circuit and its associated waveforms is shown in Fig.47.

In this circuit, the inductor is saturated while switch SW1 is closed, thus reducing the period during which energy is conducted from the transformer to the load. Varying the level of this control current modulates the main output voltage waveform (see Fig.48), thus regulating the output voltage across the load.

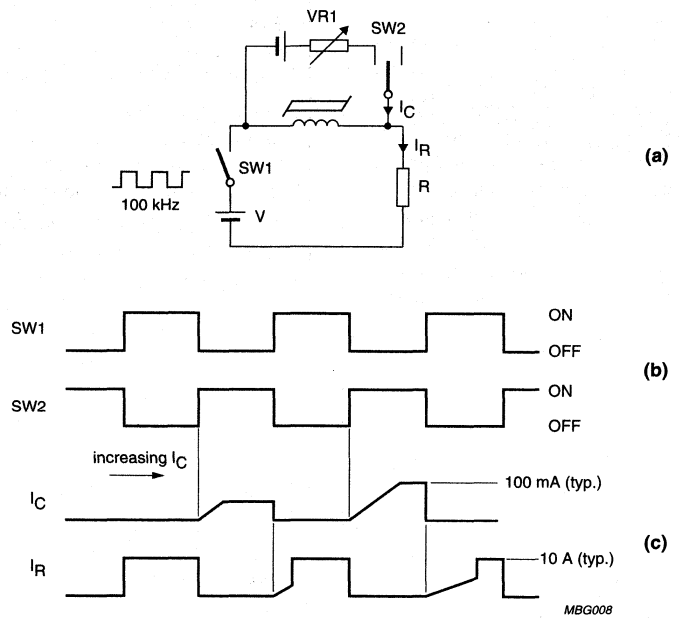


Fig.47 Schematic of a saturable inductor and associated waveforms (with regulation).

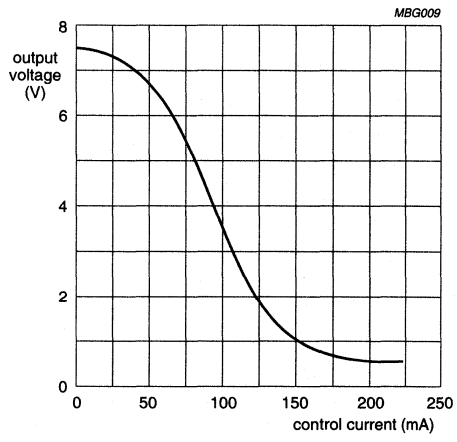


Fig.48 Typical control curve for a 3R1 ring core (size 14 × 9 × mm, with 15 turns).

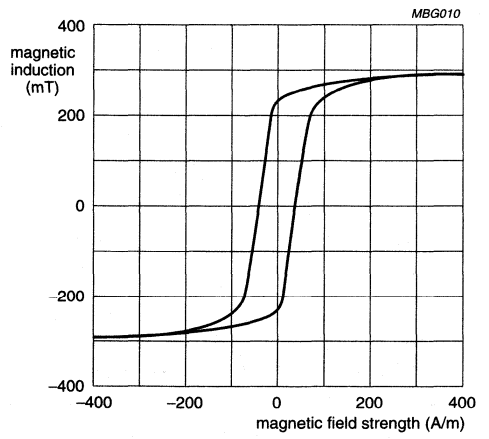


Fig.49 Properties of 3R1 ferrite material; f = 100 kHz, T = 25°C

The 3R1 ferrite material is an excellent alternative to amorphous metal for the cores of saturable inductors of SMPS.

Remark:

The performance of 3R1 is comparable to that of amorphous metal making it an excellent material for applications such as output regulation and spike suppression. When 3R1 ring cores are driven exactly at their natural mechanical resonant frequencies a magneto-elastic resonance will occur. With large flux excursions and no mechanical damping, amplitudes can become so high that the maximum tensile stress of the ferrite is exceeded. Cracks or even breakage of the ring core could be the result. It is advised not to drive the toroidal cores at their radial resonant frequencies or even subharmonics (e.g. half this resonant frequency).

Resonant frequencies can be calculated for any ring core with the following formula:

$$f_r = \frac{5700}{\pi\left(\frac{D_o + D_i}{2}\right)} \text{ kHz}$$

where:

f = radial resonant frequency (kHz)

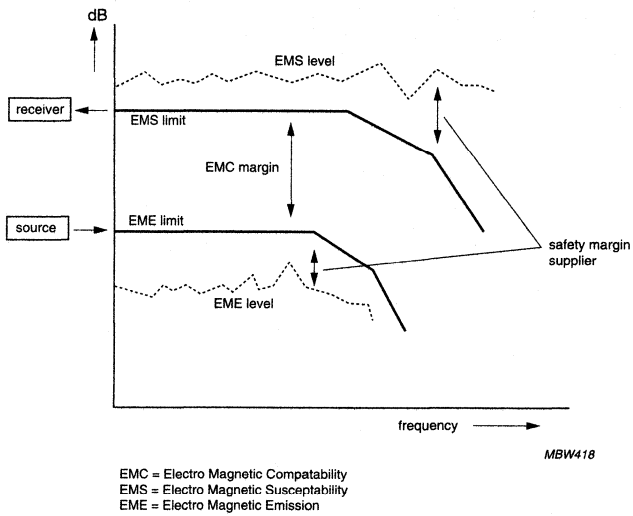
D_o = outside diameter (mm)

D_i = inside diameter (mm)

Ferrites for Interference Suppression and Electromagnetic Compatibility (EMC)

With the ever increasing intensive use of electronic equipment Electromagnetic Compatibility (EMC) has become an important item. Laws specify limits of the level of interference caused by equipment (EMR) and also the sensitivity of equipment to incoming interference (EMS).

Limiting curves are defined by organizations such as CISPR and FCC. Since the density of equipment increases, laws will become more stringent in the near future.



EMC = Electro Magnetic Compatability
EMS = Electro Magnetic Susceptability
EME = Electro Magnetic Emission

Fig.50 Principles of Electromagnetic Compatibility (EMC).

During the design phase, problems with interference can be avoided to some extent. Often additional suppression components such as capacitors and coils will be necessary to meet the required levels. Inductive components are very effective in blocking interfering signals, especially at high frequencies. The principles of suppression are shown in Fig.51.

Capacitors are used as a shunt impedance for the unwanted signal.

Unfortunately for high frequencies, most capacitors do not have the low impedance one might expect because of parasitic inductance or resistance.

Inductors are used in series with the load impedance. They provide a low impedance for the wanted signal, but a high impedance for the interfering, unwanted, signal.

Philips have a full range of ring cores, beads, beads on wire, SMD beads, wideband chokes and cable shields to suit every application. Rods and tubes are also often used for this application after they have been coiled by the user.

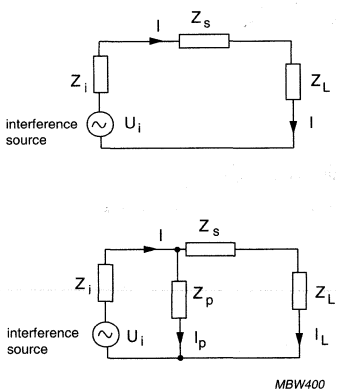


Fig.51 Basic suppression circuits.

SAMPLE BOXES

As the design process in these areas is often based on trial and error, we have assembled 6 different **designers' sample boxes**. Each box is filled with a selection from our standard ranges, which aims at a specific application area. The boxes also contain a booklet with full information about the products and their applications. These sample boxes are:

- Sample box 9: SMD beads and chokes.
- Sample box 10: Cable shielding.
- Sample box 11:EMI suppression products.

INTERFERENCE SUPPRESSION BEADS

A range of beads is available in two material grades, especially developed for suppression purposes.

They can easily be shifted on existing wires in the equipment.

- 3S1 for frequencies up to 30 MHz
- 4S2 for frequencies from 10 to 1000 MHz.

The material grades and beads are fully guaranteed for their main feature, impedance as a function of frequency.

The grade 3S1 has a high permeability and is therefore rather sensitive for DC load. In applications where a high DC current is flowing 4S2 can be a better choice (see Figs 52 and 53).

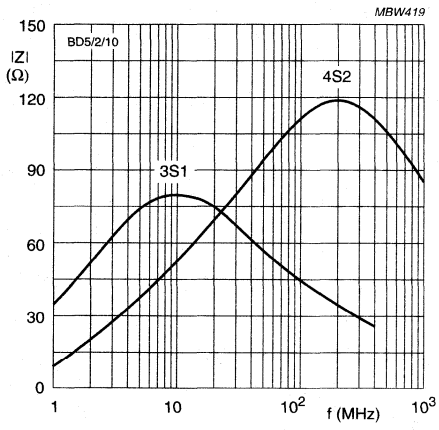


Fig.52 Impedance as a function of frequency for material grades 3S1 and 4S2; bead size 5 × 2 × 10 mm.

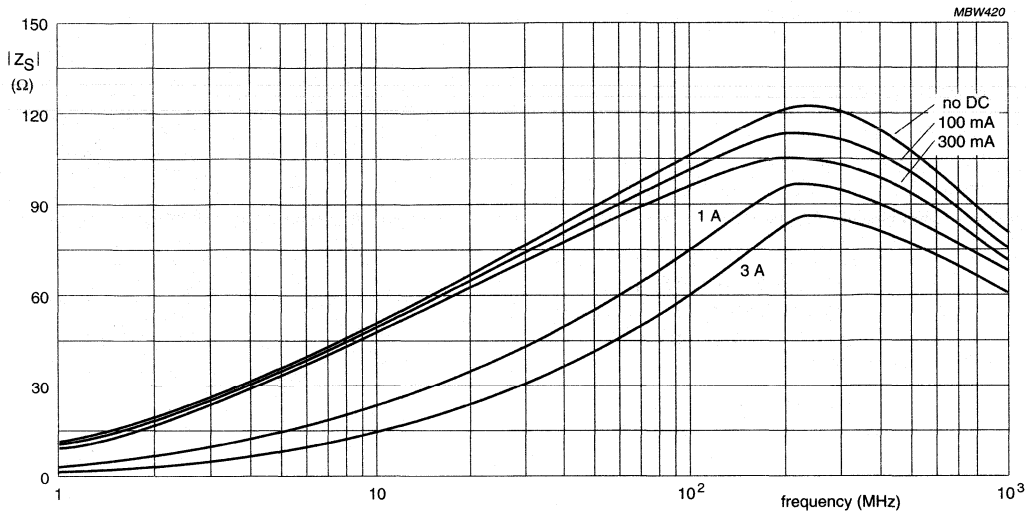


Fig.53 Impedance as a function of frequency at different DC levels for material grade 4S2.

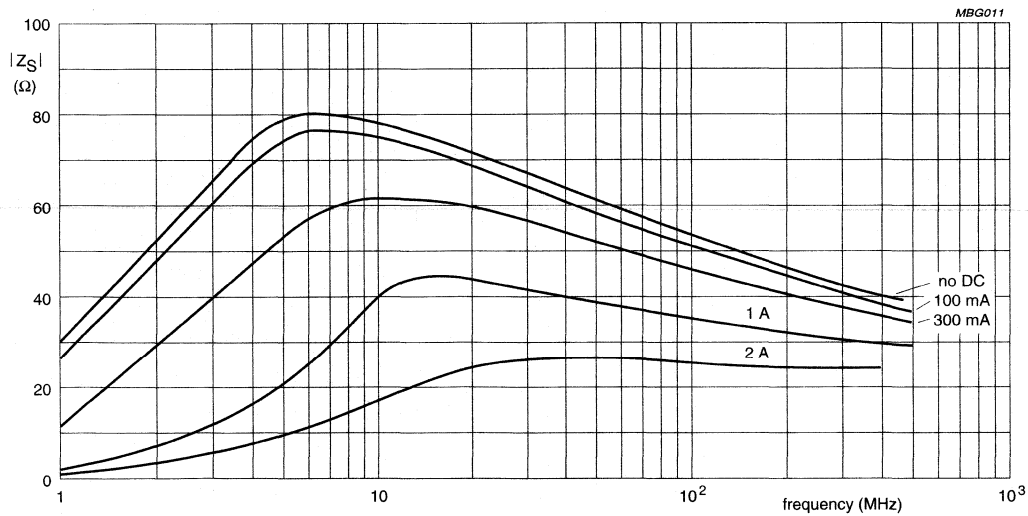


Fig.54 Impedance as a function of frequency at different DC levels for material grade 3S1.

BEADS ON WIRE

This product range consists of suppression beads, already mounted on pre-soldered 0.6 mm wire and taped on standard reels. These can be handled by automatic placement machines.

SMD FERRITE BEADS.

In response to market demands for smaller, lighter and more integrated electronic devices a series of SMD beads was added to our range. They are available in different sizes and 2 suppression ferrite grades.

Basically these beads consist of a ferrite tube with a rectangular cross-section and a flat tinned copper wire which is bent around the edges and forms the terminals of the component. This design offers many superior mechanical and electrical features.

Some examples of their impedance as a function of frequency and the influence of bias current are given in the graphs.

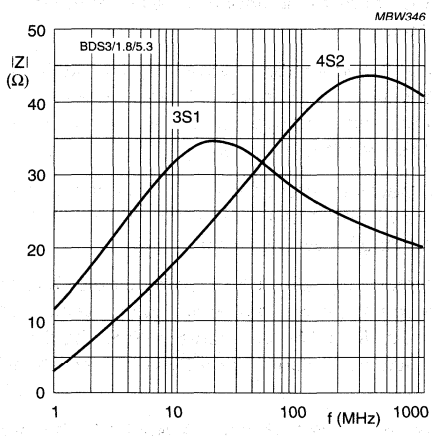


Fig.55 Impedance as a function of frequency for SMD beads.

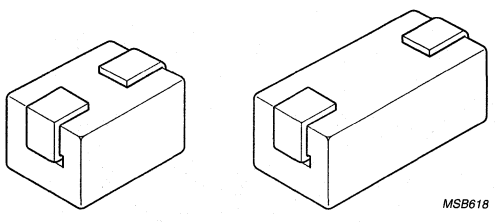


Fig.56 Outline of SMD beads.

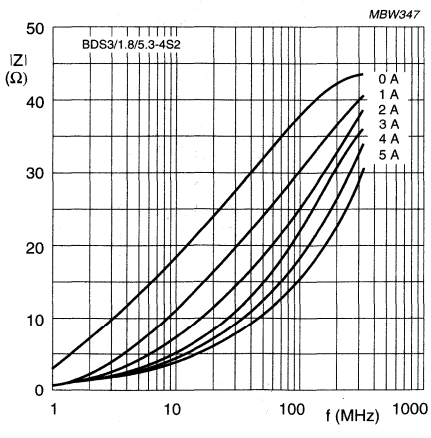


Fig.57 Impedance as a function of frequency for an SMD bead with bias current as a parameter.

SMD FERRITE BEADS FOR COMMON-MODE INTERFERENCE SUPPRESSION

Philips Components has introduced a new range of soft ferrite SMD beads for common-mode interference suppression.

With standard suppression methods in a signal path, the wanted signal is often suppressed along with the interference, and in many modern applications (EDP for instance) this leads to unacceptable loss of signal.

In Philips' new interference suppression beads, a pair of conductors within a single soft ferrite block are connected along their lengths by an air gap.

Common-mode signals - interference signals passing in the same direction along the input and output channels of a device (a IC for instance) - serve to reinforce the magnetic flux around both conductors, and are therefore attenuated.

In contrast, the wanted signal passing along the input and output channels serves to cancel the flux around the conductors and therefore passes unattenuated.

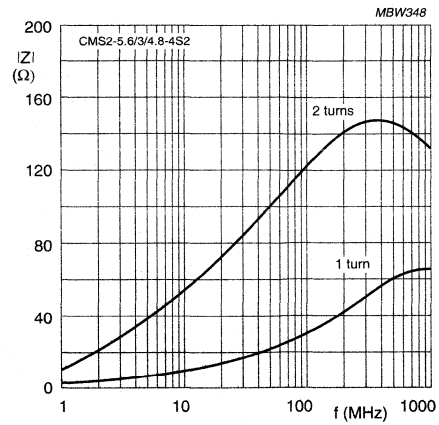


Fig.58 Impedance as a function of frequency of an SMD common mode bead with two conductors.

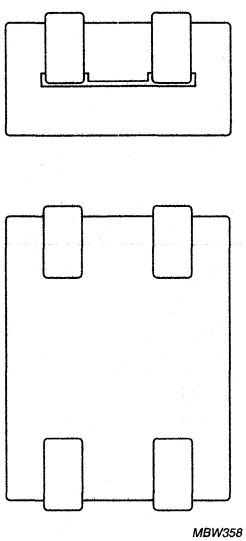


Fig.59 Outline of an SMD common-mode choke.

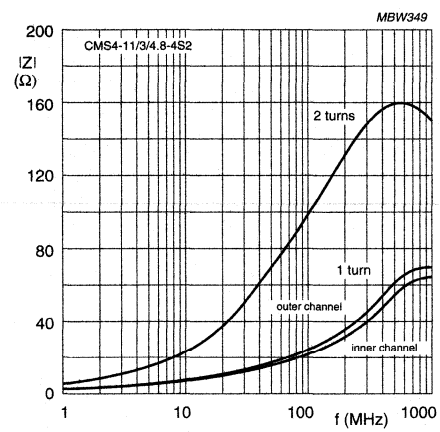


Fig.60 Impedance as a function of frequency of an SMD common mode bead with four conductors.

WIDEBAND CHOKES

Wideband chokes are wired multi-hole beads. Since they have up to 2 1/2 turns of wire their impedance values are rather high over a broad frequency range, hence their name.

The magnetic circuit is closed so there is little stray field. The DC resistance is very low since only a short length of 0.6 mm copper wire is used.

These products already have a long service record and are still popular for various applications.

Recently the range was extended with several new types: e.g. with isolation and taped on reel.

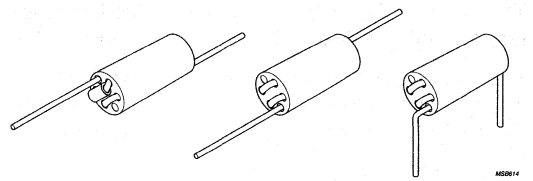


Fig.61 Outline of wideband chokes.

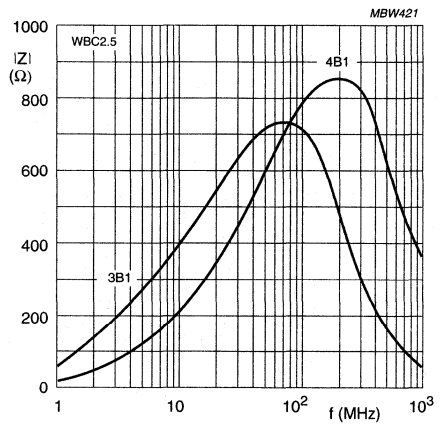


Fig.62 Impedance as a function of frequency for a wideband choke.

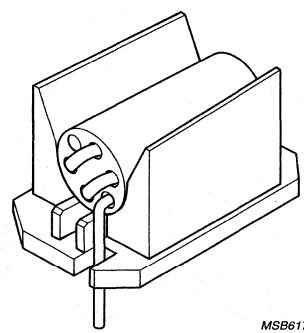


Fig.63 Outline of a wideband choke with support plate.

SMD WIDEBAND CHOKES

SMD wideband chokes are an alternative to a SMD bead when more impedance or damping is required.

The design of this product is based on our well known range of wideband chokes.

In these products the conductor wire is wound through holes in a multi-hole ferrite core, thus separating them physically and reducing coil capacitance.

The result is a high impedance over a wide frequency range, a welcome feature for many interference problems.

The present SMD design preserves the excellent properties and reliability of the original wideband chokes by keeping the number of electrical interfaces to an absolute minimum.

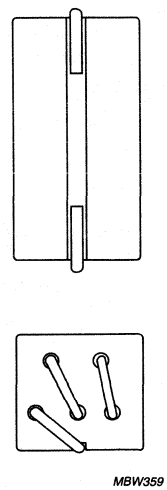


Fig.64 Outline of an SMD wideband choke.

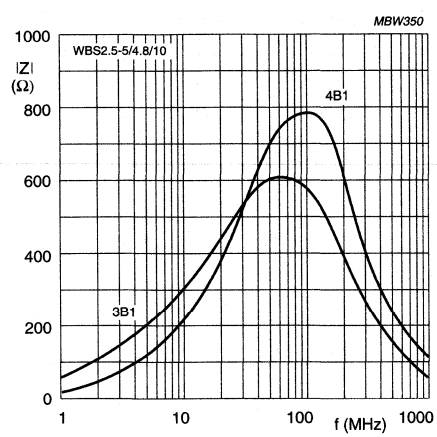


Fig.65 Impedance as a function of frequency for SMD wideband chokes.

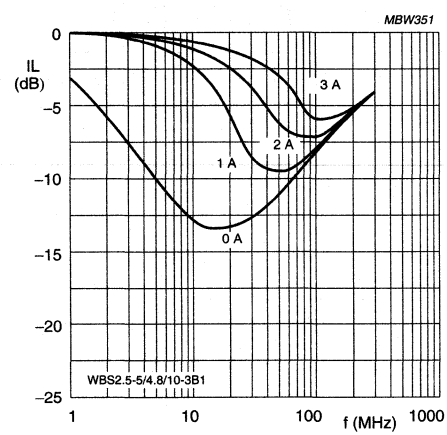


Fig.66 Insertion loss of a 3B1 SMD wideband choke as a function of frequency (50Ω circuit).

CABLE SHIELDS

New in our range are so-called cable shields. These products are an effective remedy against common-mode interference on coaxial or flat cables. They come in several shapes: round tubes, rectangular sleeves and split sleeves to mount on existing cable connections.

Our new suppression material 3S4 is very suitable for this application. It combines a high permeability (1700) for high impedance in the lower frequency range with an excellent high frequency behaviour for true wideband suppression.

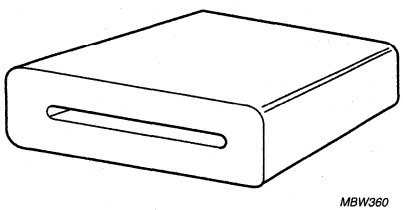


Fig.67 Outline of a cable shield.

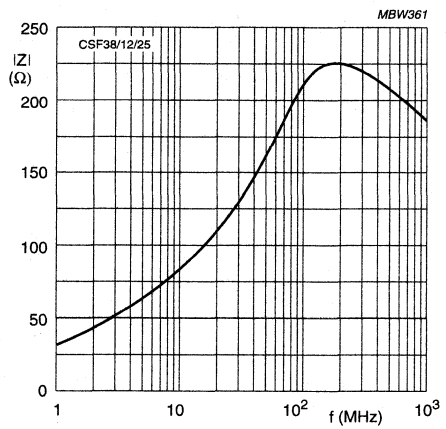


Fig.68 Impedance of a cable shield as a function of frequency

RODS AND TUBES

Rods and tubes are generally used to increase the inductance of a coil. The magnetic circuit is very open and therefore the mechanical dimensions have more influence on the inductance than the ferrite's permeability (see Fig.69) unless the rod is very slender.

In order to establish the effect of a rod on the inductance of a coil, the following procedure should be carried out.

- Calculate the length to diameter ratio of the rod (l/d)
- Find this value on the horizontal axis and draw a vertical line.

The intersection of this line with the curve of the material permeability gives the effective rod permeability.

The inductance of the coil, provided the winding covers the whole length of the rod is given by:

$$L = \mu_0 \mu_{rod} \frac{N^2 A}{l} (H) \quad (9)$$

where:

N = number of turns

A = cross sectional area of rod

l = length of coil

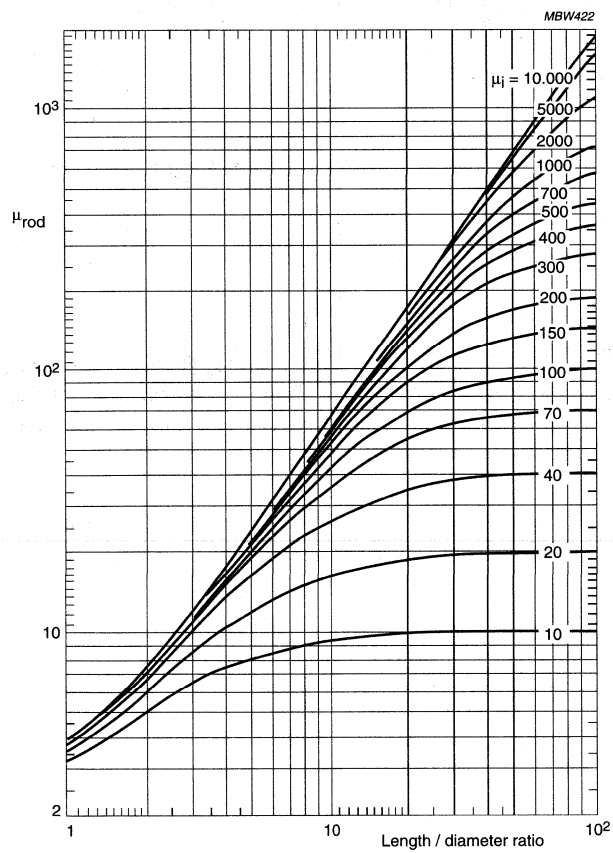


Fig.69 Rod permeability (μ_{rod}) as a function of length to diameter ratio with material permeability as a parameter.

Literature and reference materials

PHILIPS COMPONENTS APPLICATION LITERATURE

9398 082 97011	Loss formulas for power ferrites and their use in transformer design
9398 074 80011	Application note on the design of low profile high frequency transformers
9398 083 36011	The use of soft ferrites for interference suppression
9398 235 21011	EFD for low-profile DC-DC converters
9398 080 00011	3F4 ferrite for MHz power conversion
9398 237 50011	SMD coil formers and cores
9398 235 68011	SMD beads and chokes
9398 083 34011	3S4 a new soft ferrite for EMI-suppression
9398 387 00011	Wideband chokes
9398 075 00011	3R1 ferrite ring cores in magnetic amplifiers
9398 236 01011	3C90 and 3C30, new low-loss power ferrites
9398 236 26011	25 W DC/DC converter using integrated planar magnetics
9398 083 39011	Design of planar power transformers
9398 235 55011	Ferrite rod antennas for RF identification
9398 083 20011	Gluing of ferrite cores
9398 237 28011	Cable shielding
9398 083 40011	Planar E cores

IEC STANDARDS ON SOFT FERRITES

133 (1985)	Dimensions for pot cores made of magnetic oxides and associated parts
205 (1966)	Calculation of the effective parameters of magnetic piece parts
205A (1968)	First supplement
205B (1974)	Second supplement
226 (1967)	Dimensions of cross cores (X cores) made of ferromagnetic oxides and associated parts
367	Cores for inductors and transformers for telecommunications
367-1 (1982)	Part 1: Measuring methods
367-2 (1974)	Part 2: Guides for the drafting of performance specifications
367-2A (1976)	First supplement
424 (1973)	Guide to the specification of limits for physical imperfections of parts made from magnetic oxides
431 (1983)	Dimensions of square cores (RM cores) made of magnetic oxides and associated parts
525 (1976)	Dimensions of toroids made of magnetic oxides or iron powder
647 (1979)	Dimensions for magnetic oxide cores intended for use in power supplies (EC cores)
1185 (1992)	Magnetic oxide cores (ETD cores) intended for use in power supply applications - Dimensions
1246 (1994)	Magnetic oxide cores (E cores) of rectangular cross-section and associated parts - Dimensions

Literature and reference materials

REFERENCE BOOKS ON MAGNETIC COMPONENT DESIGN

1.	Soft Ferrites, Properties and Applications	2nd Edition, E.C. Snelling, Butterworths Publishing, 80 Montvale Ave., Stoneham, MA 02180 Tel: (617) 928-2500
2.	Ferrites for Inductors and Transformers	C. Snelling & A. Giles, Research Studies Press, distributed by J. Wiley & Sons, 605 Third Ave., New York, NY 10016
3.	Transformer and Inductor Design Handbook	C. McLyman, Marcel Deckker, 207 Madison Ave., New York, NY10016
4.	Magnetic Core Selection for Transformers and Inductors	C. McLyman, Marcel Deckker, 207 Madison Ave., New York, Ny10016
5.	Handbook of Transformer Applications	W. Flanigan, McGraw Hill Publishing Co., 1221 Ave. of Americas, New York, NY 10020
6.	Transformers for Electronic Circuits	N. Grossner, McGraw Hill Publishing Co., 1221 Ave. of Americas, New York NY 10020
7.	Magnetic Components-Design and Applications	S. Smith Van Nostrand Reinhold Co., 135 West 50th St., New York, NY 10020
8.	Design Shortcuts and Procedures for Electronic Power Transformers and Inductors	Ordean Kiltie, O. Kiltie & Co. 2445 Fairfield, Ft. Wayne, IN 46807
9.	Switching and Linear Power Supply, Power Converter Design	A. Pressman, Hayden Book Co. Inc., 50 Essex St., Rochelle Park., NY 07662
10.	High Frequency Switching Power Supplies	G. Chrysiss, McGraw Hill Publishing Co, 1221 Ave. of Americas, NY
11.	Design of Solid State Power Supplies	3rd Edition, E. Hnatek, Van Nostrand Reinhold Co., New York, NW 10020
12.	Power Devices and Their Applications	Edited by: Dr. F. Lee & Dr. D. Chen, VPEC, Vol. III, 1990. Tel: (703) 231-4536
13.	Application of Magnetism	J.K. Watson, John Wiley & Sons, Inc. 605 Third Ave., New York, NY 10016
14.	Applied Electromagnetics	M.A. Plonus, McGraw Hill Publishing Co., 1221 Ave. of Americas, New York, NY 10020
15.	Transmission Line Transformers	J. Sevick, American Radio Relay League, 225 Main Street, Newington, CT 06111

Soft Ferrites

Properties specified in this section are related to room temperature (25 °C) unless otherwise stated. They have been measured on sintered, non ground ring cores of dimensions ∅25 × ∅15 × 10 mm which are not subjected to external stresses.

Products generally do not fully comply with the material specification. Deviations may occur due to shape size and grinding operations etc.

Specified product properties are given in the data sheets or product drawings.

MATERIAL GRADE SURVEY

Ferrite material grade survey

FERRITE MATERIAL	μ_i AT 25 °C	B_{sat} (MT) at 25 °C (3000 A/M)	T_C (°C)	ρ (Ωm)	FERRITE TYPE	MAIN APPLICATION AREA	AVAILABLE CORE SHAPES
4C6	100	≈400	≥350	$\approx 10^5$	NiZn	telecom filters signal transformers pulse transformers delay lines	RM, P, PT, PTS, EP, E, ER, ring cores (toroids)
3D3	750	≈400	≥200	≈2	MnZn		
3B7	2300	[a]450	≥170	≈1	MnZn		
3H1	2300	≈400	≥130	≈1	MnZn		
3H3	2000	≈400	≥160	≈2	MnZn		
3E1	3800	≈400	≥125	≈1	MnZn		
3E4	4700	≈400	≥125	≈1	MnZn		
3E5	10000	≈400	≥125	≈0.5	MnZn		
3E6	12000	≈400	≥130	≈0.1	MnZn		
3E7	15000	[a]400	≥130	≈0.1	MnZn		
3E25	6000	≈400	≥125	≈0.5	MnZn		
3E27	6000	≈480	≥175	≈0.5	MnZn		
3B8	2300	≈450	≥200	≈1	MnZn	power conversion general purpose transformers	E, Planar E, EC, EFD, EP, ETD, ER, U, UR, I, RM/I, RM/ILP, P/I, PT, PTS, PQ, ring cores (toroids)
3C15	1800	≈500	≥190	≈1	MnZn		
3C30	1800	≈500	≥220	≈2	MnZn		
3C81	2700	≈450	≥210	≈1	MnZn		
3C85	2000	≈450	≥200	≈2	MnZn		
3C90	2000	≈450	≥220	≈5	MnZn		
3C94	2300	≈450	≥220	≈5	MnZn		
3F3	1800	≈450	≥200	≈2	MnZn		
3F4	900	≈450	≥220	≈10	MnZn		
3F35	1400	≈500	≥240	≈5	MnZn		
4F1	80	≈350	≥260	$\approx 10^5$	NiZn		
3S1	4000	≈400	≥125	≈1	MnZn	suppression	EMI beads, beads on wire, SMD beads, common-mode chokes, cable shields, rods, ring cores (toroids), wideband chokes
3S3	350	≈350	≥225	$\approx 10^4$	MnZn		
3S4	1700	≈350	≥110	$\approx 10^3$	MnZn		
4S2	700	≈350	≥125	$\approx 10^5$	NiZn		
4C65	125	≈400	≥350	$\approx 10^5$	NiZn		
4A11	700	≈350	≥125	$\approx 10^5$	NiZn		
4A15	1200	≈350	≥125	$\approx 10^5$	NiZn		
3C11	4300	≈400	≥125	≈1	MnZn		
3E25	6000	≈400	≥125	≈0.5	MnZn		
3C2	700	≈400	≥150	≈0.1	MnZn	deflection coils	yoke rings
2A2	350	≈250	≥135	$\approx 10^6$	MgZn		
2A3	300	≈270	≥175	$\approx 10^6$	MgZn		
2B1	350	≈250	≥125	$\approx 10^6$	MgZn		

Soft Ferrites

FERRITE MATERIAL	μ_i AT 25 °C	B_{sat} (MT) at 25 °C (3000 A/M)	T_C (°C)	ρ (Ωm)	FERRITE TYPE	MAIN APPLICATION AREA	AVAILABLE CORE SHAPES
4E1	15	≈200	≥500	$\approx 10^5$	NiZn	tuning suppression	rods, tubes, wideband chokes
4D2	60	≈240	≥400	$\approx 10^5$	NiZn		
4B1	250	≈350	≥250	$\approx 10^5$	NiZn		
3B1	900	≈400	≥150	≈0.2	MnZn		
3R1	800	≈450	≥230	$\approx 10^3$	MnZn	magnetic regulators	ring cores (toroids)

Iron powder material grade survey

IRON POWDER MATERIAL	μ_i AT 25 °C	B_{sat} (MT) at 25 °C (3000 A/M)	MAXIMUM OPERATING TEMPERATURE (°C)	MAIN APPLICATION AREA	AVAILABLE CORE SHAPES
2P40	40	950	140	suppression	ring cores (toroids)
2P50	50	1000	140		
2P65	65	1150	140		
2P80	80	1400	140		
2P90	90	1600	140		

Typical mechanical and thermal properties

PROPERTY	MnZn FERRITE	NiZn FERRITE	UNIT
Young's modules	(90 to 150) × 10^3	(80 to 150) × 10^3	N/mm^2
Ultimate compressive strength	200 to 600	200 to 700	N/mm^2
Ultimate tensile strength	20 to 65	30 to 60	N/mm^2
Vickers hardness	600 to 700	800 to 900	N/mm^2
Linear expansion coefficient	(10 to 12) × 10^{-6}	(7 to 8) × 10^{-6}	K^{-1}
Specific heat	700 to 800	750	$J.kg^{-1} \cdot K^{-1}$
Heat conductivity	(3.5 to 5.0) × 10^{-3}	(3.5 to 5.0) × 10^{-3}	$J.mm^{-1}.s^{-1} \cdot K^{-1}$

Material grade specification 2A2

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	350 ±25%	
B	25 °C; 10 kHz; 250 A/ m	≈200	mT
	100 °C; 10 kHz; 250 A/ m	≈130	
P_V	25 °C; 16 kHz; 100 mT	≤250	kW/m^3
	85 °C; 16 kHz; 100 mT	≤200	
H_C	from 800 A/m	≤60	A/m
ρ	DC; 25 °C	≈10^6	Ωm
T_C		≥135	°C
density		≈4300	kg/m^3

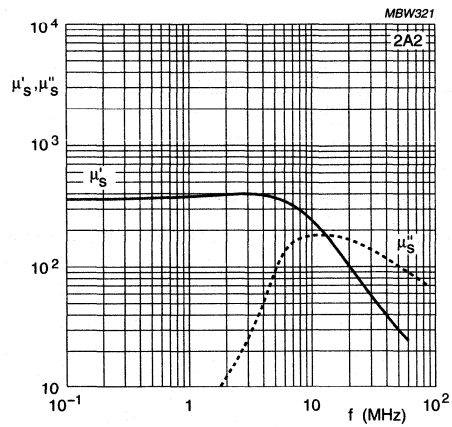


Fig.1 Complex permeability as a function of frequency.

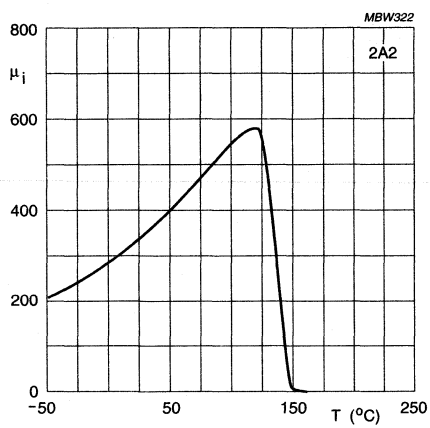


Fig.2 Initial permeability as a function of temperature.

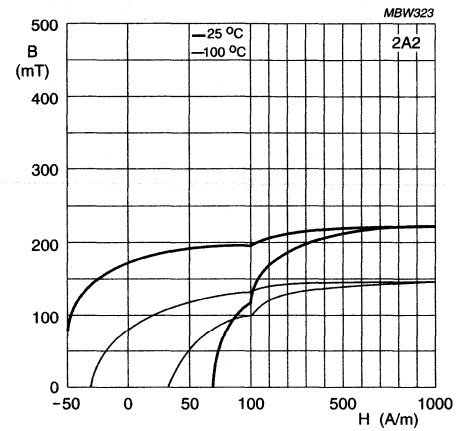


Fig.3 Typical B-H loops.

Material grade specification 2A2

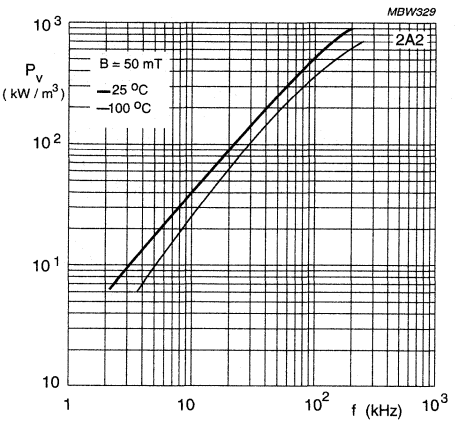


Fig.4 Specific power loss as a function of frequency.

Material grade specification 2A3

2A3 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	300 ±25%	
B	25 °C; 10 kHz; 250 A/ m	≈250	mT
	100 °C; 10 kHz; 250 A/ m	≈180	
P_V	25 °C; 1 MHz; 0.1 mT	≤250	kW/m³
	25 °C; 3 MHz; 0.1 mT	≤200	
H_C	from 800 A/m	≤60	A/m
ρ	DC; 25 °C	≈10^6	Ωm
T_C		≥175	°C
density		≈4400	kg/m³

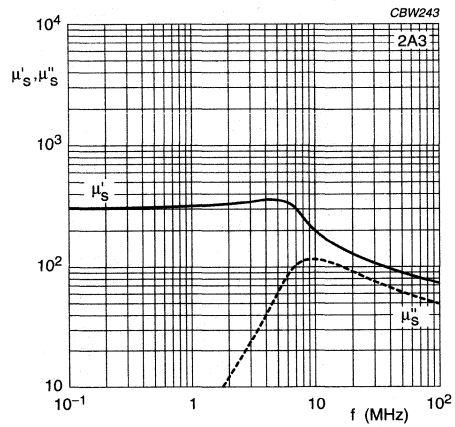


Fig.1 Complex permeability as a function of frequency.

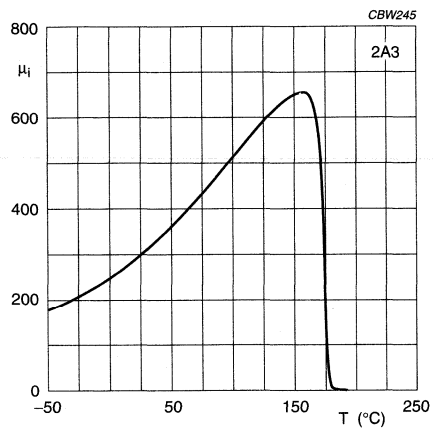


Fig.2 Initial permeability as a function of temperature.

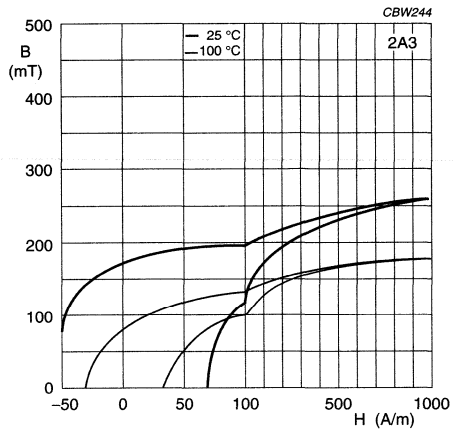


Fig.3 Typical B-H loops.

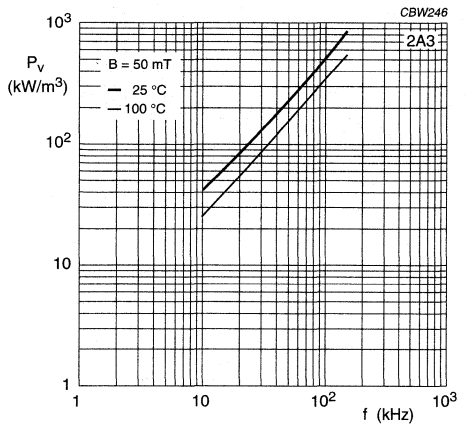


Fig.4 Specific power loss as a function of frequency.

Material grade specification

2B1

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	500 ±25%	
B	25 °C; 10 kHz; 250 A/ m	≈200	mT
	100 °C; 10 kHz; 250 A/ m	≈130	
P_V	25 °C; 16 kHz; 100 mT	≤150	kW/m^3
	100 °C; 16 kHz; 100 mT	≤60	
	25 °C; 64 kHz; 100 mT	≤650	
	100 °C; 64 kHz; 100 mT	≤320	
H_C	from 800 A/m	≤30	A/m
ρ	DC; 25 °C	≈10^6	Ωm
T_C		≥125	°C
density		≈4500	kg/m^3

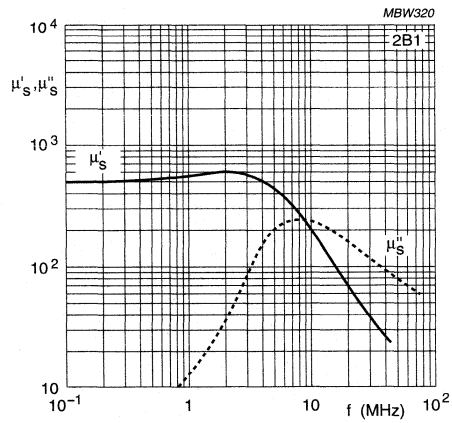


Fig.1 Complex permeability as a function of frequency.

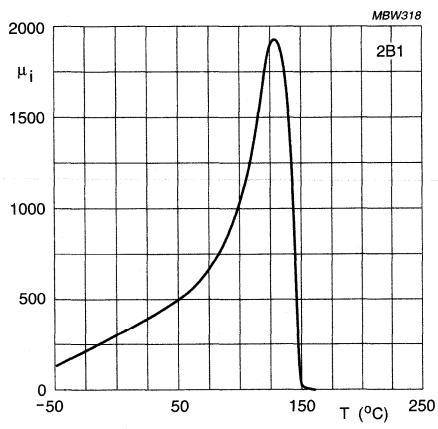


Fig.2 Initial permeability as a function of temperature.

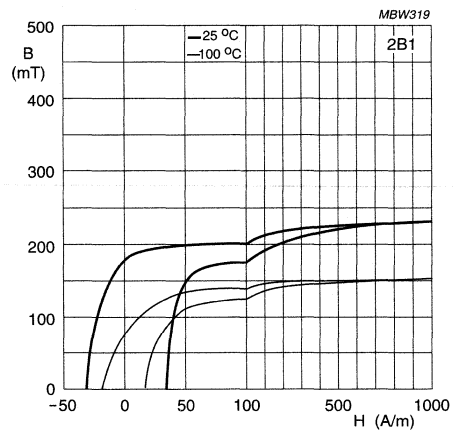


Fig.3 Typical B-H loops.

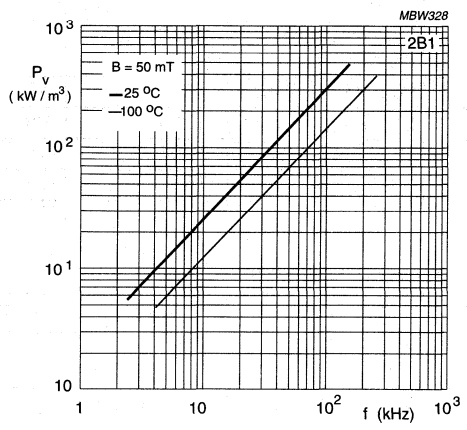


Fig.4 Specific power loss as a function of frequency.

Material grade specification

2P.. SPECIFICATIONS

Material grade specification - 2P40

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	40 ±10%	
$\tan\delta/\mu_i$	25 °C; 100 kHz; 0.1 mT	$\leq 1500 \times 10^{-6}$	
B_r	from 25×10^3 A/m	≈250	mT
H_C	from 25×10^3 A/m	≈2000	A/m
B	$H = 25 \times 10^3$ A/m	≈950	mT
α_F	25 to 55 °C	$\approx 10 \times 10^{-6}$	K^{-1}
T_{max}		160	°C

Material grade specification - 2P50

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	50 ±10%	
$\tan\delta/\mu_i$	25 °C; 100 kHz; 0.1 mT	$\approx 1500 \times 10^{-6}$	
B_r	from 25×10^3 A/m	≈300	mT
H_C	from 25×10^3 A/m	≈1800	A/m
B	$H = 25 \times 10^3$ A/m	≈1000	mT
α_F	25 to 55 °C	$\approx 20 \times 10^{-6}$	K^{-1}
T_{max}		140	°C

Material grade specification - 2P65

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	65 ±10%	
$\tan\delta/\mu_i$	25 °C; 100 kHz; 0.1 mT	$\approx 1000 \times 10^{-6}$	
B_r	from 25×10^3 A/m	≈350	mT
H_C	from 25×10^3 A/m	≈1500	A/m
B	$H = 25 \times 10^3$ A/m	≈1150	mT
α_F	25 to 55 °C	$\approx 15 \times 10^{-6}$	K^{-1}
T_{max}		140	°C

Material grade specification - 2P80

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	80 ±10%	
$\tan\delta/\mu_i$	25 °C; 100 kHz; 0.1 mT	$\approx 1000 \times 10^{-6}$	
B_r	from 25×10^3 A/m	≈400	mT
H_C	from 25×10^3 A/m	≈1200	A/m
B	$H = 25 \times 10^3$ A/m	≈1400	mT
α_F	25 to 55 °C	$\approx 15 \times 10^{-6}$	K^{-1}
T_{max}		140	°C

Material grade specification - 2P90

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	90 ±10%	
$\tan\delta/\mu_i$	25 °C; 100 kHz; 0.1 mT	$\approx 1000 \times 10^{-6}$	
B_r	from 25×10^3 A/m	≈450	mT
H_C	from 25×10^3 A/m	≈900	A/m
B	$H = 25 \times 10^3$ A/m	≈1600	mT
α_F	25 to 55 °C	$\approx 15 \times 10^{-6}$	K^{-1}
T_{max}		140	°C

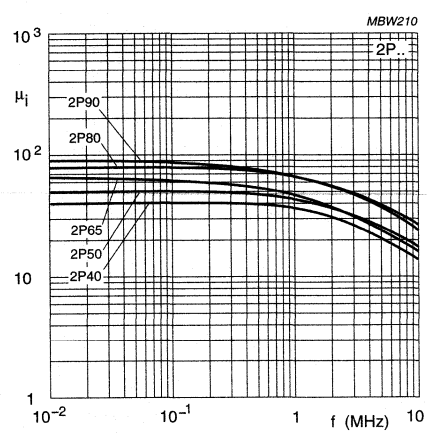


Fig.1 Initial permeability as a function of frequency.

Material grade specification 2P..

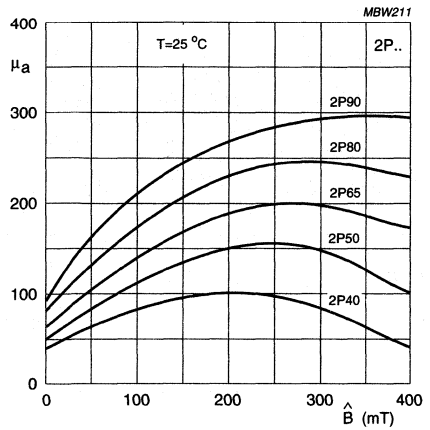


Fig.2 Amplitude permeability as a function of peak flux density.

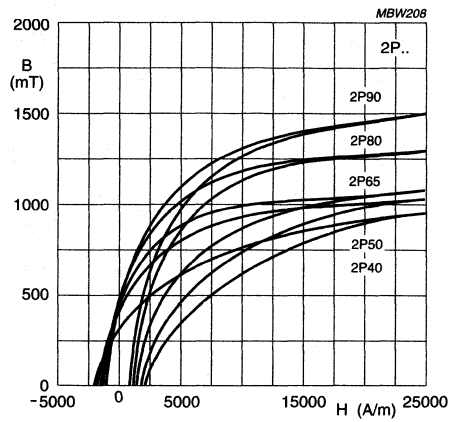


Fig.3 Typical B-H loops.

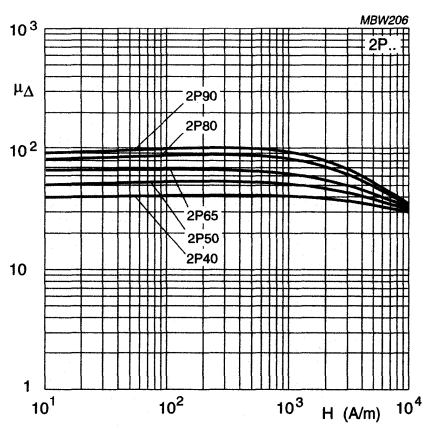


Fig.4 Incremental permeability as a function of magnetic field strength.

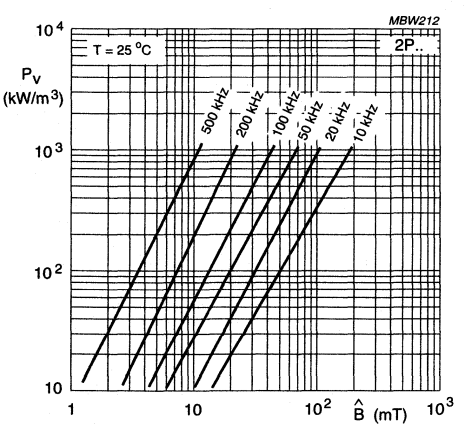


Fig.5 Specific power loss as a function of peak flux density with frequency as a parameter.

Material grade specification

3B1

3B1 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	900 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈330	mT
	100 °C; 10 kHz; 250 A/ m	≈200	
$\tan\delta/\mu_i$	25 °C; 450 kHz; 0.1 mT	$\leq 50 \times 10^{-6}$	
ρ	DC; 25 °C	≈0.2	Ωm
T_C		≥150	°C
density		≈4800	kg/m^3

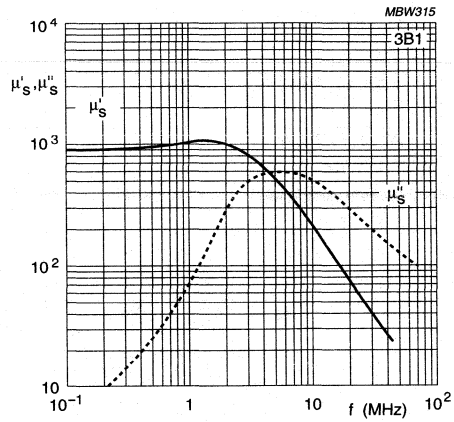


Fig.1 Complex permeability as a function of frequency.

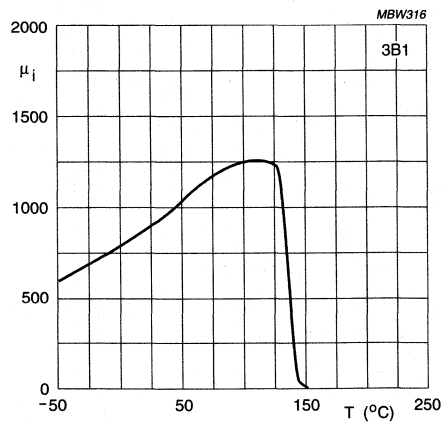


Fig.2 Initial permeability as a function of temperature.

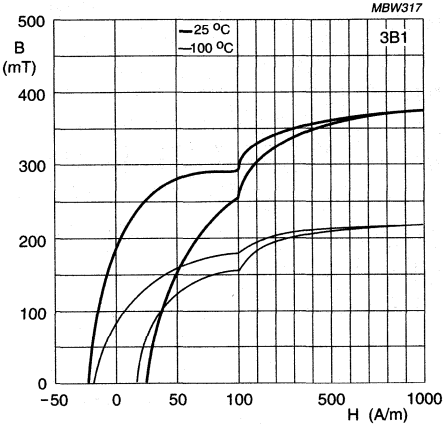


Fig.3 Typical B-H loops.

Material grade specification — 3B7

3B7 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	2300 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈410	mT
	100 °C; 10 kHz; 250 A/ m	≈300	
$\tan\delta/\mu_i$	25 °C; 100 kHz; 0.1 mT	$\leq 5 \times 10^{-6}$	
	25 °C; 500 kHz; 0.1 mT	$\approx 25 \times 10^{-6}$	
	25 °C; 1 MHz; 0.1 mT	$\approx 120 \times 10^{-6}$	
D_F	25 °C; 10 kHz; 0.1 mT	$\leq 3.5 \times 10^{-6}$	
α_F	+20 to 70 °C; ≤10 kHz; 0.1 mT	$(0 \pm 0.6) \times 10^{-6}$	K^{-1}
ρ	DC, 25 °C	≈1	Ωm
T_C		≥170	°C
density		≈4800	kg/m^3

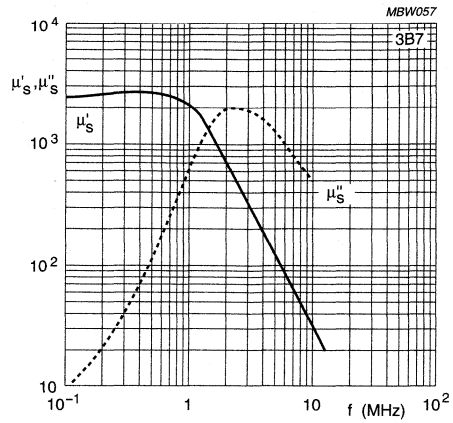


Fig.1 Complex permeability as a function of frequency.

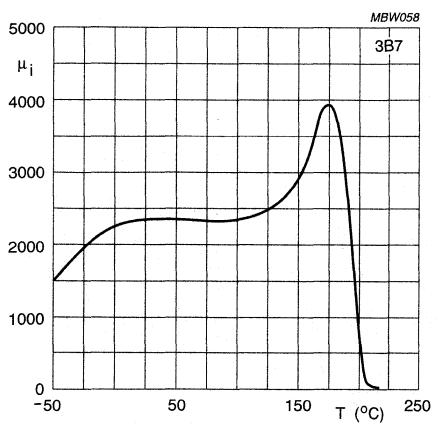


Fig.2 Initial permeability as a function of temperature.

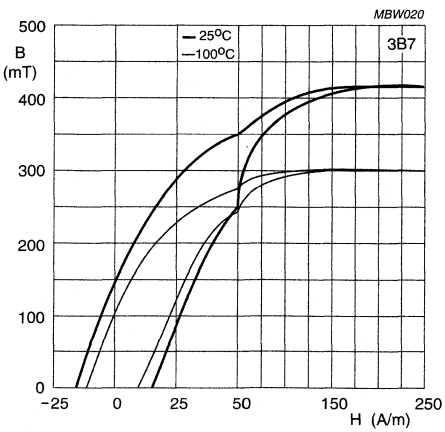


Fig.3 Typical B-H loops.

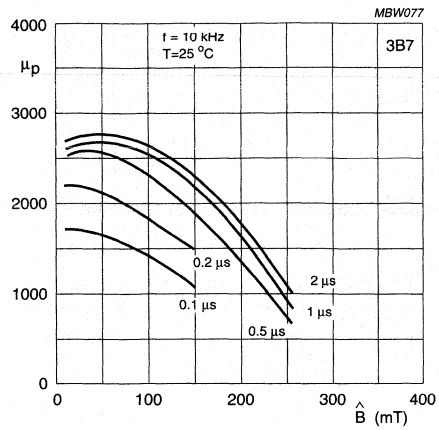


Fig.4 Pulse characteristics (unipolar pulses).

3B8 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	2300 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈420	mT
	100 °C; 10 kHz; 250 A/ m	≈330	
$\tan\delta/\mu_i$	25 °C; 100 kHz; 0.1 mT	$\leq 5 \times 10^{-6}$	
P_V	25 °C; 25 kHz; 200 mT	≤140	kW/m³
	25 °C; 100 kHz; 100 mT	≤155	
ρ	DC; 25 °C	≈2	Ωm
T_C		≥200	°C
density		≈4800	kg/m³

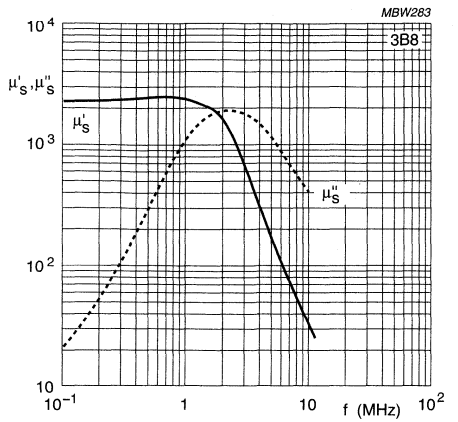


Fig.1 Complex permeability as a function of frequency.

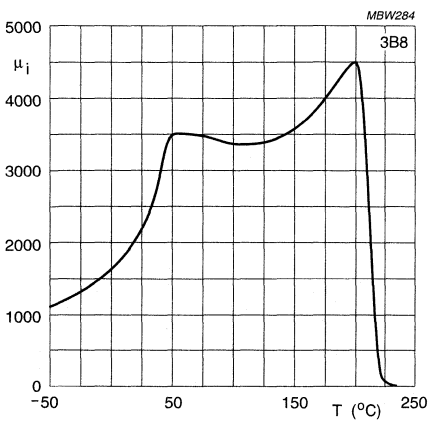


Fig.2 Initial permeability as a function of temperature.

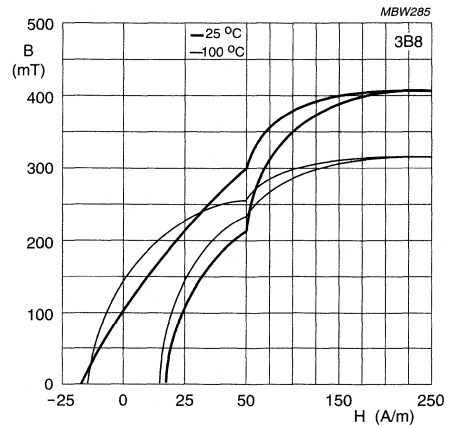


Fig.3 Typical B-H loops.

Material grade specification 3B8

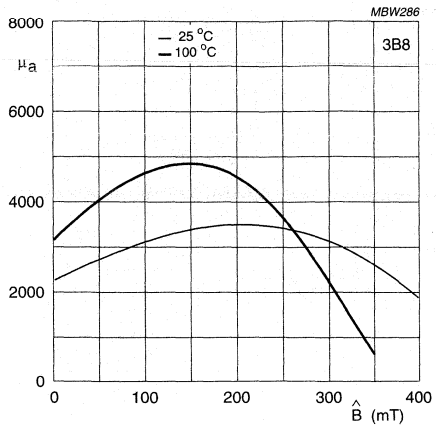


Fig.4 Amplitude permeability as a function of peak flux density.

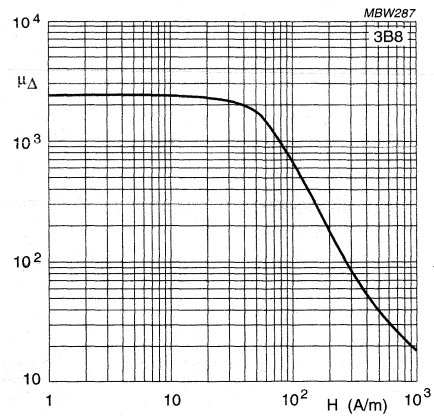


Fig.5 Incremental permeability as a function of magnetic field strength.

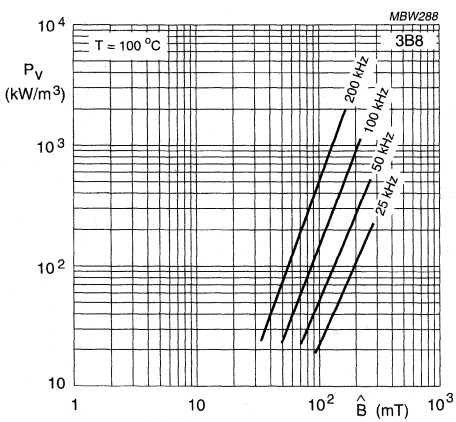


Fig.6 Specific power loss as a function of peak flux density with frequency as a parameter.

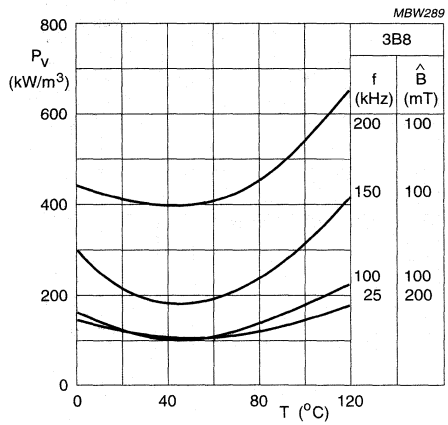


Fig.7 Specific power loss for several frequency/flux density combinations as a function of temperature.

Material grade specification 3C2

3C2 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	700 ±25%	
B	25 °C; 10 kHz; 250 A/ m	≈250	mT
	100 °C; 10 kHz; 250 A/ m	≈200	
P_V	25 °C; 16 kHz; 200 mT	≤100	kW/m^3
	85 °C; 16 kHz; 100 mT	≤120	
	25 °C; 64 kHz; 100 mT	≤450	
	85 °C; 64 kHz; 100 mT	≤500	
H_C	from 800 A/m	≤40	A/m
ρ	DC; 25 °C	≈1	Ωm
T_C		≥180	°C
density		≈4800	kg/m^3

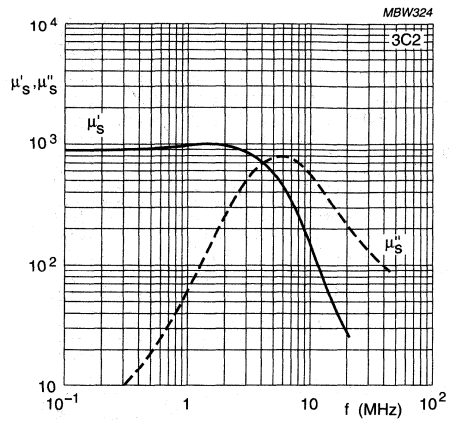


Fig.1 Complex permeability as a function of frequency.

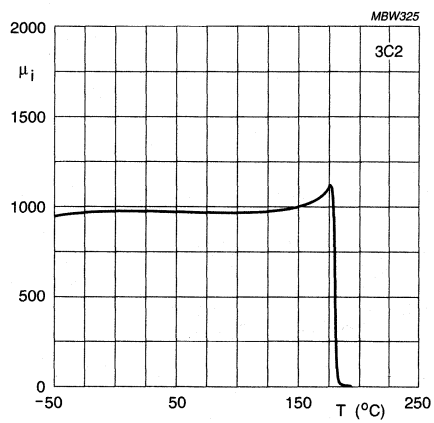


Fig.2 Initial permeability as a function of temperature.

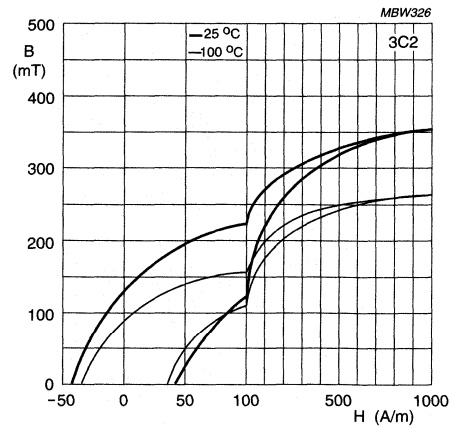


Fig.3 Typical B-H loops.

Material grade specification 3C2

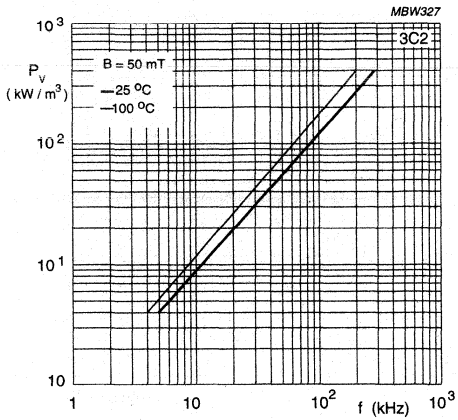


Fig.4 Specific power loss as a function of frequency.

Material grade specification — 3C11

3C11 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	4300 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≥350	mT
	100 °C; 10 kHz; 250 A/ m	≥180	
$\tan\delta/\mu_i$	25 °C; 100 kHz; 0.1 mT	$\leq 20 \times 10^{-6}$	
	25 °C; 300 kHz; 0.1 mT	$\leq 200 \times 10^{-6}$	
ρ	DC; 25 °C	≈1	Ωm
T_C		≥125	°C
density		≈4900	kg/m³

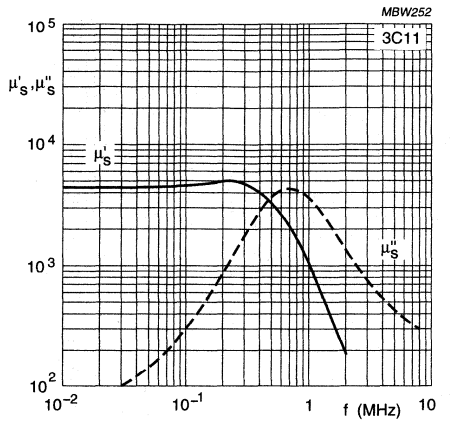


Fig.1 Complex permeability as a function of frequency.

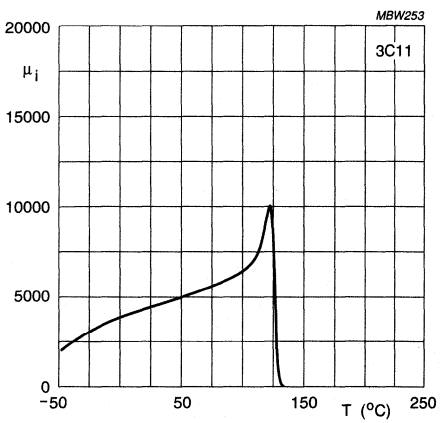


Fig.2 Initial permeability as a function of temperature.

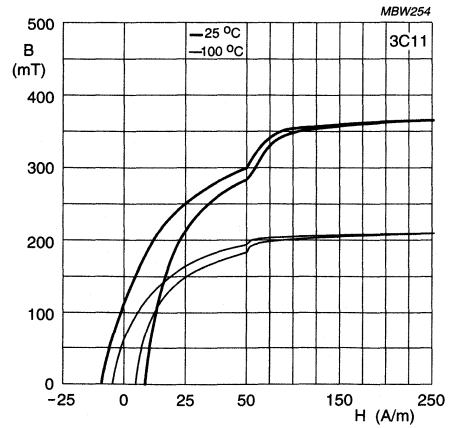


Fig.3 Typical B-H loops.

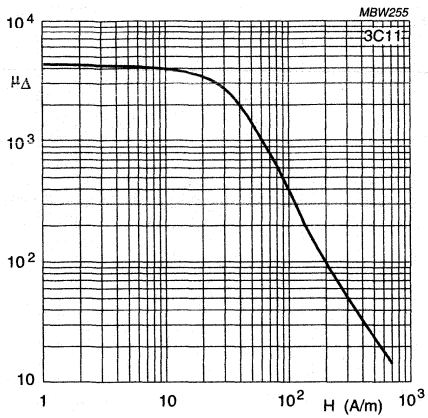


Fig.4 Incremental permeability as a function of magnetic field strength.

Material grade specification — 3C15

3C15 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	1800 ±20%	
μ_a	100 °C; 25 kHz; 200 mT	5500 ±25%	
B	100 °C; 10 kHz; 250 A/ m	≥350	mT
P_V	100 °C; 25 kHz; 200 mT 100 °C; 100 kHz; 100 mT	≤140 ≤165	kW/m³
ρ	DC; 25 °C	≈1	Ωm
T_C		≥190	°C
density		≈4800	kg/m³

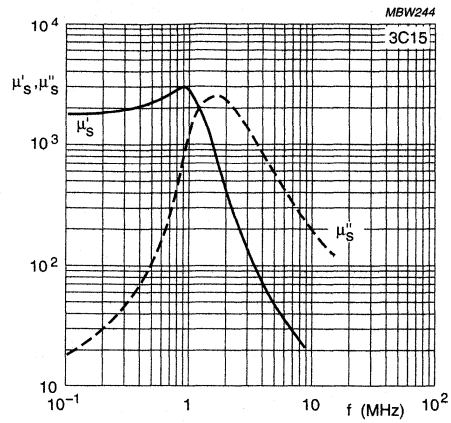


Fig.1 Complex permeability as a function of frequency.

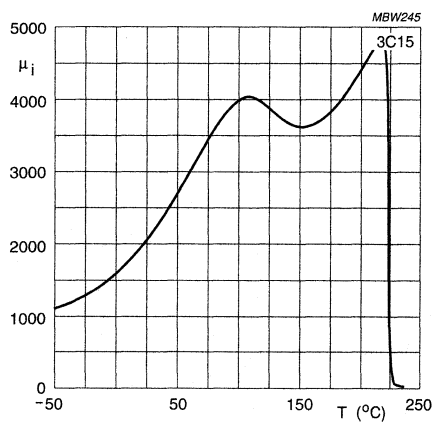


Fig.2 Initial permeability as a function of temperature.

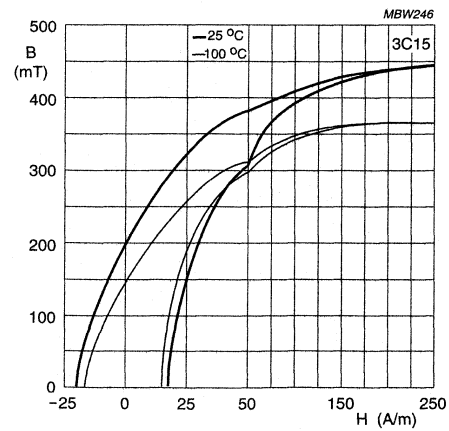


Fig.3 Typical B-H loops.

Material grade specification 3C15

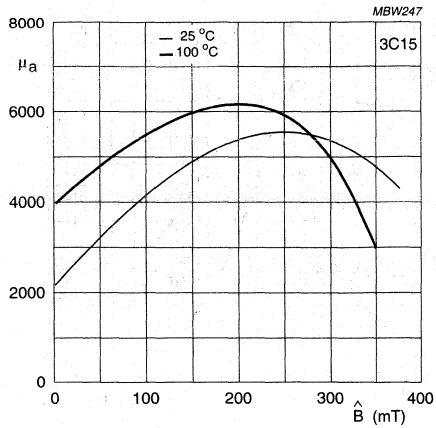


Fig.4 Amplitude permeability as a function of peak flux density.

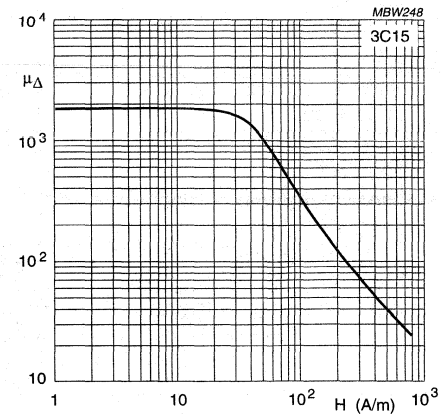


Fig.5 Incremental permeability as a function of magnetic field strength.

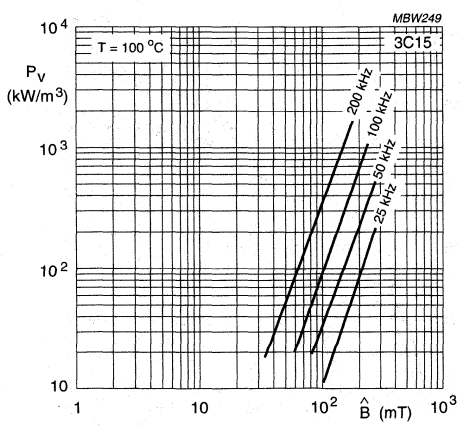


Fig.6 Specific power loss as a function of peak flux density with frequency as a parameter.

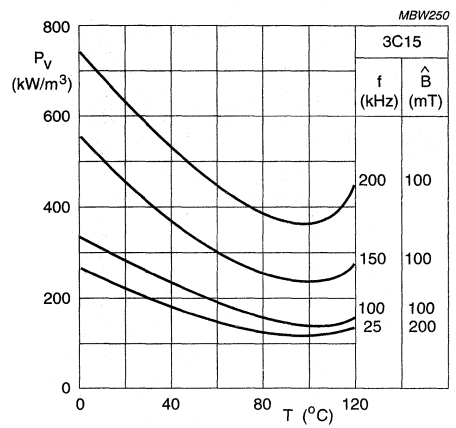


Fig.7 Specific power loss for several frequency/flux density combinations as a function of temperature.

Material grade specification 3C30

3C30 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	1800 ±20%	
μ_a	100 °C; 25 kHz; 200 mT	5000 ±25%	
B	100 °C; 10 kHz; 250 A/ m	≥370	mT
P_V	100 °C; 25 kHz; 200 mT	≤80	kW/m³
	100 °C; 100 kHz; 100 mT	≤80	
	100 °C; 100 kHz; 200 mT	≈450	
ρ	DC; 25 °C	≈2	Ωm
T_C		≥240	°C
density		≈4800	kg/m³

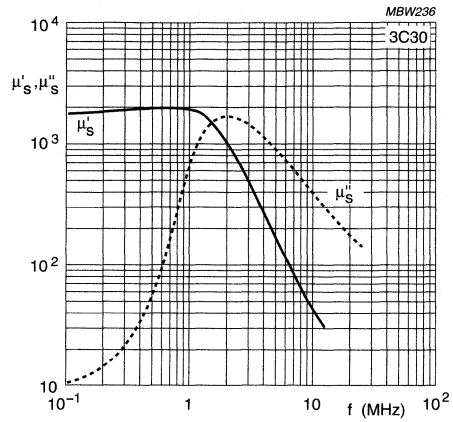


Fig.1 Complex permeability as a function of frequency.

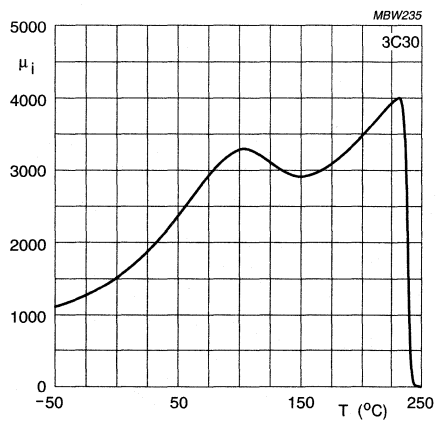


Fig.2 Initial permeability as a function of temperature.

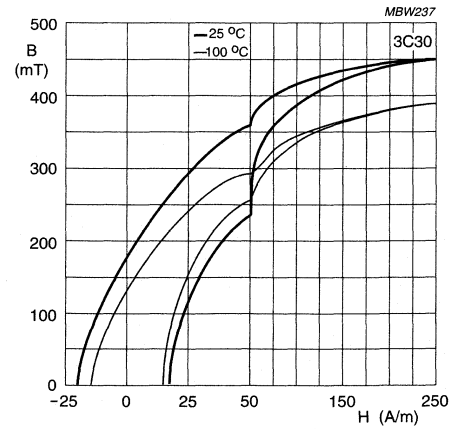


Fig.3 Typical B-H loops.

Material grade specification 3C30

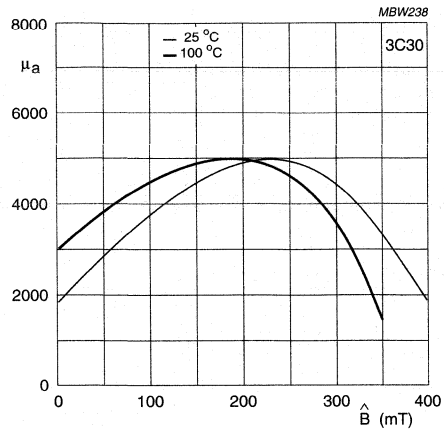


Fig.4 Amplitude permeability as a function of peak flux density.

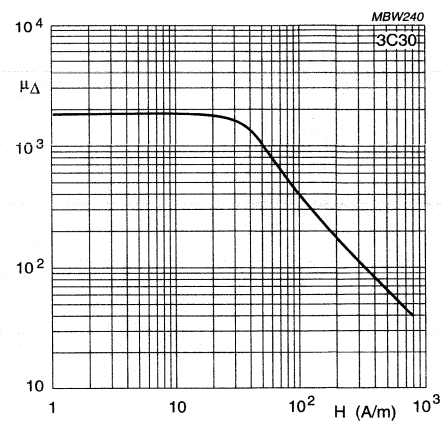


Fig.5 Incremental permeability as a function of magnetic field strength.

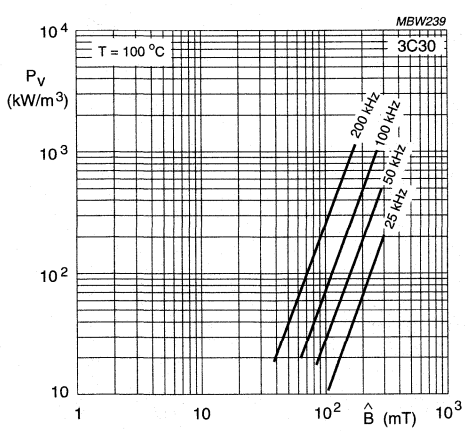


Fig.6 Specific power loss as a function of peak flux density with frequency as a parameter.

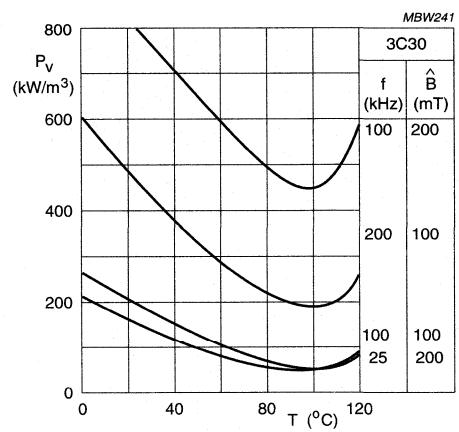


Fig.7 Specific power loss for several frequency/flux density combinations as a function of temperature.

Material grade specification — 3C81

3C81 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	2700 ±20%	
μ_a	100 °C; 25 kHz; 200 mT	5500 ±20%	
B	25 °C; 10 kHz; 250 A/ m 100 °C; 10 kHz; 250 A/ m	≈420 ≈330	mT
P_V	100 °C; 25 kHz; 200 mT	≤185	kW/m^3
ρ	DC; 25 °C	≈1	Ωm
T_C		≥210	°C
density		≈4800	kg/m^3

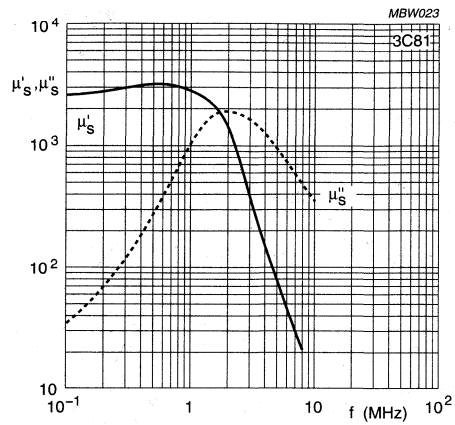


Fig.1 Complex permeability as a function of frequency.

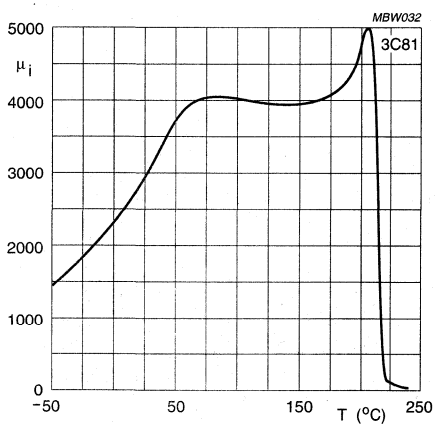


Fig.2 Initial permeability as a function of temperature.

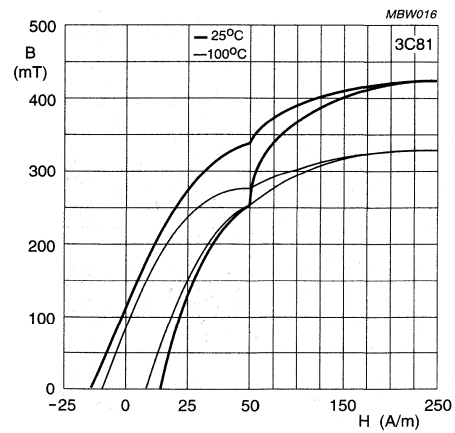


Fig.3 Typical B-H loops.

Material grade specification 3C81

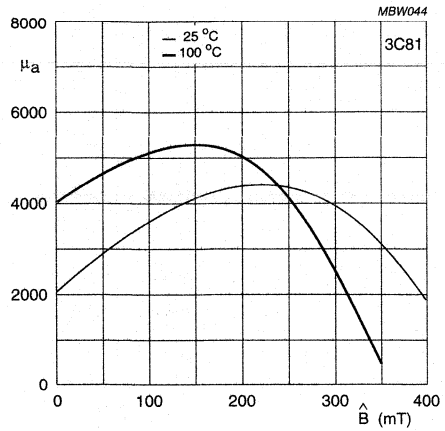


Fig.4 Amplitude permeability as a function of peak flux density.

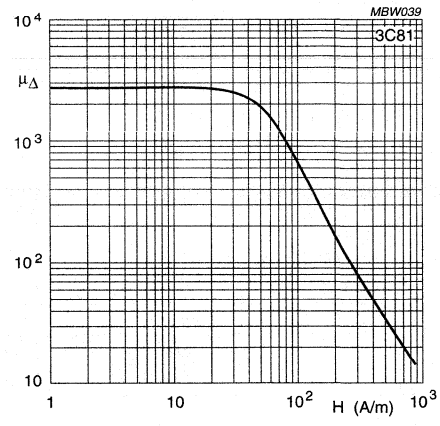


Fig.5 Incremental permeability as a function of magnetic field strength.

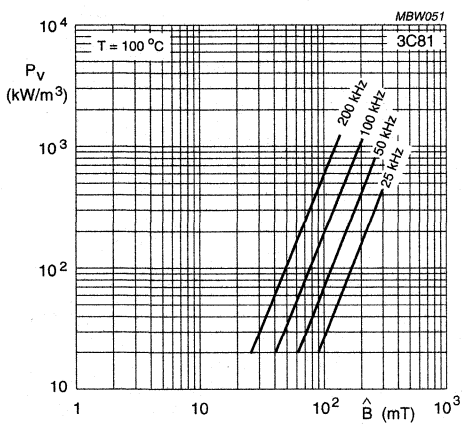


Fig.6 Specific power loss as a function of peak flux density with frequency as a parameter.

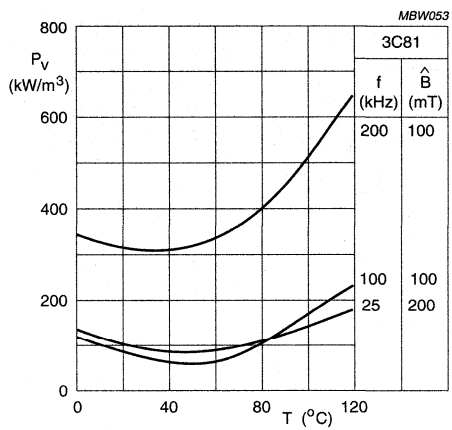


Fig.7 Specific power loss for several frequency/flux density combinations as a function of temperature.

Material grade specification 3C85

3C85 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	2000 ±20%	
μ_a	100 °C; 25 kHz; 200 mT	5500 ±25%	
B	25 °C; 10 kHz; 250 A/ m	≥400	mT
	100 °C; 10 kHz; 250 A/ m	≥330	
P_V	100 °C; 25 kHz; 200 mT	≤140	kW/m^3
	100 °C; 100 kHz; 100 mT	≤165	
ρ	DC; 25 °C	≈2	Ωm
T_C		≥200	°C
density		≈4800	kg/m^3

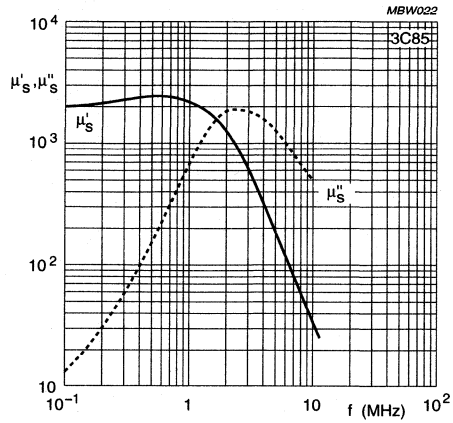


Fig.1 Complex permeability as a function of frequency.

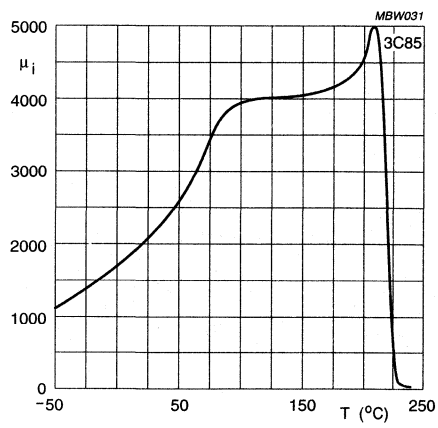


Fig.2 Initial permeability as a function of temperature.

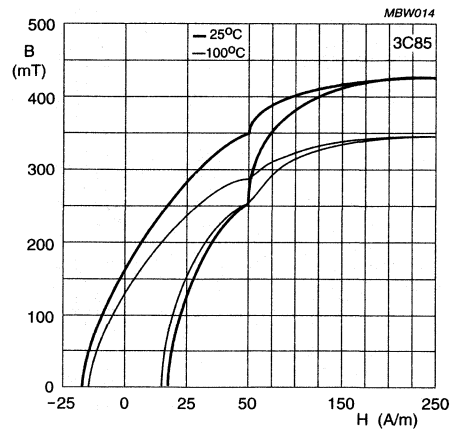


Fig.3 Typical B-H loops.

Material grade specification 3C85

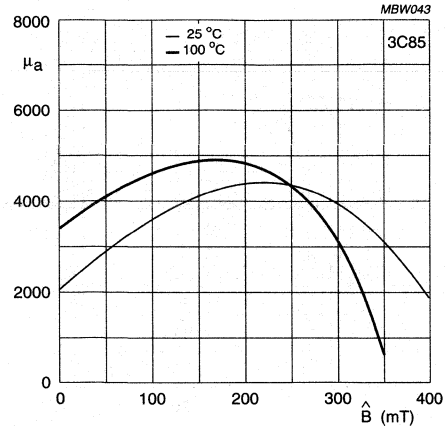


Fig.4 Amplitude permeability as a function of peak flux density.

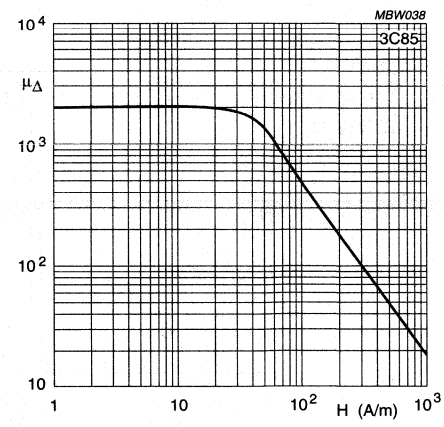


Fig.5 Incremental permeability as a function of magnetic field strength.

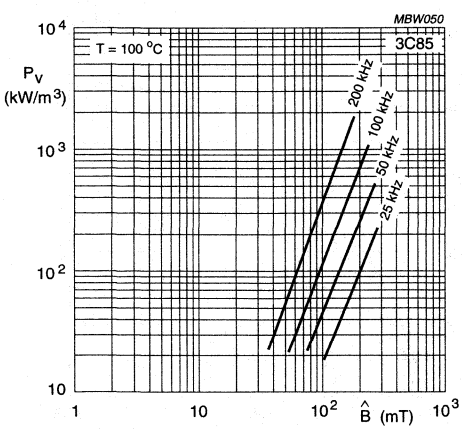


Fig.6 Specific power loss as a function of peak flux density with frequency as a parameter.

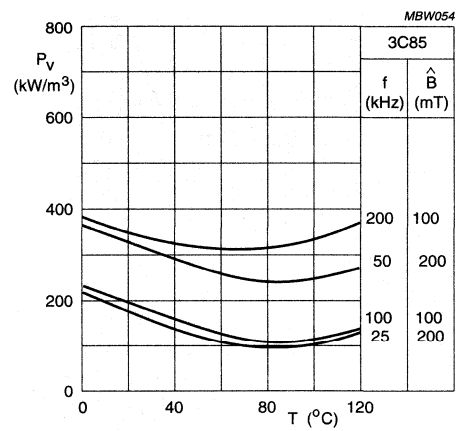


Fig.7 Specific power loss for several frequency/flux density combinations as a function of temperature.

Material grade specification — 3C90

3C90 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	2000 ±20%	
μ_a	100 °C; 25 kHz; 200 mT	5500 ±25%	
B	25 °C; 10 kHz; 250 A/ m	≥430	mT
	100 °C; 10 kHz; 250 A/ m	≥340	mT
P_V	100 °C; 25 kHz; 200 mT	≤80	kW/m³
	100 °C; 100 kHz; 100 mT	≤80	
	100 °C; 100 kHz; 200 mT	≈450	
ρ	DC, 25 °C	≈5	Ωm
T_C		≥220	°C
density		≈4800	kg/m³

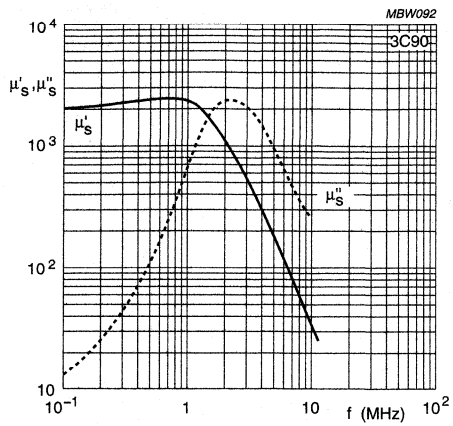


Fig.1 Complex permeability as a function of frequency.

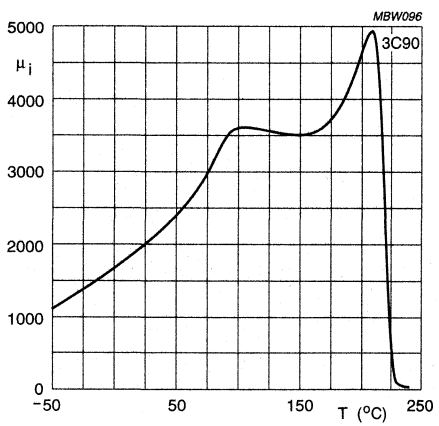


Fig.2 Initial permeability as a function of temperature.

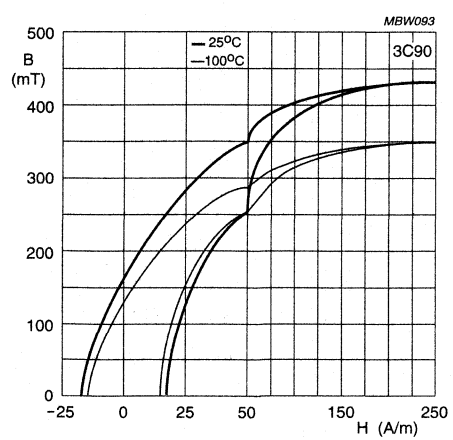


Fig.3 Typical B-H loops.

Material grade specification 3C90

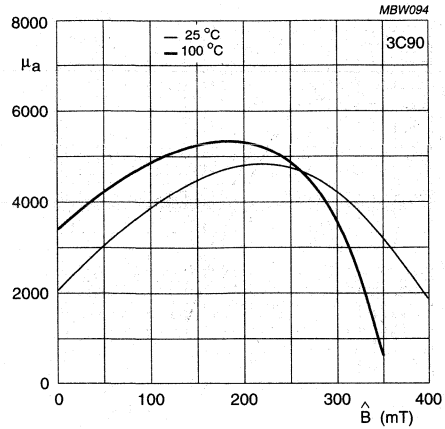


Fig.4 Amplitude permeability as a function of peak flux density.

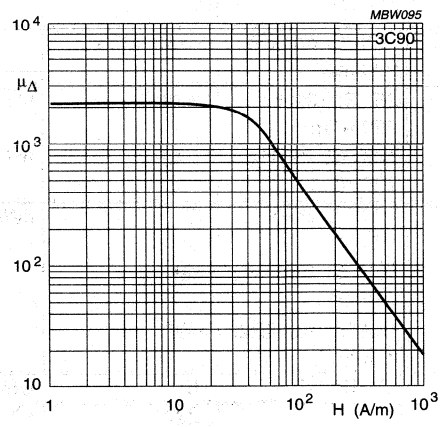


Fig.5 Incremental permeability as a function of magnetic field strength.

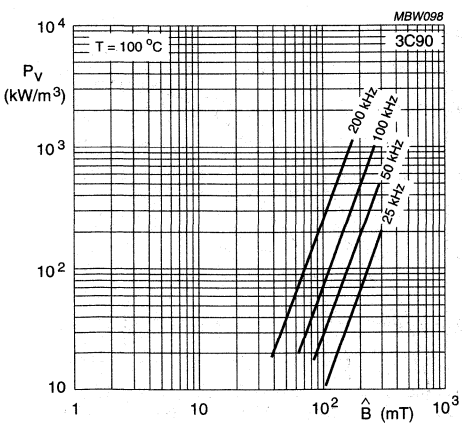


Fig.6 Specific power loss as a function of peak flux density with frequency as a parameter.

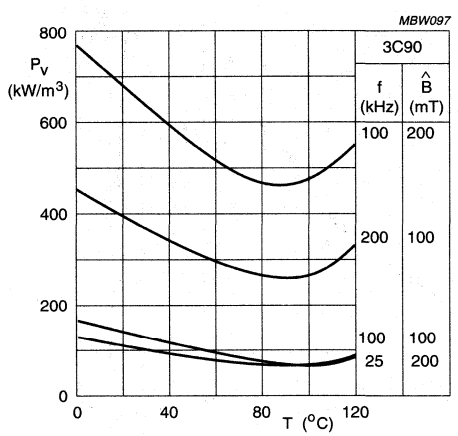


Fig.7 Specific power loss for several frequency/flux density combinations as a function of temperature.

Preliminary material grade specification — 3C94

3C94 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	2300 ±20%	
μ_a	100 °C; 25 kHz; 200 mT	4500	
B	25 °C; 10 kHz; 250 A/ m	≥430	mT
	100 °C; 10 kHz; 250 A/ m	≥340	mT
$P_{V(av)}$	100 °C; 25 kHz; 200 mT	60	kW/m³
	100 °C; 100 kHz; 100 mT	60	
	100 °C; 100 kHz; 200 mT	350	
ρ	DC, 25 °C	≈5	Ωm
T_C		≥220	°C
density		≈4800	kg/m³

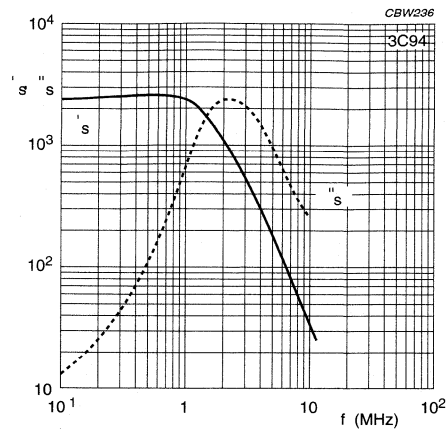


Fig.1 Complex permeability as a function of frequency.

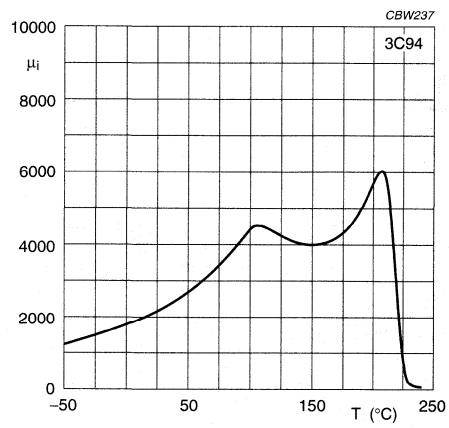


Fig.2 Initial permeability as a function of temperature.

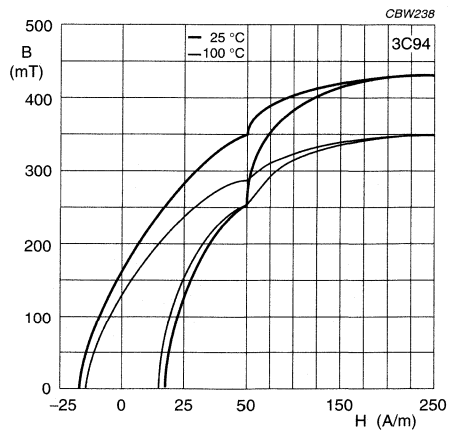


Fig.3 Typical B-H loops.

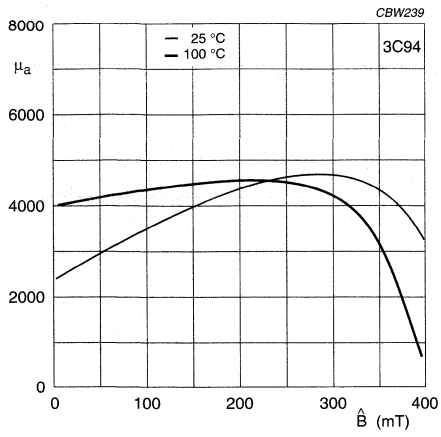


Fig.4 Amplitude permeability as a function of peak flux density.

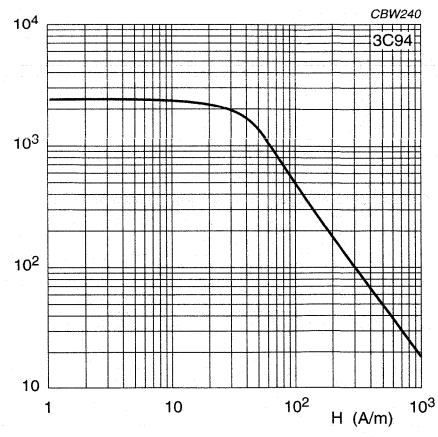


Fig.5 Incremental permeability as a function of magnetic field strength.

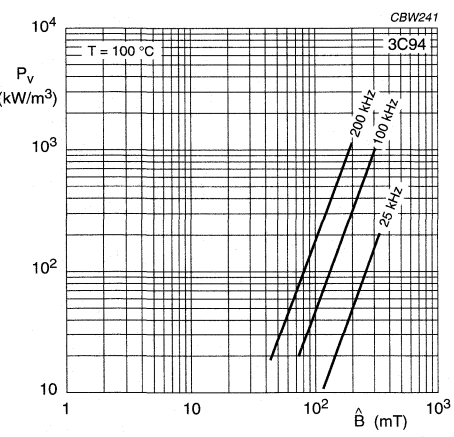


Fig.6 Specific power loss as a function of peak flux density with frequency as a parameter.

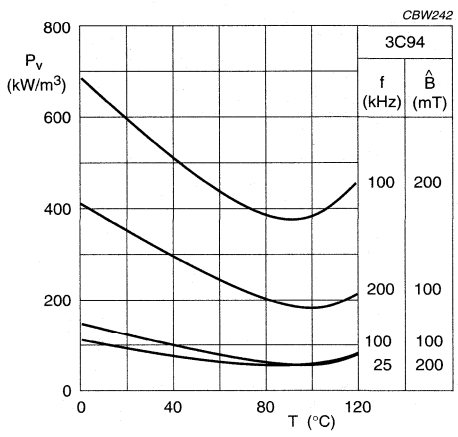


Fig.7 Specific power loss for several frequency/flux density combinations as a function of temperature.

Material grade specification — 3D3

3D3 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	750 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈320	mT
	100 °C; 10 kHz; 250 A/ m	≈260	
$\tan\delta/\mu_i$	25 °C; 300 kHz; 0.1 mT	$\leq 10 \times 10^{-6}$	
	25 °C; 1 MHz; 0.1 mT	$\leq 30 \times 10^{-6}$	
η_B	25 °C; 100 kHz; 1.5 to 3 mT	$\leq 1.8 \times 10^{-3}$	T^{-1}
D_F	25 °C; 10 kHz; 0.1 mT	$\leq 12 \times 10^{-6}$	
α_F	25 to 70 °C; ≤10 kHz; 0.1 mT	$(1.5 \pm 1) \times 10^{-6}$	K^{-1}
ρ	DC; 25 °C	≈2	Ωm
T_C		≥200	°C
density		≈4700	kg/m^3

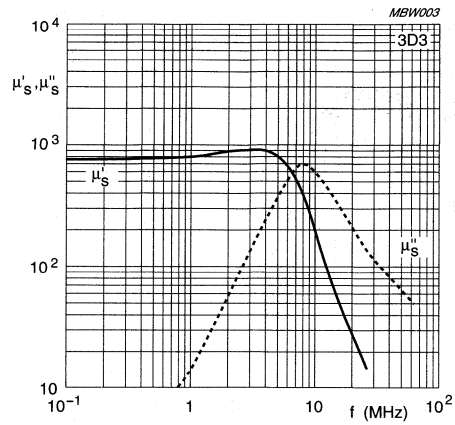


Fig.1 Complex permeability as a function of frequency.

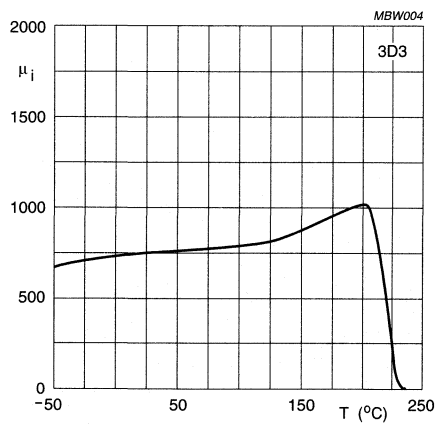


Fig.2 Initial permeability as a function of temperature.

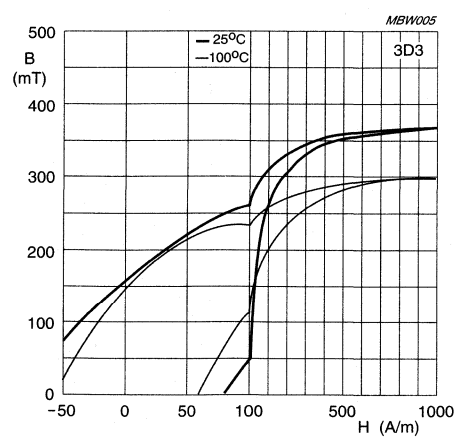


Fig.3 Typical B-H loops.

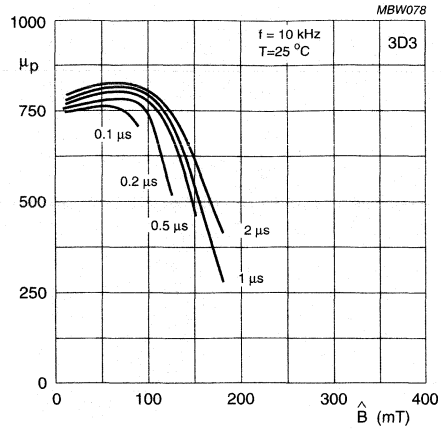


Fig.4 Pulse characteristics (unipolar pulses).

Material grade specification 3E1

3E1 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	3800 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈350	mT
	100 °C; 10 kHz; 250 A/ m	≈200	
$\tan\delta/\mu_i$	25 °C; 100 kHz; 0.1 mT	$\leq 20 \times 10^{-6}$	
	25 °C; 300 kHz; 0.1 mT	$\leq 150 \times 10^{-6}$	
η_B	25 °C; 10 kHz; 1.5 to 3 mT	$\leq 1.2 \times 10^{-3}$	T^{-1}
D_F	25 °C; 10 kHz; 0.1 mT	$\leq 5 \times 10^{-6}$	
ρ	DC; 25 °C	≈1	Ωm
T_C		≥125	°C
density		≈4800	kg/m^3

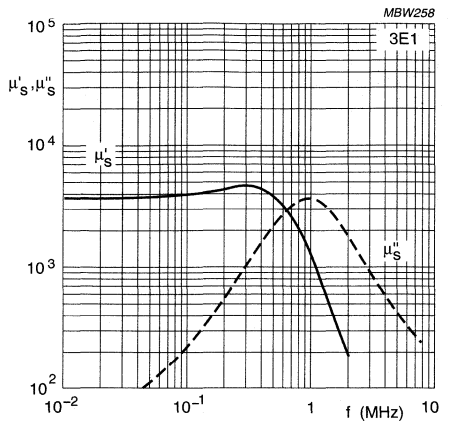


Fig.1 Complex permeability as a function of frequency.

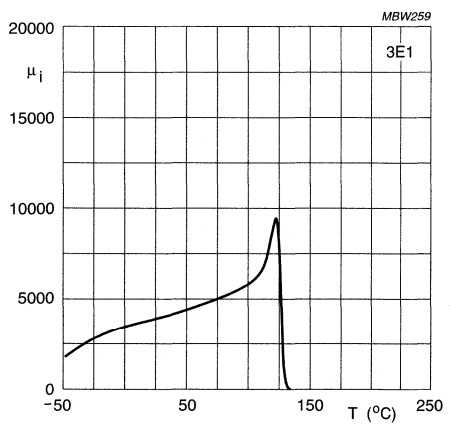


Fig.2 Initial permeability as a function of temperature.

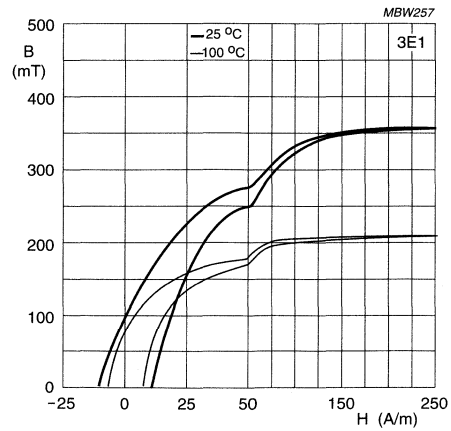


Fig.3 Typical B-H loops.

Material grade specification 3E1

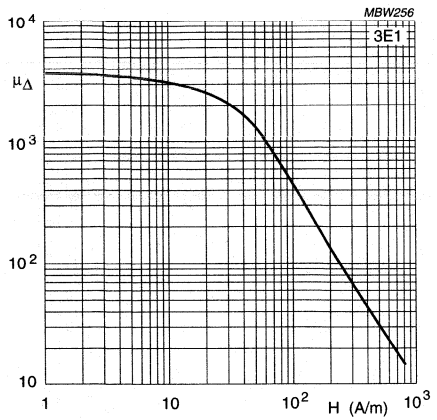


Fig.4 Incremental permeability as a function of magnetic field strength.

Material grade specification — 3E4

3E4 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	4700 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈360	mT
	100 °C; 10 kHz; 250 A/ m	≈210	
$\tan\delta/\mu_i$	25 °C; 100 kHz; 0.1 mT	$\leq 20 \times 10^{-6}$	
	25 °C; 300 kHz; 0.1 mT	$\leq 150 \times 10^{-6}$	
η_B	25 °C; 10 kHz; 1.5 to 3 mT	$\leq 1 \times 10^{-3}$	T^{-1}
D_F	25 °C; 10 kHz; 0.1 mT	$\leq 5 \times 10^{-6}$	
ρ	DC; 25 °C	≈1	Ωm
T_C		≥125	°C
density		≈4800	kg/m^3

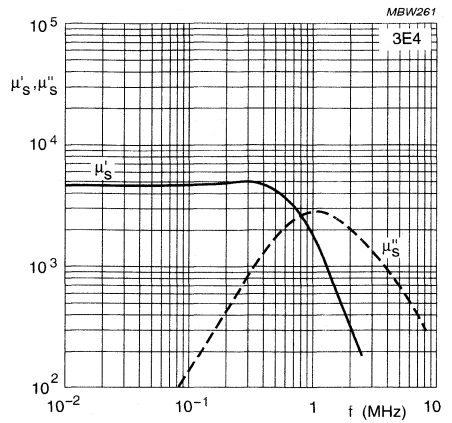


Fig.1 Complex permeability as a function of frequency.

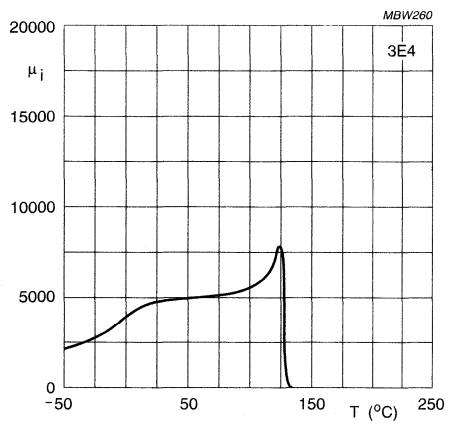


Fig.2 Initial permeability as a function of temperature.

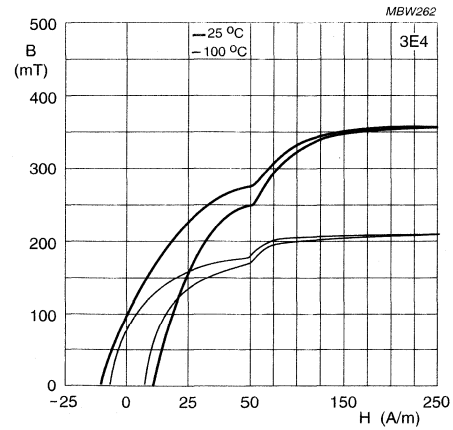


Fig.3 Typical B-H loops.

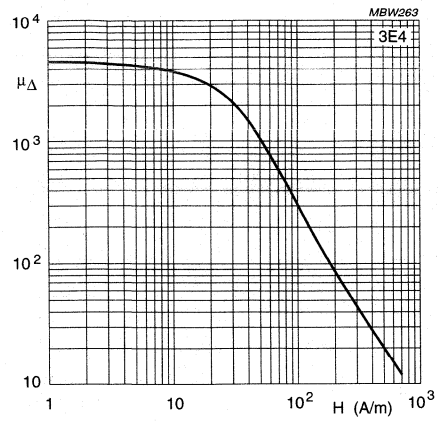


Fig.4 Incremental permeability as a function of magnetic field strength.

Material grade specification 3E5

3E5 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	10000 ±20%	
B	25 °C; 10 kHz; 250 A/ m 100 °C; 10 kHz; 250 A/ m	≈380 ≈210	mT
$\tan\delta/\mu_i$	25 °C; 30 kHz; 0.1 mT 25 °C; 300 kHz; 0.1 mT	$\leq 25 \times 10^{-6}$ $\leq 75 \times 10^{-6}$	
η_B	25 °C; 10 kHz; 1.5 to 3 mT	$\leq 1 \times 10^{-3}$	T^{-1}
ρ	DC; 25 °C	≈0.5	Ωm
T_C		≥125	°C
density		≈4900	kg/m^3

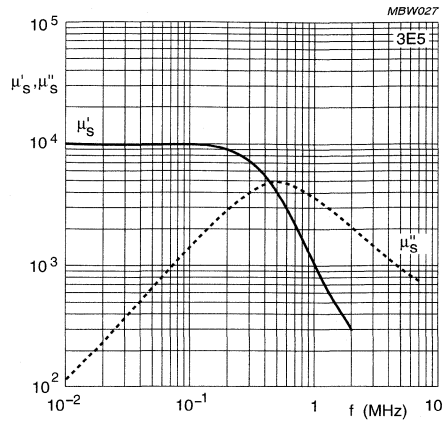


Fig.1 Complex permeability as a function of frequency.

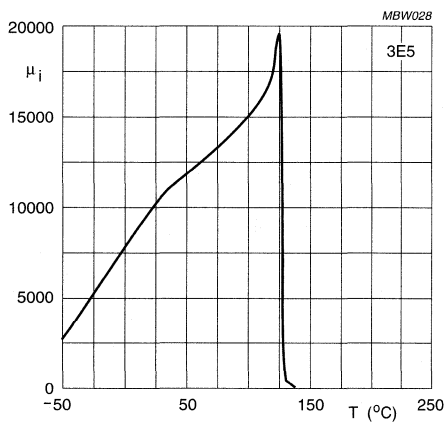


Fig.2 Initial permeability as a function of temperature.

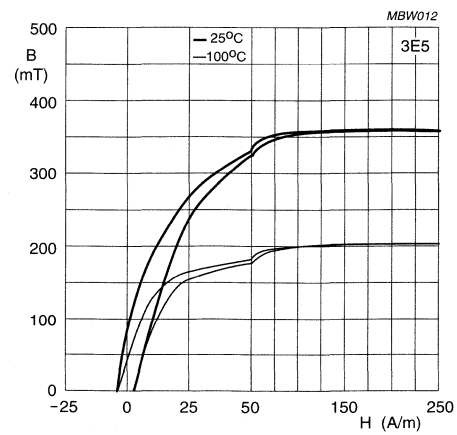


Fig.3 Typical B-H loops.

Material grade specification 3E5

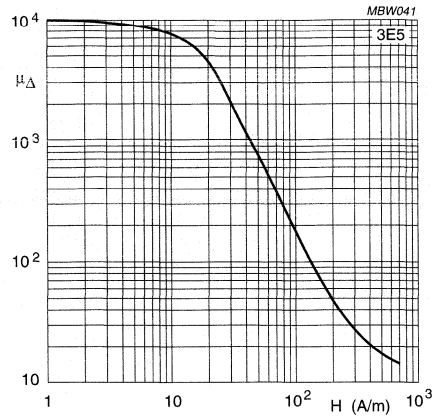


Fig.4 Incremental permeability as a function of magnetic field strength.

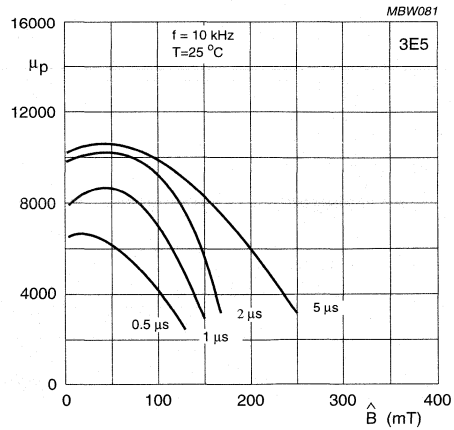


Fig.5 Pulse characteristics (unipolar pulses).

Material grade specification 3E6

3E6 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE(1)	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	12000 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈380	mT
	100 °C; 10 kHz; 250 A/ m	≈210	
$\tan\delta/\mu_i$	25 °C; 10 kHz; 0.1 mT	$\leq 10 \times 10^{-6}$	
	25 °C; 30 kHz; 0.1 mT	$\leq 30 \times 10^{-6}$	
η_B	25 °C; 10 kHz; 1.5 to 3 mT	$\leq 1 \times 10^{-3}$	T^{-1}
ρ	DC; 25 °C	≈0.1	Ωm
T_C		≥130	°C
density		≈4900	kg/m^3

Note

1. Measured on sintered, non-ground ring cores of dimensions Ø14 × Ø9 × 5 which are not subjected to external stresses.

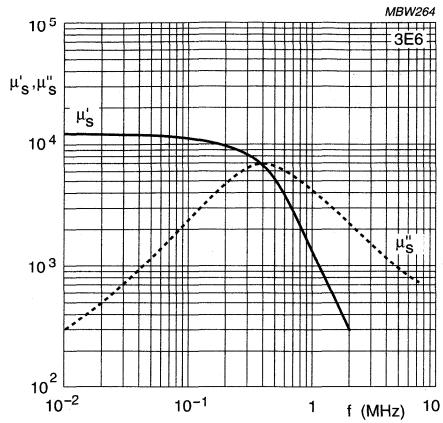


Fig.1 Complex permeability as a function of frequency.

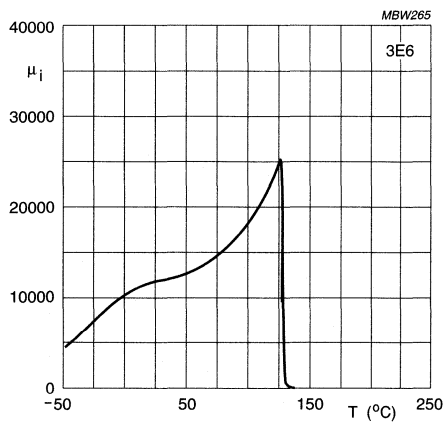


Fig.2 Initial permeability as a function of temperature.

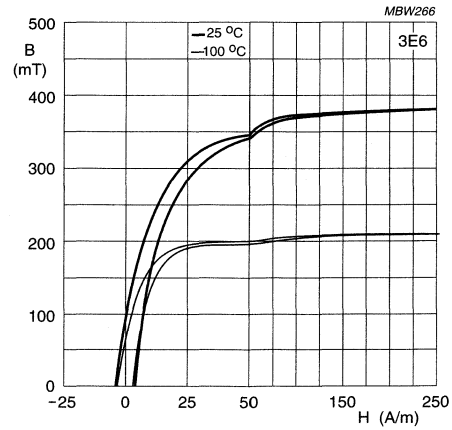


Fig.3 Typical B-H loops.

Material grade specification 3E6

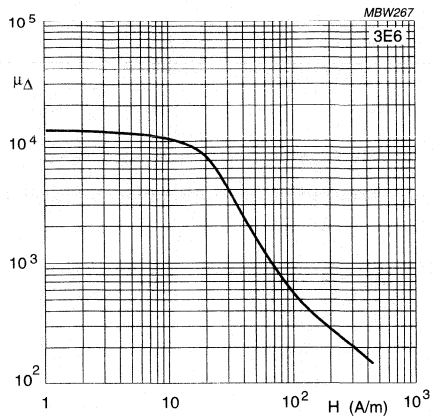


Fig.4 Incremental permeability as a function of magnetic field strength.

Material grade specification — 3E7

3E7 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE(1)	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	15000 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈380	mT
	100 °C; 10 kHz; 250 A/ m	≈210	
$\tan\delta/\mu_i$	25 °C; 10 kHz; 0.1 mT	$\leq 10 \times 10^{-6}$	
	25 °C; 30 kHz; 0.1 mT	$\leq 30 \times 10^{-6}$	
η_B	25 °C; 10 kHz; 1.5 to 3 mT	$\leq 1 \times 10^{-3}$	T^{-1}
ρ	DC; 25 °C	≈0.1	Ωm
T_C		≥130	°C
density		≈4900	kg/m^3

Note

1. Measured on sintered, non-ground ring cores of dimensions Ø14 × Ø9 × 5 which are not subjected to external stresses.

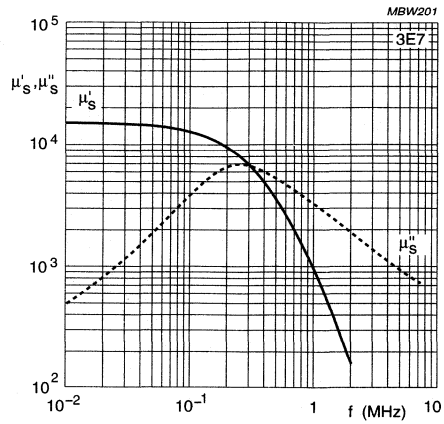


Fig.1 Complex permeability as a function of frequency.

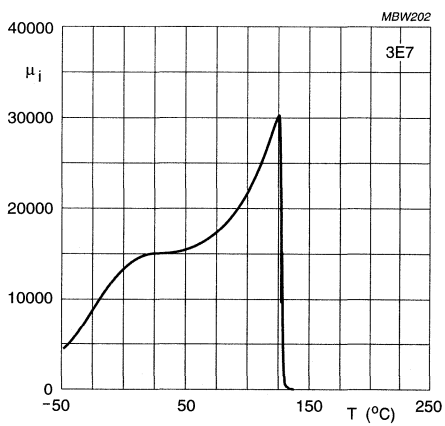


Fig.2 Initial permeability as a function of temperature.

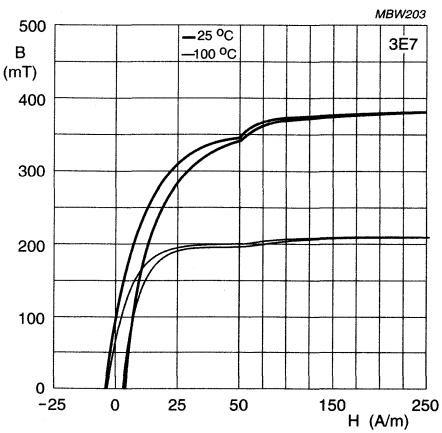


Fig.3 Typical B-H loops.

Material grade specification 3E7

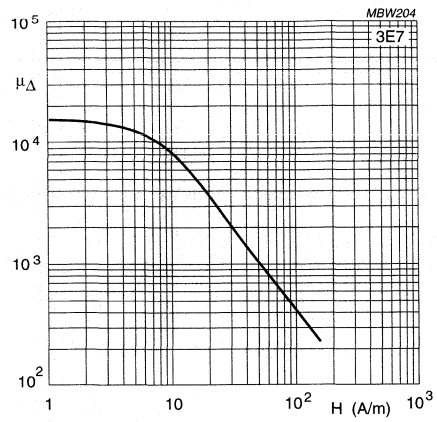


Fig.4 Incremental permeability as a function of magnetic field strength.

Material grade specification — 3E25

3E25 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	6000 ±20%	
B	25 °C; 10 kHz; 250 A/m	≈350	mT
	100 °C; 10 kHz; 250 A/m	≈180	mT
$\tan\delta/\mu_i$	25 °C; 100 kHz; 0.1 mT	$\leq 25 \times 10^{-6}$	
	25 °C; 300 kHz; 0.1 mT	$\leq 200 \times 10^{-6}$	
ρ	DC; 25 °C	≈0.5	Ωm
T_C		≥125	°C
density		≈4900	kg/m^3

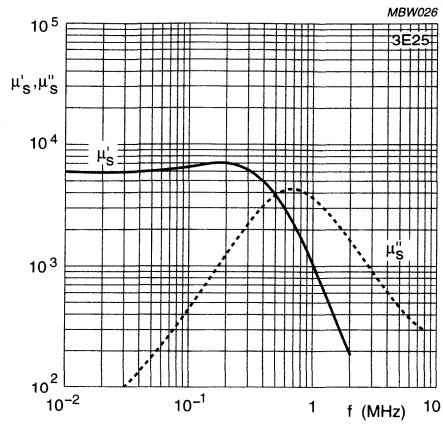


Fig.1 Complex permeability as a function of frequency.

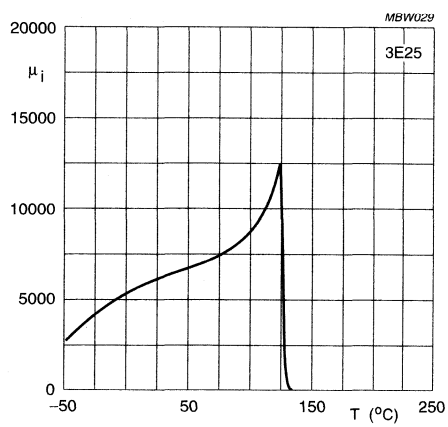


Fig.2 Initial permeability as a function of temperature.

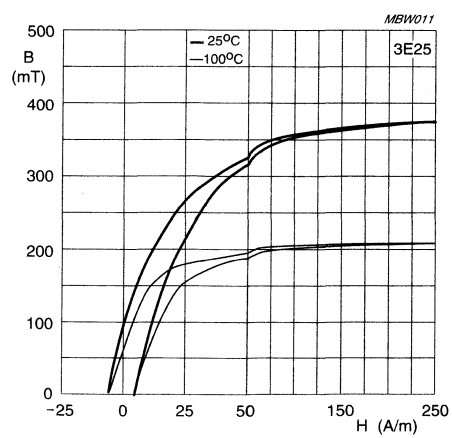


Fig.3 Typical B-H loops.

Material grade specification 3E25

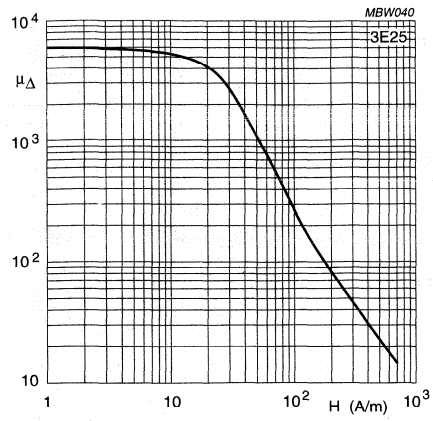


Fig.4 Incremental permeability as a function of magnetic field strength.

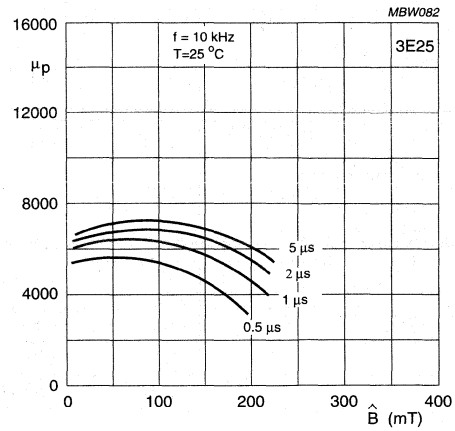


Fig.5 Pulse characteristics (unipolar pulses).

Material grade specification — 3E27

3E27 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	6000 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈400	mT
	100 °C; 10 kHz; 250 A/ m	≈300	
$\tan\delta/\mu_i$	25 °C; 100 kHz; 0.1 mT	$\leq 15 \times 10^{-6}$	
ρ	DC; 25 °C	≈0.5	Ωm
T_C		≥150	°C
density		≈4800	kg/m^3

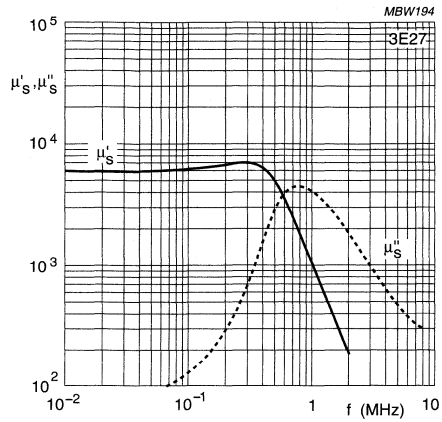


Fig.1 Complex permeability as a function of frequency.

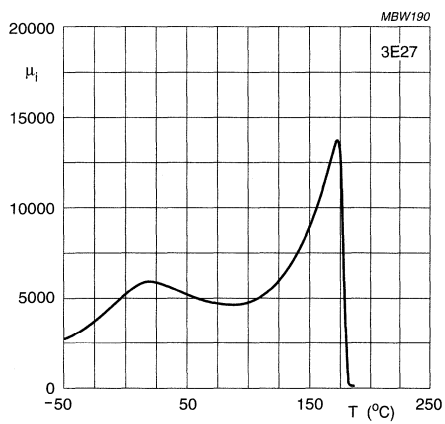


Fig.2 Initial permeability as a function of temperature.

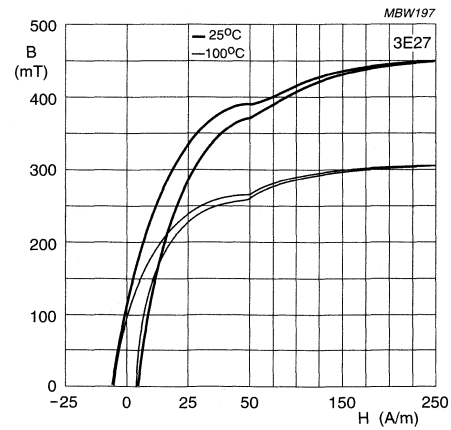


Fig.3 Typical B-H loops.

Material grade specification 3E27

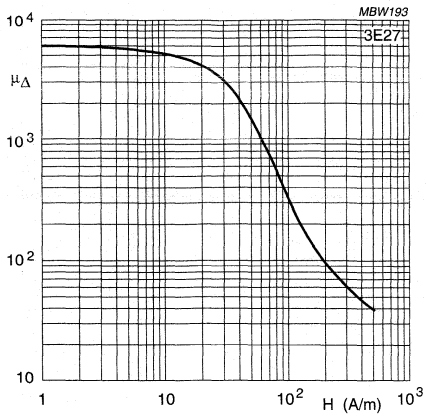


Fig.4 Incremental permeability as a function of magnetic field strength.

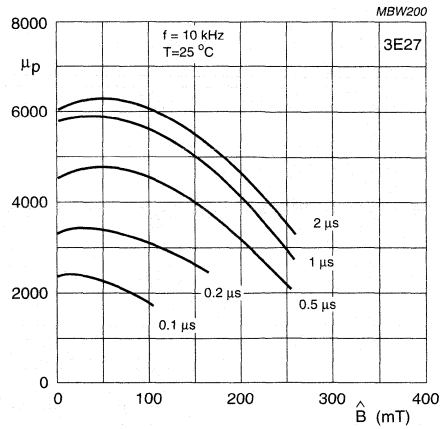


Fig.5 Pulse characteristics (unipolar pulses).

Material grade specification 3F3

3F3 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	1800 ±20%	
μ_a	100 °C; 25 kHz; 200 mT	≈4000	
B	25 °C; 10 kHz; 250 A/m	≥400	mT
	100 °C; 10 kHz; 250 A/m	≥330	mT
P_V	100 °C; 100 kHz; 100 mT	≤80	kW/m^3
	100 °C; 400 kHz; 50 mT	≤150	kW/m^3
ρ	DC; 25 °C	≈2	Ωm
T_C		≥200	°C
density		≈4750	kg/m^3

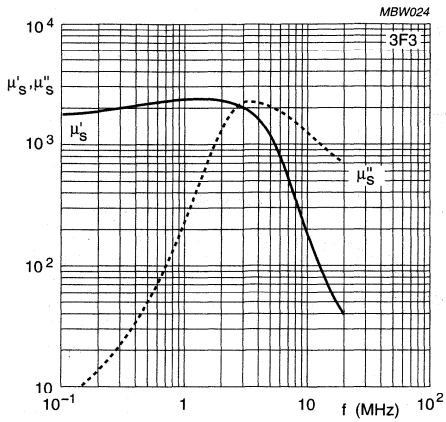


Fig.1 Complex permeability as a function of frequency.

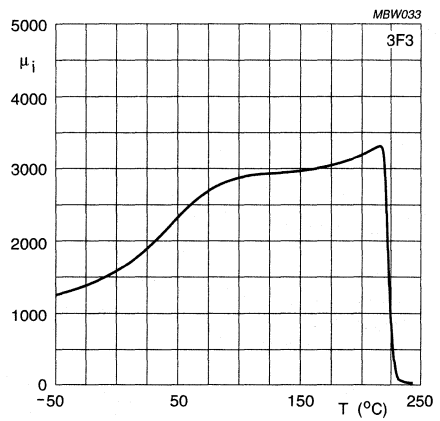


Fig.2 Initial permeability as a function of temperature.

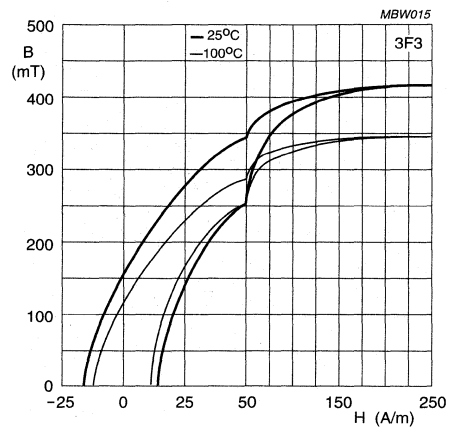


Fig.3 Typical B-H loops.

Material grade specification 3F3

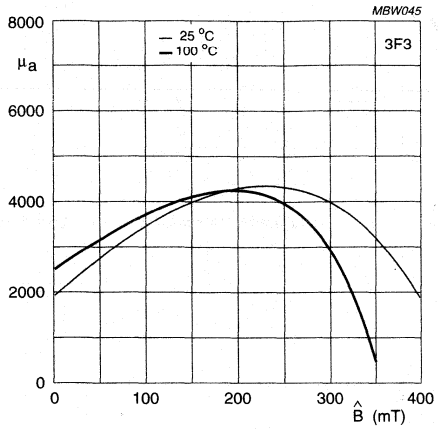


Fig.4 Amplitude permeability as function of peak flux density.

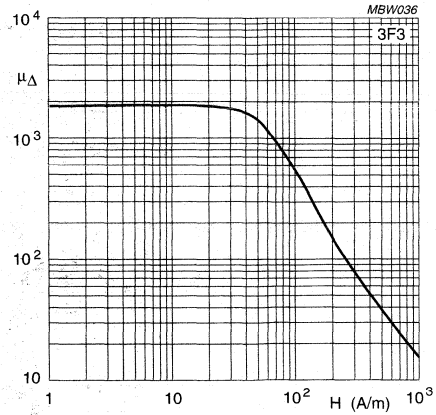


Fig.5 Incremental permeability as a function of magnetic field strength.

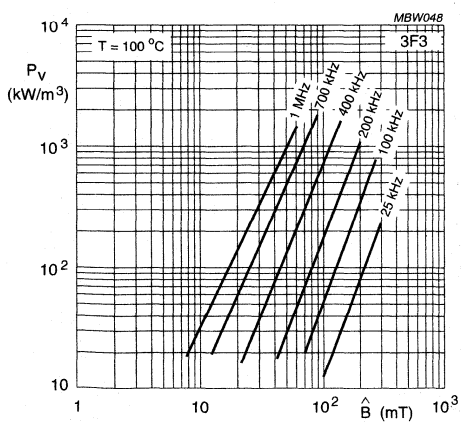


Fig.6 Specific power loss as a function of peak flux density with frequency as a parameter.

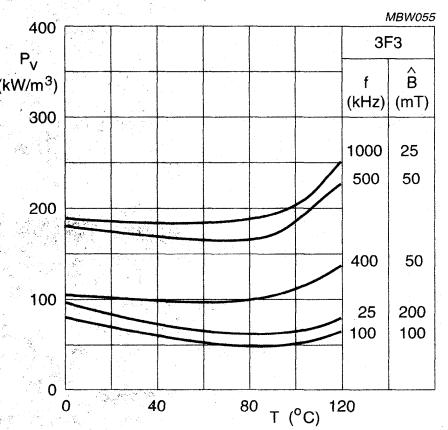


Fig.7 Specific power loss for several frequency/flux density combinations as a function of temperature.

Material grade specification 3F4

3F4 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	900 ±20%	
μ_a	100 °C; 25 kHz; 200 mT	≈1700	
B	25 °C; 10 kHz; 250 A/m	≥350	mT
	100 °C; 10 kHz; 250 A/m	≥300	mT
P_V	100 °C; 1 MHz; 30 mT	≤200	kW/m^3
	100 °C; 3 MHz; 10 mT	≤320	kW/m^3
ρ	DC; 25 °C	≈10	Ωm
T_C		≥220	°C
density		≈4700	kg/m^3

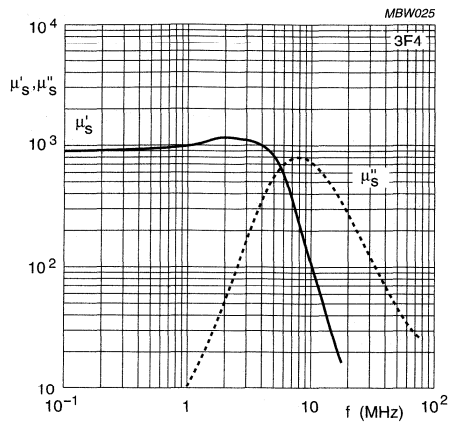


Fig.1 Complex permeability as a function of frequency.

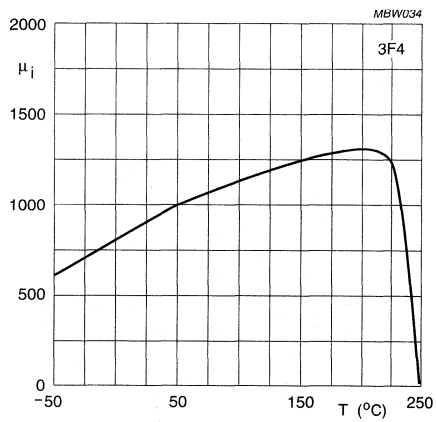


Fig.2 Initial permeability as a function of temperature.

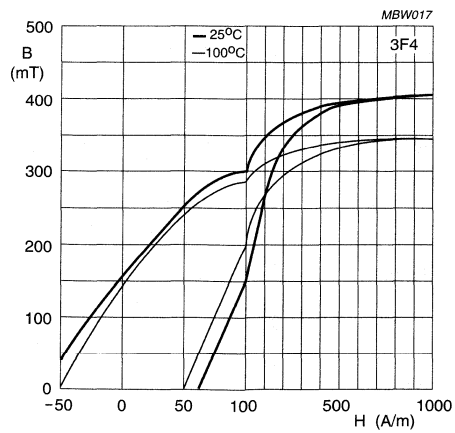


Fig.3 Typical B-H loops.

Material grade specification 3F4

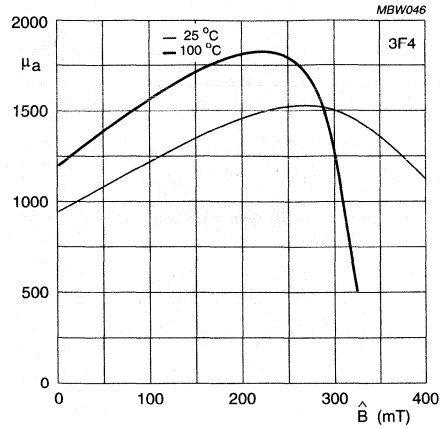


Fig.4 Amplitude permeability as function of peak flux density.

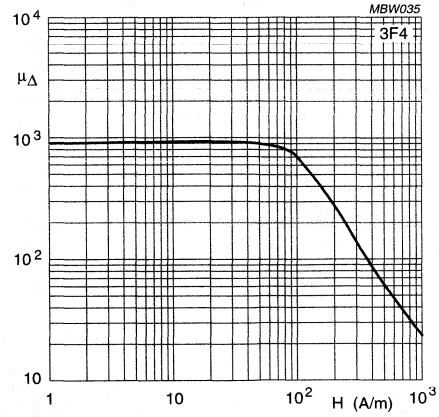


Fig.5 Incremental permeability as a function of magnetic field strength.

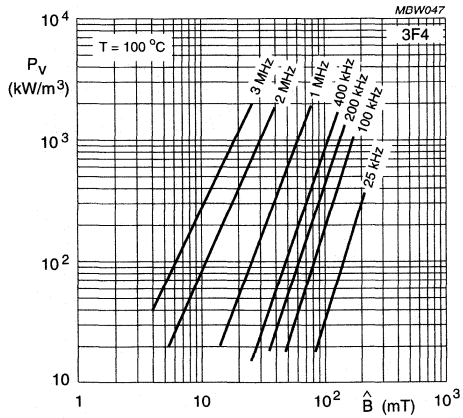


Fig.6 Specific power loss as a function of peak flux density with frequency as a parameter.

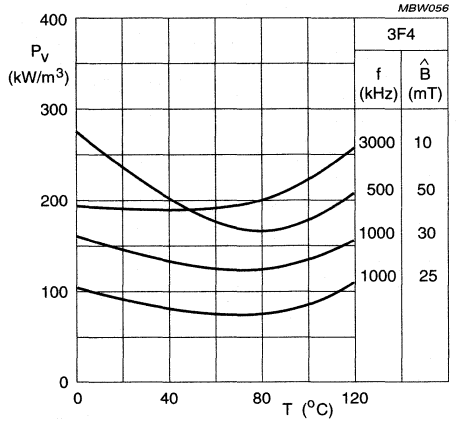


Fig.7 Specific power loss for several frequency/flux density combinations as a function of temperature.

3F35 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	≈1400	
μ_a	100 °C; 25 kHz; 200 mT	≈2500	
B	25 °C; 10 kHz; 250 A/m	≥400	mT
	100 °C; 10 kHz; 250 A/m	≥330	mT
$P_{V(av)}$	100 °C; 500 kHz; 50 mT	120	kW/m³
	100 °C; 500 kHz; 100 mT	900	kW/m³
ρ	DC; 25 °C	≈5	Ωm
T_C		≥240	°C
density		≈4750	kg/m³

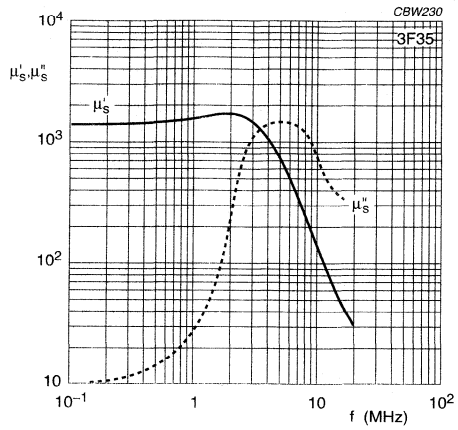


Fig.1 Complex permeability as a function of frequency.

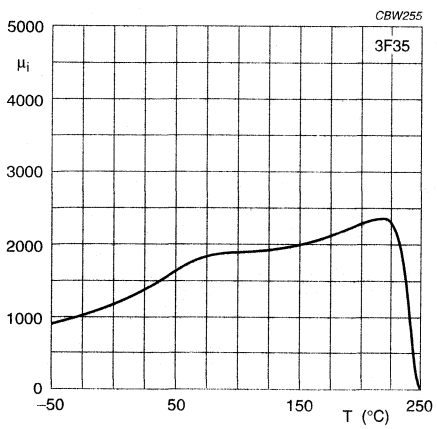


Fig.2 Initial permeability as a function of temperature.

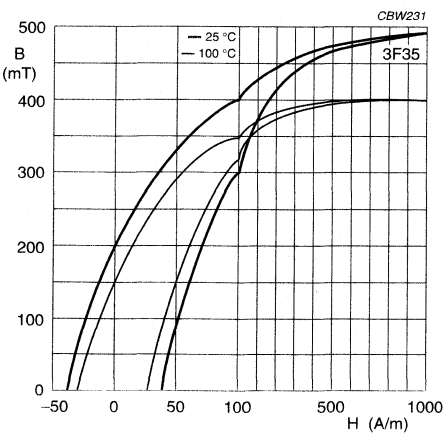


Fig.3 Typical B-H loops.

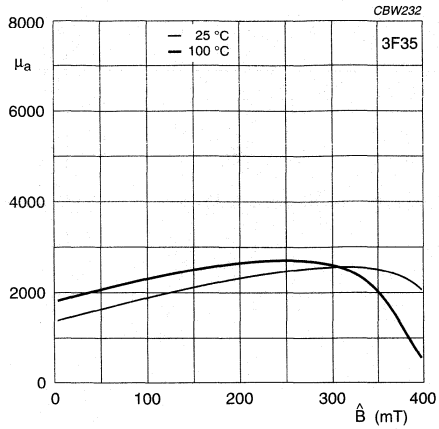


Fig.4 Amplitude permeability as function of peak flux density.

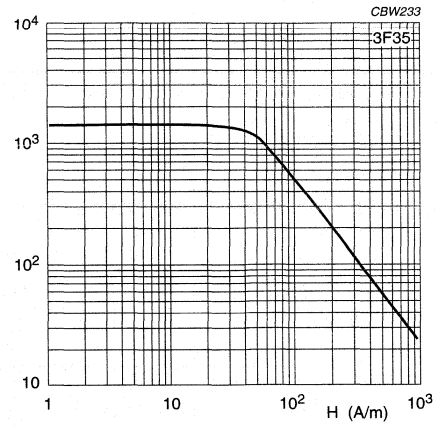


Fig.5 Incremental permeability as a function of magnetic field strength.

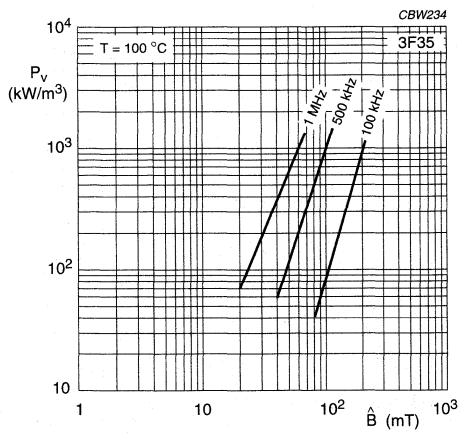


Fig.6 Specific power loss as a function of peak flux density with frequency as a parameter.

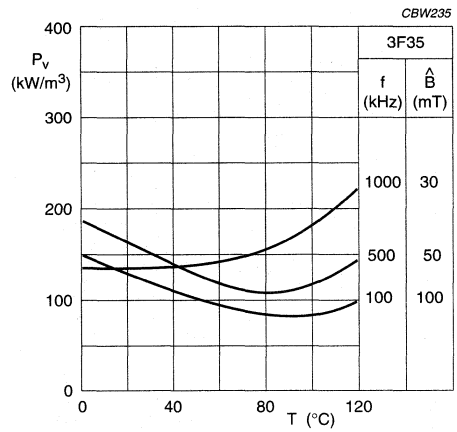


Fig.7 Specific power loss for several frequency/flux density combinations as a function of temperature.

Material grade specification 3H1

3H1 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	2300 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈350	mT
	100 °C; 10 kHz; 250 A/ m	≈210	
$\tan\delta/\mu_i$	25 °C; 10 kHz; 0.1 mT	$\leq 1.5 \times 10^{-6}$	
	25 °C; 100 kHz; 0.1 mT	$\leq 5 \times 10^{-6}$	
η_B	25 °C; 10 kHz; 1.5 to 3 mT	$\leq 1 \times 10^{-3}$	T^{-1}
D_F	25 °C; 10 kHz; 0.1 mT	$\leq 4.5 \times 10^{-6}$	
α_F	≤10 kHz; 0.1 mT: 5 to 25 °C	$(1 \pm 0.5) \times 10^{-6}$	K^{-1}
	25 to 55 °C	$(1 \pm 0.5) \times 10^{-6}$	
	25 to 70 °C	$(1 \pm 0.5) \times 10^{-6}$	
ρ	DC; 25 °C	≈1	Ωm
T_C		≥130	°C
density		≈4800	kg/m^3

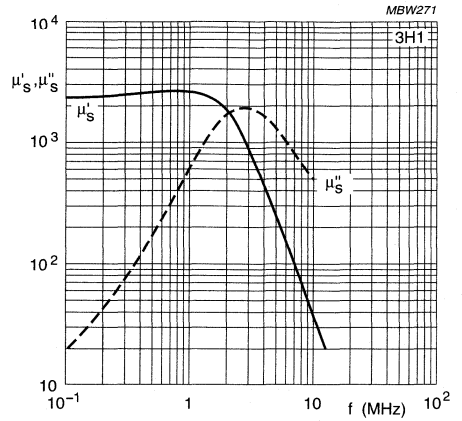


Fig.1 Complex permeability as a function of frequency.

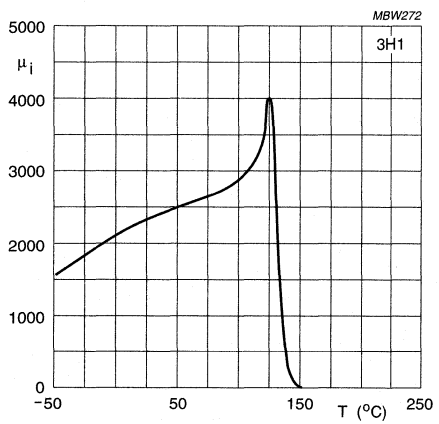


Fig.2 Initial permeability as a function of temperature.

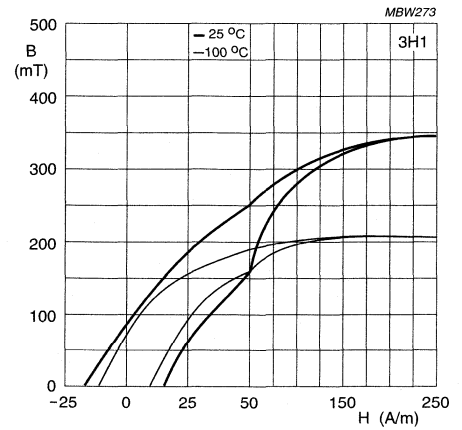


Fig.3 Typical B-H loops.

Material grade specification — 3H3

3H3 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	2000 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈330	mT
	100 °C; 10 kHz; 250 A/ m	≈250	
$\tan\delta/\mu_i$	25 °C; 0.1 mT:		
	30 kHz	$\leq 1.6 \times 10^{-6}$	
	100 kHz	$\leq 2.5 \times 10^{-6}$	
η_B	25 °C; 100 kHz; 1.5 to 3 mT	$\leq 0.6 \times 10^{-3}$	T^{-1}
D_F	0.1 mT; 10 kHz:		
	25 °C	$\leq 3 \times 10^{-6}$	
	40 °C	$\leq 3 \times 10^{-6}$	
α_F	≤10 kHz; 0.1 mT:		K^{-1}
	5 to 25 °C	$(0.7 \pm 0.3) \times 10^{-6}$	
	25 to 55 °C	$(0.7 \pm 0.3) \times 10^{-6}$	
	25 to 70 °C	$(0.7 \pm 0.3) \times 10^{-6}$	
ρ	DC; 25 °C	≈2	Ωm
T_C		≥160	°C
density		≈4700	kg/m^3

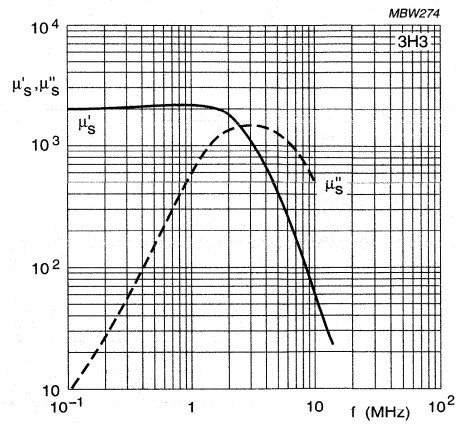


Fig.1 Complex permeability as a function of frequency.

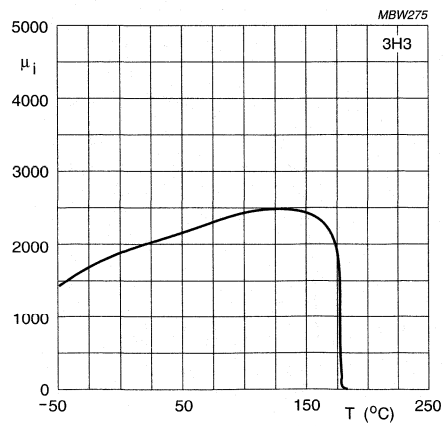


Fig.2 Initial permeability as a function of temperature.

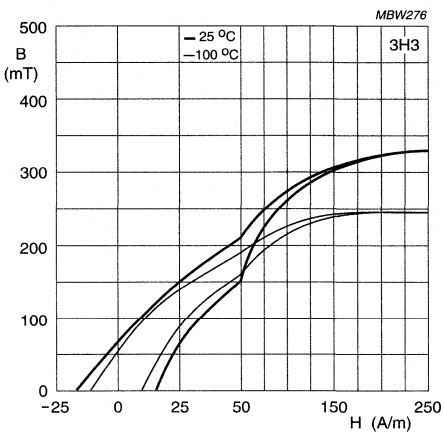


Fig.3 Typical B-H loops.

Material grade specification 3R1

3R1 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	800 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≥360	mT
	100 °C; 10 kHz; 250 A/ m	≥285	
B_r	from 1 kA/m; 25 °C	≥310	mT
	from 1 kA/m; 100 °C	≥220	
H_c	from 1 kA/m; 25 °C	≤52	A/m
	from 1 kA/m; 100 °C	≤23	
ρ	DC; 25 °C	≈10^3	Ωm
T_C		≥230	°C
density		≈4700	kg/m^3

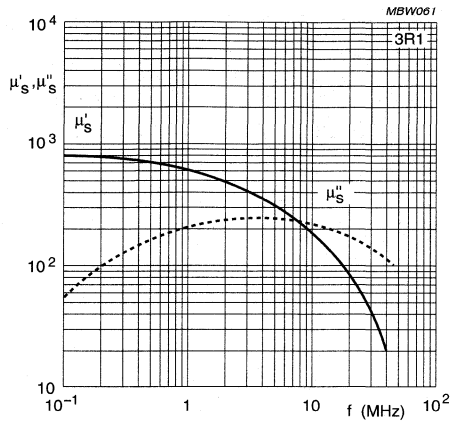


Fig.1 Complex permeability as a function of frequency.

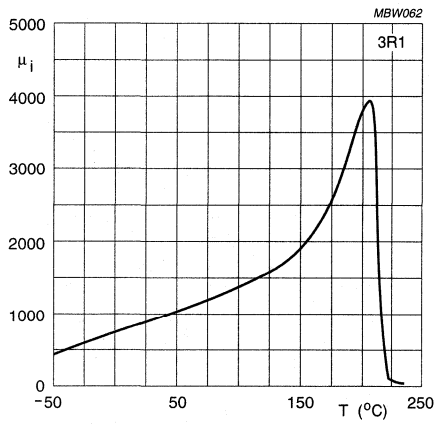


Fig.2 Initial permeability as a function of temperature.

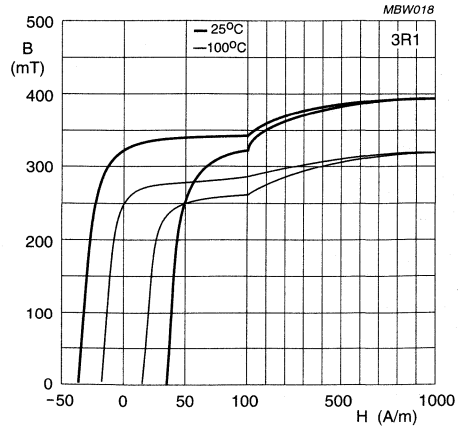


Fig.3 Typical B-H loops.

Material grade specification 3R1

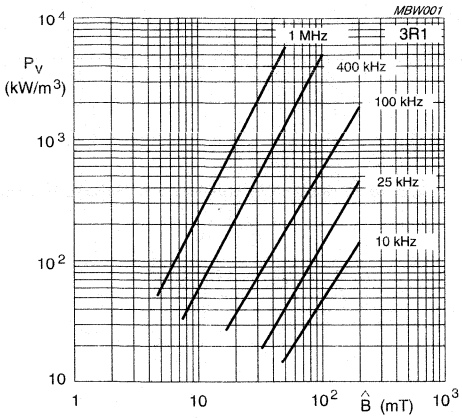


Fig.4 Specific power loss as a function of peak flux density with frequency as a parameter.

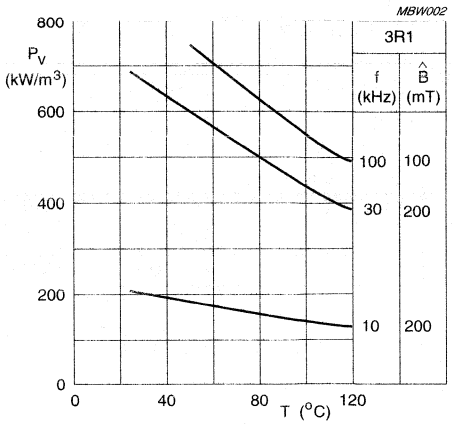


Fig.5 Specific power loss for several frequency/flux density combinations as a function of temperature.

Remark:

When 3R1 ring cores are driven exactly at their natural mechanical resonant frequencies a magneto-elastic resonance will occur. With large flux excursions and no mechanical damping, amplitudes can become so high that the maximum tensile stress of the ferrite is exceeded. Cracks or even breakage of the ring core could be the result. It is advised not to drive the toroidal cores at their radial resonant frequencies or even subharmonics (e.g. half this resonant frequency).

Resonant frequencies can be calculated for any ring core with the following simple formula:

$$f_r = \frac{5700}{\pi\left(\frac{D_o + D_i}{2}\right)} \text{ kHz}$$

where:

f = radial resonant frequency (kHz)

D_o = outside diameter (mm)

D_i = inside diameter (mm)

Material grade specification 3S1

3S1 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	≈4000	
B	25 °C; 10 kHz; 250 A/ m	≈350	mT
	100 °C; 10 kHz; 250 A/ m	≈180	
|Z| (1)	25 °C; 1 MHz;	≥30	Ω
	25 °C; 10 MHz;	≥60	
ρ	DC; 25 °C	≈1	Ωm
T_C		≥125	°C
density		≈4900	kg/m^3

Note

1. Measured on a bead ∅5 × ∅2 × 10 mm.

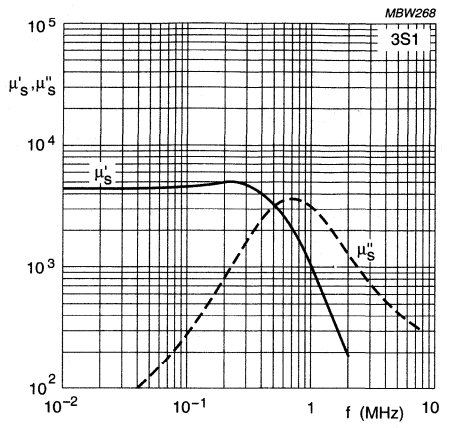


Fig.1 Complex permeability as a function of frequency.

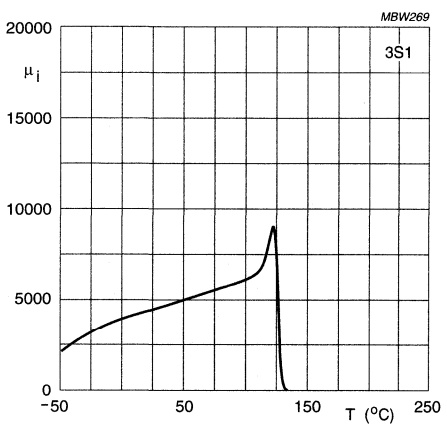


Fig.2 Initial permeability as a function of temperature.

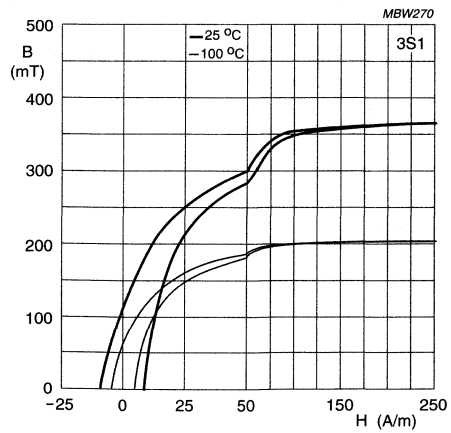


Fig.3 Typical B-H loops.

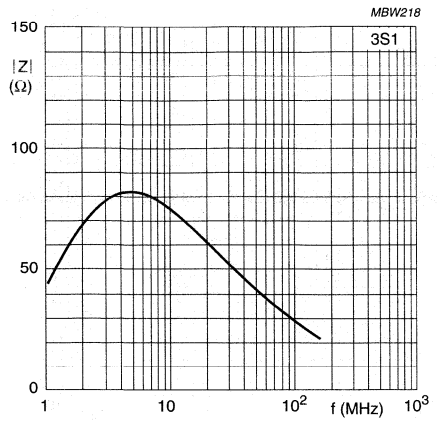


Fig.4 Impedance as a function of frequency.

Material grade specification 3S3

3S3 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	≈350	
B	25 °C; 10 kHz; 250 A/ m	≈300	mT
	100 °C; 10 kHz; 250 A/ m	≈250	
|Z| (1)	25 °C; 30 MHz;	≥25	Ω
	25 °C; 100 MHz;	≥60	
	25 °C; 300 MHz;	≥100	
ρ	DC; 25 °C	$\approx 10^4$	Ωm
T_C		≥225	°C
density		≈4800	kg/m³

Note

1. Measured on a bead ∅5 × ∅2 × 10 mm.

Remark: This wideband EMI-suppression material is optimized for applications with high bias currents at elevated temperatures (e.g. rods for chokes in commutation motors).

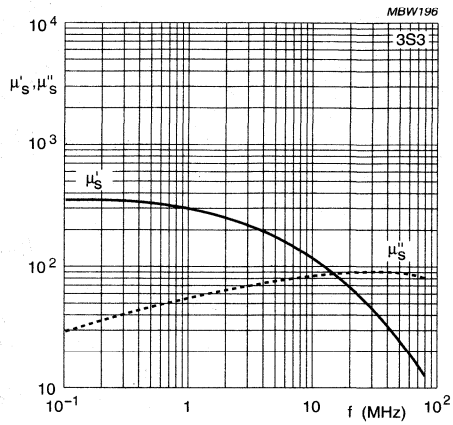


Fig.1 Complex permeability as a function of frequency.

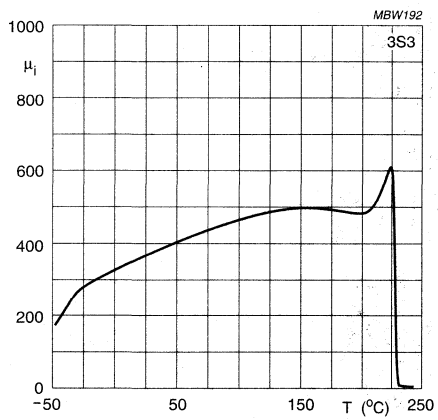


Fig.2 Initial permeability as a function of temperature.

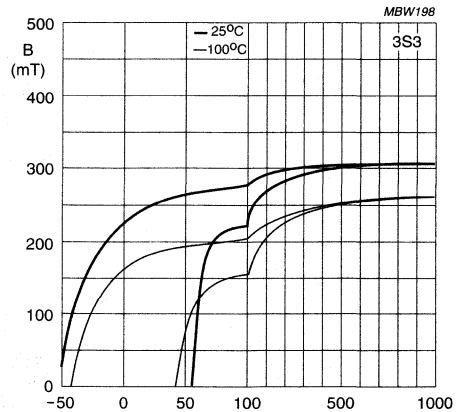


Fig.3 Typical B-H loops.

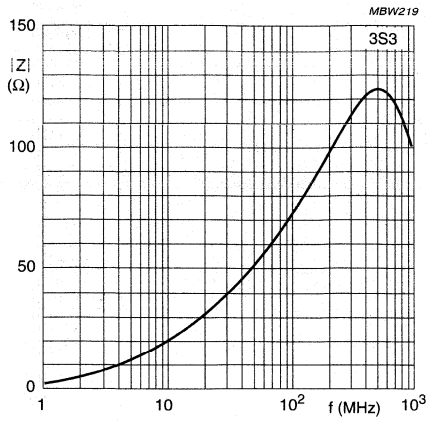


Fig.4 Impedance as a function of frequency.

Material grade specification 3S4

3S4 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	≈1700	
B	25 °C; 10 kHz; 250 A/ m	≈300	mT
	100 °C; 10 kHz; 250 A/ m	≈140	
|Z|(1)	25 °C; 3 MHz;	≥25	Ω
	25 °C; 30 MHz;	≥60	
	25 °C; 100 MHz;	≥80	
	25 °C; 300 MHz;	≥90	
ρ	DC, 25 °C	$\approx 10^3$	Ωm
T_C		≥110	°C
density		≈4800	kg/m³

Note

1. Measured on a bead∅5× ∅2 × 10 mm

Remark: This wideband EMI-suppression material is optimized for applications without bias currents at moderate temperatures (e.g. common-mode chokes).

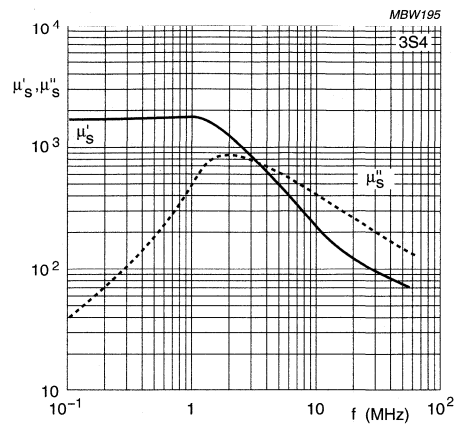


Fig.1 Complex permeability as a function of frequency.

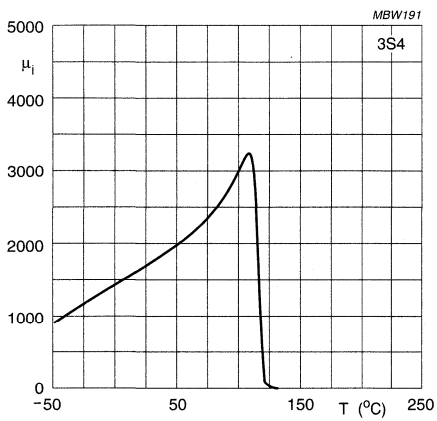


Fig.2 Initial permeability as a function of temperature.

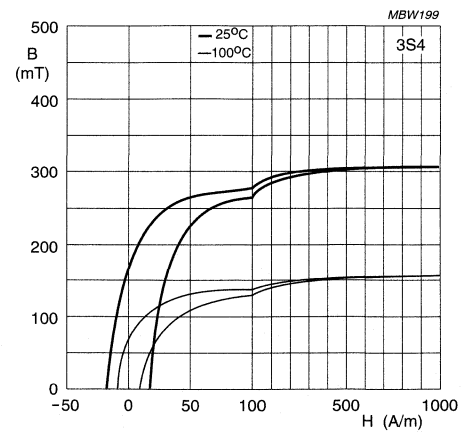


Fig.3 Typical B-H loops.

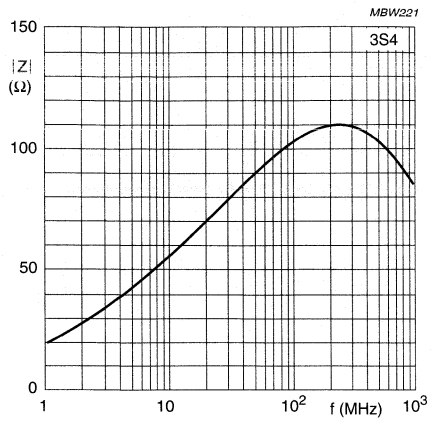


Fig.4 Impedance as a function of frequency.

Material grade specification — 4A11

4A11 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	700 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈270	mT
	100 °C; 10 kHz; 250 A/ m	≈180	
$\tan\delta/\mu_i$	25 °C; 1 MHz; 0.1 mT	$\leq 100 \times 10^{-6}$	
	25 °C; 3 MHz; 0.1 mT	$\leq 1000 \times 10^{-6}$	
ρ	DC; 25 °C	$\approx 10^5$	Ωm
T_C		≥125	°C
density		≈5100	kg/m^3

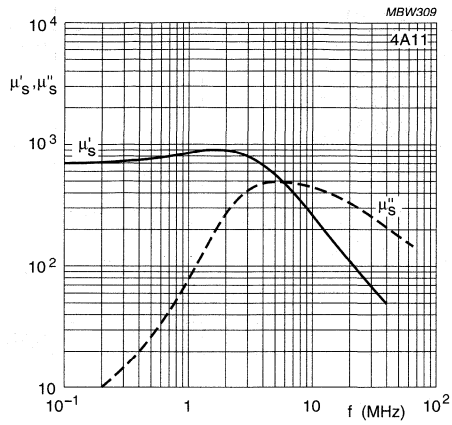


Fig.1 Complex permeability as a function of frequency.

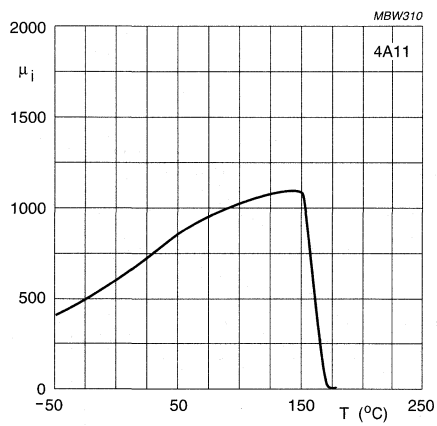


Fig.2 Initial permeability as a function of temperature.

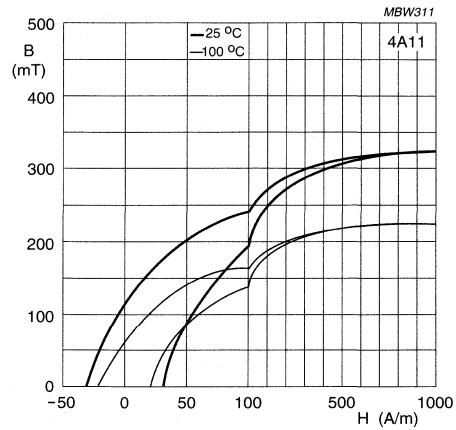


Fig.3 Typical B-H loops.

Material grade specification — 4A15

4A15 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	1200 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈300	mT
	100 °C; 10 kHz; 250 A/ m	≈180	
$\tan\delta/\mu_i$	25 °C; 1 MHz; 0.1 mT	$\leq 300 \times 10^{-6}$	
	25 °C; 3 MHz; 0.1 mT	$\leq 1500 \times 10^{-6}$	
ρ	DC; 25 °C	$\approx 10^5$	Ωm
T_C		≥125	°C
density		≈5100	kg/m^3

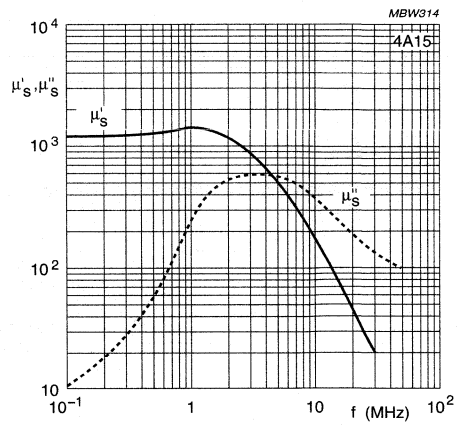


Fig.1 Complex permeability as a function of frequency.

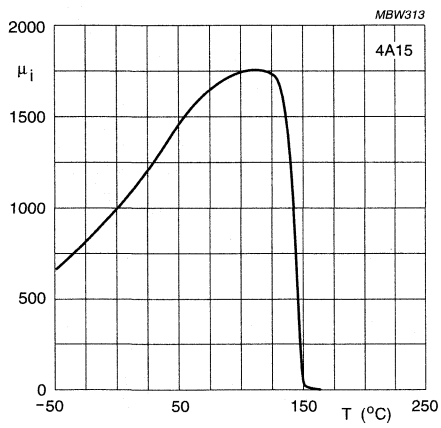


Fig.2 Initial permeability as a function of temperature.

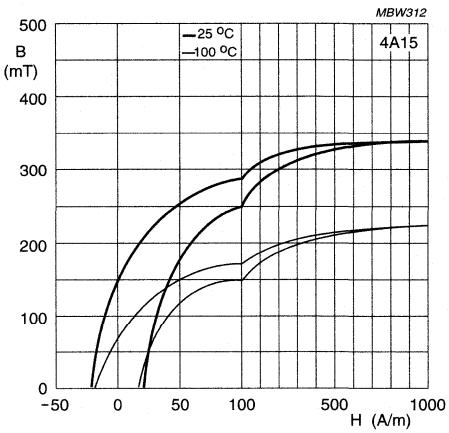


Fig.3 Typical B-H loops.

Material grade specification 4B1

4B1 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	250 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈310	mT
	100 °C; 10 kHz; 250 A/ m	≈260	
$\tan\delta/\mu_i$	25 °C; 1 MHz; 0.1 mT	$\leq 90 \times 10^{-6}$	
	25 °C; 3 MHz; 0.1 mT	$\leq 300 \times 10^{-6}$	
ρ	DC; 25 °C	$\approx 10^5$	Ωm
T_C		≥250	°C
density		≈4600	kg/m^3

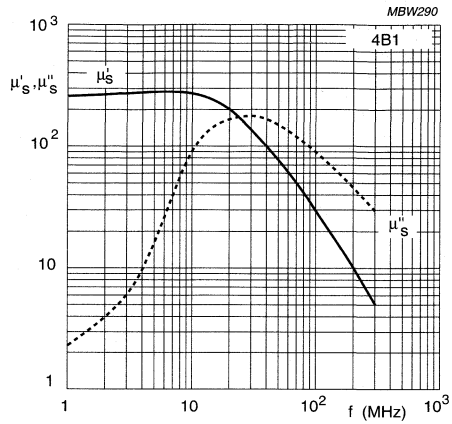


Fig.1 Complex permeability as a function of frequency.

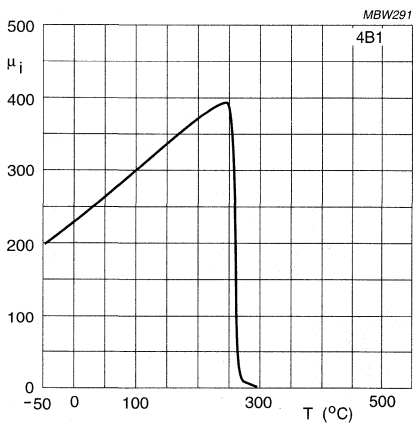


Fig.2 Initial permeability as a function of temperature.

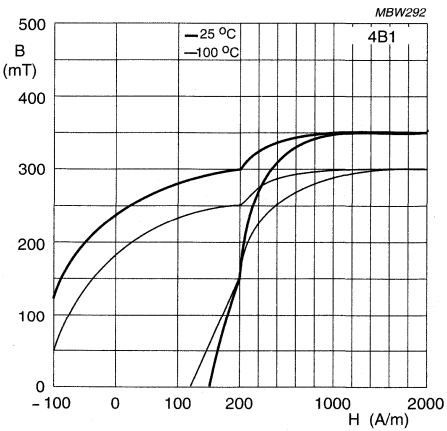


Fig.3 Typical B-H loops.

Material grade specification 4C6

4C6 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	100 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈300	mT
	100 °C; 10 kHz; 250 A/ m	≈250	
$\tan\delta/\mu_i$	25 °C; 3 MHz; 0.1 mT	$\leq 60 \times 10^{-6}$	
	25 °C; 10 MHz; 0.1 mT	$\leq 100 \times 10^{-6}$	
η_B	25 °C; 100 kHz; 1.5 to 3 mT	$\leq 20 \times 10^{-3}$	T^{-1}
D_F	25 °C; 100 kHz; 0.1 mT	$\leq 10 \times 10^{-6}$	
α_F	5 to 25 °C; ≤10 kHz; 0.1 mT	$(3 \pm 3) \times 10^{-6}$	K^{-1}
	25 to 55 °C; ≤10 kHz; 0.1 mT	$(3 \pm 3) \times 10^{-6}$	
ρ	DC; 25 °C	$\approx 10^5$	Ωm
T_C		≥350	°C
density		≈4500	kg/m^3

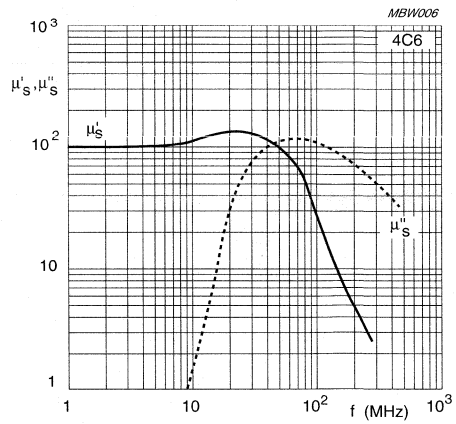


Fig.1 Complex permeability as a function of frequency.

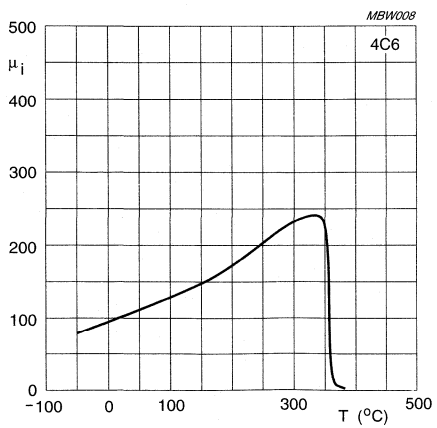


Fig.2 Initial permeability and loss factor as a function of temperature.

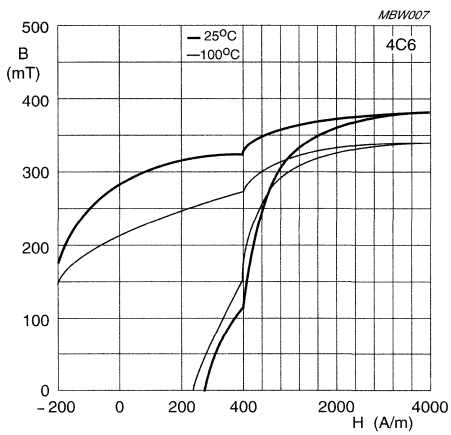


Fig.3 Typical B-H loops.

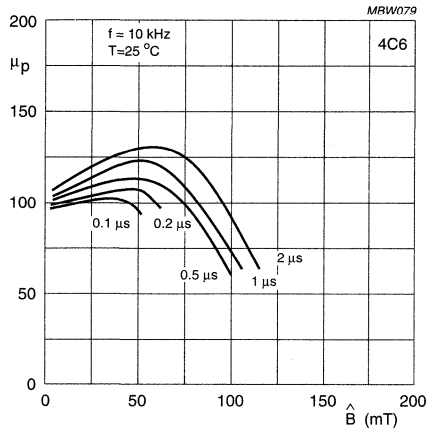


Fig.4 Pulse characteristics (unipolar pulses).

Material grade specification — 4C65

4C65 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	125 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈300	mT
	100 °C; 10 kHz; 250 A/ m	≈250	
$\tan\delta/\mu_i$	25 °C; 3 MHz; 0.1 mT	$\leq 80 \times 10^{-6}$	
	25 °C; 10 MHz; 0.1 mT	$\leq 130 \times 10^{-6}$	
ρ	DC; 25 °C	$\approx 10^5$	Ωm
T_C		≥350	°C
density		≈4500	kg/m^3

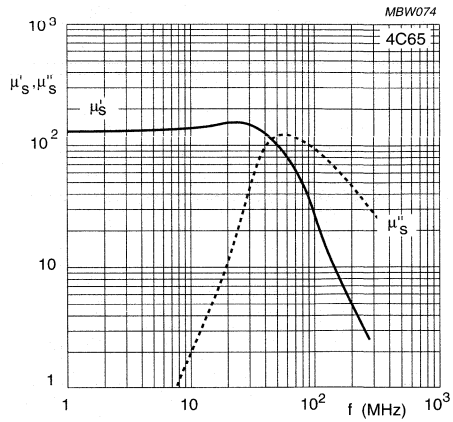


Fig.1 Complex permeability as a function of frequency.

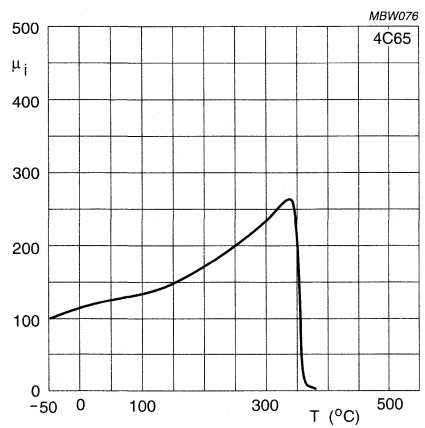


Fig.2 Initial permeability as a function of temperature.

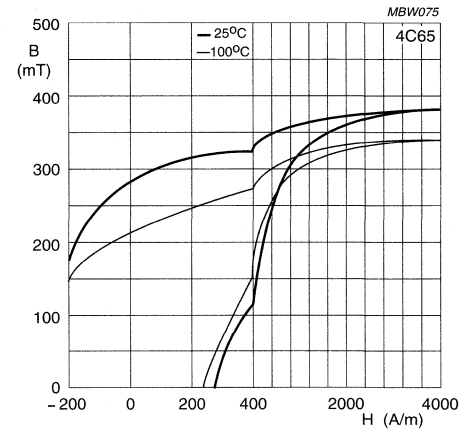


Fig.3 Typical B-H loops.

Material grade specification 4C65

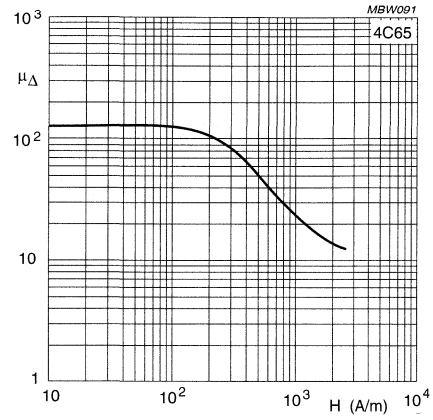


Fig.4 Incremental permeability as a function of magnetic field strength.

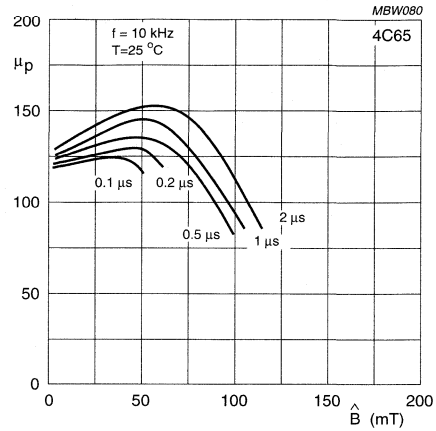


Fig.5 Pulse characteristics (unipolar pulses).

Material grade specification 4D2

4D2 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	60 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈200	mT
	100 °C; 10 kHz; 250 A/ m	≈180	
$\tan\delta/\mu_i$	25 °C; 10 MHz; 0.1 mT	$\leq 100 \times 10^{-6}$	
	25 °C; 30 MHz; 0.1 mT	$\leq 600 \times 10^{-6}$	
ρ	DC, 25 °C	$\approx 10^5$	Ωm
T_C		≥400	°C
density		≈4200	kg/m^3

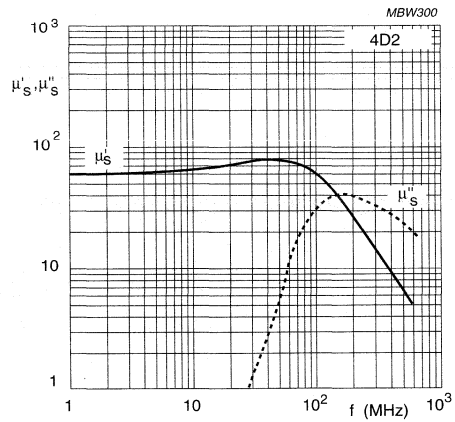


Fig.1 Complex permeability as a function of frequency.

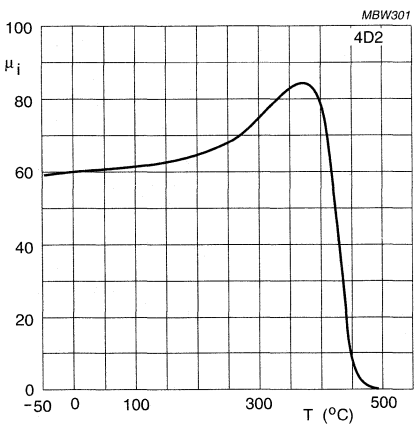


Fig.2 Initial permeability as a function of temperature.

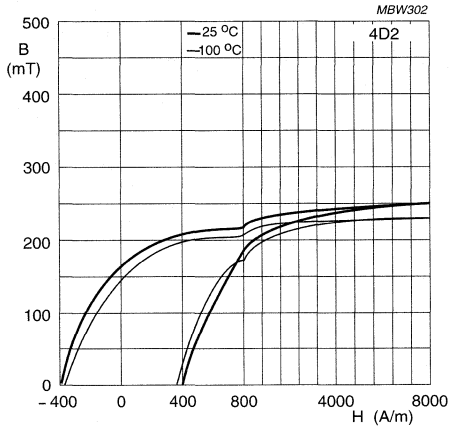


Fig.3 Typical B-H loops.

Material grade specification 4E1

4E1 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	15 ±20%	
B	25 °C; 10 kHz; 250 A/ m	≈80	mT
	100 °C; 10 kHz; 250 A/ m	≈75	mT
$\tan\delta/\mu_i$	25 °C; 10 MHz; 0.1 mT	$\leq 300 \times 10^{-6}$	
	25 °C; 30 MHz; 0.1 mT	$\leq 350 \times 10^{-6}$	
ρ	DC, 25 °C	$\approx 10^5$	Ωm
T_C		≥500	°C
density		≈3700	kg/m^3

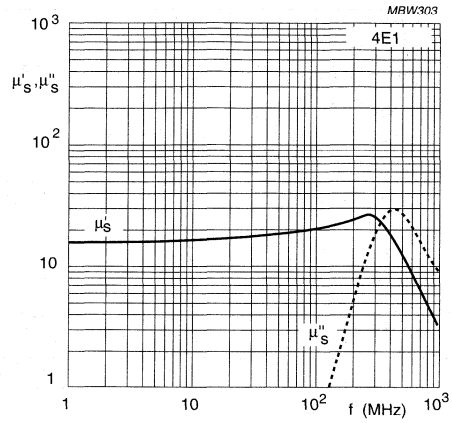


Fig.1 Complex permeability as a function of frequency.

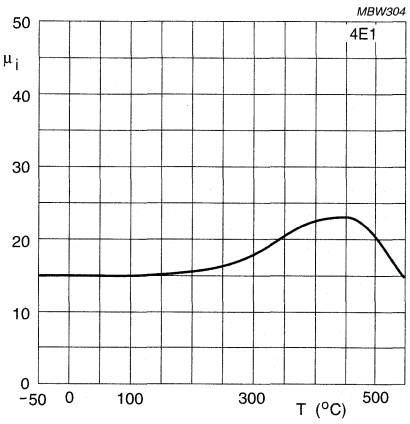


Fig.2 Initial permeability as a function of temperature.

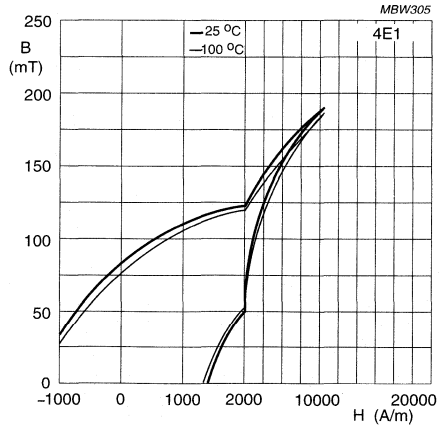


Fig.3 Typical B-H loops.

Material grade specification 4F1

4F1 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	≈80	
μ_a	100 °C; 25 kHz; 200 mT	≈300	
B	25 °C; 10 kHz; 250 A/ m 100 °C; 10 kHz; 250 A/ m	≥50 ≥100	mT
P_V	100 °C; 3 MHz; 10 mT 100 °C; 10 MHz; 5 mT	≤200 ≤200	kW/m^3
ρ	DC, 25 °C	≈10^5	Ωm
T_C		≥260	°C
density		≈4600	kg/m^3

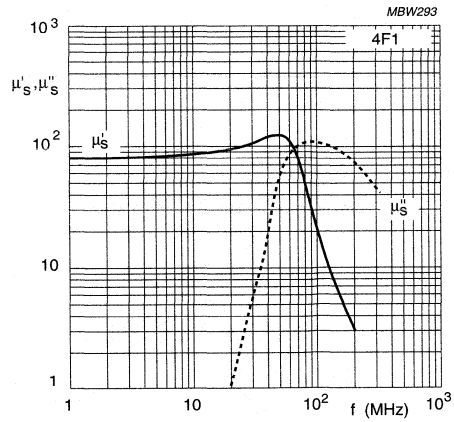


Fig.1 Complex permeability as a function of frequency.

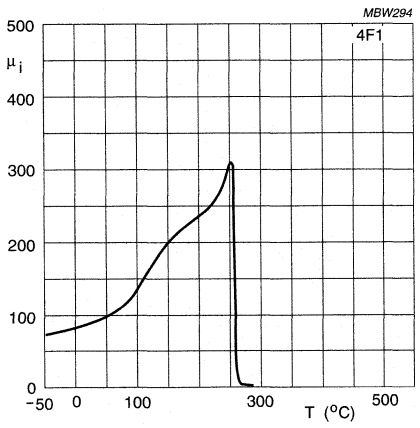


Fig.2 Initial permeability as a function of temperature.

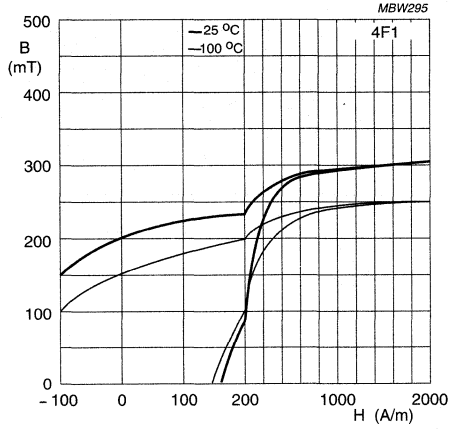


Fig.3 Typical B-H loops.

Material grade specification 4F1

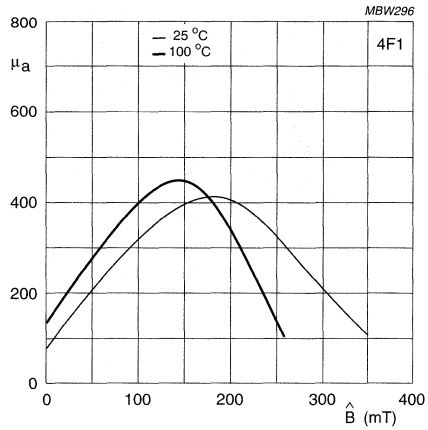


Fig.4 Amplitude permeability as function of peak flux density.

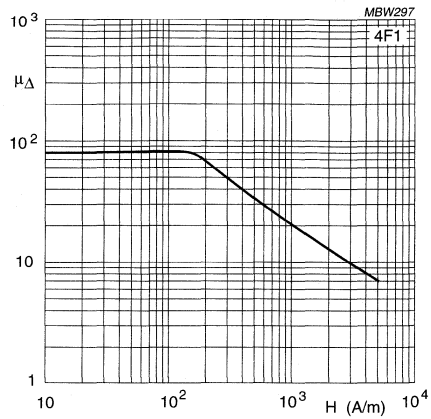


Fig.5 Incremental permeability as a function of magnetic field strength.

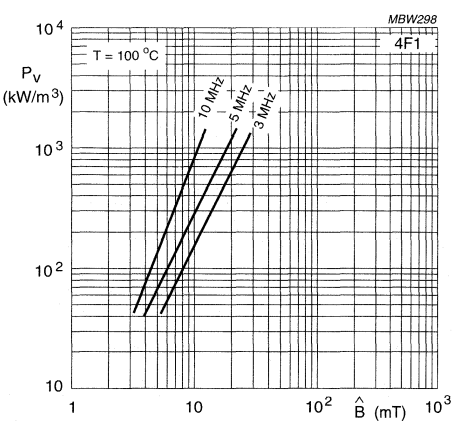


Fig.6 Specific power loss as a function of peak flux density with frequency as a parameter.

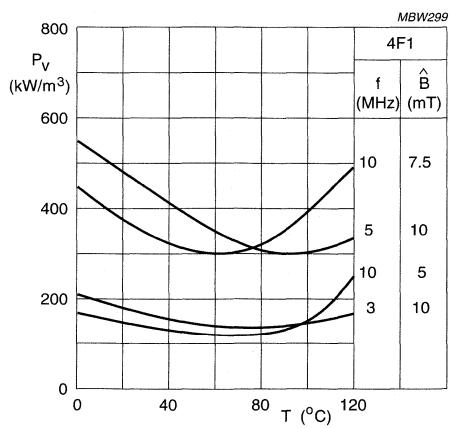


Fig.7 Specific power loss for several frequency/flux density combinations as a function of temperature.

Material grade specification 4S2

4S2 SPECIFICATIONS

SYMBOL	CONDITIONS	VALUE	UNIT
μ_i	25 °C; ≤10 kHz; 0.1 mT	≈700	
B	25 °C; 10 kHz; 250 A/ m	≈270	mT
	100 °C; 10 kHz; 250 A/ m	≈180	
$\lvert Z \rvert$ (1)	25 °C; 30 MHz;	≥50	Ω
	25 °C; 300 MHz;	≥90	
ρ	DC; 25 °C	≈10^5	Ωm
T_C		≥125	°C
density		≈5000	kg/m^3

Note

1. Measured on a bead ∅5 × ∅2 × 10 mm.

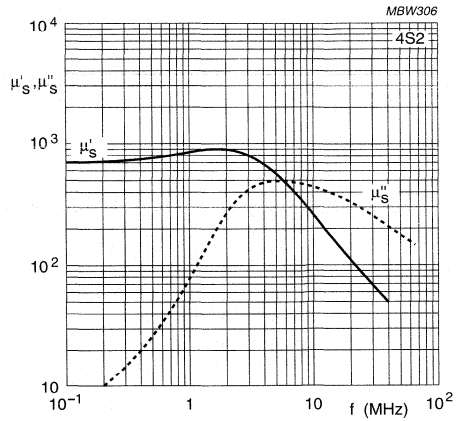


Fig.1 Complex permeability as a function of frequency.

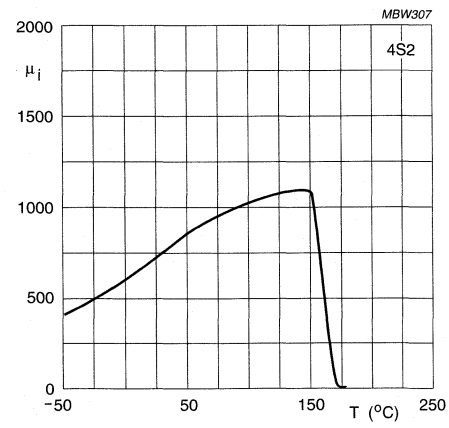


Fig.2 Initial permeability as a function of temperature.

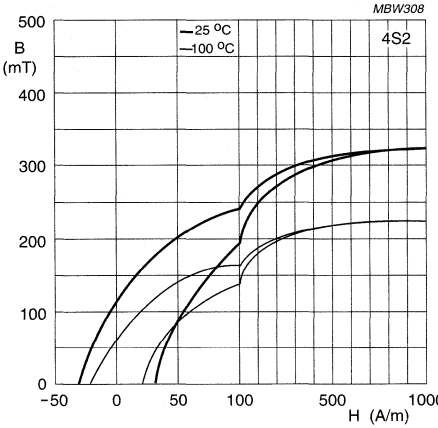


Fig.3 Typical B-H loops.

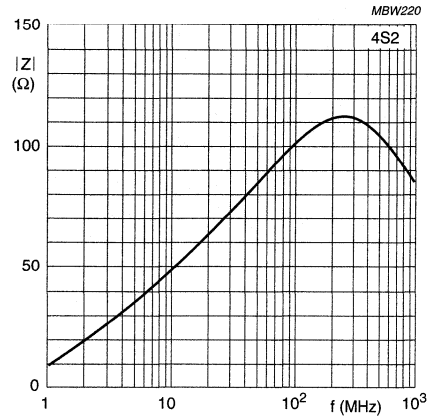
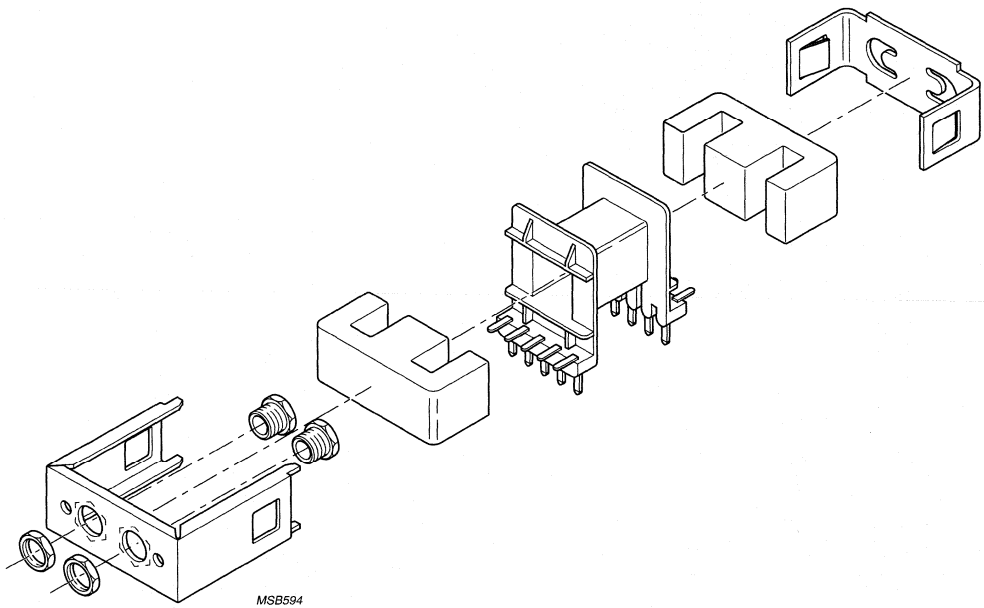


Fig.4 Impedance as a function of frequency.



For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview E cores

CORE TYPE	V_e (mm^3)	A_e (mm^2)	MASS (g)
E5.3/2.7/2	31.4	2.50	0.08
E6.3/2.9/2	40.6	3.30	0.12
E8.8/4.1/2	78.0	5.00	0.25
E13/6/6	559	20.2	1.4
E13/7/4	369	12.4	0.9
E16/8/5	750	20.1	2.0
E19/8/5	900	22.6	2.3
E19/8/9	1650	41.3	4.0
E20/10/5	1340	31.2	4.0
E20/10/6	1490	32.0	3.7
E25/9/6	1860	38.4	4.8
E25/10/6	1930	37.0	4.8
E25/13/7	2990	52.0	8.0
E25/13/11	4500	78.4	11
E25/16/6	2840	37.0	7.1
E30/15/7	4000	60.0	11
E31/13/9	5150	83.2	13
E32/16/9	6180	83.0	16
E34/14/9	5590	80.7	14
E41/17/12	11500	149	30
E42/21/15	17300	178	44
E42/21/20	22700	233	56
E42/33/20	34200	236	82
E46/23/30	43300	412	109
E47/20/16	20800	234	53
E50/27/15	26900	225	68
E55/28/21	44000	353	108
E55/28/25	52000	420	130
E56/24/19	36000	337	90
E65/32/27	79000	540	205
E71/33/32	102000	683	260
E80/38/20	72300	392	180

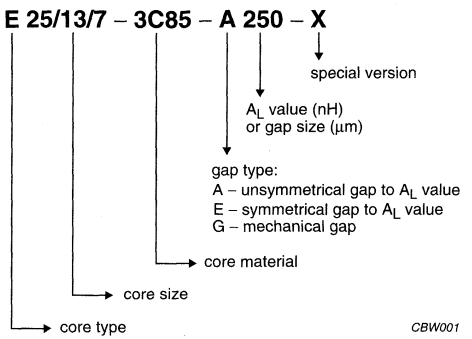


Fig.1 Type number structure for cores.

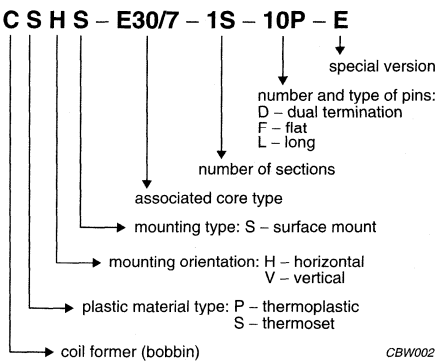
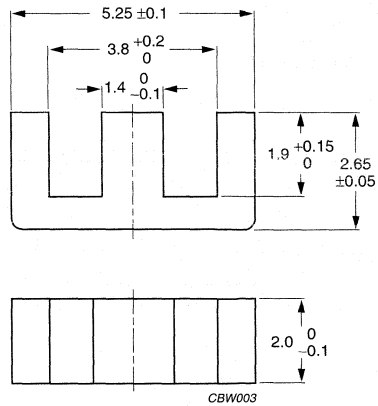


Fig.2 Type number structure for coil formers.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	4.70	mm^{-1}
V_e	effective volume	33.3	mm^3
l_e	effective length	12.5	mm
A_e	effective area	2.66	mm^2
A_{min}	minimum area	2.63	mm^2
m	mass of core half	≈0.08	g



Dimensions in mm.

Fig.1 E5.3/2.7/2 core half.

Core halves for general purpose transformers and power applications

Clamping force 5 ±2 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3	265 ±25%	≈990	≈0	E5.3/2.7/2-3F3
3F4 des	165 ±25%	≈615	≈0	E5.3/2.7/2-3F4

Core halves of high permeability grades

Clamping force 5 ±2 N, flux density $\hat{B} \leq 0.1$ mT.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5	1400 +40/–30%	≈5240	≈0	E5.3/2.7/2-3E5
3E6	1600 +40/–30%	≈5980	≈0	E5.3/2.7/2-3E6

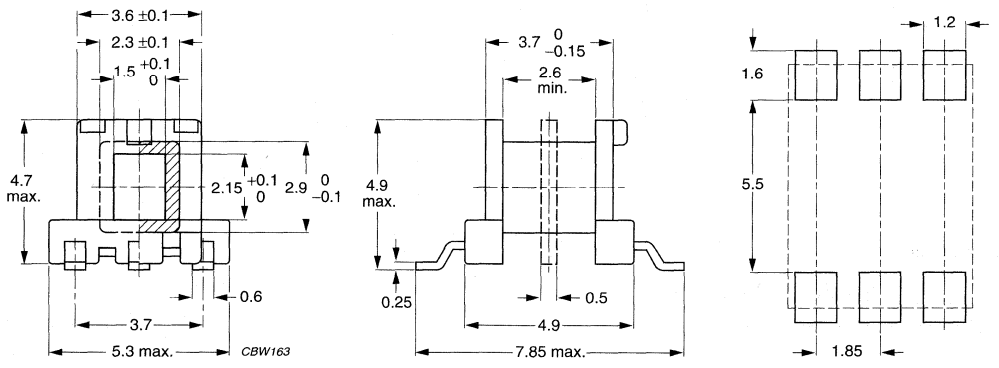
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3F3	≥300	–	≤0.005	≤0.008	–	–
3F4	≥250	–	–	–	≤0.006	≤0.010

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E54705(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 E5.3/2.7/2 coil former (SMD); 6-solder pads.

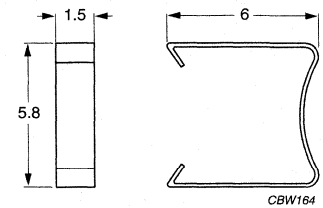
Winding data for E5.3/2.7/2 coil former (SMD) with 6 solder pads

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	1.5	2.6	12.6	CPHS-E5.3/2-1S-6P
2	2 × 0.6	2 × 1.0	12.6	CPHS-E5.3/2-2S-6P

MOUNTING PARTS

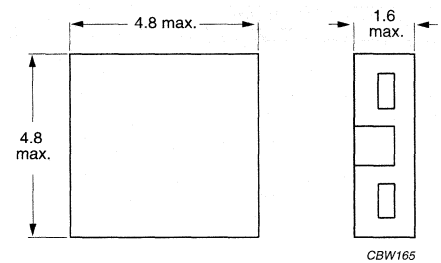
General data for mounting parts

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clamp	stainless steel (CrNi); clamping force ≈5 N	3	CLM-E5.3/2
Cover	liquid crystal polymer (LCP)	4	COV-E5.3/2



Dimensions in mm.

Fig.3 E5.3/2.7/2 clamp.



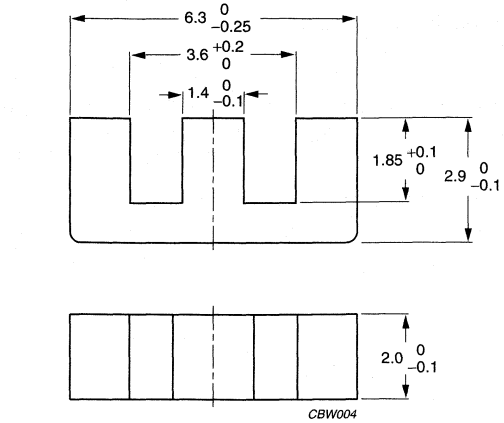
Dimensions in mm.

Fig.4 E5.3/2.7/2 cover.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	3.67	mm^{-1}
V_e	effective volume	40.6	mm^3
l_e	effective length	12.2	mm
A_e	effective area	3.3	mm^2
A_{min}	minimum area	2.6	mm^2
m	mass of core half	≈0.12	g



Dimensions in mm.

Fig.1 E6.3/2.9/2 core half.

Core halves for general purpose transformers and power applications

Clamping force 5 ±2 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3	360 ±25%	≈1050	≈0	E6.3/2.9/2-3F3
3F4 des	225 ±25%	≈660	≈0	E6.3/2.9/2-3F4

Core halves of high permeability grades

Clamping force 5 ±2 N, flux density $\hat{B} \leq 0.1$ mT

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E1	700 ±25%	≈2060	≈0	E6.3/2.9/2-3E1
3E5	1700 +40/−30%	≈5000	≈0	E6.3/2.9/2-3E5
3E6	2100 +40/−30%	≈6180	≈0	E6.3/2.9/2-3E6

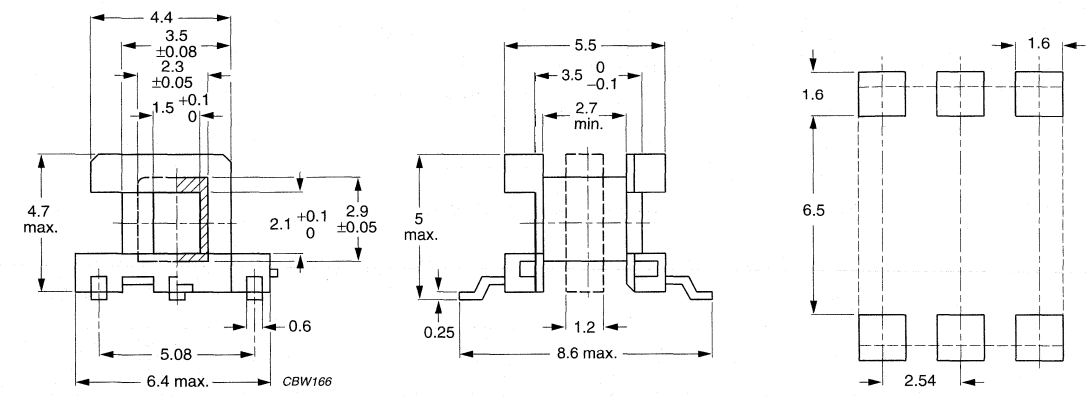
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3F3	≥300	–	≤0.007	≤0.010	–	–
3F4	≥250	–	–	–	≤0.008	≤0.013

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL 94V-0"*;; UL file number E54705(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 E6.3/2.9/2 coil former (SMD); 6-solder pads.

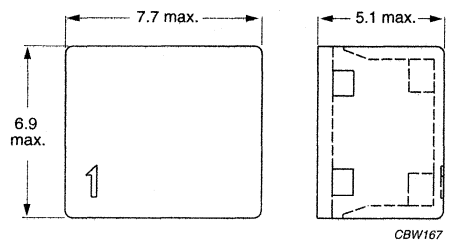
Winding data for E6.3/2.9/2 coil former (SMD) with 6 solder pads

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	1.62	2.7	12.8	CPHS-E6.3/2-1S-6P
2	2 × 0.45	2 × 0.75	12.8	CPHS-E6.3/2-2S-6P

MOUNTING PARTS

General data for mounting parts

ITEM	REMARKS	FIGURE	TYPE NUMBER
Cover	liquid crystal polymer (LCP)	3	COV-E6.3/2



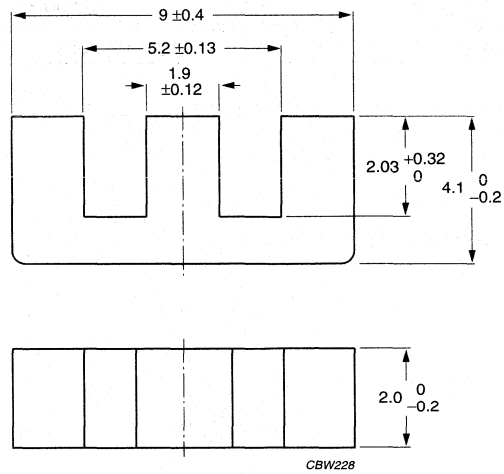
Dimensions in mm.

Fig.3 E6.3/2.9/2 cover.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	3.13	mm^{-1}
V_e	effective volume	78	mm^3
l_e	effective length	15.6	mm
A_e	effective area	5.0	mm^2
A_{min}	minimum area	3.6	mm^2
m	mass of core half	≈0.25	g



Dimensions in mm.

Fig.1 E8.8/4.1/2 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 5 ±2 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 prot	460 ±25%	≈1140	≈0	E8.8/4.1/2-3F3
3F4 prot	280 ±25%	≈695	≈0	E8.8/4.1/2-3F4

Core halves of high permeability grades

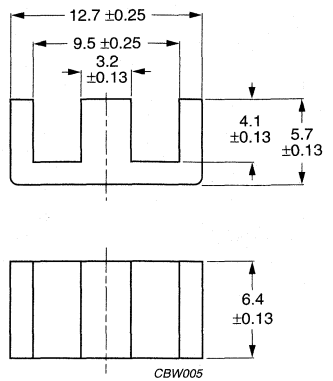
A_L measured in combination with an non-gapped core half, clamping force 15 ±5 N, flux density $\hat{B} \leq 0.1$ mT.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E6 prot	2500 +40/−30%	≈6210	≈0	E8.8/4.1/2-3E6

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.37	mm^{-1}
V_e	effective volume	559	mm^3
l_e	effective length	27.7	mm
A_e	effective area	20.2	mm^2
m	mass of core half	≈1.4	g



Dimensions in mm.

Fig.1 E13/6/6 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 15 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	63 ±3%	≈70	≈520	E13/6/6-3C81-A63
	100 ±3%	≈110	≈300	E13/6/6-3C81-A100
	160 ±3%	≈175	≈170	E13/6/6-3C81-A160
	250 ±5%	≈275	≈100	E13/6/6-3C81-A250
	315 ±10%	≈340	≈75	E13/6/6-3C81-A315
	1950 ±25%	≈2130	≈0	E13/6/6-3C81
3C85	63 ±3%	≈70	≈520	E13/6/6-3C85-A63
	100 ±3%	≈110	≈300	E13/6/6-3C85-A100
	160 ±3%	≈175	≈170	E13/6/6-3C85-A160
	250 ±5%	≈275	≈100	E13/6/6-3C85-A250
	315 ±10%	≈340	≈75	E13/6/6-3C85-A315
	1470 ±25%	≈1605	≈0	E13/6/6-3C85
3C90	1470 ±25%	≈1605	≈0	E13/6/6-3C90
3F3 des	63 ±3%	≈70	≈520	E13/6/6-3F3-A63
	100 ±3%	≈110	≈300	E13/6/6-3F3-A100
	160 ±3%	≈175	≈170	E13/6/6-3F3-A160
	250 ±5%	≈275	≈100	E13/6/6-3F3-A250
	315 ±10%	≈340	≈75	E13/6/6-3F3-A315
	1250 ±25%	≈1370	≈0	E13/6/6-3F3

Core halves of high permeability grades

A_L measured in combination with a non-gapped core half, clamping force 15 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 sup	2600 ±25%	≈2840	≈0	E13/6/6-3E25
3E27	2600 ±25%	≈2840	≈0	E13/6/6-3E27
3E5	≥3700	≥4040	≈0	E13/6/6-3E5

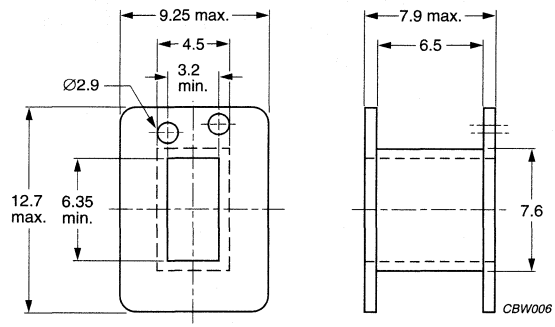
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.12	–	–
3C85	≥320	≤0.09	≤0.10	–
3C90	≥320	≤0.06	≤0.06	–
3F3	≥320	–	≤0.06	≤0.11

COIL FORMERS

General data for E13/6/6 coil former

ITEM	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-2"*; UL file number E41938(M)
Maximum operating temperature	105 °C, Class A



Dimensions in mm.

Fig.2 E13/6/6 coil former.

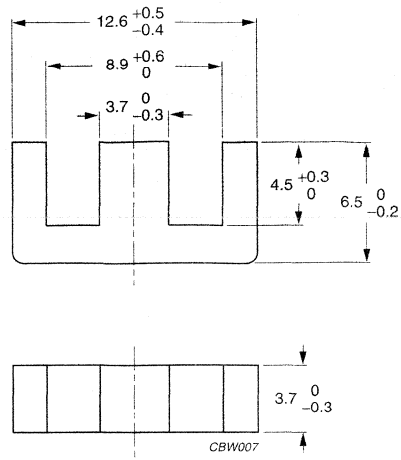
Winding data for E13/6/6 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	15.4	6.5	32.0	CP-E13/6/6-1S

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.39	mm^{-1}
V_e	effective volume	369	mm^3
l_e	effective length	29.7	mm
A_e	effective area	12.4	mm^2
A_{min}	minimum area	12.2	mm^2
m	mass of core half	≈0.9	g



Dimensions in mm.

Fig.1 E13/7/4 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 15 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85	800 ±25%	≈1500	≈0	E13/7/4-3C85
	250 ±20%	≈475	≈50	E13/7/4-3C85-G50
	110 ±15%	≈210	≈150	E13/7/4-3C85-G150
	45 ±8%	≈85	≈500	E13/7/4-3C85-G500
3C90	800 ±25%	≈1500	≈0	E13/7/4-3C90
3F3	700 ±25%	≈1300	≈0	E13/7/4-3F3
	250 ±20%	≈475	≈50	E13/7/4-3F3-G50
	110 ±15%	≈210	≈150	E13/7/4-3F3-G150
	45 ±8%	≈85	≈500	E13/7/4-3F3-G500

Core halves of high permeability grades

Clamping force 15 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E1	1200 ±25%	≈2200	≈0	E13/7/4-3E1
3E25 sup	1500 ±25%	≈2800	≈0	E13/7/4-3E25
3E27	1500 ±25%	≈2800	≈0	E13/7/4-3E27

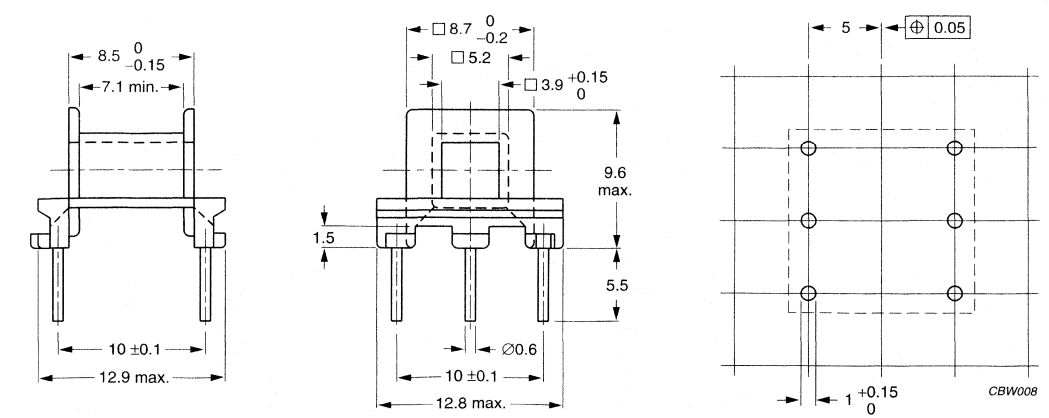
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.06	≤0.07	–
3C90	≥320	≤0.05	≤0.05	–
3F3	≥320	–	≤0.05	≤0.07

COIL FORMER

General data for 6-pins E13/7/4 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-2"*; UL file number E41871(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C, *"IEC 85"* class B
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.2 E13/7/4 coil former; 6-pins.

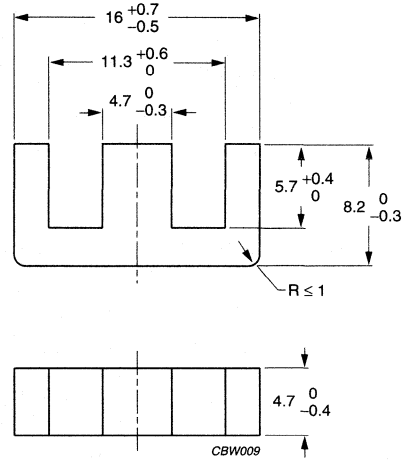
Winding data 6-pins for E13/7/4 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	11.6	7.1	24	CPH-E13/7/5-1S-6P

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.87	mm^{-1}
V_e	effective volume	750	mm^3
l_e	effective length	37.6	mm
A_e	effective area	20.1	mm^2
A_{min}	minimum area	19.3	mm^2
m	mass of core half	≈2.0	g



Dimensions in mm.

Fig.1 E16/8/5 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85	1100 ±25%	≈1640	≈0	E16/8/5-3C85
	380 ±20%	≈565	≈50	E16/8/5-3C85-G50
	170 ±12%	≈250	≈150	E16/8/5-3C85-G150
	70 ±5%	≈105	≈500	E16/8/5-3C85-G500
3C90	1100 ±25%	≈1640	≈0	E16/8/5-3C90
3F3	980 ±25%	≈1470	≈0	E16/8/5-3F3
	380 ±20%	≈565	≈50	E16/8/5-3F3-G50
	170 ±12%	≈250	≈150	E16/8/5-3F3-G150
	70 ±5%	≈105	≈500	E16/8/5-3F3-G500

Core halves of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E1	1800 ±25%	≈2700	≈0	E16/8/5-3E1
3E25 sup	2200 ±25%	≈3300	≈0	E16/8/5-3E25
3E27	2200 ±25%	≈3300	≈0	E16/8/5-3E27

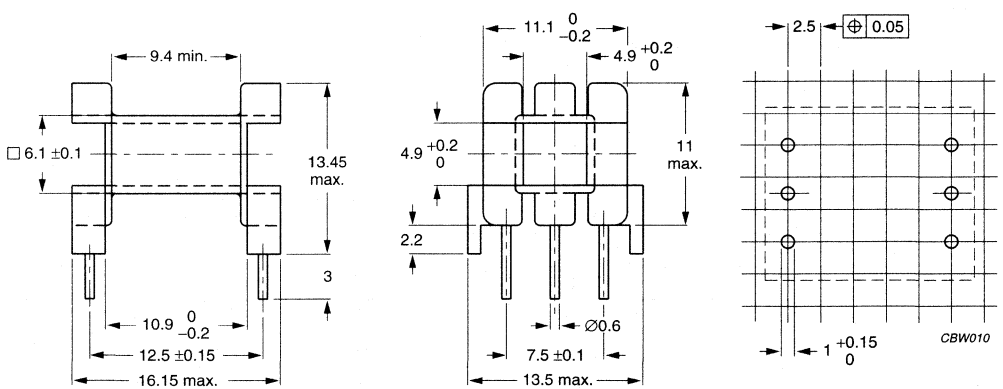
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.12	≤0.14	–
3C90	≥320	≤0.10	≤0.10	–
3F3	≥320	–	≤0.10	≤0.15

COIL FORMER

General data for 6-pins E16/8/5 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-2"*; UL file number E41871(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C, *"IEC 85"* class B
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.2 E16/8/5 coil former; 6-pins.

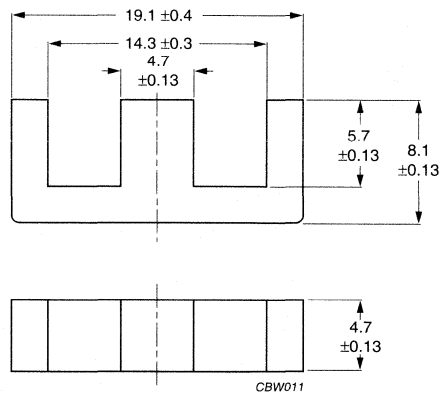
Winding data for 6-pins E16/8/5 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	21.6	9.4	33	CPH-E16/8/5-1S-6P

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.77	mm^{-1}
V_e	effective volume	900	mm^3
l_e	effective length	39.9	mm
A_e	effective area	22.6	mm^2
m	mass of core half	≈2.3	g



Dimensions in mm.

Fig.1 E19/8/5 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	63 ±3%	≈90	≈590	E19/8/5-3C81-A63
	100 ±3%	≈140	≈330	E19/8/5-3C81-A100
	160 ±3%	≈225	≈190	E19/8/5-3C81-A160
	250 ±5%	≈350	≈110	E19/8/5-3C81-A250
	315 ±10%	≈440	≈80	E19/8/5-3C81-A315
	1500 ±25%	≈2110	≈0	E19/8/5-3C81
3C85	63 ±3%	≈90	≈590	E19/8/5-3C85-A63
	100 ±3%	≈140	≈330	E19/8/5-3C85-A100
	160 ±3%	≈225	≈190	E19/8/5-3C85-A160
	250 ±5%	≈350	≈110	E19/8/5-3C85-A250
	315 ±10%	≈440	≈80	E19/8/5-3C85-A315
	1170 ±25%	≈1650	≈0	E19/8/5-3C85
3C90	1170 ±25%	≈1650	≈0	E19/8/5-3C90
3F3 des	63 ±3%	≈90	≈590	E19/8/5-3F3-A63
	100 ±3%	≈140	≈330	E19/8/5-3F3-A100
	160 ±3%	≈225	≈190	E19/8/5-3F3-A160
	250 ±5%	≈350	≈110	E19/8/5-3F3-A250
	315 ±10%	≈440	≈80	E19/8/5-3F3-A315
	995 ±25%	≈1400	≈0	E19/8/5-3F3

Core halves of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 sup	2300 ±25%	≈3230	≈0	E19/8/5-3E25
3E27	2300 ±25%	≈3230	≈0	E19/8/5-3E27
3E5	≥3235	≥4540	≈0	E19/8/5-3E5

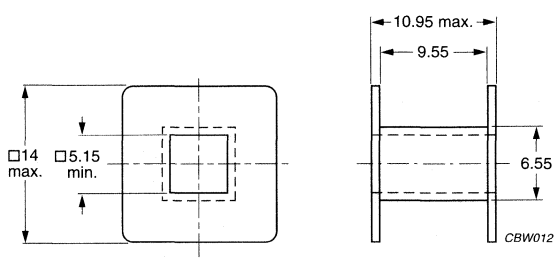
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.20	–	–
3C85	≥320	≤0.14	≤0.16	–
3C90	≥320	≤0.09	≤0.10	–
3F3	≥320	–	≤0.10	≤0.17

COIL FORMERS

General data for E19/8/5 coil former without pins

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-2"*; UL file number E41938(M)
Maximum operating temperature	105 °C, Class A



Dimensions in mm.

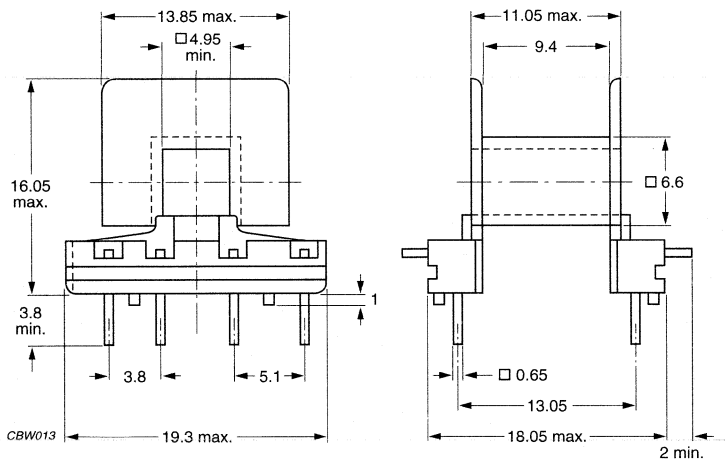
Fig.2 E19/8/5 coil former.

Winding data for E19/8/5 coil forme without pins

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	33.0	9.5	37.9	CP-E19/8/5-1S

General data for 8-pins E19/8/5 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with UL 94V-0; UL file number E41938(M)
Pin material	copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.3 E19/8/5 coil former; 8-pins.

Winding data for 8-pins E19/8/5 coil former

NUMBER OF SECTIONS	MINIMUM WNDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	32.3	9.4	40.9	CPH-E19/8/5-1S-8PD

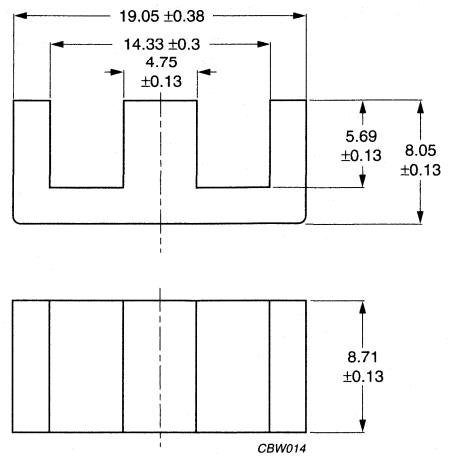
E core and accessories

E19/8/9 (813E343)

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.960	mm^{-1}
V_e	effective volume	1650	mm^3
l_e	effective length	39.9	mm
A_e	effective area	41.3	mm^2
m	mass of core half	≈4	g



Dimensions in mm.

Fig.1 E19/8/9 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 20 ±10 N unless otherwise stated.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	100 ±3%(1)	≈75	≈650	E19/8/9-3C81-E100
	160 ±3%	≈125	≈370	E19/8/9-3C81-A160
	250 ±3%	≈190	≈220	E19/8/9-3C81-A250
	315 ±3%	≈240	≈150	E19/8/9-3C81-A315
	400 ±5%	≈310	≈120	E19/8/9-3C81-A400
	2740 ±25%	≈2680	≈0	E19/8/9-3C81
3C85	100 ±3%(1)	≈75	≈650	E19/8/9-3C81-E100
	160 ±3%	≈125	≈370	E19/8/9-3C81-A160
	250 ±3%	≈190	≈220	E19/8/9-3C81-A250
	315 ±3%	≈240	≈150	E19/8/9-3C81-A315
	400 ±5%	≈310	≈120	E19/8/9-3C81-A400
	2150 ±25%	≈2100	≈0	E19/8/9-3C81
3C90	2150 ±25%	≈2100	≈0	E19/8/9-3C90

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	100 ±3%[1]	≈75	≈650	E19/8/9-3C81-E100
	160 ±3%	≈125	≈370	E19/8/9-3C81-A160
	250 ±3%	≈190	≈220	E19/8/9-3C81-A250
	315 ±3%	≈240	≈150	E19/8/9-3C81-A315
	400 ±5%	≈310	≈120	E19/8/9-3C81-A400
	1830 ±25%	≈1400	≈0	E19/8/9-3C81

Note

1. Measured in combination with an equal gapped core half, clamping force 20 ±10 N.

Core halves of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 sup	4250 ±25%	≈3270	≈0	E19/8/9-3E25
3E27	4250 ±25%	≈3270	≈0	E19/8/9-3E27
3E5	≥6300	≥4850	≈0	E19/8/9-3E5

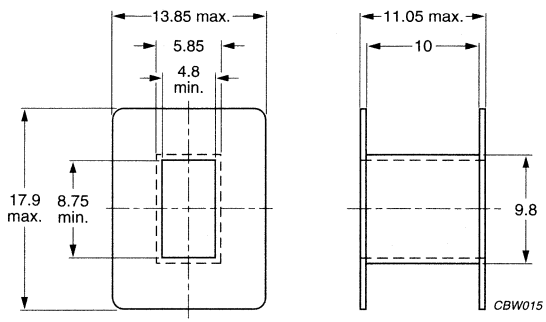
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.26	≤0.30	–
3C90	≥320	≤0.17	≤0.18	–
3F3	≥320	–	≤0.18	≤0.31

COIL FORMER

General data for E19/8/9 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-2"*; UL file number E41938(M)
Maximum operating temperature	105 °C, Class A



Dimensions in mm.

Fig.2 E19/8/9 coil former.

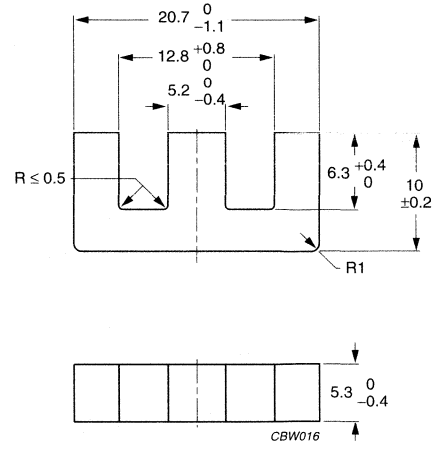
Winding data for E19/8/9 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	39.7	10	45.2	CP-E19/8/9-1S

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.37	mm^{-1}
V_e	effective volume	1340	mm^3
l_e	effective length	42.8	mm
A_e	effective area	31.2	mm^2
A_{min}	minimum area	25.2	mm^2
m	mass of core half	≈4	g



Dimensions in mm.

Fig.1 E20/10/5 core half.

Core halves

Clamping force 20 ±10 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	1250 ±25%	≈1400	≈0	E20/10/5-3C30
3C85	1500 ±25%	≈1700	≈0	E20/10/5-3C85
3C90 des	1500 ±25%	≈1700	≈0	E20/10/5-3C90
3F3 des	1400 ±25%	≈1600	≈0	E20/10/5-3F3

Core halves of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C11	2600 ±25%	≈2950	≈0	E20/10/5-3C11
3E25 des	2800 ±25%	≈3100	≈0	E20/10/5-3E25

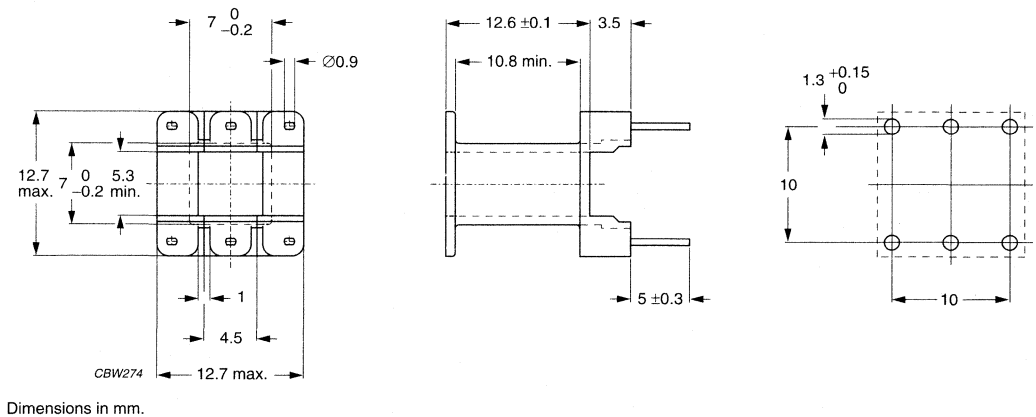
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤0.15	≤0.17	–
3C85	≥330	≤0.20	≤0.25	–
3C90	≥330	≤0.15	≤0.17	–
3F3	≥320	–	≤0.16	≤0.28

COIL FORMER

General data for 6-pins E20/10/5 coil former

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 E20/10/5 coil former; 8-pins.

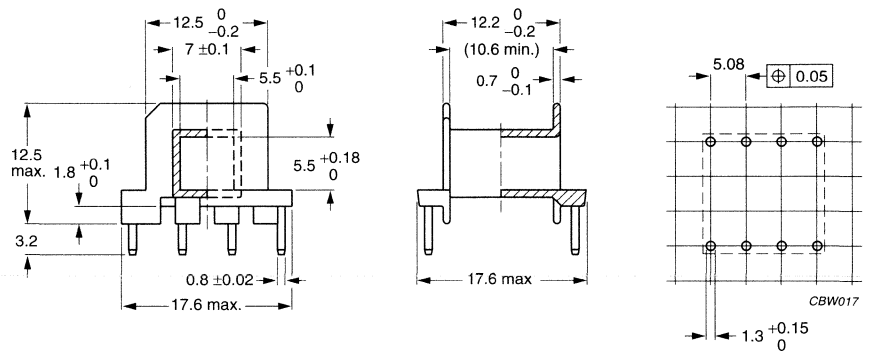
Winding data for 8-pins E20/10/5 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	28.6	10.8	38.7	CPV-E20/10/5-1S-6P

COIL FORMER

General data for 8-pins E20/10/5 coil former

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.3 E20/10/5 coil former; 8-pins.

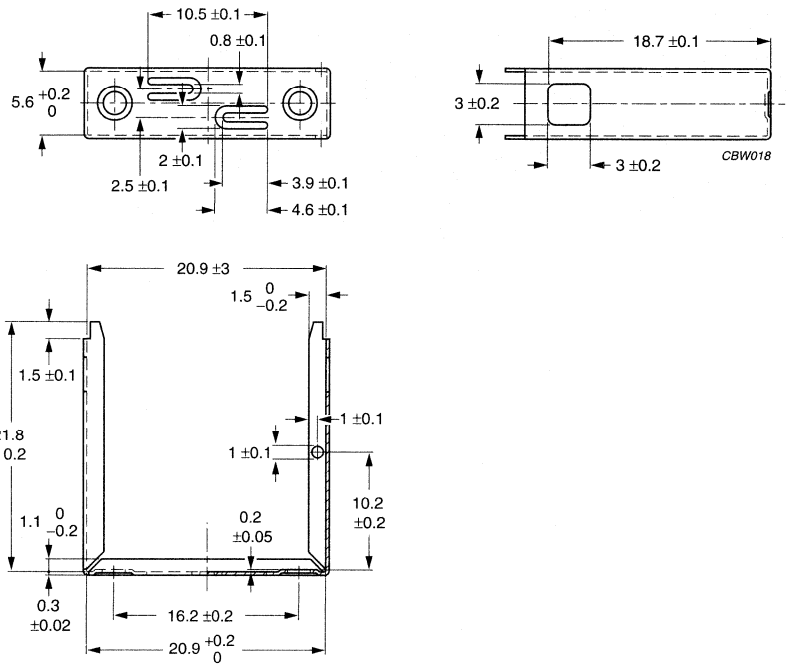
Winding data for 8-pins E20/10/5 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	27	10.6	38	CSH-E20/10/5-1S-8P

MOUNTING PARTS

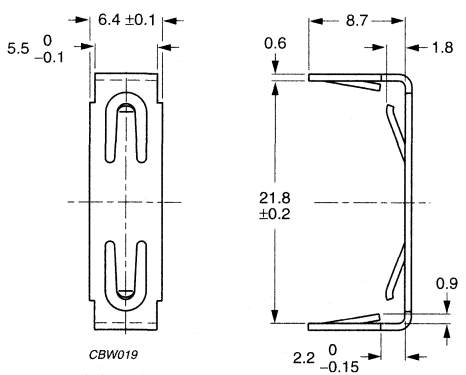
General data and ordering information

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clasp	copper-zinc alloy (CuSn), nickel (Ni) plated	4	CLA-E20/10/5
Spring	copper-tin alloy (CuSn), nickel (Ni) plated	5	SPR-E20/10/5



Dimensions in mm.

Fig.4 E20/10/5 clasp.



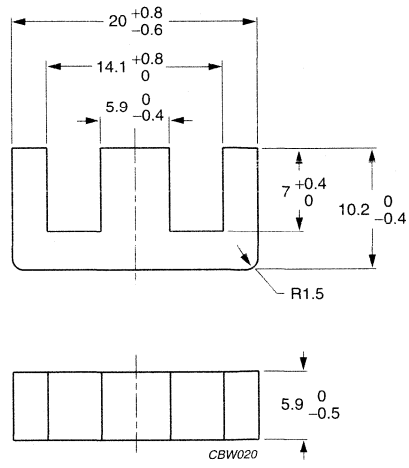
Dimensions in mm.

Fig.5 E20/10/5 spring.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.45	mm^{-1}
V_e	effective volume	1490	mm^3
l_e	effective length	46.0	mm
A_e	effective area	32.0	mm^2
m	mass of core half	≈3.7	g



Dimensions in mm.

Fig.1 E20/10/6 core half.

Core halves

Clamping force 20 ±10 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	1200 ±25%	≈1400	≈0	E20/10/6-3C30
3C85	1450 ±25%	≈1730	≈0	E20/10/6-3C85
3C90 des	1450 ±25%	≈1730	≈0	E20/10/6-3C90
3F3 des	1350 ±25%	≈1600	≈0	E20/10/6-3F3

Core halves of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C11	2600 ±25%	≈3000	≈0	E20/10/6-3C11
3E25 des	2700 ±25%	≈3200	≈0	E20/10/6-3E25

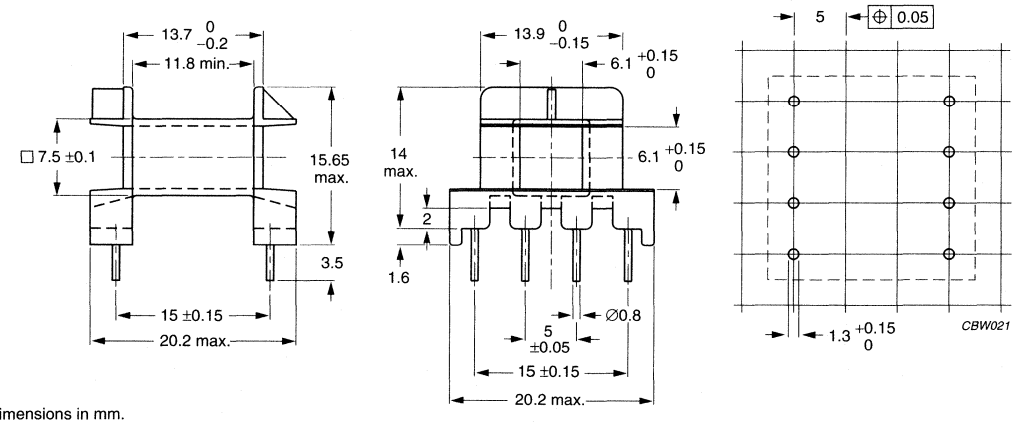
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤0.16	≤0.18	–
3C85	≥330	≤0.22	≤0.26	–
3C90	≥330	≤0.16	≤0.18	≤
3F3	≥320	–	≤0.20	≤0.30

COIL FORMER

General data for 8-pins E20/10/6 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-2"*; UL file number E41871(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

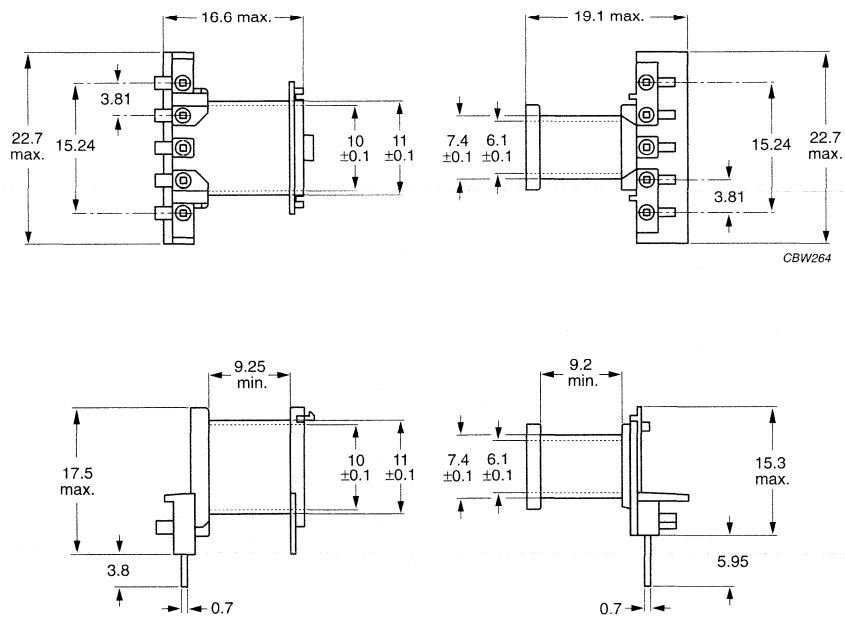
Fig.2 E20/10/6 coil former; 8-pins.

Winding data for 8-pins E20/10/6 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	35	11.8	39	CPH-E20/10/6-1S-8P

General data 10-pins coaxial E20/10/6 coil former

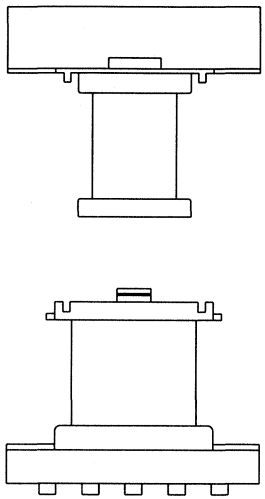
PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41871(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	125 °C, *"IEC 85"* class B
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1

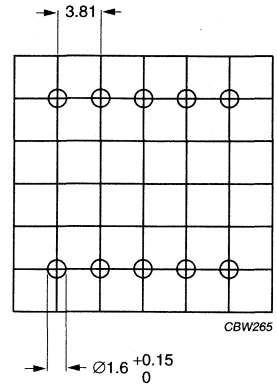


Dimensions in mm.

For mounting grid and method of fitting, see Fig.4.

Fig.3 Coaxial E20/10/6 coil former; 10-pins.





Dimensions in mm.

This coil former incorporates 8 mm creepage distance between primary and secondary windings, as well as between primary and all other conductive parts (in accordance with IEC 380 safety regulations).

Fig.4 Mounting grid and method of fitting.

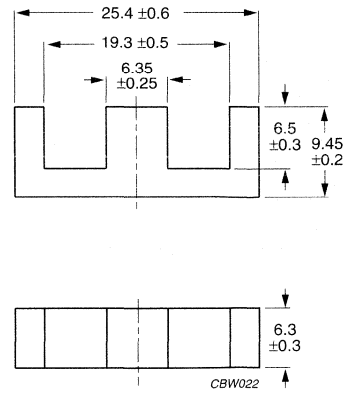
Winding data for coaxial E20/10/6 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	11.3	9.2	34.7	CSCI-E20/6-1S-5P-U
1	13.1	9.25	50	CSCO-E20/6-1S-5P-U

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.23	mm^{-1}
V_e	effective volume	1860	mm^3
l_e	effective length	47.4	mm
A_e	effective area	38.4	mm^2
A_{min}	effective area	37.0	mm^2
m	mass of core half	≈4.8	g



Dimensions in mm.

Fig.1 E25/9/6 core half.

Core halves

Clamping force 20 ±10 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85	2000 ±25%	≈1950	≈0	E25/9/6-3C85
3C90 des	1600 ±25%	≈1540	≈0	E25/9/6-3C90

Core halves of high permeability grade

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 des	3300 ±25%	≈3200	≈0	E25/9/6-3E25

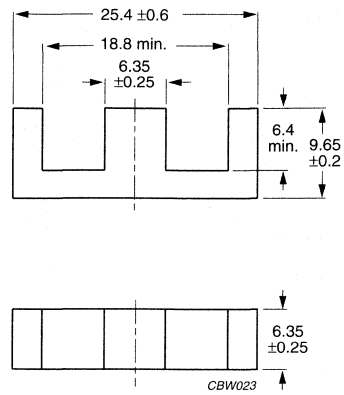
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤0.2	≤0.22	–
3C85	≥330	≤0.3	≤0.4	–
3C90	≥330	≤0.2	≤0.22	–

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.24	mm^{-1}
V_e	effective volume	1930	mm^3
l_e	effective length	49.0	mm
A_e	effective area	39.5	mm^2
A_{min}	minimum area	37.0	mm^2
m	mass of core half	≈4.8	g



Dimensions in mm.

Fig.1 E25/10/6 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	100 ±3%	≈100	≈600	E25/10/6-3C81-A100
	160 ±3%	≈165	≈340	E25/10/6-3C81-A160
	250 ±3%	≈255	≈200	E25/10/6-3C81-A250
	315 ±3%	≈320	≈150	E25/10/6-3C81-A315
	400 ±5%	≈410	≈110	E25/10/6-3C81-A400
	2340 ±25%	≈2390	≈0	E25/10/6-3C81
3C85	100 ±3%	≈100	≈600	E25/10/6-3C85-A100
	160 ±3%	≈165	≈340	E25/10/6-3C85-A160
	250 ±3%	≈255	≈200	E25/10/6-3C85-A250
	315 ±3%	≈320	≈150	E25/10/6-3C85-A315
	400 ±5%	≈410	≈110	E25/10/6-3C85-A400
	1600 ±25%	≈1600	≈0	E25/10/6-3C85
3C90 des	1600 ±25%	≈1600	≈0	E25/10/6-3C90
3F3 des	100 ±3%	≈100	≈600	E25/10/6-3F3-A100
	160 ±3%	≈165	≈340	E25/10/6-3F3-A160
	250 ±3%	≈255	≈200	E25/10/6-3F3-A250
	315 ±3%	≈320	≈150	E25/10/6-3F3-A315
	400 ±5%	≈410	≈110	E25/10/6-3F3-A400
	1470 ±25%	≈1500	≈0	E25/10/6-3F3

Core halves of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 des	3000 ±25%	≈3200	≈0	E25/10/6-3E25
3E27	3200 ±25%	≈3200	≈0	E25/10/6-3E27
3E5	≥5075	≥5075	≈0	E25/10/6-3E5

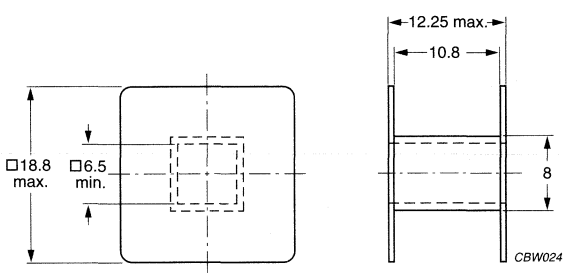
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.4	–	–
3C85	≥330	≤0.3	≤0.4	–
3C90	≥330	≤0.2	≤0.22	–
3F3	≥320	–	≤0.22	≤0.38

COIL FORMERS

General data for E25/10/6 coil former without pins

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-2"*
Maximum operating temperature	105 °C, Class A



Dimensions in mm.

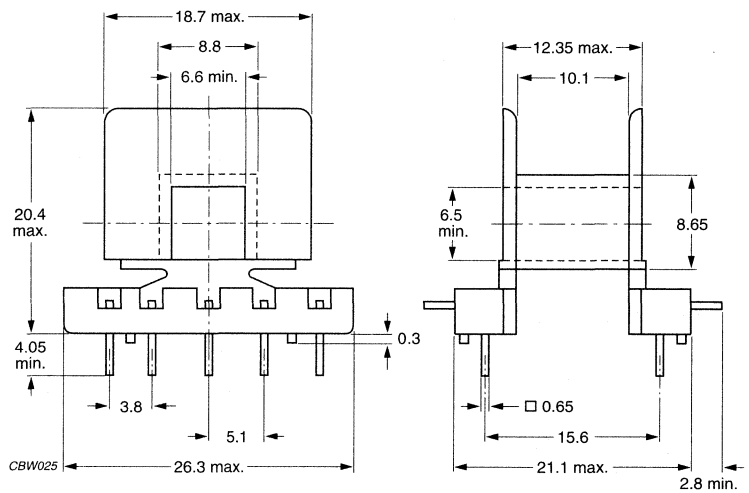
Fig.2 E25/10/6 coil former.

Winding data for E25/10/6 coil former without pins

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	56.2	10.8	49.1	CP-E25/10/6-1S

General data for 10-pins E25/10/6 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA), glass reinforced, flame retardant in accordance with *"UL 94-HB"*; UL file number E41938(M)
Maximum operating temperature	130 °C, *"IEC 85"* class B
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s
Pin material	copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated



Dimensions in mm.

Fig.3 E25/10/6 coil former; 10-pins.

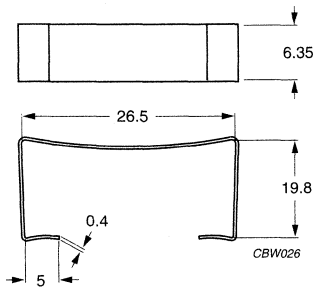
Winding data for 10-pins E25/10/6 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	47.4	10.1	53.1	CPH-E25/10/6-1S-10P

MOUNTING PARTS

General data for mounting parts

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clamp	stainless steel (CrNi); clamping force ≈30 N	4	CLM-E25/10/6



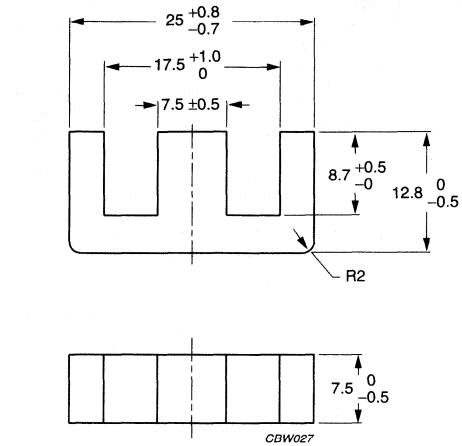
Dimensions in mm.

Fig.4 E25/10/6 clamp.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.11	mm^{-1}
V_e	effective volume	2990	mm^3
l_e	effective length	58.0	mm
A_e	effective area	52.0	mm^2
m	mass of core half	≈8	g



Dimensions in mm.

Fig.1 E25/13/7 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 20 ±10 N unless otherwise stated.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	1600 ±25%	≈1460	≈0	E25/13/7-3C30
3C81	160 ±3%	≈140	≈480	E25/13/7-3C81-A160
	250 ±3%	≈220	≈270	E25/13/7-3C81-A250
	315 ±3%	≈280	≈200	E25/13/7-3C81-A315
	400 ±3%	≈355	≈150	E25/13/7-3C81-A400
	630 ±5%	≈560	≈80	E25/13/7-3C81-A630
	2460 ±25%	≈2170	≈0	E25/13/7-3C81
3C85	160 ±3%	≈140	≈480	E25/13/7-3C85-A160
	250 ±3%	≈220	≈270	E25/13/7-3C85-A250
	315 ±3%	≈280	≈200	E25/13/7-3C85-A315
	400 ±3%	≈355	≈150	E25/13/7-3C85-A400
	630 ±5%	≈560	≈80	E25/13/7-3C85-A630
	1900 ±25%	≈1700	≈0	E25/13/7-3C85
3C90 des	1900 ±25%	≈1700	≈0	E25/13/7-3C90
3F3 des	160 ±3%	≈140	≈480	E25/13/7-3F3-A160
	250 ±3%	≈220	≈270	E25/13/7-3F3-A250
	315 ±3%	≈280	≈200	E25/13/7-3F3-A315
	400 ±3%	≈355	≈150	E25/13/7-3F3-A400
	630 ±5%	≈560	≈80	E25/13/7-3F3-A630
	1650 ±25%	≈1460	≈0	E25/13/7-3F3

Core halves of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C11	3100 ±25%	≈2800	≈0	E25/13/7-3C11
3E25 sup	4000 ±25%	≈3530	≈0	E25/13/7-3E25
3E27	4000 ±25%	≈3530	≈0	E25/13/7-3E27

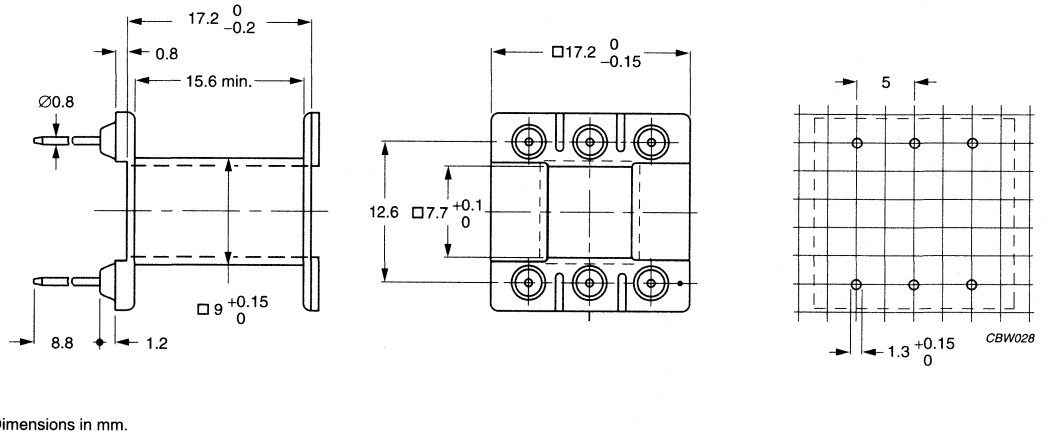
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤0.35	≤0.38	–
3C81	≥320	≤0.61	–	–
3C85	≥330	≤0.47	≤0.55	–
3C90	≥330	≤0.35	≤0.38	–
3F3	≥320	–	≤0.38	≤0.65

COIL FORMER

General data for 6-pins E25/13/7 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41871(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

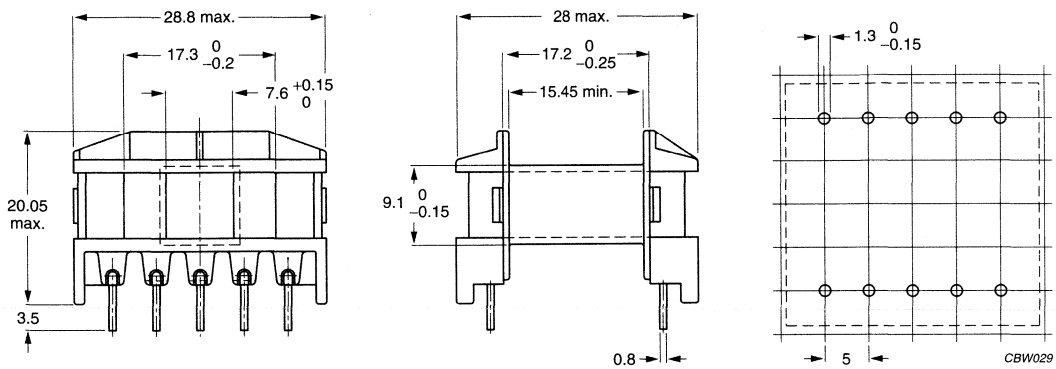
Fig.2 E25/13/7 coil former; 6-pins.

Winding data for 6-pins E25/13/7 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	56	15.6	49	CPV-E25/13/7-1S-6P

General data for 10-pins E25/13/7 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41871(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.3 E25/13/7 coil former; 10-pins.

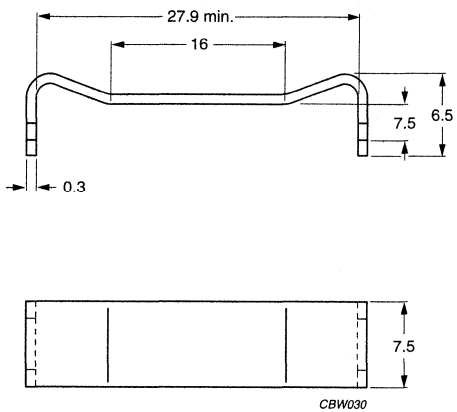
Winding data for 10-pins E25/13/7 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	63.3	15.45	52.8	CPH-E25/13/7-1S-10P

MOUNTING PARTS

General data for mounting parts

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clip	stainless steel (CrNi)	4	CLI-E25/13/7



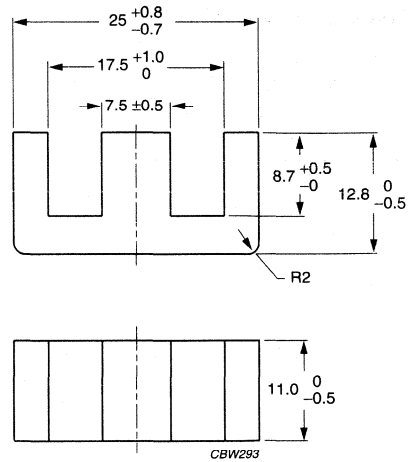
Dimensions in mm.

Fig.4 E25/13/7 clip.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.733	mm^{-1}
V_e	effective volume	4500	mm^3
l_e	effective length	57.5	mm
A_e	effective area	78.4	mm^2
m	mass of core half	≈11	g



Dimensions in mm.

Fig.1 E25/13/11 core half.

Core halves

Gapped cores are available on request, clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85	2800 ±25%	≈1780	≈0	E25/13/11-3C85
3C90 des	2800 ±25%	≈1780	≈0	E25/13/11-3C90
3F3 des	2700 ±25%	≈1660	≈0	E25/13/11-3F3

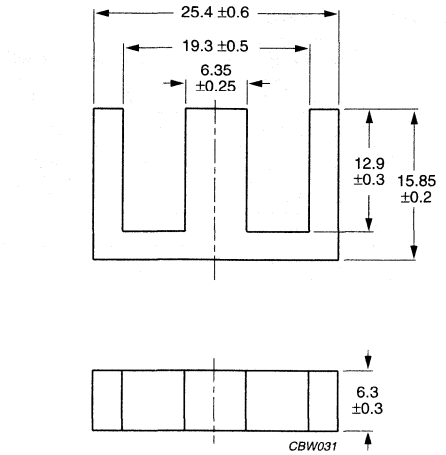
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥330	≤0.70	≤0.80	–
3C90	≥330	≤0.55	≤0.55	–
3F3	≥320	–	≤0.55	≤0.95

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.93	mm^{-1}
V_e	effective volume	2840	mm^3
l_e	effective length	74.0	mm
A_e	effective area	38.4	mm^2
A_{min}	minimum area	37.0	mm^2
m	mass of core half	≈7.1	g



Dimensions in mm.

Fig.1 E25/16/6 core half.

Core halves

Clamping force 20 ±10 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85	1300 ±25%	≈2000	≈0	E25/16/6-3C85
3C90 des	1300 ±25%	≈2000	≈0	E25/16/6-3C90

Core halves of high permeability grade

Clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 des	2700 ±25%	≈4300	≈0	E25/16/6-3E25

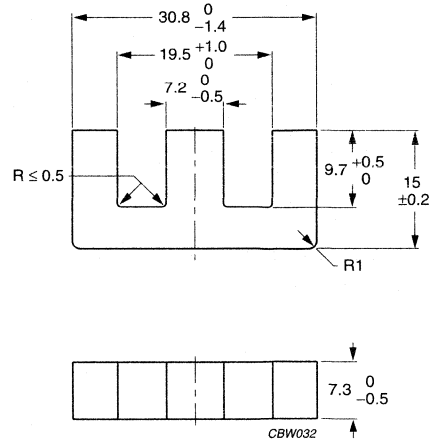
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥330	≤0.45	≤0.55
3C90	≥330	≤0.30	≤0.32

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.12	mm^{-1}
V_e	effective volume	4000	mm^3
l_e	effective length	67.0	mm
A_e	effective area	60.0	mm^2
A_{min}	minimum area	49.0	mm^2
m	mass of core half	≈11	g



Dimensions in mm.

Fig.1 E30/15/7 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 20 ±10 N, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	1700 ±25%	≈1500	≈0	E30/15/7-3C30
3C81	160 ±3%	≈145	≈530	E30/15/7-3C81-A160
	250 ±3%	≈225	≈300	E30/15/7-3C81-A250
	315 ±3%	≈285	≈230	E30/15/7-3C81-A315
	400 ±3%	≈365	≈170	E30/15/7-3C81-A400
	630 ±5%	≈580	≈90	E30/15/7-3C81-A630
	2500 ±25%	≈2270	≈0	E30/15/7-3C81
3C85	160 ±3%	≈145	≈530	E30/15/7-3C85-A160
	250 ±3%	≈225	≈300	E30/15/7-3C85-A250
	315 ±3%	≈285	≈230	E30/15/7-3C85-A315
	400 ±3%	≈365	≈170	E30/15/7-3C85-A400
	630 ±5%	≈580	≈90	E30/15/7-3C85-A630
	1900 ±25%	≈1700	≈0	E30/15/7-3C85
3C90 des	2000 ±25%	≈1780	≈0	E25/13/7-3C90

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	160 ±3%	≈145	≈530	E30/15/7-3F3-A160
	250 ±3%	≈225	≈300	E30/15/7-3F3-A250
	315 ±3%	≈285	≈230	E30/15/7-3F3-A315
	400 ±3%	≈365	≈170	E30/15/7-3F3-A400
	630 ±5%	≈580	≈90	E30/15/7-3F3-A630
	1600 ±25%	≈1430	≈0	E30/15/7-3F3

Core halves of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C11	3300 ±25%	≈2900	≈0	E30/15/7-3C11
3E25 sup	4100 ±25%	≈3650	≈0	E30/15/7-3E25
3E27	4100 ±25%	≈3650	≈0	E30/15/7-3E27

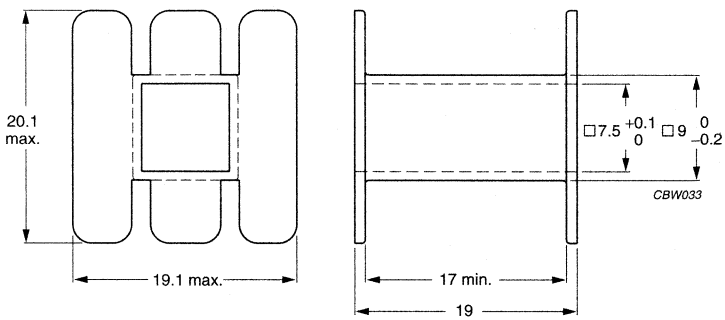
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤0.45	≤0.48	–
3C81	≥320	≤0.82	–	–
3C85	≥330	≤0.65	≤0.75	–
3C90	≥330	≤0.45	≤0.48	–
3F3	≥320	–	≤0.47	≤0.80

COIL FORMERS

GENERAL DATA FOR E30/15/7 COIL FORMER WITHOUT PINS

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-HB"*; UL file number E41613(M)
Maximum operating temperature	120 °C



Dimensions in mm.

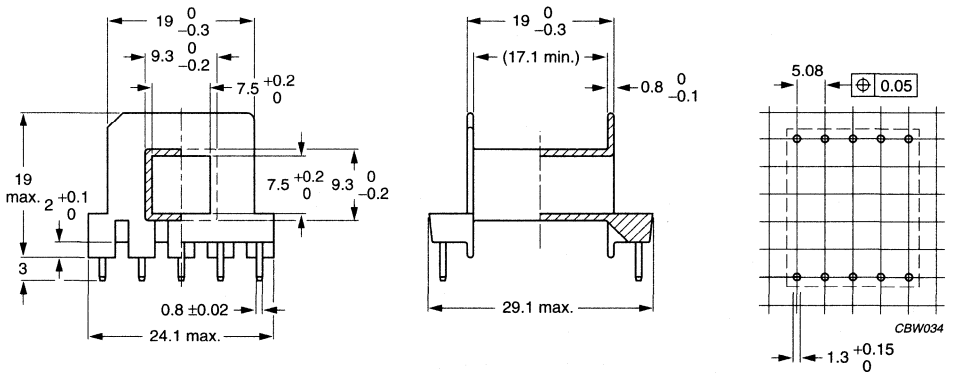
Fig.2 E30/15/7 coil former.

WINDING DATA FOR E30/15/7 COIL FORMER WITHOUT PINS (E)

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	80	16.8	56	CP-E30/15/7-1S

GENERAL DATA FOR 10-PINS E30/15/7 COIL FORMER

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s.
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.3 E30/15/7 coil former; 10-pins.

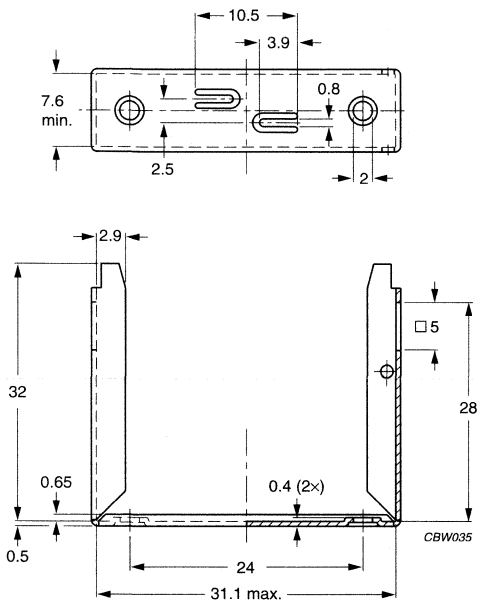
WINDING DATA FOR 10-PINS E30/15/7 COIL FORMER (E)

NUMBER OF NECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	80	17.1	56	CSH-E30/7-1S-10P

MOUNTING PARTS

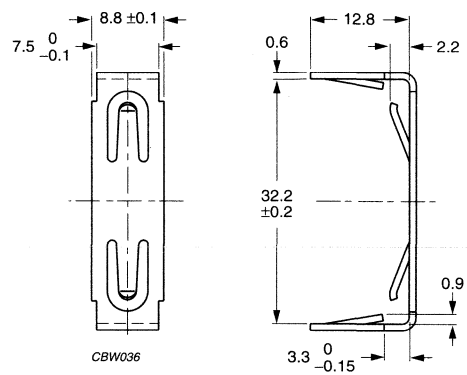
General data and ordering information

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clasp	CuZn alloy, Ni plated	4	CLA-E30/15/7
Spring	stainless steel (CrNi)	5	SPR-E30/15/7



Dimensions in mm.

Fig.4 E30/15/7 clasp.



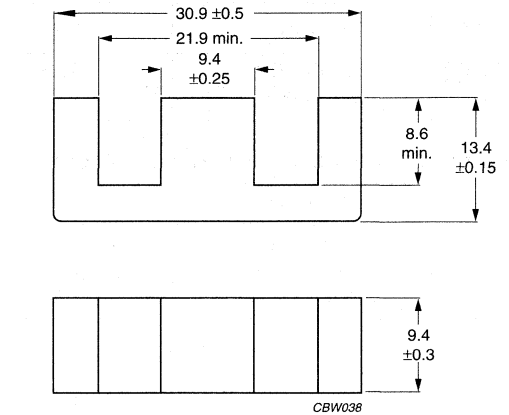
Dimensions in mm.

Fig.5 E30/15/7 spring.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.740	mm^{-1}
V_e	effective volume	5150	mm^3
l_e	effective length	61.9	mm
A_e	effective area	83.2	mm^2
m	mass of core half	≈13	g



Dimensions in mm.

Fig.1 E31/13/9 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	250 ±3%	≈150	≈470	E31/13/9-3C81-A250
	315 ±3%	≈190	≈350	E31/13/9-3C81-A315
	400 ±3%	≈235	≈260	E31/13/9-3C81-A400
	630 ±3%	≈375	≈150	E31/13/9-3C81-A630
	1000 ±5%	≈590	≈80	E31/13/9-3C81-A1000
	3735 ±25%	≈2200	≈0	E31/13/9-3C81
3C85	250 ±3%	≈150	≈470	E31/13/9-3C85-A250
	315 ±3%	≈190	≈350	E31/13/9-3C85-A315
	400 ±3%	≈235	≈260	E31/13/9-3C85-A400
	630 ±3%	≈375	≈150	E31/13/9-3C85-A630
	1000 ±5%	≈590	≈80	E31/13/9-3C85-A1000
	2970 ±25%	≈1750	≈0	E31/13/9-3C85
3C90	2970 ±25%	≈1750	≈0	E31/13/9-3C90
3F3 des	250 ±3%	≈150	≈470	E31/13/9-3F3-A250
	315 ±3%	≈190	≈350	E31/13/9-3F3-A315
	400 ±3%	≈235	≈260	E31/13/9-3F3-A400
	630 ±3%	≈375	≈150	E31/13/9-3F3-A630
	1000 ±5%	≈590	≈80	E31/13/9-3F3-A1000
	2650 ±25%	≈1560	≈0	E31/13/9-3F3

Core halves of high permeability grades

Clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 sup	6790 ±25%	≈4000	≈0	E31/13/9-3E25
3E27	6790 ±25%	≈4000	≈0	E31/13/9-3E27

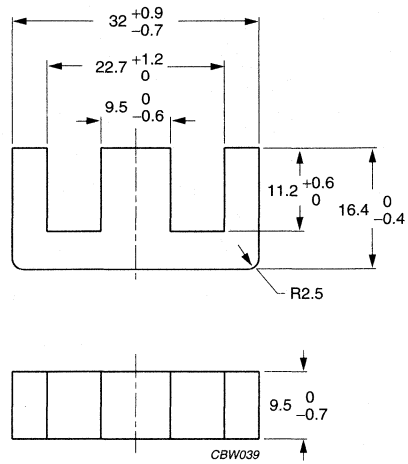
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤1.1	≤	–
3C85	≥320	≤0.80	≤0.93	–
3C90	≥320	≤0.52	≤0.58	–
3F3	≥320	–	≤0.57	≤0.98

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.894	mm^{-1}
V_e	effective volume	6180	mm^3
l_e	effective length	74	mm
A_e	effective area	83	mm^2
m	mass of core half	≈16	g



Dimensions in mm.

Fig.1 E32/16/9 core half.

Core halves

Clamping force 20 ±10 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	2050 ±25%	≈1500	≈0	E32/16/9-3C30
3C85	2500 ±25%	≈1850	≈0	E32/16/9-3C85
3C90 des	2500 ±25%	≈1850	≈0	E32/16/9-3C90
3F3 des	2300 ±25%	≈1700	≈0	E32/16/9-3F3

Core halves of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C11	4000 ±25%	≈2950	≈0	E32/16/9-3C11
3E25 des	5000 ±25%	≈3700	≈0	E32/16/9-3E25

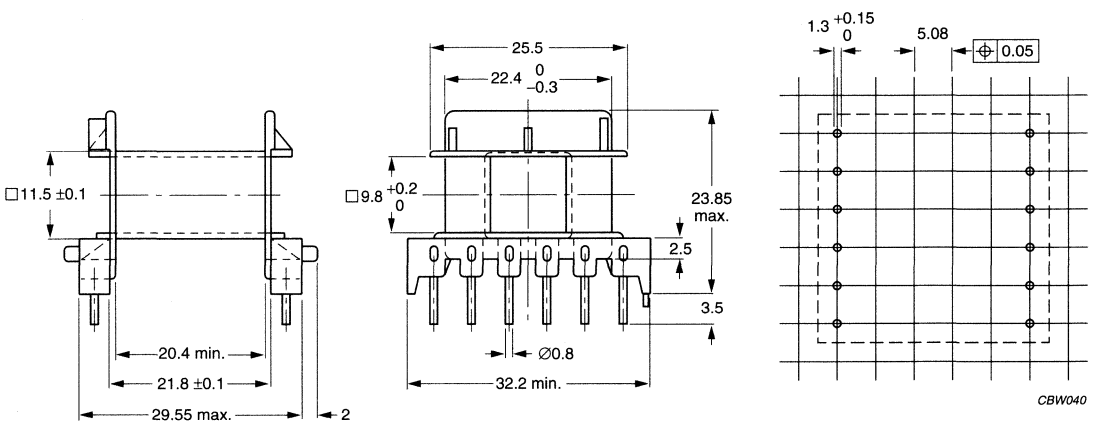
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤0.65	≤0.7	–
3C85	≥330	≤0.9	≤1.10	–
3C90	≥330	≤0.65	≤0.7	–
3F3	≥320	–	≤0.75	≤1.25

COIL FORMER

General data for 12-pins E32/16/9 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41871(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C, *"IEC 85"* class B
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.2 E32/16/9 coil former; 12-pins.

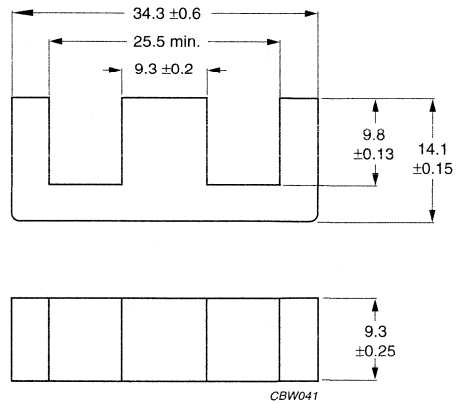
Winding data for 12-pins E32/16/9 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	97	20.5	60	CPH-E32/16/9-1S-12P

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.850	mm^{-1}
V_e	effective volume	5590	mm^3
l_e	effective length	69.3	mm
A_e	effective area	80.7	mm^2
m	mass of core half	≈14	g



Dimensions in mm.

Fig.1 E34/14/9 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	250 ±3%	≈170	≈450	E34/14/9-3C81-A250
	315 ±3%	≈215	≈340	E34/14/9-3C81-A315
	400 ±3%	≈270	≈250	E34/14/9-3C81-A400
	630 ±3%	≈430	≈140	E34/14/9-3C81-A630
	1000 ±5%	≈680	≈70	E34/14/9-3C81-A1000
	3200 ±25%	≈2170	≈0	E34/14/9-3C81
3C85	250 ±3%	≈170	≈450	E34/14/9-3C85-A250
	315 ±3%	≈215	≈340	E34/14/9-3C85-A315
	400 ±3%	≈270	≈250	E34/14/9-3C85-A400
	630 ±3%	≈430	≈140	E34/14/9-3C85-A630
	1000 ±5%	≈680	≈70	E34/14/9-3C85-A1000
	2440 ±25%	≈1660	≈0	E34/14/9-3C85
3C90	2440 ±25%	≈1660	≈0	E34/14/9-3C90
3F3 des	250 ±3%	≈170	≈450	E34/14/9-3F3-A250
	315 ±3%	≈215	≈340	E34/14/9-3F3-A315
	400 ±3%	≈270	≈250	E34/14/9-3F3-A400
	630 ±3%	≈430	≈140	E34/14/9-3F3-A630
	1000 ±5%	≈680	≈70	E34/14/9-3F3-A1000
	2125 ±25%	≈1440	≈0	E34/14/9-3F3

Core halves of high permeability grades

Clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 sup	4695 ±25%	≈3190	≈0	E34/14/9-3E25
3E27	4695 ±25%	≈3190	≈0	E34/14/9-3E27

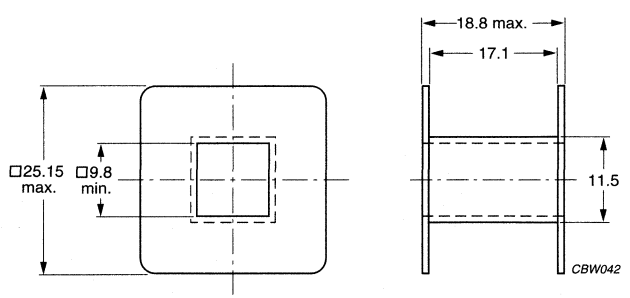
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤1.2	–	–
3C85	≥320	≤0.9	≤1.0	–
3C90	≥320	≤0.56	≤0.63	–
3F3	≥320	–	≤0.62	≤1.1

COIL FORMERS

General data for E34/14/9 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-HB"*; UL file number E41938(M)
Maximum operating temperature	130 °C, Class B



Dimensions in mm.

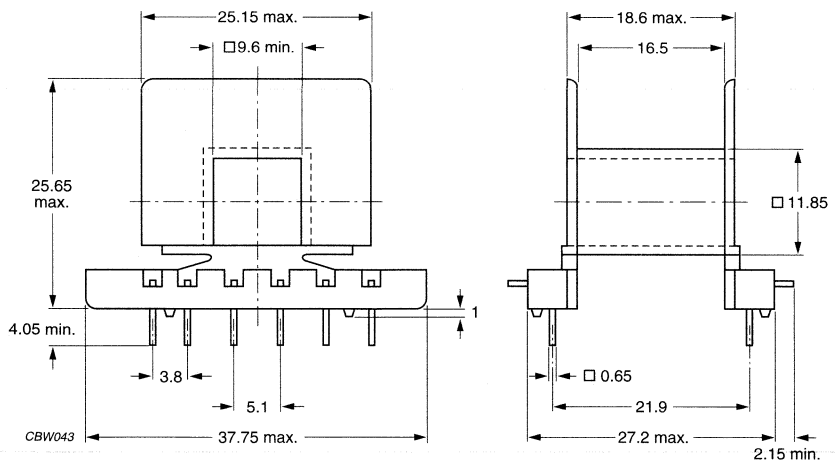
Fig.2 E34/14/9 coil former.

Winding data for E34/14/9 coil former without pins

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	111	17.1	67.0	CP-E34/14/9-1S

General data for 12-pins E34/14/9 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-HB"*; UL file number E41938(M)
Maximum operating temperature	130 °C, *"IEC 85"* class B
Pin material	copper-zinc alloy (CuZnP), tin-lead alloy (SnPb) plated
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.3 E34/14/9 coil former: 12-pins.

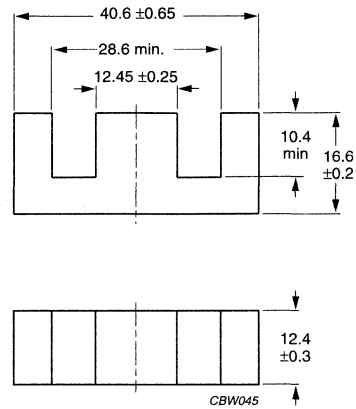
Winding data for 12-pins E34/14/9 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	102	16.5	69.0	CPH-E34/14/9-1S-12PD

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.517	mm^{-1}
V_e	effective volume	11500	mm^3
l_e	effective length	77.0	mm
A_e	effective area	149	mm^2
A_{min}	minimum area	142	mm^2
m	mass of core half	≈30	g



Dimensions in mm.

Fig.1 E41/17/12 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 40 ±20 N, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	3400 ±25%	≈1500	≈0	E41/17/12-3C30
3C81	250 ±3%(1)	≈105	≈880	E41/17/12-3C81-E250
	315 ±5%(1)	≈130	≈670	E41/17/12-3C81-E315
	400 ±5%	≈165	≈500	E41/17/12-3C81-A400
	630 ±10%	≈260	≈290	E41/17/12-3C81-A630
	1000 ±10%	≈415	≈160	E41/17/12-3C81-A1000
	5370 ±25%	≈2230	≈0	E41/17/12-3C81
3C85	250 ±3%(1)	≈105	≈880	E41/17/12-3C85-E250
	315 ±5%(1)	≈130	≈670	E41/17/12-3C85-E315
	400 ±5%	≈165	≈500	E41/17/12-3C85-A400
	630 ±10%	≈260	≈290	E41/17/12-3C85-A630
	1000 ±10%	≈415	≈160	E41/17/12-3C85-A1000
	4100 ±25%	≈1800	≈0	E41/17/12-3C85
3C90 des	4100 ±25%	≈1800	≈0	E41/17/12-3C90

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	250 ±3%(1)	≈105	≈880	E41/17/12-3F3-E250
	315 ±5%(1)	≈130	≈670	E41/17/12-3F3-E315
	400 ±5%	≈165	≈500	E41/17/12-3F3-A400
	630 ±10%	≈260	≈290	E41/17/12-3F3-A630
	1000 ±10%	≈415	≈160	E41/17/12-3F3-A1000
	3575 ±25%	≈1470	≈0	E41/17/12-3F3

Note

1. Measured in combination with an equal gapped core half, clamping force 40 ±20 N.

Core halves of high permeability grades

Clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 sup	9400 ±25%	≈3870	≈0	E41/17/12-3E25
3E27	9400 ±25%	≈3870	≈0	E41/17/12-3E27

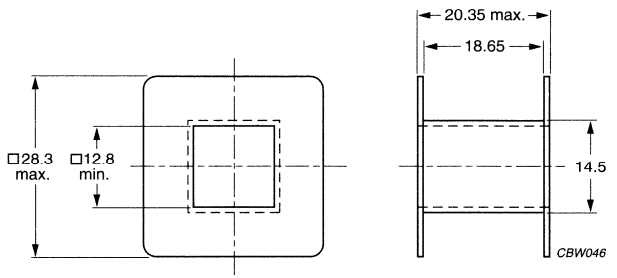
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤1.30	≤1.45	–
3C81	≥320	≤2.40	–	–
3C85	≥330	≤1.80	≤2.20	–
3C90	≥330	≤1.30	≤1.45	–
3F3	≥320	–	≤1.40	≤2.20

COIL FORMERS

General data for E41/17/12 coil former without pins

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-2"*; UL file number E41938(M)
Maximum operating temperature	105 °C, Class A



Dimensions in mm.

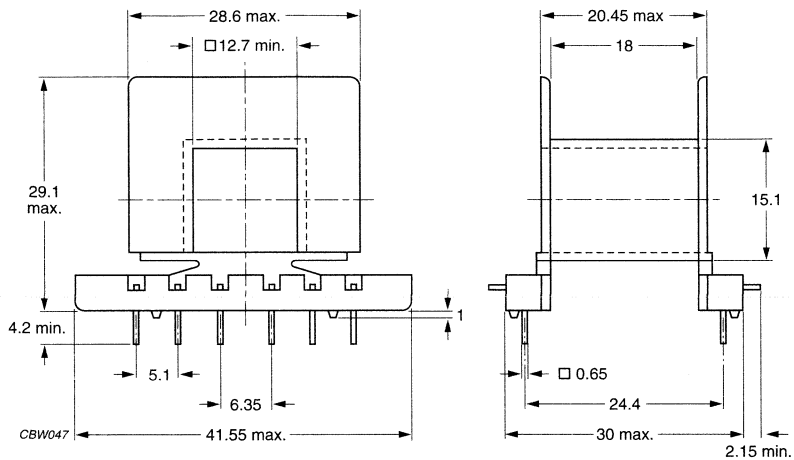
Fig.2 E41/17/12 coil former.

Winding data for E41/17/12 coil former without pins

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	120	18.6	79.6	CP-E41/17/12-1S

General data for 12-pins E41/17/12 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-2"*; UL file number E41938(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C, Class B
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.3 E41/17/12 coil former; 12-pins.

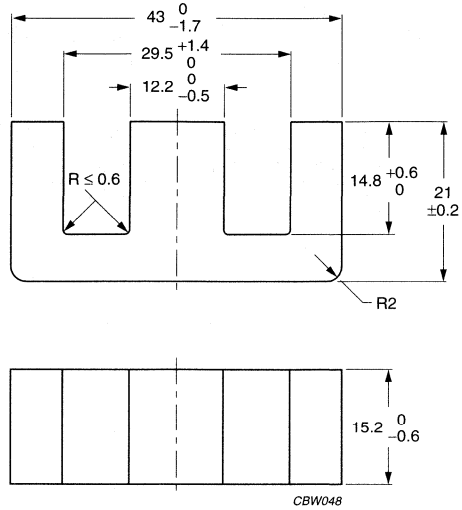
Winding data for 12-pins E41/17/12 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	114	18	81.2	CPH-E41/12-1S-12PD

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.548	mm^{-1}
V_e	effective volume	17300	mm^3
l_e	effective length	97.0	mm
A_e	effective area	178	mm^2
A_{min}	minimum area	175	mm^2
m	mass of core half	≈44	g



Dimensions in mm.

Fig.1 E42/21/15 core half.

Core halves

A_L measured in combination with a non gapped core half, clamping force 40 ±20 N, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	3450 ±25%	≈1550	≈0	E42/21/15-3C30
3C81	250 ±3%(1)	≈110	≈1110	E42/21/15-3C81-E250
	315 ±3%(1)	≈135	≈840	E42/21/15-3C81-E315
	400 ±5%	≈170	≈630	E42/21/15-3C81-A400
	630 ±5%	≈270	≈360	E42/21/15-3C81-A630
	1000 ±10%	≈430	≈200	E42/21/15-3C81-A1000
	5300 ±25%	≈2300	≈0	E42/21/15-3C81
3C85	250 ±3%(1)	≈110	≈1110	E42/21/15-3C85-E250
	315 ±3%(1)	≈135	≈840	E42/21/15-3C85-E315
	400 ±5%	≈170	≈630	E42/21/15-3C85-A400
	630 ±5%	≈270	≈360	E42/21/15-3C85-A630
	1000 ±10%	≈430	≈200	E42/21/15-3C85-A1000
	3900 ±25%	≈1700	≈0	E42/21/15-3C85
3C90 des	4100 ±25%	≈1780	≈0	E42/21/15-3C90

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	250 ±3%(1)	≈110	≈1110	E42/21/15-3F3-E250
	315 ±3%(1)	≈135	≈840	E42/21/15-3F3-E315
	400 ±5%	≈170	≈630	E42/21/15-3F3-A400
	630 ±5%	≈270	≈360	E42/21/15-3F3-A630
	1000 ±10%	≈430	≈200	E42/21/15-3F3-A1000
	3600 ±25%	≈1570	≈0	E42/21/15-3F3

Note

1. Measured in combination with an equal core half, clamping force 40 ±20 N.

Core halves of high permeability grades

Clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C11	8000 ±25%	≈3600	≈0	E42/21/15-3C11
3E25 sup	8000 ±25%	≈3480	≈0	E42/21/15-3E25
3E27	8000 ±25%	≈3480	≈0	E42/21/15-3E27

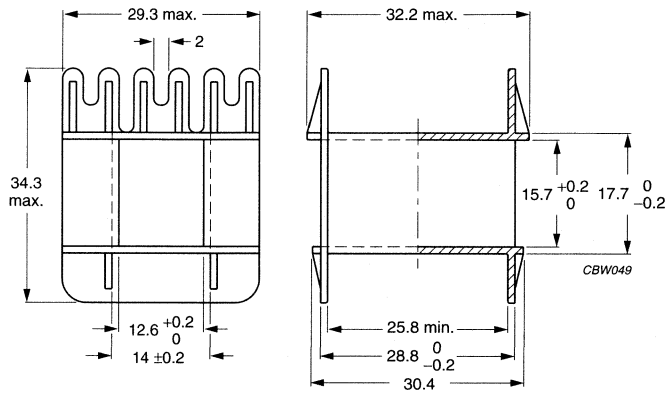
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤1.9	≤2.2	–
3C81	≥320	≤3.6	–	–
3C85	≥330	≤2.8	≤3.2	–
3C90	≥330	≤1.9	≤2.2	–
3F3	≥320	–	≤2.2	≤3.8

COIL FORMERS

General data for E42/21/15 coil former without pins (E)

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-HB"*; UL file number E41613(M)
Maximum operating temperature	120 °C



Dimensions in mm.

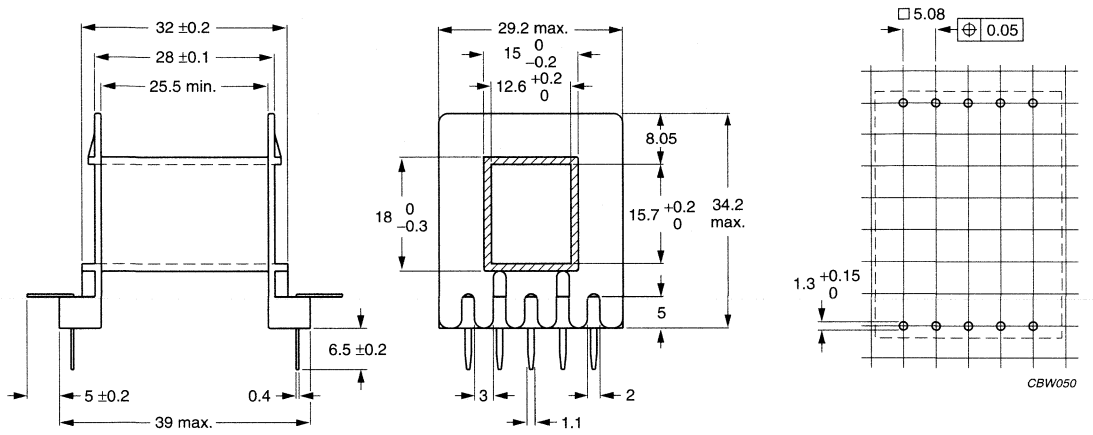
Fig.2 E6.3/2.9/2 coil former (SMD); 6-solder pads.

Winding data for E42/21/15 coil former without pins (E)

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	178	26	93	CP-E42/21/15-1S-E

General data for 10-pins E42/21/15 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-HB"*; UL file number E41613(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	120 °C
Resistance to soldering heat	350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

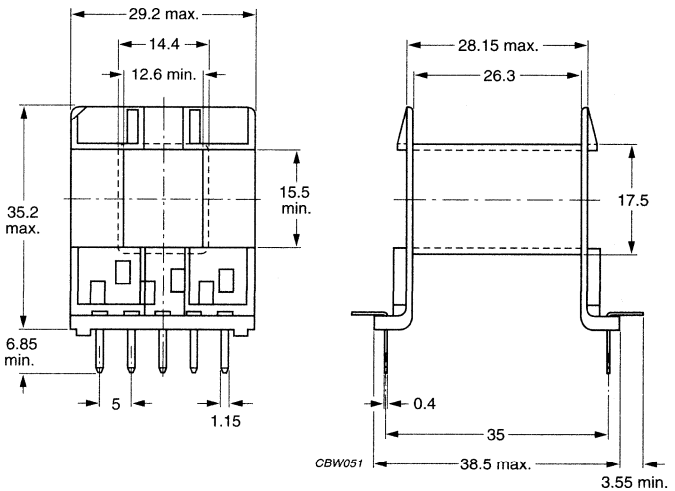
Fig.3 E42/21/15 coil former; 10-pins.

Winding data for 10-pins E42/21/15 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	178	26	93	CPH-E42/15-1S-10P

General data for 10-pins E42/21/15 coil former (A)

PARAMETER	SPECIFICATION
Coil former material	thermoplastic polyester, glass reinforced, flame retardant in accordance with *"UL 94V-HB"*; UL file number E69578(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C, Class B
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.4 E42/21/15 coil former; 10-pins (A).

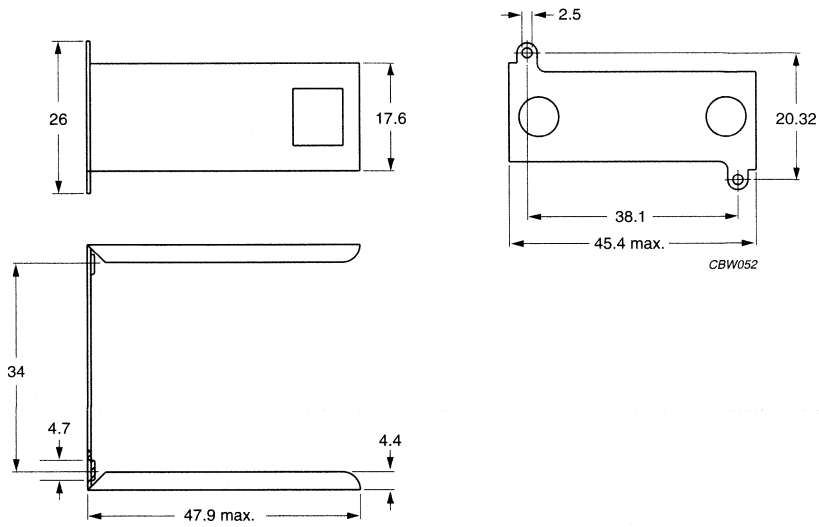
Winding data for 10-pins E42/21/15 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	180	26.3	87	CPH-E42/15-1S-10PD-A

MOUNTING PARTS

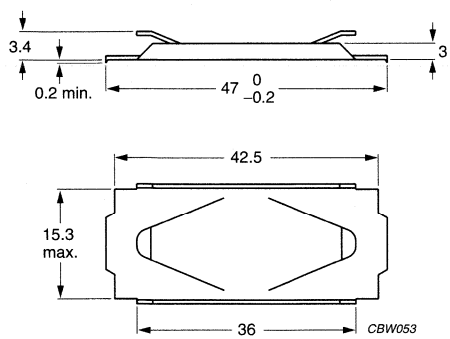
General data for mounting parts

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clasp	steel, zinc (Zn) plated	5	CLA-E42/21/15
Spring	steel, zinc (Zn) plated	6	SPR-E42/21/15



Dimensions in mm.

Fig.5 E42/21/15 clasp.



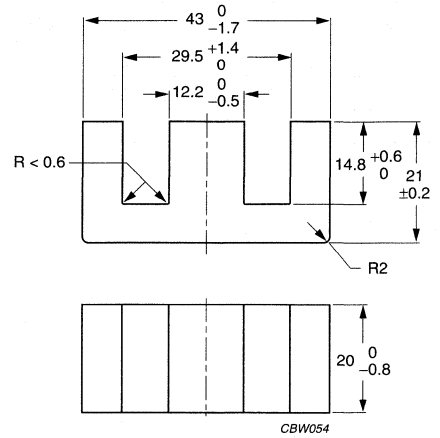
Dimensions in mm.

Fig.6 E42/21/15 spring.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.417	mm^{-1}
V_e	effective volume	22700	mm^3
l_e	effective length	97.0	mm
A_e	effective area	233	mm^2
A_{min}	minimum area	233	mm^2
m	mass of core half	≈56	g



Dimensions in mm.

Fig.1 E42/21/20 core half.

Core halves

Gapped cores are available on request. Clamping force 40 ±20 N, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	4500 ±25%	≈1550	≈0	E42/21/20-3C30
3C81	250 ±3%(1)	≈84	≈1470	E42/21/20-3C81-E250
	315 ±3%(1)	≈105	≈1110	E42/21/20-3C81-E315
	400 ±3%(1)	≈134	≈830	E42/21/20-3C81-E400
	630 ±5%	≈211	≈480	E42/21/20-3C81-A630
	1000 ±10%	≈334	≈270	E42/21/20-3C81-A1000
	6950 ±25%	≈2300	≈0	E42/21/20-3C81
3C85	250 ±3%	≈84	≈1470	E42/21/20-3C85-E250
	315 ±3%	≈105	≈1110	E42/21/20-3C85-E315
	400 ±3%	≈134	≈830	E42/21/20-3C85-E400
	630 ±5%	≈211	≈480	E42/21/20-3C85-A630
	1000 ±10%	≈334	≈270	E42/21/20-3C85-A1000
	5000 ±25%	≈1660	≈0	E42/21/20-3C85
3C90 des	5200 ±25%	≈1720	≈0	E42/21/20-3C90

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	250 ±3%(1)	≈84	≈1470	E42/21/20-3F3-E250
	315 ±3%(1)	≈105	≈1110	E42/21/20-3F3-E315
	400 ±3%(1)	≈134	≈830	E42/21/20-3F3-E400
	630 ±5%	≈211	≈480	E42/21/20-3F3-A630
	1000 ±10%	≈334	≈270	E42/21/20-3F3-A1000
	4600 ±25%	≈1530	≈0	E42/21/20-3F3

Note

1. Measured in combination with an equal gapped core half, clamping force 40 ±20 N.

Core halves of high permeability grades

Clamping force 40 ±20 N.

GRADE	A_L() (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 sup	10500 ±25%	≈3520	≈0	E42/21/20-3E25
3E27	10500 ±25%	≈3520	≈0	E42/21/20-3E27

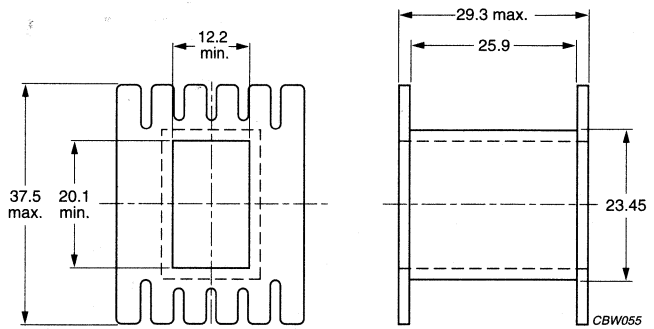
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤2.4	≤2.9	–
3C81	≥320	≤4.7	–	–
3C85	≥330	≤3.5	≤4.1	–
3C90	≥330	≤2.4	≤2.9	–
3F3	≥320	–	≤2.7	≤5.0

COIL FORMER

General data for E42/21/20 coil former

PARAMETER	SPECIFICATION
Coil former material	thermoplastic polyester, glass reinforced, flame retardant in accordance with *"UL 94V-HB"*; UL file number E69578(M)
Maximum operating temperature	130 °C, Class B



Dimensions in mm.

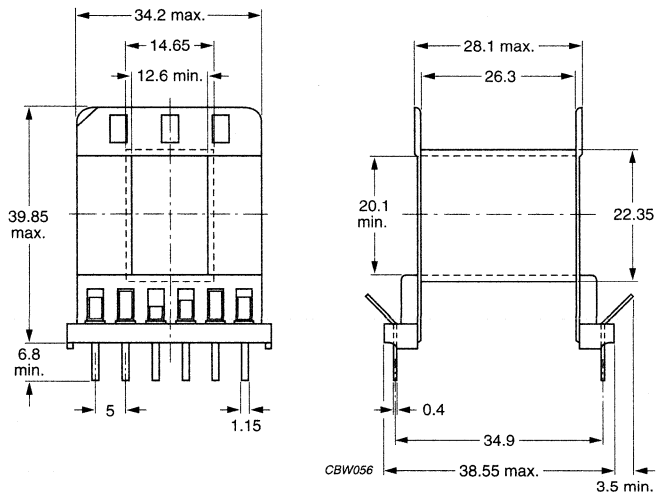
Fig.2 E42/21/20 coil former.

Winding data for E42/21/20 coil former without pins

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	173	25.9	100	CP-E42/21/20-1S

General data for 12-pins E42/21/20 coil former

PARAMETER	SPECIFICATION
Coil former material	thermoplastic polyester, glass reinforced, flame retardant in accordance with *"UL 94V-HB"*; UL file number E69578 (M)
Maximum operating temperature	130 °C, Class B
Pin material	copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.3 E42/21/20 coil former; 12-pins.

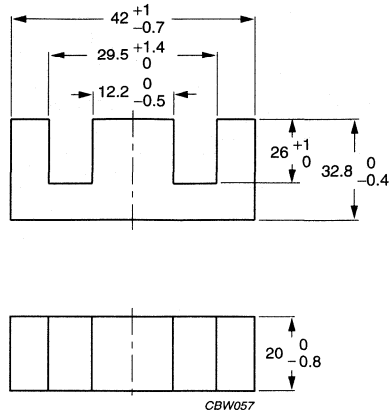
Winding data for 12-pins E42/21/20 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	255	26.3	78.5	CPH-E42/20-1S-12PD

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.614	mm^{-1}
V_e	effective volume	34200	mm^3
l_e	effective length	145	mm
A_e	effective area	236	mm^2
A_{min}	minimum area	234	mm^2
m	mass of core half	≈82	g



Dimensions in mm.

Fig.1 E42/33/20 core half.

Core halves

Clamping force 40 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	3250 ±25%	≈1600	≈0	E42/33/20-3C30
3C85	4000 ±25%	≈2000	≈0	E42/33/20-3C85
3C90 des	4000 ±25%	≈2000	≈0	E42/33/20-3C90
3F3 des	3700 ±25%	≈1850	≈0	E42/33/20-3F3

Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥350	≤3.6	≤4.2	–
3C85	≥330	≤4.8	≤6.0	–
3C90	≥330	≤3.6	≤4.2	–
3F3	≥320	–	≤4.0	≤7.3

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.380	mm^{-1}
V_e	effective volume	20800	mm^3
l_e	effective length	88.9	mm
A_e	effective area	234	mm^2
A_{min}	minimum area	226	mm^2
m	mass of core half	≈53	g

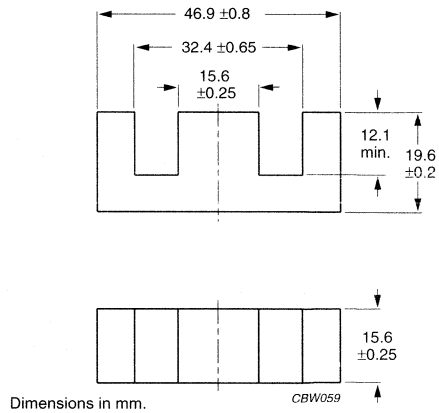


Fig.1 E47/20/16 core half.

Core halves

A_L measured in combination with a non gapped core half, clamping force 40 ±20 N, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	4750 ±25%	≈1500	≈0	E47/20/16-3C30
3C81	250 ±3%(1)	≈76	≈1460	E47/20/16-3C81-E250
	315 ±3%(1)	≈95	≈1100	E47/20/16-3C81-E315
	400 ±3%(1)	≈121	≈830	E47/20/16-3C81-E400
	630 ±5%	≈191	≈480	E47/20/16-3C81-A630
	1000 ±10%	≈303	≈270	E47/20/16-3C81-A1000
	7540 ±25%	≈2290	≈0	E47/20/16-3C81
3C85	250 ±3%(1)	≈76	≈1460	E47/20/16-3C85-E250
	315 ±3%(1)	≈95	≈1100	E47/20/16-3C85-E315
	400 ±3%(1)	≈121	≈830	E47/20/16-3C85-E400
	630 ±5%	≈191	≈480	E47/20/16-3C85-A630
	1000 ±10%	≈303	≈270	E47/20/16-3C85-A1000
	5500 ±25%	≈1660	≈0	E47/20/16-3C85
3C90 des	5500 ±25%	≈1660	≈0	E47/20/16-3C90
3F3 des	250 ±3%(1)	≈76	≈1458	E47/20/16-3F3-E250
	315 ±3%(1)	≈95	≈1100	E47/20/16-3F3-E315
	400 ±3%(1)	≈121	≈830	E47/20/16-3F3-E400
	630 ±5%	≈191	≈480	E47/20/16-3F3-A630
	1000 ±10%	≈303	≈270	E47/20/16-3F3-A1000
	5100 ±25%	≈1550	≈0	E47/20/16-3F3

Note

1. Measured in combination with an equal gapped core half, clamping force 40 ±20 N.

Core halves of high permeability grades

Clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 sup	11475 ±25%	≈3480	≈0	E47/20/16-3E25
3E27	11475 ±25%	≈3480	≈0	E47/20/16-3E27

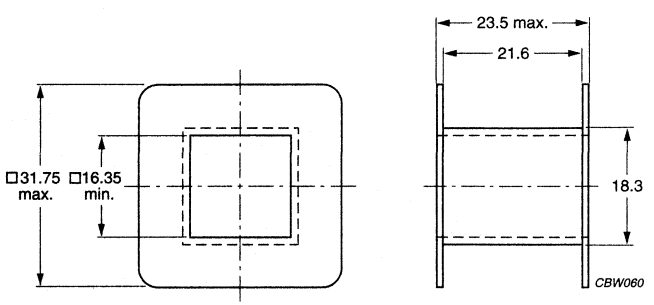
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥350	≤2.3	≤2.7	–
3C81	≥320	≤4.3	–	–
3C85	≥330	≤3.3	≤3.8	–
3C90	≥330	≤2.3	≤2.7	–
3F3	≥320	–	≤2.5	≤4.0

COIL FORMERS

General data for E47/20/16 coil former without pins

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-2"*; UL file number E41938(M)
Maximum operating temperature	105 °C, Class A



Dimensions in mm.

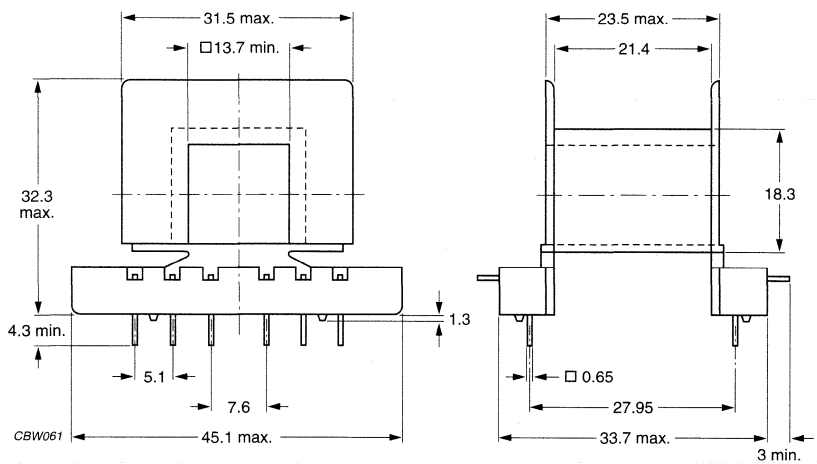
Fig.2 E47/20/16 coil former.

Winding data for E47/20/16 coil former without pins

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	130	21.6	93.3	CP-E47/20/16-1S

General data for 12-pins E47/20/16 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-HB"*; UL file number E41938(M)
Maximum operating temperature	130 °C, Class B
Pin material	copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.3 E47/20/16 coil former: 12-pins.

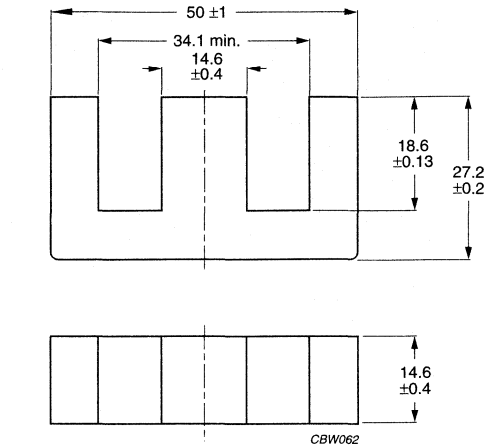
Winding data for 12-pins E47/20/16 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	131	21.4	94.7	CPH-E47/16-1S-12PD

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.530	mm^{-1}
V_e	effective volume	26900	mm^3
l_e	effective length	120	mm
A_e	effective area	225	mm^2
m	mass of core half	≈68	g



Dimensions in mm.

Fig.1 E50/27/15 core half.

Core halves

A_L measured in combination with a non gapped core half, clamping force 40 ±20 N, unless stated otherwise..

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	250 ±3%(1)	≈106	≈1410	E50/27/15-3C81-E250
	315 ±3%(1)	≈133	≈1060	E50/27/15-3C81-E315
	400 ±3%(1)	≈169	≈790	E50/27/15-3C81-E400
	630 ±5%	≈267	≈450	E50/27/15-3C81-A630
	1000 ±10%	≈424	≈250	E50/27/15-3C81-A1000
	5500 ±25%	≈2300	≈0	E50/27/15-3C81
3C85	250 ±3%(1)	≈106	≈1410	E50/27/15-3C85-E250
	315 ±3%(1)	≈133	≈1060	E50/27/15-3C85-E315
	400 ±3%(1)	≈169	≈790	E50/27/15-3C85-E400
	630 ±5%	≈267	≈450	E50/27/15-3C85-A630
	1000 ±10%	≈424	≈250	E50/27/15-3C85-A1000
	4355 ±25%	≈1840	≈0	E50/27/15-3C85
3C90	4355 ±25%	≈1840	≈0	E50/27/15-3C90

Note

1. Measured in combination with an equal gapped core half, clamping force 40 ±20 N.

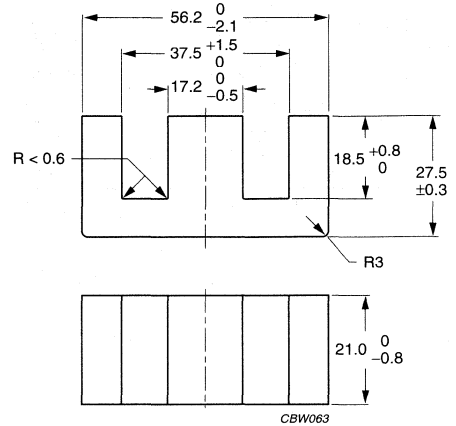
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤5.5	–	–
3C85	≥320	≤4.2	≤4.9	–
3C90	≥320	≤2.7	≤3.4	–

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.350	mm^{-1}
V_e	effective volume	44000	mm^3
l_e	effective length	124	mm
A_e	effective area	353	mm^2
A_{min}	minimum area	345	mm^2
m	mass of core half	≈108	g



Dimensions in mm.

Fig.1 E55/28/21 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 40 ±20 N, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	5400 ±25%	≈1550	≈0	E55/28/21-3C30
3C81	315 ±3%(1)	≈88	≈1740	E55/28/21-3C81-E315
	400 ±3%(1)	≈112	≈1300	E55/28/21-3C81-E400
	630 ±3%(1)	≈176	≈750	E55/28/21-3C81-E630
	1000 ±5%	≈280	≈430	E55/28/21-3C81-A1000
	1600 ±10%	≈448	≈230	E55/28/21-3C81-A1600
	8625 ±25%	≈2400	≈0	E55/28/21-3C81
3C85	315 ±3%(1)	≈88	≈1740	E55/28/21-3C85-E315
	400 ±3%(1)	≈112	≈1300	E55/28/21-3C85-E400
	630 ±3%(1)	≈176	≈750	E55/28/21-3C85-E630
	1000 ±5%	≈280	≈430	E55/28/21-3C85-A1000
	1600 ±10%	≈448	≈230	E55/28/21-3C85-A1600
	6300 ±25%	≈1750	≈0	E55/28/21-3C85
3C90 des	6400 ±25%	≈1780	≈0	E55/28/21-3C90

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	315 ±3%(1)	≈88	≈1740	E55/28/21-3F3-E315
	400 ±3%(1)	≈112	≈1300	E55/28/21-3F3-E400
	630 ±3%(1)	≈176	≈750	E55/28/21-3F3-E630
	1000 ±5%	≈280	≈430	E55/28/21-3F3-A1000
	1600 ±10%	≈448	≈230	E55/28/21-3F3-A1600
	5700 ±25%	≈1590	≈0	E55/28/21-3F3

Note

1. Measured in combination with an equal gapped core half, clamping force 40 ±20 N.

Core halves of high permeability grades

Clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C11	12800 ±25%	≈3700	≈0	E55/28/21-3C11
3E25 des	14000 ±25%	≈4000	≈0	E55/28/21-3E25
3E27	15400 ±25%	≈4300	≈0	E55/28/21-3E27

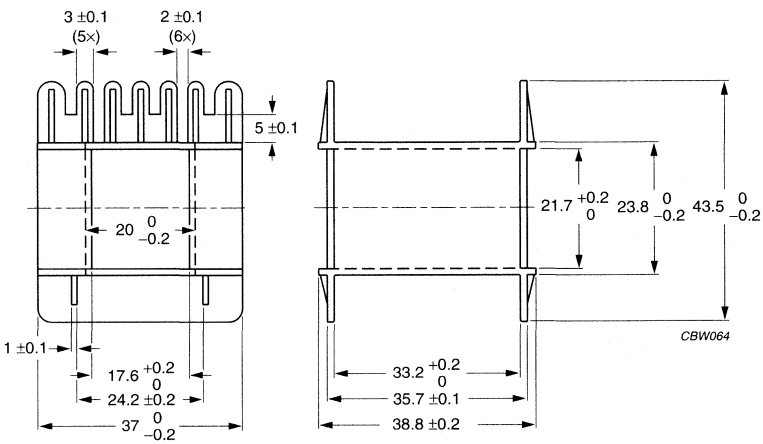
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥350	≤4.8	≤5.9	–
3C81	≥320	≤9.0	–	–
3C85	≥310	≤6.2	≤7.8	–
3C90	≥310	≤4.8	≤5.9	–
3F3	≥310	–	≤5.6	≤10.3

COIL FORMERS

General data for E55/28/21 coil former without pins

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-HB"*; UL file number E41613(M)
Maximum operating temperature	120 °C



Dimensions in mm.

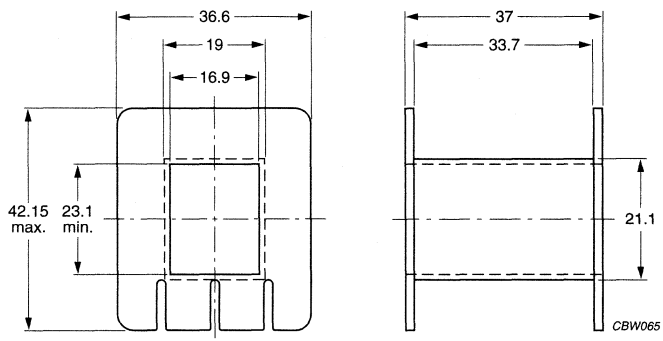
Fig.2 E55/28/21 coil former (E).

Winding data for E55/28/21 coil former without pins (E)

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	250	33.2	116	CP-E55/28/21-1S

General data for E55/28/21 coil former without pins (A)

PARAMETER	SPECIFICATION
Coil former material	thermoplastic polyester, glass reinforced, flame retardant in accordance with *"UL 94V-HB"*; UL file number E41938(M)
Maximum operating temperature	130 °C, Class B



Dimensions in mm.

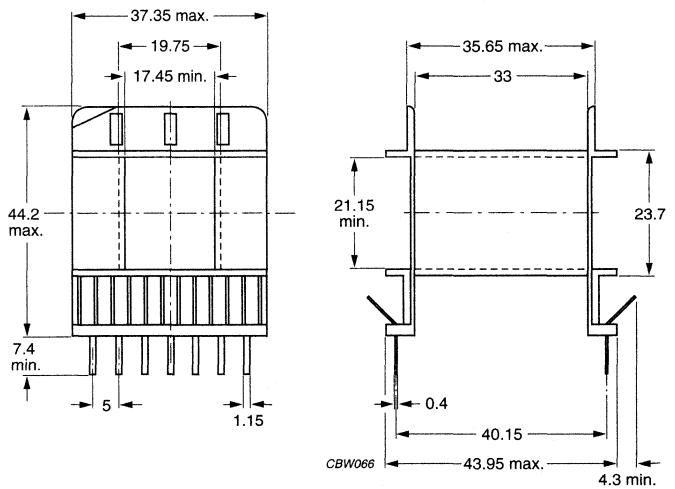
Fig.3 E55/28/21 coil former (A).

Winding data for E55/28/21 coil former without pins (A)

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	277	33.7	113	CP-E55/28/21-1S-A

General data for 14-pins E55/28/21 coil former

PARAMETER	SPECIFICATION
Coil former material	thermoplastic polyester, glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E69578(M)
Maximum operating temperature	150 °C
Pin material	copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.4 E55/28/21 coil former; 14-pins.

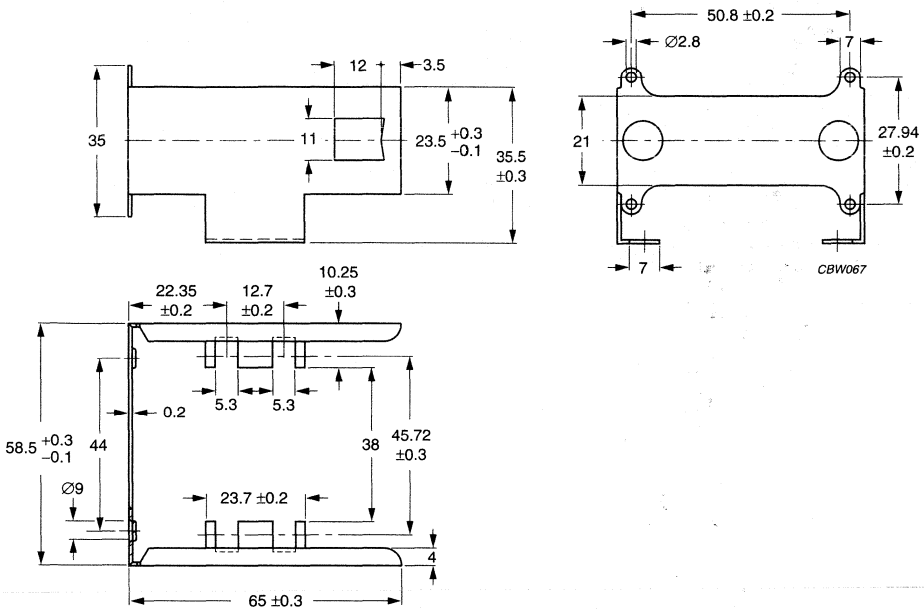
Winding data for 14-pins E55/28/21 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	278	33	119	CPH-E55/28/21-1S-14P

MOUNTING PARTS

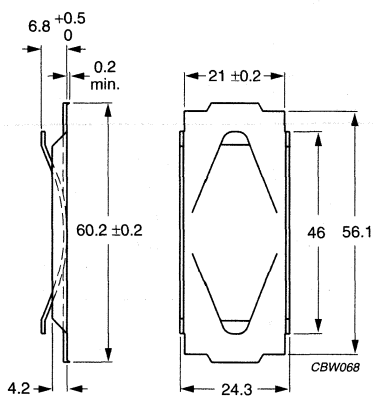
GENERAL DATA FOR MOUNTING PARTS

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clasp	steel, zinc (Zn) plated	5	CLA-E55/28/21
Spring	steel, zinc (Zn) plated	6	SPR-E55/28/21



Dimensions in mm.

Fig.5 E55/28/21 clasp.



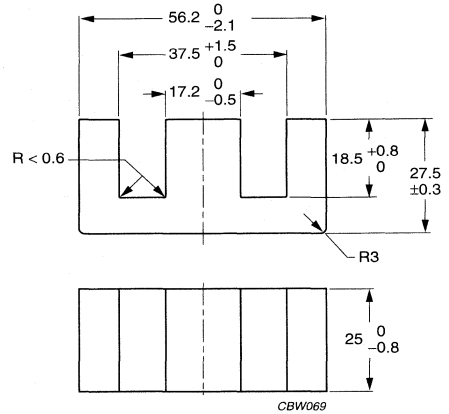
Dimensions in mm.

Fig.6 E55/28/21 spring.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.239	mm^{-1}
V_e	effective volume	52000	mm^3
l_e	effective length	123	mm
A_e	effective area	420	mm^2
A_{min}	minimum area	411	mm^2
m	mass of core half	≈130	g



Dimensions in mm.

Fig.1 E55/28/25 core half.

Core halves

Clamping force 40 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	6500 ±25%	≈1580	≈0	E55/28/25-3C30
3C85	8000 ±25%	≈1950	≈0	E55/28/25-3C85
3C90 des	8000 ±25%	≈1950	≈0	E55/28/25-3C90
3F3 des	7400 ±25%	≈1800	≈0	E55/28/25-3F3

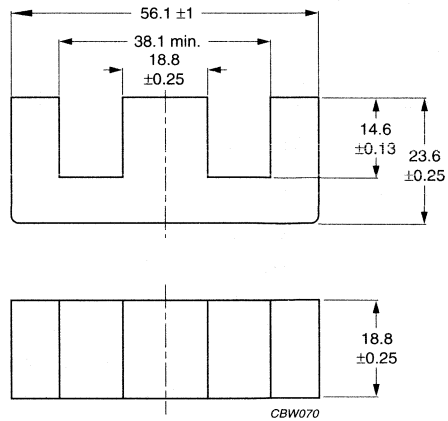
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥350	≤5.7	≤7.3	–
3C85	≥320	≤7.2	≤10.2	–
3C90	≥330	≤5.7	≤7.3	–
3F3	≥310	–	≤6.6	≤12.7

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.320	mm^{-1}
V_e	effective volume	36000	mm^3
l_e	effective length	107	mm
A_e	effective area	337	mm^2
m	mass of core half	≈90	g



Dimensions in mm.

Fig.1 E56/24/19 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 60 ±20 N,unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	315 ±3%(1)	≈79	≈1650	E56/24/19-3C81-E315
	400 ±3%(1)	≈101	≈1240	E56/24/19-3C81-E400
	630 ±3%(1)	≈158	≈720	E56/24/19-3C81-E630
	1000 ±5%	≈251	≈410	E56/24/19-3C81-A1000
	1600 ±10%	≈402	≈230	E56/24/19-3C81-A1600
	9500 ±25%	≈2380	≈0	E56/24/19-3C81
3C85	315 ±3%(1)	≈79	≈1650	E56/24/19-3C85-E315
	400 ±3%(1)	≈101	≈1240	E56/24/19-3C85-E400
	630 ±3%(1)	≈158	≈720	E56/24/19-3C85-E630
	1000 ±5%	≈251	≈410	E56/24/19-3C85-A1000
	1600 ±10%	≈402	≈230	E56/24/19-3C85-A1600
	6900 ±25%	≈1730	≈0	E56/24/19-3C85
3C90	6900 ±25%	≈1730	≈0	E56/24/19-3C90

Note

1. Measured in combination with an equal gapped core half, clamping force 60 ±20 N.

Core halves of high permeability grades

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 sup	14580 ±25%	≈3660	≈0	E56/24/19-3E25
3E27	14580 ±25%	≈3660	≈0	E56/24/19-3E27

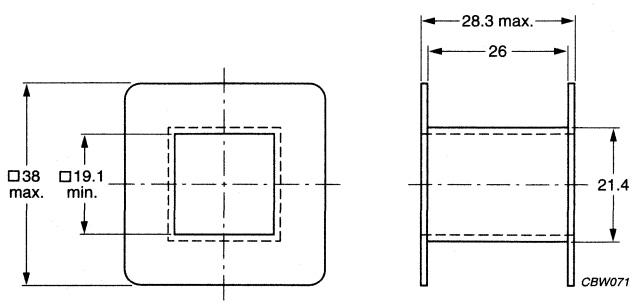
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤7.4	–	–
3C85	≥320	≤5.6	≤6.5	–
3C90	≥320	≤3.6	≤4.8	–

COIL FORMERS

General data for E56/24/19 coil former without pins

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-2"*; UL file number E41938(M)
Maximum operating temperature	105 °C, Class A



Dimensions in mm.

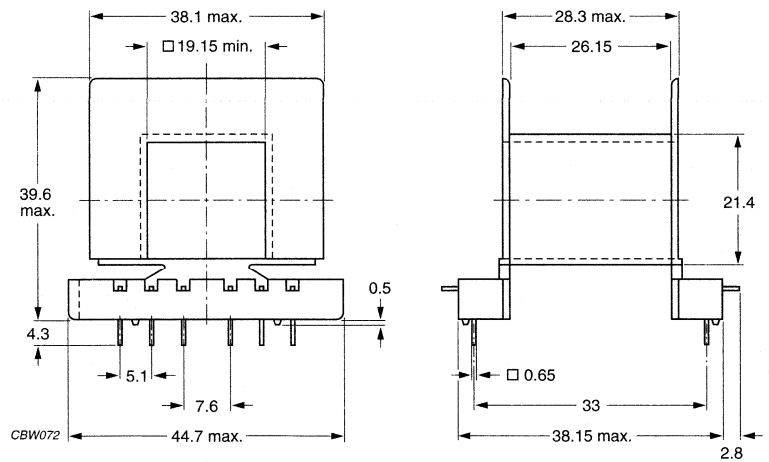
Fig.2 E56/24/19 coil former.

Winding data for E56/24/19 coil former without pins

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	222	26.1	112	CP-E56/24/19-1S

General data for 12-pins E56/24/19 coil former

PARAMETER	SPECIFICATION
Coil former material	thermoplastic polyester, glass reinforced, flame retardant in accordance with *"UL 94V-0"*;UL file number E69578(M)
Maximum operating temperature	180 °C, Class H
Pin material	copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.3 E56/24/19 coil former; 12-pins.

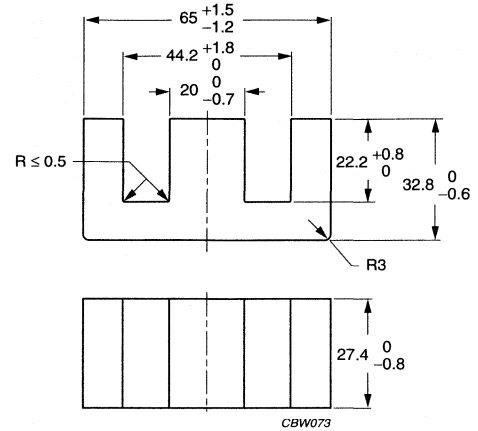
Winding data for 12-pins E56/24/19 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	205	26.2	114	CPH-E56/24/19-1S-12PD

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.274	mm^{-1}
V_e	effective volume	79000	mm^3
l_e	effective length	147	mm
A_e	effective area	540	mm^2
A_{min}	minimum area	530	mm^2
m	mass of core half	≈205	g



Dimensions in mm.

Fig.1 E65/32/27 core half.

Core halves

Gapped cores are available on request. Clamping force 60 ±20 N, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	7000 ±25%	≈1580	≈0	E65/32/27-3C30
3C85	8600 ±25%	≈1900	≈0	E65/32/27-3C85
3C90 des	8600 ±25%	≈1900	≈0	E65/32/27-3C90
3F3 des	7300 ±25%	≈1590	≈0	E65/32/27-3F3

Core halves of high permeability grades

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C11	16700 ±25%	≈3800	≈0	E65/32/27-3C11

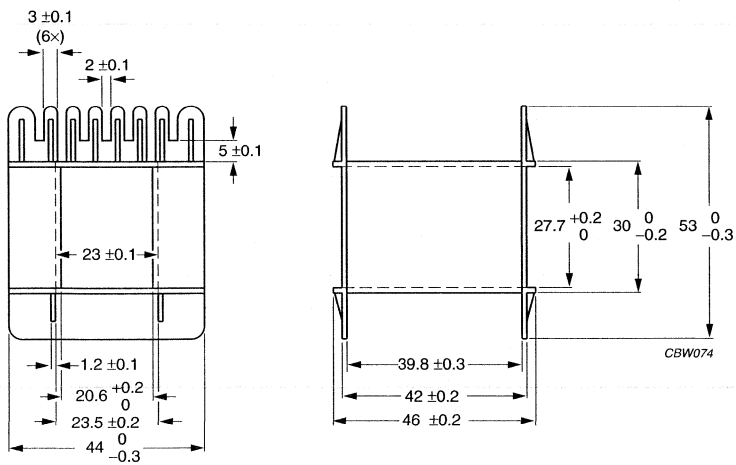
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥350	≤9.1	≤12.0	–
3C85	≥320	≤12.0	≤15.0	–
3C90	≥330	≤9.1	≤12.0	–
3F3	≥310	–	≤10.5	≤21.0

COIL FORMER

General data for E65/32/27 coil former without pins

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41613(M)
Maximum operating temperature	130 °C



Dimensions in mm.

Fig.2 E65/32/27 coil former.

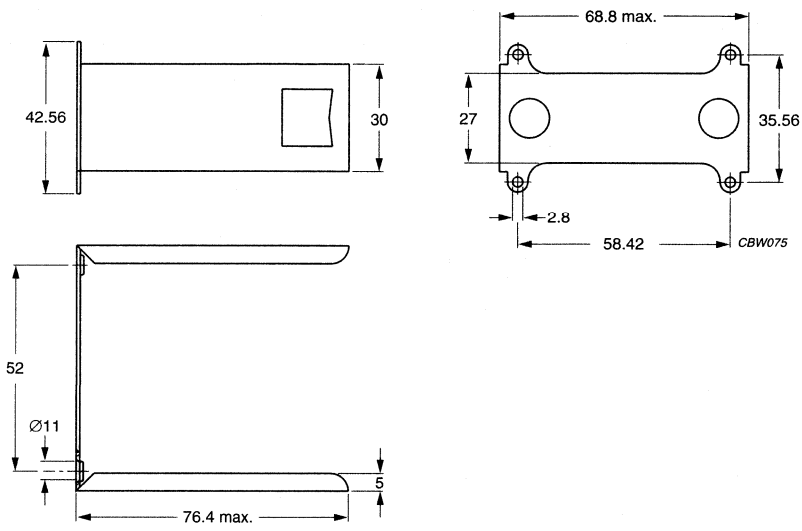
Winding data for E65/32/27 coil former without pins (E)

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	394	39.5	150	CP-E65/32/27-1S

MOUNTING PARTS

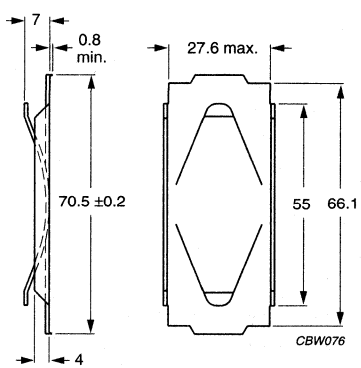
General data for mounting parts

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clasp	steel, zinc (Zn) plated	3	CLA-E65/32/27
Spring	steel, zinc (Zn) plated	4	SPR-E65/32/27



Dimensions in mm.

Fig.3 E65/32/27 clasp.



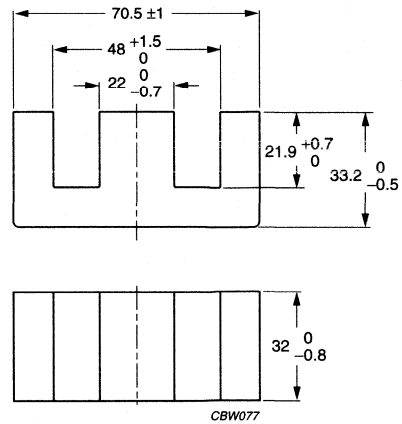
Dimensions in mm.

Fig.4 E65/32/27 spring.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.218	mm^{-1}
V_e	effective volume	102000	mm^3
l_e	effective length	149	mm
A_e	effective area	683	mm^2
A_{min}	minimum area	676	mm^2
m	mass of core half	≈260	g



Dimensions in mm.

Fig.1 E71/33/32 core half.

Core halves

Clamping force 60 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	8700 ±25%	≈1550	≈0	E71/33/32-3C30
3C85	10800 ±25%	≈1950	≈0	E71/33/32-3C85
3C90 des	10800 ±25%	≈1950	≈0	E71/33/32-3C90
3F3 des	10000 ±25%	≈1800	≈0	E71/33/32-3F3

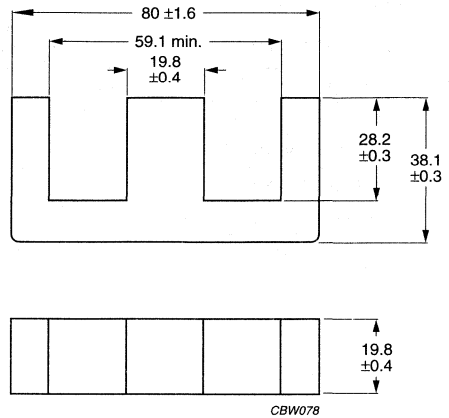
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥350	≤12.0	≤16.5	–
3C85	≥320	≤14.5	≤22.0	–
3C90	≥330	≤12.0	≤16.5	–
3F3	≥310	–	≤14.0	≤29.0

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.470	mm^{-1}
V_e	effective volume	72300	mm^3
l_e	effective length	184	mm
A_e	effective area	392	mm^2
m	mass of core half	≈180	g



Dimensions in mm.

Fig.1 E80/38/20 core half.

Core halves

A_L measured in combination with a non-gapped core half, clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	315 ±3%(1)	≈118	≈1980	E80/38/20-3C81-E315
	400 ±3%(1)	≈150	≈1460	E80/38/20-3C81-E400
	630 ±3%(1)	≈236	≈830	E80/38/20-3C81-E630
	1000 ±5%	≈374	≈460	E80/38/20-3C81-A1000
	1600 ±10%	≈598	≈240	E80/38/20-3C81-A1600
	6730 ±25%	≈2500	≈0	E80/38/20-3C81
3C85	315 ±3%(1)	≈118	≈1980	E80/38/20-3C85-E315
	400 ±3%(1)	≈150	≈1460	E80/38/20-3C85-E400
	630 ±3%(1)	≈236	≈830	E80/38/20-3C85-E630
	1000 ±5%	≈374	≈460	E80/38/20-3C85-A1000
	1600 ±10%	≈598	≈240	E80/38/20-3C85-A1600
	5070 ±25%	≈1900	≈0	E80/38/20-3C85
3C90	5070 ±25%	≈1900	≈0	E80/38/20-3C90

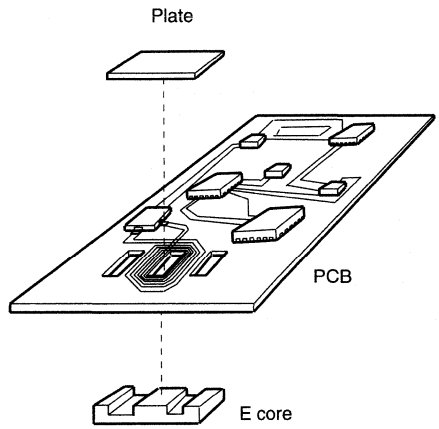
GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	315 ±3%(1)	≈118	≈1980	E80/38/20-3F3-E315
	400 ±3%(1)	≈150	≈1460	E80/38/20-3F3-E400
	630 ±3%(1)	≈236	≈830	E80/38/20-3F3-E630
	1000 ±5%	≈374	≈460	E80/38/20-3F3-A1000
	1600 ±10%	≈598	≈240	E80/38/20-3F3-A1600
	4590 ±25%	≈1720	≈0	E80/38/20-3F3

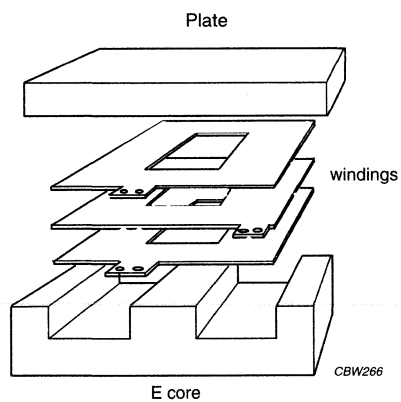
Note

1. Measured in combination with an equal gapped core half, clamping force 60 ±20 N.

Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤14.8	–	–
3C85	≥320	≤11.2	≤13.0	–
3F3	≥320	–	≤8.0	≤13.8
3C90	≥320	≤7.2	≤10.0	–





For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview Planar E cores

CORE TYPE	V_e (mm^3)	A_e (mm^2)	MASS (g)
E14/3.5/5	300	14.5	0.6
PLT14/5/1.5	–	–	0.5
E14/3.5/5/R	230	14.2	0.6
PLT14/5/1.5/S	–	–	0.5
E18/4/10	960	39.5	2.4
PLT18/10/2	–	–	1.7
E18/4/10/R	830	40.8	2.4
PLT18/10/2/S	–	–	1.7
E22/6/16	2550	78.5	6.5
PLT22/16/2.5	–	–	4.0
E22/6/16/R	2100	80.4	6.5
PLT22/16/2.5/S	–	–	4.0
E32/6/20	5380	129	13
PLT32/20/3	–	–	10
E38/8/25	10200	194	25
PLT38/25/4	–	–	18
E43/10/28	13900	225	35
PLT43/28/4	–	–	24
E58/11/38	24600	305	62
PLT58/38/4	–	–	44
E64/10/50	40700	511	100
PLT64/50/5	–	–	78

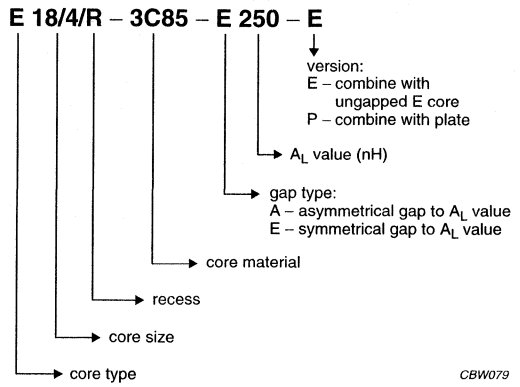


Fig.1 Type number structure for cores.

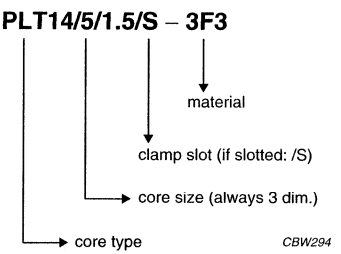


Fig.2 Type number structure for plates.

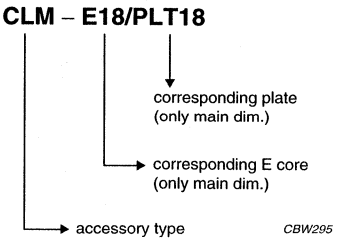


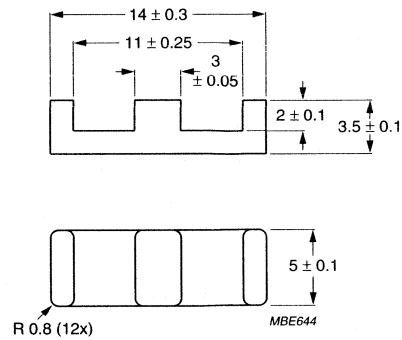
Fig.3 Type number structure for clamps.

Planar E cores E14/3.5/5

CORES

Effective core parameters of a set of E cores

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.43	mm^{-1}
V_e	effective volume	300	mm^3
l_e	effective length	20.7	mm
A_e	effective area	14.5	mm^2
A_{min}	minimum area	14.5	mm^2
m	mass of core half	≈0.6	g



Dimensions in mm.

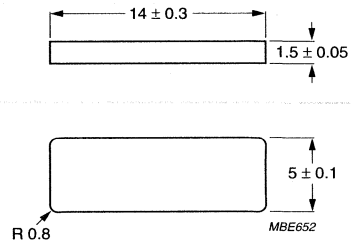
Fig.1 E14/3.5/5 core.

Effective core parameters of an E/PLT combination

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.16	mm^{-1}
V_e	effective volume	240	mm^3
l_e	effective length	16.7	mm
A_e	effective area	14.5	mm^2
A_{min}	minimum area	14.5	mm^2
m	mass of plate	≈0.5	g

Ordering information for plates

GRADE	TYPE NUMBER
3F3 des	PLT14/5/1.5-3F3
3F4 des	PLT14/5/1.5-3F4
3E6 des	PLT14/5/1.5-3E6



Dimensions in mm.

Fig.2 PLT 14/5/1.5.

Core halves for use in combination with an ungapped E core

A_L measured in combination with a non-gapped core half, clamping force 10 ±5 N, using a PCB coil containing 4 layers of 8 tracks each, total heigth 1.6 mm, E + PLT is measured with a single PCB coil, E + E with two PCB coils stacked.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	63 ±3%	≈72	≈530	E14/3.5-3F3-A63-E
	100 ±5%	≈114	≈270	E14/3.5-3F3-A100-E
	160 ±8%	≈182	≈130	E14/3.5-3F3-A160-E
	1100 ±25%	≈1250	≈0	E14/3.5/5-3F3
3F4 des	63 ±3%	≈72	≈530	E14/3.5-3F4-A63-E
	100 ±5%	≈114	≈270	E14/3.5-3F4-A100-E
	160 ±8%	≈182	≈130	E14/3.5-3F4-A160-E
	650 ±25%	≈740	≈0	E14/3.5/5-3F4
3E6 des	5600 +40/-30%	≈6360	≈0	E14/3.5/5-3E6

Core halves for use in combination with a plate (PLT)

A_L measured in combination with a plate (PLT) clamping force 10 ±5 N, using a PCB coil containing 4 layers of 8 tracks each, total heigth 1.6 mm, E + PLT is measured with a single PCB coil, E + E with two PCB coils stacked.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	63 ±3%	≈58	≈600	E14/3.5-3F3-A63-P
	100 ±5%	≈92	≈300	E14/3.5-3F3-A100-P
	160 ±8%	≈148	≈150	E14/3.5-3F3-A160-P
	1300 ±25%	≈1200	≈0	E14/3.5/5-3F3
3F4 des	63 ±3%	≈58	≈600	E14/3.5-3F4-A63-P
	100 ±5%	≈92	≈300	E14/3.5-3F4-A100-P
	160 ±8%	≈148	≈150	E14/3.5-3F4-A160-P
	780 ±25%	≈720	≈0	E14/3.5/5-3F4
3E6 des	6400 +40/-30%	≈5900	≈0	E14/3.5/5-3E6

Properties under power conditions

CORE COMBINATION	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 10 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
E+E14-3F3	≥300	–	≤0.033	≤0.060	–	–
E+PLT14-3F3	≥300	–	≤0.027	≤0.047	–	–
E+E14-3F4	≥250	–	–	–	≤0.060	≤0.096
E+PLT14-3F4	≥250	–	–	–	≤0.048	≤0.077

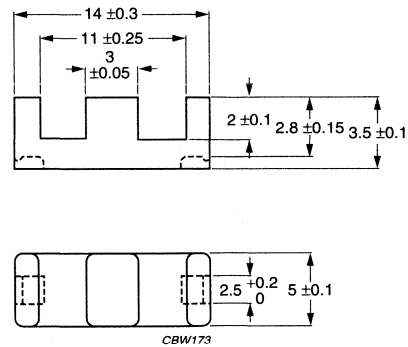
CORES

Effective core parameters of an E/PLT combination

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.15	mm^{-1}
V_e	effective volume	230	mm^3
l_e	effective length	16.4	mm
A_e	effective area	14.2	mm^2
A_{min}	minimum area	10.9	mm^2
m	mass of E core half	≈0.6	g
m	mass of plate	≈0.5	g

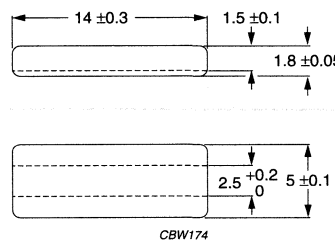
Ordering information for plates

GRADE	TYPE NUMBER
3F3 des	PLT14/5/1.5/S-3F3
3F4 des	PLT14/5/1.5/S-3F4
3E6 des	PLT14/5/1.5/S-3E6



Dimensions in mm.

Fig.1 E14/3.5/5/R core.



Dimensions in mm.

Fig.2 PLT 14/5/1.5/S.

Core halves for use in combination with a slotted plate (PLT/S)

A_L measured in combination with a slotted plate (PLT/S) clamping force 10 ±5 N; measurement coil as for E14/3.5/5.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	63 ±3%	≈58	≈600	E14/3.5/R-3F3-A63-P
	100 ±5%	≈92	≈300	E14/3.5/R-3F3-A100-P
	160 ±8%	≈148	≈150	E14/3.5/R-3F3-A160-P
	1300 ±25%	≈1200	≈0	E14/3.5/5/R-3F3
3F4 des	63 ±3%	≈58	≈600	E14/3.5/R-3F4-A63-P
	100 ±5%	≈92	≈300	E14/3.5/R-3F4-A100-P
	160 ±8%	≈148	≈150	E14/3.5/R-3F4-A160-P
	780 ±25%	≈710	≈0	E14/3.5/5/R-3F4
3E6 des	6400 +40/–30%	≈5900	≈0	E14/3.5/5/R-3E6

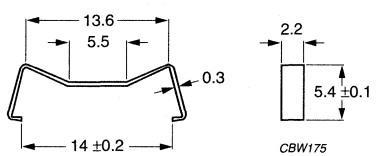
Properties of E/PLT combinations under power conditions

CORE COMBINATION	B (mT) at	CORE LOSS (W) at			
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
E14/R+PLT14/S-3F3	≥300	≤0.027	≤0.047	–	–
E14/R+PLT14/S-3F4	≥250	–	–	≤0.048	≤0.077

MOUNTING PARTS

General data and ordering information

ITEM	MATERIAL	FIGURE	TYPE NUMBER
Clamp	stainless steel (CrNi)	3	CLM-E14/PLT14



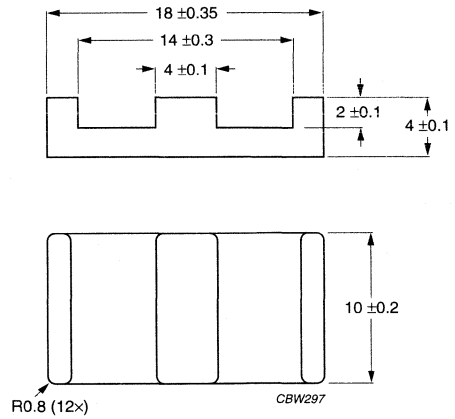
Dimensions in mm.

Fig.3 Clamp for E14/R+PLT14/S.

CORES

Effective core parameters of a set of E cores

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.616	mm^{-1}
V_e	effective volume	960	mm^3
l_e	effective length	24.3	mm
A_e	effective area	39.5	mm^2
A_{min}	minimum area	39.5	mm^2
m	mass of core half	≈2.4	g



Dimensions in mm.

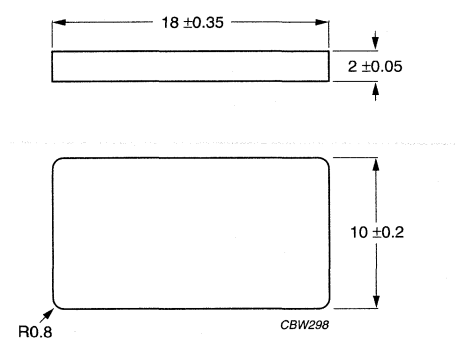
Fig.1 E18/4/10 core half.

Effective core parameters of an E/PLT combination

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.514	mm^{-1}
V_e	effective volume	800	mm^3
l_e	effective length	20.3	mm
A_e	effective area	39.5	mm^2
A_{min}	minimum area	39.5	mm^2
m	mass of plate	≈1.7	g

Ordering information for plates

GRADE	TYPE NUMBER
3E6 des	PLT18/10/2-3E6
3F3 des	PLT18/10/2-3F3
3F4 des	PLT18/10/2-3F4



Dimensions in mm.

Fig.2 PLT 18/10/2.

Core halves for use in combination with an non-gapped E core

A_L measured in combination with a non-gapped core half, clamping force 20 ±10 N, using a PCB coil containing 4 layers of 8 tracks each, total heigth 1.6 mm, E + PLT is measured with a single PCB coil, E + E with two PCB coils stacked.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	100 ±3%	≈49	≈800	E18/4-3F3-A100-E
	160 ±3%	≈78	≈420	E18/4-3F3-A160-E
	250 ±5%	≈123	≈220	E18/4-3F3-A250-E
	315 ±8%	≈154	≈170	E18/4-3F3-A315-E
	2700 ±25%	≈1320	≈0	E18/4/10-3F3
3F4 des	100 ±3%	≈49	≈800	E18/4-3F4-A100-E
	160 ±3%	≈78	≈420	E18/4-3F4-A160-E
	250 ±5%	≈123	≈220	E18/4-3F4-A250-E
	315 ±8%	≈154	≈170	E18/4-3F4-A315-E
	1550 ±25%	≈760	≈0	E18/4/10-3F4
3E6 des	13500 +40/-30%	≈6600	≈0	E18/4/10-3E6

Core halves for use in combination with a plate (PLT)

A_L measured in combination with a plate (PLT), clamping force 20 ±10 N, using a PCB coil containing 4 layers of 8 tracks each, total heigth 1.6 mm, E + PLT is measured with a single PCB coil, E + E with two PCB coils stacked.

GRADE	A_L() (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	100 ±3%	≈41	≈870	E18/4-3F3-A100-P
	160 ±3%	≈65	≈470	E18/4-3F3-A160-P
	250 ±5%	≈102	≈240	E18/4-3F3-A250-P
	315 ±8%	≈129	≈170	E18/4-3F3-A315-P
	3100 ±25%	≈1270	≈0	E18/4/10-3F3
3F4 des	100 ±3%	≈41	≈870	E18/4-3F4-A100-P
	160 ±3%	≈65	≈470	E18/4-3F4-A160-P
	250 ±5%	≈102	≈240	E18/4-3F4-A250-P
	315 ±8%	≈129	≈170	E18/4-3F4-A315-P
	1800 ±25%	≈740	≈0	E18/4/10-3F4
3E6 des	15500 +40/-30%	≈6400	≈0	E18/4/10-3E6

Properties under power conditions

CORE COMBINATION	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 10 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
E+E18-3F3	≥300	–	≤0.11	≤0.19	–	–
E+PLT18-3F3	≥300	–	≤0.090	≤0.16	–	–
E+E18-3F4	≥250	–	–	–	≤0.19	≤0.31
E+PLT18-3F4	≥250	–	–	–	≤0.16	≤0.26

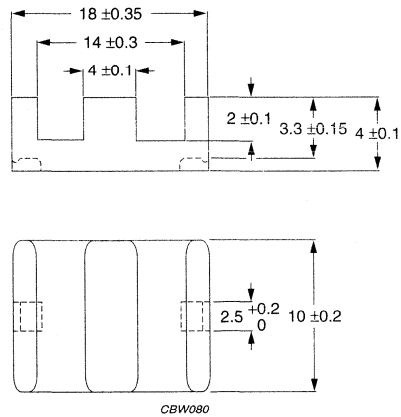
CORES

Effective core parameters of an E/PLT combination

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.498	mm^{-1}
V_e	effective volume	830	mm^3
l_e	effective length	20.3	mm
A_e	effective area	40.8	mm^2
A_{min}	minimum area	35.9	mm^2
m	mass of E core half	≈2.4	g
m	mass of plate	≈1.7	g

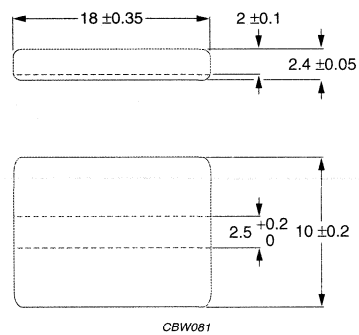
Ordering information for plates

GRADE	TYPE NUMBER
3F3 des	PLT18/10/2/S-3F3
3F4 des	PLT18/10/2/S-3F4
3E6 des	PLT18/10/2/S-3E6



Dimensions in mm.

Fig.1 E18/4/10/R core.



Dimensions in mm.

Fig.2 PLT 18/10/2/S.

Core halves for use in combination with a slotted plate (PLT/S)

A_L measured in combination with a slotted plate (PLT/S) clamping force 10 ±5 N; measurement coil as for E18/4/10.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	100 ±3%	≈41	≈870	E18/4/R-3F3-A100-P
	160 ±3%	≈65	≈470	E18/4/R-3F3-A160-P
	250 ±5%	≈102	≈240	E18/4/R-3F3-A250-P
	315 ±8%	≈129	≈170	E18/4/R-3F3-A315-P
	3100 ±25%	≈1270	≈0	E18/4/10/R-3F3
3F4 des	100 ±3%	≈41	≈870	E18/4/R-3F4-A100-P
	160 ±3%	≈65	≈470	E18/4/R-3F4-A160-P
	250 ±5%	≈102	≈240	E18/4/R-3F4-A250-P
	315 ±8%	≈129	≈170	E18/4/R-3F4-A315-P
	1800 ±25%	≈740	≈0	E18/4/10/R-3F4
3E6 des	15500 +40/–30%	≈6400	≈0	E18/4/10/R-3E6

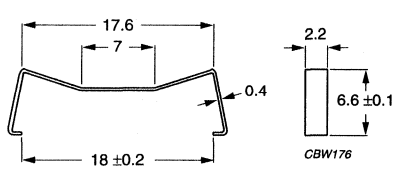
Properties of E/PLT combinations under power conditions

CORE COMBINATION	B (mT) at	CORE LOSS (W) at			
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
E18/R+PLT18/S-3F3	≥300	≤0.090	≤0.16	–	–
E18/R+PLT18/S-3F4	≥250	–	–	≤0.16	≤0.26

MOUNTING PARTS

General data and ordering information

ITEM	MATERIAL	FIGURE	TYPE NUMBER
Clamp	stainless steel (CrNi)	3	CLM-E18/PLT18



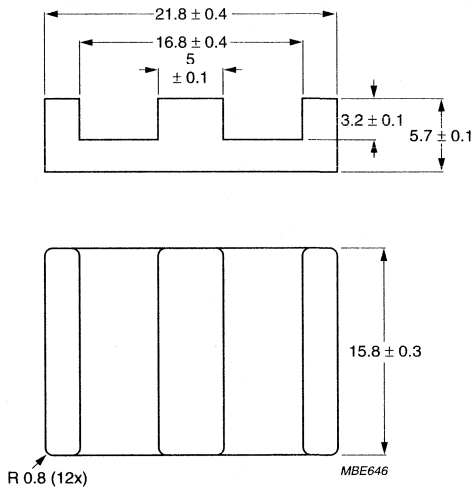
Dimensions in mm.

Fig.3 Clamp for E18/R+PLT18/S.

CORES

Effective core parameters of a set of E cores

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.414	mm^{-1}
V_e	effective volume	2550	mm^3
l_e	effective length	32.5	mm
A_e	effective area	78.5	mm^2
A_{min}	minimum area	78.5	mm^2
m	mass of core half	≈6.5	g



Dimensions in mm.

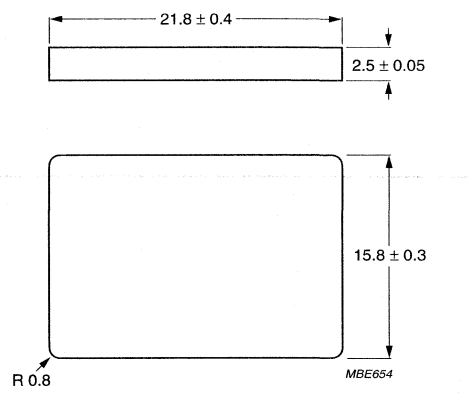
Fig.1 E22/6/16.

Effective core parameters of an E/PLT combination

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.332	mm^{-1}
V_e	effective volume	2040	mm^3
l_e	effective length	26.1	mm
A_e	effective area	78.5	mm^2
A_{min}	minimum area	78.5	mm^2
m	mass of plate	≈4	g

Ordering information for plates

GRADE	TYPE NUMBER
3F3 des	PLT22/16/2.5-3F3
3F4 des	PLT22/16/2.5-3F4
3E6 des	PLT22/16/2.5-3E6



Dimensions in mm.

Fig.2 PLT22/16/2.5.

Core halves for use in combination with an non-gapped E core

A_L measured in combination with a non-gapped core half, clamping force 20 ±10 N, using a PCB coil containing 5 layers of 20tracks each, total heigth 2.5 mm, E + PLT is measured with a single PCB coil, E + E with two PCB coils stacked.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	160 ±3%	≈53	≈900	E22/6-3F3-A160-E
	250 ±3%	≈82	≈490	E22/6-3F3-A250-E
	315 ±3%	≈104	≈360	E22/6-3F3-A315-E
	400 ±5%	≈132	≈280	E22/6-3F3-A400-E
	630 ±8%	≈208	≈160	E22/6-3F3-A630-E
	4300 ±25%	≈1420	≈0	E22/6/16-3F3
3F4 des	160 ±3%	≈53	≈900	E22/6-3F4-A160-E
	250 ±3%	≈82	≈490	E22/6-3F4-A250-E
	315 ±3%	≈104	≈360	E22/6-3F4-A315-E
	400 ±5%	≈132	≈280	E22/6-3F4-A400-E
	630 ±8%	≈208	≈160	E22/6-3F4-A630-E
	2400 ±25%	≈790	≈0	E22/6/16-3F4
3E6 des	22000 +40/-30%	≈7250	≈0	E22/6/16-3E6

Core halves for use in combination with a plate (PLT)

A_L measured in combination with a plate (PLT), clamping force 20 ±10 N, using a PCB coil containing 5 layers of 20tracks each, total heigth 2.5 mm, E + PLT is measured with a single PCB coil, E + E with two PCB coils stacked.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	160 ±3%	≈42	≈950	E22/6-3F3-A160-P
	250 ±3%	≈66	≈550	E22/6-3F3-A250-P
	315 ±3%	≈83	≈400	E22/6-3F3-A315-P
	400 ±5%	≈106	≈280	E22/6-3F3-A400-P
	630 ±8%	≈166	≈160	E22/6-3F3-A630-P
	5000 ±25%	≈1320	≈0	E22/6/16-3F3
3F4 des	160 ±3%	≈42	≈950	E22/6-3F4-A160-P
	250 ±3%	≈66	≈550	E22/6-3F4-A250-P
	315 ±3%	≈83	≈400	E22/6-3F4-A315-P
	400 ±5%	≈106	≈280	E22/6-3F4-A400-P
	630 ±8%	≈166	≈160	E22/6-3F4-A630-P
	2900 ±25%	≈770	≈0	E22/6/16-3F4
3E6 des	26000 +40/-30%	≈6900	≈0	E22/6/16-3E6

Properties under power conditions

CORE COMBINATION	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 10 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
E+E22-3F3	≥300	–	≤0.28	≤0.50	–	–
E+PLT22-3F3	≥300	–	≤0.23	≤0.40	–	–
E+E22-3F4	≥250	–	–	–	≤0.51	≤0.82
E+PLT22-3F4	≥250	–	–	–	≤0.41	≤0.66

Planar E cores E22/6/16/R

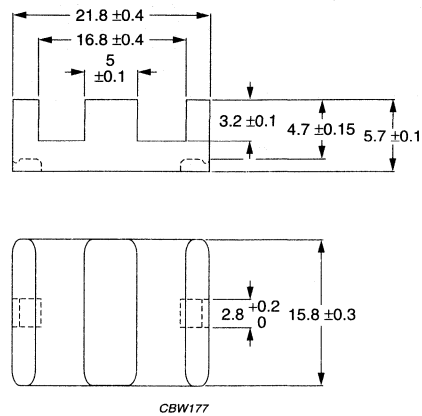
CORES

Effective core parameters of an E/PLT combination

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.324	mm^{-1}
V_e	effective volume	2100	mm^3
l_e	effective length	26.1	mm
A_e	effective area	80.4	mm^2
A_{min}	minimum area	72.6	mm^2
m	mass of E core half	≈6.5	g
m	mass of plate	≈4	g

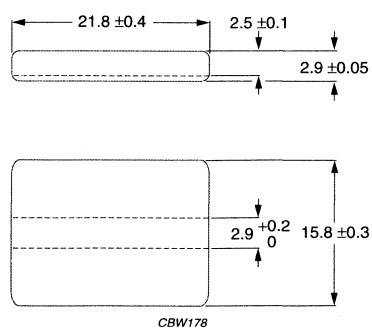
Ordering information for plates

GRADE	TYPE NUMBER
3F3 des	PLT22/16/2.5/S-3F3
3F4 des	PLT22/16/2.5/S-3F4
3E6 des	PLT22/16/2.5/S-3E6



Dimensions in mm.

Fig.1 E22/6/16/R.



Dimensions in mm.

Fig.2 PLT22/16/2.5/S.

Core halves for use in combination with a slotted plate (PLT/S)

A_L measured in combination with a slotted plate (PLT/S) clamping force 10 ±5 N; measurement coil as for E22/6/16.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	160 ±3%	≈42	≈950	E22/6/R-3F3-A160-P
	250 ±3%	≈66	≈550	E22/6/R-3F3-A250-P
	315 ±3%	≈83	≈400	E22/6/R-3F3-A315-P
	400 ±5%	≈106	≈280	E22/6/R-3F3-A400-P
	630 ±8%	≈166	≈160	E22/6/R-3F3-A630-P
	5000 ±25%	≈1320	≈0	E22/6/16/R-3F3
3F4 des	160 ±3%	≈42	≈950	E22/6/R-3F4-A160-P
	250 ±3%	≈66	≈550	E22/6/R-3F4-A250-P
	315 ±3%	≈83	≈400	E22/6/R-3F4-A315-P
	400 ±5%	≈106	≈280	E22/6/R-3F4-A400-P
	630 ±8%	≈166	≈160	E22/6/R-3F4-A630-P
	2900 ±25%	≈770	≈0	E22/6/16/R-3F4
3E6 des	26000 +40/–30%	≈6900	≈0	E22/6/16/R-3E6

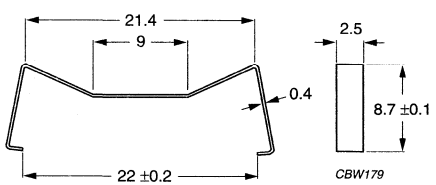
Properties of E/PLT combinations under power conditions

CORE COMBINATION	B (mT) at	CORE LOSS (W) at			
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
E22/R+PLT22/S-3F3	≥300	≤0.23	≤0.40	–	–
E22/R+PLT22/S-3F4	≥250	–	–	≤0.41	≤0.66

MOUNTING PARTS

General data and ordering information

ITEM	MATERIAL	FIGURE	TYPE NUMBER
Clamp	stainless steel (CrNi)	3	CLM-E22/PLT22



Dimensions in mm.

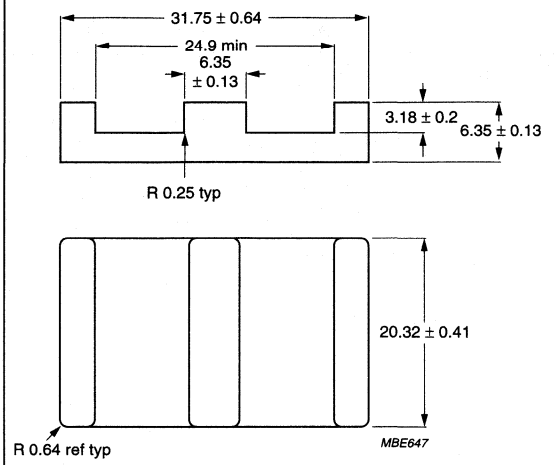
Fig.3 Clamp for E22/R+PLT22/S.

Planar E cores E32/6/20

CORES

Effective core parameters of a set of E cores

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.323	mm^{-1}
V_e	effective volume	5380	mm^3
l_e	effective length	41.7	mm
A_e	effective area	129	mm^2
m	mass of core half	≈13	g



Dimensions in mm.

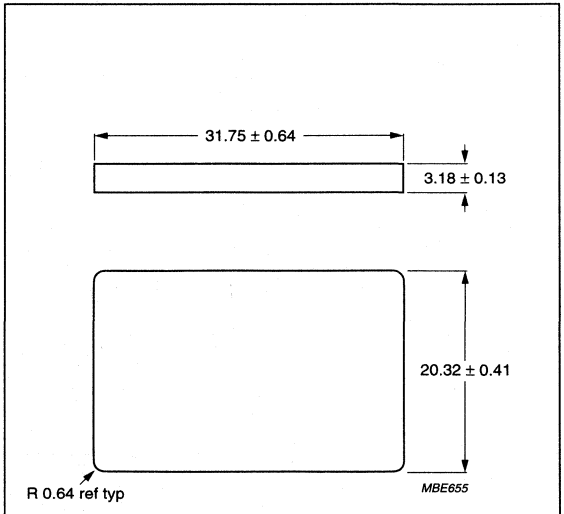
Fig.1 E32/6/20.

Effective core parameters of an E/PLT combination

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.278	mm^{-1}
V_e	effective volume	4560	mm^3
l_e	effective length	35.9	mm
A_e	effective area	129	mm^2
m	mass of plate	≈10	g

Ordering information for plates

GRADE	TYPE NUMBER
3C85 des	PLT32/20/3-3C85
3F3 des	PLT32/20/3-3F3
3F4 des	PLT32/20/3-3F4



Dimensions in mm.

Fig.2 PLT32/20/3.

Core halves for use in combination with an E core

A_L measured in combination with a non gapped core half, clamping force 30 ±10 N, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	160 ±3%(1)	≈41	≈1200	E32/6-3C85-E160-E
	250 ±3%(1)	≈64	≈700	E32/6-3C85-E250-E
	315 ±3%	≈81	≈550	E32/6-3C85-A315-E
	400 ±3%	≈103	≈450	E32/6-3C85-A400-E
	630 ±3%	≈162	≈260	E32/6-3C85-A630-E
	6425 ±25%	≈1650	≈0	E32/6/20-3C85
3F3 des	160 ±3%(1)	≈41	≈1200	E32/6-3F3-E160-E
	250 ±3%(1)	≈64	≈700	E32/6-3F3-E250-E
	315 ±3%	≈81	≈550	E32/6-3F3-A315-E
	400 ±3%	≈103	≈450	E32/6-3F3-A400-E
	630 ±3%	≈162	≈260	E32/6-3F3-A630-E
	5900 ±25%	≈1520	≈0	E32/6/20-3F3
3F4 des	160 ±3%(1)	≈41	≈1200	E32/6-3F4-E160-E
	250 ±3%(1)	≈64	≈700	E32/6-3F4-E250-E
	315 ±3%	≈81	≈550	E32/6-3F4-A315-E
	400 ±3%	≈103	≈450	E32/6-3F4-A400-E
	630 ±3%	≈162	≈260	E32/6-3F4-A630-E
	3200 ±25%	≈820	≈0	E32/6/20-3F4

Note

1. Measured in combination with an equal gapped E core half, clamping force 30 ±10 N.

Core halves for use in combination with a plate (PLT)

A_L measured in combination with a plate (PLT), clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	160 ±3%	≈35	≈1200	E32/6-3C85-A160-P
	250 ±3%	≈55	≈700	E32/6-3C85-A250-P
	315 ±3%	≈69	≈550	E32/6-3C85-A315-P
	400 ±3%	≈87	≈450	E32/6-3C85-A400-P
	630 ±3%	≈138	≈260	E32/6-3C85-A630-P
	7350 ±25%	≈1610	≈0	E32/6/20-3C85
3F3 des	160 ±3%	≈35	≈1200	E32/6-3F3-A160-P
	250 ±3%	≈55	≈700	E32/6-3F3-A250-P
	315 ±3%	≈69	≈550	E32/6-3F3-A315-P
	400 ±3%	≈87	≈450	E32/6-3F3-A400-P
	630 ±3%	≈138	≈260	E32/6-3F3-A630-P
	6780 ±25%	≈1490	≈0	E32/6/20-3F3

Planar E cores E32/6/20

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F4 des	160 ±3%	≈35	≈1200	E32/6-3F4-A160-P
	250 ±3%	≈55	≈700	E32/6-3F4-A250-P
	315 ±3%	≈69	≈550	E32/6-3F4-A315-P
	400 ±3%	≈87	≈450	E32/6-3F4-A400-P
	630 ±3%	≈138	≈260	E32/6-3F4-A630-P
	3700 ±25%	≈810	≈0	E32/6/20-3F4

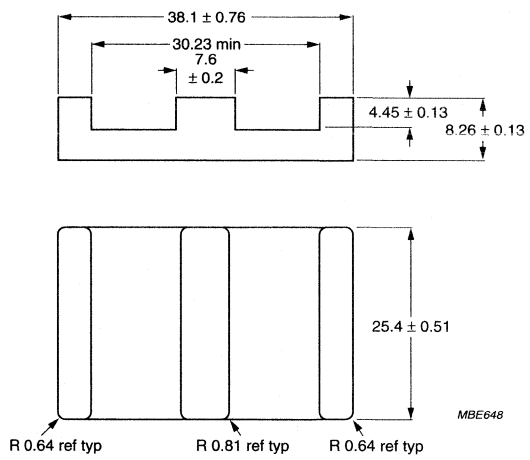
Properties under power conditions

CORE COMBINATION	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 10 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
E+E32-3C85	≥320	≤0.84	≤0.97	–	–	–
E+PLT32-3C85	≥320	≤0.71	≤0.82	–	–	–
E+E32-3F3	≥320	–	≤0.59	≤1.00	–	–
E+PLT32-3F3	≥320	–	≤0.50	≤0.85	–	–
E+E32-3F4	≥250	–	–	–	≤1.60	≤2.00
E+PLT32-3F4	≥250	–	–	–	≤1.36	≤1.70

CORES

Effective core parameters of a set of E cores

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.272	mm^{-1}
V_e	effective volume	10200	mm^3
l_e	effective length	52.6	mm
A_e	effective area	194	mm^2
m	mass of core half	≈25	g



Dimensions in mm.

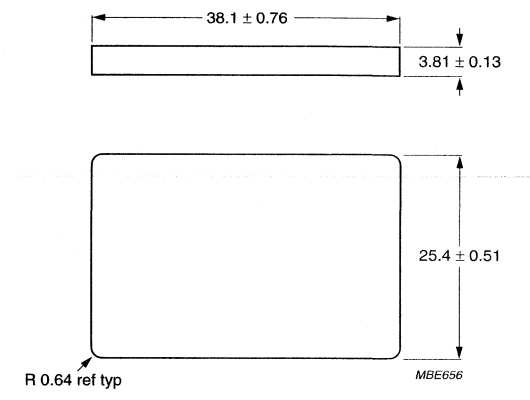
Fig.1 E38/8/25 core half.

Effective core parameters of an E/PLT combination

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.226	mm^{-1}
V_e	effective volume	8460	mm^3
l_e	effective length	43.7	mm
A_e	effective area	194	mm^2
m	mass of plate	≈18	g

Ordering information for plates

GRADE	TYPE NUMBER
3C85 des	PLT38/25/4-3C85
3F3 des	PLT38/25/4-3F3
3F4 des	PLT38/25/4-3F4



Dimensions in mm.

Fig.2 PLT38/25/4.

Core halves for use in combination with an E core

A_L measured in combination with a non gapped core half, clamping force 40 ±15 N, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	250 ±3%(1)	≈54	≈1100	E38/8-3C85-E250-E
	315 ±3%(1)	≈68	≈850	E38/8-3C85-E315-E
	400 ±3%(1)	≈86	≈650	E38/8-3C85-E400-E
	630 ±5%	≈136	≈400	E38/8-3C85-A630-E
	1000 ±10%	≈216	≈250	E38/8-3C85-A1000-E
	7940 ±25%	≈1720	≈0	E38/8/25-3C85
3F3 des	250 ±3%(1)	≈54	≈1100	E38/8-3F3-E250-E
	315 ±3%(1)	≈68	≈850	E38/8-3F3-E315-E
	400 ±3%(1)	≈86	≈650	E38/8-3F3-E400-E
	630 ±5%	≈136	≈400	E38/8-3F3-A630-E
	1000 ±10%	≈216	≈250	E38/8-3F3-A1000-E
	7250 ±25%	≈1570	≈0	E38/8/25-3F3
3F4 des	250 ±3%(1)	≈54	≈1100	E38/8-3F4-E250-E
	315 ±3%(1)	≈68	≈850	E38/8-3F4-E315-E
	400 ±3%(1)	≈86	≈650	E38/8-3F4-E400-E
	630 ±5%	≈136	≈400	E38/8-3F4-A630-E
	1000 ±10%	≈216	≈250	E38/8-3F4-A1000-E
	3880 ±25%	≈840	≈0	E38/8/25-3F4

Note

1. Measured in combination with an equal gapped core half, clamping force 40 ±15 N.

Core halves for use in combination with a plate (PLT)

A_L measured in combination with a plate (PLT), clamping force 40 ±15 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	250 ±3%	≈45	≈1100	E38/8-3C85-A250-P
	315 ±3%	≈57	≈850	E38/8-3C85-A315-P
	400 ±3%	≈72	≈650	E38/8-3C85-A400-P
	630 ±5%	≈113	≈400	E38/8-3C85-A630-P
	1000 ±10%	≈180	≈250	E38/8-3C85-A1000-P
	9290 ±25%	≈1670	≈0	E38/8/25-3C85
3F3 des	250 ±3%	≈45	≈1100	E38/8-3F3-A250-P
	315 ±3%	≈57	≈850	E38/8-3F3-A315-P
	400 ±3%	≈72	≈650	E38/8-3F3-A400-P
	630 ±5%	≈113	≈400	E38/8-3F3-A630-P
	1000 ±10%	≈180	≈250	E38/8-3F3-A1000-P
	8500 ±25%	≈1520	≈0	E38/8/25-3F3

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F4 des	250 ±3%	≈45	≈1100	E38/8-3F4-A250-P
	315 ±3%	≈57	≈850	E38/8-3F4-A315-P
	400 ±3%	≈72	≈650	E38/8-3F4-A400-P
	630 ±5%	≈113	≈400	E38/8-3F4-A630-P
	1000 ±10%	≈180	≈250	E38/8-3F4-A1000-P
	4600 ±25%	≈830	≈0	E38/8/25-3F4

Properties under power conditions

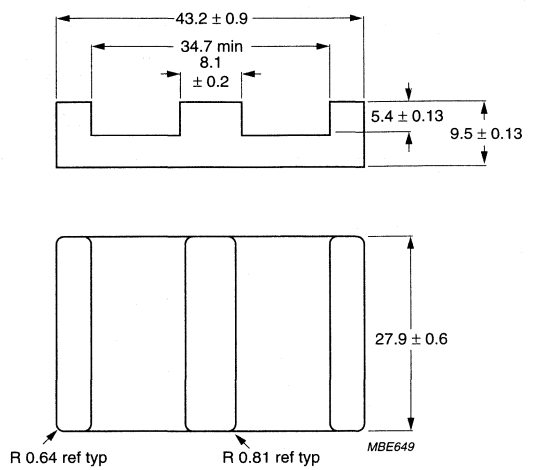
CORE COMBINATION	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 10 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
E+E38-3C85	≥320	≤1.60	≤1.80	–	–	–
E+PLT38-3C85	≥320	≤1.35	≤1.50	–	–	–
E+E38-3F3	≥320	–	≤1.20	≤2.00	–	–
E+PLT38-3F3	≥320	–	≤1.00	≤1.65	–	–
E+E38-3F4	≥250	–	–	–	≤3.00	≤3.50
E+PLT38-3F4	≥250	–	–	–	≤2.50	≤2.90

Planar E cores E43/10/28

CORES

Effective core parameters of a set of E cores

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.276	mm^{-1}
V_e	effective volume	13900	mm^3
l_e	effective length	61.7	mm
A_e	effective area	225	mm^2
m	mass of core half	≈35	g



Dimensions in mm.

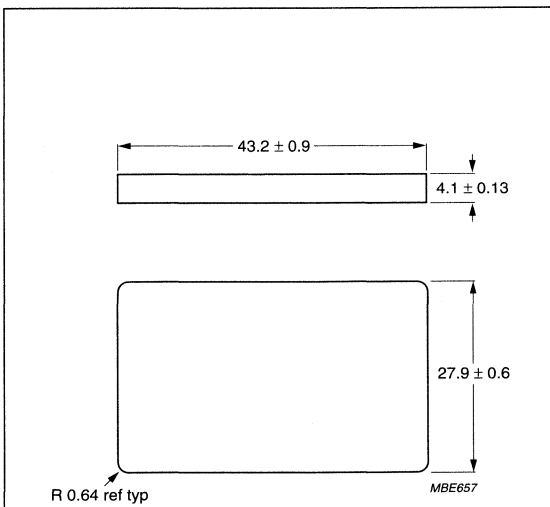
Fig.1 E43/10/28 core half.

Effective core parameters of an E/PLT combination

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.226	mm^{-1}
V_e	effective volume	11500	mm^3
l_e	effective length	50.8	mm
A_e	effective area	225	mm^2
m	mass of core half	≈24	g

Ordering information

GRADE	TYPE NUMBER
3C85 des	PLT43/28/4-3C85
3F3 des	PLT43/28/4-3F3
3F4 des	PLT43/28/4-3F4



Dimensions in mm.

Fig.2 PLT43/28/4.

Core halves for use in combination with an E core

A_L measured in combination with a non gapped core half, clamping force 40 ±20 N, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	250 ±3%(1)	≈55	≈1100	E43/10-3C85-E250-E
	315 ±3%(1)	≈69	≈800	E43/10-3C85-E315-E
	400 ±3%(1)	≈87	≈700	E43/10-3C85-E400-E
	630 ±5%	≈138	≈400	E43/10-3C85-A630-E
	1000 ±10%	≈219	≈250	E43/10-3C85-A1000-E
	8030 ±25%	≈1710	≈0	E43/10/28-3C85
3F3 des	250 ±3%(1)	≈55	≈1100	E43/10-3F3-E250-E
	315 ±3%(1)	≈69	≈800	E43/10-3F3-E315-E
	400 ±3%(1)	≈87	≈700	E43/10-3F3-E400-E
	630 ±5%	≈138	≈400	E43/10-3F3-A630-E
	1000 ±10%	≈219	≈250	E43/10-3F3-A1000-E
	7310 ±25%	≈1600	≈0	E43/10/28-3F3
3F4 des	250 ±3%(1)	≈55	≈1100	E43/10-3F4-E250-E
	315 ±3%(1)	≈69	≈800	E43/10-3F4-E315-E
	400 ±3%(1)	≈87	≈700	E43/10-3F4-E400-E
	630 ±5%	≈138	≈400	E43/10-3F4-A630-E
	1000 ±10%	≈219	≈250	E43/10-3F4-A1000-E
	3870 ±25%	≈850	≈0	E43/10/28-3F4

Note

1. Measured in combination with an equal gapped E core half, clamping force 40 ±20 N.

Core halves for use in combination with a plate (PLT)

A_L measured in combination with a plate (PLT).

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	250 ±3%	≈45	≈1100	E43/10-3C85-A250-P
	315 ±3%	≈57	≈800	E43/10-3C85-A315-P
	400 ±3%	≈72	≈700	E43/10-3C85-A400-P
	630 ±5%	≈113	≈400	E43/10-3C85-A630-P
	1000 ±10%	≈180	≈250	E43/10-3C85-A1000-P
	9250 ±25%	≈1710	≈0	E43/10/28-3C85
3F3 des	250 ±3%	≈45	≈1100	E43/10-3F3-A250-P
	315 ±3%	≈57	≈800	E43/10-3F3-A315-P
	400 ±3%	≈72	≈700	E43/10-3F3-A400-P
	630 ±5%	≈113	≈400	E43/10-3F3-A630-P
	1000 ±10%	≈180	≈250	E43/10-3F3-A1000-P
	8700 ±25%	≈1560	≈0	E43/10/28-3F3

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F4 des	250 ±3%	≈45	≈1100	E43/10-3F4-A250-P
	315 ±3%	≈57	≈800	E43/10-3F4-A315-P
	400 ±3%	≈72	≈700	E43/10-3F4-A400-P
	630 ±5%	≈113	≈400	E43/10-3F4-A630-P
	1000 ±10%	≈180	≈250	E43/10-3F4-A1000-P
	4660 ±25%	≈850	≈0	E43/10/28-3F4

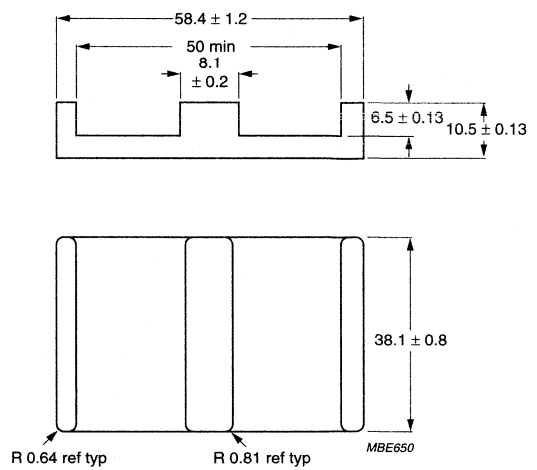
Properties under power conditions

CORE COMBINATION	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 10 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
E+E43-3C85	≥320	–	≤2.50	–	–	–
E+PLT43-3C85	≥320	–	≤2.10	–	–	–
E+E43-3F3	≥320	–	≤1.60	≤2.70	–	–
E+PLT43-3F3	≥320	–	≤1.35	≤2.25	–	–
E+E43-3F4	≥250	–	–	–	≤4.20	≤5.00
E+PLT43-3F4	≥250	–	–	–	≤3.50	≤4.15

CORES

Effective core parameters of a set of E cores

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.268	mm^{-1}
V_e	effective volume	24600	mm^3
l_e	effective length	81.2	mm
A_e	effective area	305	mm^2
m	mass of core half	≈62	g



Dimensions in mm.

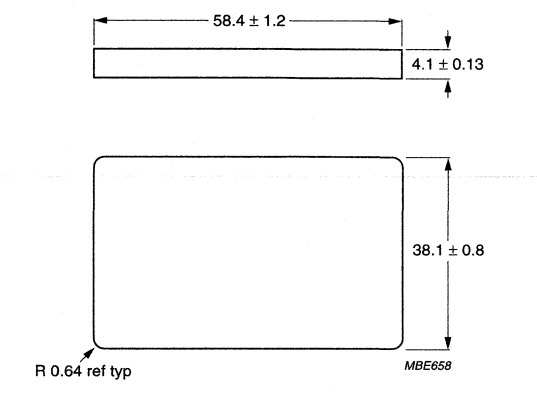
Fig.1 E58/11/38 core half.

Effective core parameters of an E/PLT combination

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.224	mm^{-1}
V_e	effective volume	20800	mm^3
l_e	effective length	68.3	mm
A_e	effective area	305	mm^2
m	mass of core half	≈44	g

Ordering information for plates

GRADE	TYPE NUMBER
3C85 des	PLT58/38/4-3C85
3F3 des	PLT58/38/4-3F3
3F4 des	PLT58/38/4-3F4



Dimensions in mm.

Fig.2 PLT 58/38/4.

Core halves for use in combination with an E core

A_L measured in combination with a non gapped core half, clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	315 ±3%(1)	≈67	≈1400	E58/11-3C85-E315-E
	400 ±3%(1)	≈85	≈1100	E58/11-3C85-E400-E
	630 ±5%(1)	≈134	≈650	E58/11-3C85-E630-E
	1000 ±5%	≈213	≈400	E58/11-3C85-A1000-E
	1600 ±10%	≈341	≈200	E58/11-3C85-A1600-E
	8480 ±25%	≈1800	≈0	E58/11/38-3C85
3F3 des	315 ±3%(1)	≈67	≈1400	E58/11-3F3-E315-E
	400 ±3%(1)	≈85	≈1100	E58/11-3F3-E400-E
	630 ±5%(1)	≈134	≈650	E58/11-3F3-E630-E
	1000 ±5%	≈213	≈400	E58/11-3F3-A1000-E
	1600 ±10%	≈341	≈200	E58/11-3F3-A1600-E
	7710 ±25%	≈1640	≈0	E58/11/38-3F3
3F4 des	315 ±3%(1)	≈67	≈1400	E58/11-3F4-E315-E
	400 ±3%(1)	≈85	≈1100	E58/11-3F4-E400-E
	630 ±5%(1)	≈134	≈650	E58/11-3F4-E630-E
	1000 ±5%	≈213	≈400	E58/11-3F4-A1000-E
	1600 ±10%	≈341	≈200	E58/11-3F4-A1600-E
	4030 ±25%	≈860	≈0	E58/11/38-3F4

Note

1. Measured in combination with an equal gapped E core half, clamping force 40 ±20 N.

Core halves for use in combination with a plate (PLT)

A_L measured in combination with a plate (PLT).

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	315 ±3%	≈56	≈1400	E58/11-3C85-A315-P
	400 ±3%	≈71	≈1100	E58/11-3C85-A400-P
	630 ±5%	≈112	≈650	E58/11-3C85-A630-P
	1000 ±5%	≈178	≈400	E58/11-3C85-A1000-P
	1600 ±10%	≈285	≈200	E58/11-3C85-A1600-P
	9970 ±25%	≈780	≈0	E58/11/38-3C85
3F3 des	315 ±3%	≈56	≈1400	E58/11-3F3-A315-P
	400 ±3%	≈71	≈1100	E58/11-3F3-A400-P
	630 ±5%	≈112	≈650	E58/11-3F3-A630-P
	1000 ±5%	≈178	≈400	E58/11-3F3-A1000-P
	1600 ±10%	≈285	≈200	E58/11-3F3-A1600-P
	9070 ±25%	≈1620	≈0	E58/11/38-3F3

Planar E cores E58/11/38

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F4 des	315 ±3%	≈56	≈1400	E58/11-3F4-A315-P
	400 ±3%	≈71	≈1100	E58/11-3F4-A400-P
	630 ±5%	≈112	≈650	E58/11-3F4-A630-P
	1000 ±5%	≈178	≈400	E58/11-3F4-A1000-P
	1600 ±10%	≈285	≈200	E58/11-3F4-A1600-P
	4780 ±25%	≈850	≈0	E58/11/38-3F4

Properties under power conditions

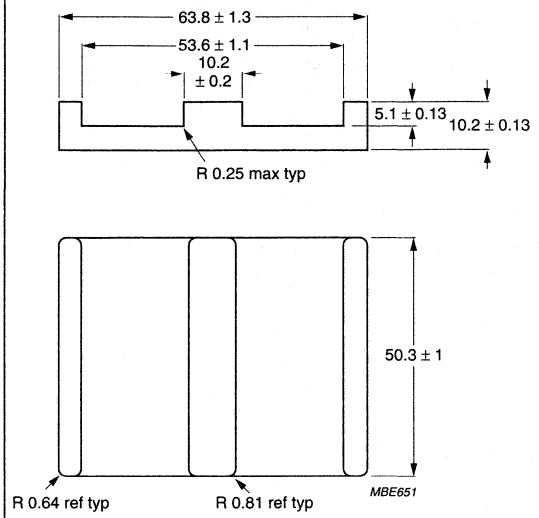
CORE COMBINATION	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 10 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
E+E58-3C85	≥320	–	≤4.40	–	–	–
E+PLT58-3C85	≥320	–	≤3.75	–	–	–
E+E58-3F3	≥320	–	≤2.70	≤4.70	–	–
E+PLT58-3F3	≥320	–	≤2.30	≤4.00	–	–
E+E58-3F4	≥250	–	–	–	≤7.40	≤8.00
E+PLT58-3F4	≥250	–	–	–	≤6.25	≤6.80

Planar E cores E64/10/50

CORES

Effective core parameters of a set of E cores

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.156	mm^{-1}
V_e	effective volume	40700	mm^3
l_e	effective length	79.7	mm
A_e	effective area	511	mm^2
m	mass of core half	≈100	g



Dimensions in mm.

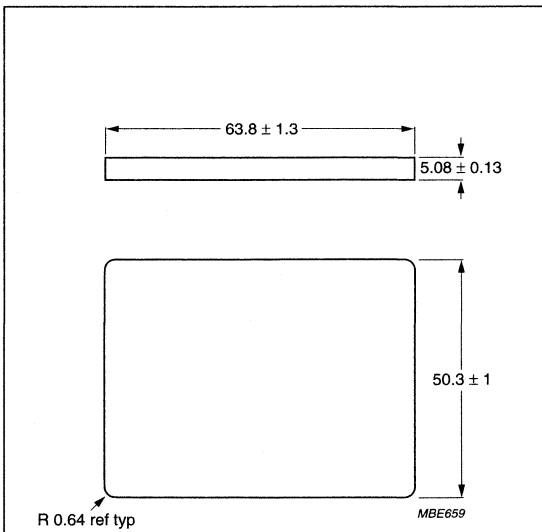
Fig.1 E64/10/50.

Effective core parameters of an E/PLT combination

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.136	mm^{-1}
V_e	effective volume	35500	mm^3
l_e	effective length	69.6	mm
A_e	effective area	511	mm^2
m	mass of plate	≈78	g

Ordering information for plates

GRADE	TYPE NUMBER
3C85 des	PLT64/50/5-3C85
3F3 des	PLT64/50/5-3F3
3F4 des	PLT64/50/5-3F4



Dimensions in mm.

Fig.2 PLT 64/50/5.

Core halves for use in combination with an E core

A_L measured in combination with a non gapped core half, clamping force 100 ±30 N, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	630 ±3%(1)	≈78	≈1100	E64/10-3C85-E630-E
	1000 ±3%(1)	≈124	≈660	E64/10-3C85-E1000-E
	1600 ±5%	≈199	≈385	E64/10-3C85-A1600-E
	2500 ±10%	≈310	≈225	E64/10-3C85-A2500-E
	3150 ±10%	≈391	≈170	E64/10-3C85-A3150-E
	14640 ±25%	≈1820	≈0	E64/10/50-3C85
3F3 des	630 ±3%(1)	≈78	≈1100	E64/10-3F3-E630-E
	1000 ±3%(1)	≈124	≈660	E64/10-3F3-E1000-E
	1600 ±5%	≈199	≈385	E64/10-3F3-A1600-E
	2500 ±10%	≈310	≈225	E64/10-3F3-A2500-E
	3150 ±10%	≈391	≈170	E64/10-3F3-A3150-E
	13300 ±25%	≈1650	≈0	E64/10/50-3F3
3F4 des	630 ±3%(1)	≈78	≈1100	E64/10-3F4-E630-E
	1000 ±3%(1)	≈124	≈660	E64/10-3F4-E1000-E
	1600 ±5%	≈199	≈385	E64/10-3F4-A1600-E
	2500 ±10%	≈310	≈225	E64/10-3F4-A2500-E
	3150 ±10%	≈391	≈170	E64/10-3F4-A3150-E
	6960 ±25%	≈860	≈0	E64/10/50-3F4

Note

1. Measured in combination with an equa -gapped core half, clamping force 100 ±30 N.

Core halves for use in combination with a plate (PLT)

A_L measured in combination with a plate (PLT), clamping force 100 ±30 N.

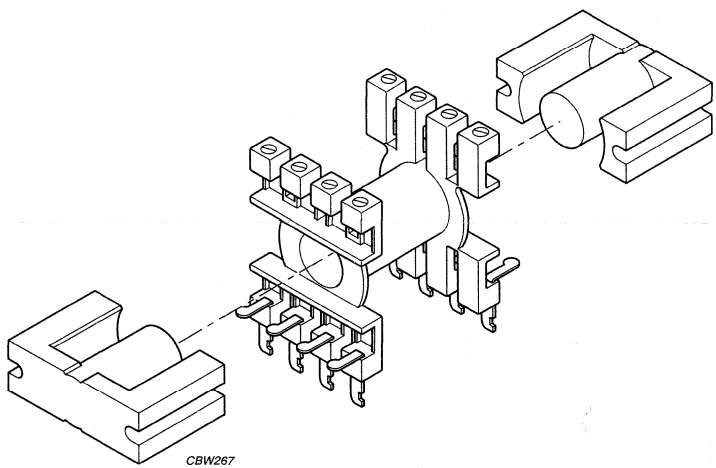
GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	630 ±3%	≈78	≈1100	E64/10-3C85-A-630-P
	1000 ±3%	≈124	≈660	E64/10-3C85-A-1000-P
	1600 ±5%	≈199	≈385	E64/10-3C85-A-1600-P
	2500 ±10%	≈310	≈225	E64/10-3C85-A-2500-P
	3150 ±10%	≈391	≈170	E64/10-3C85-A-3150-P
	16540 ±25%	≈1790	≈0	E64/10/50-3C85
3F3 des	630 ±3%	≈78	≈1100	E64/10-3F3-A-630-P
	1000 ±3%	≈124	≈660	E64/10-3F3-A-1000-P
	1600 ±5%	≈199	≈385	E64/10-3F3-A-1600-P
	2500 ±10%	≈310	≈225	E64/10-3F3-A-2500-P
	3150 ±10%	≈391	≈170	E64/10-3F3-A-3150-P
	15050 ±25%	≈1630	≈0	E64/10/50-3F3

Planar E cores E64/10/50

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F4 des	630 ±3%	≈78	≈1100	E64/10-3F4-A-630-P
	1000 ±3%	≈124	≈660	E64/10-3F4-A-1000-P
	1600 ±5%	≈199	≈385	E64/10-3F4-A-1600-P
	2500 ±10%	≈310	≈225	E64/10-3F4-A-2500-P
	3150 ±10%	≈391	≈170	E64/10-3F4-A-3150-P
	7920 ±25%	≈860	≈0	E64/10/50-3F4

Properties under power conditions

CORE COMBINATION	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 10 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
E+E64-3C85	≥320	–	≤7.30	–	–	–
E+PLT64-3C85	≥320	–	≤6.40	–	–	–
E+E64-3F3	≥320	–	≤4.50	≤7.80	–	–
E+PLT64-3F3	≥320	–	≤3.95	≤6.80	–	–
E+E64-3F4	≥250	–	–	–	≤12.0	≤15.0
E+PLT64-3F4	≥250	–	–	–	≤10.5	≤13.0



For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview E cores

CORE TYPE	V_e (mm^3)	A_e (mm^3)	MASS (g)
EC35	6530	84.3	19
EC41	10800	121	30
EC52	18800	180	56
EC70	40100	279	127

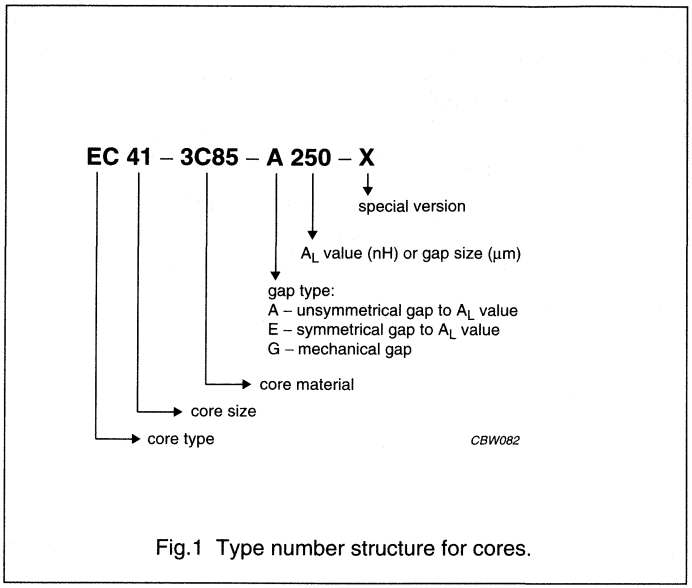


Fig.1 Type number structure for cores.

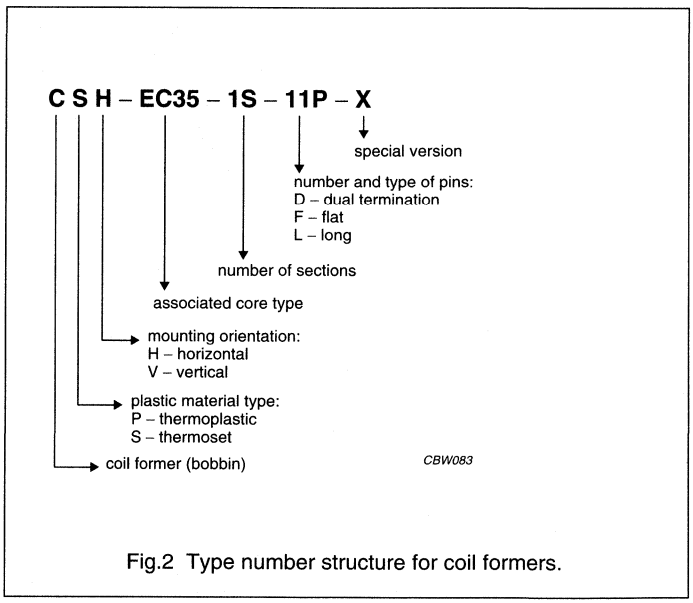
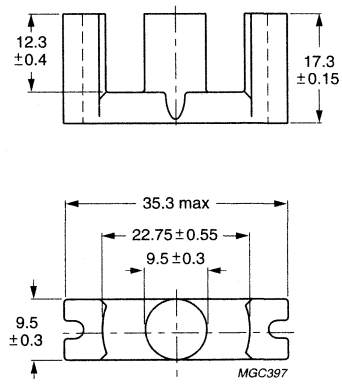


Fig.2 Type number structure for coil formers.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.918	mm^{-1}
V_e	effective volume	6530	mm^3
l_e	effective length	77.4	mm
A_e	effective area	84.3	mm^2
A_{min}	minimum area	71	mm^2
m	mass of core half	≈19	g



Dimensions in mm.

Fig.1 EC35 core half.

Core halves

A_L measured in combination with an non-gapped core half, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81 sup	100 ±3%(1)	≈73	≈1470	EC35-3C81-E100
	160 ±3%(1)	≈117	≈820	EC35-3C81-E160
	250 ±3%	≈184	≈470	EC35-3C81-A250
	315 ±5%	≈231	≈350	EC35-3C81-A315
	400 ±10%	≈290	≈260	EC35-3C81-A400
	≥2250	≥1640	≈0	EC35-3C81
3C85 sup	100 ±3%(1)	≈73	≈1470	EC35-3C85-E100
	160 ±3%(1)	≈117	≈820	EC35-3C85-E160
	250 ±3%	≈184	≈470	EC35-3C85-A250
	315 ±5%	≈231	≈350	EC35-3C85-A315
	400 ±10%	≈290	≈260	EC35-3C85-A400
	2100 ±25%	≈1530	≈0	EC35-3C85

Note

1. Measured in combination with an equal gapped core half (symmetrical air gap).

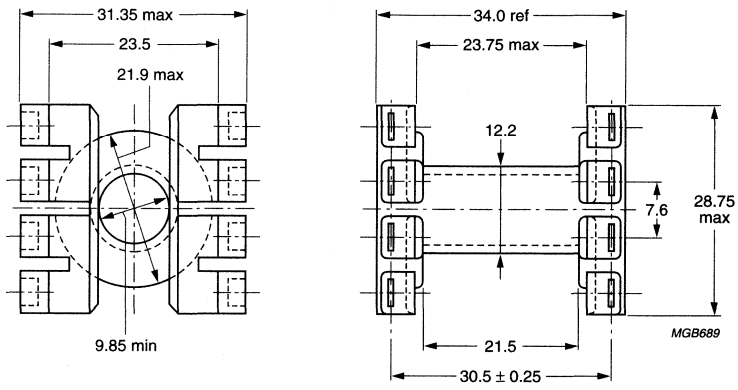
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C81	≥320	≤1.4	–
3C85	≥320	≤1.0	≤1.2

COIL FORMERS

General data 8-slots EC35 coil former for insertable pins

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E44716(M)
Maximum operating temperature	105 °C



Dimensions in mm.

Fig.2 EC35 coil former; 8-slots.

Winding data 8-slots EC35 coil former for insertable pins

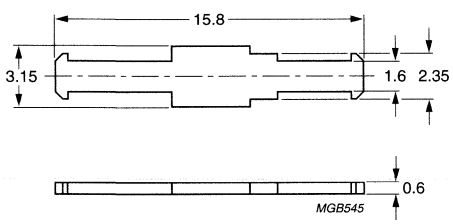
Coil formers with inserted pins are available on request.

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	97.1	21.5	53.1	CP-EC35-1S

MOUNTING PARTS

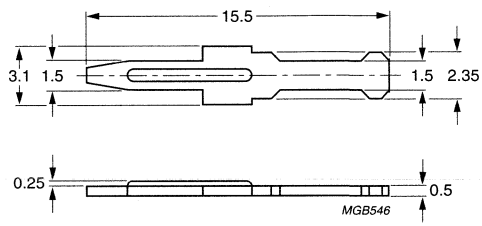
General data and ordering information

ITEM	REMARKS	MOUNT	FIGURE	TYPE NUMBER
Insertable pins	solderability: *"IEC 68-2-20"*, Part 2, Test Ta, method 1; material: copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated	general	3	PIN-EC
		horizontal	4	PIN/H-EC
Base plate 2-holes	aluminium		5	BPL2-EC35
Base plate 4-holes	aluminium		6	BPL4-EC35
Clamp	copper-zinc alloy (CuZn)		7	CLM/U-EC35



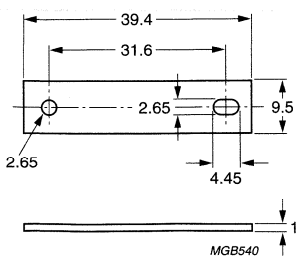
Dimensions in mm.

Fig.3 EC pin; general mount.



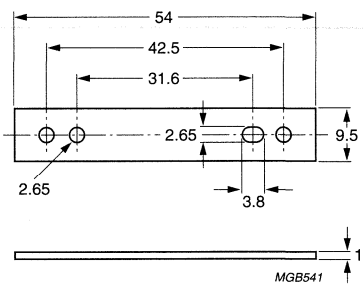
Dimensions in mm.

Fig.4 EC pin; horizontal mount.



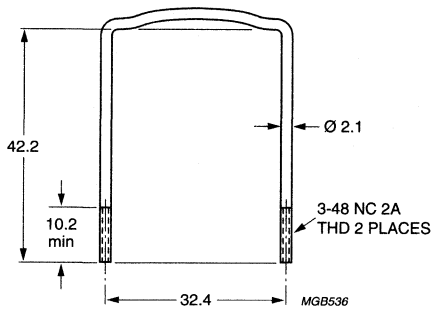
Dimensions in mm.

Fig.5 EC35 base plate; 2 holes.



Dimensions in mm.

Fig.6 EC35 base plate; 4 holes.



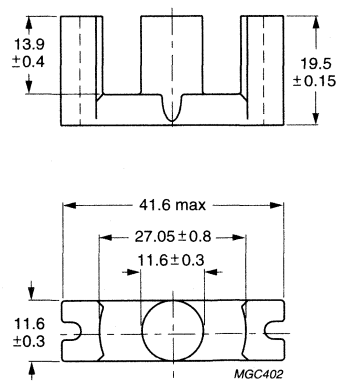
Dimensions in mm.

Fig.7 EC35 clamp.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.735	mm^{-1}
V_e	effective volume	10800	mm^3
l_e	effective length	89.3	mm
A_e	effective area	121	mm^2
A_{min}	minimum area	106	mm^2
m	mass of core half	≈30	g



Dimensions in mm.

Fig.1 EC41 core half.

Core halves

A_L measured in combination with an non-gapped core half, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81 sup	100 ±3%(1)	≈59	≈2200	EC41-3C81-E100
	160 ±3%(1)	≈94	≈1220	EC41-3C81-E160
	250 ±3%(1)	≈147	≈705	EC41-3C81-E250
	315 ±5%	≈186	≈530	EC41-3C81-A315
	400 ±5%	≈236	≈390	EC41-3C81-A400
	≥2800	≥1640	≈0	EC41-3C81
3C85 sup	100 ±3%(1)	≈59	≈2200	EC41-3C81-E100
	160 ±3%(1)	≈94	≈1220	EC41-3C81-E160
	250 ±3%(1)	≈147	≈705	EC41-3C81-E250
	315 ±5%	≈186	≈530	EC41-3C81-A315
	400 ±5%	≈186	≈390	EC41-3C81-A400
	2700 ±25%	≈1580	≈0	EC41-3C85

Note

1. Measured in combination with an equal gapped core half (symmetrical air gap).

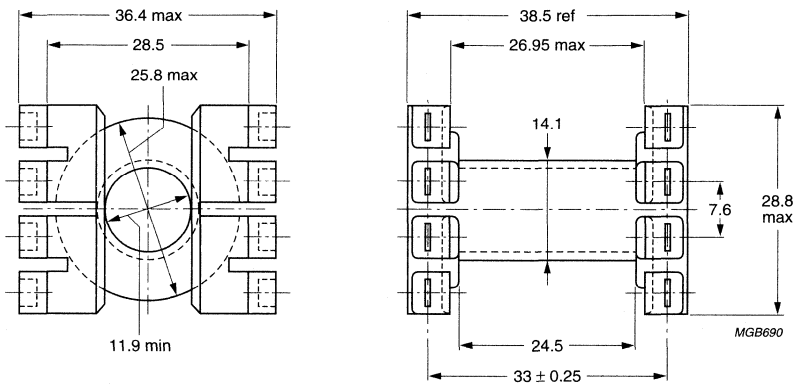
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C81	≥320	≤2.2	–
3C85	≥320	≤1.7	≤2.0

COIL FORMERS

General data 8-slots EC41 coil former for insertable pins

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E44716(M)
Maximum operating temperature	105 °C



Dimensions in mm.

Fig.2 EC41 coil former; 8-slots.

Winding data 8-slots EC41 coil former for insertable pins

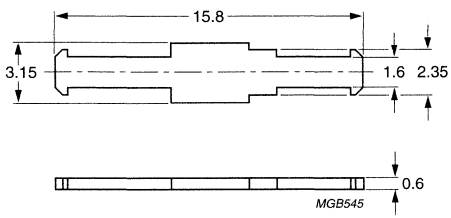
Coil formers with inserted pins are available on request.

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	137.5	24.5	62.4	CP-EC41-1S

MOUNTING PARTS

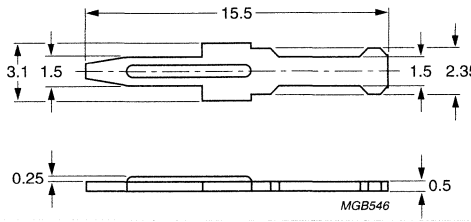
General data and ordering information

ITEM	REMARKS	MOUNT	FIGURE	TYPE NUMBER
Insertable pins	solderability: *"IEC 68-2-20"*, Part 2, Test Ta, method 1 material: copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated	general	3	PIN-EC
		horizontal	4	PIN/H-EC
		vertical	5	PIN/V-EC41
Clamp	copper-zinc alloy (CuZn)		6	CLM/U-EC41
Base plate 4-holes	aluminium (Al)		7	BPL4-EC41



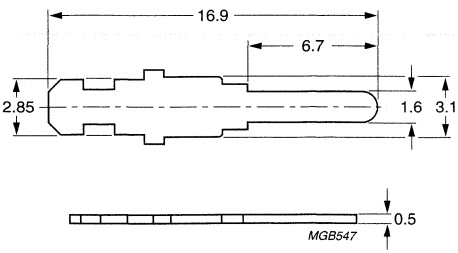
Dimensions in mm.

Fig.3 EC pin; general mount.



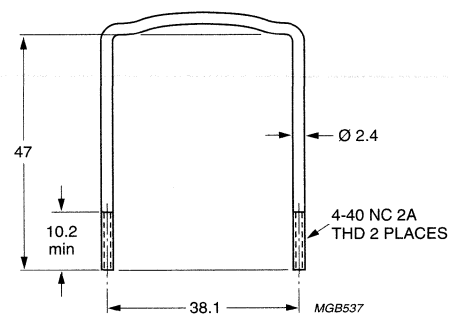
Dimensions in mm.

Fig.4 EC pin; horizontal mount.



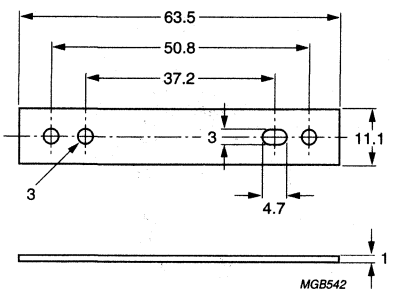
Dimensions in mm.

Fig.5 EC41 pin; vertical mount.



Dimensions in mm.

Fig.6 EC41 clamp.



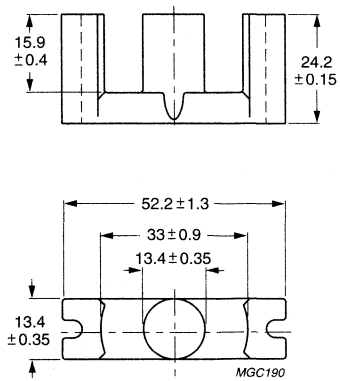
Dimensions in mm.

Fig.7 EC41 base plate; 4-holes.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.581	mm^{-1}
V_e	effective volume	18800	mm^3
l_e	effective length	105	mm
A_e	effective area	180	mm^2
A_{min}	minimum area	141	mm^2
m	mass of core half	≈56	g



Dimensions in mm.

Fig.1 EC52 core half.

Core halves

A_L measured in combination with an non-gapped core half, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81 sup	160 ±3%(1)	≈74	≈1920	EC52-3C81-E160
	250 ±3%(1)	≈116	≈1100	EC52-3C81-E250
	315 ±3%(1)	≈147	≈830	EC52-3C81-E315
	400 ±3%	≈185	≈620	EC52-3C81-A400
	630 ±5%	≈290	≈350	EC52-3C81-A630
	≥3550	≥1640	≈0	EC52-3C81
3C85 sup	160 ±3%(1)	≈74	≈1920	EC52-3C85-E160
	250 ±3%(1)	≈116	≈1100	EC52-3C85-E250
	315 ±3%(1)	≈147	≈830	EC52-3C85-E315
	400 ±3%	≈185	≈620	EC52-3C85-A400
	630 ±5%	≈290	≈350	EC52-3C85-A630
	3600 ±25%	≈1660	≈0	EC52-3C85

Note

1. Measured in combination with an equal gapped core half (symmetrical air gap).

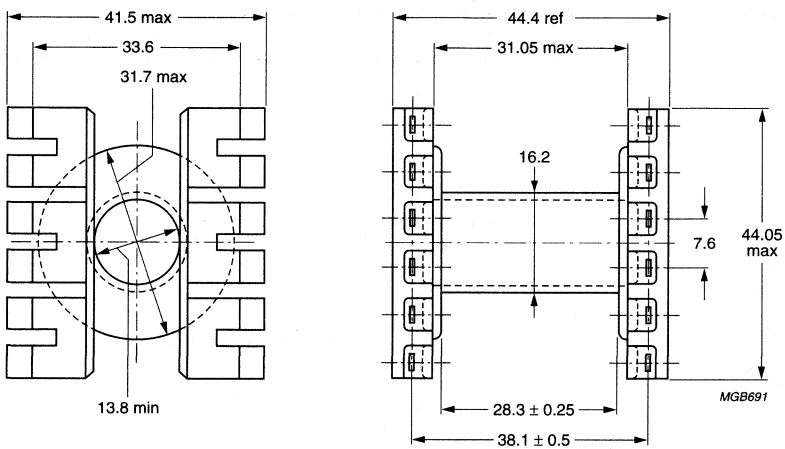
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C81	≥320	≤3.8	–
3C85	≥320	≤2.9	≤3.4

COIL FORMERS

General data 12-slots EC52 coil former for insertable pins

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E44716(R)
Maximum operating temperature	105 °C



Dimensions in mm.

Fig.2 EC52 coil former; 12-slots.

Winding data for 12-slots EC52 coil former for insertable pins

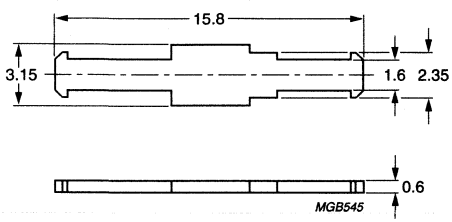
Coil formers with inserted pins are available on request.

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	212	28.3	74.9	CP-EC52-1S

MOUNTING PARTS

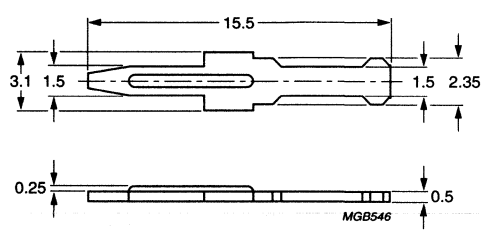
General data and ordering information

ITEM	REMARKS	MOUNT	FIGURE	TYPE NUMBER
Insertable pins	solderability: *"IEC 68-2-20"*, Part 2, Test Ta, method 1 material: copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated	general	3	PIN-EC
		horizontal	4	PIN/H-EC
		vertical	5	PIN/V-EC52
Clamp	copper-zinc alloy (CuZn)		6	CLM/U-EC52
Base plate 4-holes	aluminium		7	BPL4-EC52



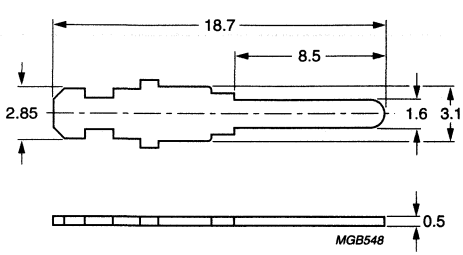
Dimensions in mm.

Fig.3 EC pin; general mount.



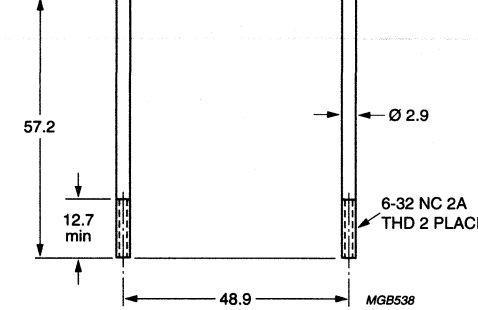
Dimensions in mm.

Fig.4 EC pin; horizontal mount.



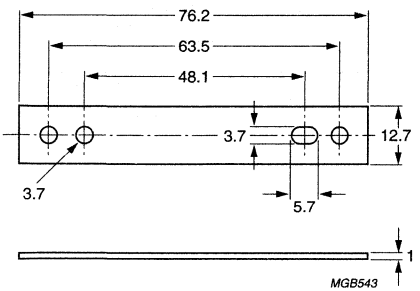
Dimensions in mm.

Fig.5 EC52 pin; vertical mount.



Dimensions in mm.

Fig.6 EC52 clamp.



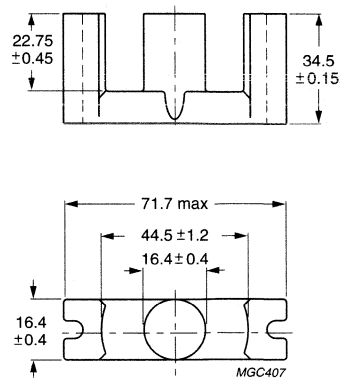
Dimensions in mm.

Fig.7 EC52 base plate; 4-holes.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.514	mm^{-1}
V_e	effective volume	40100	mm^3
l_e	effective length	144	mm
A_e	effective area	279	mm^2
A_{min}	minimum area	211	mm^2
m	mass of core half	≈127	g



Dimensions in mm.

Fig.1 EC70 core half.

Core halves

A_L measured in combination with an non-gapped core half, unless stated otherwise.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81 sup	250 ±3%(1)	≈102	≈1830	EC70-3C81-E250
	315 ±3%(1)	≈130	≈1370	EC70-3C81-E315
	400 ±3%(1)	≈165	≈1020	EC70-3C81-E400
	630 ±5%	≈256	≈580	EC70-3C81-A630
	1000 ±10%	≈406	≈320	EC70-3C81-A1000
	≥4000	≥1620	≈0	EC70-3C81
3C85 sup	250 ±3%(1)	≈102	≈1830	EC70-3C85-E250
	315 ±3%(1)	≈130	≈1370	EC70-3C85-E315
	400 ±3%(1)	≈165	≈1020	EC70-3C85-E400
	630 ±5%	≈256	≈580	EC70-3C85-A630
	1000 ±10%	≈406	≈320	EC70-3C85-A1000
	3900 ±25%	≈1580	≈0	EC70-3C85

Note

1. Measured in combination with an equal gapped core half (symmetrical air gap).

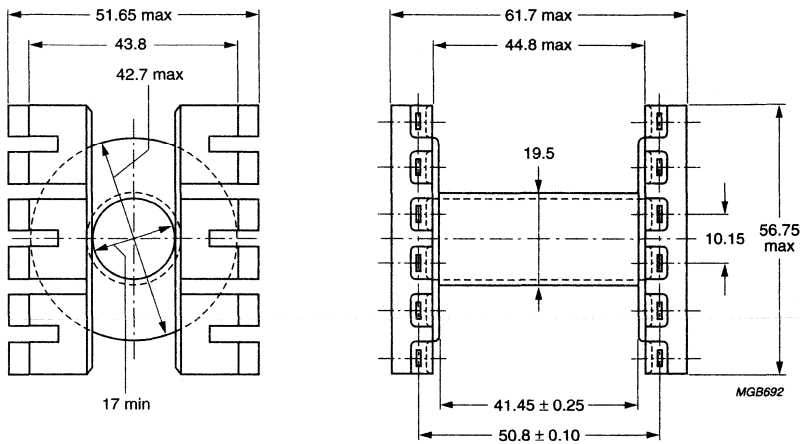
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C81	≥330	≤8.2	–
3C85	≥330	≤6.2	≤7.3

COIL FORMERS

General data 8-slots EC70 coil former for insertable pins

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E44716(M)
Maximum operating temperature	105 °C



Dimensions in mm.

Fig.2 EC70 coil former; 8-slots.

Winding data 8-slots EC70 coil former for insertable pins; see note 1

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	465	41.5	97.3	CP-EC70-1S

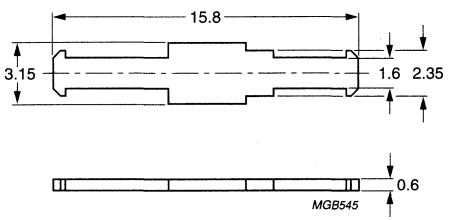
Note

1. Coil formers with inserted pins are available on request.

MOUNTING PARTS

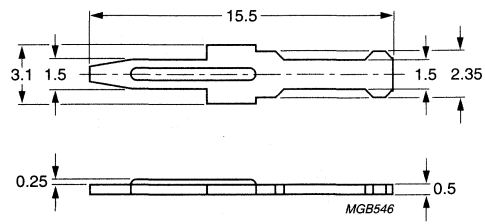
General data and ordering information

ITEM	REMARKS	MOUNT	FIGURE	TYPE NUMBER
Insertable pins	solderability: *"IEC 68-2-20"*, Part 2, Test Ta, method 1 material: copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated	general	3	PIN-EC
		horizontal	4	PIN/H-EC
		vertical	5	PIN/V-EC70
Clamp	copper-zinc alloy (CuZn)		6	CLM/U-EC70
Base plate 4-holes	aluminium		7	BPL4-EC70



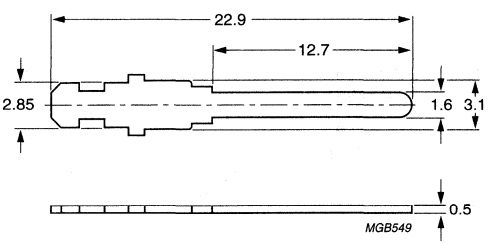
Dimensions in mm.

Fig.3 EC pin; general mount.



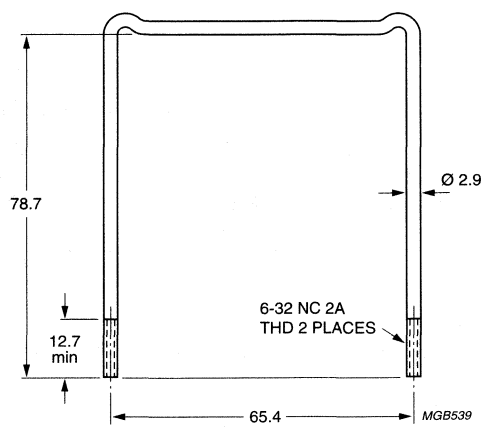
Dimensions in mm.

Fig.4 EC pin; horizontal mount.



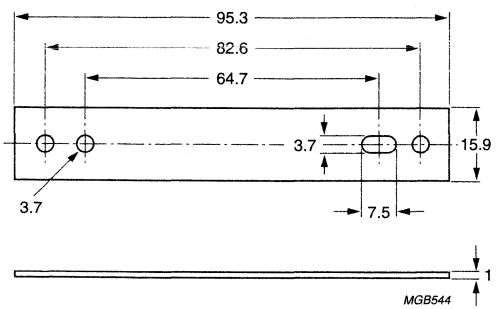
Dimensions in mm.

Fig.5 EC70 pin; vertical mount.



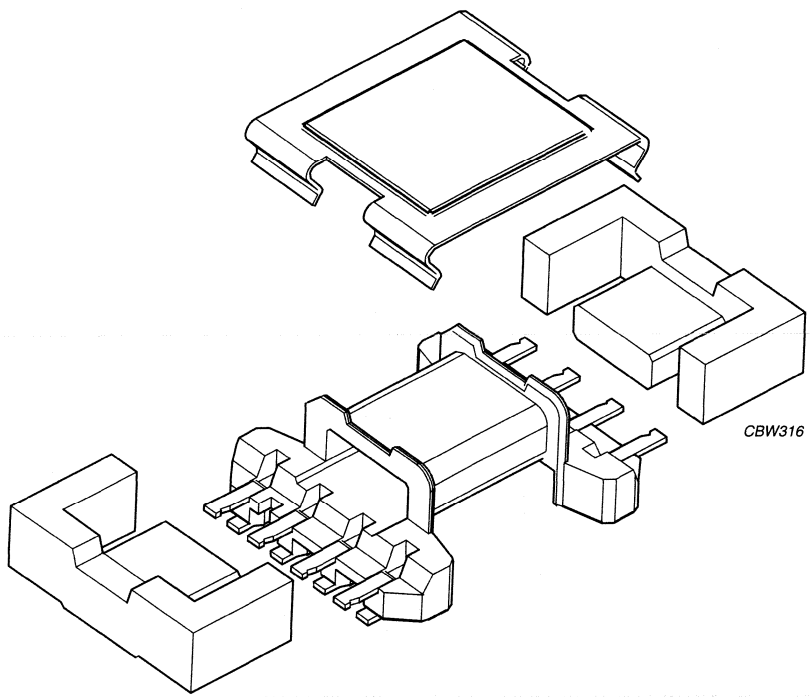
Dimensions in mm.

Fig.6 EC70 clamp.



Dimensions in mm.

Fig.7 EC70 base plate; 4-holes.



For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview EFD cores

CORE TYPE	V_e (mm^3)	A_e (mm^2)	MASS (g)
EFD10	171	7.2	0.45
EFD12	325	11.4	0.9
EFD15	510	15.0	1.4
EFD20	1460	31.0	3.5
EFD25	3300	58.0	8
EFD30	4700	69.0	12

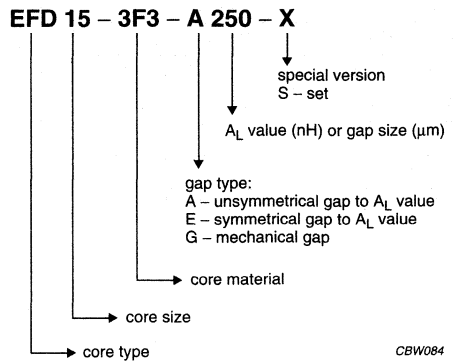


Fig.1 Type number structure for cores.

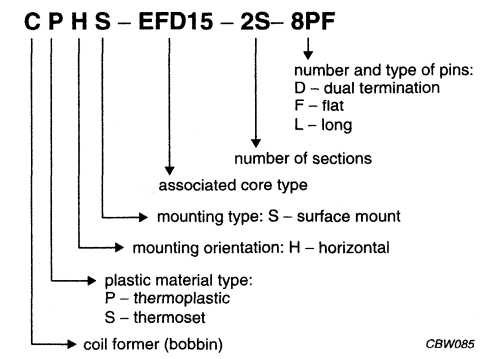
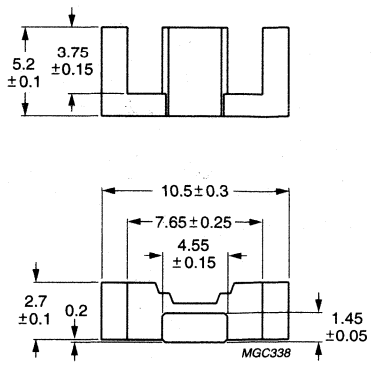


Fig.2 Type number structure for coil formers.

CORES

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	3.29	mm^{-1}
V_e	effective volume	171	mm^3
l_e	effective length	23.7	mm
A_e	effective area	7.2	mm^2
A_{min}	minimum area	6.5	mm^2
m	mass of core half	≈0.45	g



Dimensions in mm.

Fig.1 EFD10 core half.

Core sets

Clamping force 10 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	25 ±5%	≈66	≈540	EFD10-3F3-A25-S
	40 ±8%	≈105	≈300	EFD10-3F3-A40-S
	63 ±10%	≈165	≈170	EFD10-3F3-A63-S
	500 ±25%	≈1290	≈0	EFD10-3F3-S
3F4 des	25 ±5%	≈66	≈520	EFD10-3F4-A25-S
	40 ±8%	≈105	≈280	EFD10-3F4-A40-S
	63 ±10%	≈165	≈150	EFD10-3F4-A63-S
	280 ±25%	≈730	≈0	EFD10-3F4-S
3E4 des	1400 +40/–30%	≈3670	≈0	EFD10-3E4-S
3E5 des	2000 +40/–30%	≈5240	≈0	EFD10-3E5-S

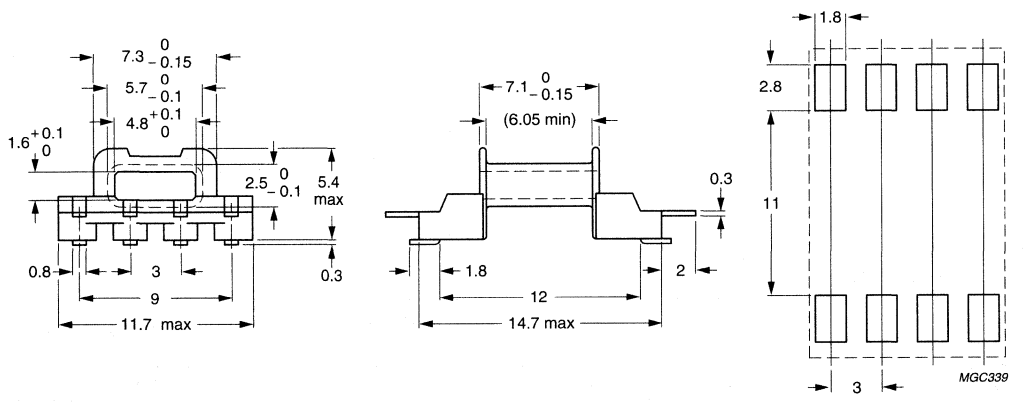
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at			
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3F3	≥315	≤0.02	≤0.035	–	–
3F4	≥250	–	–	≤0.034	≤0.055

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E83005(M)
Solder pad material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 EFD10 coil former (SMD); 8-solder pads.

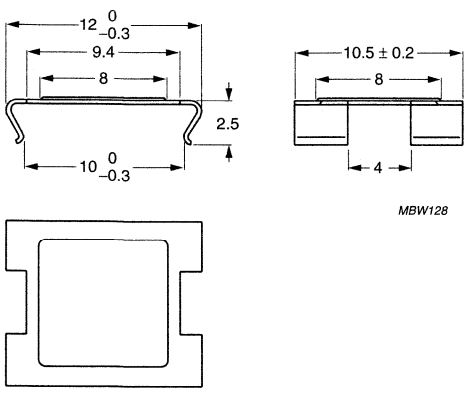
Winding data for EFD10 coil former (SMD) with 8-solder pads

NUMBER OF SECTIONS	NUMBER OF SOLDER PADS	MINIMUM WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	8	4.2	6.05	14.8	CPHS-EFD10-1S-8P

MOUNTING PARTS

General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clamp	stainless steel (CrNi); clamping force ≈15 N	3	CLM-EFD10



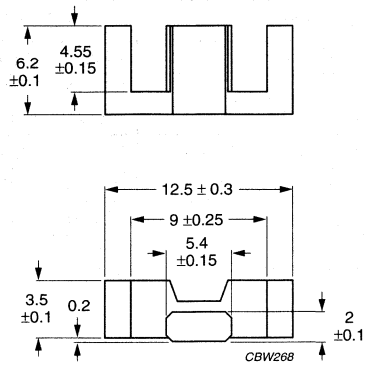
Dimensions in mm.

Fig.3 EFD10 mounting clamp.

CORES

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.50	mm^{-1}
V_e	effective volume	325	mm^3
l_e	effective length	28.5	mm
A_e	effective area	11.4	mm^2
A_{min}	minimum area	10.7	mm^2
m	mass of core half	≈0.9	g



Dimensions in mm.

Fig.1 EFD12 core half.

Core sets

Clamping force 15 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	40 ±5%	≈80	≈490	EFD12-3F3-A40-S
	63 ±8%	≈125	≈280	EFD12-3F3-A63-S
	100 ±10%	≈200	≈160	EFD12-3F3-A100-S
	700 ±25%	≈1370	≈0	EFD12-3F3-S
3F4 des	40 ±5%	≈80	≈470	EFD12-3F4-A40-S
	63 ±8%	≈125	≈260	EFD12-3F4-A63-S
	100 ±10%	≈200	≈140	EFD12-3F4-A100-S
	380 ±25%	≈760	≈0	EFD12-3F4-S
3E4 des	1900 +40%/–30%	≈3780	≈0	EFD12-3E4-S
3E5 des	2800 +40%/–30%	≈5570	≈0	EFD12-3E5-S

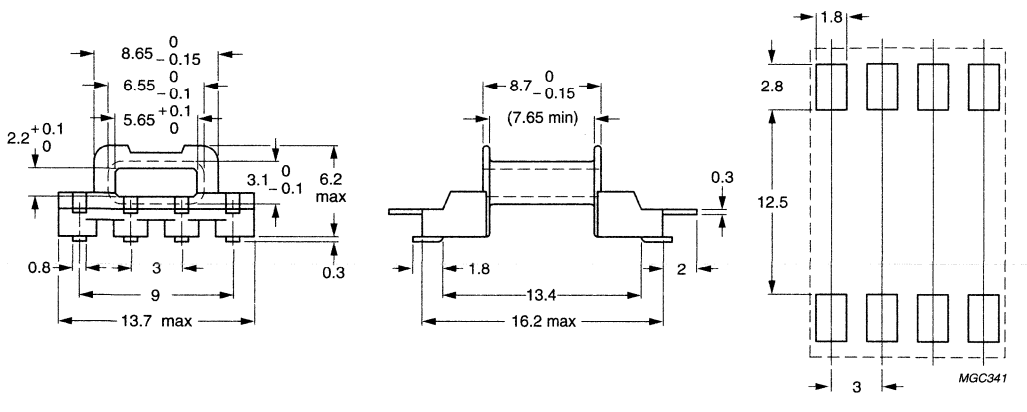
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at			
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3F3	≥315	≤0.04	≤0.065	–	–
3F4	≥250	–	–	≤0.65	≤0.11

COIL FORMERS

General data

ITEM	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E83005(M)
Solder pad material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, I*"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 EFD12 coil former (SMD); 8-solder pads.

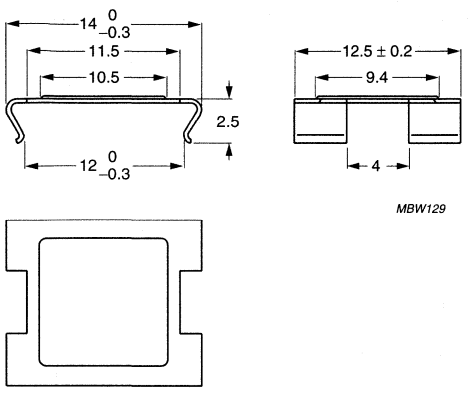
Winding data for EFD12 coil former (SMD) with 8-solder pads

NUMBER OF SECTIONS	NUMBER OF SOLDER PADS	MINIMUM WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	8	6.5	7.65	18.6	CPHS-EFD12-1S-8P

MOUNTING PARTS

General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clamp	stainless steel (CrNi); clamping force ≈20 N	3	CLM-EFD12



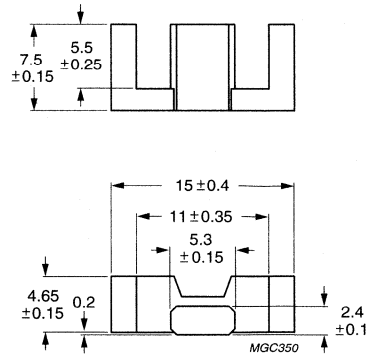
Dimensions in mm.

Fig.3 EFD12 mounting clamp.

CORES

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.27	mm^{-1}
V_e	effective volume	510	mm^3
l_e	effective length	34.0	mm
A_e	effective area	15.0	mm^2
A_{min}	minimum area	12.2	mm^2
m	mass of core half	≈1.4	g



Dimensions in mm.

Fig.1 EFD15 core half.

Core sets

Clamping force 20 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3	63 ±5%	≈115	≈350	EFD15-3F3-A63-S
	100 ±8%	≈180	≈170	EFD15-3F3-A100-S
	160 ±10%	≈290	≈100	EFD15-3F3-A160-S
	780 ±25%	≈1400	≈0	EFD15-3F3-S
3F4 des	63 ±5%	≈115	≈350	EFD15-3F4-A63-S
	100 ±8%	≈180	≈160	EFD15-3F4-A100-S
	160 ±10%	≈290	≈90	EFD15-3F4-A160-S
	400 ±25%	≈720	≈0	EFD15-3F4-S
3E4	2000 +40/−30%	≈3610	≈0	EFD15-3E4-S
3E5	3600 +40/−30%	≈6500	≈0	EFD15-3E5-S

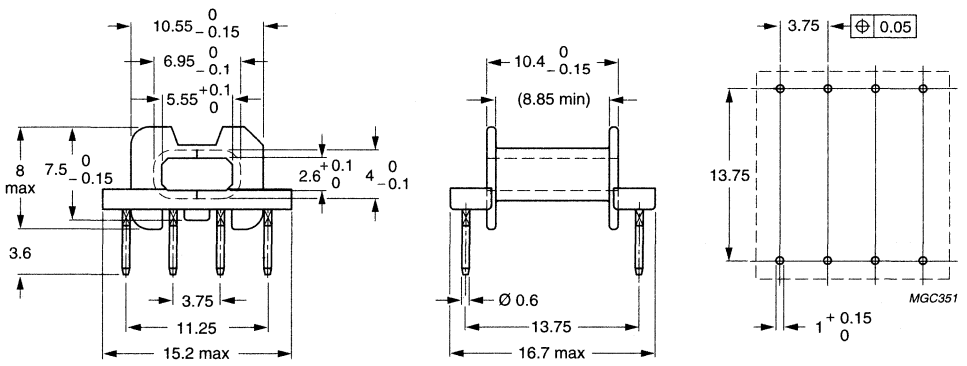
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at			
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3F3	≥315	≤0.06	≤0.10	–	–
3F4	≥250	–	–	≤0.10	≤0.16

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 EFD15 coil former; 8-pins.

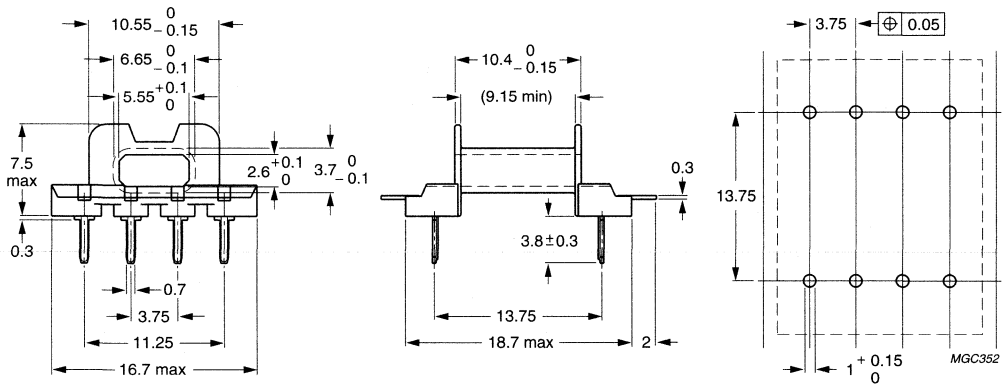
Winding data for EFD15 coil former with 8-pins

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	14.8	8.85	26.3	CSH-EFD15-1S-8P

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E83005(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.3 EFD15 coil former (SMD); 8-pins.

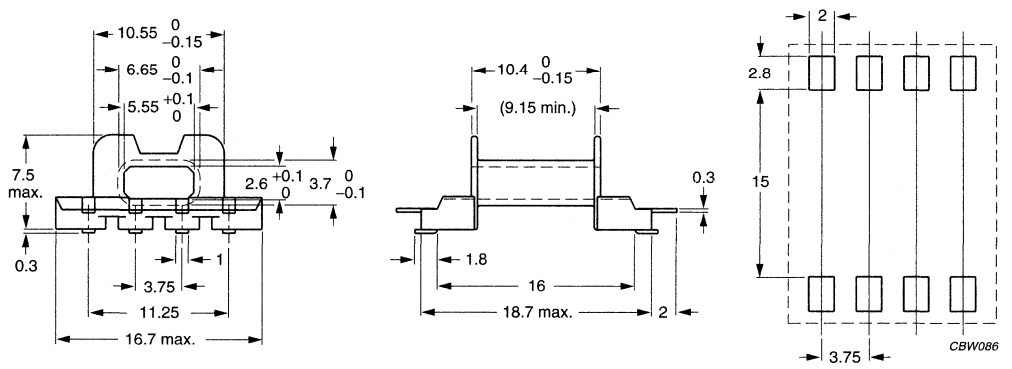
Winding data for EFD15 coil former (PCB) with 8-pins

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	16.7	9.15	25.6	CPH-EFD15-1S-8P

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E83005(M)
Solder pad material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.4 EFD15 coil former (SMD); 8-solder pads.

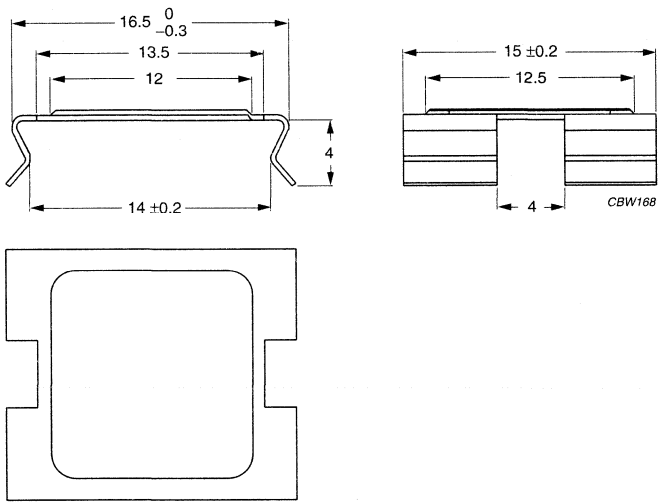
Winding data for EFD15 coil former (SMD) with 8-solder pads

NUMBER OF SECTIONS	NUMBER OF SOLDER PADS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	8	16.7	9.15	25.6	CPHS-EFD15-1S-8P

MOUNTING PARTS

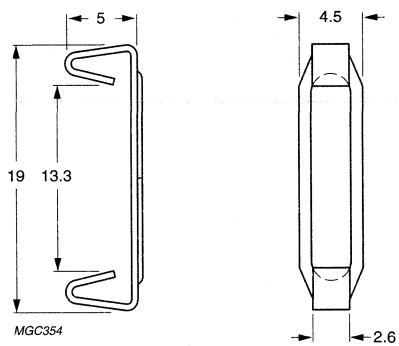
General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clip	stainless steel (CrNi); clamping force ≈ 12.5 N	6	CLI-EFD15
Clamp	stainless steel (CrNi); clamping force ≈ 25 N	5	CLM-EFD15



Dimensions in mm.

Fig.5 Clamp CLM-EFD15.



Dimensions in mm.

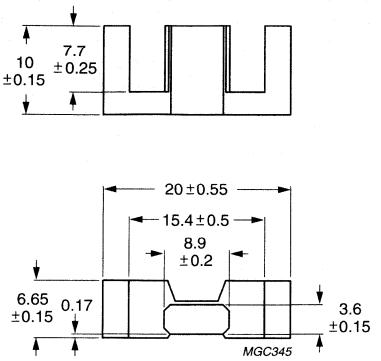
Fig.6 Clip CLI-EFD15.

EFD cores and accessories EFD20

CORES

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.52	mm^{-1}
V_e	effective volume	1460	mm^3
l_e	effective length	47.0	mm
A_e	effective area	31.0	mm^2
A_{min}	minimum area	29	mm^2
m	mass of core half	≈3.5	g



Dimensions in mm.

Fig.1 EFD20 core half.

Core halves and sets

A_L measured as a set or in combination with a non-gapped core half, clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	1150 ±25%	≈1450	≈0	EFD20-3C30
3C85	1300 ±25%	≈1540	≈0	EFD20-3C85
3C90 des	1300 ±25%	≈1540	≈0	EFD20-3C90
3F3 des	63 ±3%	≈75	≈500	EFD20-3F3-E63-S
	100 ±3%	≈120	≈240	EFD20-3F3-A100-S
	160 ±5%	≈195	≈140	EFD20-3F3-A160-S
	250 ±8%	≈300	≈90	EFD20-3F3-A250-S
	315 ±10%	≈425	≈65	EFD20-3F3-A315-S
	1200 ±25%	≈1450	≈0	EFD20-3F3
3F4 des	63 ±3%	≈75	≈500	EFD20-3F4-E63-S
	100 ±3%	≈120	≈240	EFD20-3F4-A100-S
	160 ±5%	≈195	≈140	EFD20-3F4-A160-S
	250 ±8%	≈300	≈90	EFD20-3F4-A250-S
	315 ±10%	≈425	≈65	EFD20-3F4-A315-S
	650 ±25%	≈800	≈0	EFD20-3F4

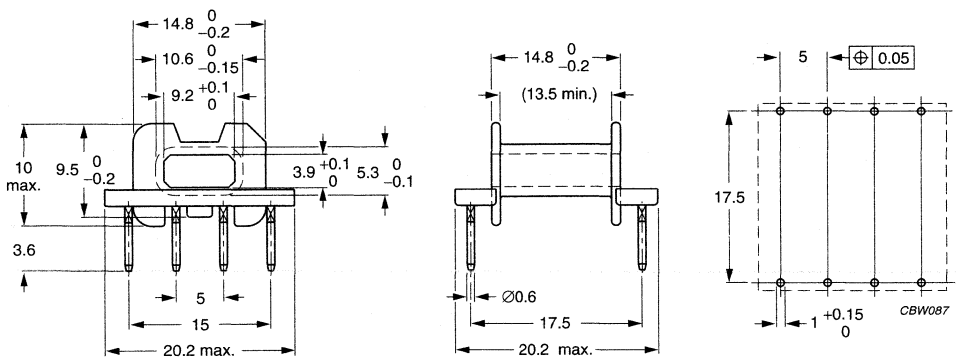
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C30	≥360	≤0.16	≤0.17	–	–	–
3C85	≥330	≤0.21	≤0.27	–	–	–
3C90	≥330	≤0.16	≤0.17	–	–	–
3F3	≥315	–	≤0.17	≤0.28	–	–
3F4	≥300	–	–	–	≤0.30	≤0.50

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL94 V-0"*; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 EFD20 coil former; 8-pins.

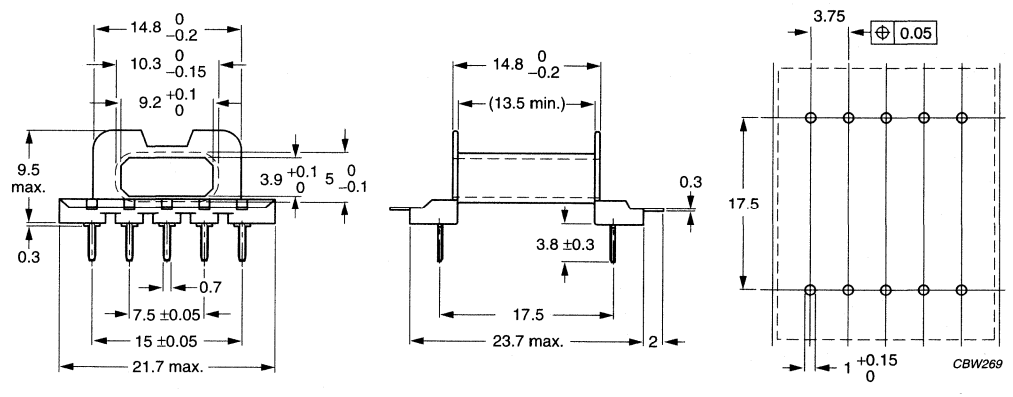
Winding data for EFD20 coil former with 8-pins

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	26.4	13.2	36.5	CSH-EFD20-1S-8P

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL94 V-0"*; UL file number E83005 (M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.3 EFD20 coil former (PCB); 10-pins.

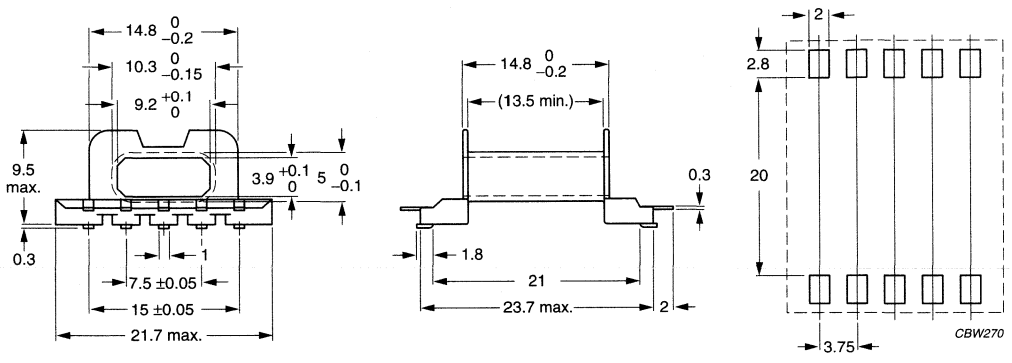
Winding data for EFD20 coil former (PCB) with 10-pins

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	27.7	13.5	34.1	CPH-EFD20-1S-10P

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL94 V-0"*; UL file number E83005 (M)
Solder pad material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.4 EFD20 coil former (SMD); 10-solder pads.

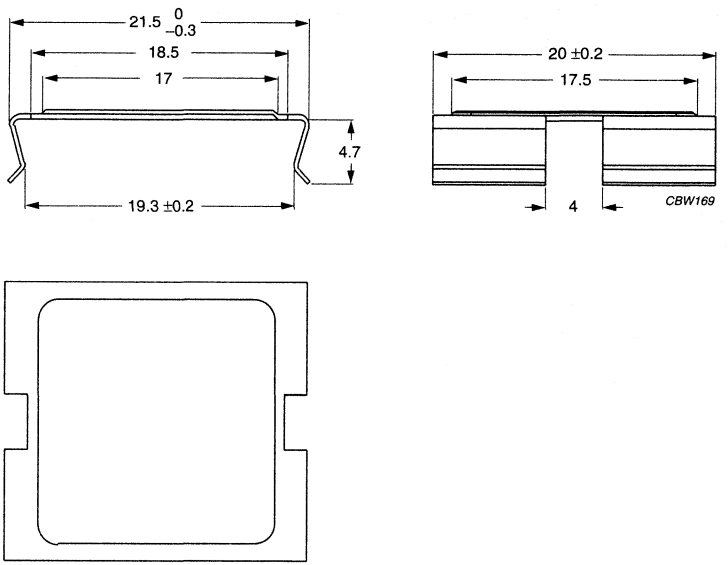
Winding data for EFD20 coil former (SMD) with 10-solder pads

NUMBER OF SECTIONS	NUMBER OF SOLDER PADS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	10	27.7	13.5	34.1	CPHS-EFD20-1S-10P

MOUNTING PARTS

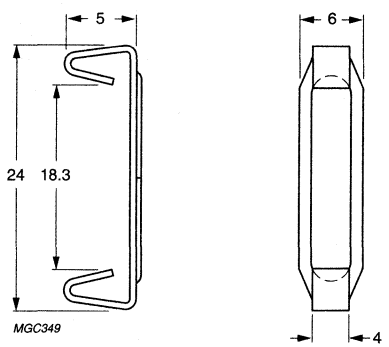
General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clip	stainless steel (CrNi); clamping force ≈ 20 N	6	CLI-EFD20
Clamp	stainless steel (CrNi); clamping force ≈ 30 N	5	CLM-EFD20



Dimensions in mm.

Fig.5 Clamp CLM-EFD20



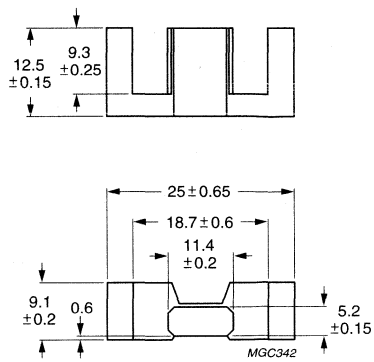
Dimensions in mm.

Fig.6 Clip CLI-EFD20.

CORES

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.00	mm^{-1}
V_e	effective volume	3300	mm^3
l_e	effective length	57.0	mm
A_e	effective area	58.0	mm^2
A_{min}	minimum area	55	mm^2
m	mass of core half	≈8	g



Dimensions in mm.

Fig.1 EFD25 core half.

Core halves

Gapped cores are available on request. Clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	1800 ±25%	≈1450	≈0	EFD25-3C30
3C85	2200 ±25%	≈1780	≈0	EFD25-3C85
3C90 des	2200 ±25%	≈1780	≈0	EFD25-3C90
3F3 des	2000 ±25%	≈1600	≈0	EFD25-3F3
3F4 des	1000 ±25%	≈800	≈0	EFD25-3F4

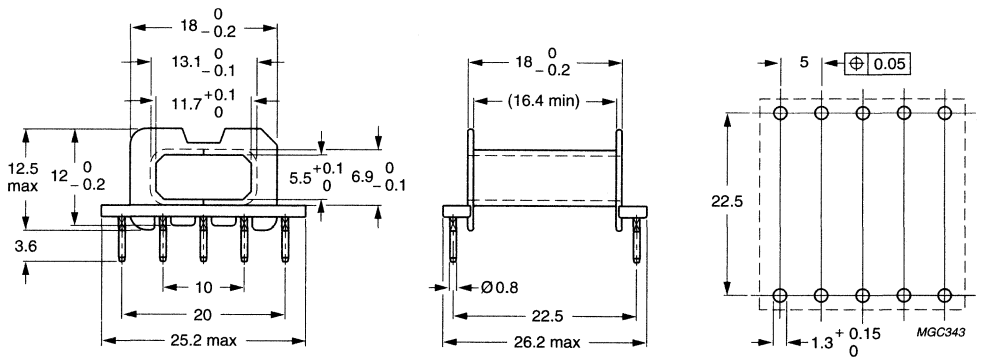
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C30	≥360	≤0.35	≤0.38	–	–	–
3C85	≥320	≤0.50	≤0.60	–	–	–
3C90	≥330	≤0.35	≤0.38	–	–	–
3F3	≥315	–	≤0.38	≤0.66	–	–
3F4	≥300	–	–	–	≤0.70	≤1.10

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 EFD25 coil former; 10-pins.

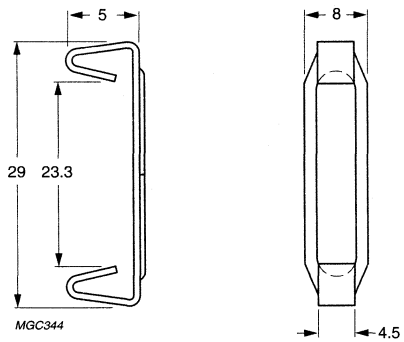
Winding data for EFD25 coil former with 10-pins

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	40.2	16.4	46.4	CSH-EFD25-1S-10P

MOUNTING PARTS

General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clip	stainless steel (CrNi); clamping force ≈30 N	3	CLI-EFD25



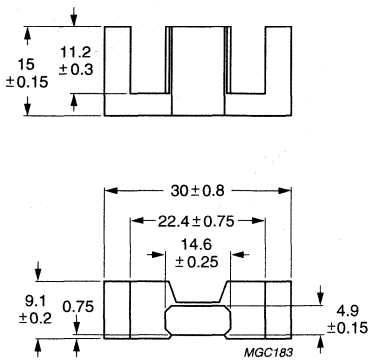
Dimensions in mm.

Fig.3 EFD25 mounting clip.

CORES

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.98	mm^{-1}
V_e	effective volume	4700	mm^3
l_e	effective length	68.0	mm
A_e	effective area	69.0	mm^2
A_{min}	minimum area	66.0	mm^2
m	mass of core half	≈12	g



Dimensions in mm.

Fig.1 EFD30 core half.

Core halves and sets

Clamping force 70 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	1950 ±25%	≈1550	≈0	EFD30-3C30
3C85	2100 ±25%	≈1650	≈0	EFD30-3C85
3C90 des	2100 ±25%	≈1650	≈0	EFD30-3C90
3F3 des	160 ±3%	≈126	≈500	EFD30-3F3-A160-S
	250 ±3%	≈195	≈350	EFD30-3F3-A250-S
	315 ±5%	≈250	≈250	EFD30-3F3-A315-S
	400 ±5%	≈315	≈200	EFD30-3F3-A400-S
	630 ±10%	≈500	≈120	EFD30-3F3-A630-S
	1900 ±25%	≈1500	≈0	EFD30-3F3
3F4 des	160 ±3%	≈126	≈500	EFD30-3F4-A160-S
	250 ±3%	≈195	≈350	EFD30-3F4-A250-S
	315 ±5%	≈250	≈250	EFD30-3F4-A315-S
	400 ±5%	≈315	≈200	EFD30-3F4-A400-S
	630 ±10%	≈500	≈120	EFD30-3F4-A630-S
	1050 ±25%	≈820	≈0	EFD30-3F4

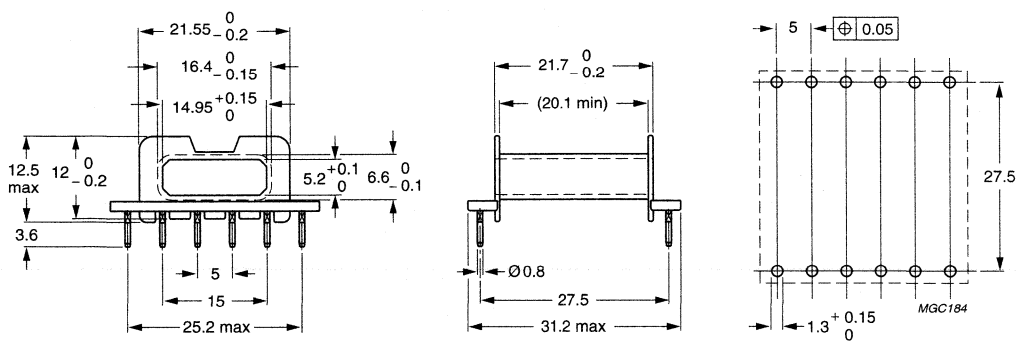
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 Mz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C30	≥360	≤0.50	≤0.54	–	–	–
3C85	≥320	≤0.74	≤0.86	–	–	–
3C90	≥330	≤0.50	≤0.54	–	–	–
3F3	≥315	–	≤0.54	≤0.91	–	–
3F4	≥300	–	–	–	≤1.00	≤1.60

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 EFD30 coil former; 12-pins.

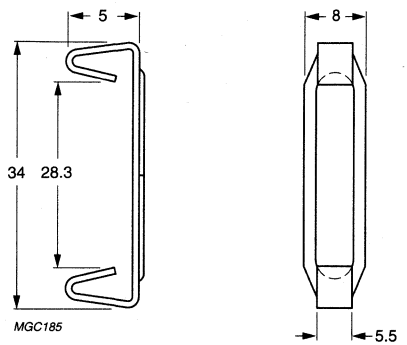
Winding data for EFD30 coil former with 12-pins

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	52.3	20.1	52.9	CSH-EFD30-1S-12P

MOUNTING PARTS

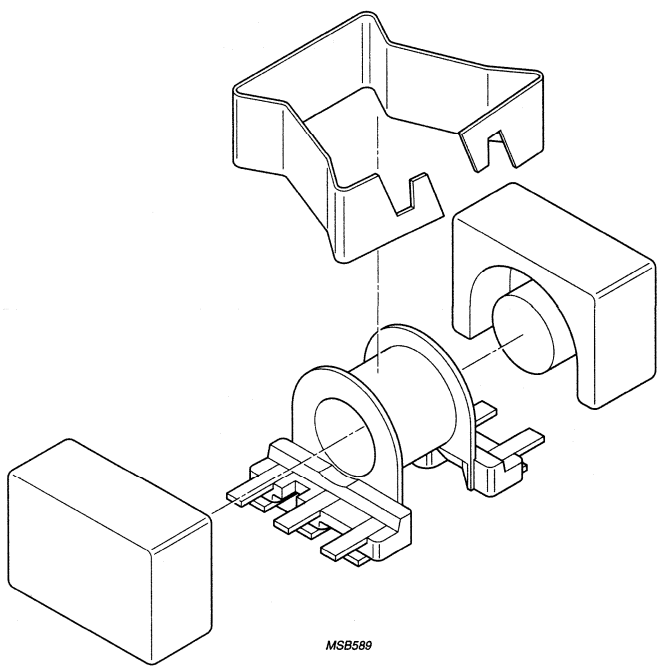
General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clip	stainless steel (CrNi); clamping force ≈35 N	3	CLI-EFD30



Dimensions in mm.

Fig.3 EFD30 mounting clip.



For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview EP cores

CORE TYPE	V_e (mm^3)	A_e (mm^2)	MASS (g)
EP7	165	10.7	0.8
EP10	215	11.3	1.1
EP13	472	19.5	2.4
EP17	999	33.7	5
EP20	3230	78.7	16

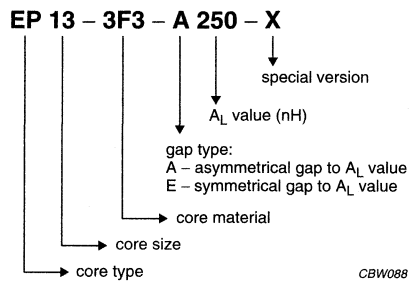


Fig.1 Type number structure for cores.

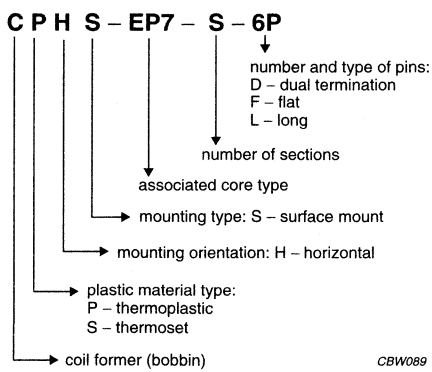
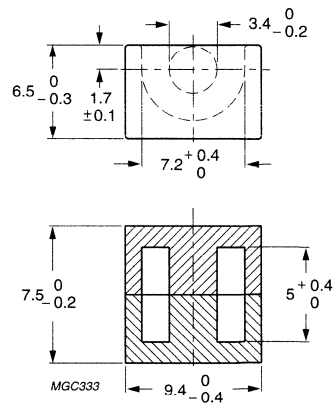


Fig.2 Type number structure for coil formers.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.45	mm^{-1}
V_e	effective volume	165	mm^3
l_e	effective length	15.5	mm
A_e	effective area	10.7	mm^2
A_{min}	minimum area	8.55	mm^2
m	mass of core set	≈0.8	g



Dimensions in mm.

Fig.1 EP7 core set.

Core sets for general purpose transformers and power applications

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3H1 sup	63 ±3%	≈76	≈260	EP7-3H1-E63
	100 ±3%	≈121	≈150	EP7-3H1-A100
	160 ±5%	≈193	≈85	EP7-3H1-A160
	1200 ±25%	≈1450	≈0	EP7-3H1
3C81	25 ±3%	≈30	≈790	EP7-3C81-E25
	40 ±3%	≈48	≈440	EP7-3C81-A40
	63 ±3%	≈76	≈260	EP7-3C81-A63
	100 ±3%	≈121	≈150	EP7-3C81-A100
	160 ±5%	≈193	≈85	EP7-3C81-A160
	≥875	≥1060	≈0	EP7-3C81
3C85	25 ±3%	≈30	≈790	EP7-3C85-E25
	40 ±3%	≈48	≈440	EP7-3C85-A40
	63 ±3%	≈76	≈260	EP7-3C85-A63
	100 ±3%	≈121	≈150	EP7-3C85-A100
	160 ±5%	≈193	≈85	EP7-3C85-A160
	1120 ±25%	≈1350	≈0	EP7-3C85

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3	25 ±3%	≈30	≈790	EP7-3F3-E25
	40 ±3%	≈48	≈440	EP7-3F3-A40
	63 ±3%	≈76	≈260	EP7-3F3-A63
	100 ±3%	≈121	≈150	EP7-3F3-A100
	160 ±5%	≈193	≈85	EP7-3F3-A160
	1000 ±25%	≈1210	≈0	EP7-3F3
3F4 des	100 ±3%	≈121	≈150	EP7-3F4-A100
	160 ±5%	≈193	≈85	EP7-3F4-A160
	600 ±25%	≈730	≈0	EP7-3F4
3H3	63 ±3%	≈76	≈260	EP7-3H3-A63
	100 ±3%	≈121	≈150	EP7-3H3-A100
	160 ±5%	≈193	≈85	EP7-3H3-A160
	1120 ±25%	≈1350	≈0	EP7-3H3

Core sets of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3E1	2100 ±25%	≈2540	EP7-3E1
3E25 sup	≥2500	≥3020	EP7-3E25
3E27	≥2500	≥3020	EP7-3E27
3E5	5200 +40/–30%	≈6290	EP7-3E5
3E6	5800 +40/–30%	≈7000	EP7-3E6

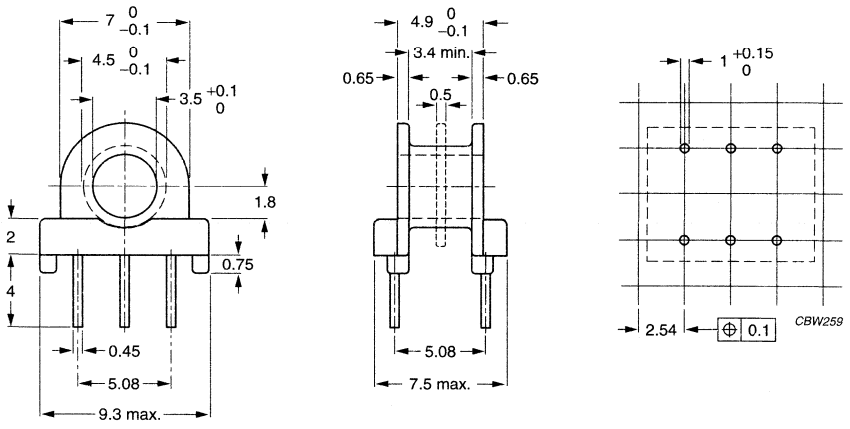
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C81	≥315	≤0.04	–	–	–	–
3C85	≥315	≤0.03	≤0.03	–	–	–
3F3	≥315	–	≤0.02	≤0.035	–	–
3F4	≥250	–	–	–	≤0.033	≤0.053

COIL FORMERS

General data CSH-EP7-1S-6P

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E46770(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

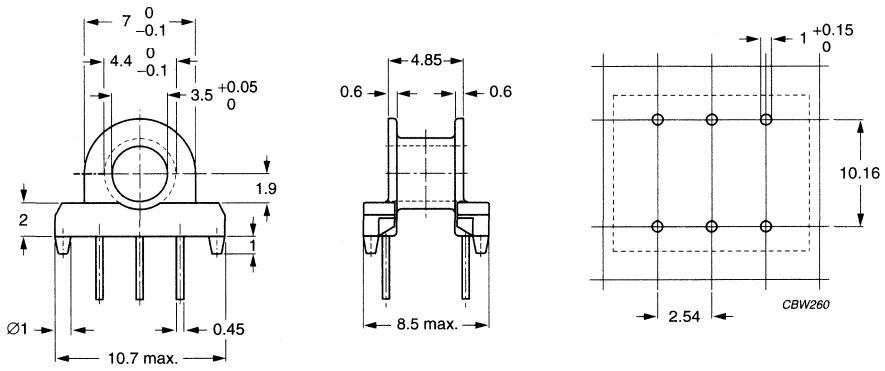
Fig.2 EP7 coil former: 6-pins.

Winding data for 6-pins EP7 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	4.1	3.6	17.9	CSH-EP7-1S-6P
2	2 × 1.75	2 × 1.45	17.9	CSH-EP7-2S-6P-T

General data CSH-EP7-1S-6P-A

PARMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E46770(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

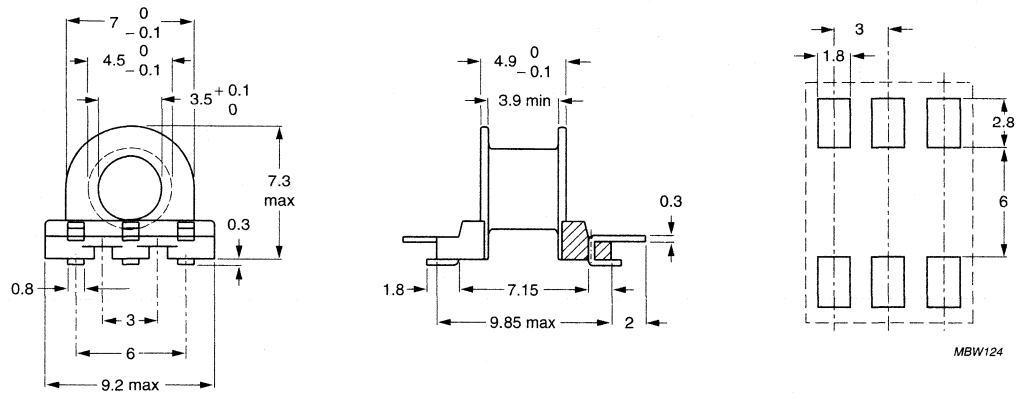
Fig.3 EP7 coil former: 6-pins (A).

Winding data for 6-pins EP7 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	4.3	3.5	17.7	CSH-EP7-1S-6P-B

General data for 6-pads SMD coil former

PARAMETER	SPECIFICATION
Coil former material	Liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number: E83005(M)
Solder pad material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.4 Coil former CPHS-EP7-1S-6P: 6-pads.

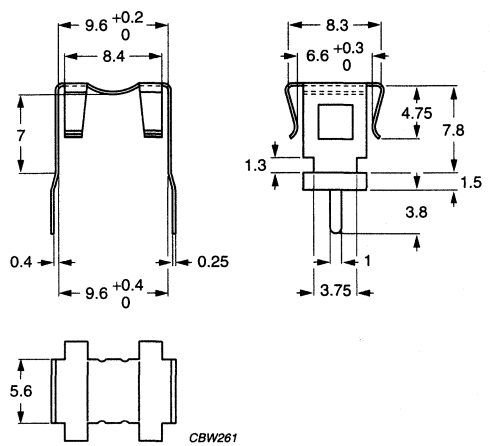
Winding data for 6-pads SMD coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	4.7	3.9	17.9	CPHS-EP7-1S-6P

MOUNTING PARTS

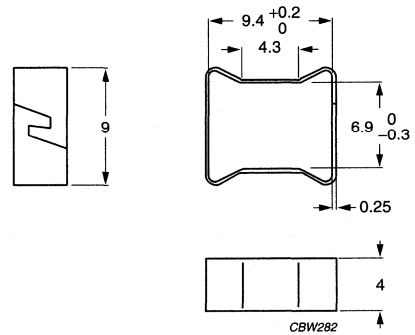
General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Mounting clip	stainless steel (CrNi); to be used in combination with CSH-EP7-1S-6P-B	6	CLI/P-EP7
Mounting clip	stainless steel (CrNi); clamping force ≈22 N	6	CLI-EP7



Dimensions in mm.

Fig.5 Mounting clip CLI/P-EP7.



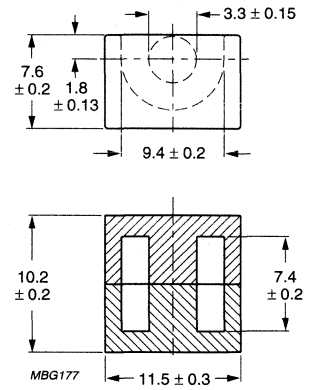
Dimensions in mm.

Fig.6 Mounting clip CLI-EP7.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.70	mm^{-1}
V_e	effective volume	215	mm^3
l_e	effective length	19.3	mm
A_e	effective area	11.3	mm^2
A_{min}	minimum area	8.55	mm^2
m	mass of core set	≈1.1	g



Dimensions in mm.

Fig.1 EP10 core set.

Core sets for general purpose transformers and power applications

Clamping force 30 ± 10N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	25 ±3%	≈34	≈870	EP10-3C81-E25
	40 ±3%	≈54	≈480	EP10-3C81-A40
	63 ±3%	≈85	≈280	EP10-3C81-A63
	100 ±3%	≈135	≈160	EP10-3C81-A100
	160 ±5%	≈216	≈90	EP10-3C81-A160
	≥900	≥1210	≈0	EP10-3C81
3C85	25 ±3%	≈34	≈870	EP10-3C85-E25
	40 ±3%	≈54	≈480	EP10-3C85-A40
	63 ±3%	≈85	≈280	EP10-3C85-A63
	100 ±3%	≈135	≈160	EP10-3C85-A100
	160 ±5%	≈216	≈90	EP10-3C85-A160
	1025 ±25%	≈1380	≈0	EP10-3C85
3F3	25 ±3%	≈34	≈870	EP10-3F3-E25
	40 ±3%	≈54	≈480	EP10-3F3-A40
	63 ±3%	≈85	≈280	EP10-3F3-A63
	100 ±3%	≈135	≈160	EP10-3F3-A100
	160 ±5%	≈216	≈90	EP10-3F3-A160
	925 ±25%	≈1250	≈0	EP10-3F3

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F4 des	63 ±3%	≈85	≈280	EP10-3F4-A63
	100 ±3%	≈135	≈160	EP10-3F4-A100
	160 ±5%	≈216	≈90	EP10-3F4-A160
	560 ±25%	≈760	≈0	EP10-3F4

Core sets of high permeability grades

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E1	2000 +30/–20%	≈2700	≈0	EP10-3E1
3E4	3200 +40/–30%	≈4300	≈0	EP10-3E4
3E25 sup	≥2500	≥3370	≈0	EP10-3E25
3E27	≥2500	≥3370	≈0	EP10-3E27
3E5	4800 +40/–30%	≈6500	≈0	EP10-3E5
3E6	6900 +40/–30%	≈9340	≈0	EP10-3E6

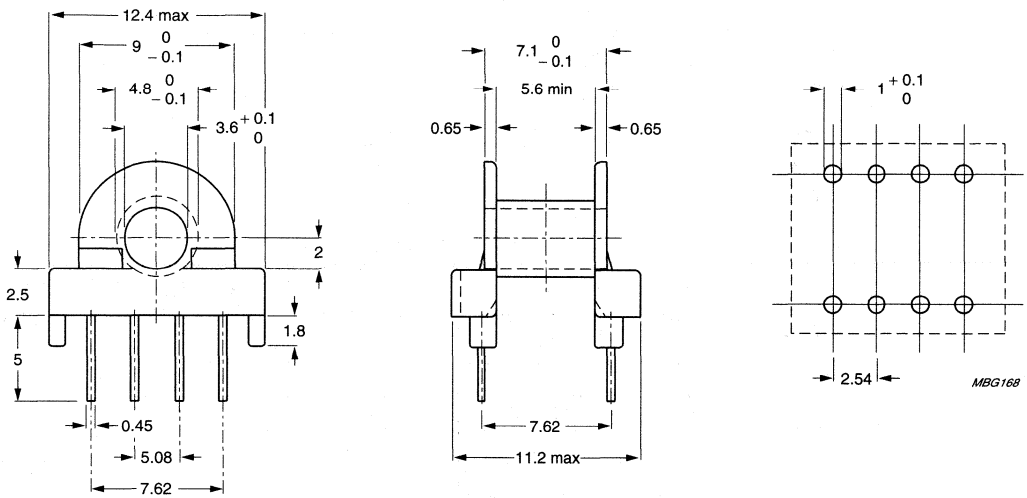
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C81	≥315	≤0.043	≤	–	–	–
3C85	≥315	≤0.032	≤0.040	–	–	–
3F3	≥315	–	≤0.025	≤0.045	–	–
3F4	≥250	–	–	–	≤0.043	≤0.069

COIL FORMER

General data CSH-EP10-1S-8P

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E46770(M)
Pin material	copper clad steel, tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

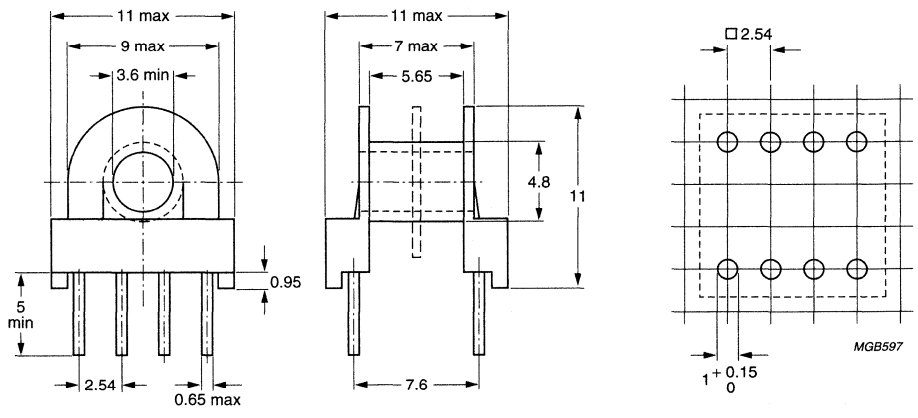
Fig.2 EP10 coil former: 8-pins.

Winding data for 8-pins EP10 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	11.4	5.6	21.5	CSH-EP10-1S-8P

General data CSH-EP10-1S-8P-A

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E46770(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.3 EP10 coil former: 8-pins (A).

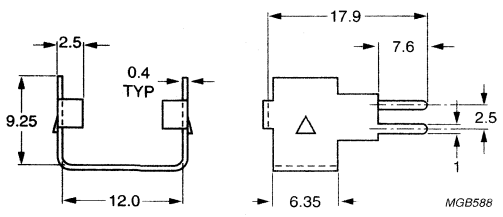
Winding data for 8-pins EP10 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	11.4	5.7	21.5	CSH-EP10-1S-8P-A
2	2 × 4.77	2 × 2.6	21.5	CSH-EP10-2S-8P-A

MOUNTING PARTS

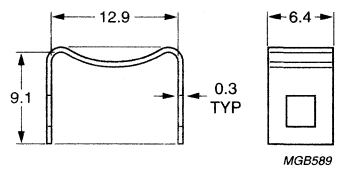
General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clasp	copper-nickel-zinc alloy (nickel silver)	4	CLA-EP10
Spring	copper-nickel-zinc alloy (nickel silver)	5	SPR-EP10
Clip	stainless steel (CrNi); clamping force ≈27 N	6	CLI-EP10



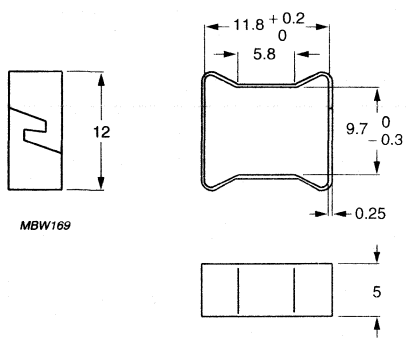
Dimensions in mm.

Fig.4 Mounting clasp CLA-EP10.



Dimensions in mm.

Fig.5 Mounting spring SPR-EP10.



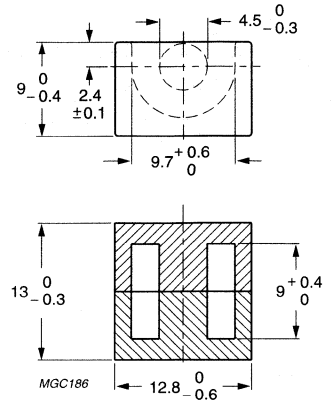
Dimensions in mm.

Fig.6 Mounting clip CLI-EP10.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.24	mm^{-1}
V_e	effective volume	472	mm^3
l_e	effective length	24.2	mm
A_e	effective area	19.5	mm^2
A_{min}	minimum area	14.9	mm^2
m	mass of core set	≈2.4	g



Dimensions in mm.

Fig.1 EP13 core set.

Core sets for general purpose transformers and power applications

Clamping force 30 ± 10N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	40 ±3%	≈39	≈880	EP13-3C81-E40
	63 ±3%	≈62	≈500	EP13-3C81-A63
	100 ±3%	≈100	≈250	EP13-3C81-A100
	160 ±3%	≈160	≈150	EP13-3C81-A160
	250 ±5%	≈250	≈85	EP13-3C81-A250
	≥1250	≥1230	≈0	EP13-3C81
3C85	40 ±3%	≈39	≈880	EP13-3C85-E40
	63 ±3%	≈62	≈500	EP13-3C85-A63
	100 ±3%	≈100	≈230	EP13-3C85-A100
	160 ±3%	≈160	≈130	EP13-3C85-A160
	250 ±5%	≈250	≈75	EP13-3C85-A250
	1475 ±25%	≈1460	≈0	EP13-3C85
3F3	40 ±3%	≈39	≈880	EP13-3F3-E40
	63 ±3%	≈62	≈500	EP13-3F3-A63
	100 ±3%	≈160	≈250	EP13-3F3-A100
	160 ±3%	≈160	≈150	EP13-3F3-A160
	250 ±5%	≈250	≈85	EP13-3F3-A250
	1325 ±25%	≈1310	≈0	EP13-3F3

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F4 des	160 ±3%	≈160	≈150	EP13-3F4-A160
	250 ±5%	≈250	≈85	EP13-3F4-A250
	315 ±5%	≈315	≈50	EP13-3F4-A315
	680 ±25%	≈770	≈0	EP13-3F4

Core sets of high permeability grades

Clamping force 30 ± 10N.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3E1	2600 ±25%	≈2560	EP13-3E1
3E25 sup	≥3400	≥3350	EP13-3E25
3E27	≥3400	≥3350	EP13-3E27
3E4	4400 ±25%	≈4300	EP13-3E4
3E5	7000 +40/–30%	≈6900	EP13-3E5
3E6	10000 +40/–30%	≈9900	EP13-3E6

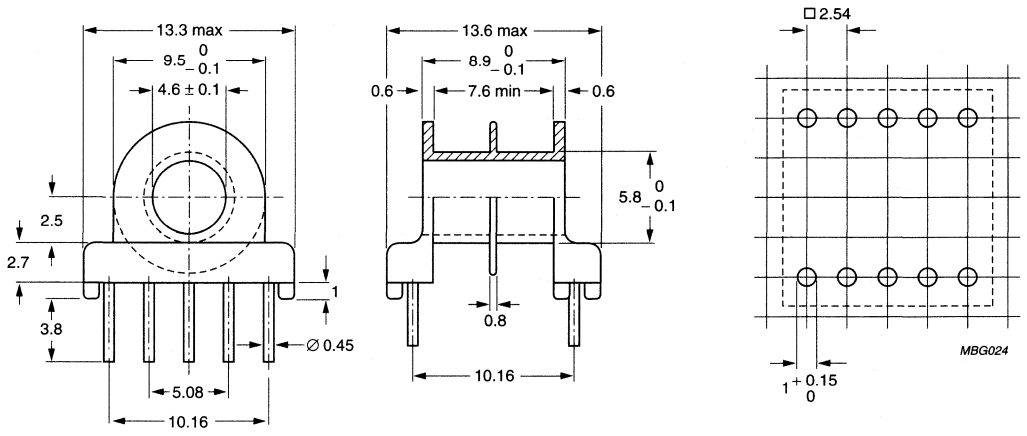
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C81	≥315	≤0.10	–	–	–	–
3C85	≥315	≤0.08	≤0.09	–	–	–
3F3	≥315	–	≤0.05	≤0.1	–	–
3F4	≥250	–	–	–	≤0.094	≤0.15

COIL FORMERS

General data CSH-EP13-10P

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number: E46770(M)
Pin material	copper clad steel tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 EP13 coil former; 10-pins.

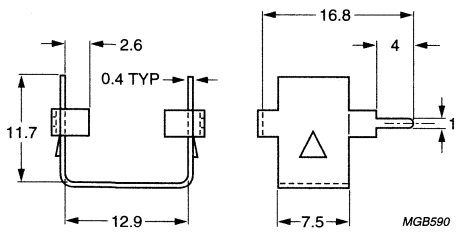
Winding data for 10-pins EP13 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	13.6	7.6	23.8	CSH-EP13-1S-10P
2	2 × 6.1	2 × 3.4	23.8	CSH-EP13-2S-10P

MOUNTING PARTS

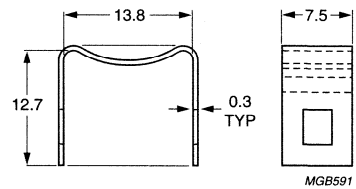
General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clasp	copper-nickel-zinc alloy (nickel silver)	3	CLA-EP13
Spring	copper-nickel-zinc alloy (nickel silver)	3	SPR-EP13
Clip	stainless steel (CrNi); clamping force ≈32 N	3	CLI-EP13



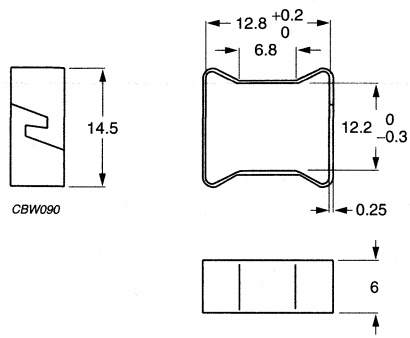
Dimensions in mm.

Fig.3 Mounting clasp CLA-EP13.



Dimensions in mm.

Fig.4 Mounting spring SPR-EP13.



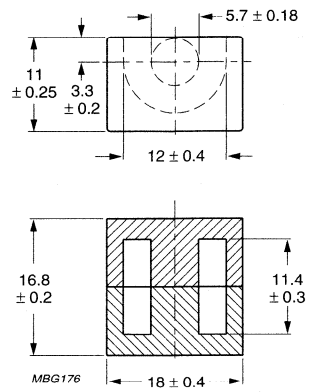
Dimensions in mm.

Fig.5 Mounting clip for CLI-EP13.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.870	mm^{-1}
V_e	effective volume	999	mm^3
l_e	effective length	29.5	mm
A_e	effective area	33.7	mm^2
A_{min}	minimum area	25.5	mm^2
m	mass of set	≈5	g



Dimensions in mm.

Fig.1 EP17 core set.

Core sets for general purpose transformers and power applications

Clamping force 40 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	63 ±3%	≈42	≈930	EP17-3C81-E63
	100 ±3%	≈67	≈530	EP17-3C81-A100
	160 ±3%	≈107	≈300	EP17-3C81-A160
	250 ±3%	≈167	≈180	EP17-3C81-A250
	315 ±5%	≈210	≈135	EP17-3C81-A315
	≥1950	≥1300	≈0	EP17-3C81
3C85	63 ±3%	≈42	≈930	EP17-3C85-E63
	100 ±3%	≈67	≈530	EP17-3C85-A100
	160 ±3%	≈107	≈300	EP17-3C85-A160
	250 ±3%	≈167	≈180	EP17-3C85-A250
	315 ±5%	≈210	≈135	EP17-3C85-A315
	2230 ±25%	≈1490	≈0	EP17-3C85
3F3	63 ±3%	≈42	≈930	EP17-3F3-E63
	100 ±3%	≈67	≈530	EP17-3F3-A100
	160 ±3%	≈107	≈300	EP17-3F3-A160
	250 ±3%	≈167	≈180	EP17-3F3-A250
	315 ±5%	≈210	≈135	EP17-3F3-A315
	2000 ±25%	≈1330	≈0	EP17-3F3

Core sets of high permeability grades

Clamping force 40 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 sup	≥5300	≥3530	≈0	EP17-3E25
3E27	≥5300	≥3530	≈0	EP17-3E27
3E5	≥8000	≥5530	≈0	EP17-3E5

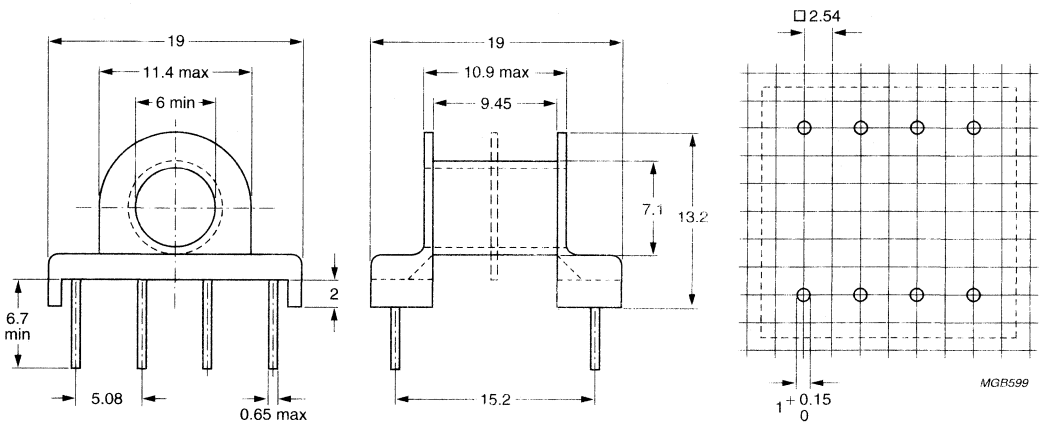
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.21	–	–
3C85	≥320	≤0.16	≤0.18	–
3F3	≥320	–	≤0.11	≤0.19

COIL FORMER

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 EP17 coil former: 8-pins.

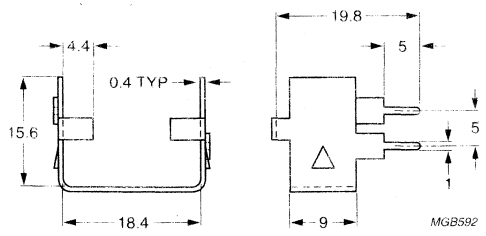
Winding data for 8-pins EP17 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	18.0	9.45	28.9	CSH-EP17-1S-8P
2	2 × 8.3	2 × 4.6	28.9	CSH-EP17-2S-8P

MOUNTING PARTS

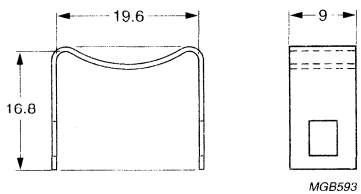
General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clasp	copper-nickel-zinc alloy (nickel silver)	3	CLA-EP17
Spring	copper-nickel-zinc alloy (nickel silver)	4	SPR-EP17



Dimensions in mm.

Fig.3 Mounting clasp CLA-EP17.



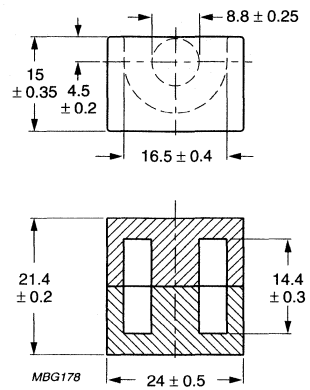
Dimensions in mm.

Fig.4 Mounting spring SPR-EP17.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.520	mm^{-1}
V_e	effective volume	3230	mm^3
l_e	effective length	41.1	mm
A_e	effective area	78.7	mm^2
A_{min}	minimum area	60.8	mm^2
m	mass of set	≈16	g



Dimensions in mm.

Fig.1 EP20 core set.

Core sets for general purpose transformers and power applications

Clamping force 60 ±20 N.

GRADE	A_L() (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	160 ±3%	≈65	≈740	EP20-3C81-E160
	250 ±3%	≈101	≈440	EP20-3C81-A250
	315 ±3%	≈127	≈340	EP20-3C81-A315
	400 ±3%	≈162	≈250	EP20-3C81-A400
	630 ±5%	≈255	≈150	EP20-3C81-A630
	≥3450	≥1400	≈0	EP20-3C81
3C85	160 ±3%	≈65	≈740	EP20-3C85-E160
	250 ±3%	≈101	≈440	EP20-3C85-A250
	315 ±3%	≈127	≈340	EP20-3C85-A315
	400 ±3%	≈162	≈250	EP20-3C85-A400
	630 ±5%	≈255	≈150	EP20-3C85-A630
	3950 ±25%	≈1600	≈0	EP20-3C85
3F3	160 ±3%	≈65	≈740	EP20-3F3-E160
	250 ±3%	≈101	≈440	EP20-3F3-A250
	315 ±3%	≈127	≈340	EP20-3F3-A315
	400 ±3%	≈162	≈250	EP20-3F3-A400
	630 ±5%	≈255	≈150	EP20-3F3-A630
	3550 ±25%	≈1440	≈0	EP20-3F3

Core sets of high permeability grades

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E25 sup	≥8700	≥3520	≈0	EP20-3E25
3E27	≥8700	≥3520	≈0	EP20-3E27
3E5	≥13500	≥5580	≈0	EP20-3E5

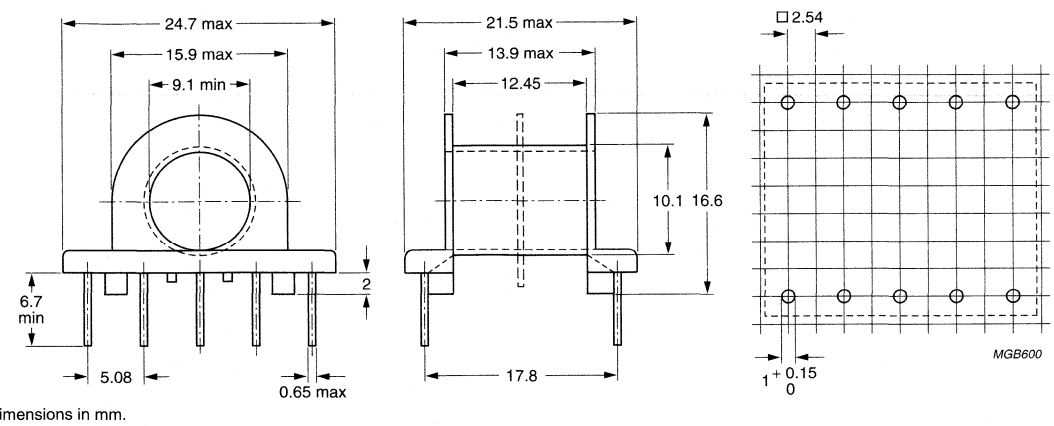
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.66	–	–
3C85	≥320	≤0.50	<0.58	–
3F3	≥320	–	≤0.36	≤0.62

COIL FORMER

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.2 EP20 coil former: 10-pins.

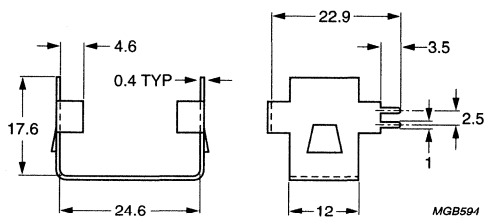
Winding data for 10-pins EP20 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	32.6	12.5	41.0	CSH-EP20-1S-10P
2	2×15.5	5.85	41.0	CSH-EP20-2S-10P

MOUNTING PARTS

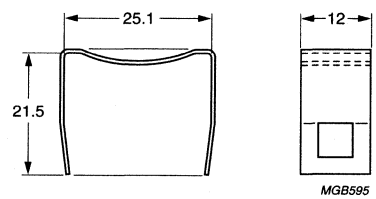
General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clasp	copper-nickel-zinc alloy (nickel silver)	3	CLA-EP20
Spring	copper-nickel-zinc alloy (nickel silver)	4	SPR-EP20



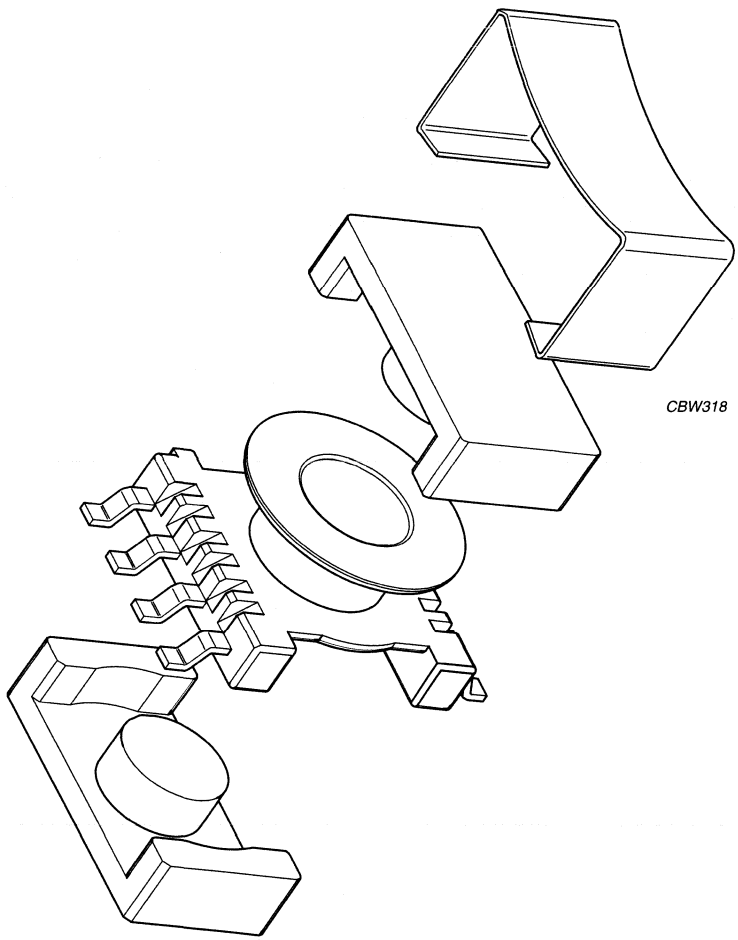
Dimensions in mm.

Fig.3 Mounting clasp CLA-EP20.



Dimensions in mm.

Fig.4 Mounting spring SPR-EP20.



For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview ER cores

CORE TYPE	V_e (mm^3)	A_e (mm^2)	MASS (g)
ER9.5	120	8.47	0.35
ER11	174	11.9	0.5
ER14.5	333	17.6	0.9
ER28	5260	81.4	14
ER28L	6140	81.4	16
ER35	9710	107	23
ER40	14600	149	37
ER42	19200	194	48
ER42A	16800	170	45
ER48	25500	255	64
ER54	23000	250	61

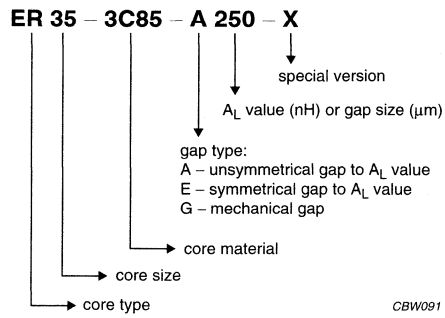
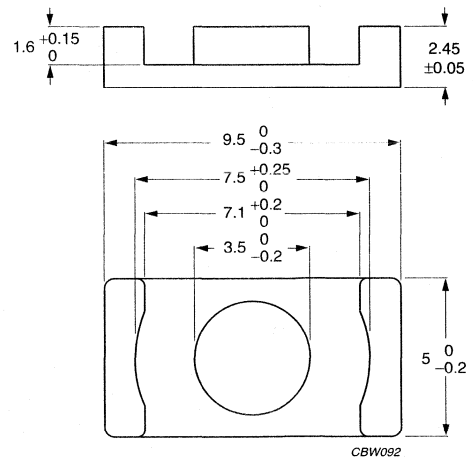


Fig.1 Type number structure for cores.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.67	mm^{-1}
V_e	effective volume	120	mm^3
l_e	effective length	14.2	mm
A_e	effective area	8.47	mm^2
A_{min}	minimum area	7.60	mm^2
m	mass of core half	≈0.35	g



Dimensions in mm.

Fig.1 ER9.5 core half.

Core sets for general purpose transformers and power applications

Clamping force 10 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	63 ±3%	≈84	≈200	ER9.5-3F3-A63-S
	100 ±3%	≈133	≈100	ER9.5-3F3-A100-S
	160 ±10%	≈213	≈70	ER9.5-3F3-A160-S
	850 ±25%	≈1130	≈0	ER9.5-3F3-S
3F4 des	40 ±3%	≈53	≈300	ER9.5-3F4-A40-S
	63 ±5%	≈84	≈200	ER9.5-3F4-A63-S
	100 ±5%	≈133	≈100	ER9.5-3F4-A100-S
	525 ±25%	≈700	≈0	ER9.5-3F4-S

Core sets of high permeability grades

Clamping force 10 ±5 N, flux density $\hat{B} \leq 0.1$ mT.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5 des	3600 +40/−30%	≈4780	≈0	ER9.5-3E5-S
3E6 des	4800 +40/−30%	≈6380	≈0	ER9.5-3E6-S

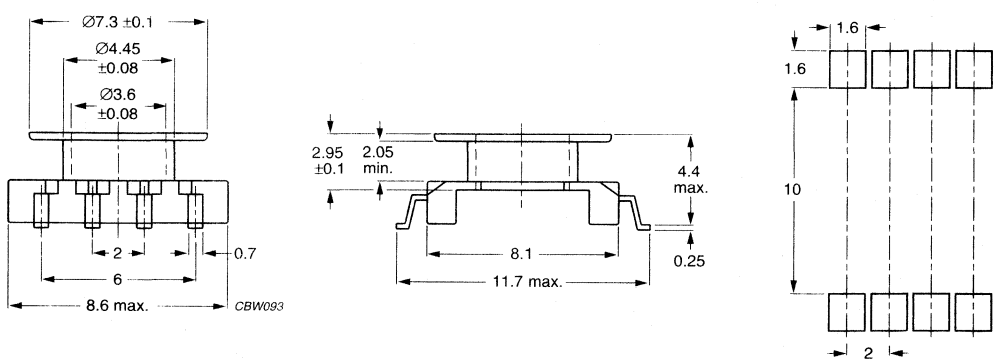
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at			
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3F3	≥300	≤0.015	≤0.025	–	–
3F4	≥250	–	–	≤0.024	≤0.038

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E54705(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 ER9.5 coil former (SMD); 8-solder pads.

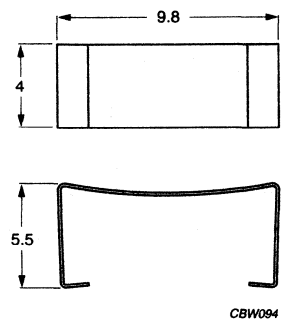
Winding data for ER9.5 coil former (SMD) with 8 solder pads

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	2.8	2.05	18.4	CPVS-ER9.5-1S-8P

MOUNTING PARTS

General data and ordering information

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clamp	stainless steel (CrNi); clamping force ≈20 N	3	CLM-ER9.5



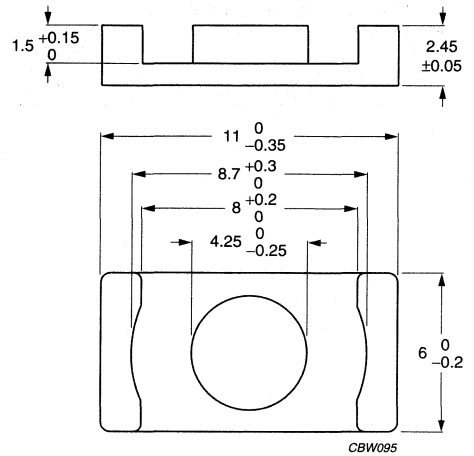
Dimensions in mm.

Fig.3 ER9.5 clamp.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.23	mm^{-1}
V_e	effective volume	174	mm^3
l_e	effective length	14.7	mm
A_e	effective area	11.9	mm^2
A_{min}	minimum area	10.3	mm^2
m	mass of core half	≈0.5	g



Dimensions in mm.

Fig.1 ER11 core half.

Core sets for general purpose transformers and power applications

A_L measured in combination with a non-gapped core half, clamping force 15 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 des	100 ±3%	≈98	≈200	ER11-3F3-A100-S
	160 ±3%	≈155	≈100	ER11-3F3-A160-S
	250 ±10%	≈245	≈60	ER11-3F3-A250-S
	1200 ±25%	≈1170	≈0	ER11-3F3-S
3F4 des	63 ±3%	≈61	≈300	ER11-3F4-A63-S
	100 ±5%	≈98	≈200	ER11-3F4-A100-S
	160 ±8%	≈155	≈100	ER11-3F4-A160-S
	725 ±25%	≈710	≈0	ER11-3F4-S

Core sets of high permeability grades

A_L measured in combination with an non-gapped core half, clamping force 15 ±5 N, flux density $\hat{B} \leq 0.1$ mT.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5 des	5000 +40/−30%	≈4890	≈0	ER11-3E5-S
3E6 des	6700 +40/−30%	≈6560	≈0	ER11-3E6-S

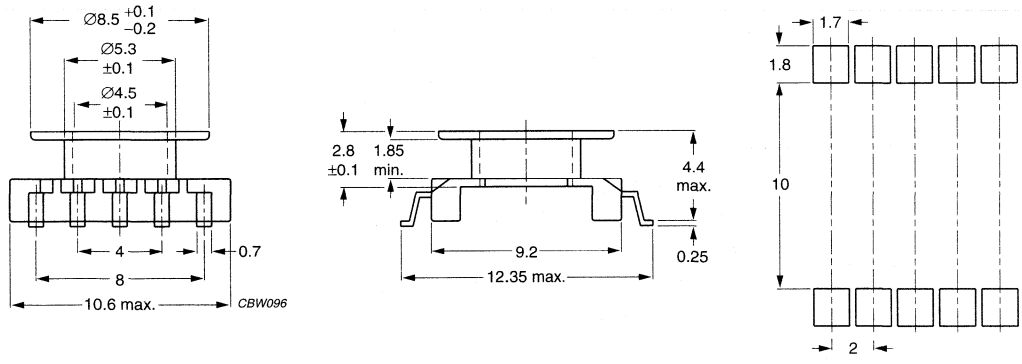
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at			
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3F3	≥300	≤0.025	≤0.040	–	–
3F4	≥250	–	–	≤0.035	≤0.056

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E54705(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 ER11 coil former (SMD); 10-solder pads.

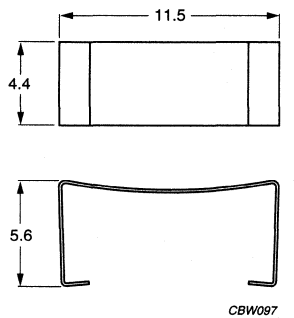
Winding data for ER11 coil former (SMD) with 10 solder pads

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	2.8	1.85	21.6	CPVS-ER11-1S-10P

MOUNTING PARTS

General data and ordering information

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clamp	stainless steel (CrNi); clamping force ≈25 N	3	CLM-ER11



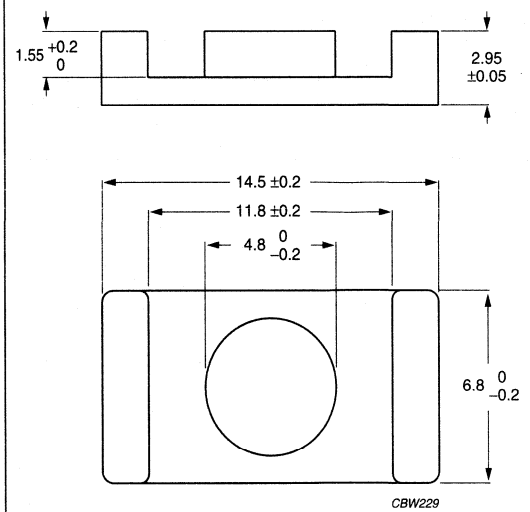
Dimensions in mm.

Fig.3 ER11 clamp.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.08	mm^{-1}
V_e	effective volume	333	mm^3
l_e	effective length	19.0	mm
A_e	effective area	17.6	mm^2
A_{min}	minimum area	16.6	mm^2
m	mass of core half	≈0.9	g



Dimensions in mm.

Fig.1 ER14.5 core half.

Core sets for general purpose transformers and power applications

A_L measured in combination with a non-gapped core half, clamping force 10 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 prot	1400 ±25%	≈1200	≈0	ER14.5-3F3-S
3F4 prot	845 ±25%	≈725	≈0	ER14.5-3F4-S

Core sets of high permeability grades

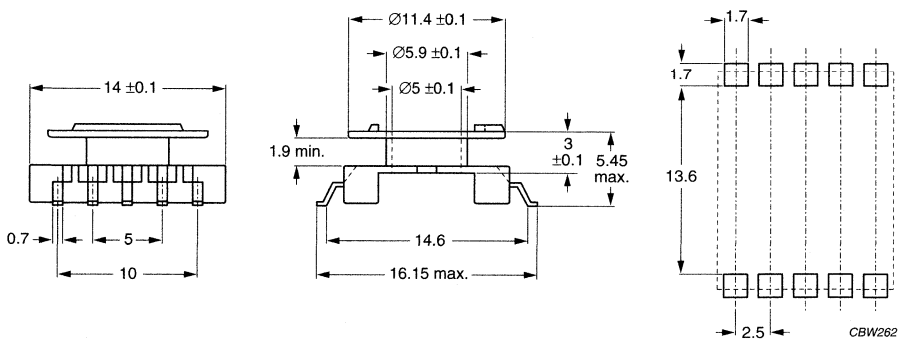
A_L measured with clamping force 10 ±5 N, flux density $\hat{B} \leq 0.1$ mT.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E6 prot	7900 +40/−30%	≈6800	≈0	ER14.5-3E6-S

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E54705(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 ER14.5 coil former (SMD); 10-solder pads.

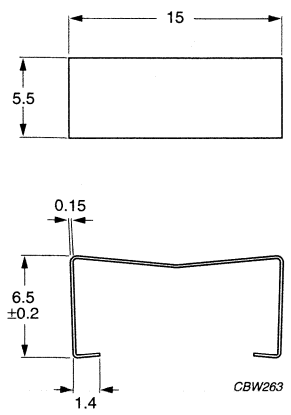
Winding data for ER11 coil former (SMD) with 10 solder pads

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	5.1	1.9	27	CPVS-ER14.5-1S-10P

MOUNTING PARTS

General data and ordering information

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clamp	stainless steel (CrNi)	3	CLM-ER14.5



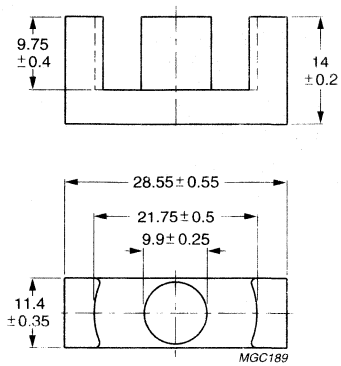
Dimensions in mm.

Fig.3 ER11 clamp.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.786	mm^{-1}
V_e	effective volume	5260	mm^3
l_e	effective length	64	mm
A_e	effective area	81.4	mm^2
A_{min}	minimum area	77	mm^2
m	mass of core half	≈14	g



Dimensions in mm.

Fig.1 ER28 core half.

Core halves

Clamping force 40 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	2400 ±25%	≈1500	≈0	ER28-3C30
3C85	2900 ±25%	≈1800	≈0	ER28-3C85
3C90 des	2900 ±25%	≈1800	≈0	ER28-3C90

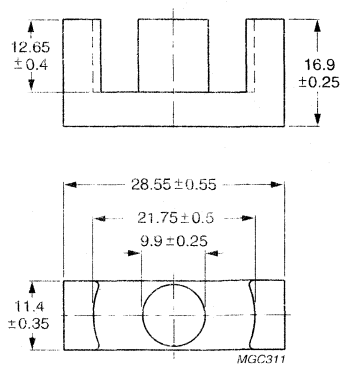
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C30	≥360	≤0.55	≤0.60
3C85	≥320	≤0.9	≤1.1
3C90	≥320	≤0.55	≤0.60

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.928	mm^{-1}
V_e	effective volume	6140	mm^3
l_e	effective length	75.5	mm
A_e	effective area	81.4	mm^2
A_{min}	minimum area	77	mm^2
m	mass of core half	≈16	g



Dimensions in mm.

Fig.1 ER28L core half.

Core halves

Clamping force 40 ±20 N. Gapped core are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	2100 ±25%	≈1550	≈0	ER28L-3C30
3C85	2500 ±25%	≈1900	≈0	ER28L-3C85
3C90 des	2500 ±25%	≈1900	≈0	ER28L-3C90

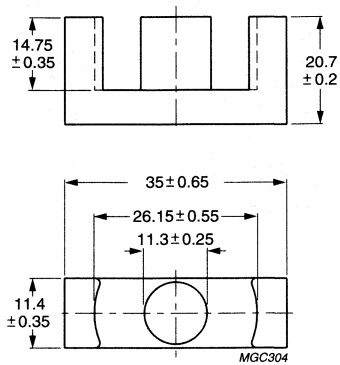
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C30	≥360	≤0.65	≤0.70
3C85	≥320	≤1.0	≤1.3
3C90	≥320	≤0.65	≤0.70

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.849	mm^{-1}
V_e	effective volume	9710	mm^3
l_e	effective length	90.8	mm
A_e	effective area	107	mm^2
A_{min}	minimum area	100	mm^2
m	mass of core half	≈23	g



Dimensions in mm.

Fig.1 ER35 core half.

Core halves

Clamping force 40 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	2300 ±25%	≈1550	≈0	ER35-3C30
3C85	2800 ±25%	≈1900	≈0	ER35-3C85
3C90 des	2800 ±25%	≈1900	≈0	ER35-3C90

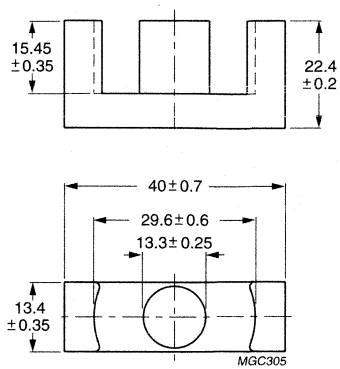
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C30	≥360	≤1.0	≤1.1
3C85	≥320	≤1.4	≤1.6
3C90	≥320	≤1.0	≤1.1

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.658	mm^{-1}
V_e	effective volume	14600	mm^3
l_e	effective length	98	mm
A_e	effective area	149	mm^2
A_{min}	minimum area	139	mm^2
m	mass of core half	≈37	g



Dimensions in mm.

Fig.1 ER40 core half.

Core halves

Clamping force 50 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	2900 ±25%	≈1550	≈0	ER40-3C30
3C85	3600 ±25%	≈1900	≈0	ER40-3C85
3C90 des	3600 ±25%	≈1900	≈0	ER40-3C90

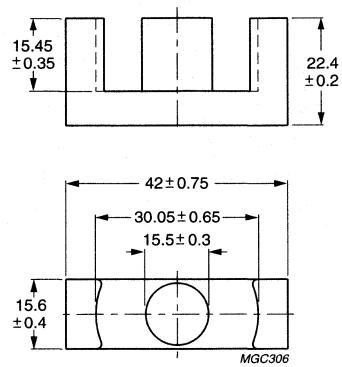
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C30	≥360	≤1.5	≤1.7
3C85	≥320	≤2.1	≤2.4
3C90	≥320	≤1.5	≤1.7

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.509	mm^{-1}
V_e	effective volume	19200	mm^3
l_e	effective length	98.8	mm
A_e	effective area	194	mm^2
A_{min}	minimum area	189	mm^2
m	mass of core half	≈48	g



Dimensions in mm.

Fig.1 ER42 core half.

Core halves

Clamping force 50 ±20 N. Gapped cores available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	3800 ±25%	≈1550	≈0	ER42-3C30
3C85	4600 ±25%	≈1900	≈0	ER42-3C85
3C90 des	4600 ±25%	≈1900	≈0	ER42-3C90

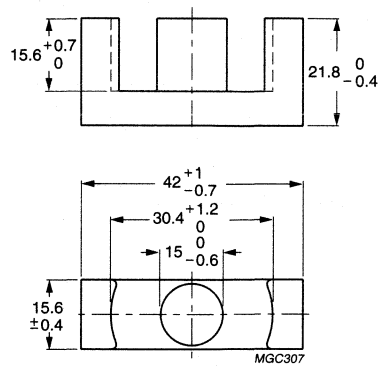
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C30	≥360	≤2.0	≤2.2
3C85	≥320	≤2.7	≤3.2
3C90	≥320	≤2.0	≤2.2

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.582	mm^{-1}
V_e	effective volume	16800	mm^3
l_e	effective length	99	mm
A_e	effective area	170	mm^2
A_{min}	minimum area	170	mm^2
m	mass of core half	≈45	g



Dimensions in mm.

Fig.1 ER42A core half.

Core halves

Clamping force 40 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	3300 ±25%	≈1550	≈0	ER42A-3C30
3C85	4000 ±25%	≈1900	≈0	ER42A-3C85
3C90 des	4000 ±25%	≈1900	≈0	ER42A-3C90

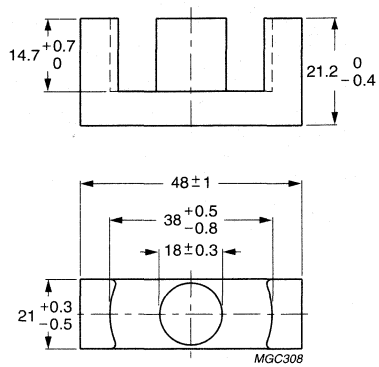
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C30	≥360	≤1.7	≤2.0
3C85	≥320	≤2.4	≤2.9
3C90	≥320	≤1.7	≤2.0

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.392	mm^{-1}
V_e	effective volume	25500	mm^3
l_e	effective length	100	mm
A_e	effective area	255	mm^2
A_{min}	minimum area	248	mm^2
m	mass of core half	≈64	g



Dimensions in mm.

Fig.1 ER48 core half.

Core halves

Clamping force 50 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	4600 ±25%	≈1500	≈0	ER48-3C30
3C85	5700 ±25%	≈1900	≈0	ER48-3C85
3C90 des	5700 ±25%	≈1900	≈0	ER48-3C90

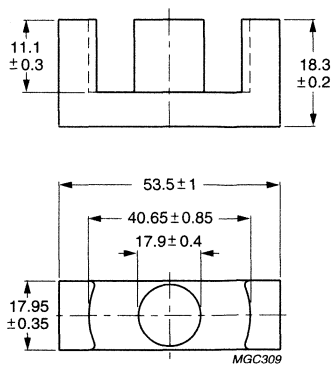
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C30	≥360	≤2.9	≤3.4
3C85	≥320	≤3.6	≤4.6
3C90	≥320	≤2.9	≤3.4

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.370	mm^{-1}
V_e	effective volume	23000	mm^3
l_e	effective length	91.8	mm
A_e	effective area	250	mm^2
A_{min}	minimum area	240	mm^2
m	mass of core half	≈61	g



Dimensions in mm.

Fig.1 ER54 core half.

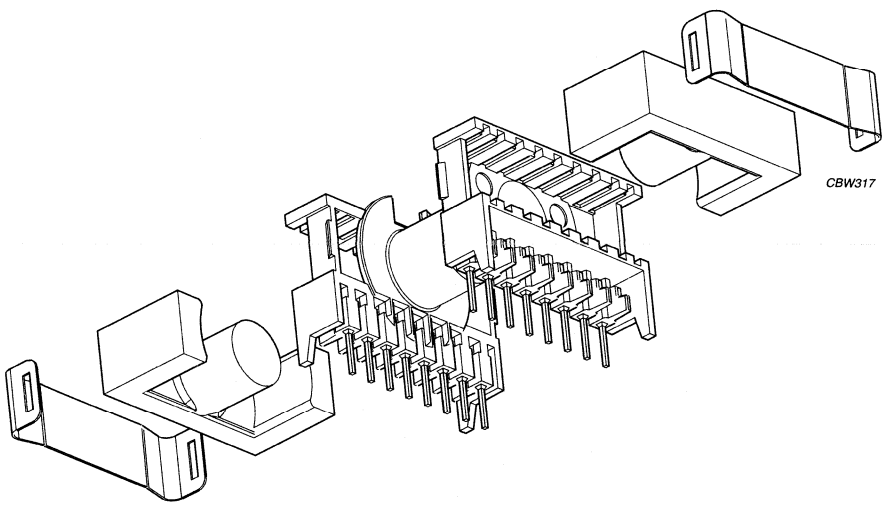
Core halves

Clamping force 50 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	5000 ±25%	≈1500	≈0	ER54-3C30
3C85	6100 ±25%	≈1800	≈0	ER54-3C85
3C90 des	6100 ±25%	≈1800	≈0	ER54-3C90

Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C30	≥360	≤2.5	≤2.9
3C85	≥320	≤3.2	≤3.8
3C90	≥320	≤2.5	≤2.9



For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview ETD cores

CORE TYPE	V_e (mm^3)	A_e (mm^3)	MASS (g)
ETD29	5470	76.0	14
ETD34	7640	97.1	20
ETD39	11500	125	30
ETD44	17800	173	47
ETD49	24000	211	62
ETD54	35500	280	90
ETD59	51500	368	130

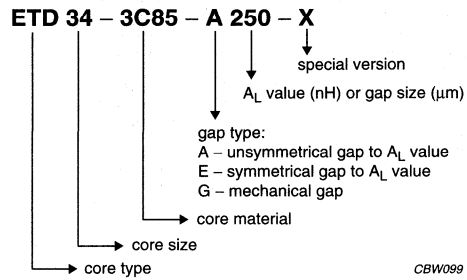


Fig.1 Type number structure for cores.

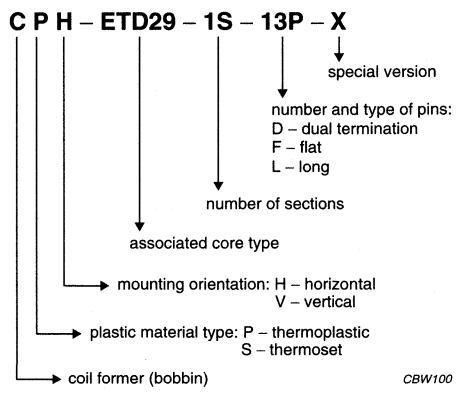
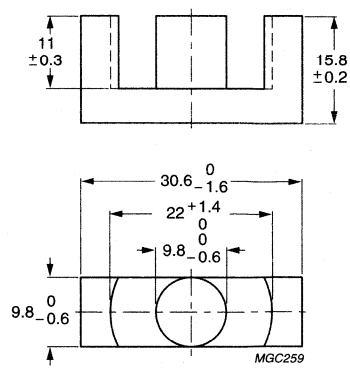


Fig.2 Type number structure for coil formers.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.947	mm^{-1}
V_e	effective volume	5470	mm^3
l_e	effective length	72	mm
A_e	effective area	76	mm^2
A_{min}	minimum area	71	mm^2
m	mass of core half	≈14	g



Dimensions in mm.

Fig.1 ETD29 core half.

Core halves

Clamping force 40 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	1900 ±25%	≈1500	≈0	ETD29-3C30
3C85	2350 ±25%	≈1850	≈0	ETD29-3C85
3C90 des	2350 ±25%	≈1850	≈0	ETD29-3C90
3F3 des	2200 ±25%	≈1700	≈0	ETD29-3F3

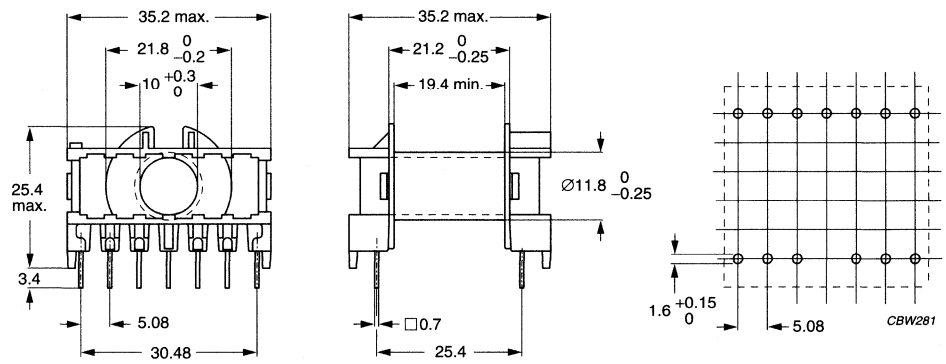
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤0.55	≤0.60	–
3C85	≥320	≤0.80	≤0.90	–
3C90	≥330	≤0.55	≤0.60	–
3F3	≥320	–	≤0.65	≤1.1

COIL FORMER

General data 13-pins ETD29 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329(R)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 ETD29 coil former; 13-pins.

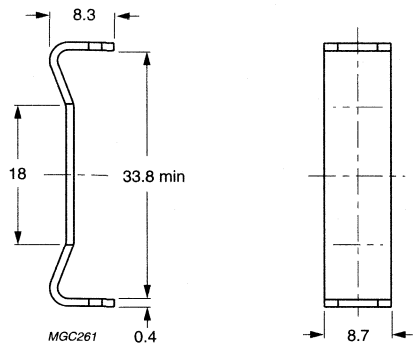
Winding data for 13-pins ETD29 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	90	19.4	53	CPH-ETD29-1S-13P

MOUNTING PARTS

General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Mounting clip	material: stainless steel	3	CLI-ETD29



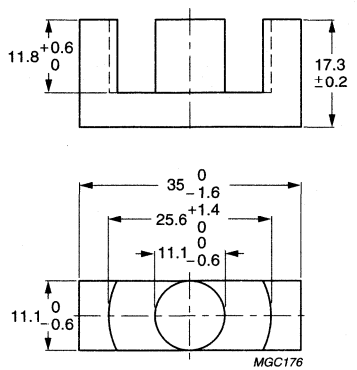
Dimensions in mm.

Fig.3 Mounting clip for ETD29.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.810	mm^{-1}
V_e	effective volume	7640	mm^3
l_e	effective length	78.6	mm
A_e	effective area	97.1	mm^2
A_{min}	minimum area	91.6	mm^2
m	mass of core half	≈20	g



Dimensions in mm.

Fig.1 ETD34 core half.

Core halves

Clamping force 40 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	2200 ±25%	≈1500	≈0	ETD34-3C30
3C85	2700 ±25%	≈1870	≈0	ETD34-3C85
3C90 des	2700 ±25%	≈1870	≈0	ETD34-3C90
3F3 des	2500 ±25%	≈1750	≈0	ETD34-3F3

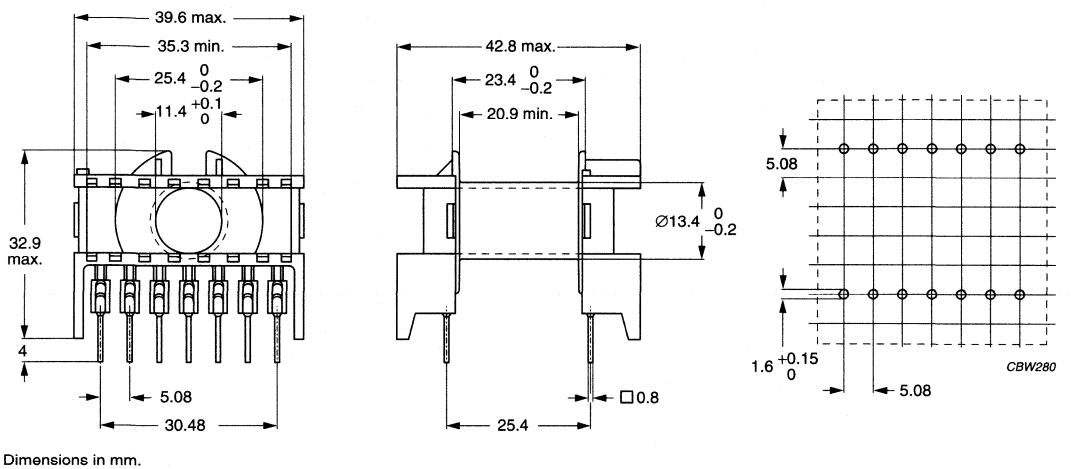
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤0.80	≤0.90	–
3C85	≥320	≤1.10	≤1.30	–
3C90	≥330	≤0.80	≤0.90	–
3F3	≥320	–	≤0.90	≤1.6

COIL FORMERS

General data 14-pins ETD34 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329(R)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

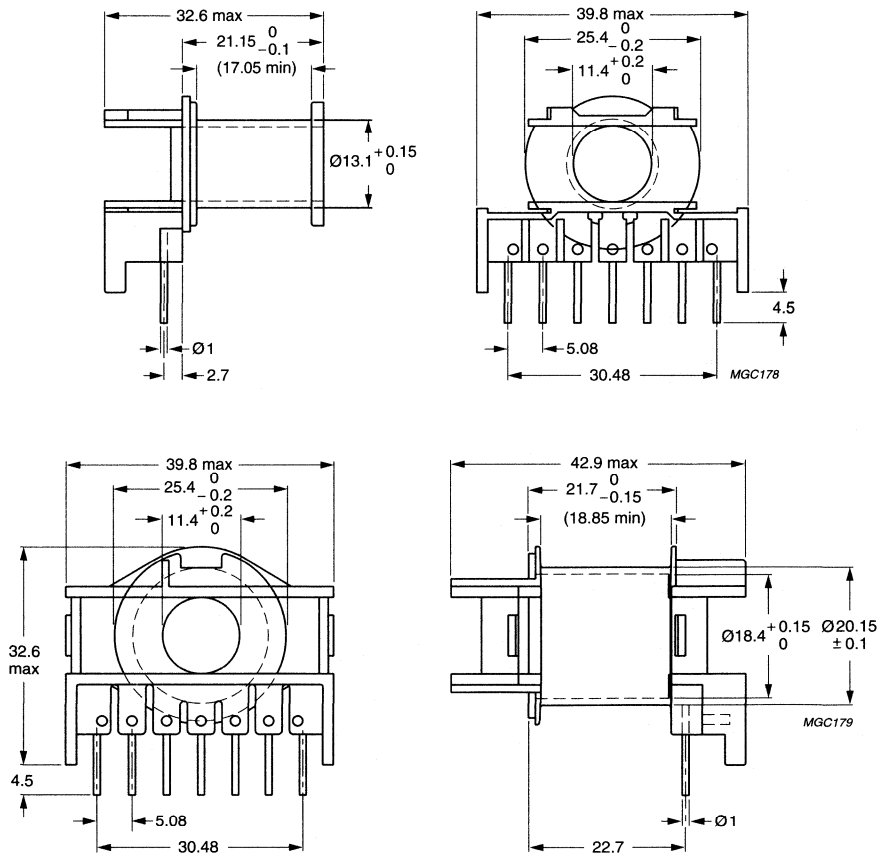
Fig.2 ETD34 coil former; 14-pins.

Winding data for 14-pins ETD34 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	123	20.9	60	CPH-ETD34-1S-14P

General data 7-pins coaxial ETD34 coil former

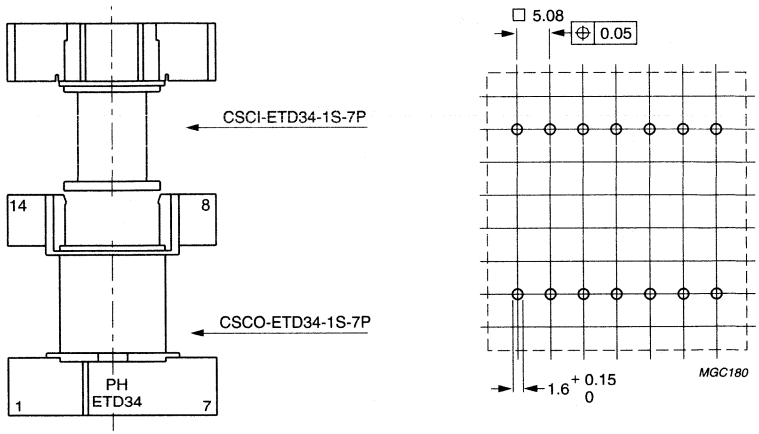
PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E63312(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

For mounting grid and method of fitting, see Fig.4.

Fig.3 Coaxial ETD34 coil former; 7-pins.



Dimensions in mm.

This coil former incorporates 8 mm creepage distance between primary and secondary windings, as well as between primary and all other conductive parts (in accordance with IEC 380 safety regulations).

Fig.4 Mounting grid and method of fitting.

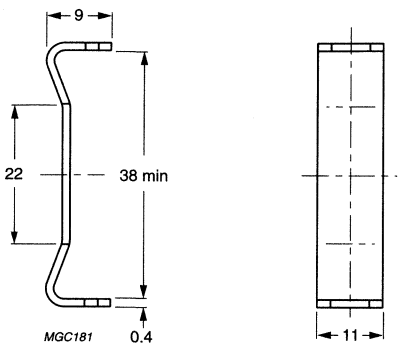
Winding data for coaxial ETD34 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	44.5	17	49.5	CSCI-ETD34-1S-7P
1	49	18.9	71	CSCO-ETD34-1S-7P

MOUNTING PARTS

General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Mounting clip	material: stainless steel	5	CLI-ETD34



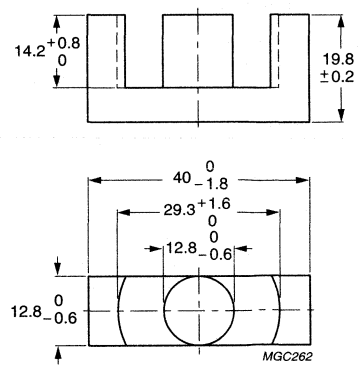
Dimensions in mm.

Fig.5 Mounting clip for ETD34.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.737	mm^{-1}
V_e	effective volume	11500	mm^3
l_e	effective length	92.2	mm
A_e	effective area	125	mm^2
A_{min}	minimum area	123	mm^2
m	mass of core half	≈30	g



Dimensions in mm.

Fig.1 ETD39 core half.

Core halves

Clamping force 40 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	2450 ±25%	≈1550	≈0	ETD39-3C30
3C85	3000 ±25%	≈1900	≈0	ETD39-3C85
3C90 des	3000 ±25%	≈1900	≈0	ETD39-3C90
3F3 des	2800 ±25%	≈1750	≈0	ETD39-3F3

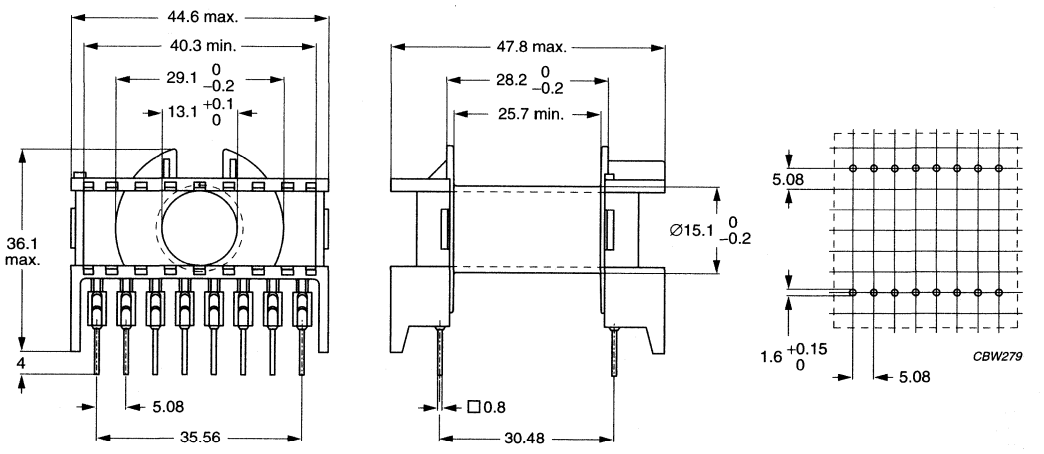
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤1.3	≤1.4	–
3C85	≥320	≤1.6	≤1.9	–
3C90	≥330	≤1.3	≤1.4	–
3F3	≥320	–	≤1.4	≤2.5

COIL FORMER

General data 16-pins ETD39 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329(R)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 ETD39 coil former; 16-pins.

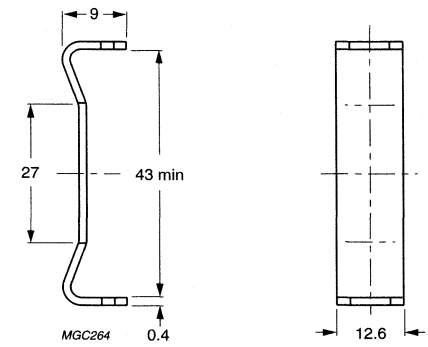
Winding data for 16-pins ETD39 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	177	25.7	69	CPH-ETD39-1S-16P

MOUNTING PARTS

General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Mounting clip	material: stainless steel	3	CLI-ETD39



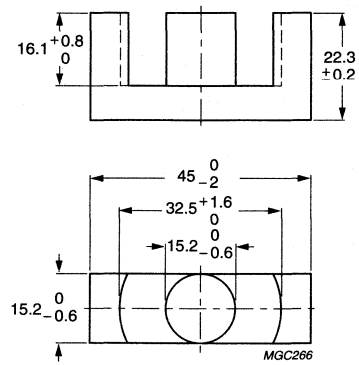
Dimensions in mm.

Fig.3 Mounting clip for ETD39.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.589	mm^{-1}
V_e	effective volume	17800	mm^3
l_e	effective length	103	mm
A_e	effective area	173	mm^2
A_{min}	minimum area	172	mm^2
m	mass of core half	≈47	g



Dimensions in mm.

Fig.1 ETD44 core half.

Core halves

Clamping force 40 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	3100 ±25%	≈1550	≈0	ETD44-3C30
3C85	3800 ±25%	≈1900	≈0	ETD44-3C85
3C90 des	3800 ±25%	≈1900	≈0	ETD44-3C90
3F3 des	3500 ±25%	≈1780	≈0	ETD44-3F3

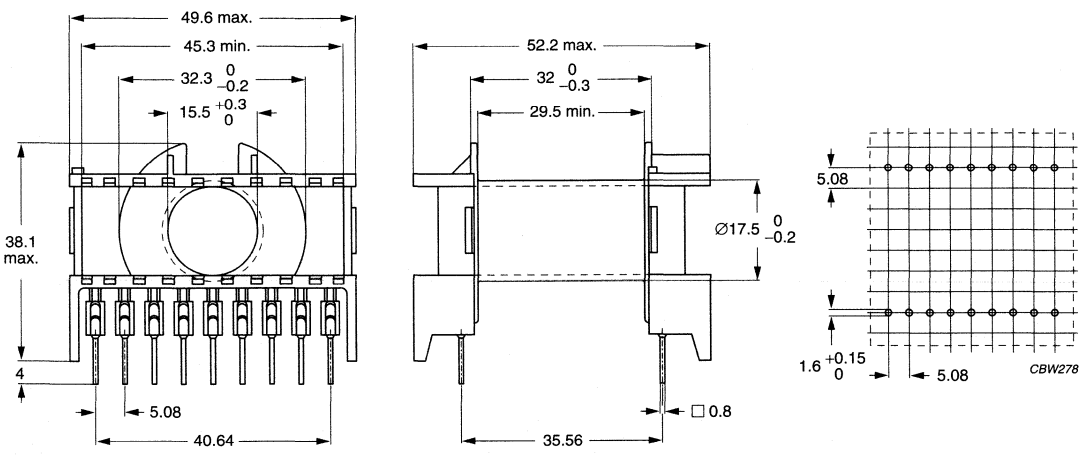
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤2.0	≤2.2	–
3C85	≥320	≤2.5	≤3.0	–
3C90	≥330	≤2.0	≤2.2	≤
3F3	≥320	–	≤2.2	≤ 3.9

COIL FORMERS

General data 18-pins ETD44 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329(R)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 ETD44 coil former; 18-pins.

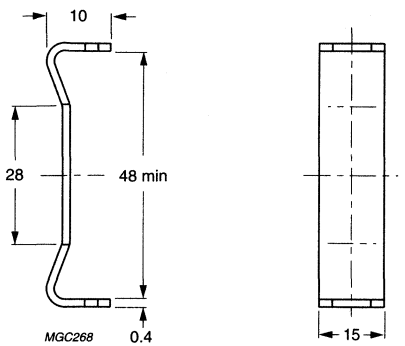
Winding data for 18-pins ETD44 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	214	29.5	77	CPH-ETD44-1S-18P

MOUNTING PARTS

General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Mounting clip	material: stainless steel	3	CLI-ETD44



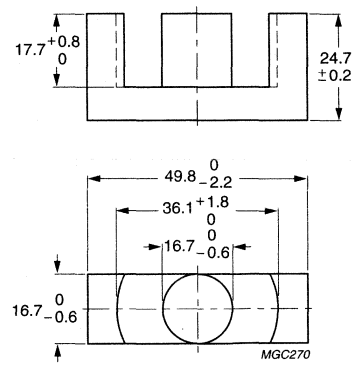
Dimensions in mm.

Fig.3 Mounting clip for ETD44.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.534	mm^{-1}
V_e	effective volume	24000	mm^3
l_e	effective length	114	mm
A_e	effective area	211	mm^2
A_{min}	minimum area	209	mm^2
m	mass of core half	≈62	g



Dimensions in mm.

Fig.1 ETD49 core half.

Core halves

Clamping force 50 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	3400 ±25%	≈1550	≈0	ETD49-3C30
3C85	4200 ±25%	≈1950	≈0	ETD49-3C85
3C90 des	4200 ±25%	≈1950	≈0	ETD49-3C90
3F3 des	3900 ±25%	≈1800	≈0	ETD49-3F3

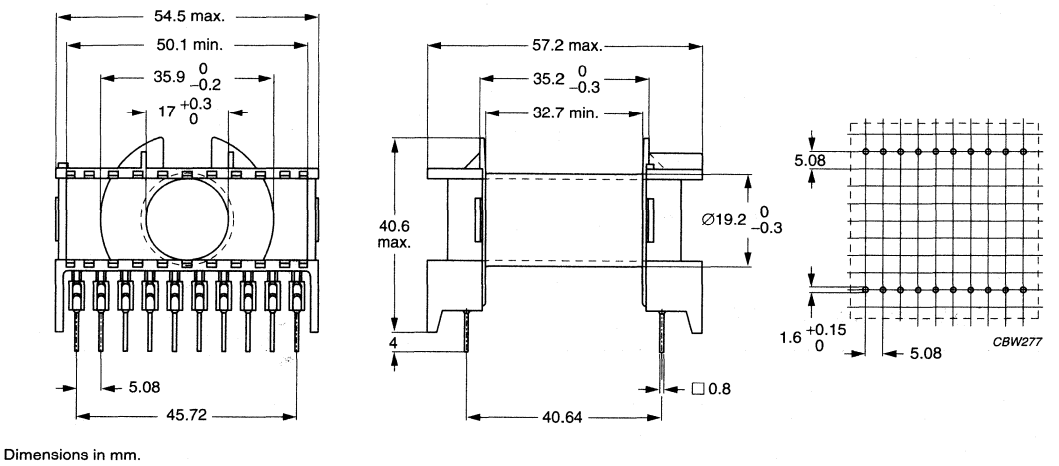
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤2.7	≤3.1	–
3C85	≥320	≤3.4	≤4.0	–
3C90	≥330	≤2.7	≤3.1	–
3F3	≥320	–	≤3.0	≤5.4

COIL FORMERS

General data 20-pins ETD49 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329(R)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 ETD49 coil former; 20-pins.

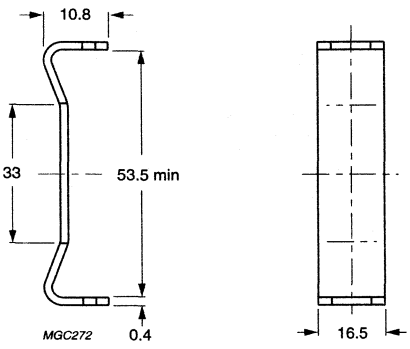
Winding data for 20-pins ETD49 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	273	32.7	85	CPH-ETD49-1S-20P

MOUNTING PARTS

General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Mounting clip	material: stainless steel	3	CLI-ETD49



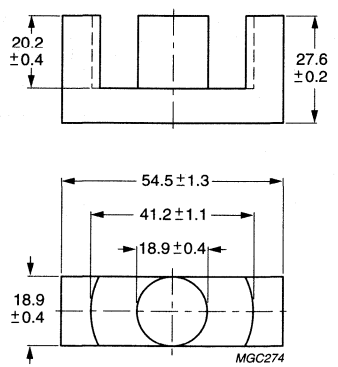
Dimensions in mm.

Fig.3 Mounting clip for ETD49.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.454	mm^{-1}
V_e	effective volume	35500	mm^3
l_e	effective length	127	mm
A_e	effective area	280	mm^2
A_{min}	minimum area	270	mm^2
m	mass of core half	≈90	g



Dimensions in mm.

Fig.1 ETD54 core half.

Core halves

Clamping force 50 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	4100 ±25%	≈1580	≈0	ETD54-3C30
3C85	5000 ±25%	≈1950	≈0	ETD54-3C85
3C90 des	5000 ±25%	≈1950	≈0	ETD54-3C90
3F3 des	4600 ±25%	≈1800	≈0	ETD54-3F3

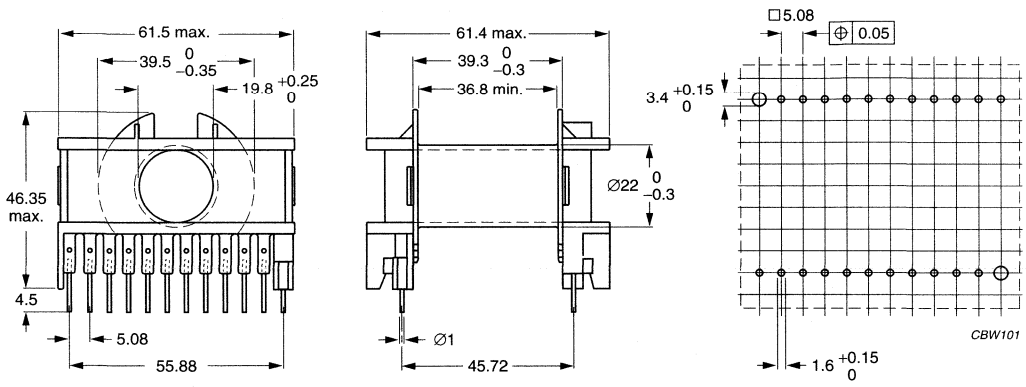
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤4.0	≤4.8	–
3C85	≥320	≤5.0	≤6.2	–
3C90	≥330	≤4.0	≤4.8	–
3F3	≥320	–	≤4.5	≤8.5

COIL FORMERS

General data 22-pins ETD54 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41613(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 ETD54 coil former; 22-pins.

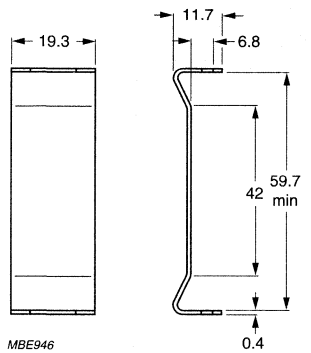
Winding data for 22-pins ETD54 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	316	36.8	96	CPH-ETD54-1S-22P

MOUNTING PARTS

General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Mounting clip	material: stainless steel	3	CLI-ETD54



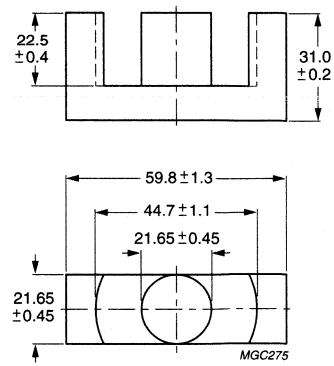
Dimensions in mm.

Fig.3 Mounting clip for ETD54.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.378	mm^{-1}
V_e	effective volume	51500	mm^3
l_e	effective length	139	mm
A_e	effective area	368	mm^2
A_{min}	minimum area	360	mm^2
m	mass of core half	≈130	g



Dimensions in mm.

Fig.1 ETD59 core half.

Core halves

Clamping force 70 ±20 N. Gapped cores are available on request.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C30 des	4900 ±25%	≈1600	≈0	ETD59-3C30
3C85	6000 ±25%	≈1950	≈0	ETD59-3C85
3C90 des	6000 ±25%	≈1950	≈0	ETD59-3C90
3F3 des	5600 ±25%	≈1800	≈0	ETD59-3F3

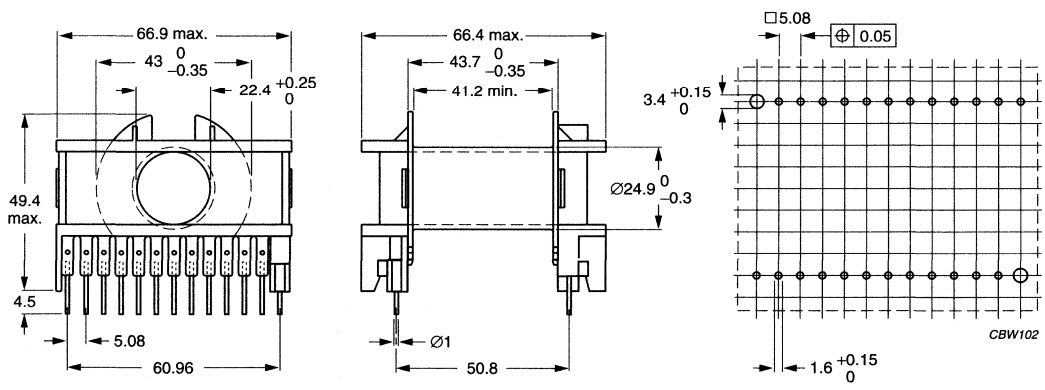
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C30	≥360	≤5.9	≤7.3	–
3C85	≥320	≤7.8	≤10.0	–
3C90	≥330	≤5.9	≤7.3	–
3F3	≥320	–	≤6.7	≤12.8

COIL FORMER

General data 24-pins ETD59 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41613(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 ETD59 coil former; 24-pins.

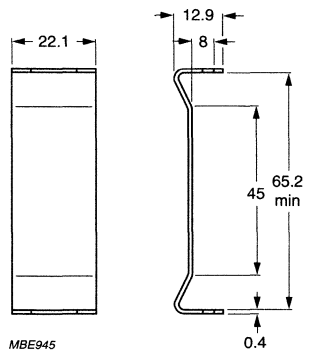
Winding data for 24-pins ETD59 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	366	41.2	106	CPH-ETD59-1S-24P

MOUNTING PARTS

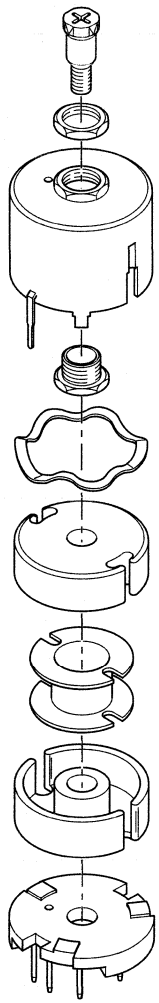
General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Mounting clip	material: stainless steel	3	CLI-ETD59



Dimensions in mm.

Fig.3 Mounting clip for ETD59.



MSB599

For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview Pcores

CORE TYPE	V_e (mm^3)	A_e (mm^2)	MASS (g)
P7/4	70	7.0	0.5
P9/5	126	10.1	0.8
P11/7	251	16.2	1.8
P11/7/I	309	19.0	1.9
P14/8	495	25.1	3.2
P14/18/I	628	29.9	3.5
PT14/8	492	23.3	2.8
PTS14/8	495	22.0	2.5
P18/11	1120	43.3	6.0
P18/11/I	1270	47.5	7
PT18/11	1110	40.6	6
PTS18/11	1070	37.2	5
P22/13	2000	63.4	12
P22/13/I	2460	73.4	13
PT23/11	1740	61.0	10.5
PTS23/11	1810	57.2	9
PT23/18	2590	62.2	14
PTS23/18	2630	58.3	13
P26/16	3530	93.9	20
P26/16/I	4370	110	21
P30/19	6190	137	34
PT30/19	5700	132	31
PTS30/19	5570	111	30
P36/22	10700	202	54
P42/29	18200	265	104
P66/56	88300	717	550

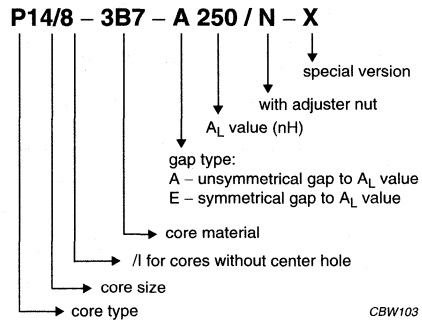


Fig.1 Type number structure for cores.

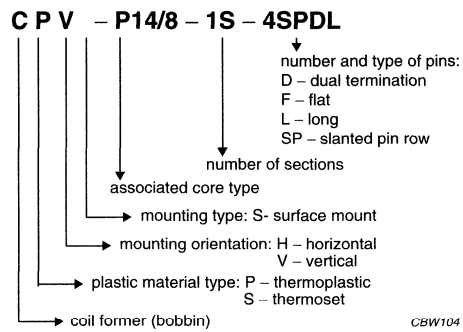


Fig.2 Type number structure for coil formers.

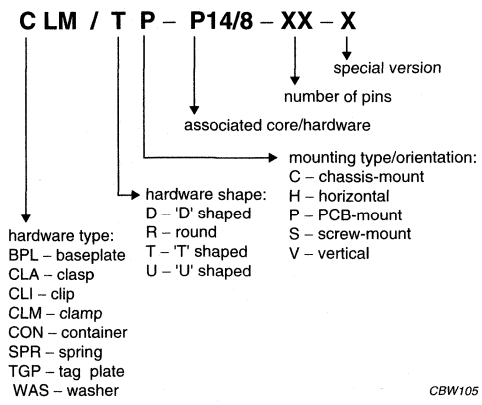
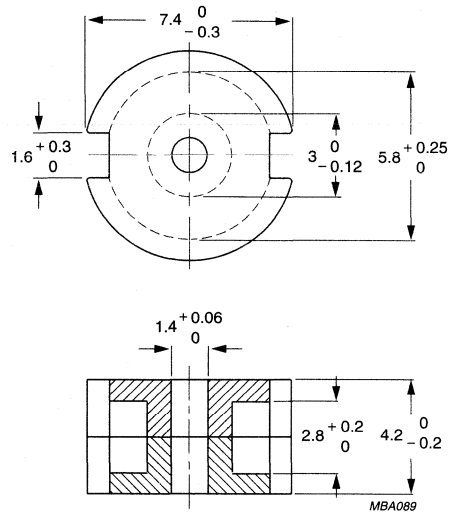


Fig.3 Type number structure for hardware.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.43	mm^{-1}
V_e	effective volume	70.0	mm^3
l_e	effective length	10.0	mm
A_e	effective area	7.0	mm^2
A_{min}	minimum area	5.18	mm^2
m	mass of set	≈0.5	g



Dimensions in mm.

Fig.1 P7/4 core set.

Core sets for filter applications

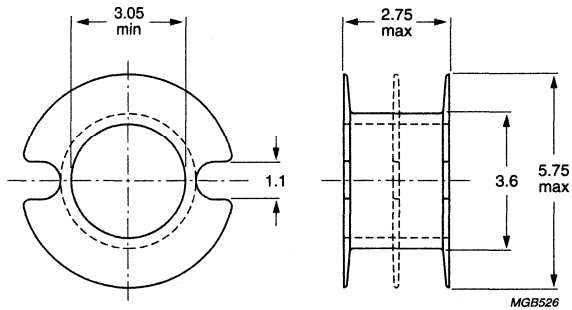
Clamping force 20 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3D3 sup	480 ±25%	≈550	≈0	–	P7/4-3D3
3E5	≥3000	≥3414	≈0	–	P7/4-3E5
3H1 sup	970 ±25%	≈1100	≈0	–	P7/4-3H1
3B7 sup	1150 ±25%	≈1300	≈0	–	P7/4-3B7

COIL FORMERS

General data for coil former CP-P7/4-1S

PARAMETER	SPECIFICATION
Coil former material	polycarbonate (PC), glass reinforced, flame retardant in accordance with *"UL 94V-1"*; UL file number E41613(M)
Maximum operating temperature	130 °C, *"IEC 85"* class B



Dimensions in mm.

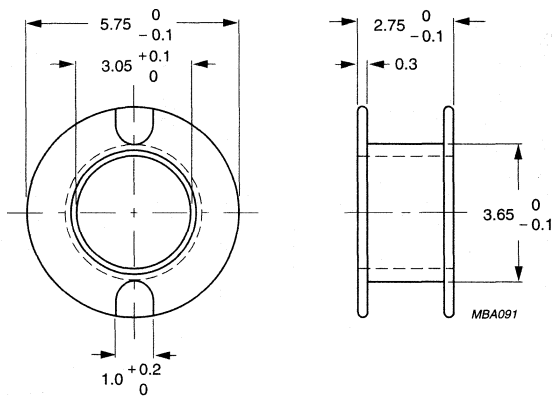
Fig.2 Coil former: CP-P7/4-1S.

Winding data for coil former CP-P7/4-1S-E

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	2.15	1.95	14.6	CP-P7/4-1S

General data for coil former CP-P7/4-1S-A

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41938(M)
Maximum operating temperature	130 °C, *"IEC 85"* class B



Dimensions in mm.

Fig.3 Coil former: CP-P7/4-1S-A.

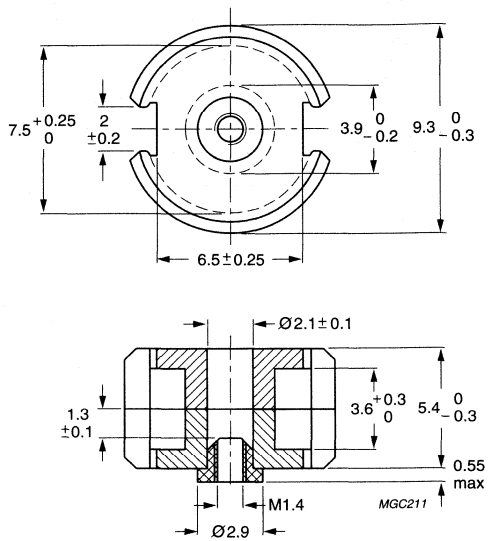
Winding data for CP-P7/4-1S-A coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	1.94	2.1	14.4	CP-P7/4-1S-A

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.24	mm^{-1}
V_e	effective volume	126	mm^3
l_e	effective length	12.5	mm
A_e	effective area	10.1	mm^2
A_{min}	minimum area	8.0	mm^2
m	mass of set	≈0.8	g



Dimensions in mm.

Fig.1 P9/5 core set.

Core sets for filter applications

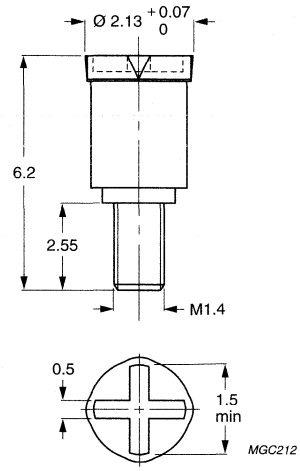
Clamping force 25 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
4C6 sup	16 ±3%	≈16	≈1100	P9/5-4C6-E16/N	P9/5-4C6-E16
	25 ±3%	≈25	≈500	P9/5-4C6-E25/N	P9/5-4C6-E25
	40 ±3%	≈40	≈300	P9/5-4C6-E40/N	P9/5-4C6-E40
	100 ±25%	≈100	≈0	–	P9/5-4C6
3D3 sup	40 ±3%	≈40	≈400	P9/5-3D3-E40/N	P9/5-3D3-E40
	63 ±3%	≈63	≈200	P9/5-3D3-E63/N	P9/5-3D3-E63
	630 ±25%	≈630	≈0	–	P9/5-3D3
3E5	≥4220	≥4166	≈0	–	P9/5-3E5
3H1 sup	63 ±3%	≈63	≈200	P9/5-3H1-A63/N	P9/5-3H1-A63
	100 ±3%	≈100	≈120	P9/5-3H1-A100/N	P9/5-3H1-A100
	160 ±3%	≈160	≈70	P9/5-3H1-A160/N	P9/5-3H1-A160
	250 ±10%	≈250	≈40	P9/5-3H1-A250/N	P9/5-3H1-A250
	1260 ±25%	≈1260	≈0	–	P9/5-3H1
3B7 sup	63 ±3%	≈63	≈200	P9/5-3B7-A63/N	P9/5-3B7-A63
	100 ±3%	≈100	≈120	P9/5-3B7-A100/N	P9/5-3B7-A100
	160 ±3%	≈160	≈70	P9/5-3B7-A160/N	P9/5-3B7-A160
	1230 ±25%	≈1230	≈0	–	P9/5-3B7

INDUCTANCE ADJUSTERS

General data

ITEM	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 P9/5 inductance adjuster.

Inductance adjuster selection chart sup (applies to all types)

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	$\Delta L/L$(1)	TYPES FOR MEDIUM ADJUSTMENT	$\Delta L/L$(1)	TYPES FOR HIGH ADJUSTMENT	$\Delta L/L$(1)
3H1; 3B7	63	–	–	ADJ-P9/P11-YELLOW	18	ADJ-P9/P11-BROWN	31
	100	–	–	ADJ-P9/P11-YELLOW	11	ADJ-P9/P11-BROWN	21
	160	ADJ-P9/P11-YELLOW	8	ADJ-P9/P11-BROWN	14	ADJ-P9/P11-GREY	21
	250	ADJ-P9/P11-YELLOW	4	ADJ-P9/P11-GREY	10	–	–
4C6	16	–	–	–	–	ADJ-P9/P11-YELLOW	26
	25	–	–	–	–	ADJ-P9/P11-YELLOW	26
	40	–	–	ADJ-P9/P11-YELLOW	11	–	–

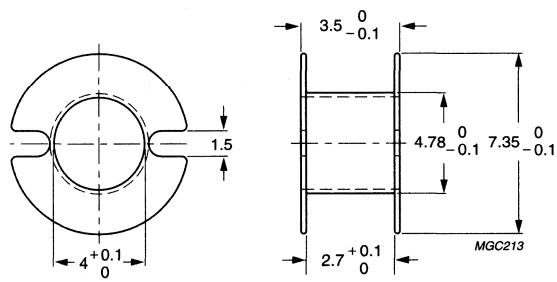
Note

1. Maximum adjustment range.

COIL FORMERS

General data for coil former CP-P9/5-1S

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329 (R)
Maximum operating temperature	155 °C, *"IEC 85"* class F



Dimensions in mm.

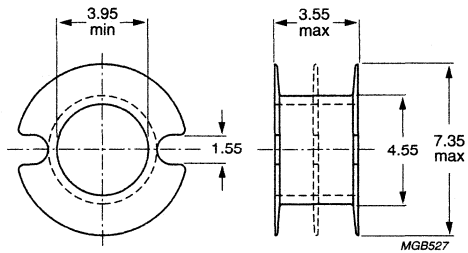
Fig.3 Coil former: CP-P9/5-1S.

Winding data for coil former CP-P9/5-1S

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	3.1	2.5	18.9	CP-P9/5-1S

General data for coil former CP-P9/5-1S-A

PARAMETER	SPECIFICATION
Coil former material	acetal (POM), glass reinforced, flame retardant in accordance with *"UL 94-HB"*; UL file number E66288(R)
Maximum operating temperature	105 °C



Dimensions in mm.

Fig.4 Coil former: CP-P9/5-1S-A.

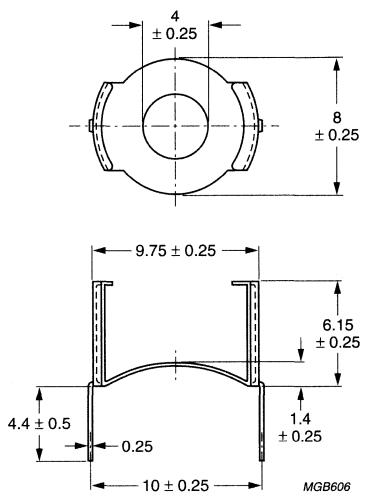
Winding data for CP-P9/5-1S-A coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	3.42	2.8	18.4	CP-P9/5-1S-A

MOUNTING PARTS

General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Clamp	spring steel, tin plated	5	CLM/TP-P9/5



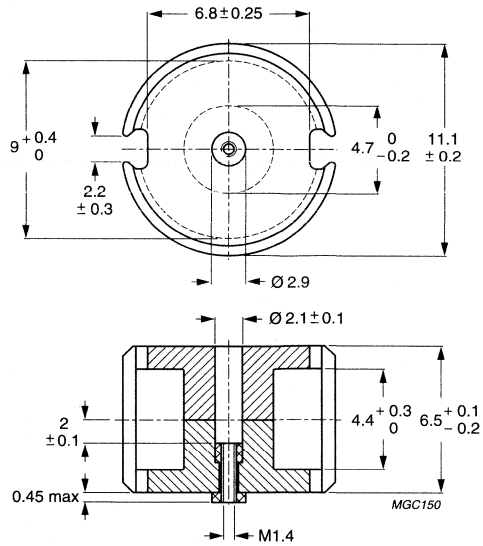
Dimensions in mm.

Fig.5 Clamp: CLM/TP-P9/5.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.956	mm^{-1}
V_e	effective volume	251	mm^3
l_e	effective length	15.5	mm
A_e	effective area	16.2	mm^2
A_{min}	minimum area	13.3	mm^2
m	mass of set	≈1.8	g



Dimensions in mm.

Fig.1 P11/7 core set.

Core sets for filter applications

Clamping force 35 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
4C6 sup	25 ±3%	≈19	≈1000	P11/7-4C6-E25/N	P11/7-4C6-E25
	40 ±3%	≈31	≈400	P11/7-4C6-E40/N	P11/7-4C6-E40
	120 ±25%	≈100	≈0	–	P11/7-4C6
3D3 sup	16 ±3%	≈12	≈1500	P11/7-3D3-E16/N	P11/7-3D3-E16
	25 ±3%	≈19	≈900	P11/7-3D3-E25/N	P11/7-3D3-E25
	40 ±3%	≈31	≈600	P11/7-3D3-E40/N	P11/7-3D3-E40
	63 ±3%	≈48	≈350	P11/7-3D3-E63/N	P11/7-3D3-E63
	100 ±3%	≈76	≈200	P11/7-3D3-A100/N	P11/7-3D3-A100
	800 ±25%	≈610	≈0	–	P11/7-3D3
3H3 sup	160 ±3%	≈122	≈110	P11/7-3H3-A160/N	P11/7-3H3-A160
	250 ±3%	≈190	≈70	P11/7-3H3-A250/N	P11/7-3H3-A250
	1650 ±25%	≈1250	≈0	–	P11/7-3H3
3H1 sup	100 ±3%	≈76	≈200	P11/7-3H1-A100/N	P11/7-3H1-A100
	160 ±3%	≈122	≈110	P11/7-3H1-A160/N	P11/7-3H1-A160
	250 ±3%	≈190	≈70	P11/7-3H1-A250/N	P11/7-3H1-A250
	1800 ±25%	≈1370	≈0	–	P11/7-3H1

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3B7 sup	100 ±3%	≈76	≈200	P11/7-3B7-A100/N	P11/7-3B7-A100
	160 ±3%	≈122	≈110	P11/7-3B7-A160/N	P11/7-3B7-A160
	250 ±3%	≈184	≈70	P11/7-3B7-A250/N	P11/7-3B7-A250
	1800 ±25%	≈1370	≈0	–	P11/7-3B7

Core sets for general purpose transformers and power applications

Clamping force 35 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	100 ±3%	≈76	≈200	P11/7-3B8-A100
	160 ±3%	≈122	≈110	P11/7-3B8-A160
	250 ±3%	≈190	≈70	P11/7-3B8-A250
	1800 ±25%	≈1370	≈0	P11/7-3B8
3C81	100 ±3%	≈76	≈200	P11/7-3C81-A100
	160 ±3%	≈122	≈110	P11/7-3C81-A160
	250 ±3%	≈190	≈70	P11/7-3C81-A250
	2020 ±25%	≈1540	≈0	P11/7-3C81
3F3 sup	100 ±3%	≈76	≈200	P11/7-3F3-A100
	160 ±3%	≈122	≈110	P11/7-3F3-A160
	250 ±5%	≈190	≈70	P11/7-3F3-A250
	1500 ±25%	≈1150	≈0	P11/7-3F3

Core sets of high permeability grades

Clamping force 35 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E4 sup	4100 +40/–30%	≈3100	≈0	P11/7-3E4
3E5	≥5750	≥4820	≈0	P11/7-3E5

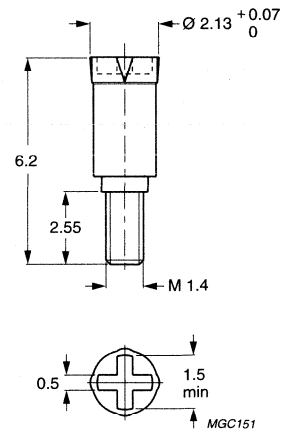
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3B8	≥315	≤0.07	–	–
3C81	≥315	≤0.05	–	–
3F3	≥315	–	≤0.03	≤0.05

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 P11/7 inductance adjuster.

Inductance adjuster selection chart sup (applies to all types)

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	$\Delta L/L^{(1)}$	TYPES FOR MEDIUM ADJUSTMENT	$\Delta L/L^{(1)}$	TYPES FOR HIGH ADJUSTMENT	$\Delta L/L^{(1)}$
3H1; 3H3; 3B7	100	–	–	ADJ-P9/P11-YELLOW	13	ADJ-P9/P11-BROWN	24
	160	ADJ-P9/P11-YELLOW	8	ADJ-P9/P11-BROWN	15	ADJ-P9/P11-GREY	22
	250	ADJ-P9/P11-BROWN	9	ADJ-P9/P11-GREY	14	–	–
3D3	16	–	–	ADJ-P9/P11-YELLOW	19	–	–
	25	–	–	–	–	ADJ-P9/P11-YELLOW	30
	40	–	–	–	–	ADJ-P9/P11-YELLOW	24
	63	–	–	ADJ-P9/P11-YELLOW	18	–	–
	100	–	–	ADJ-P9/P11-YELLOW	11	–	–
4C6	16	–	–	–	–	ADJ-P9/P11-YELLOW	19
	25	–	–	–	–	ADJ-P9/P11-YELLOW	24
	40	–	–	ADJ-P9/P11-YELLOW	16	–	–

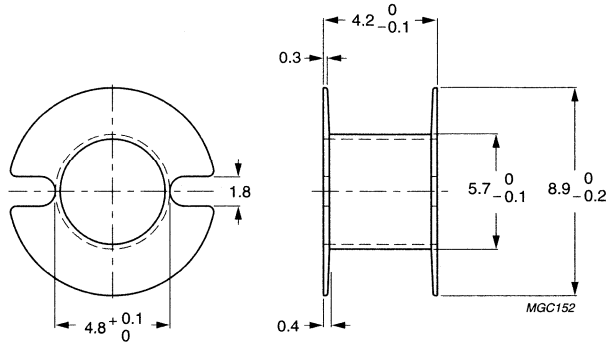
Note

1. Maximum adjustment range.

COIL FORMERS

General data CP-P11/7-1S coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329 (R)
Maximum operating temperature	155 °C, *"IEC 85"* class F



Dimensions in mm.

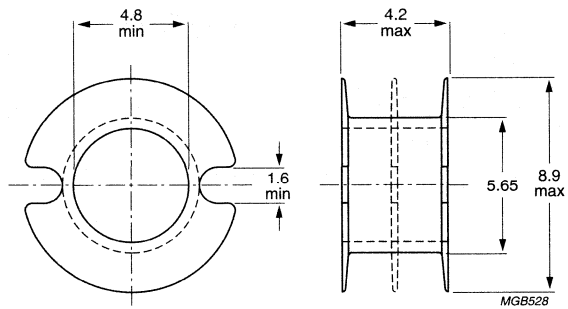
Fig.3 Coil former: CP-P11/7-1S.

Winding data for CP-P11/7-1S coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	4.8	3.1	22.6	CP-P11/7-1S

General data for CP-P11/7-A coil former

PARAMETER	SPECIFICATION
Coil former material	acetal (POM), glass reinforced, flame retardant in accordance with *"UL 94-HB"*; UL file number E66288(R)
Maximum operating temperature	105 °C



Dimensions in mm.

Fig.4 Coil former: CP-P11/7-A.

Winding data for CP-P11/7-A coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	4.77	3.43	22.7	CP-P11/7-1S-A
2	2 × 2.00	2 × 1.52	22.7	CP-P11/7-2S-A
3	3 × 1.16	3 × 0.91	22.7	CP-P11/7-3S-A(1)

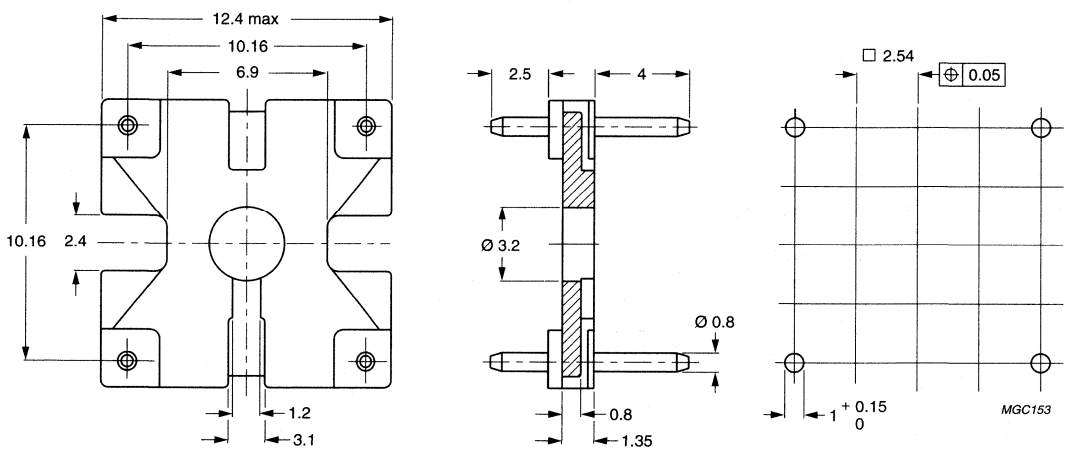
Note

1. UL file number E93370(M).

MOUNTING PARTS

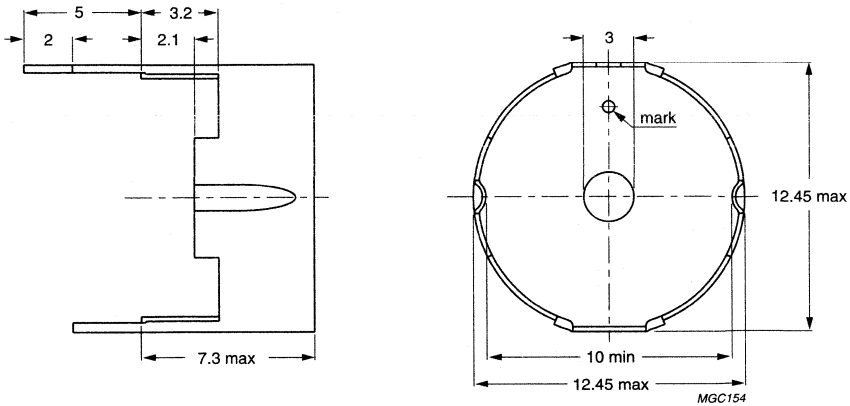
General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Tag plate	material: phenolformaldehyde (PF), glass reinforced	5	TGP-P11/7-4P
	flame retardant: in accordance with *"UL 94V-0"*; file number E63312(M)		
	maximum operating temperature: 180 °C, *"IEC 85"* class H		
	pins: copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated		
	resistance to soldering heat in accordance with *"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s		
	solderability in accordance with *"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s		
Container	copper-zinc alloy (CuZn), nickel-plated	6	CON-P11/7
	earth pins: presoldered		
Spring	CrNi-steel	7	SPR-P11/7
	spring force: ≈35 N when mounted		
Clamp	spring steel, tin-plated	8	CLM/TP-P11/7



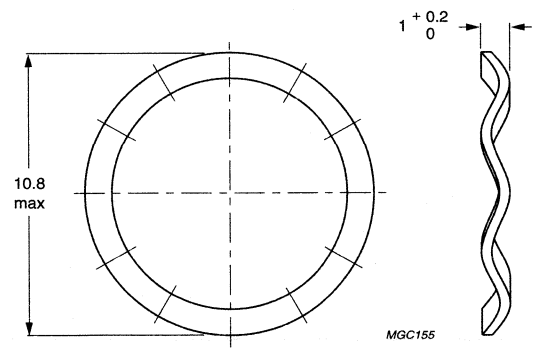
Dimensions in mm.

Fig.5 P11/7 tag plate.



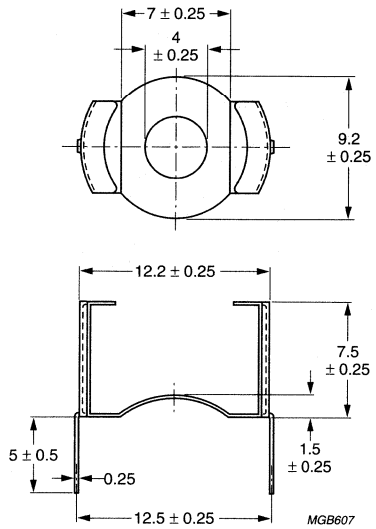
Dimensions in mm.

Fig.6 Container: CON-P11/7.



Dimensions in mm.

Fig.7 Spring: SPR-P11/7.



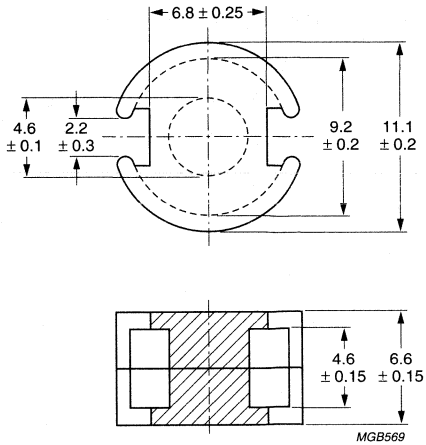
Dimensions in mm.

Fig.8 Clamp: CLM/TP-P11/7.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.860	mm^{-1}
V_e	effective volume	309	mm^3
l_e	effective length	16.3	mm
A_e	effective area	19.0	mm^2
A_{min}	minimum area	13.9	mm^2
m	mass of set	≈1.9	g



Dimensions in mm.

Fig.1 P11/7/I core set.

Core sets for general purpose transformers and power applications

Clamping force 10 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	63 ±3%	≈43	≈475	P11/7/I-3C81-A63
	100 ±3%	≈68	≈277	P11/7/I-3C81-A100
	160 ±3%	≈109	≈160	P11/7/I-3C81-A160
	250 ±5%	≈170	≈97	P11/7/I-3C81-A250
	315 ±5%	≈215	≈74	P11/7/I-3C81-A315
	2100 ±25%	≈1440	≈0	P11/7/I-3C81
3C85	63 ±3%	≈43	≈475	P11/7/I-3C85-A63
	100 ±3%	≈68	≈277	P11/7/I-3C85-A100
	160 ±3%	≈109	≈160	P11/7/I-3C85-A160
	250 ±5%	≈170	≈97	P11/7/I-3C85-A250
	315 ±5%	≈215	≈74	P11/7/I-3C85-A315
	1750 ±25%	≈1200	≈0	P11/7/I-3C85
3F3	63 ±3%	≈43	≈475	P11/7/I-3F3-A63
	100 ±3%	≈68	≈277	P11/7/I-3F3-A100
	160 ±3%	≈109	≈160	P11/7/I-3F3-A160
	250 ±5%	≈170	≈97	P11/7/I-3F3-A250
	315 ±5%	≈215	≈74	P11/7/I-3F3-A315
	1750 ±25%	≈1211	≈0	P11/7/I-3F3

Properties of core sets under power conditions

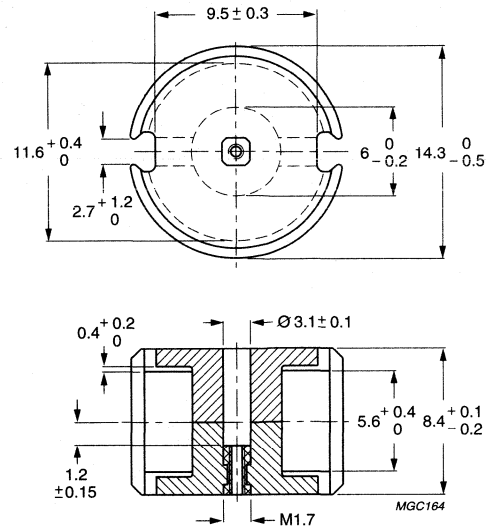
For coil former and winding data, see data sheet, *"P11/7"*.

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	**f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C**	**f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C**	**f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C**
3C81	≥320	≤0.06	–	–
3C85	≥320	≤0.05	≤0.06	–
3F3	≥320	–	≤0.04	≤0.06

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.789	mm^{-1}
V_e	effective volume	495	mm^3
l_e	effective length	19.8	mm
A_e	effective area	25.1	mm^2
A_{min}	minimum area	19.8	mm^2
m	mass of set	≈3.2	g



Dimensions in mm.

Fig.1 P14/8 core set.

Core sets for filter applications

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
4C6 sup	25 ±3%	≈16	≈1700	P14/8-4C6-E25/N	P14/8-4C6-E25
	40 ±3%	≈25	≈800	P14/8-4C6-E40/N	P14/8-4C6-E40
	63 ±3%	≈40	≈350	P14/8-4C6-E63/N	P14/8-4C6-E63
	160 ±25%	≈100	≈0	–	P14/8-4C6
3D3	40 ±3%	≈25	≈900	P14/8-3D3-E40/N	P14/8-3D3-E40
	63 ±3%	≈40	≈550	P14/8-3D3-E63/N	P14/8-3D3-E63
	100 ±3%	≈63	≈300	P14/8-3D3-E100/N	P14/8-3D3-E100
	1000 ±25%	≈630	≈0	–	P14/8-3D3
3H3 sup	160 ±3%	≈100	≈180	P14/8-3H3-A160/N	P14/8-3H3-A160
	250 ±3%	≈157	≈110	P14/8-3H3-A250/N	P14/8-3H3-A250
	315 ±3%	≈198	≈80	P14/8-3H3-A315/N	P14/8-3H3-A315
	400 ±3%	≈252	≈60	P14/8-3H3-A400/N	P14/8-3H3-A400
	2150 ±25%	≈1350	≈0	–	P14/8-3H3

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3H1 sup	160 ±3%	≈100	≈180	P14/8-3H1-A160/N	P14/8-3H1-A160
	250 ±3%	≈157	≈110	P14/8-3H1-A250/N	P14/8-3H1-A250
	315 ±3%	≈198	≈80	P14/8-3H1-A315/N	P14/8-3H1-A315
	400 ±3%	≈252	≈60	P14/8-3H1-A400/N	P14/8-3H1-A400
	630 ±5%	≈395	≈40	P14/8-3H1-A630/N	P14/8-3H1-A630
	2350 ±25%	≈1480	≈0	–	P14/8-3H1
3B7 sup	63 ±3%	≈40	≈650	P14/8-3B7-E63/N	P14/8-3B7-E63
	100 ±3%	≈63	≈380	P14/8-3B7-E100/N	P14/8-3B7-E100
	160 ±3%	≈100	≈180	P14/8-3B7-A160/N	P14/8-3B7-A160
	250 ±3%	≈156	≈110	P14/8-3B7-A250/N	P14/8-3B7-A250
	315 ±3%	≈198	≈80	P14/8-3B7-A315/N	P14/8-3B7-A315
	2240 ±25%	≈1410	≈0	–	P14/8-3B7

Core sets for general purpose transformers and power applications

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	160 ±3%	≈100	≈180	P14/8-3B8-A160
	250 ±3%	≈157	≈110	P14/8-3B8-A250
	315 ±3%	≈198	≈80	P14/8-3B8-A315
	400 ±3%	≈252	≈60	P14/8-3B8-A400
	630 ±5%	≈395	≈40	P14/8-3B8-A630
	2350 ±25%	≈1480	≈0	P14/8-3B8
3C81	63 ±3%	≈40	≈650	P14/8-3C81-E63
	100 ±3%	≈63	≈380	P14/8-3C81-A100
	160 ±3%	≈100	≈180	P14/8-3C81-A160
	250 ±3%	≈157	≈110	P14/8-3C81-A250
	315 ±3%	≈198	≈80	P14/8-3C81-A315
	2800 ±25%	≈1760	≈0	P14/8-3C81
3C85 sup	63 ±3%	≈40	≈650	P14/8-3C85-E63
	100 ±3%	≈63	≈380	P14/8-3C85-A100
	160 ±3%	≈100	≈180	P14/8-3C85-A160
	250 ±3%	≈157	≈110	P14/8-3C85-A250
	315 ±3%	≈198	≈80	P14/8-3C85-A315
	2150 ±25%	≈1350	≈0	P14/8-3C85

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3 sup	63 ±3%	≈40	≈650	P14/8-3F3-E63
	100 ±3%	≈63	≈380	P14/8-3F3-A100
	160 ±3%	≈100	≈180	P14/8-3F3-A160
	250 ±3%	≈157	≈110	P14/8-3F3-A250
	315 ±3%	≈198	≈80	P14/8-3F3-A315
	2000 ±25%	≈1250	≈0	P14/8-3F3
3F4 sup	160 ±3%	≈100	≈170	P14/8-3F4-A160
	250 ±3%	≈157	≈100	P14/8-3F4-A250
	315 ±3%	≈198	≈70	P14/8-3F4-A315
	1200 ±25%	≈760	≈0	P14/8-3F4

Core sets of high permeability grades

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3E1 sup	3700 ±25%	≈2350	P14/8-3E1
3E4 sup	5300 +40/–30%	≈3300	P14/8-3E4
3E25 sup	5750 ±25%	≈3610	P14/8-3E25
3E27	5750 ±25%	≈3610	P14/8-3E27
3E5	≥6300	≥3950	P14/8-3E5

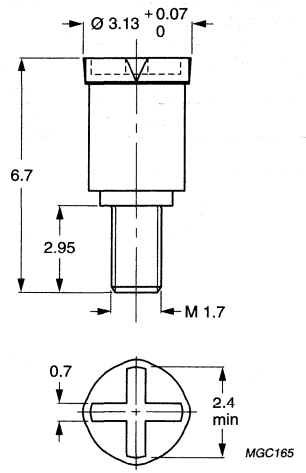
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3B8	≥315	≤0.15	–	–	–	–
3C81	≥315	≤0.10	–	–	–	–
3C85	≥315	≤0.08	≤0.10	–	–	–
3F3	≥315	–	≤0.06	≤0.10	–	–
3F4	≥250	–	–	–	≤0.099	≤0.16

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 P14/8 inductance adjuster.

Inductance adjuster selection chart (sup) (applies to all types)

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	$\Delta L/L^{(1)}$	TYPES FOR MEDIUM ADJUSTMENT	$\Delta L/L^{(1)}$	TYPES FOR HIGH ADJUSTMENT	$\Delta L/L^{(1)}$
3H1; 3H3; 3B7	100	–	–	ADJ-P14-ORANGE	14	–	–
	160	–	–	ADJ-P14-WHITE	17	ADJ-P14-BROWN	24
	250	ADJ-P14-WHITE	10	ADJ-P14-BROWN	15	–	–
	315	ADJ-P14-WHITE	8	–	–	ADJ-P14-GREY	19
	400	ADJ-P14-BROWN	9	–	–	–	–
	630	ADJ-P14-BROWN	4	–	–	–	–
3D3	40	–	–	–	–	ADJ-P14-ORANGE	24
	63	–	–	–	–	ADJ-P14-ORANGE	20
	100	ADJ-P14-ORANGE	11	–	–	–	–
4C6	25	–	–	–	–	ADJ-P14-ORANGE	20
	40	–	–	ADJ-P14-ORANGE	18	–	–
	63	ADJ-P14-ORANGE	10	–	–	–	–

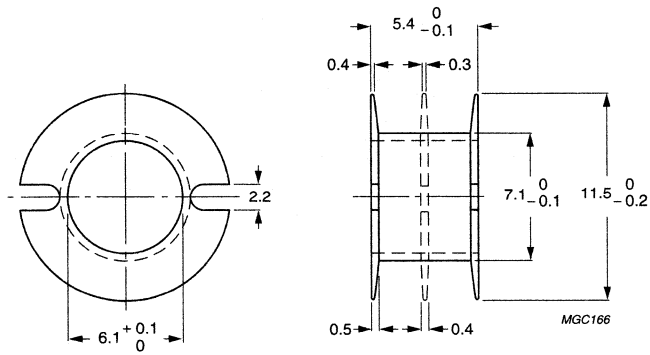
Note

1. Maximum adjustment range.

COIL FORMERS

General data for CP-P14/8 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329 (R)
Maximum operating temperature	155 °C, *"IEC 85"* class F



Dimensions in mm.

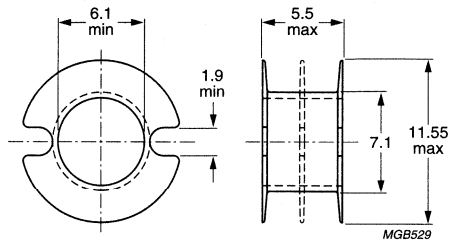
Fig.3 Coil former CP-P14/8.

Winding data for CP-P14/8 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	8.8	4.1	28.9	CP-P14/8-1S
2	2 × 4.0	2 × 1.85	28.9	CP-P14/8-2S

General data for CP-P14/8-A coil former

PARAMETER	SPECIFICATION
Coil former material	acetal (POM), glass reinforced, flame retardant in accordance with *"UL 94-HB"*; UL file number E66288(R)
Maximum operating temperature	105 °C



Dimensions in mm.

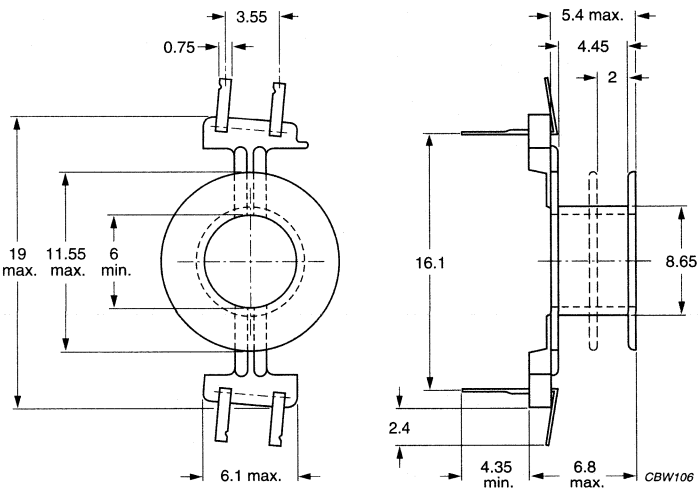
Fig.4 Coil former CP-P14/8-A.

Winding data for CP-P14/8-A coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	8.65	4.5	29.3	CP-P14/8-1S-A
2	2 × 3.81	2 × 2.2	29.3	CP-P14/8-2S-A
3	3 × 2.19	3 × 1.2	29.3	CP-P14/8-3S-A

General data 4-pins P14/8 coil former for PCB mounting

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41938 (M)
Maximum operating temperature	130 °C
Pin material	copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

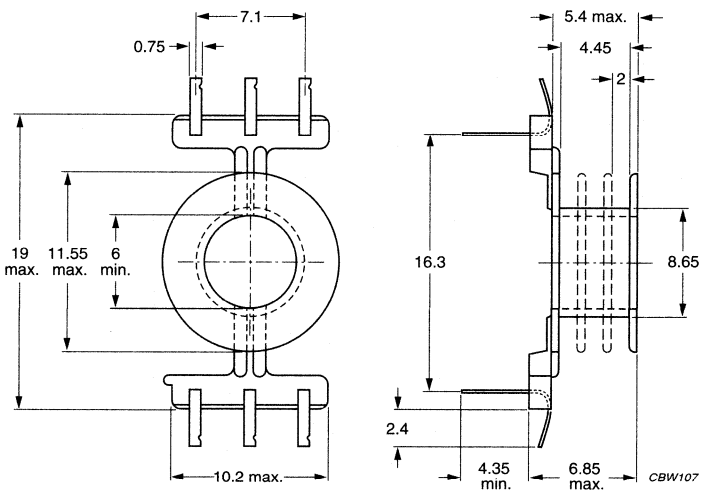
Fig.5 P14/8 coil former for PCB mounting; 4-pins.

Data for 4-pins P14/8 coil former for PCB mounting

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	LENGTH OF PINS (mm)	TYPE NUMBER
1	8.65	4.4	29.0	4.4	CPV-P14/8-1S-4SPD
1	8.65	4.4	29.0	6.8	CPV-P14/8-1S-4SPDL
2	2×3.87	2×2.0	29.0	4.4	CPV-P14/8-2S-4SPD
2	2×3.87	2×2.0	29.0	6.8	CPV-P14/8-2S-4SPDL

General data 6-pins P14/8 coil former for PCB mounting

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41938(M)
Maximum operating temperature	130 °C
Pin material	copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.6 P14/8 coil former for PCB mounting; 6-pins.

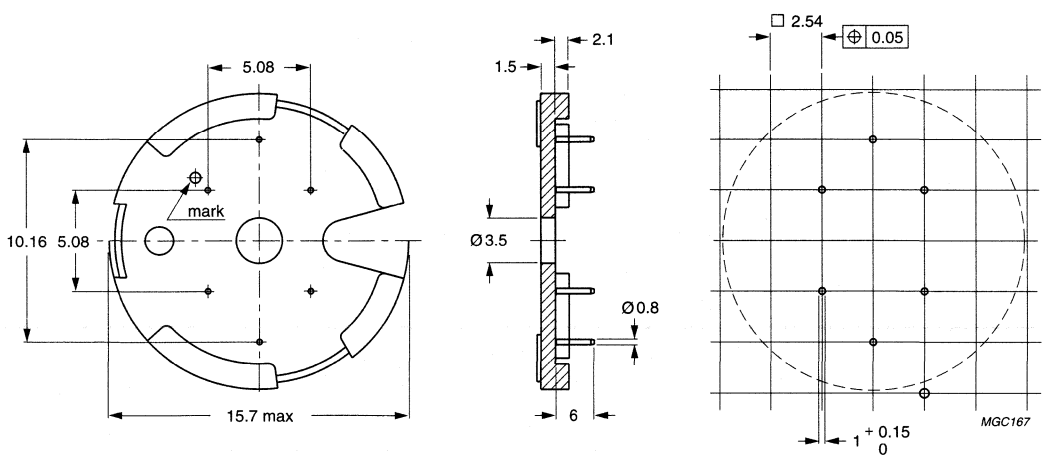
Data for 6-pins P14/8 coil former for PCB mounting

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	LENGTH OF PINS (mm)	TYPE NUMBER
1	8.65	4.4	29.0	4.4	CPV-P14/8-1S-6PD
1	8.65	4.4	29.0	6.8	CPV-P14/8-1S-6PDL
2	2 × 3.87	2 × 2.0	29.0	4.4	CPV-P14/8-2S-6PD
2	2 × 3.87	2 × 2.0	29.0	6.8	CPV-P14/8-2S-6PDL

MOUNTING PARTS

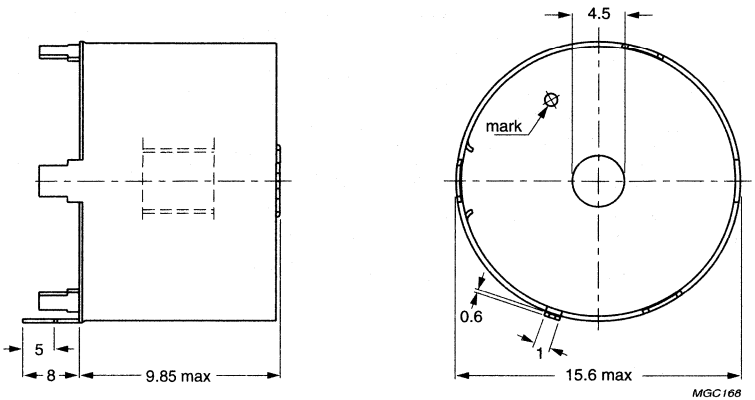
General data for mounting parts

ITEM	REMARKS	FIGURE	TYPE NUMBER
Tag plate	material: phenolformaldehyde (PF), glass reinforced	7	TGP-P14/8-6P
	flame retardant: in accordance with *"UL 94V-0"*; UL file number E63312 (M)		
	maximum operating temperature: 180 °C, *"IEC 85"* class H		
	pins: copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated		
	resistance to soldering heat in accordance with *"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s		
	solderability in accordance with *"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s		
Container	copper-zinc alloy (CuZn), nickel-plated	8	CON-P14/8
	earth pins: presoldered		
Spring	CrNi-steel	9	SPR-P14/8
	spring force: ≈60 N when mounted		
Clamp	spring steel, tin-plated	10	CLM/TP-P14/8
Washer	phenolformaldehyde (PF)	11	WAS-CLM/TP-P14/8



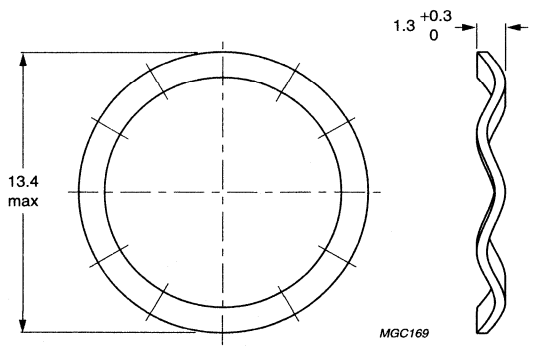
Dimensions in mm.

Fig.7 Tag plate: TGP-P14/8.



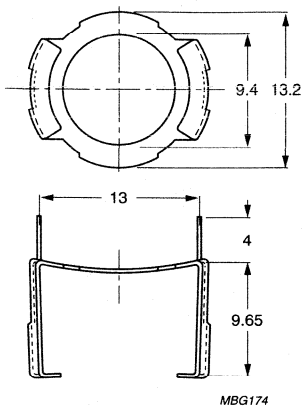
Dimensions in mm.

Fig.8 Container: CON-P14/8.



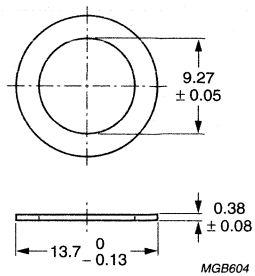
Dimensions in mm.

Fig.9 Spring: SPR-P14/8.



Dimensions in mm.

Fig.10 Clamp: CLM/TP-P14/8.



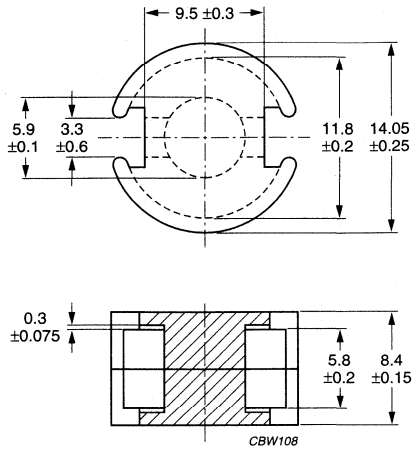
Dimensions in mm.

Fig.11 Washer: WAS-CLM/TP-P14/8.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.700	mm^{-1}
V_e	effective volume	628	mm^3
l_e	effective length	21.0	mm
A_e	effective area	29.9	mm^2
A_{min}	minimum area	21.3	mm^2
m	mass of set	≈3.5	g



Dimensions in mm.

Fig.1 P14/8/I core set.

Core sets for general purpose transformers and power applications

Clamping force 15 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	100 ±3%	≈56	≈455	P14/8/I-3C81-A100
	160 ±3%	≈89	≈264	P14/8/I-3C81-A160
	250 ±3%	≈139	≈157	P14/8/I-3C81-A250
	315 ±5%	≈175	≈119	P14/8/I-3C81-A315
	400 ±5%	≈223	≈92	P14/8/I-3C81-A400
	2900 ±25%	≈1610	≈0	P14/8/I-3C81
3C85	100 ±3%	≈56	≈455	P14/8/I-3C85-A100
	160 ±3%	≈89	≈264	P14/8/I-3C85-A160
	250 ±3%	≈139	≈157	P14/8/I-3C85-A250
	315 ±5%	≈175	≈119	P14/8/I-3C85-A315
	400 ±5%	≈223	≈92	P14/8/I-3C85-A400
	2400 ±25%	≈1330	≈0	P14/8/I-3C85
3F3	100 ±3%	≈56	≈455	P14/8/I-3F3-A100
	160 ±3%	≈89	≈264	P14/8/I-3F3-A160
	250 ±3%	≈139	≈157	P14/8/I-3F3-A250
	315 ±5%	≈175	≈119	P14/8/I-3F3-A315
	400 ±5%	≈223	≈92	P14/8/I-3F3-A400
	2400 ±25%	≈1330	≈0	P14/8/I-3F3

Properties of core sets under power conditions

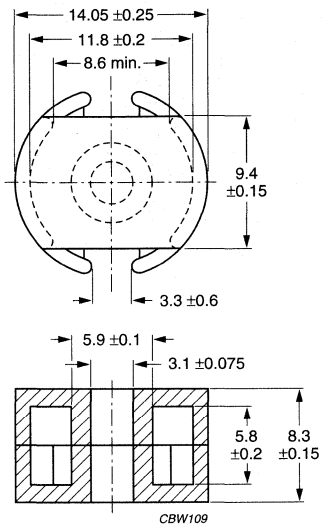
For coil former and winding data, see data sheet, *"P14/8"*.

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.13	–	–
3C85	≥320	≤0.10	≤0.12	–
3F3	≥320	–	≤0.07	≤0.12

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.910	mm^{-1}
V_e	effective volume	492	mm^3
l_e	effective length	21.1	mm
A_e	effective area	23.3	mm^2
A_{min}	minimum area	19.9	mm^2
m	mass of set	≈2.8	g



Dimensions in mm.

Fig.1 PT14/8 core set.

Core sets for general purpose transformers and power applications

Clamping force 15 ±15 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B7 sup	63 ±3%	≈45	≈594	PT14/8-3B7-E63
	100 ±3%	≈72	≈345	PT14/8-3B7-E100
	160 ±3%	≈115	≈201	PT14/8-3B7-A160
	250 ±3%	≈180	≈119	PT14/8-3B7-A250
	315 ±5%	≈227	≈89	PT14/8-3B7-A315
	2000 ±25%	≈1440	≈0	PT14/8-3B7
3C81	63 ±3%	≈45	≈594	PT14/8-3C81-A63
	100 ±3%	≈72	≈345	PT14/8-3C81-A100
	160 ±3%	≈115	≈201	PT14/8-3C81-A160
	250 ±3%	≈180	≈119	PT14/8-3C81-A250
	315 ±5%	≈227	≈89	PT14/8-3C81-A315
	2400 ±25%	≈1730	≈0	PT14/8-3C81

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85	63 ±3%	≈45	≈594	PT14/8-3C85-A63
	100 ±3%	≈72	≈345	PT14/8-3C85-A100
	160 ±3%	≈115	≈201	PT14/8-3C85-A160
	250 ±3%	≈180	≈119	PT14/8-3C85-A250
	315 ±5%	≈227	≈89	PT14/8-3C85-A315
	1800 ±25%	≈1300	≈0	PT14/8-3C85
3F3	63 ±3%	≈45	≈594	PT14/8-3F3-A63
	100 ±3%	≈72	≈345	PT14/8-3F3-A100
	160 ±3%	≈115	≈201	PT14/8-3F3-A160
	250 ±3%	≈180	≈119	PT14/8-3F3-A250
	315 ±5%	≈227	≈89	PT14/8-3F3-A315
	1650 ±25%	≈1190	≈0	PT14/8-3F3

Core sets of high permeability grades

Clamping force 15 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5	≥5350	≥3874	≈0	PT14/8-3E5
3E27	4500 ±25%	≈3240	≈0	PT14/8-3E27

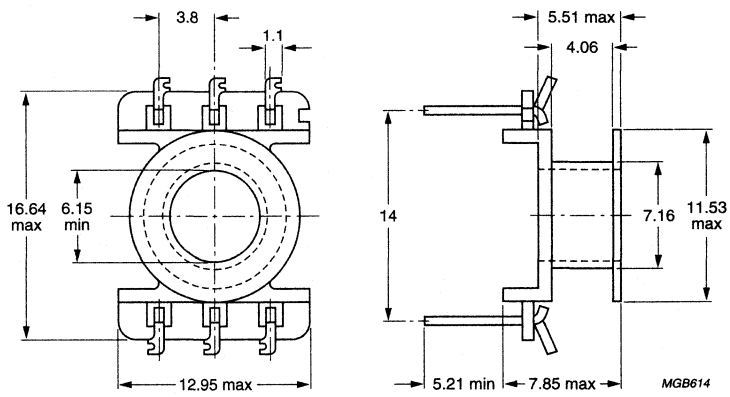
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.10	–	–
3C85	≥320	≤0.08	≤0.09	–
3F3	≥320	–	≤0.06	≤0.10

COIL FORMERS

General data 6-pins PT14/8 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41938(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 PT14/8 coil former; 6-pins.

Winding data for 6-pins PT14/8 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	7.9	4.1	29.2	CPV-PT14/8-1S-6P

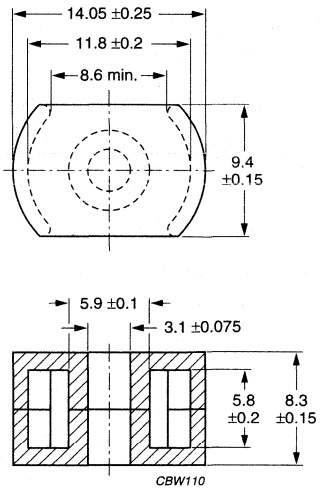
Note

1. For additional coil formers and mounting parts, see data sheet, *"P14/8"*.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.02	mm^{-1}
V_e	effective volume	495	mm^3
l_e	effective length	22.5	mm
A_e	effective area	22.0	mm^2
A_{min}	minimum area	19.9	mm^2
m	mass of set	≈2.5	g



Dimensions in mm.

Fig.1 PTS14/8 core set.

Core sets for general purpose transformers and power applications

Clamping force 15 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B7 sup	63 ±3%	≈51	≈559	PTS14/8-3B7-A63
	100 ±3%	≈81	≈323	PTS14/8-3B7-A100
	160 ±3%	≈130	≈188	PTS14/8-3B7-A160
	250 ±3%	≈204	≈109	PTS14/8-3B7-A250
	315 ±5%	≈257	≈84	PTS14/8-3B7-A315
	1945 ±25%	≈1580	≈0	PTS14/8-3B7
3C81	63 ±3%	≈51	≈559	PTS14/8-3C81-A63
	100 ±3%	≈81	≈323	PTS14/8-3C81-A100
	160 ±3%	≈130	≈188	PTS14/8-3C81-A160
	250 ±3%	≈204	≈109	PTS14/8-3C81-A250
	315 ±5%	≈257	≈84	PTS14/8-3C81-A315
	2330 ±25%	≈1890	≈0	PTS14/8-3C81
3C85	63 ±3%	≈51	≈559	PTS14/8-3C85-A63
	100 ±3%	≈81	≈323	PTS14/8-3C85-A100
	160 ±3%	≈130	≈188	PTS14/8-3C85-A160
	250 ±3%	≈204	≈109	PTS14/8-3C85-A250
	315 ±5%	≈257	≈84	PTS14/8-3C85-A315
	1750 ±25%	≈1420	≈0	PTS14/8-3C85

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3	63 ±3%	≈51	≈323	PTS14/8-3F3-A63
	100 ±3%	≈81	≈188	PTS14/8-3F3-A100
	160 ±3%	≈130	≈109	PTS14/8-3F3-A160
	250 ±3%	≈204	≈0	PTS14/8-3F3-A250
	315 ±5%	≈257	≈84	PTS14/8-3F3-A315
	1625 ±25%	≈1320	≈559	PTS14/8-3F3

Core sets of high permeability grades

Clamping force 15 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5	≥4800	≥3900	≈0	PTS14/8-3E5
3E27	4370 ±25%	≈3540	≈0	PTS14/8-3E25

Properties of core sets under power conditions

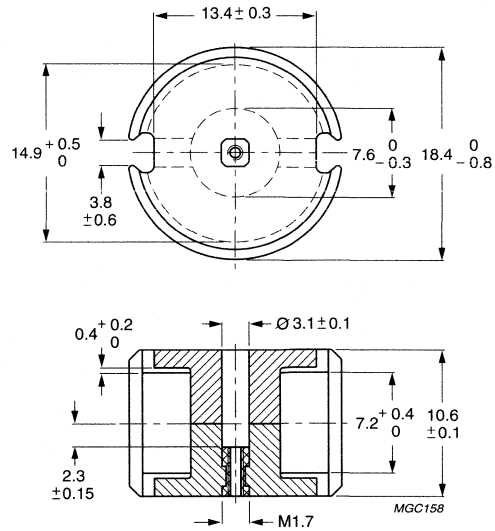
For coil formers and mounting parts, see data sheet, *"PT14/8"*.

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.10	–	–
3C85	≥320	≤0.077	≤0.089	–
3F3	≥320	–	≤0.054	≤0.94

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.597	mm^{-1}
V_e	effective volume	1120	mm^3
l_e	effective length	25.8	mm
A_e	effective area	43.3	mm^2
A_{min}	minimum area	36.1	mm^2
m	mass of set	≈6.0	g



Dimensions in mm.

Fig.1 P18/11 core set.

Core sets for filter applications

Clamping force 80 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
4C6 sup	25 ±3%	≈12	≈3500	P18/11-4C6-E25/N	P18/11-4C6-E25
	40 ±3%	≈19	≈1800	P18/11-4C6-E40/N	P18/11-4C6-E40
	63 ±3%	≈30	≈750	P18/11-4C6-E63/N	P18/11-4C6-E63
	210 ±25%	≈100	≈0	–	P18/11-4C6
3D3 sup	63 ±3%	≈30	≈1100	P18/11-3D3-E63/N	P18/11-3D3-E63
	100 ±3%	≈48	≈550	P18/11-3D3-E100/N	P18/11-3D3-E100
	160 ±3%	≈76	≈300	P18/11-3D3-E160/N	P18/11-3D3-E160
	1400 ±25%	≈670	≈0	–	P18/11-3D3
3H3 sup	160 ±3%	≈76	≈350	P18/11-3H3-E160/N	P18/11-3H3-E160
	250 ±3%	≈119	≈200	P18/11-3H3-A250/N	P18/11-3H3-A250
	315 ±3%	≈149	≈150	P18/11-3H3-A315/N	P18/11-3H3-A315
	400 ±3%	≈190	≈120	P18/11-3H3-A400/N	P18/11-3H3-A400
	630 ±5%	≈300	≈80	P18/11-3H3-A630/N	P18/11-3H3-A630
	3100 ±25%	≈1470	≈0	–	P18/11-3H3

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3H1 sup	160 ±3%	≈76	≈350	P18/11-3H1-E160/N	P18/11-3H1-E160
	250 ±3%	≈119	≈200	P18/11-3H1-A250/N	P18/11-3H1-A250
	315 ±3%	≈149	≈150	P18/11-3H1-A315/N	P18/11-3H1-A315
	400 ±3%	≈190	≈120	P18/11-3H1-A400/N	P18/11-3H1-A400
	630 ±5%	≈300	≈80	P18/11-3H1-A630/N	P18/11-3H1-A630
	3400 ±25%	≈1620	≈0	–	P18/11-3H1
3B7 sup	100 ±3%	≈46	≈680	P18/11-3B7-E100/N	P18/11-3B7-E100
	160 ±3%	≈76	≈350	P18/11-3B7-E160/N	P18/11-3B7-E160
	250 ±3%	≈119	≈200	P18/11-3B7-A250/N	P18/11-3B7-A250
	315 ±3%	≈150	≈150	P18/11-3B7-A315/N	P18/11-3B7-A315
	400 ±3%	≈190	≈120	P18/11-3B7-A400/N	P18/11-3B7-A400
	3680 ±25%	≈1750	≈0	–	P18/11-3B7

Core sets for general purpose transformers and power applications

Clamping force 80 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	160 ±3%	≈76	≈350	P18/11-3B8-A160
	250 ±3%	≈119	≈200	P18/11-3B8-A250
	315 ±3%	≈149	≈150	P18/11-3B8-A315
	400 ±3%	≈190	≈120	P18/11-3B8-A400
	630 ±5%	≈300	≈80	P18/11-3B8-A630
	3400 ±25%	≈1620	≈0	P18/11-3B8
3C81	100 ±3%	≈46	≈680	P18/11-3C81-E100
	160 ±3%	≈76	≈350	P18/11-3C81-A160
	250 ±3%	≈119	≈200	P18/11-3C81-A250
	315 ±3%	≈149	≈150	P18/11-3C81-A315
	400 ±3%	≈190	≈120	P18/11-3C81-A400
	4000 ±25%	≈1900	≈0	P18/11-3C81
3C85 sup	100 ±3%	≈46	≈680	P18/11-3C85-E100
	160 ±3%	≈76	≈350	P18/11-3C85-A160
	250 ±3%	≈119	≈200	P18/11-3C85-A250
	315 ±3%	≈149	≈150	P18/11-3C85-A315
	400 ±3%	≈190	≈120	P18/11-3C85-A400
	3100 ±25%	≈1470	≈0	P18/11-3C85
3F3 sup	100 ±3%	≈46	≈680	P18/11-3F3-E100
	160 ±3%	≈76	≈350	P18/11-3F3-A160
	250 ±3%	≈119	≈200	P18/11-3F3-A250
	315 ±3%	≈149	≈150	P18/11-3F3-A315
	400 ±3%	≈190	≈120	P18/11-3F3-A400
	2850 ±25%	≈1350	≈0	P18/11-3F3

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F4 sup	160 ±3%	≈76	≈340	P18/11-3F4-A160
	250 ±3%	≈119	≈190	P18/11-3F4-A250
	315 ±3%	≈149	≈140	P18/11-3F4-A315
	400 ±3%	≈190	≈110	P18/11-3F4-A400
	1600 ±25%	≈765	≈0	P18/11-3F4

Core sets of high permeability grades

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3E1 sup	5400 ±25%	≈2560	P18/11-3E1
3E25 sup	7500 ±25%	≈3560	P18/11-3E25
3E27	7500 ±25%	≈3560	P18/11-3E27
3E4 sup	7550 +40/-30%	≈3580	P18/11-3E4
3E5	≥8400	≥3990	P18/11-3E5

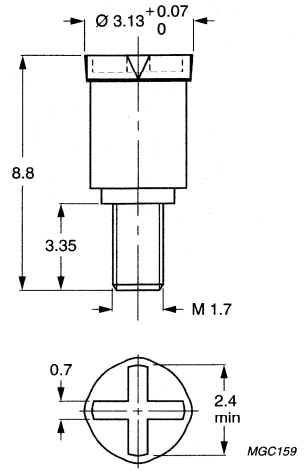
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3B8	≥315	≤0.35	–	–	–	–
3C81	≥315	≤0.23	–	–	–	–
3C85	≥315	≤0.18	≤0.22	–	–	–
3F3	≥315	–	≤0.13	≤0.22	–	–
3F4	≥250	–	–	–	≤0.22	≤0.36

INDUCTANCE ADJUSTERS

General data

ITEM	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 P18/11 inductance adjuster.

Inductance adjuster selection chart sup (applies to all types)

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	$\Delta L/L^{(1)}$	TYPES FOR MEDIUM ADJUSTMENT	$\Delta L/L^{(1)}$	TYPES FOR HIGH ADJUSTMENT	$\Delta L/L^{(1)}$
3H1; 3H3; 3B7	63	–	–	ADJ-P18-YELLOW	16	–	–
	100	–	–	–	–	ADJ-P18-BROWN	42
	160	ADJ-P18-YELLOW	9	ADJ-P18-RED	18	ADJ-P18-BROWN	28
	250	ADJ-P18-RED	11	ADJ-P18-WHITE	14	ADJ-P18-BROWN	18
	315	ADJ-P18-RED	8	ADJ-P18-BROWN	14	ADJ-P18-VIOLET	20
	400	ADJ-P18-WHITE	8	ADJ-P18-VIOLET	16	–	–
	630	ADJ-P18-VIOLET	8	–	–	–	–
	1000	ADJ-P18-VIOLET	5	–	–	–	–
	1250	–	–	–	–	–	–
3D3	40	–	–	–	–	ADJ-P18-YELLOW	19
	63	–	–	ADJ-P18-YELLOW	17	–	–
	100	–	–	–	–	ADJ-P18-RED	26
	160	–	–	ADJ-P18-RED	15	–	–
4C6	25	–	–	ADJ-P18-YELLOW	15	–	–
	40	–	–	ADJ-P18-YELLOW	16	–	–
	63	–	–	–	–	–	–

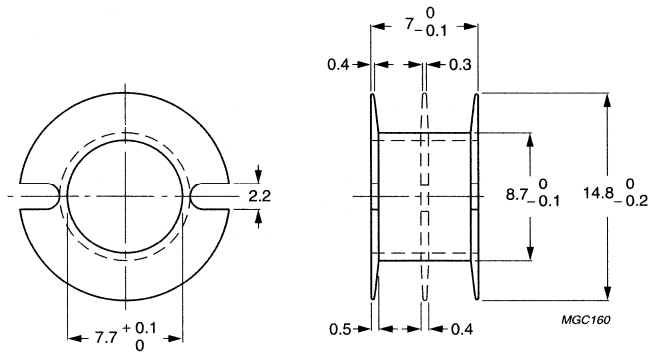
Note

1. Maximum adjustment range.

COIL FORMERS

General data CP-P18/11

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329 (R)
Maximum operating temperature	155 °C, *"IEC 85"* class F



Dimensions in mm.

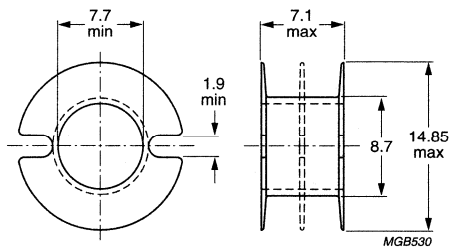
Fig.3 CP-P18/11 coil former.

Winding data for CP-P18/11 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	17.1	5.7	36.6	CP-P18/11-1S
2	2 × 7.95	2 × 2.65	36.6	CP-P18/11-2S
3	3 × 4.95	3 × 1.6	36.6	CP-P18/11-3S

General data for CP-P18/11-A coil former

PARAMETER	SPECIFICATION
Coil former material	acetal (POM), glass reinforced, flame retardant in accordance with *"UL 94-HB"*; UL file number E66288 (R)
Maximum operating temperature	105 °C



Dimensions in mm.

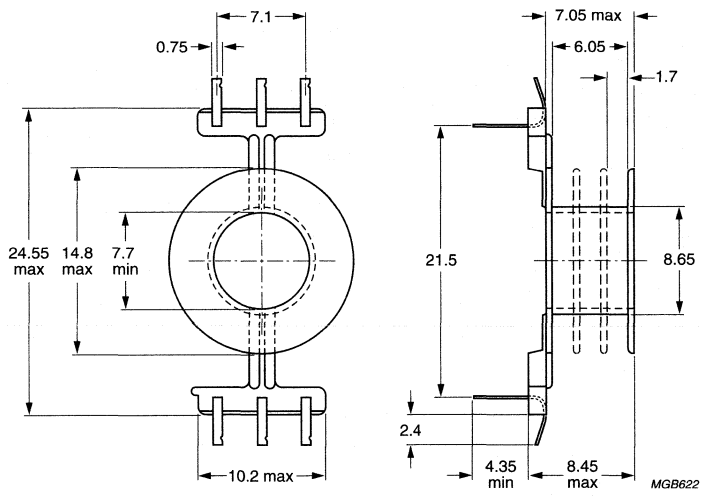
Fig.4 CP-P18/11-A coil former.

Winding data for CP-P18/11-A coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	16.85	6.1	37.0	CP-P18/11-1S-A
2	2 × 7.48	2 × 2.8	37.0	CP-P18/11-2S-A
3	3 × 4.45	3 × 1.7	37.0	CP-P18/11-3S-A

General data 6-pins P18/11 coil former for PCB mounting

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41938(M)
Maximum operating temperature	130 °C
Pin material	copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.5 P18/11 coil former for PCB mounting; 6-pins.

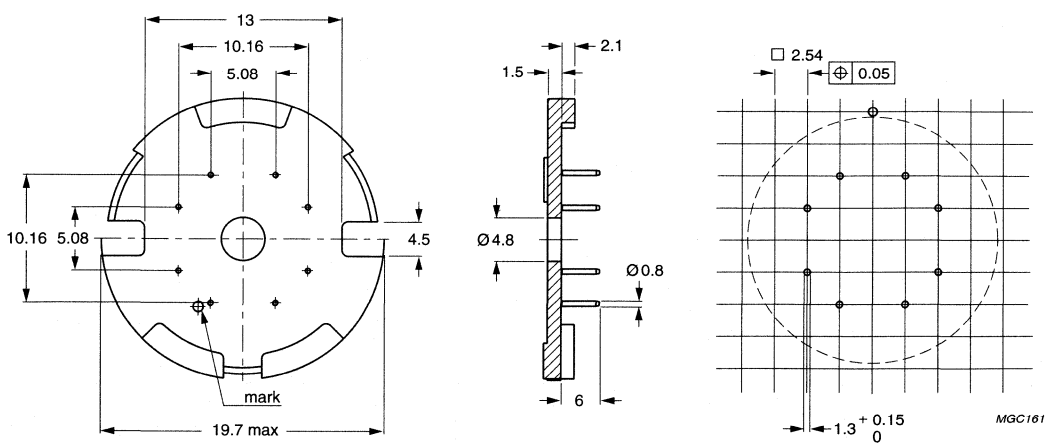
Data for 6-pins P18/11 coil former for PCB mounting

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	LENGTH OF PINS (mm)	TYPE NUMBER
1	16.8	6.0	36.7	4.4	CPV-P18/11-1S-6PD
1	16.8	6.0	36.7	6.8	CPV-P18/11-1S-6PDL
2	2 × 7.61	2 × 2.8	36.7	4.4	CPV-P18/11-2S-6PD
2	2 × 7.61	2 × 2.8	36.7	6.8	CPV-P18/11-2S-6PDL
3	3 × 4.58	3 × 1.7	36.7	4.4	CPV-P18/11-3S-6PD
3	3 × 4.58	3 × 1.7	36.7	6.8	CPV-P18/11-3S-6PDL

MOUNTING PARTS

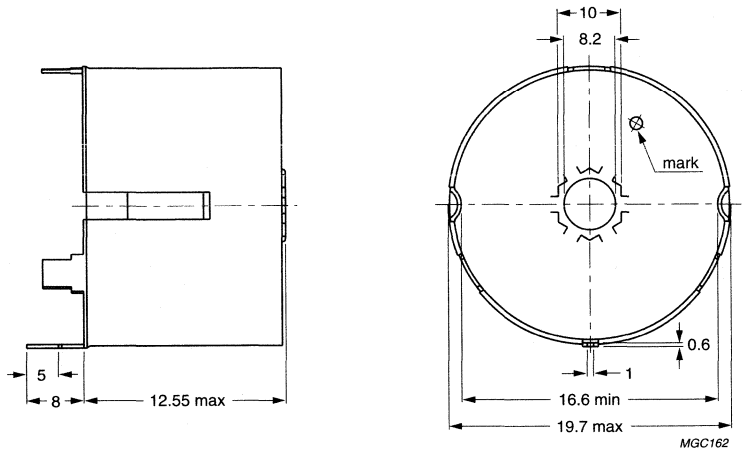
General data for mounting parts

ITEM	REMARKS	FIGURE	TYPE NUMBER
Tag plate	material: phenolformaldehyde (PF), glass reinforced	6	TGP-P18/11-8P
	flame retardant: in accordance with *"UL 94V-0"*; UL file number E63312 (M)		
	maximum operating temperature: 180 °C, *"IEC 85"* class H		
	pins: copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated		
	resistance to soldering heat in accordance with *"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s		
	solderability in accordance with *"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s		
Container	copper-zinc alloy (CuZn), nickel-plated	7	CON-P18/11
	earth pins: presoldered		
Spring	CrNi-steel	8	SPR-P18/11
	spring force: ≈100 N when mounted		
Nut	copper-zinc alloy, nickel-plated	9	NUT
Bush	nickel-plated copper-zinc alloy	10	FIB
Clamp	spring steel, tin-plated	11	CLM/TP-P18/11
Washer	phenolformaldehyde (PF)	12	WAS-CLM/TP-P18/11



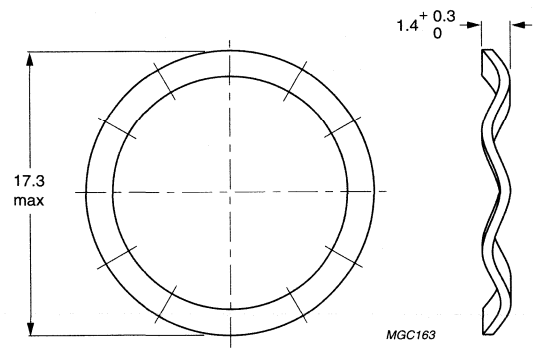
Dimensions in mm.

Fig.6 Tag plate: TGP-P18/11-8P.



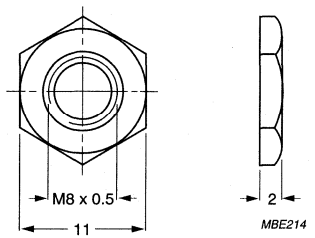
Dimensions in mm.

Fig.7 Container: CON-P18/11.



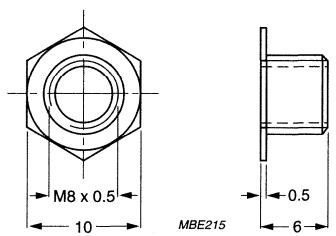
Dimensions in mm.

Fig.8 Spring: SPR-P18/11.



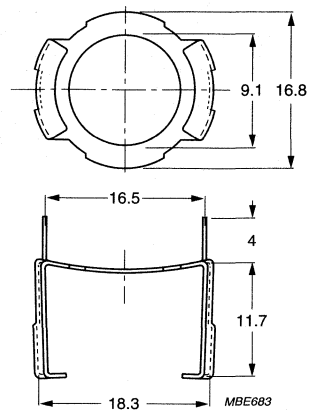
Dimensions in mm.

Fig.9 Fixing nut: NUT.



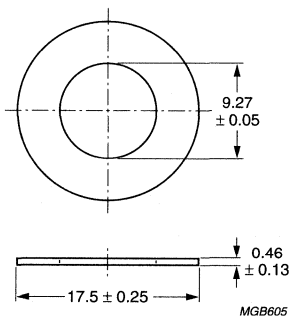
Dimensions in mm.

Fig.10 Fixing bush: FIB.



Dimensions in mm.

Fig.11 Clamp: CLM/TP-P18/11.



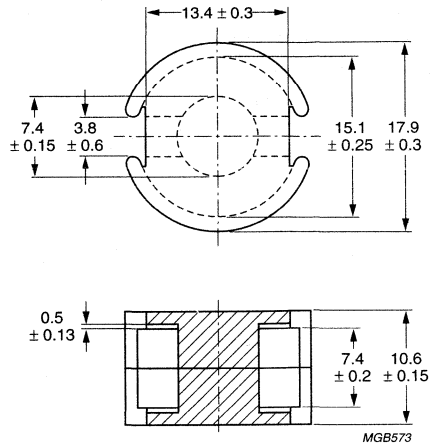
Dimensions in mm.

Fig.12 Washer: WAS-CLM/TP-P18/11.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.560	mm^{-1}
V_e	effective volume	1270	mm^3
l_e	effective length	26.7	mm
A_e	effective area	47.5	mm^2
A_{min}	minimum area	42.9	mm^2
m	mass of set	≈7	g



Dimensions in mm.

Fig.1 P18/11/I core set.

Core sets for general purpose transformers and power applications

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	160 ±3%	≈72	≈432	P18/11/I-3C81-A160
	250 ±3%	≈112	≈259	P18/11/I-3C81-A250
	315 ±3%	≈141	≈198	P18/11/I-3C81-A315
	400 ±3%	≈179	≈150	P18/11/I-3C81-A400
	630 ±5%	≈282	≈86	P18/11/I-3C81-A630
	4200 ±25%	≈1870	≈0	P18/11/I-3C81
3C85	160 ±3%	≈72	≈432	P18/11/I-3C85-A160
	250 ±3%	≈112	≈259	P18/11/I-3C85-A250
	315 ±3%	≈141	≈198	P18/11/I-3C85-A315
	400 ±3%	≈179	≈150	P18/11/I-3C85-A400
	630 ±5%	≈282	≈86	P18/11/I-3C85-A630
	3370 ±25%	≈1500	≈0	P18/11/I-3C85
3F3	160 ±3%	≈72	≈432	P18/11/I-3F3-A160
	250 ±3%	≈112	≈259	P18/11/I-3F3-A250
	315 ±3%	≈141	≈198	P18/11/I-3F3-A315
	400 ±3%	≈179	≈150	P18/11/I-3F3-A400
	630 ±5%	≈282	≈86	P18/11/I-3F3-A630
	3110 ±25%	≈1395	≈0	P18/11/I-3F3

Properties of core sets under power conditions

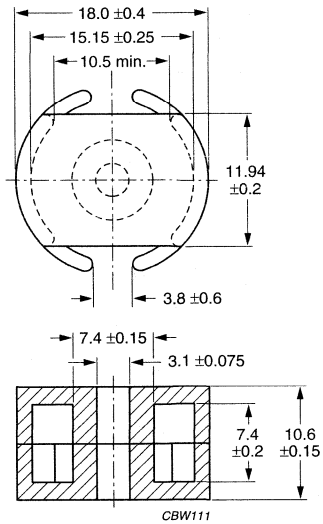
For coil former and winding data, see data sheet, *"P18/11"*.

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.26	–	–
3C85	≥320	≤0.20	≤0.23	–
3F3	≥320	–	≤0.14	≤0.24

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.670	mm^{-1}
V_e	effective volume	1110	mm^3
l_e	effective length	27.2	mm
A_e	effective area	40.6	mm^2
A_{min}	minimum area	32.9	mm^2
m	mass of set	≈6	g



Dimensions in mm.

Fig.1 PT18/11 core set.

Core sets for general purpose transformers and power applications

Clamping force 20 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B7 sup	100 ±3%	≈53	≈632	PT18/11-3B7-E100
	160 ±3%	≈85	≈366	PT18/11-3B7-E160
	250 ±3%	≈133	≈216	PT18/11-3B7-A250
	315 ±3%	≈168	≈165	PT18/11-3B7-A315
	400 ±5%	≈213	≈124	PT18/11-3B7-A400
	3020 ±25%	≈1609	≈0	PT18/11-3B7
3C81	100 ±3%	≈53	≈632	PT18/11-3C81-A100
	160 ±3%	≈85	≈366	PT18/11-3C81-A160
	250 ±3%	≈133	≈216	PT18/11-3C81-A250
	315 ±3%	≈168	≈165	PT18/11-3C81-A315
	400 ±5%	≈213	≈124	PT18/11-3C81-A400
	3130 ±25%	≈1670	≈0	PT18/11-3C81
3C85	100 ±3%	≈53	≈632	PT18/11-3C85-A100
	160 ±3%	≈85	≈366	PT18/11-3C85-A160
	250 ±3%	≈133	≈216	PT18/11-3C85-A250
	315 ±3%	≈168	≈165	PT18/11-3C85-A315
	400 ±5%	≈213	≈124	PT18/11-3C85-A400
	2850 ±25%	≈1520	≈0	PT18/11-3C85

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3	100 ±3%	≈53	≈632	PT18/11-3F3-A100
	160 ±3%	≈85	≈366	PT18/11-3F3-A160
	250 ±3%	≈133	≈216	PT18/11-3F3-A250
	315 ±3%	≈168	≈165	PT18/11-3F3-A315
	400 ±5%	≈213	≈124	PT18/11-3F3-A400
	2505 ±25%	≈1340	≈0	PT18/11-3F3

Core sets of high permeability grades

Clamping force 15 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5	≥7940	≥4230	≈0	PT18/11-3E5
3E27	5760 ±25%	≈3075	≈0	PT18/11-3E27

Properties of core sets under power conditions

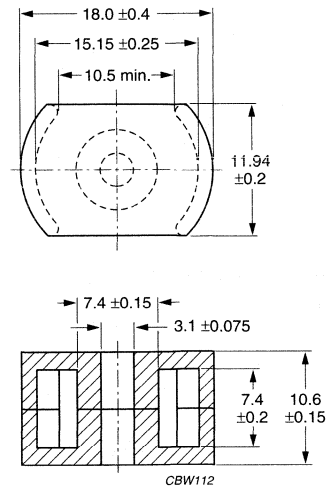
For coil formers and mounting parts, see data sheet, *"P18/11"*.

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.23	–	–
3C85	≥320	≤0.17	≤0.20	–
3F3	≥320	–	≤0.12	≤0.21

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.770	mm^{-1}
V_e	effective volume	1070	mm^3
l_e	effective length	28.7	mm
A_e	effective area	37.2	mm^2
m	mass of set	≈5	g



Dimensions in mm.

Fig.1 PTS18/11 core set.

Core sets for general purpose transformers and power applications

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B7 (sup)	100 ±3%	≈61	≈570	PTS18/11-3B7-E100
	160 ±3%	≈98	≈350	PTS18/11-3B7-E160
	250 ±3%	≈153	≈200	PTS18/11-3B7-A250
	315 ±3%	≈193	≈150	PTS18/11-3B7-A315
	400 ±5%	≈245	≈110	PTS18/11-3B7-A400
	2780 ±25%	≈1710	≈0	PTS18/11-3B7
3C81	100 ±3%	≈61	≈570	PTS18/11-3C81-E100
	160 ±3%	≈98	≈350	PTS18/11-3C81-A160
	250 ±3%	≈153	≈200	PTS18/11-3C81-A250
	315 ±3%	≈193	≈150	PTS18/11-3C81-A315
	400 ±5%	≈245	≈110	PTS18/11-3C81-A400
	3000 ±25%	≈1830	≈0	PTS18/11-3C81
3C85	100 ±3%	≈61	≈570	PTS18/11-3C85-E100
	160 ±3%	≈98	≈350	PTS18/11-3C85-A160
	250 ±3%	≈153	≈200	PTS18/11-3C85-A250
	315 ±3%	≈193	≈150	PTS18/11-3C85-A315
	400 ±5%	≈245	≈110	PTS18/11-3C85-A400
	2400 ±25%	≈1480	≈0	PTS18/11-3C85

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3	100 ±3%	≈61	≈570	PTS18/11-3F3-A100
	160 ±3%	≈98	≈350	PTS18/11-3F3-A160
	250 ±3%	≈153	≈200	PTS18/11-3F3-A250
	315 ±3%	≈193	≈150	PTS18/11-3F3-A315
	400 ±5%	≈245	≈110	PTS18/11-3F3-A400
	2225 ±25%	≈1365	≈0	PTS18/11-3F3

Core sets of high permeability grades

Clamping force 30 ±10 N.

GRADE	A_L() (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5	≥7045	≥4320	≈0	PTS18/11-3E5
3E27	5140 ±25%	≈3150	≈0	PTS18/11-3E27

Properties of core sets under power conditions

For coil former and mounting data, see data sheet, *"P18/11"*.

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.22	–	–
3C85	≥320	≤0.17	≤0.19	–
3F3	≥320	–	≤0.12	≤0.20

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.497	mm^{-1}
V_e	effective volume	2000	mm^3
l_e	effective length	31.5	mm
A_e	effective area	63.4	mm^2
A_{min}	minimum area	51.3	mm^2
m	mass of set	≈12	g

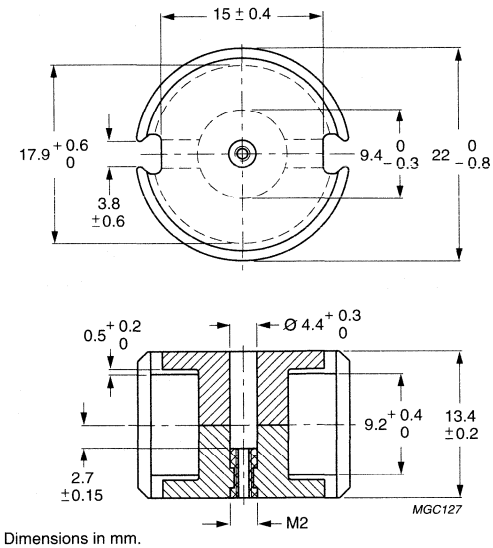


Fig.1 P22/13 core set.

Core sets for filter applications

Clamping force 140 ±30 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
4C6 sup	25 ±3%	≈10	≈5600	P22/13-4C6-E25/N	P22/13-4C6-E25
	40 ±3%	≈16	≈2900	P22/13-4C6-E40/N	P22/13-4C6-E40
	63 ±3%	≈25	≈1400	P22/13-4C6-E63/N	P22/13-4C6-E63
	250 ±25%	≈100	≈0	–	P22/13-4C6
3D3 sup	40 ±3%	≈16	≈3000	P22/13-3D3-E40/N	P22/13-3D3-E40
	63 ±3%	≈25	≈1500	P22/13-3D3-E63/N	P22/13-3D3-E63
	100 ±3%	≈40	≈900	P22/13-3D3-E100/N	P22/13-3D3-E100
	160 ±3%	≈64	≈500	P22/13-3D3-E160/N	P22/13-3D3-E160
	1700 ±25%	≈670	≈0	–	P22/13-3D3
3H3 sup	160 ±3%	≈64	≈500	P22/13-3H3-E160/N	P22/13-3H3-E160
	250 ±3%	≈99	≈300	P22/13-3H3-E250/N	P22/13-3H3-E250
	315 ±3%	≈125	≈250	P22/13-3H3-E315/N	P22/13-3H3-E315
	400 ±3%	≈158	≈170	P22/13-3H3-A400/N	P22/13-3H3-A400
	630 ±3%	≈249	≈100	P22/13-3H3-A630/N	P22/13-3H3-A630
	3900 ±25%	≈1540	≈0	–	P22/13-3H3
3H1 sup	160 ±3%	≈64	≈500	P22/13-3H1-E160/N	P22/13-3H1-E160
	250 ±3%	≈99	≈300	P22/13-3H1-E250/N	P22/13-3H1-E250
	315 ±3%	≈125	≈250	P22/13-3H1-A315/N	P22/13-3H1-A315
	400 ±3%	≈158	≈170	P22/13-3H1-A400/N	P22/13-3H1-A400
	630 ±3%	≈249	≈100	P22/13-3H1-A630/N	P22/13-3H1-A630
	4300 ±25%	≈1700	≈0	–	P22/13-3H1

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3B7 sup	160 ±3%	≈63	≈500	P22/13-3B7-E160/N	P22/13-3B7-E160
	250 ±3%	≈99	≈300	P22/13-3B7-E250/N	P22/13-3B7-E250
	315 ±3%	≈125	≈250	P22/13-3B7-E315/N	P22/13-3B7-E315
	400 ±3%	≈157	≈170	P22/13-3B7-A400/N	P22/13-3B7-A400
	630 ±3%	≈249	≈100	P22/13-3B7-A630/N	P22/13-3B7-A630
	4650 ±25%	≈1840	≈0	–	P22/13-3B7

Core sets for general purpose transformers and power applications

Clamping force 140 ±30 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	160 ±3%	≈64	≈500	P22/13-3B8-A160
	250 ±3%	≈99	≈300	P22/13-3B8-A250
	315 ±3%	≈125	≈250	P22/13-3B8-A315
	400 ±3%	≈158	≈170	P22/13-3B8-A400
	630 ±3%	≈249	≈100	P22/13-3B8-A630
	4300 ±25%	≈1700	≈0	P22/13-3B8
3C81	160 ±3%	≈64	≈500	P22/13-3C81-A160
	250 ±3%	≈99	≈300	P22/13-3C81-A250
	315 ±3%	≈125	≈250	P22/13-3C81-A315
	400 ±3%	≈158	≈170	P22/13-3C81-A400
	630 ±3%	≈249	≈100	P22/13-3C81-A630
	5200 ±25%	≈2060	≈0	P22/13-3C81
3C85 sup	160 ±3%	≈64	≈500	P22/13-3C85-A160
	250 ±3%	≈99	≈300	P22/13-3C85-A250
	315 ±3%	≈125	≈250	P22/13-3C85-A315
	400 ±3%	≈158	≈170	P22/13-3C85-A400
	630 ±3%	≈249	≈100	P22/13-3C85-A630
	3900 ±25%	≈1540	≈0	P22/13-3C85
3F3 sup	160 ±3%	≈64	≈500	P22/13-3F3-A160
	250 ±3%	≈99	≈300	P22/13-3F3-A250
	315 ±3%	≈125	≈250	P22/13-3F3-A315
	400 ±3%	≈158	≈170	P22/13-3F3-A400
	630 ±3%	≈249	≈100	P22/13-3F3-A630
	3550 ±25%	≈1410	≈0	P22/13-3F3
3F4 sup	160 ±3%	≈64	≈500	P22/13-3F4-A160
	250 ±3%	≈99	≈300	P22/13-3F4-A250
	315 ±3%	≈125	≈250	P22/13-3F4-A315
	400 ±3%	≈158	≈170	P22/13-3F4-A400
	630 ±3%	≈249	≈100	P22/13-3F4-A630
	2000 ±25%	≈800	≈0	P22/13-3F4

Core sets of high permeability grades

Clamping force 140 ±30 N.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3E1 sup	6900 ±25%	≈2730	P22/13-3E1
3E5	≥11200	≥4430	P22/13-3E5
3E25 sup	9250 ±25%	≈3660	P22/13-3E25
3E27	9250 ±25%	≈3660	P22/13-3E27
3E4 sup	9450 +40/–30%	≈3740	P22/13-3E4

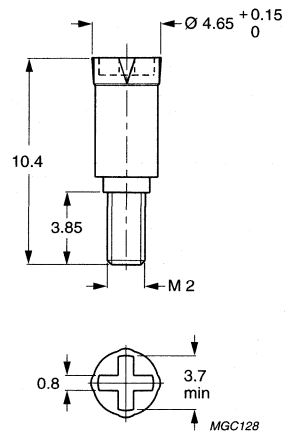
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3B8	≥315	≤0.56	–	–	–	–
3C81	≥315	≤0.41	–	–	–	–
3C85	≥315	≤0.32	≤0.38	–	–	–
3F3	≥315	–	≤0.22	≤0.40	–	–
3F4	≥250	–	–	–	≤0.40	≤0.64

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 P22/13 inductance adjuster.

Inductance adjuster selection chart

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	ΔL/L (1)	TYPES FOR MEDIUM ADJUSTMENT	ΔL/L (1)	TYPES FOR HIGH ADJUSTMENT	ΔL/L (1)
3H1; 3H3; 3B7	100	–	–	ADJ-P22/RM8-RED	16	ADJ-P22/RM8-ORANGE	21
	160	ADJ-P22/RM8-RED	11	ADJ-P22/RM8-YELLOW	18	ADJ-P22/RM8-WHITE	27
	250	ADJ-P22/RM8-YELLOW	12	ADJ-P22/RM8-WHITE	18	–	–
	315	ADJ-P22/RM8-YELLOW	9	–	–	ADJ-P22/RM8-BROWN	22
	400	ADJ-P22/RM8-WHITE	11	ADJ-P22/RM8-BROWN	17	ADJ-P22/RM8-BLACK	30
	630	ADJ-P22/RM8-BROWN	10	ADJ-P22/RM8-BLACK	18	–	–
	1000	ADJ-P22/RM8-BROWN	6	ADJ-P22/RM8-BLACK	12	–	–
	1250	ADJ-P22/RM8-BROWN	4	ADJ-P22/RM8-BLACK	7	–	–
3D3	40	–	–	–	–	ADJ-P22/RM8-ORANGE	27
	63	–	–	–	–	ADJ-P22/RM8-ORANGE	26
	100	–	–	ADJ-P22/RM8RED	16	ADJ-P22/RM8-YELLOW	27
	160	ADJ-P22/RM8-RED	10	ADJ-P22/RM8-YELLOW	17	–	–
	250	ADJ-P22/RM8-YELLOW	–	–	–	–	–
4C6	25	ADJ-P22/RM8-GREEN	14	ADJ-P22/RM8-RED	16	–	–
	40	–	–	–	–	ADJ-P22/RM8-ORANGE	24
	63	–	–	ADJ-P22/RM8-RED	15	ADJ-P22/RM8-ORANGE	19
	100	–	–	ADJ-P22/RM8-ORANGE	10	ADJ-P22/RM8-WHITE	20

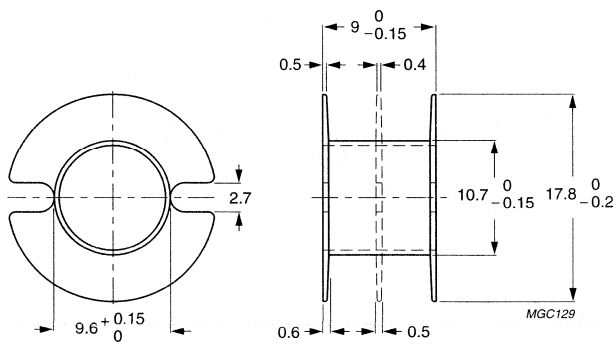
Note

1. Maximum adjustment range.

COIL FORMERS

General data CP-P22/13 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329 (R)
Maximum operating temperature	155 °C, *"IEC 85"* class F



Dimensions in mm.

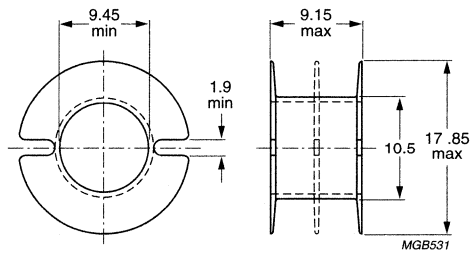
Fig.3 Coil former: CP-P22/13.

Winding data for CP-P22/13 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	26.2	7.5	44.5	CP-P22/13-1S
2	2 × 12.2	2 × 3.45	44.5	CP-P22/13-2S
3	3 × 7.6	3 × 2.1	44.5	CP-P22/13-3S

General data for CP-P22/13-A coil former

PARAMETER	SPECIFICATION
Coil former material	acetal (POM), glass reinforced, flame retardant in accordance with *"UL 94-HB"*; UL file number E66288(R)
Maximum operating temperature	105 °C



Dimensions in mm.

Fig.4 Coil former: CP-P22/13-A.

Winding data for CP-P22/13-A coil former

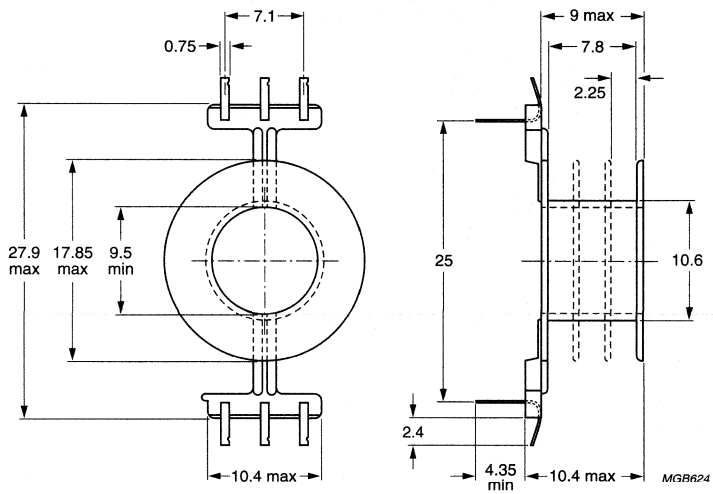
NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	27.5	8.1	44.3	CP-P22/13-1S-A
2	2 × 12.9	2 × 3.9	44.3	CP-P22/13-2S-A
3	3 × 8.01	3 × 2.4	44.3	CP-P22/13-3S-A(1)

Note

1. In accordance with *"UL 94-HB"*.

General data 6-pins P22/13 coil former for PCB mounting

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41938(M)
Maximum operating temperature	130 °C
Pin material	copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.5 P22/13 coil former for PCB mounting; 6-pins.

Data for 6-pins P22/13 coil former for PCB mounting

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	MINIMUM LENGTH OF PINS (mm)	TYPE NUMBER
1	25.2	7.8	44.5	4.4	CPV-P22/13-1S-6PD
1	25.2	7.8	44.5	6.8	CPV-P22/13-1S-6PDL
2	2 × 11.7	2 × 3.6	44.5	4.4	CPV-P22/13-2S-6PD
2	2 × 11.7	2 × 3.6	44.5	6.8	CPV-P22/13-2S-6PDL
3	3 × 7.03	3 × 2.2	44.5	4.4	CPV-P22/13-3S-6PD(1)
3	3 × 7.03	3 × 2.2	44.5	6.8	CPV-P22/13-3S-6PDL(1)

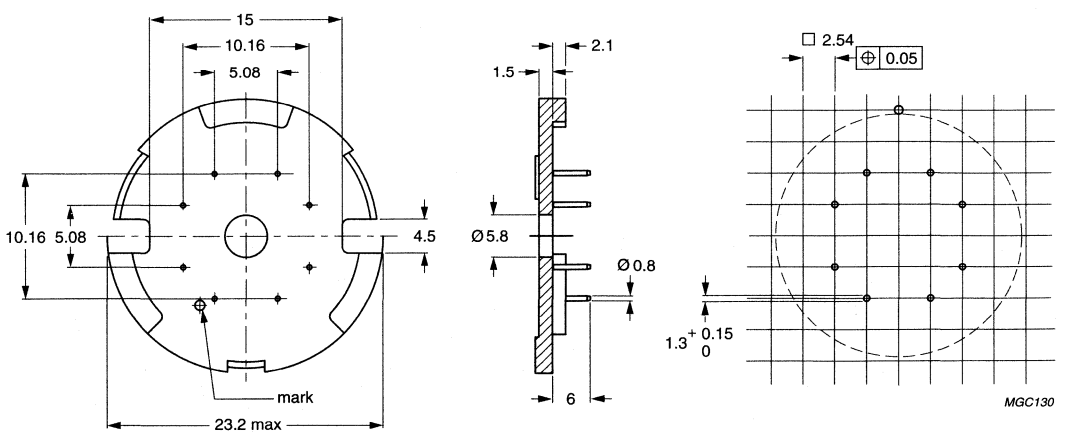
Note

1. In accordance with *"UL 94-HB"*.

MOUNTING PARTS

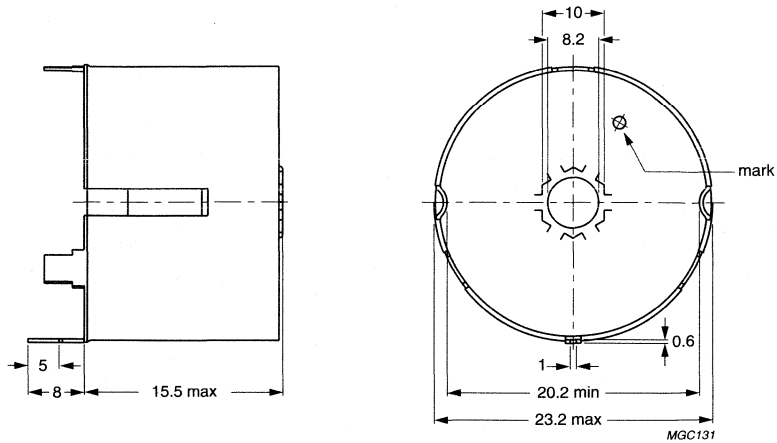
General data and ordering information

ITEM	REMARKS	FIGURE	TYPE NUMBER
Tag plate	material: phenolformaldehyde (PF), glass reinforced	6	TGP-P22/13-8P
	flame retardant: in accordance with *"UL 94V-0"*; UL file number E63312(M)		
	maximum operating temperature: 180 °C, *"IEC 85"* class H		
	pins: copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated		
	resistance to soldering heat in accordance with *"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s		
	solderability in accordance with *"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s		
Container	copper-zinc alloy (CuZn), nickel-plated	7	CON-P22/13
	earth pins: presoldered		
Spring	CrNi-steel	8	SPR-P22/13
	spring force: ≈140 N when mounted		
Nut	copper-zinc alloy, nickel-plated	9	NUT
Bush	copper-zinc alloy, nickel-plated	10	FIB
Clamp	spring steel, tin-plated	11	CLM/TS-P22/13
Washer	phenolformaldehyde (PF)	12	WAS-CLM/TS-P22/13



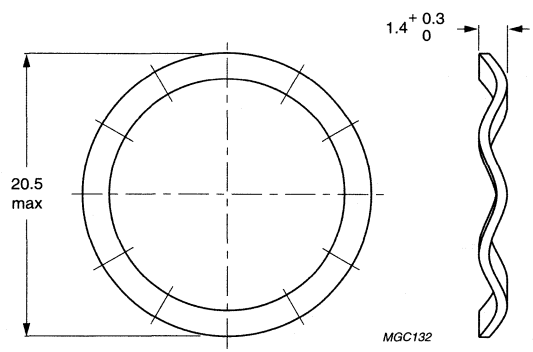
Dimensions in mm.

Fig.6 Tag plate: TGP-P22/13-8P.



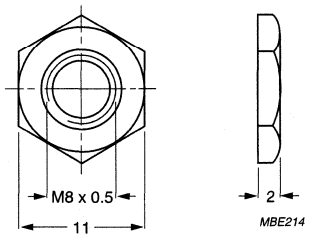
Dimensions in mm.

Fig.7 Container: CON-P22/13.



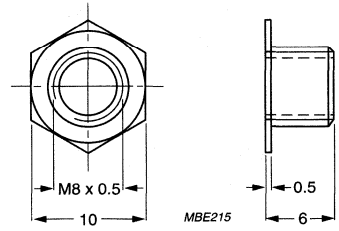
Dimensions in mm.

Fig.8 Spring: SPR-P22/13.



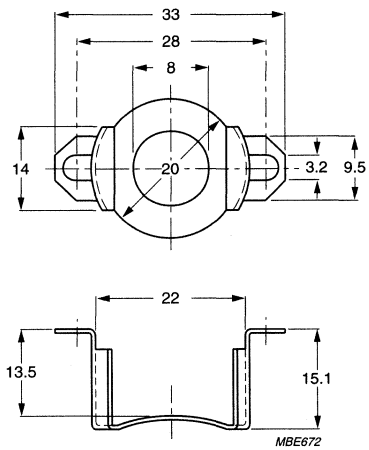
Dimensions in mm.

Fig.9 Fixing nut: NUT



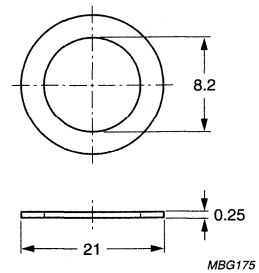
Dimensions in mm.

Fig.10 Fixing bush: FIB.



Dimensions in mm.

Fig.11 Clamp: CLM/S-P22/13.



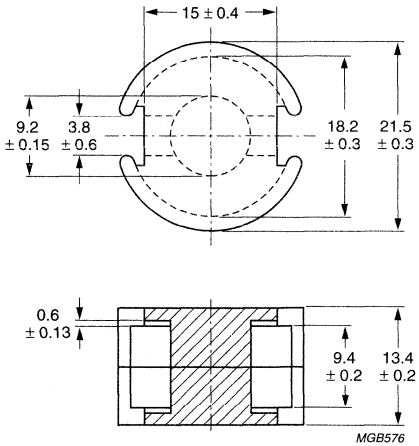
Dimensions in mm.

Fig.12 Washer: WAS-CLM/S-P22/13.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.450	mm^{-1}
V_e	effective volume	2460	mm^3
l_e	effective length	33.3	mm
A_e	effective area	73.4	mm^2
A_{min}	minimum area	53.6	mm^2
m	mass of set	≈13	g



Dimensions in mm.

Fig.1 P22/13/I core set.

Core sets for general purpose transformers and power applications

Clamping force 40 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	250 ±3%	≈90	≈417	P22/13/I-3C81-A250
	315 ±3%	≈113	≈320	P22/13/I-3C81-A315
	400 ±3%	≈143	≈241	P22/13/I-3C81-A400
	630 ±3%	≈225	≈142	P22/13/I-3C81-A630
	1000 ±5%	≈358	≈81	P22/13/I-3C81-A1000
	5330 ±25%	≈1910	≈0	P22/13/I-3C81
3C85	250 ±3%	≈90	≈417	P22/13/I-3C85-A250
	315 ±3%	≈113	≈320	P22/13/I-3C85-A315
	400 ±3%	≈143	≈241	P22/13/I-3C85-A400
	630 ±3%	≈225	≈142	P22/13/I-3C85-A630
	1000 ±5%	≈358	≈81	P22/13/I-3C85-A1000
	4250 ±25%	≈1520	≈0	P22/13/I-3C85
3F3	250 ±3%	≈90	≈417	P22/13/I-3F3-A250
	315 ±3%	≈113	≈320	P22/13/I-3F3-A315
	400 ±3%	≈143	≈241	P22/13/I-3F3-A400
	630 ±3%	≈225	≈142	P22/13/I-3F3-A630
	1000 ±5%	≈358	≈81	P22/13/I-3F3-A1000
	4070 ±25%	≈1459	≈0	P22/13/I-3F3

Properties of core sets under power conditions

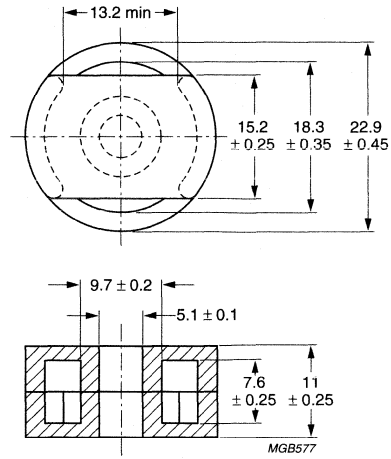
For coil former and mounting data, see data sheet, *"P22/13"*.

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	**f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C**	**f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C**	**f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C**
3C81	≥320	≤0.50	–	–
3C85	≥320	≤0.38	≤0.44	–
3F3	≥320	–	≤0.27	≤0.47

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.470	mm^{-1}
V_e	effective volume	1740	mm^3
l_e	effective length	28.6	mm
A_e	effective area	61.0	mm^2
A_{min}	minimum area	53.6	mm^2
m	mass of set	≈10.5	g



Dimensions in mm.

Fig.1 PT23/11 core set.

Core sets for general purpose transformers and power applications

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	160 ±3%	≈59	≈564	PT23/11-3C81-A160
	250 ±3%	≈93	≈338	PT23/11-3C81-A250
	315 ±3%	≈117	≈259	PT23/11-3C81-A315
	400 ±3%	≈149	≈196	PT23/11-3C81-A400
	630 ±5%	≈235	≈114	PT23/11-3C81-A630
	5500 ±25%	≈2050	≈0	PT23/11-3C81
3C85	160 ±3%	≈59	≈564	PT23/11-3C85-A160
	250 ±3%	≈93	≈338	PT23/11-3C85-A250
	315 ±3%	≈117	≈259	PT23/11-3C85-A315
	400 ±3%	≈149	≈196	PT23/11-3C85-A400
	630 ±5%	≈235	≈114	PT23/11-3C85-A630
	4155 ±25%	≈1550	≈0	PT23/11-3C85
3F3	160 ±3%	≈59	≈564	PT23/11-3F3-A160
	250 ±3%	≈93	≈338	PT23/11-3F3-A250
	315 ±3%	≈117	≈259	PT23/11-3F3-A315
	400 ±3%	≈149	≈196	PT23/11-3F3-A400
	630 ±5%	≈235	≈114	PT23/11-3F3-A630
	3700 ±25%	≈1380	≈0	PT23/11-3F3

Core sets of high permeability grades

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5	≥11250	≥4210	≈0	PT23/11-3E5
3E27	8400 ±25%	≈3134	≈0	PT23/11-3E27

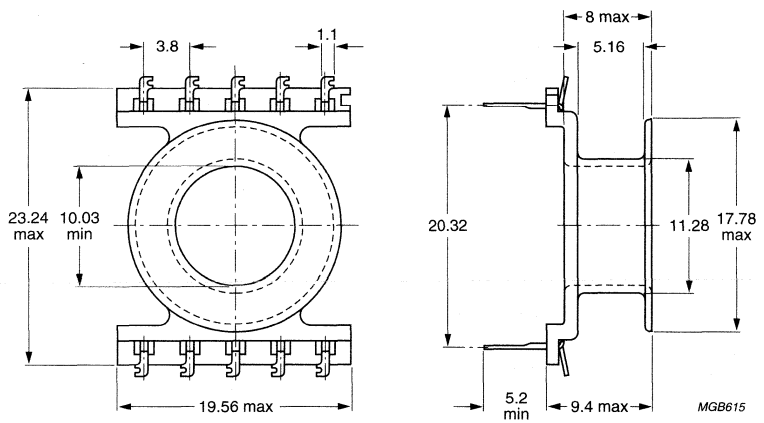
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.36	–	–
3C85	≥320	≤0.27	≤0.32	–
3F3	≥320	–	≤0.19	≤0.33

COIL FORMERS

General data 10-pins PT23/11 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41938(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 PT23/11 coil former; 10-pins.

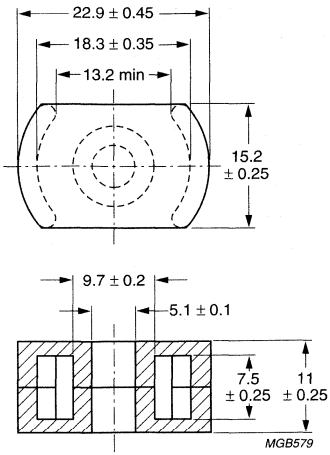
Winding data for 10-pins PT23/11 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	15.1	5.2	45.2	CPV-PT23/11-1S-10P

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.550	mm^{-1}
V_e	effective volume	1810	mm^3
l_e	effective length	31.6	mm
A_e	effective area	57.2	mm^2
A_{min}	minimum area	53.6	mm^2
m	mass of set	≈9	g



Dimensions in mm.

Fig.1 PTS23/11 core set.

Core sets for general purpose transformers and power applications

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	160 ±3%	≈70	≈526	PTS23/11-3C81-A160
	250 ±3%	≈110	≈315	PTS23/11-3C81-A250
	315 ±3%	≈138	≈241	PTS23/11-3C81-A315
	400 ±3%	≈175	≈183	PTS23/11-3C81-A400
	630 ±5%	≈276	≈107	PTS23/11-3C81-A630
	4890 ±25%	≈2150	≈0	PTS23/11-3C81
3C85	160 ±3%	≈70	≈526	PTS23/11-3C85-A160
	250 ±3%	≈110	≈315	PTS23/11-3C85-A250
	315 ±3%	≈138	≈241	PTS23/11-3C85-A315
	400 ±3%	≈175	≈183	PTS23/11-3C85-A400
	630 ±5%	≈276	≈107	PTS23/11-3C85-A630
	3560 ±25%	≈1570	≈0	PTS23/11-3C85
3F3	160 ±3%	≈70	≈526	PTS23/11-3F3-A160
	250 ±3%	≈110	≈315	PTS23/11-3F3-A250
	315 ±3%	≈138	≈241	PTS23/11-3F3-A315
	400 ±3%	≈175	≈183	PTS23/11-3F3-A400
	630 ±5%	≈276	≈107	PTS23/11-3F3-A630
	3280 ±25%	≈1510	≈0	PTS23/11-3F3

Core sets of high permeability grades

Clamping force 30 ±10 N.

GRADE	A_L() (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5	≥10220	≥4470	≈0	PTS23/11-3E5
3E27	7250 ±25%	≈3190	≈0	PTS23/11-3E27

Properties of core sets under power conditions

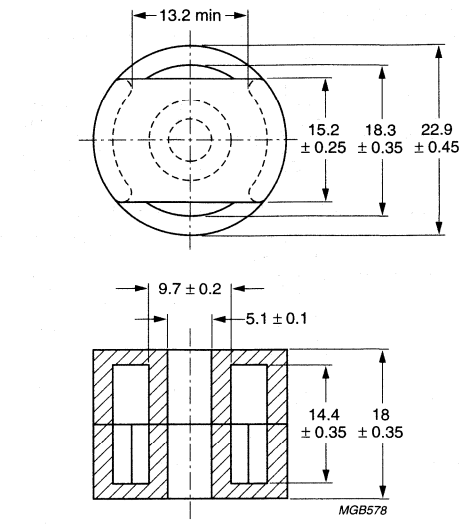
For coil former and mounting data, see data sheet, *"PT23/11"*.

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.37	–	–
3C85	≥320	≤0.28	≤0.33	–
3F3	≥320	–	≤0.20	≤0.35

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.670	mm^{-1}
V_e	effective volume	2590	mm^3
l_e	effective length	41.6	mm
A_e	effective area	62.2	mm^2
A_{min}	minimum area	53.6	mm^2
m	mass of set	≈14	g



Dimensions in mm.

Fig.1 PT23/18 core set.

Core sets for general purpose transformers and power applications

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	160 ±3%	≈85	≈581	PT23/18-3C81-A160
	250 ±3%	≈133	≈345	PT23/18-3C81-A250
	315 ±3%	≈168	≈262	PT23/18-3C81-A315
	400 ±3%	≈213	≈196	PT23/18-3C81-A400
	630 ±5%	≈335	≈112	PT23/18-3B9-A630
	4100 ±25%	≈2180	≈0	PT23/18-3C81
3C85	160 ±3%	≈85	≈581	PT23/18-3C85-A160
	250 ±3%	≈133	≈345	PT23/18-3C85-A250
	315 ±3%	≈168	≈262	PT23/18-3C85-A315
	400 ±3%	≈213	≈196	PT23/18-3C85-A400
	630 ±5%	≈335	≈112	PT23/18-3B9-A630
	3000 ±25%	≈1600	≈0	PT23/18-3C85
3F3	160 ±3%	≈85	≈581	PT23/18-3F3-A160
	250 ±3%	≈133	≈345	PT23/18-3F3-A250
	315 ±3%	≈168	≈262	PT23/18-3F3-A315
	400 ±3%	≈213	≈196	PT23/18-3F3-A400
	630 ±5%	≈335	≈112	PT23/18-3B9-A630
	2750 ±25%	≈1480	≈0	PT23/18-3F3

Core sets of high permeability grades

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5	≥8400	≥4480	≈0	PT23/18-3E5
3E27	6400 ±25%	≈3410	≈0	PT23/18-3E27

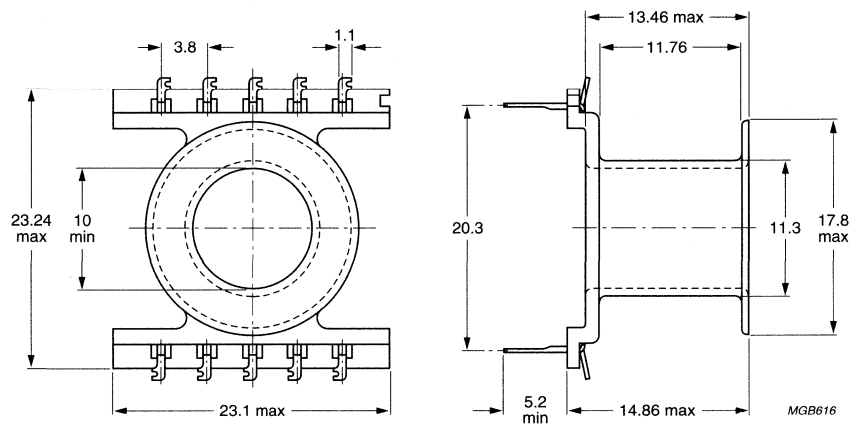
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.53	–	–
3C85	≥320	≤0.40	≤0.47	–
3F3	≥320	–	≤0.29	≤0.49

COIL FORMER

General data 10-pins PT23/18 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41938(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 PT23/18 coil former; 10-pins.

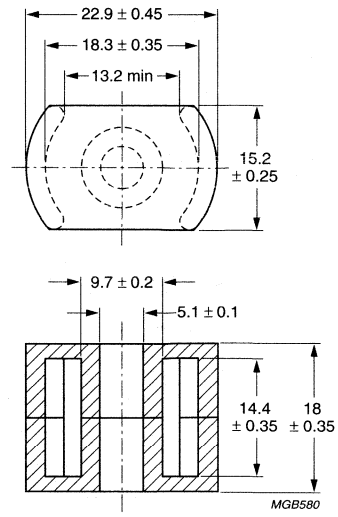
Winding data for 10-pins PT23/18 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	36.0	11.8	45.2	CPV-PT23/18-1S-10P

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.770	mm^{-1}
V_e	effective volume	2630	mm^3
l_e	effective length	45.1	mm
A_e	effective area	58.3	mm^2
A_{min}	minimum area	53.6	mm^2
m	mass of set	≈13	g



Dimensions in mm.

Fig.1 PTS23/18 core set.

Core sets for general purpose transformers and power applications

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	160 ±3%	≈98	≈546	PTS23/18-3C81-A160
	250 ±3%	≈154	≈320	PTS23/18-3C81-A250
	315 ±3%	≈194	≈241	PTS23/18-3C81-A315
	400 ±3%	≈246	≈180	PTS23/18-3C81-A400
	630 ±5%	≈387	≈102	PTS23/18-3C81-A630
	3800 ±25%	≈2320	≈0	PTS23/18-3C81
3C85	160 ±3%	≈98	≈546	PTS23/18-3C85-A160
	250 ±3%	≈154	≈320	PTS23/18-3C85-A250
	315 ±3%	≈194	≈241	PTS23/18-3C85-A315
	400 ±3%	≈246	≈180	PTS23/18-3C85-A400
	630 ±5%	≈387	≈102	PTS23/18-3C85-A630
	2900 ±25%	≈1770	≈0	PTS23/18-3C85
3F3	160 ±3%	≈98	≈546	PTS23/18-3F3-A160
	250 ±3%	≈154	≈320	PTS23/18-3F3-A250
	315 ±3%	≈194	≈241	PTS23/18-3F3-A315
	400 ±3%	≈246	≈180	PTS23/18-3F3-A400
	630 ±5%	≈387	≈102	PTS23/18-3F3-A630
	2500 ±25%	≈1500	≈0	PTS23/18-3F3

Core sets of high permeability grades

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5	≥8170	≥5000	≈0	PTS23/18-3E5
3E27	5945 ±25%	≈3630	≈0	PTS23/18-3E27

Properties of core sets under power conditions

For coil former and winding data, see data sheet, *"PT23/18"*.

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.54	–	–
3C85	≥320	≤0.41	≤0.48	–
3F3	≥320	–	≤0.29	≤0.50

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.400	mm^{-1}
V_e	effective volume	3530	mm^3
l_e	effective length	37.6	mm
A_e	effective area	93.9	mm^2
A_{min}	minimum area	76.5	mm^2
m	mass of set	≈20	g

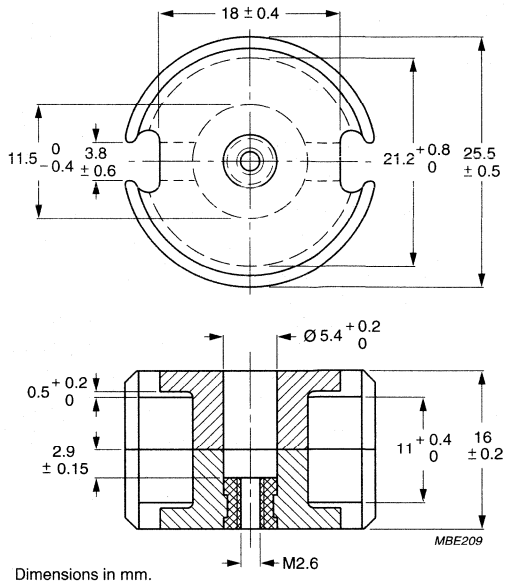


Fig.1 P26/16 core set.

Core sets for filter applications

Clamping force 200 ±50 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
4C6 sup	63 ±3%	≈20	≈2500	P26/16-4C6-E63/N	P26/16-4C6-E63
	100 ±3%	≈32	≈1100	P26/16-4C6-E100/N	P26/16-4C6-E100
	310 ±25%	≈100	≈0	–	P26/16-4C6
3D3 sup	100 ±3%	≈32	≈1600	P26/16-3D3-E100/N	P26/16-3D3-E100
	160 ±3%	≈51	≈900	P26/16-3D3-E160/N	P26/16-3D3-E160
	250 ±3%	≈80	≈500	P26/16-3D3-E250/N	P26/16-3D3-E250
	2150 ±25%	≈680	≈0	–	P26/16-3D3
3H3 sup	160 ±3%	≈51	≈900	P26/16-3H3-E160/N	P26/16-3H3-E160
	250 ±3%	≈80	≈500	P26/16-3H3-E250/N	P26/16-3H3-E250
	315 ±3%	≈100	≈370	P26/16-3H3-E315/N	P26/16-3H3-E315
	400 ±3%	≈127	≈260	P26/16-3H3-E400/N	P26/16-3H3-E400
	630 ±3%	≈200	≈150	P26/16-3H3-A630/N	P26/16-3H3-A630
	5000 ±25%	≈1590	≈0	–	P26/16-3H3

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3H1 sup	160 ±3%	≈51	≈900	P26/16-3H1-E160/N	P26/16-3H1-E160
	250 ±3%	≈80	≈500	P26/16-3H1-E250/N	P26/16-3H1-E250
	315 ±3%	≈100	≈370	P26/16-3H1-E315/N	P26/16-3H1-E315
	400 ±3%	≈127	≈260	P26/16-3H1-E400/N	P26/16-3H1-E400
	630 ±3%	≈200	≈150	P26/16-3H1-A630/N	P26/16-3H1-A630
	5550 ±25%	≈1760	≈0	–	P26/16-3H1
3B7 sup	160 ±3%	≈51	≈900	P26/16-3B7-E160/N	P26/16-3B7-E160
	250 ±3%	≈80	≈500	P26/16-3B7-E250/N	P26/16-3B7-E250
	315 ±3%	≈100	≈370	P26/16-3B7-E315/N	P26/16-3B7-E315
	400 ±3%	≈127	≈260	P26/16-3B7-E400/N	P26/16-3B7-E400
	630 ±3%	≈200	≈150	P26/16-3B7-A630/N	P26/16-3B7-A630
	6000 ±25%	≈1900	≈0	–	P26/16-3B7

Core sets for general purpose transformers and power applications

Clamping force 200 ±50 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	250 ±3%	≈80	≈500	P26/16-3B8-A250
	315 ±3%	≈100	≈370	P26/16-3B8-A315
	400 ±3%	≈127	≈260	P26/16-3B8-A400
	630 ±3%	≈200	≈150	P26/16-3B8-A630
	5550 ±25%	≈1760	≈0	P26/16-3B8
3C81	160 ±3%	≈51	≈900	P26/16-3C81-E160
	250 ±3%	≈80	≈500	P26/16-3C81-A250
	315 ±3%	≈100	≈370	P26/16-3C81-A315
	400 ±3%	≈127	≈260	P26/16-3C81-A400
	630 ±3%	≈200	≈150	P26/16-3C81-A630
	6700 ±25%	≈2130	≈0	P26/16-3C81
3C85 sup	160 ±3%	≈51	≈90	P26/16-3C85-E160
	250 ±3%	≈80	≈500	P26/16-3C85-A250
	315 ±3%	≈100	≈370	P26/16-3C85-A315
	400 ±3%	≈127	≈260	P26/16-3C85-A400
	630 ±3%	≈200	≈150	P26/16-3C85-A630
	5000 ±25%	≈1590	≈0	P26/16-3C85
3F3 sup	160 ±3%	≈51	≈90	P26/16-3F3-E160
	250 ±3%	≈80	≈500	P26/16-3F3-A250
	315 ±3%	≈100	≈370	P26/16-3F3-A315
	400 ±3%	≈127	≈260	P26/16-3F3-A400
	630 ±3%	≈200	≈150	P26/16-3F3-A630
	4600 ±25%	≈1460	≈0	P26/16-3F3

Core sets of high permeability grades

Clamping force 200 ±50 N.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3E1 sup	9000 ±25%	≈2860	P26/16-3E1
3E25 sup	12000 ±25%	≈3810	P26/16-3E25
3E27	12000 ±25%	≈3810	P26/16-3E27
3E4 sup	12100 +40/-30%	≈3850	P26/16-3E4
3E5	≥14000	≥4460	P26/16-3E5

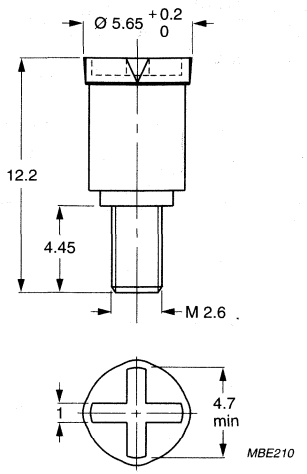
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3B8	≥315	≤1.00	–	–
3C81	≥315	≤0.72	–	–
3C85	≥315	≤0.56	≤0.67	–
3F3	≥315	–	≤0.40	≤0.65

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 P26/16 inductance adjuster.

Inductance adjuster selection chart sup (applies to all types)

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	$\Delta L/L^{(1)}$	TYPES FOR MEDIUM ADJUSTMENT	$\Delta L/L^{(1)}$	TYPES FOR HIGH ADJUSTMENT	$\Delta L/L^{(1)}$
3H1; 3H3; 3B7	63	–	–	–	–	ADJ-P26-RED	25
	100	–	–	–	–	ADJ-P26-RED	22
	160	–	–	ADJ-P26-RED	15	ADJ-P26-WHITE	27
	250	ADJ-P26-RED	10	ADJ-P26-WHITE	18	ADJ-P26-BROWN	23
	315	ADJ-P26-RED	8	ADJ-P26-WHITE	14	ADJ-P26-BROWN	18
	400	ADJ-P26-RED	6	ADJ-P26-BROWN	13	ADJ-P26-GREY	25
	630	ADJ-P26-BROWN	8	ADJ-P26-GREY	16	–	–
	1000	ADJ-P26-BROWN	5	ADJ-P26-GREY	9	–	–
	1600	–	–	ADJ-P26-GREY	5	–	–
3D3	100	–	–	–	–	ADJ-P26-RED	21
	160	–	–	ADJ-P26-RED	14	ADJ-P26-WHITE	25
	250	ADJ-P26-RED	9	ADJ-P26-WHITE	15	ADJ-P26-GREY	35
	400	ADJ-P26-WHITE	8	ADJ-P26-GREY	17	–	–
4C6	63	–	–	–	–	ADJ-P26-RED	21
	100	–	10	ADJ-P26-RED	15	–	–

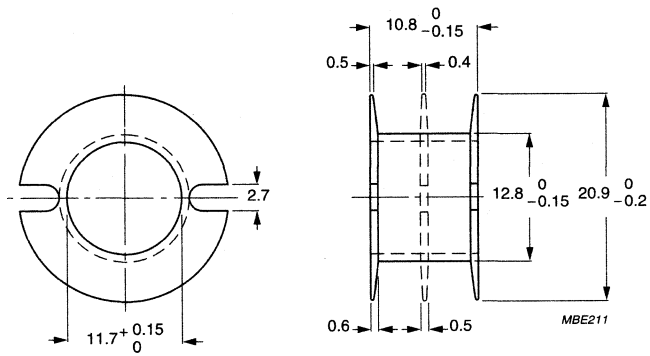
Note

1. Maximum adjustment range.

COIL FORMERS

General data for CP-P26/16 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329 (R)
Maximum operating temperature	155 °C, *"IEC 85"* class F



Dimensions in mm.

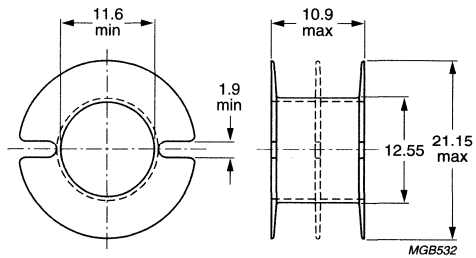
Fig.3 Coil former CP-P26/16.

Winding data for CP-P26/16 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	37.1	9.3	52.6	CP-P26/16-1S
2	2 × 17.5	2 × 4.35	52.6	CP-P26/16-2S
3	3 × 11	3 × 2.7	52.6	CP-P26/16-3S

General data for CP-P26/16-A coil former

PARAMETER	SPECIFICATION
Coil former material	acetal (POM), glass reinforced, flame retardant in accordance with *"UL 94-HB"*; UL file number E66288(R)
Maximum operating temperature	105 °C



Dimensions in mm.

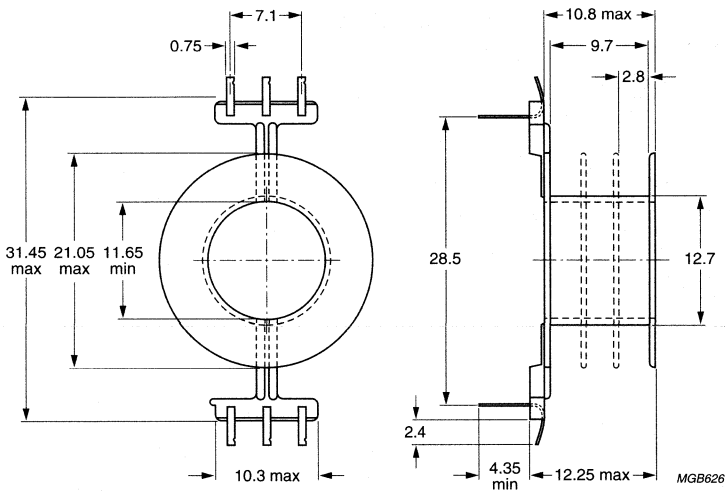
Fig.4 Coil former CP-P26/16-A.

Winding data for CP-P26/16-A coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	38.4	9.7	52.7	CP-P26/16-1S-A
2	2 × 19.2	2 × 4.6	52.7	CP-P26/16-2S-A
3	3 × 11.1	3 × 2.8	52.7	CP-P26/16-3S-A

General data 6-pins P26/16 coil former for PCB mounting

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41938(M)
Maximum operating temperature	130 °C
Pin material	copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.5 P26/16 coil former for PCB mounting; 6-pins.

Data for 6-pins P26/16 coil former for PCB mounting

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	MINIMUM LENGTH OF PINS (mm)	TYPE NUMBER
1	36.7	9.7	52.7	4.4	CPV-P26/16-1S-6PD
1	36.7	9.7	52.7	6.8	CPV-P26/16-1S-6PDL
2	2 × 16.6	2 × 4.5	52.7	4.4	CPV-P26/16-2S-6PD
2	2 × 16.6	2 × 4.5	52.7	6.8	CPV-P26/16-2S-6PDL
3	3 × 10.3	3 × 2.8	52.7	4.4	CPV-P26/16-3S-6PD(1)
3	3 × 10.3	3 × 2.8	52.7	6.8	CPV-P26/16-3S-6PDL(1)

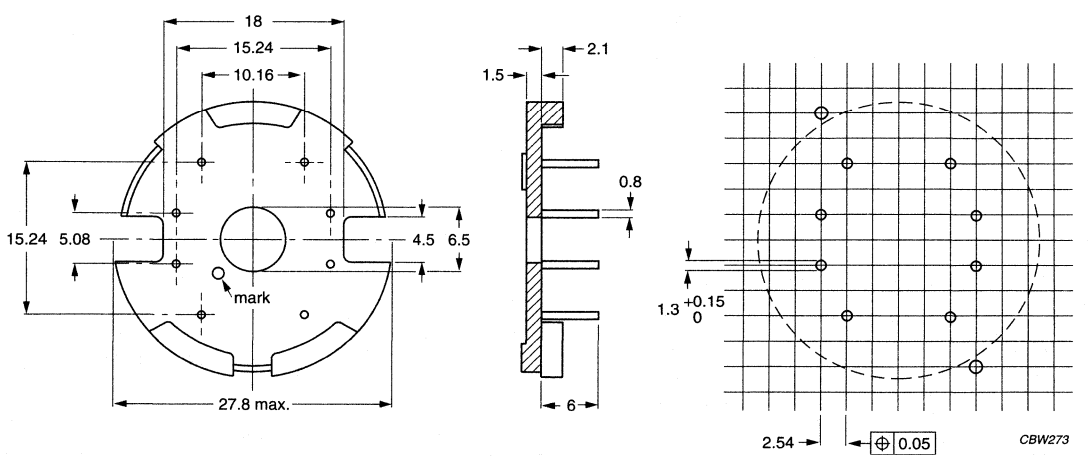
Note

1. In accordance with *"UL 94-HB"*.

MOUNTING PARTS

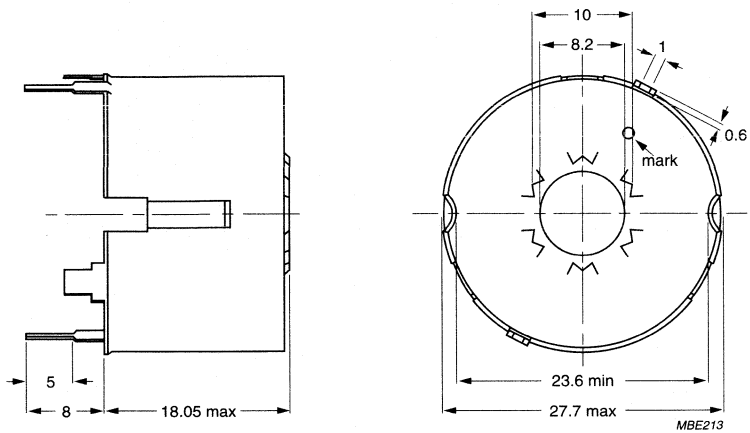
General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Tag plate	material: phenolformaldehyde (PF), glass reinforced	6	TGP-P26/16-8P
	flame retardant: in accordance with *"UL 94V-0"*; UL file number E63312(M)		
	maximum operating temperature: 180 °C, *"IEC 85"* class H		
	pins: copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated		
	resistance to soldering heat in accordance with *"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s		
	solderability in accordance with *"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s		
Container	copper-zinc alloy, nickel-plated	7	CON-P26/16
	earth pins: presoldered		
Spring	CrNi-steel	8	SPR-P26/16
	spring force: ≈200 N when mounted		
Nut	copper-zinc alloy, nickel-plated	9	NUT
Bush	copper-zinc alloy, nickel-plated	10	FIB
Clamp	spring steel, tin-plated	11	CLM/TP-P26/16



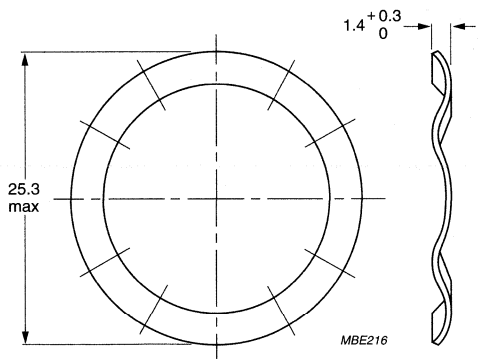
Dimensions in mm.

Fig.6 P26/16 tag plate.



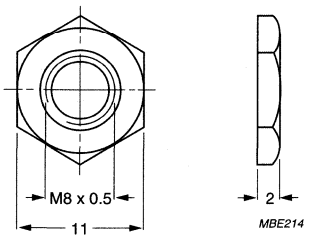
Dimensions in mm.

Fig.7 P26/16 container.



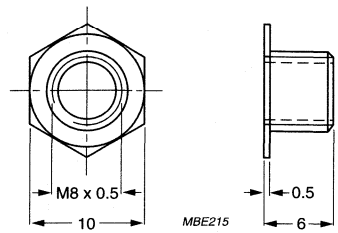
Dimensions in mm.

Fig.8 P26/16 spring.



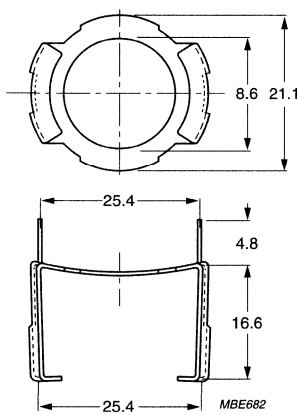
Dimensions in mm.

Fig.9 Fixing nut.



Dimensions in mm.

Fig.10 Fixing bush.



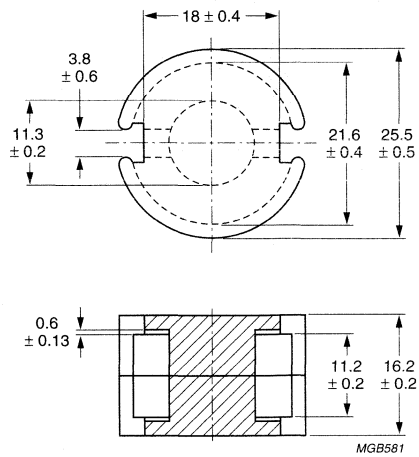
Dimensions in mm.

Fig.11 Clamp: CLM/TP-P26/16.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.360	mm^{-1}
V_e	effective volume	4370	mm^3
l_e	effective length	39.6	mm
A_e	effective area	110	mm^2
A_{min}	minimum area	82.8	mm^2
m	mass of set	≈21	g



Dimensions in mm.

Fig.1 P26/16/I core set.

Core sets for general purpose transformers and power applications

Clamping force 50 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	250 ±3%	≈72	≈638	P26/16/I-3C81-E250
	315 ±3%	≈90	≈488	P26/16/I-3C81-A315
	400 ±3%	≈115	≈371	P26/16/I-3C81-A400
	630 ±3%	≈181	≈218	P26/16/I-3C81-A630
	1000 ±3%	≈287	≈127	P26/16/I-3C81-A1000
	7000 ±25%	≈2010	≈0	P26/16/I-3C81
3C85	250 ±3%	≈72	≈638	P26/16/I-3C85-E250
	315 ±3%	≈90	≈488	P26/16/I-3C85-A315
	400 ±3%	≈115	≈371	P26/16/I-3C85-A400
	630 ±3%	≈181	≈218	P26/16/I-3C85-A630
	1000 ±3%	≈287	≈127	P26/16/I-3C85-A1000
	5550 ±25%	≈1600	≈0	P26/16/I-3C85
3F3	250 ±3%	≈72	≈638	P26/16/I-3F3-E250
	315 ±3%	≈90	≈488	P26/16/I-3F3-A315
	400 ±3%	≈115	≈371	P26/16/I-3F3-A400
	630 ±3%	≈181	≈218	P26/16/I-3F3-A630
	1000 ±3%	≈287	≈127	P26/16/I-3F3-A1000
	5250 ±25%	≈1505	≈0	P26/16/I-3F3

Properties of core sets under power conditions

For coil former and winding data, see data sheet, *"P26/16'.*

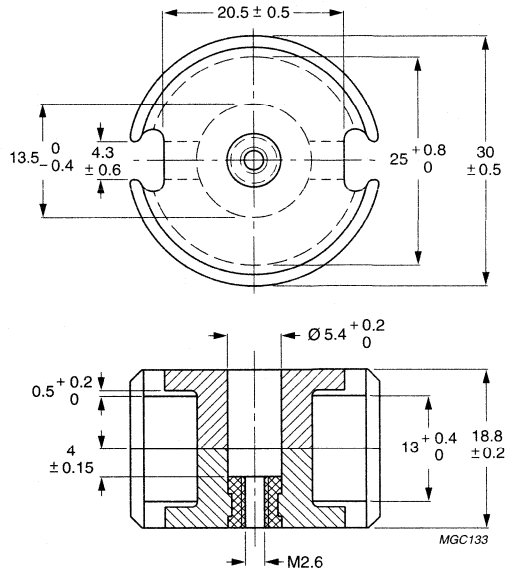
GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	**f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C**	**f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C**	**f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C**
3C81	≥320	≤0.89	–	–
3C85	≥320	≤0.68	≤0.79	–
3F3	≥320	–	≤0.48	≤0.83

P cores and accessories P30/19

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.330	mm^{-1}
V_e	effective volume	6190	mm^3
l_e	effective length	45.2	mm
A_e	effective area	137	mm^2
A_{min}	minimum area	115	mm^2
m	mass of set	≈34	g



Dimensions in mm.

Fig.1 P30/19 core set.

Core sets for filter applications

Clamping force 250 ±50 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3H1 sup	250 ±3%	≈66	≈700	P30/19-3H1-E250/N	P30/19-3H1-E250
	315 ±3%	≈83	≈550	P30/19-3H1-E315/N	P30/19-3H1-E315
	400 ±3%	≈105	≈400	P30/19-3H1-E400/N	P30/19-3H1-E400
	630 ±3%	≈165	≈250	P30/19-3H1-A630/N	P30/19-3H1-A630
	1000 ±3%	≈263	≈160	P30/19-3H1-A1000/N	P30/19-3H1-A1000
	1600 ±5%	≈420	≈80	P30/19-3H1-A1600/N	P30/19-3H1-A1600
	7050 ±25%	≈1850	≈0	–	P30/19-3H1
3B7 sup	250 ±3%	≈66	≈700	P30/19-3B7-E250/N	P30/19-3B7-E250
	315 ±3%	≈83	≈550	P30/19-3B7-E315/N	P30/19-3B7-E315
	400 ±3%	≈105	≈400	P30/19-3B7-E400/N	P30/19-3B7-E400
	630 ±3%	≈165	≈250	P30/19-3B7-A630/N	P30/19-3B7-A630
	1000 ±3%	≈263	≈160	P30/19-3B7-A1000/N	P30/19-3B7-A1000
	7580 ±25%	≈1990	≈0	–	P30/19-3B7

Core sets for general purpose transformers and power applications

Clamping force 250 ±50 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	250 ±3%	≈66	≈700	P30/19-3B8-A250
	315 ±3%	≈83	≈550	P30/19-3B8-A315
	400 ±3%	≈105	≈400	P30/19-3B8-A400
	630 ±3%	≈165	≈250	P30/19-3B8-A630
	7050 ±25%	≈1850	≈0	P30/19-3B8
3C81	250 ±3%	≈66	≈700	P30/19-3C81-E250
	315 ±3%	≈83	≈550	P30/19-3C81-A315
	400 ±3%	≈105	≈400	P30/19-3C81-A400
	630 ±3%	≈165	≈250	P30/19-3C81-A630
	1000 ±3%	≈263	≈160	P30/19-3C81-A1000
	8300 ±25%	≈2170	≈0	P30/19-3C81
3C85	250 ±3%	≈66	≈700	P30/19-3C85-E250
	315 ±3%	≈83	≈550	P30/19-3C85-A315
	400 ±3%	≈105	≈400	P30/19-3C85-A400
	630 ±3%	≈165	≈250	P30/19-3C85-A630
	1000 ±3%	≈263	≈160	P30/19-3C85-A1000
	6300 ±25%	≈1650	≈0	P30/19-3C85
3F3	250 ±3%	≈66	≈700	P30/19-3F3-E250
	315 ±3%	≈83	≈550	P30/19-3F3-A315
	400 ±3%	≈105	≈400	P30/19-3F3-A400
	630 ±3%	≈165	≈250	P30/19-3F3-A630
	1000 ±3%	≈263	≈160	P30/19-3F3-A1000
	5750 ±25%	≈1500	≈0	P30/19-3F3

Core sets of high permeability grades

Clamping force 250 ±50 N.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3E1 sup	10300 ±25%	≈2700	P30/19-3E1
3E25 sup	14000 ±25%	≈3650	P30/19-3E25
3E27	14000 ±25%	≈3650	P30/19-3E27
3E4 sup	15100 +40/-30%	≈3960	P30/19-3E4
3E5	≥18750	≥4920	P30/19-3E5

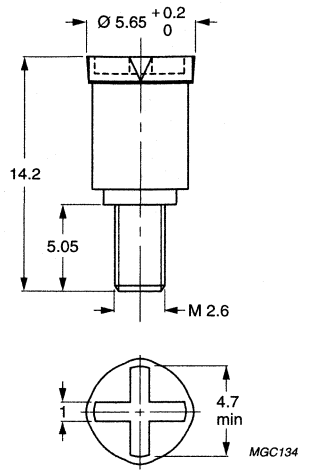
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3B8	≥315	≤1.75	–	–
3C81	≥315	≤1.26	–	–
3C85	≥315	≤1.00	≤1.20	–
3F3	≥315	–	≤0.70	≤1.20

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 P30/19 inductance adjuster.

Inductance adjuster selection chart

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	ΔL/L (1)	TYPES FOR MEDIUM ADJUSTMENT	ΔL/L (1)	TYPES FOR HIGH ADJUSTMENT	ΔL/L (1)
3H1; 3H3; 3B7	250	–	–	ADJ-P30/RM10-YELLOW	16	–	–
	–	–	–	–	–	–	–
	630	ADJ-P30/RM10-YELLOW	6	–	–	ADJ-P30/RM10-GREY	21
	1000	–	–	ADJ-P30/RM10-GREY	13	–	–
	1600	–	–	ADJ-P30/RM10-GREY	7	–	–
	2500	–	–	–	–	–	–

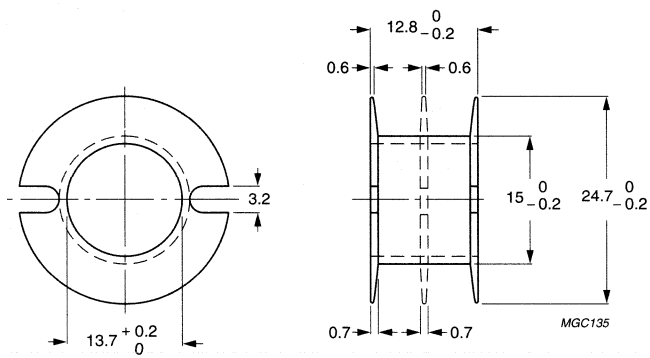
Note

1. Maximum adjustment range.

COIL FORMERS

General data CP-P30/19 coil former

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329 (R)
Maximum operating temperature	155 °C, *"IEC 85"* class F



Dimensions in mm.

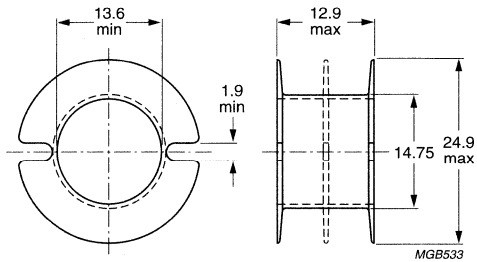
Fig.3 Coil former: CP-P30/19.

Winding data for P30/19 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	53.2	11.1	62	CP-P30/19-1S
2	2 × 24.9	2 × 5.15	62	CP-P30/19-2S
3	3 × 15.5	3 × 3.2	62	CP-P30/19-3S

General data CP-P30/19-A coil former

PARAMETER	SPECIFICATION
Coil former material	acetal (POM), glass reinforced, flame retardant in accordance with *"UL 94-HB"*; UL file number E66288(R)
Maximum operating temperature	105 °C



Dimensions in mm.

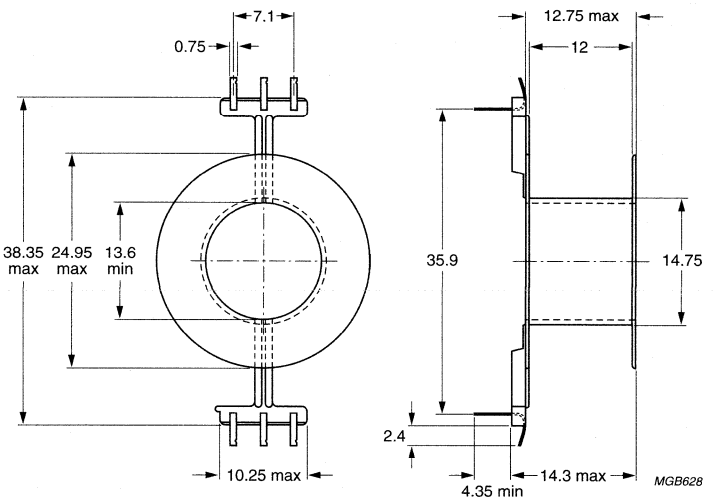
Fig.4 Coil former: CP-P30/19-A.

Winding data for P30/19-A coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	57.6	11.7	62.1	CP-P30/19-1S-A
2	2×27.3	2×5.5	62.1	CP-P30/19-2S-A
3	3×15.6	3×5.5	62.1	CP-P30/19-3S-A

General data 6-pins P30/19 coil former for PCB mounting

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA6.6), glass reinforced, flame retardant in accordance with *"UL 94-HB"*; UL file number E41938(M)
Maximum operating temperature	130 °C
Pin material	copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated
Resistance to soldering heat	*"IEC 68-2-20"*, Part 1, Test Tb, method 1B, 350 °C, 3.5 s. For connection of wire to pins: 430 °C, 2 seconds
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.5 P30/19 coil former for PCB mounting; 6-pins.

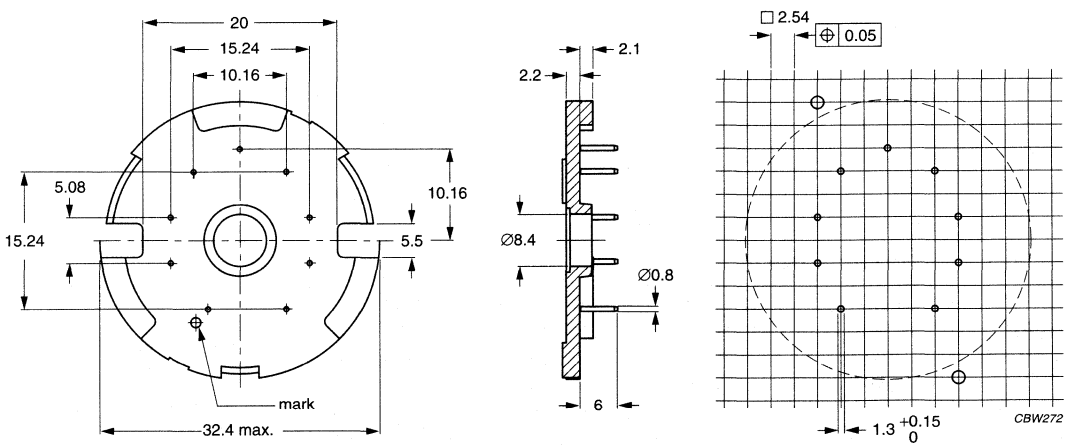
Data for 6-pins P30/19 coil former for PCB mounting

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	MINIMUM LENGTH OF PINS (mm)	TYPE NUMBER
1	55.2	12.8	62.2	4.4	CPV-P30/19-1S-6PD
1	55.2	12.8	62.2	6.8	CPV-P30/19-1S-6PDL

MOUNTING PARTS

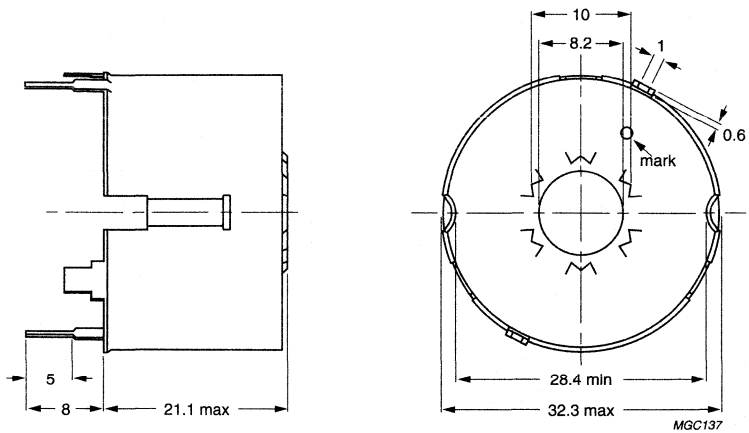
General data and ordering information

ITEM	REMARKS	FIGURE	TYPE NUMBER
Tag plate	material: phenolformaldehyde (PF), glass reinforced	6	TGP-P30/19-9P
	flame retardant: in accordance with *"UL 94V-0"*; UL file number E63312(M)		
	maximum operating temperature: 180 °C, *"IEC 85"* class H		
	pins: copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated		
	resistance to soldering heat in accordance with *"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s		
	solderability in accordance with *"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s		
Container	copper-zinc alloy (CuZn), nickel-plated	7	CON-P30/19
	earth pins: presoldered		
Spring	CrNi-steel	8	SPR-P30/19
	spring force: ≈250 N when mounted		
Nut	copper-zinc alloy, nickel-plated	9	NUT
Bush	copper-zinc alloy, nickel-plated	10	FIB
Clamp	spring steel, tin-plated	11	CLM/TS-P30/19



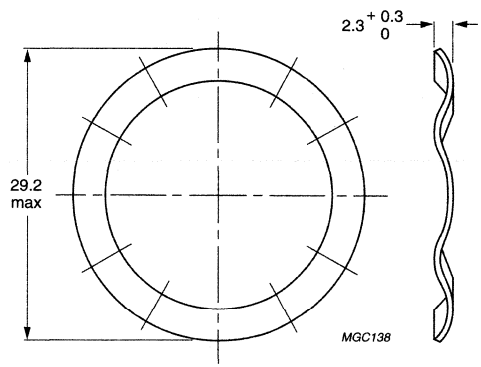
Dimensions in mm.

Fig.6 P30/19 tag plate.



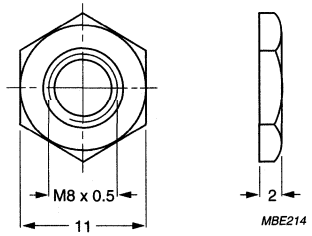
Dimensions in mm.

Fig.7 P30/19 container.



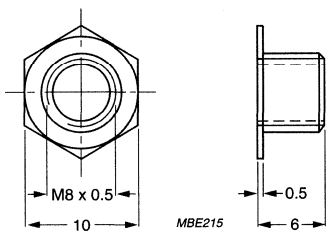
Dimensions in mm.

Fig.8 P30/19 spring.



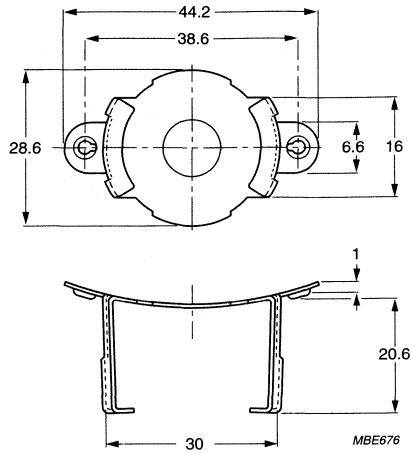
Dimensions in mm.

Fig.9 Fixing nut.



Dimensions in mm.

Fig.10 Fixing bush.



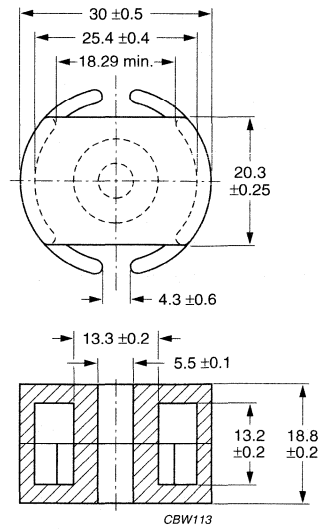
Dimensions in mm.

Fig.11 Clamp CLM/TS-P30/19.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.390	mm^{-1}
V_e	effective volume	5700	mm^3
l_e	effective length	47.1	mm
A_e	effective area	132	mm^2
A_{min}	minimum area	111	mm^2
m	mass of set	≈31	g



Dimensions in mm.

Fig.1 PT30/19 core set.

Core sets for general purpose transformers and power applications

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B7 sup	315 ±3%	≈98	≈536	PT30/19-3B7-E315
	400 ±3%	≈124	≈406	PT30/19-3B7-E400
	630 ±3%	≈195	≈239	PT30/19-3B7-E630
	1000 ±3%	≈310	≈137	PT30/19-3B7-A1000
	1600 ±5%	≈454	≈84	PT30/19-3B7-A1600
	5480 ±25%	≈1700	≈0	PT30/19-3B7
3C81	315 ±3%	≈98	≈536	PT30/19-3C81-A315
	400 ±3%	≈124	≈406	PT30/19-3C81-A400
	630 ±3%	≈195	≈239	PT30/19-3C81-A630
	1000 ±3%	≈310	≈137	PT30/19-3C81-A1000
	1600 ±5%	≈454	≈84	PT30/19-3C81-A1600
	5910 ±25%	≈1830	≈0	PT30/19-3C81
3C85	315 ±3%	≈98	≈536	PT30/19-3C85-A315
	400 ±3%	≈124	≈406	PT30/19-3C85-A400
	630 ±3%	≈195	≈239	PT30/19-3C85-A630
	1000 ±3%	≈310	≈137	PT30/19-3C85-A1000
	1600 ±5%	≈454	≈84	PT30/19-3C85-A1600
	4350 ±25%	≈1350	≈0	PT30/19-3C85

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3	315 ±3%	≈98	≈536	PT30/19-3F3-A315
	400 ±3%	≈124	≈406	PT30/19-3F3-A400
	630 ±3%	≈195	≈239	PT30/19-3F3-A630
	1000 ±3%	≈310	≈137	PT30/19-3F3-A1000
	1600 ±5%	≈454	≈84	PT30/19-3F3-A1600
	4075 ±25%	≈1150	≈0	PT30/19-3F3

Core sets of high permeability grades

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5	≥17500	≥5430	≈0	PT30/19-3E5
3E27	11150 ±25%	≈3470	≈0	PT30/19-3E27

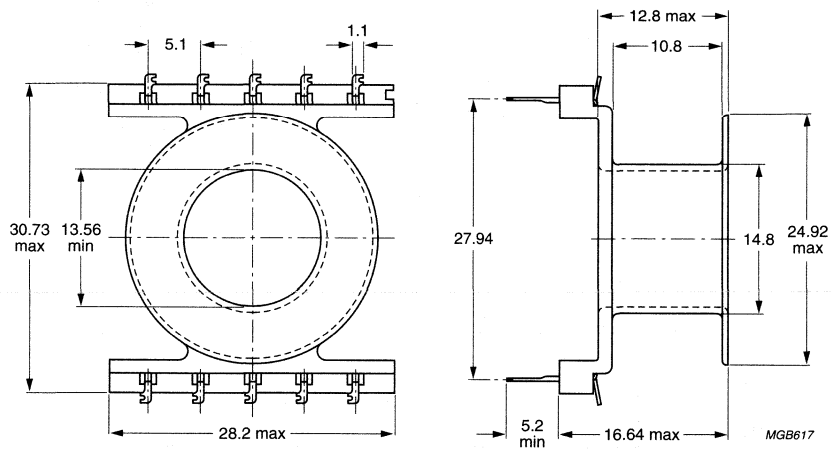
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤1.2	–	–
3C85	≥320	≤0.88	≤1.0	–
3F3	≥320	–	≤0.63	≤1.1

COIL FORMER

General data 10-pins PT30/19 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide (PA), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E41938(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 PT30/19 coil former; 10-pins.

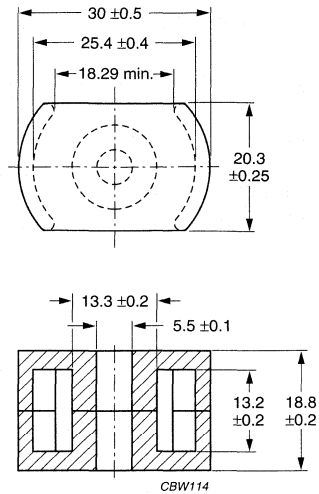
Winding data for 10-pins PT30/19 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	51.9	10.8	62.2	CPV-PT30/19-1S-10P

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.450	mm^{-1}
V_e	effective volume	5570	mm^3
l_e	effective length	50.2	mm
A_e	effective area	111	mm^2
A_{min}	minimum area	111	mm^2
m	mass of set	≈30	g



Dimensions in mm.

Fig.1 PTS30/19 core set.

Core sets for general purpose transformers and power applications

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B7 sup	315 ±3%	≈114	≈490	PTS30/19-3B7-E315
	400 ±3%	≈144	≈371	PTS30/19-3B7-E400
	630 ±3%	≈227	≈216	PTS30/19-3B7-A630
	1000 ±3%	≈361	≈122	PTS30/19-3B7-A1000
	1600 ±5%	≈577	≈66	PTS30/19-3B7-A1600
	4955 ±25%	≈1780	≈0	PTS30/19-3B7
3C81	315 ±3%	≈114	≈490	PTS30/19-3C81-A315
	400 ±3%	≈144	≈371	PTS30/19-3C81-A400
	630 ±3%	≈227	≈216	PTS30/19-3C81-A630
	1000 ±3%	≈361	≈122	PTS30/19-3C81-A1000
	1600 ±5%	≈577	≈66	PTS30/19-3C81-A1600
	5350 ±25%	≈1930	≈0	PTS30/19-3C81
3C85	315 ±3%	≈114	≈490	PTS30/19-3C85-A315
	400 ±3%	≈144	≈371	PTS30/19-3C85-A400
	630 ±3%	≈227	≈216	PTS30/19-3C85-A630
	1000 ±3%	≈361	≈122	PTS30/19-3C85-A1000
	1600 ±5%	≈577	≈66	PTS30/19-3C85-A1600
	4140 ±25%	≈1490	≈0	PTS30/19-3C85

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3	315 ±3%	≈114	≈490	PTS30/19-3F3-A315
	400 ±3%	≈144	≈371	PTS30/19-3F3-A400
	630 ±3%	≈227	≈216	PTS30/19-3F3-A630
	1000 ±3%	≈361	≈122	PTS30/19-3F3-A1000
	1600 ±5%	≈577	≈66	PTS30/19-3F3-A1600
	3950 ±25%	≈1420	≈0	PTS30/19-3F3

Core sets of high permeability grades

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5	≥14000	≥5000	≈0	PTS30/19-3E5
3E27	10800 ±25%	≈3890	≈0	PTS30/19-3E27

Properties of core sets under power conditions

For coil former data, see data sheet, *"PT30/19"*.

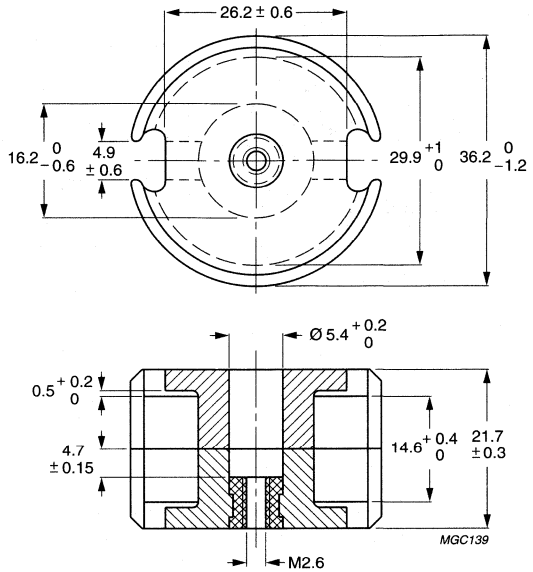
GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤1.2	–	–
3C85	≥320	≤0.87	≤1.0	–
3F3	≥320	–	≤0.62	≤1.1

P cores and accessories P36/22

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.264	mm^{-1}
V_e	effective volume	10700	mm^3
l_e	effective length	53.2	mm
A_e	effective area	202	mm^2
A_{min}	minimum area	172	mm^2
m	mass of set	≈54	g



Dimensions in mm.

Fig.1 P36/22 core set.

Core sets for filter applications

Clamping force 350 ±50 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3H1 sup	400 ±3%	≈84	≈640	P36/22-3H1-E400/N	P36/22-3H1-E400
	630 ±3%	≈132	≈380	P36/22-3H1-E630/N	P36/22-3H1-E630
	1000 ±3%	≈210	≈200	P36/22-3H1-A1000/N	P36/22-3H1-A1000
	1600 ±5%	≈336	≈110	P36/22-3H1-A1600/N	P36/22-3H1-A1600
	9000 ±25%	≈1890	≈0	–	P36/22-3H1
3B7 sup	315 ±3%	≈66	≈940	P36/22-3B7-E315/N	P36/22-3B7-E315
	400 ±3%	≈84	≈640	P36/22-3B7-E400/N	P36/22-3B7-E400
	630 ±3%	≈132	≈380	P36/22-3B7-E630/N	P36/22-3B7-E630
	1000 ±3%	≈210	≈200	P36/22-3B7-A1000/N	P36/22-3B7-A1000
	1600 ±5%	≈336	≈110	P36/22-3B7-A1600/N	P36/22-3B7-A1600
	9660 ±25%	≈2020	≈0	–	P36/22-3B7

Core sets for general purpose transformers and power applications

Clamping force 350 ±50 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	250 ±3%	≈53	≈1100	P36/22-3B8-A250
	315 ±3%	≈66	≈800	P36/22-3B8-A315
	400 ±3%	≈84	≈600	P36/22-3B8-A400
	630 ±3%	≈132	≈400	P36/22-3B8-A630
	9000 ±25%	≈1890	≈0	P36/22-3B8
3C81	315 ±3%	≈66	≈800	P36/22-3C81-E315
	400 ±3%	≈84	≈600	P36/22-3C81-E400
	630 ±3%	≈132	≈400	P36/22-3C81-A630
	1000 ±3%	≈210	≈200	P36/22-3C81-A1000
	1600 ±5%	≈336	≈160	P36/22-3C81-A1600
	10800 ±25%	≈2260	≈0	P36/22-3C81
3C85	250 ±3%	≈53	≈1100	P36/22-3C85-E250
	315 ±3%	≈66	≈800	P36/22-3C85-E315
	400 ±3%	≈84	≈600	P36/22-3C85-E400
	630 ±3%	≈132	≈400	P36/22-3C85-A630
	1000 ±3%	≈210	≈200	P36/22-3C85-A1000
	1600 ±5%	≈336	≈160	P36/22-3C85-A1600
	8000 ±25%	≈1680	≈0	P36/22-3C85
3F3	250 ±3%	≈53	≈1100	P36/22-3F3-E250
	315 ±3%	≈66	≈800	P36/22-3F3-E315
	400 ±3%	≈84	≈600	P36/22-3F3-E400
	630 ±3%	≈132	≈400	P36/22-3F3-A630
	1000 ±3%	≈210	≈200	P36/22-3F3-A1000
	1600 ±5%	≈336	≈160	P36/22-3F3-A1600
	7350 ±25%	≈1540	≈0	P36/22-3F3

Core sets of high permeability grades

Clamping force 350 ±50 N.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3E1 sup	13300 ±25%	≈2800	P36/22-3E1
3E25 sup	17500 ±25%	≈3670	P36/22-3E25
3E27	17500 ±25%	≈3670	P36/22-3E27
3E4 sup	19300 +40/-30%	≈4050	P36/22-3E4
3E5	≥24 500	≥5130	P36/22-3E5

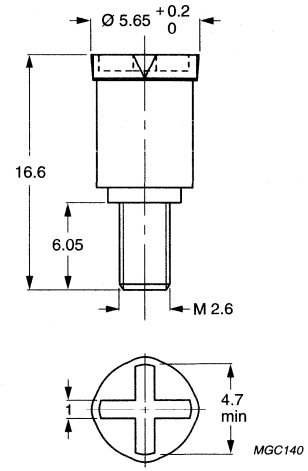
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3B8	≥315	≤3.0	–	–
3C81	≥315	≤2.2	–	–
3C85	≥315	≤1.7	≤2.0	–
3F3	≥315	–	≤1.2	≤2.0

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 P36/22 inductance adjuster.

Inductance adjuster selection chart sup (applies to all types)

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	$\Delta L/L^{(1)}$	TYPES FOR MEDIUM ADJUSTMENT	$\Delta L/L^{(1)}$	TYPES FOR HIGH ADJUSTMENT	$\Delta L/L^{(1)}$
3H1; 3B7	100	–	–	–	–	ADJ-P36/42-WHITE	29
	160	–	–	–	–	ADJ-P36/42-WHITE	24
	250	–	–	–	–	ADJ-P36/42-WHITE	18
	400	–	–	ADJ-P36/42-WHITE	12	–	–
	630	–	–	ADJ-P36/42-WHITE	8	–	–
	1000	ADJ-P36/42-WHITE	4	ADJ-P36/42-GREY	20	–	–
	1250	–	–	ADJ-P36/42-GREY	17	–	–
	1600	–	–	ADJ-P36/42-GREY	12	–	–
	2500	–	–	ADJ-P36/42-GREY	9	–	–

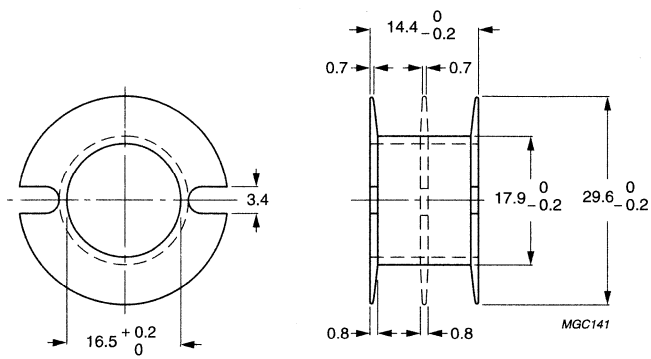
Note

1. Maximum adjustment range.

COIL FORMERS

General data for coil former CP-P36/22

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329 (R)
Maximum operating temperature	155 °C, *"IEC 85"* class F



Dimensions in mm.

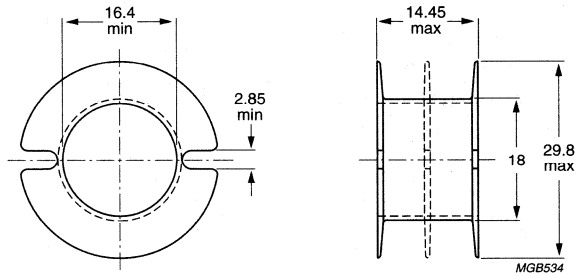
Fig.3 Coil former CP-P36/22.

Winding data for coil former CP-P36/22

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	72.4	12.5	74.3	CP-P36/22-1S
2	2 × 33.9	2 × 5.8	74.3	CP-P36/22-2S
3	3 × 21.0	3 × 3.6	74.3	CP-P36/22-3S

General data for coil former CP-P36/22-A

PARAMETER	SPECIFICATION
Coil former material	acetal (POM), glass reinforced, flame retardant in accordance with *"UL 94-HB"*; UL file number E66288(R)
Maximum operating temperature	105 °C



Dimensions in mm.

Fig.4 Coil former CP-P36/22-A.

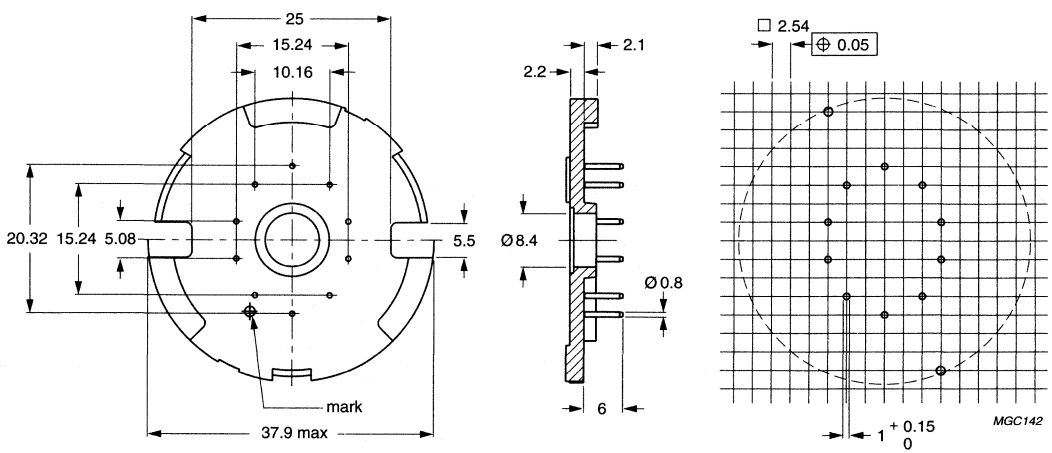
Winding data for coil former CP-P36/22-A

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	71.2	13.2	74.9	CP-P36/22-1S-A
2	2×33.7	2×6.2	74.9	CP-P36/22-2S-A
3	3×21.1	3×3.8	74.9	CP-P36/22-3S-A

MOUNTING PARTS

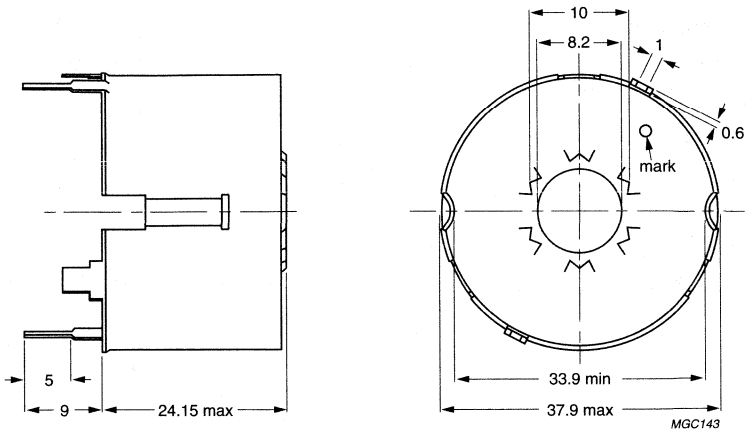
General data and ordering information

ITEM	REMARKS	FIGURE	TYPE NUMBER
Tag plate	material: phenolformaldehyde (PF), glass reinforced	5	TGP-P36/22-10P
	flame retardant: in accordance with *"UL 94V-0"*; UL file number E63312(M)		
	maximum operating temperature: 180 °C, *"IEC 85"* class H		
	pins: copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated		
	resistance to soldering heat in accordance with *"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s		
	solderability in accordance with *"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s		
Container	copper-zinc alloy (CuZn), nickel-plated	6	CON-P36/22
	earth pins: presoldered		
Spring	CrNi-steel	7	SPR-P36/22
	spring force: ≈350 N when mounted		
Nut	copper-zinc alloy, nickel-plated	8	NUT
Bush	copper-zinc alloy, nickel-plated	9	FIB



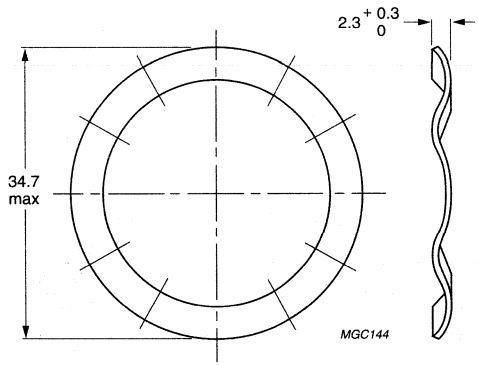
Dimensions in mm.

Fig.5 P36/22 tag plate.



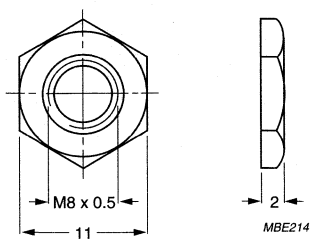
Dimensions in mm.

Fig.6 P36/22 container.



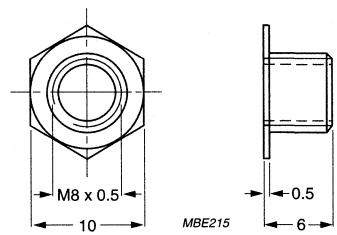
Dimensions in mm.

Fig.7 P36/22 spring.



Dimensions in mm.

Fig.8 Fixing nut.



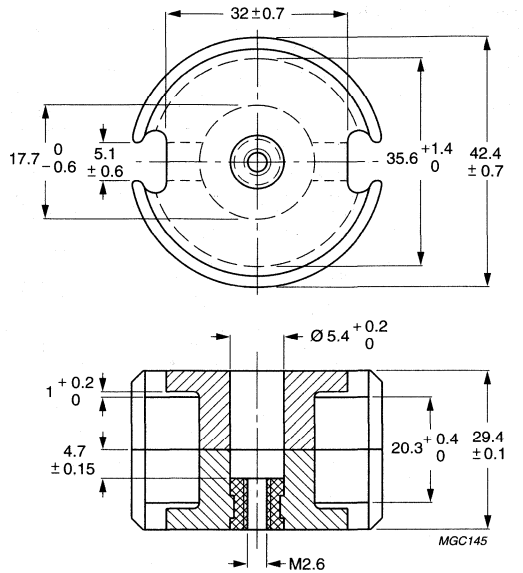
Dimensions in mm.

Fig.9 Fixing bush.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.259	mm^{-1}
V_e	effective volume	18200	mm^3
l_e	effective length	68.6	mm
A_e	effective area	265	mm^2
A_{min}	minimum area	214	mm^2
m	mass of set	≈104	g



Dimensions in mm.

Fig.1 P42/29 core set.

Core sets for filter applications

Clamping force 550 ±100 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3H1 sup	315 ±3%	≈65	≈1100	P42/29-3H1-E315/N	P42/29-3H1-E315
	400 ±3%	≈81	≈830	P42/29-3H1-E400/N	P42/29-3H1-E400
	630 ±3%	≈130	≈450	P42/29-3H1-A630/N	P42/29-3H1-A630
	1000 ±3%	≈205	≈270	P42/29-3H1-A1000/N	P42/29-3H1-A1000
	1600 ±5%	≈325	≈150	P42/29-3H1-A1600/N	P42/29-3H1-A1600
	9500 ±25%	≈1930	≈0	–	P42/29-3H1
3B7 sup	315 ±3%	≈65	≈1100	P42/29-3B7-E315/N	P42/29-3B7-E315
	400 ±3%	≈81	≈830	P42/29-3B7-E400/N	P42/29-3B7-E400
	630 ±3%	≈130	≈450	P42/29-3B7-E630/N	P42/29-3B7-E630
	1000 ±3%	≈205	≈270	P42/29-3B7-E1000/N	P42/29-3B7-E1000
	1600 ±5%	≈325	≈150	P42/29-3B7-A1600/N	P42/29-3B7-A1600
	10300 ±25%	≈2090	≈0	–	P42/29-3B7

Core sets for general purpose transformers and power applications

Clamping force 550 ±100 N.

GRADE	A_L() (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	315 ±3%	≈65	≈1100	P42/29-3C81-E315
	400 ±3%	≈81	≈800	P42/29-3C81-E400
	630 ±3%	≈130	≈500	P42/29-3C81-A630
	1000 ±3%	≈205	≈270	P42/29-3C81-A1000
	1600 ±5%	≈325	≈150	P42/29-3C81-A1600
	11500 ±25%	≈2340	≈0	P42/29-3C81
3C85	315 ±3%	≈65	≈1100	P42/29-3C85-E315
	400 ±3%	≈81	≈800	P42/29-3C85-E400
	630 ±3%	≈130	≈500	P42/29-3C85-A630
	1000 ±3%	≈205	≈270	P42/29-3C85-A1000
	1600 ±5%	≈325	≈150	P42/29-3C85-A1600
	8500 ±25%	≈1750	≈0	P42/29-3C85
3F3	315 ±3%	≈65	≈1100	P42/29-3F3-E315
	400 ±3%	≈81	≈800	P42/29-3F3-E400
	630 ±3%	≈130	≈500	P42/29-3F3-A630
	1000 ±3%	≈205	≈270	P42/29-3F3-A1000
	1600 ±5%	≈325	≈150	P42/29-3F3-A1600
	7700 ±25%	≈1600	≈0	P42/29-3F3

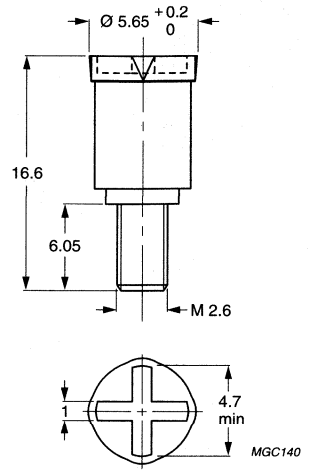
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥315	≤3.7	≤	–
3C85	≥315	≤2.9	≤3.4	–
3F3	≥315	–	≤2.0	≤3.5

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 P42/29 inductance adjuster.

Inductance adjuster selection chart sup (applies to all types)

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	$\Delta L/L^{(1)}$	TYPES FOR MEDIUM ADJUSTMENT	$\Delta L/L^{(1)}$	TYPES FOR HIGH ADJUSTMENT	$\Delta L/L^{(1)}$
3H1; 3B7	100	–	–	–	–	ADJ-P36/P42-WHITE	23
	250	–	–	–	–	ADJ-P36/P42-WHITE	16
	400	ADJ-P36/P42-YELLOW	7	ADJ-P36/P42-WHITE	11	–	–
	630	–	–	ADJ-P36/P42-WHITE	7	ADJ-P36/P42-GREY	33
	1000	–	–	ADJ-P36/P42-GREY	18	–	–
	1600	–	–	ADJ-P36/P42-GREY	11	–	–

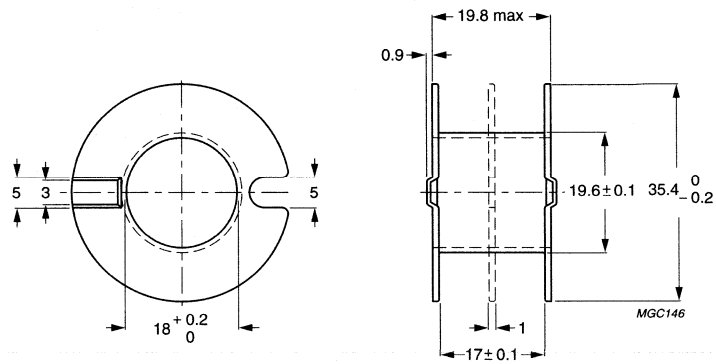
Note

1. Maximum adjustment range.

COIL FORMERS

General data CP-P42/29 coil former

PARAMETER	SPECIFICATION
Coil former material	polycarbonate (PC), glass reinforced, flame retardant in accordance with *"UL 94V-2"*; UL file number E41613(M)
Maximum operating temperature	115 °C



Dimensions in mm.

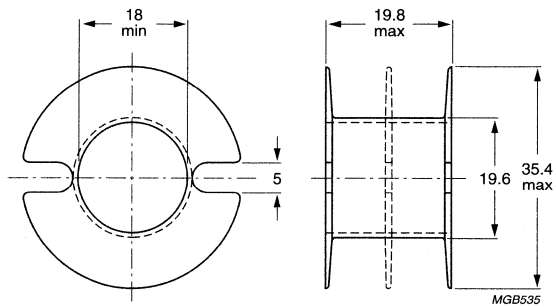
Fig.3 Coil former: CP-P42/29.

Winding data for CP-P42/29 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	140	17.7	86	CP-P42/29-1S
2	2 × 63	2 × 8	86	CP-P42/29-2S

General data for CP-P42/29-A coil former

PARAMETER	SPECIFICATION
Coil former material	acetal (POM), glass reinforced, flame retardant in accordance with *"UL 94-HB"*; UL file number E66288(R)
Maximum operating temperature	105 °C



Dimensions in mm.

Fig.4 Coil former: CP-P42/29-A.

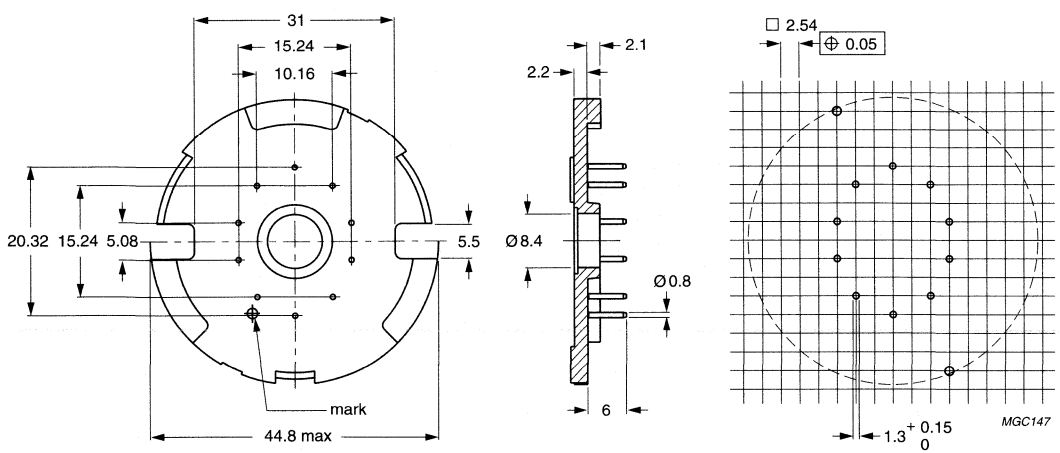
Winding data for CP-P42/29-A coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	137	17.8	86.3	CP-P42/29-1S-A
2	2 × 65	2 × 8.4	86.3	CP-P42/29-2S-A

MOUNTING PARTS

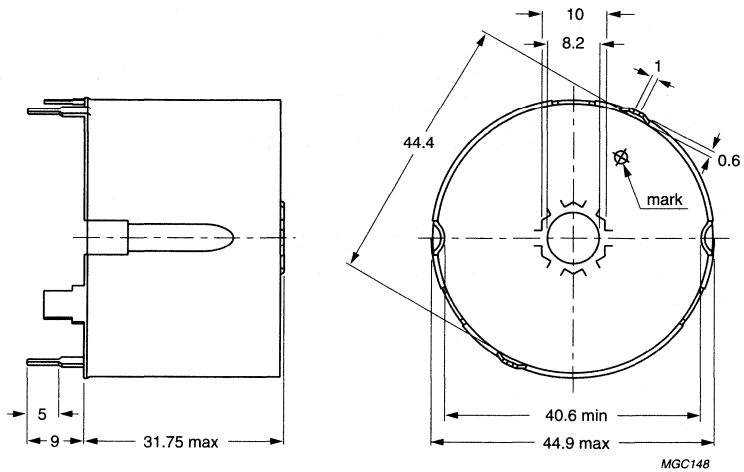
General data and ordering information

ITEM	REMARKS	FIGURE	TYPE NUMBER
Tag plate	material: phenolformaldehyde (PF), glass reinforced	5	TGP-P42/29-10P
	flame retardant: in accordance with *"UL 94V-0"*; UL file number E63312(M)		
	maximum operating temperature: 180 °C, *"IEC 85"* class H		
	pins: copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated		
	resistance to soldering heat in accordance with *"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s		
	solderability in accordance with *"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s		
Container	copper-zinc alloy (CuZn), nickel-plated	6	CON-P42/29
	earth pins: presoldered		
Spring	CrNi-steel	7	SPR-P42/29
	spring force: ≈350 N when mounted		
Nut	copper-zinc alloy, nickel-plated	8	NUT
Bush	copper-zinc alloy, nickel-plated	9	FIB



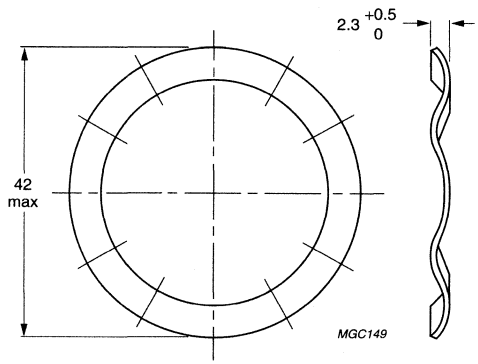
Dimensions in mm.

Fig.5 P42/29 tag plate.



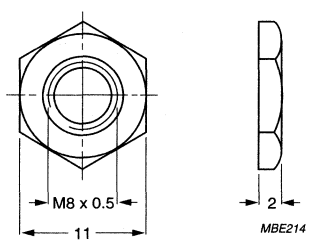
Dimensions in mm.

Fig.6 P42/29 container.



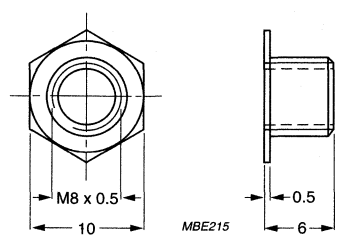
Dimensions in mm.

Fig.7 P42/29 spring.



Dimensions in mm.

Fig.8 Fixing nut: NUT.



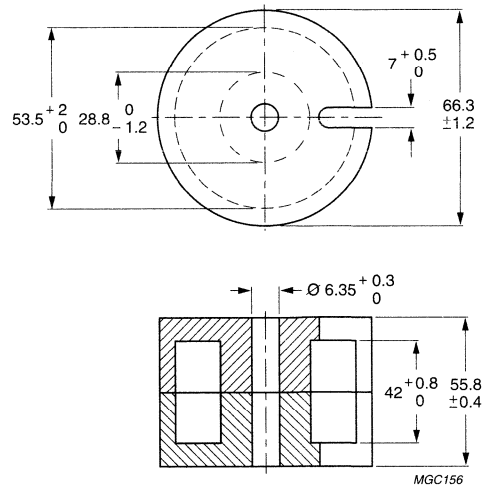
Dimensions in mm.

Fig.9 Fixing bush: FIB.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.172	mm^{-1}
V_e	effective volume	88300	mm^3
l_e	effective length	123.0	mm
A_e	effective area	717.0	mm^2
A_{min}	minimum area	591	mm^2
m	mass of set	≈550	g



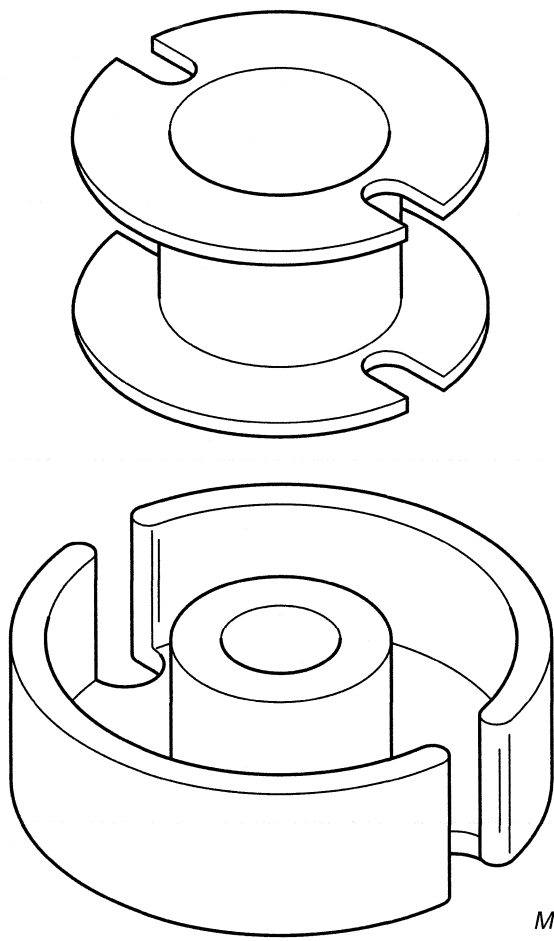
Dimensions in mm.

Fig.1 P66/56 core set.

Core sets for general purpose transformers and power applications

Clamping force 1000 ±300 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81 sup	18200 ±25%	≈2490	≈0	P66/56-3C81
3E1 sup	≥14000	≥1910	≈0	P66/56-3E1
3F3 sup	≥9250	≥1260	≈0	P66/56-3F3



MSB605

For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview PH cores

CORE TYPE
PH5.6/3.6
PH7.4/3.9
PH9.4/4.8
PH14/7.5
PH26/9.2

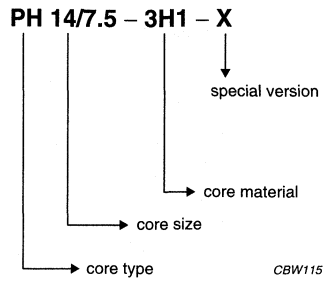
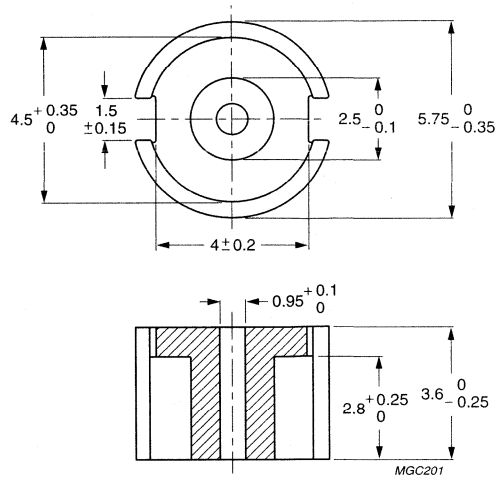


Fig.1 Type number structure for cores.

CORE HALF

Ordering information

GRADE	TYPE NUMBER
3D3	PH5.6/3.6-3D3



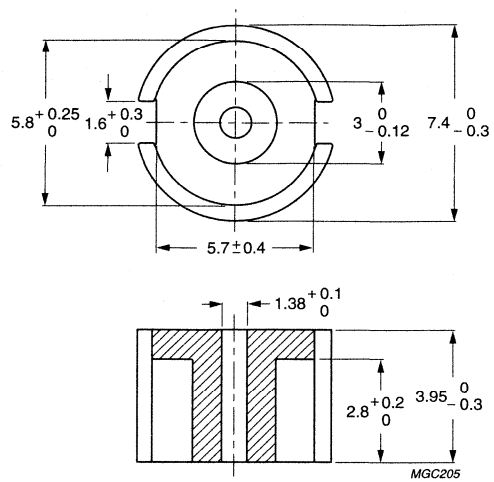
Dimensions in mm.

Fig.1 PH5.6/3.6 core half.

CORE HALF

Ordering information

GRADE	TYPE NUMBER
3D3	PH7.4/3.9-3D3



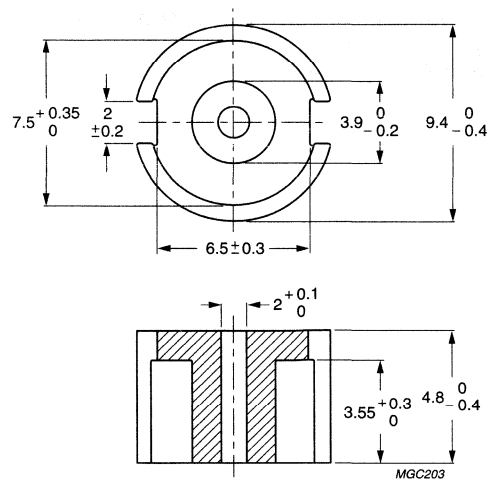
Dimensions in mm.

Fig.1 PH7.4/3.9 core half.

CORE HALF

Ordering information

GRADE	TYPE NUMBER
3D3	PH9.4/4.8-3D3



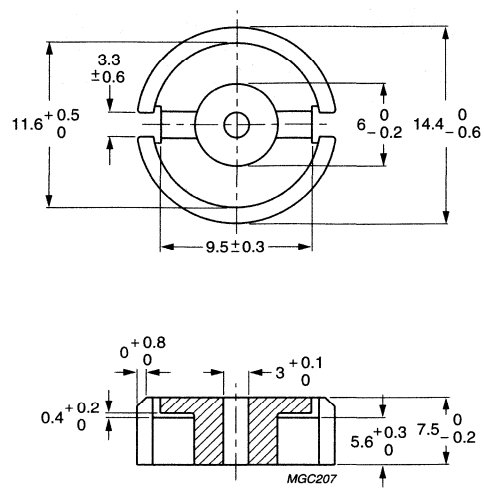
Dimensions in mm.

Fig.1 PH9.4/4.8 core half.

CORE HALF

Ordering information

GRADE	TYPE NUMBER
3H1 sup	PH14/7.5-3H1



Dimensions in mm.

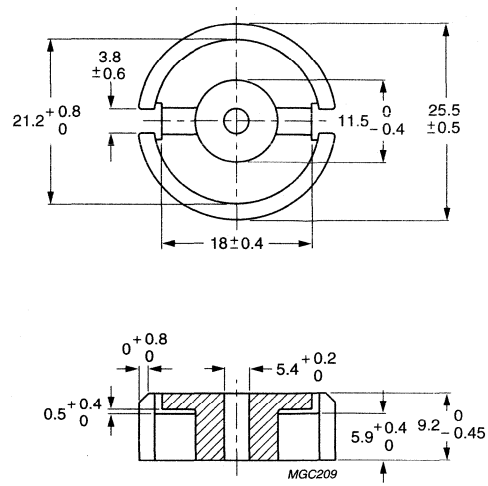
Fig.1 PH14/7.5 core half.

PH cores and accessories PH26/9.2

CORE HALF

Ordering information

GRADE	TYPE NUMBER
3H1 sup	PH26/9.2-3H1



Dimensions in mm.

Fig.1 PH26/9.2 core half.

PQ cores and accessories

For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview PQ cores

CORE TYPE	V_e (mm^3)	A_e (mm^3)	MASS (g)
PQ20/16	2330	61.9	11
PQ20/20	2850	62.6	14
PQ26/20	5820	121	29
PQ26/25	6530	120	32
PQ32/20	9440	169	47
PQ32/30	12500	167	62
PQ35/35	16300	190	80

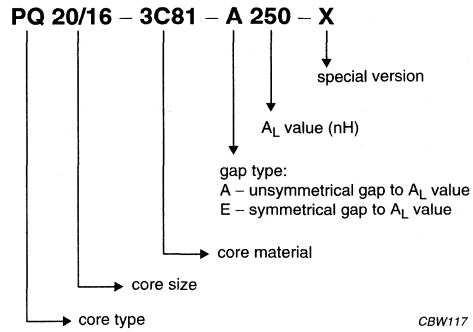


Fig.1 Type number structure for cores.

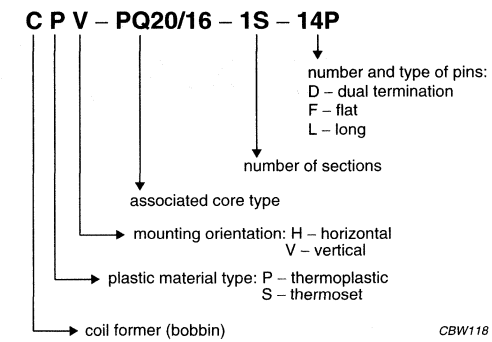
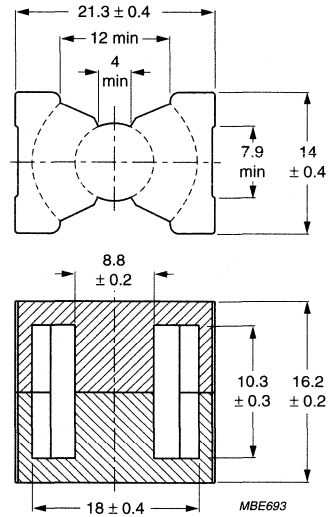


Fig.2 Type number structure for coil formers.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.607	mm^{-1}
V_e	effective volume	2330	mm^3
l_e	effective length	37.6	mm
A_e	effective area	61.9	mm^2
A_{min}	minimum area	59.1	mm^2
m	mass of set	≈11	g



Dimensions in mm.

Fig.1 PQ20/16 core set.

Core sets for general purpose transformers and power applications

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	160 ±3%	≈78	≈577	PQ20/16-3C81-A160
	250 ±3%	≈121	≈340	PQ20/16-3C81-A250
	315 ±3%	≈153	≈262	PQ20/16-3C81-A315
	400 ±3%	≈194	≈196	PQ20/16-3C81-A400
	630 ±5%	≈305	≈114	PQ20/16-3C81-A630
	4080 ±25%	≈1980	≈0	PQ20/16-3C81
3C85	160 ±3%	≈78	≈577	PQ20/16-3C85-A160
	250 ±3%	≈121	≈340	PQ20/16-3C85-A250
	315 ±3%	≈153	≈262	PQ20/16-3C85-A315
	400 ±3%	≈194	≈196	PQ20/16-3C85-A400
	630 ±5%	≈305	≈114	PQ20/16-3C85-A630
	3250 ±25%	≈1580	≈0	PQ20/16-3C85
3F3	160 ±3%	≈78	≈577	PQ20/16-3F3-A160
	250 ±3%	≈121	≈340	PQ20/16-3F3-A250
	315 ±3%	≈153	≈262	PQ20/16-3F3-A315
	400 ±3%	≈194	≈196	PQ20/16-3F3-A400
	630 ±5%	≈305	≈114	PQ20/16-3F3-A630
	3080 ±25%	1492≈	≈0	PQ20/16-3F3

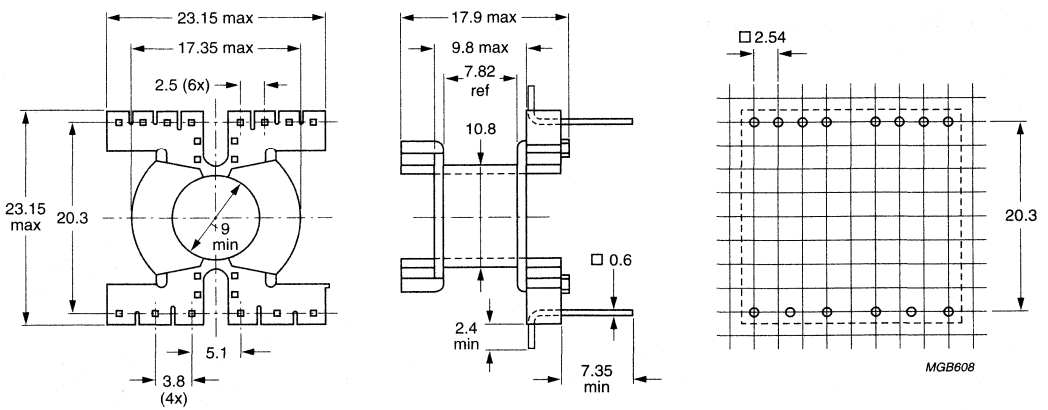
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.48	–	–
3C85	≥320	≤0.36	≤0.42	–
3F3	≥320	–	≤0.26	≤0.44

COIL FORMER

General data 14-pins PQ20/16 coil former

PARAMETER	SPECIFICATION
Coil former material	thermoplastic polyester, glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E69578(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 PQ20/16 coil former; 14-pins.

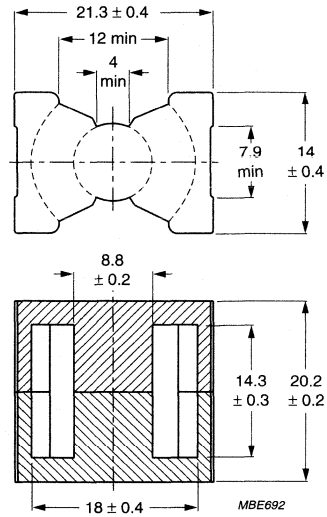
Winding data for 14-pins PQ20/16 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	23.5	7.95	44.0	CPV-PQ20/16-1S-14P
1	23.5	7.95	44.0	CPV-PQ20/16-1S-14PD

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.731	mm^{-1}
V_e	effective volume	2850	mm^3
l_e	effective length	45.7	mm
A_e	effective area	62.6	mm^2
A_{min}	minimum area	59.1	mm^2
m	mass of set	≈14	g



Dimensions in mm.

Fig.3 PQ20/20 core set.

Core sets for general purpose transformers and power applications

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	160 ±3%	≈93	≈582	PQ20/20-3C81-A160
	250 ±3%	≈145	≈340	PQ20/20-3C81-A250
	315 ±3%	≈183	≈259	PQ20/20-3C81-A315
	400 ±3%	≈232	≈193	PQ20/20-3C81-A400
	630 ±5%	≈365	≈109	PQ20/20-3C81-A630
	3580 ±25%	≈2080	≈0	PQ20/20-3C81
3C85	160 ±3%	≈93	≈582	PQ20/20-3C85-A160
	250 ±3%	≈145	≈340	PQ20/20-3C85-A250
	315 ±3%	≈183	≈259	PQ20/20-3C85-A315
	400 ±3%	≈232	≈193	PQ20/20-3C85-A400
	630 ±5%	≈365	≈109	PQ20/20-3C85-A630
	2820 ±25%	≈1635	≈0	PQ20/20-3C85
3F3	160 ±3%	≈93	≈582	PQ20/20-3F3-A160
	250 ±3%	≈145	≈340	PQ20/20-3F3-A250
	315 ±3%	≈183	≈259	PQ20/20-3F3-A315
	400 ±3%	≈232	≈193	PQ20/20-3F3-A400
	630 ±5%	≈365	≈109	PQ20/20-3F3-A630
	2650 ±25%	≈1538	≈0	PQ20/20-3F3

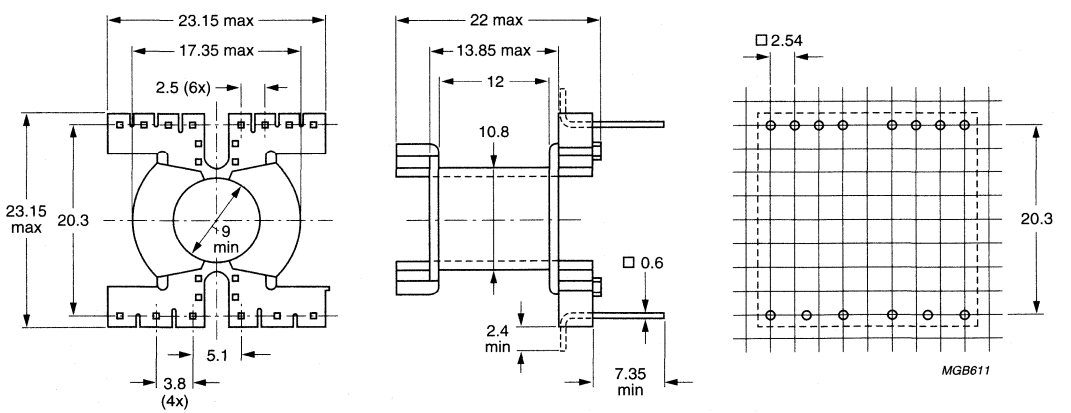
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.58	–	–
3C85	≥320	≤0.44	≤0.51	–
3F3	≥320	–	≤0.31	≤0.54

COIL FORMER

General data 14-pins PQ20/20 coil former

PARAMETER	SPECIFICATION
Coil former material	thermoplastic polyester, glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E69578(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.4 PQ20/20 coil former; 14-pins.

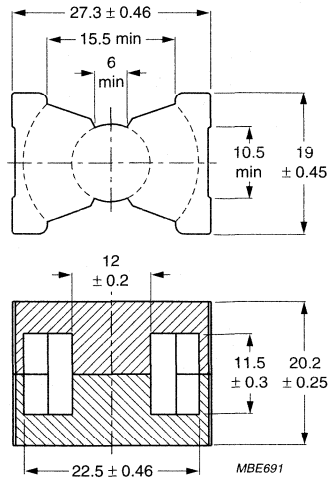
Winding data for 14-pins PQ20/20 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	36.0	12.0	44.0	CPV-PQ20/20-1S-14P
1	36.0	12.0	44.0	CPV-PQ20/20-1S-14PD

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.372	mm^{-1}
V_e	effective volume	5470	mm^3
l_e	effective length	45.0	mm
A_e	effective area	121	mm^2
A_{min}	minimum area	109	mm^2
m	mass of set	≈29	g



Dimensions in mm.

Fig.1 PQ26/20 core set.

Core sets for general purpose transformers and power applications

Clamping force 60 ±15 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	250 ±3%	≈74	≈704	PQ26/20-3C81-E250
	315 ±3%	≈93	≈539	PQ26/20-3C81-A315
	400 ±3%	≈118	≈406	PQ26/20-3C81-A400
	630 ±3%	≈186	≈241	PQ26/20-3C81-A630
	1000 ±5%	≈259	≈137	PQ26/20-3C81-A1000
	7020 ±25%	≈2070	≈0	PQ26/20-3C81
3C85	250 ±3%	≈74	≈704	PQ26/20-3C85-E250
	315 ±3%	≈93	≈539	PQ26/20-3C85-A315
	400 ±3%	≈118	≈406	PQ26/20-3C85-A400
	630 ±3%	≈186	≈241	PQ26/20-3C85-A630
	1000 ±5%	≈259	≈137	PQ26/20-3C81-A1000
	5530 ±25%	≈1630	≈0	PQ26/20-3C85
3F3	250 ±3%	≈74	≈704	PQ26/20-3F3-E250
	315 ±3%	≈93	≈539	PQ26/20-3F3-A315
	400 ±3%	≈118	≈406	PQ26/20-3F3-A400
	630 ±3%	≈186	≈241	PQ26/20-3F3-A630
	1000 ±5%	≈259	≈137	PQ26/20-3C81-A1000
	5200 ±25%	≈1535	≈0	PQ26/20-3F3

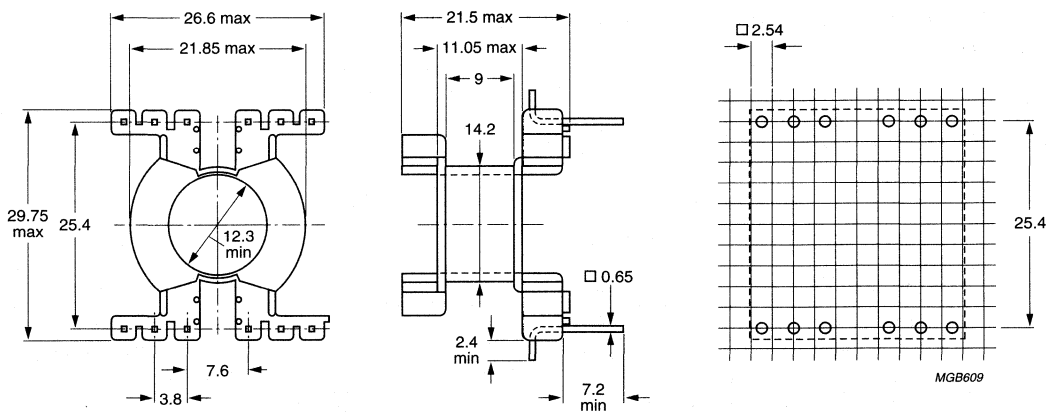
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤1.2	–	–
3C85	≥320	≤0.91	≤1.1	–
3F3	≥320	–	≤0.64	≤1.1

COIL FORMER

General data 12-pins PQ26/20 coil former

ITEM	SPECIFICATION
Coil former material	thermoplastic polyester, glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E69578(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 PQ26/20 coil former; 12-pins.

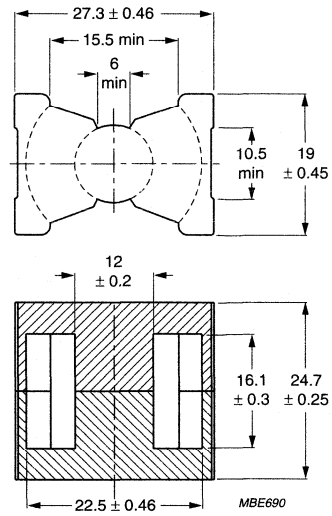
Winding data for 12-pins PQ26/20 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	31.1	9.0	56.4	CPV-PQ26/20-1S-12P
1	31.1	9.0	56.4	CPV-PQ26/20-1S-12PD

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.451	mm^{-1}
V_e	effective volume	6530	mm^3
l_e	effective length	54.3	mm
A_e	effective area	120	mm^2
A_{min}	minimum area	108	mm^2
m	mass of set	≈32	g



Dimensions in mm.

Fig.1 PQ26/25 core set.

Core sets for general purpose transformers and power applications

Clamping force 60 ±15 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	250 ±3%	≈90	≈701	PQ26/25-3C81-E250
	315 ±3%	≈113	≈533	PQ26/25-3C81-A315
	400 ±3%	≈143	≈401	PQ26/25-3C81-A400
	630 ±3%	≈226	≈234	PQ26/25-3C81-A630
	1000 ±5%	≈359	≈132	PQ26/25-3C81-A1000
	6010 ±25%	≈2160	≈0	PQ26/25-3C81
3C85	250 ±3%	≈90	≈701	PQ26/25-3C85-E250
	315 ±3%	≈113	≈533	PQ26/25-3C85-A315
	400 ±3%	≈143	≈401	PQ26/25-3C85-A400
	630 ±3%	≈226	≈234	PQ26/25-3C85-A630
	1000 ±5%	≈359	≈132	PQ26/25-3C85-A1000
	4700 ±25%	≈1690	≈0	PQ26/25-3C85
3F3	250 ±3%	≈90	≈701	PQ26/25-3F3-E250
	315 ±3%	≈113	≈533	PQ26/25-3F3-A315
	400 ±3%	≈143	≈401	PQ26/25-3F3-A400
	630 ±3%	≈226	≈234	PQ26/25-3F3-A630
	1000 ±5%	≈359	≈132	PQ26/25-3F3-A1000
	4390 ±25%	≈1574	≈0	PQ26/25-3F3

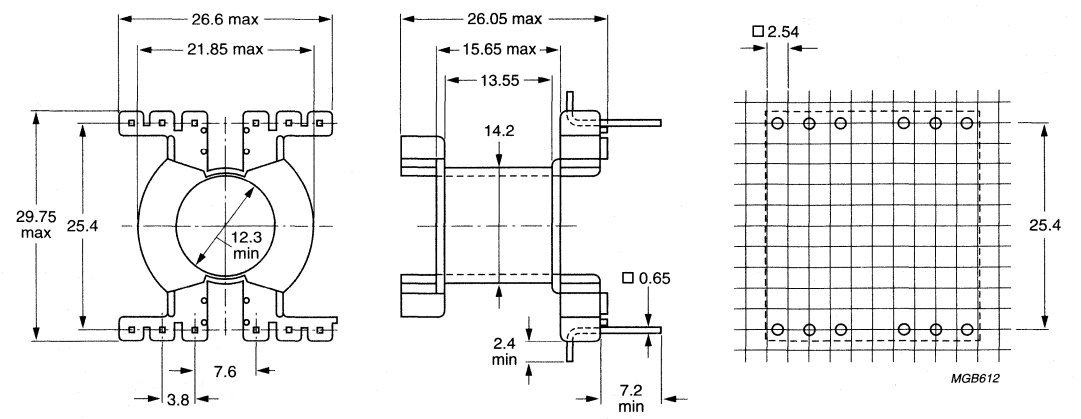
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤1.3	–	–
3C85	≥320	≤1.0	≤1.2	–
3F3	≥320	–	≤0.72	≤1.2

COIL FORMER

General data 12-pins PQ26/25 coil former

PARAMETER	SPECIFICATION
Coil former material	thermoplastic polyester, glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E69578(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 PQ26/25 coil former; 12-pins.

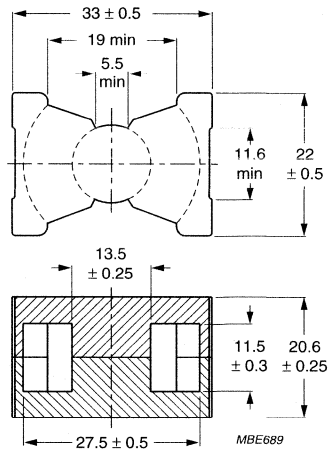
Winding data for 12-pins PQ26/25 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	47.5	13.6	56.4	CPV-PQ26/25-1S-12P
1	47.5	13.6	56.4	CPV-PQ26/25-1S-12PD

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.331	mm^{-1}
V_e	effective volume	9440	mm^3
l_e	effective length	55.9	mm
A_e	effective area	169	mm^2
A_{min}	minimum area	142	mm^2
m	mass of set	≈47	g



Dimensions in mm.

Fig.1 PQ32/20 core set.

Core sets for general purpose transformers and power applications

Clamping force 80 ±20 N.

GRADE	A_L() (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	315 ±3%	≈83	≈765	PQ32/20-3C81-E315
	400 ±3%	≈105	≈582	PQ32/20-3C81-A400
	630 ±3%	≈166	≈343	PQ32/20-3C81-A630
	1000 ±3%	≈263	≈198	PQ32/20-3C81-A1000
	1600 ±5%	≈421	≈109	PQ32/20-3C81-A1600
	7560 ±25%	≈1990	≈0	PQ32/20-3C81
3C85	315 ±3%	≈83	≈765	PQ32/20-3C85-E315
	400 ±3%	≈105	≈582	PQ32/20-3C85-A400
	630 ±3%	≈166	≈343	PQ32/20-3C85-A630
	1000 ±3%	≈263	≈198	PQ32/20-3C85-A1000
	1600 ±5%	≈421	≈109	PQ32/20-3C81-A1600
	6000 ±25%	≈1580	≈0	PQ32/20-3C85
3F3	315 ±3%	≈83	≈765	PQ32/20-3F3-E315
	400 ±3%	≈105	≈582	PQ32/20-3F3-A400
	630 ±3%	≈166	≈343	PQ32/20-3F3-A630
	1000 ±3%	≈263	≈198	PQ32/20-3F3-A1000
	1600 ±5%	≈421	≈109	PQ32/20-3C81-A1600
	6000 ±25%	≈1580	≈0	PQ32/20-3F3

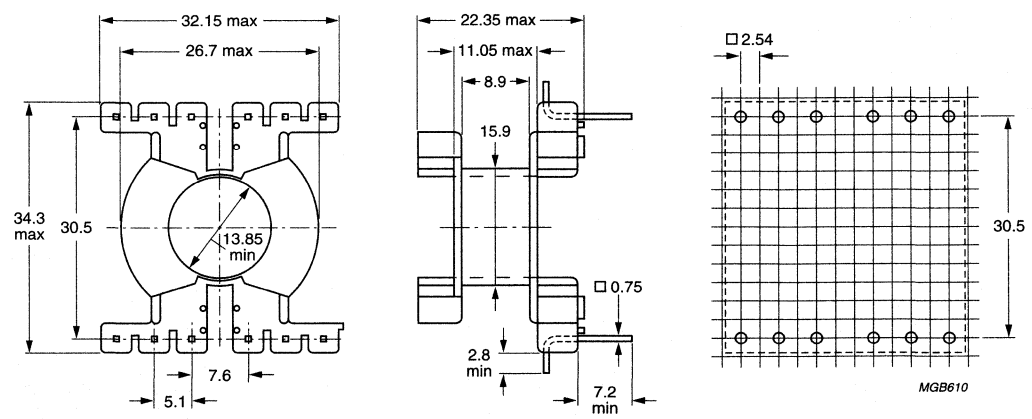
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤1.9	–	–
3C85	≥320	≤1.5	≤1.7	–
3F3	≥320	–	≤1.0	≤1.8

COIL FORMER

General data 12-pins PQ32/20 coil former

PARAMETER	SPECIFICATION
Coil former material	thermoplastic polyester, glass-reinforced, flame retardant in accordance with *"UL 94 V-0"*; UL file number E69578(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 PQ32/20 coil former; 12-pins.

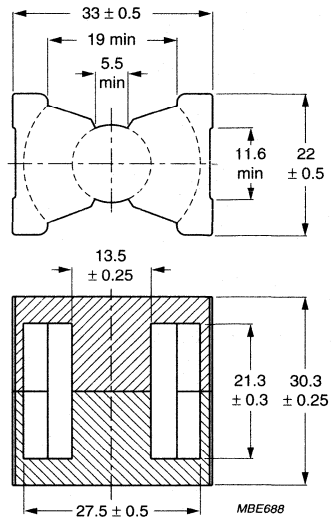
Winding data for 12-pins PQ32/20 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	44.8	8.9	66.7	CPV-PQ32/20-1S-12P
1	44.8	8.9	66.7	CPV-PQ32/20-1S-12PD

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.447	mm^{-1}
V_e	effective volume	12500	mm^3
l_e	effective length	74.7	mm
A_e	effective area	167	mm^2
A_{min}	minimum area	142	mm^2
m	mass of set	≈62	g



Dimensions in mm.

Fig.1 PQ32/30 core set.

Core sets for general purpose transformers and power applications

Clamping force 80 ±20 N.

GRADE	A_L() (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	315 ±3%	≈112	≈766	PQ32/30-3C81-E315
	400 ±3%	≈142	≈576	PQ32/30-3C81-A400
	630 ±3%	≈224	≈334	PQ32/30-3C81-A630
	1000 ±3%	≈356	≈188	PQ32/30-3C81-A1000
	1600 ±5%	≈569	≈99	PQ32/30-3C81-A1600
	6570 ±25%	≈2335	≈0	PQ32/30-3C81
3C85	315 ±3%	≈112	≈766	PQ32/30-3C85-E315
	400 ±3%	≈142	≈576	PQ32/30-3C85-A400
	630 ±3%	≈224	≈334	PQ32/30-3C85-A630
	1000 ±3%	≈356	≈188	PQ32/30-3C85-A1000
	1600 ±5%	≈569	≈99	PQ32/30-3C81-A1600
	5040 ±25%	≈1790	≈0	PQ32/30-3C85
3F3	315 ±3%	≈112	≈766	PQ32/30-3F3-E315
	400 ±3%	≈142	≈576	PQ32/30-3F3-A400
	630 ±3%	≈224	≈334	PQ32/30-3F3-A630
	1000 ±3%	≈356	≈188	PQ32/30-3F3-A1000
	1600 ±5%	≈569	≈99	PQ32/30-3C81-A1600
	4580 ±25%	≈1630	≈0	PQ32/30-3F3

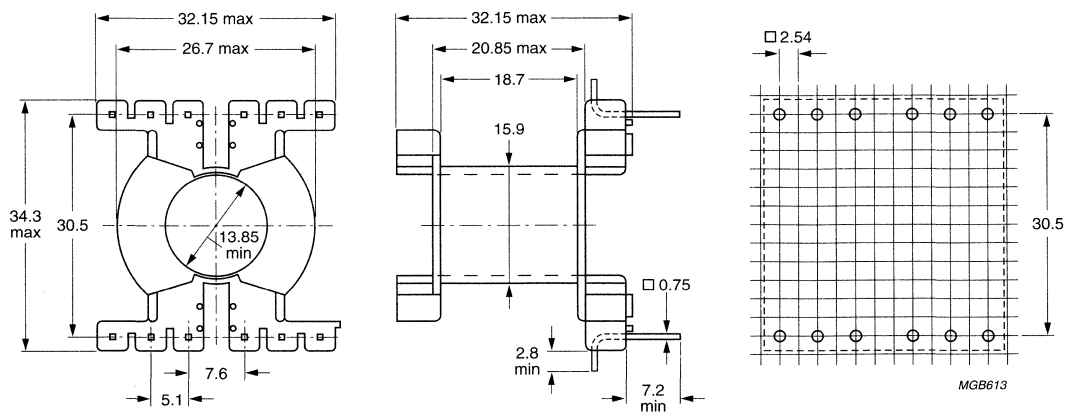
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤2.6	–	–
3C85	≥320	≤1.9	≤2.3	–
3F3	≥320	–	≤1.4	≤2.4

COIL FORMER

General data 14-pins PQ32/30 coil former

PARAMETER	SPECIFICATION
Coil former material	thermoplastic polyester, glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E69578(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 PQ32/30 coil former; 12-pins.

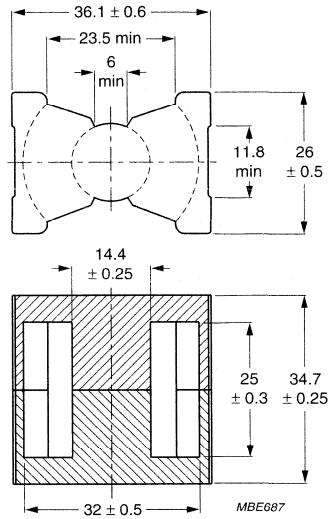
Winding data for 12-pins PQ32/30 coil former

NUMBER OF SECTIONS	MINIMUM WINDING AREA (mm^2)	NOMINAL WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	53.0	18.7	66.7	CPV-PQ32/30-1S-12P
1	53.0	18.7	66.7	CPV-PQ32/30-1S-12PD

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.454	mm^{-1}
V_e	effective volume	16300	mm^3
l_e	effective length	86.1	mm
A_e	effective area	190	mm^2
A_{min}	minimum area	162	mm^2
m	mass of set	≈80	g



Dimensions in mm.

Fig.1 PQ35/35 core set.

Core sets for general purpose transformers and power applications

Clamping force 80 ±20 N.

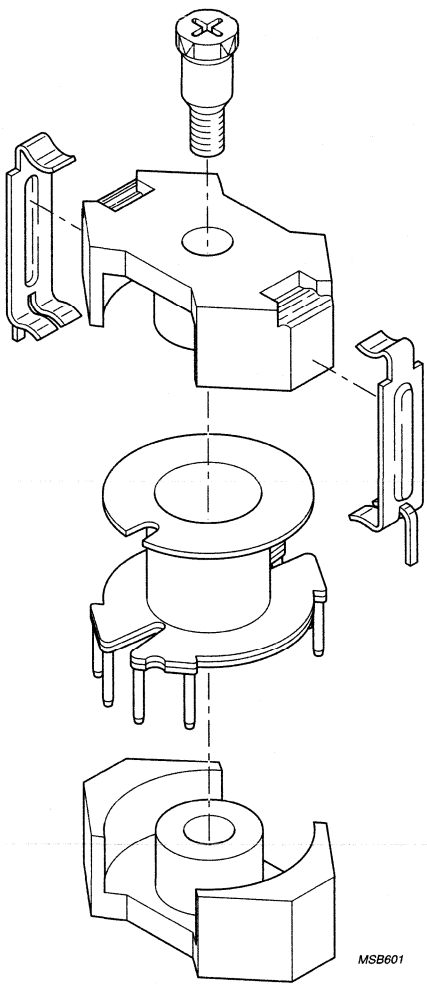
GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C81	315 ±3%	≈114	≈880	PQ35/35-3C81-E315
	400 ±3%	≈145	≈660	PQ35/35-3C81-E400
	630 ±3%	≈228	≈381	PQ35/35-3C81-A630
	1000 ±3%	≈361	≈214	PQ35/35-3C81-A1000
	1600 ±5%	≈578	≈112	PQ35/35-3C81-A1600
	5330 ±25%	≈1920	≈0	PQ35/35-3C81
3C85	315 ±3%	≈114	≈880	PQ35/35-3C85-E315
	400 ±3%	≈145	≈660	PQ35/35-3C85-E400
	630 ±3%	≈228	≈381	PQ35/35-3C85-A630
	1000 ±3%	≈361	≈214	PQ35/35-3C85-A1000
	1600 ±5%	≈578	≈112	PQ35/35-3C85-A1600
	4300 ±25%	≈1550	≈0	PQ35/35-3C85
3F3	315 ±3%	≈114	≈880	PQ35/35-3F3-E315
	400 ±3%	≈145	≈660	PQ35/35-3F3-E400
	630 ±3%	≈228	≈381	PQ35/35-3F3-A630
	1000 ±3%	≈361	≈214	PQ35/35-3F3-A1000
	1600 ±5%	≈578	≈112	PQ35/35-3F3-A1600
	4570 ±25%	≈1650	≈0	PQ35/35-3F3

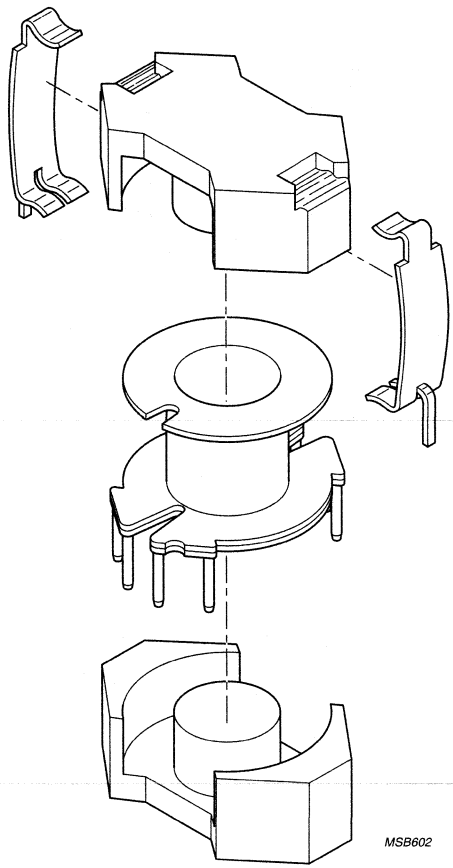
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤3.3	–	–
3C85	≥320	≤2.5	≤2.9	–
3F3	≥320	–	≤1.8	≤3.1

Soft Ferrites

RM, RM/I, RM/ILP cores and accessories





For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview RM cores

CORE TYPE	V_e (mm^3)	A_e (mm^2)	MASS (g)
RM4	230	11.0	2.5
RM4/I	322	13.8	2.8
RM4/ILP	251	14.5	1.5
RM5	450	21.2	3.0
RM5/I	574	24.8	3.3
RM5/ILP	430	24.5	2.2
RM6S	840	31.4	4.5
RM6S/I	1090	37.0	4.9
RM6S/ILP	820	37.5	4.2
RM6R	810	32.0	4.5
RM7/I	1325	44.1	7.7
RM7/ILP	1060	45.3	6.0
RM8	1850	52.0	10.9
RM8/I	2440	63.0	12.0
RM8/ILP	1860	64.9	10.0
RM10	3470	83.2	20
RM10/I	4310	96.6	22
RM10/ILP	3360	99.1	17
RM12/I	8340	146	45
RM12/ILP	6195	148	34
RM14/I	13900	198	74
RM14/ILP	10230	201	55

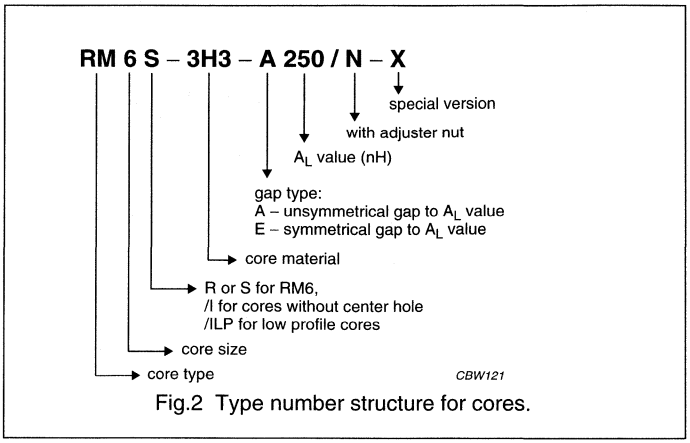


Fig.2 Type number structure for cores.

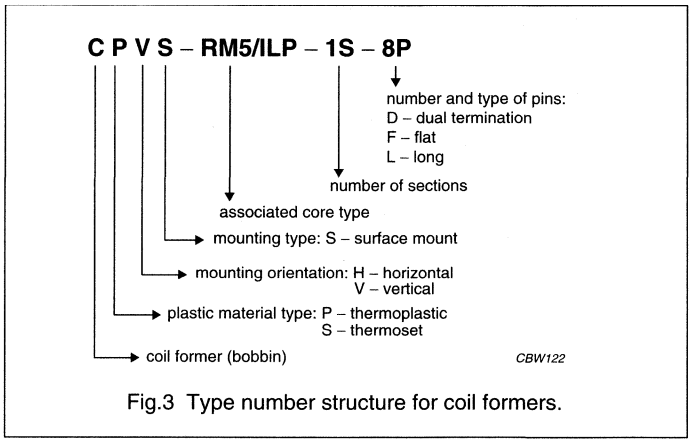
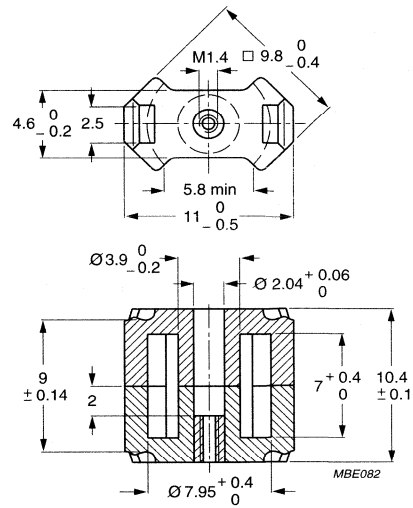


Fig.3 Type number structure for coil formers.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.94	mm^{-1}
V_e	effective volume	230	mm^3
l_e	effective length	21.3	mm
A_e	effective area	11.0	mm^2
A_{min}	minimum area	8.1	mm^2
m	mass of set	≈1.4	g



Dimensions in mm.

Fig.1 RM4 core set.

Core sets for filter applications

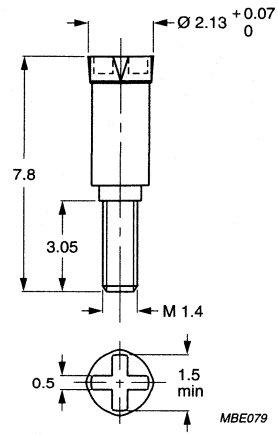
Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
4C6 sup	16 ±3%	≈24	≈1500	RM4-4C6-E16/N	RM4-4C6-E16
	25 ±3%	≈38	≈700	RM4-4C6-E25/N	RM4-4C6-E25
	40 ±3%	≈62	≈130	RM4-4C6-A40/N	RM4-4C6-A40
	65 ±25%	≈100	≈0	–	RM4-4C6
3D3	40 ±3%	≈62	≈400	RM4-3D3-E40/N	RM4-3D3-E40
	63 ±3%	≈96	≈200	RM4-3D3-A63/N	RM4-3D3-A63
	400 ±25%	≈610	≈0	–	RM4-3D3
3H3	63 ±3%	≈96	≈200	RM4-3H3-A63/N	RM4-3H3-A63
	100 ±3%	≈152	≈120	RM4-3H3-A100/N	RM4-3H3-A100
	160 ±3%	≈242	≈80	RM4-3H3-A160/N	RM4-3H3-A160
	900 ±25%	≈1360	≈0	–	RM4-3H3
3H1 sup	40 ±3%	≈62	≈350	RM4-3H1-E40/N	RM4-3H1-E40
	63 ±3%	≈96	≈200	RM4-3H1-A63/N	RM4-3H1-A63
	100 ±3%	≈152	≈120	RM4-3H1-A100/N	RM4-3H1-A100
	160 ±3%	≈242	≈80	RM4-3H1-A160/N	RM4-3H1-A160
	250 ±8%	≈380	≈50	RM4-3H1-A250/N	RM4-3H1-A250
	950 ±25%	≈1440	≈0	–	RM4-3H1

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 RM4 inductance adjuster.

Inductance adjuster selection chart

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	ΔL/L %(1)	TYPES FOR MEDIUM ADJUSTMENT	ΔL/L %(1)	TYPES FOR HIGH ADJUSTMENT	ΔL/L %(1)
3H1; 3H3	63	–	–	–	–	ADJ-RM4/RM5-RED	27
	100	–	–	ADJ-RM4/RM5-RED	17	ADJ-RM4/RM5-BROWN	25
	160	ADJ-RM4/RM5-GREEN	5	ADJ-RM4/RM5-BROWN	14	ADJ-RM4/RM5-GREY	26
	250	ADJ-RM4/RM5-RED	5	ADJ-RM4/RM5-GREY	12	ADJ-RM4/RM5-BLACK	17

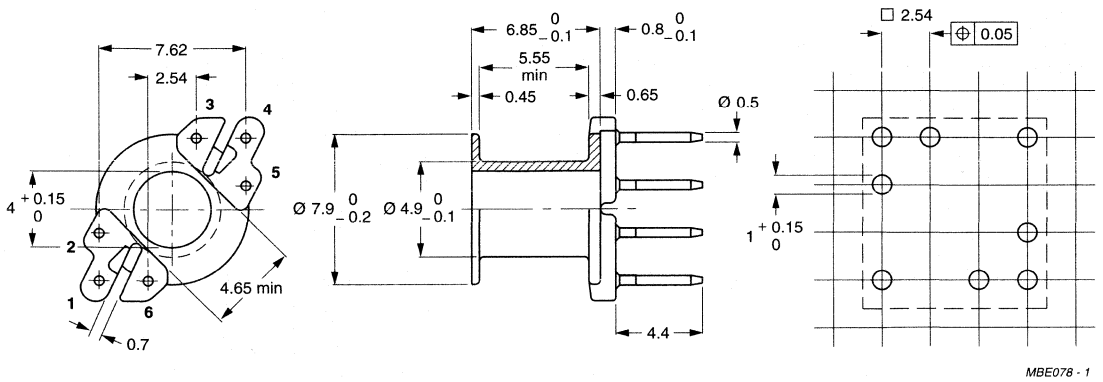
Note

1. Maximum adjustment range.

COIL FORMER

General data

PARAMETER	SPECIFICATION
Coil former material	polyester (UP), glass-reinforced, flame retardant in accordance with *"UL 94V=0"*; UL file number E61040(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.3 RM4 coil former.

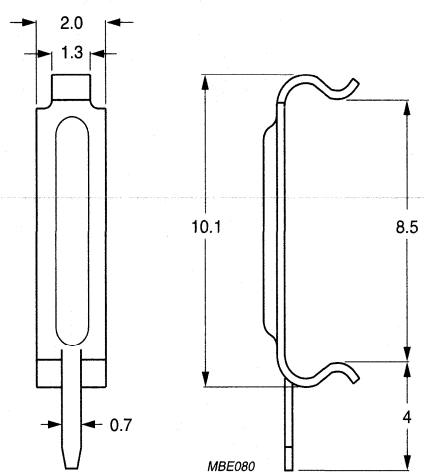
Winding data for RM4 coil former

NUMBER OF SECTIONS	NUMBER OF PINS	PIN POSITIONS USED	AVERAGE LENGTH OF TURN (mm)	WINDING AREA (mm^2)	WINDING WIDTH (mm)	TYPE NUMBER
1	6	all	20	7.4	5.55	CSV-RM4-1S-6P

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈10 N
Clip material	stainless steel (CrNi)
Clip plating	silver (Ag)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM4/5



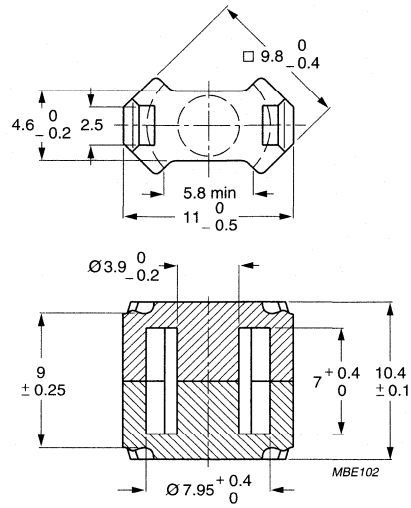
Dimensions in mm.

Fig.4 Mounting clip for RM4.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.69	mm^{-1}
V_e	effective volume	322	mm^3
l_e	effective length	23.3	mm
A_e	effective area	13.8	mm^2
A_{min}	minimum area	11.5	mm^2
m	mass of set	≈1.7	g



Dimensions in mm.

Fig.1 RM4/I core set.

Core sets for general purpose transformers and power applications

Clamping force 10 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F3	100 ±3%	≈134	≈170	RM4/I-3F3-A100
	160 ±3%	≈215	≈100	RM4/I-3F3-A160
	250 ±10%	≈336	≈50	RM4/I-3F3-A250
	950 ±25%	≈1280	≈0	RM4/I-3F3
3F4 des	100 ±3%	≈134	≈150	RM4/I-3F4-A100
	160 ±3%	≈215	≈80	RM4/I-3F4-A160
	250 ±10%	≈336	≈40	RM4/I-3F4-A250
	560 ±25%	≈750	≈0.12	RM4/I-3F4

Core sets of high permeability grades

Clamping force 10 ±5 N.

GRADE	A_L() (nH)	μ_e	TYPE NUMBER
3E1	1800 ±25%	≈2400	RM4/I-3E1
3E4	2500 +40/−30%	≈3360	RM4/I-3E4
3E5	3500 +40/−30%	≈4700	RM4/I-3E5

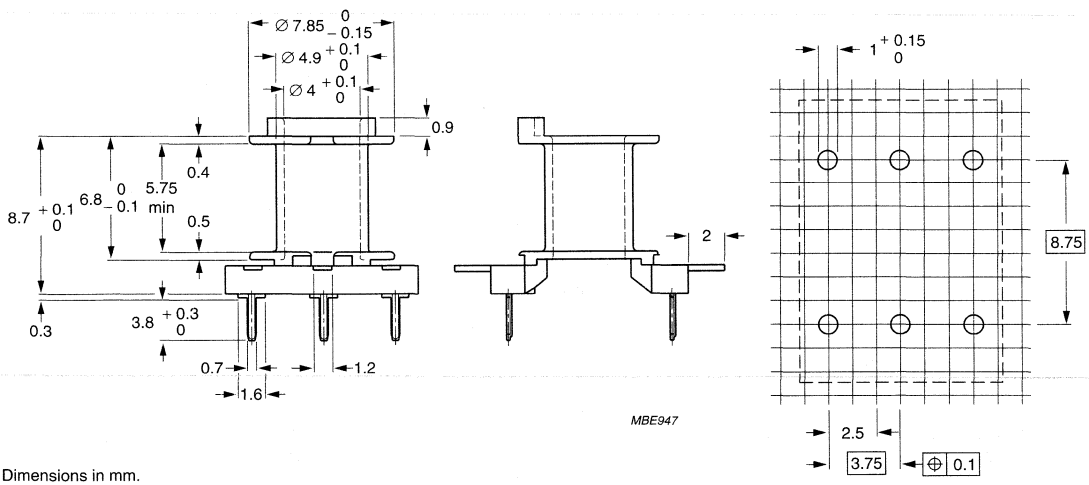
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3F3	≥300	–	≤0.05	≤0.07	–	–
3F4	≥250	–	–	–	≤0.065	≤0.11

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E83005(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

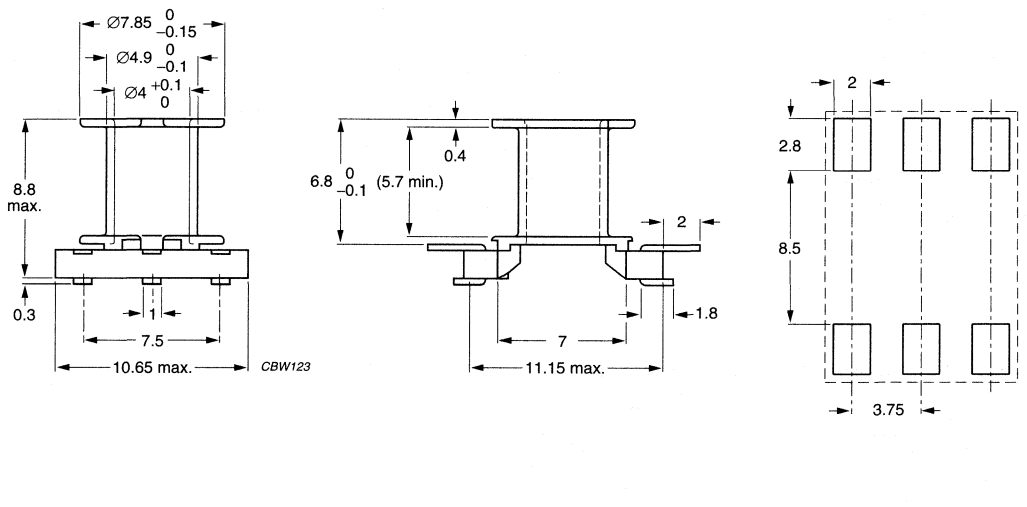
Fig.2 RM4/I coil former.

Winding data for RM4 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	8.4	5.75	19.8	CPV-RM4-1S-6PD

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E83005(M)
Solder pad material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.3 SMD coil former for RM4/I.

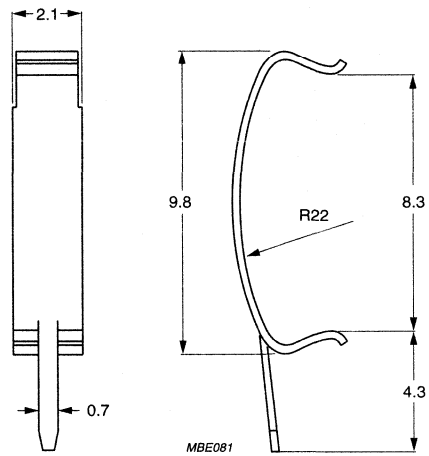
Winding data for RM4 coil former (SMD)

NUMBER OF SECTIONS	NUMBER OF SOLDER PADS	WINDING AREA (mm^2)	WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	6	8.4	5.75	19.8	CPVS-RM4-1S-6P

MOUNTING PARTS

General data mounting clip with earth pin

ITEM	SPECIFICATION
Clamping force	≈5 N
Clip material	stainless steel (CrNi)
Clip plating	lead tin alloy (SnPb)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM4/5/I

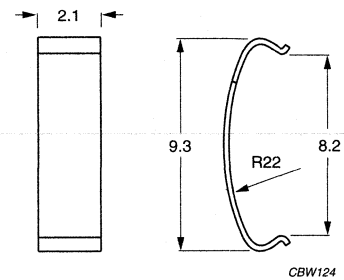


Dimensions in mm.

Fig.4 Mounting clip CLI/P-RM4/5/I.

General data mounting clip without earth pin

ITEM	SPECIFICATION
Clamping force	≈5 N
Clip material	stainless steel (CrNi)
Type number	CLI-RM4/5



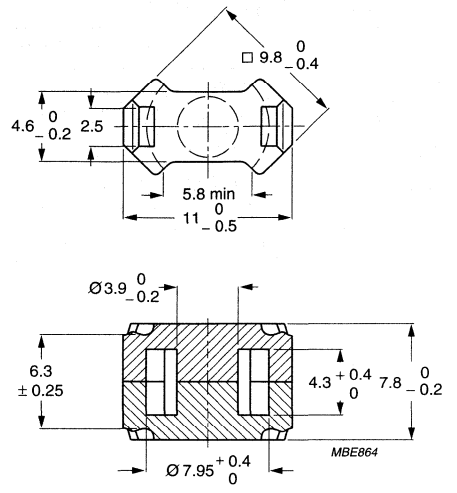
Dimensions in mm.

Fig.5 Mounting clip CLI-RM4/5.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.20	mm^{-1}
V_e	effective volume	251	mm^3
l_e	effective length	17.3	mm
A_e	effective area	14.5	mm^2
A_{min}	minimum area	11.3	mm^2
m	mass of set	≈1.5	g



Dimensions in mm.

Fig.1 RM4/ILP core set.

Core sets for general purpose transformers and power applications

Clamping force 10 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	1300 ±25%	≈1240	≈0	RM4/ILP-3C85
3C90 des	1300 ±25%	≈1240	≈0	RM4/ILP-3C90
3F3 des	1200 ±25%	≈1150	≈0	RM4/ILP-3F3
3F4 des	750 ±25%	≈720	≈0	RM4/ILP-3F4

Core sets of high permeability grades

Clamping force 10 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5 des	5000 +40/−30%	≈4800	≈0	RM4/ILP-3E5
3E6 des	6700 +40/−30%	≈6400	≈0	RM4/ILP-3E6

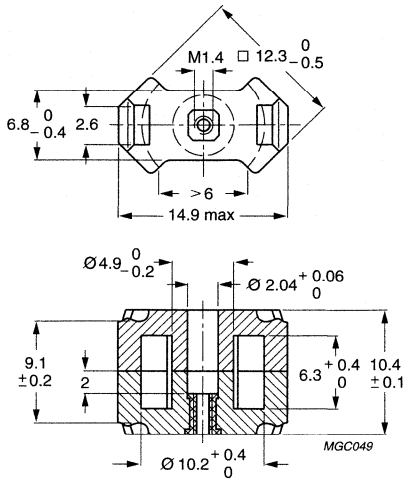
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C85	≥315	≤0.05	≤0.06	–	–	–
3C90	≥315	≤0.04	≤0.04	–	–	–
3F3	≥300	–	≤0.04	≤0.06	–	–
3F4	≥250	–	–	–	≤0.05	≤0.08

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.01	mm^{-1}
V_e	effective volume	450	mm^3
l_e	effective length	21.4	mm
A_e	effective area	21.2	mm^2
A_{min}	minimum area	14.8	mm^2
m	mass of set	≈3.0	g



Dimensions in mm.

Fig.1 RM5 core set.

Core sets for filter applications

Clamping force 25 ±10 N.

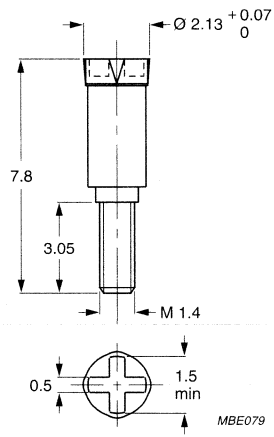
GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
4C6 sup	16 ±3%	≈13	≈2000	RM5-4C6-E16/N	RM5-4C6-E16
	25 ±3%	≈20	≈1200	RM5-4C6-E25/N	RM5-4C6-E25
	40 ±3%	≈33	≈500	RM5-4C6-E40/N	RM5-4C6-E40
	63 ±3%	≈50	≈200	RM5-4C6-E63/N	RM5-4C6-E63
	120 ±25%	≈95	≈0	–	RM5-4C6
3D3	40 ±3%	≈33	≈700	RM5-3D3-E40/N	RM5-3D3-E40
	63 ±3%	≈51	≈400	RM5-3D3-E63/N	RM5-3D3-E63
	100 ±3%	≈82	≈300	RM5-3D3-E100/N	RM5-3D3-E100
	800 ±25%	≈630	≈0	–	RM5-3D3
3H3	160 ±3%	≈130	≈200	RM5-3H3-A160/N	RM5-3H3-A160
	250 ±3%	≈200	≈120	RM5-3H3-A250/N	RM5-3H3-A250
	315 ±3%	≈250	≈90	RM5-3H3-A315/N	RM5-3H3-A315
	400 ±5%	≈320	≈70	RM5-3H3-A400/N	RM5-3H3-A400
	1650 ±25%	≈1310	≈0	–	RM5-3H3
3H1 sup	160 ±3%	≈130	≈200	RM5-3H1-A160/N	RM5-3H1-A160
	250 ±3%	≈200	≈120	RM5-3H1-A250/N	RM5-3H1-A250
	315 ±3%	≈250	≈90	RM5-3H1-A315/N	RM5-3H1-A315
	1800 ±25%	≈1430	≈0	–	RM5-3H1

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3B7 sup	63 ±3%	≈50	≈540	RM5-3B7-E63/N	RM5-3B7-E63
	100 ±3%	≈80	≈310	RM5-3B7-E100/N	RM5-3B7-E100
	160 ±3%	≈130	≈200	RM5-3B7-A160/N	RM5-3B7-A160
	250 ±3%	≈200	≈120	RM5-3B7-A250/N	RM5-3B7-A250
	315 ±3%	≈250	≈90	RM5-3B7-A315/N	RM5-3B7-A315
	1960 ±25%	≈1550	≈0	–	RM5-3B7

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 RM5 inductance adjuster.

Inductance adjuster selection chart

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	ΔL/L %(1)	TYPES FOR MEDIUM ADJUSTMENT	ΔL/L %(1)	TYPES FOR HIGH ADJUSTMENT	ΔL/L %(1)
3H1; 3H3; 3B7	63	–	–	–	–	ADJ-RM4/RM5-RED	23
	100	–	–	ADJ-RM4/RM5-RED	15	ADJ-RM4/RM5-BROWN	24
	160	ADJ-RM4/RM5-RED	11	ADJ-RM4/RM5-BROWN	15	ADJ-RM4/RM5-GREY	28
	250	ADJ-RM4/RM5-RED	6	ADJ-RM4/RM5-BROWN	10	ADJ-RM4/RM5-GREY	17
	315	ADJ-RM4/RM5-BROWN	7	ADJ-RM4/RM5-GREY	13	–	–
	400	ADJ-RM4/RM5-BROWN	5	ADJ-RM4/RM5-BLACK	14	–	–
3D3	63	–	–	–	–	ADJ-RM4/RM5-RED	20
	100	–	–	ADJ-RM4/RM5-RED	14	–	–
4C6	40	–	–	–	–	ADJ-RM4/RM5-RED	17
	63	–	–	ADJ-RM4/RM5-RED	8	–	–

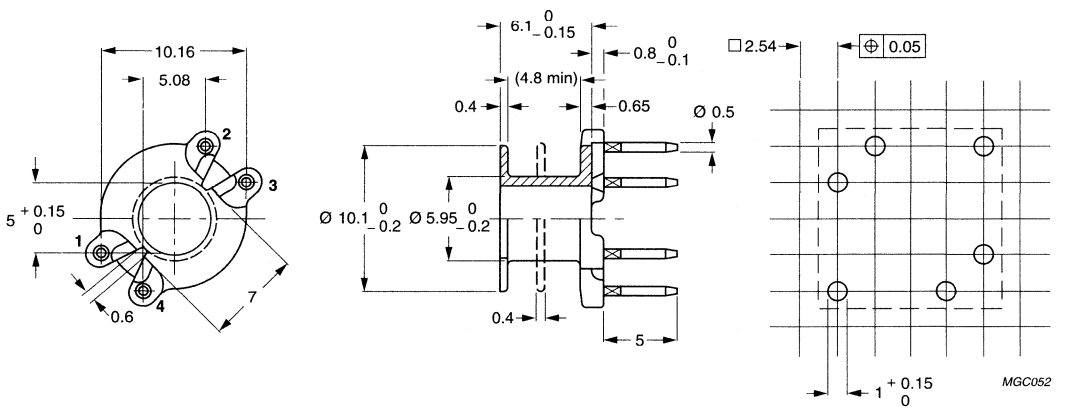
Note

1. Maximum adjustment range.

COIL FORMER

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1

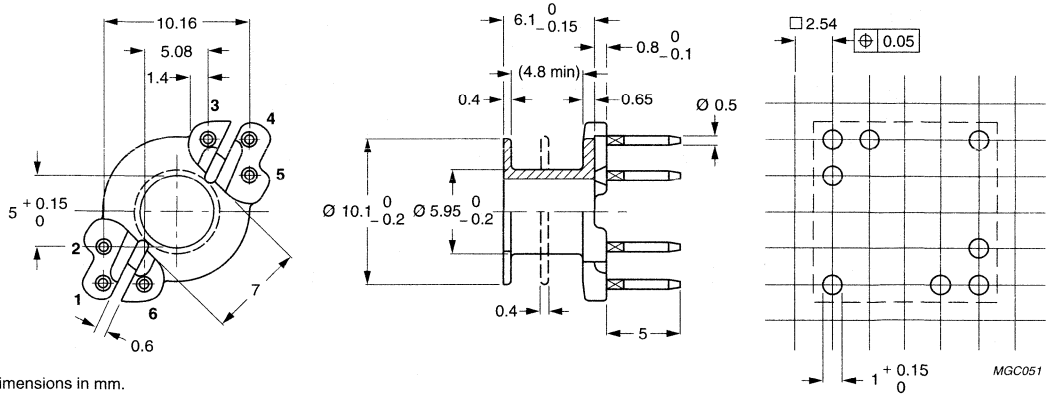


Dimensions in mm.

Fig.3 RM5 coil former; 4-pins.

Winding data for 4-pins RM5 coil former

NUMBER OF SECTIONS	NUMBER OF PINS	PIN POSITIONS USED	WINDING AREA (mm^2)	WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	4	all	9.5	4.8	25	CSV-RM5-1S-4P
2	4	all	2 × 4.35	2 × 2.2	25	CSV-RM5-2S-4P



Dimensions in mm.

Fig.4 RM5 coil former; 6-pins.

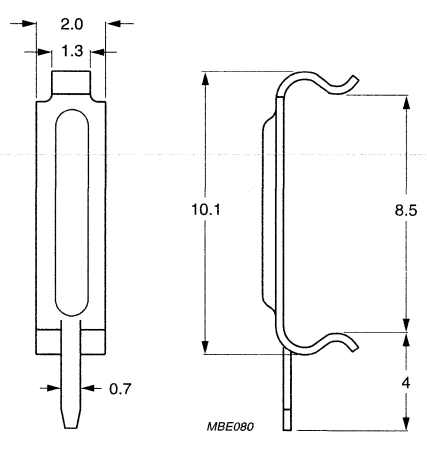
Winding data for 6-pins RM5 coil former

NUMBER OF SECTIONS	NUMBER OF PINS	PIN POSITIONS USED	WINDING AREA (mm^2)	WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	5	1, 2, 3, 5, 6	9.5	4.8	25	CSV-RM5-1S-5P
1	6	all	9.5	4.8	25	CSV-RM5-1S-6P
2	5	1, 2, 3, 5, 6	2 × 4.35	2 × 2.2	25	CSV-RM5-2S-5P
2	6	all	2 × 4.35	2 × 2.2	25	CSV-RM5-2S-6P

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈12 N
Clip material	stainless steel (CrNi)
Clip plating	silver (Ag)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM4/5



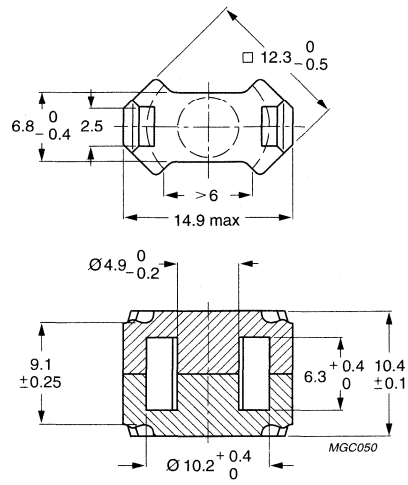
Dimensions in mm.

Fig.5 Mounting clip for RM5.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.935	mm^{-1}
V_e	effective volume	574	mm^3
l_e	effective length	23.2	mm
A_e	effective area	24.8	mm^2
A_{min}	minimum area	18.1	mm^2
m	mass of set	≈3.3	g



Dimensions in mm.

Fig.1 RM5/I core set.

Core sets for general purpose

Clamping force 12 ±5 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	100 ±3%	≈74	≈300	RM5/I-3B8-A100
	160 ±3%	≈119	≈200	RM5/I-3B8-A160
	250 ±3%	≈186	≈130	RM5/I-3B8-A250
	2000 ±25%	≈1490	≈0	RM5/I-3B8
3C85	63 ±3%	≈47	≈640	RM5/I-3C85-A63
	100 ±3%	≈74	≈300	RM5/I-3C85-A100
	160 ±3%	≈119	≈200	RM5/I-3C85-A160
	250 ±3%	≈186	≈130	RM5/I-3C85-A250
	315 ±3%	≈234	≈100	RM5/I-3C85-A315
	1800 ±25%	≈1340	≈0	RM5/I-3C85
3C90	1800 ±25%	≈1340	≈0	RM5/I-3C90
3F3	63 ±3%	≈47	≈640	RM5/I-3F3-A63
	100 ±3%	≈74	≈300	RM5/I-3F3-A100
	160 ±3%	≈119	≈200	RM5/I-3F3-A160
	250 ±3%	≈186	≈130	RM5/I-3F3-A250
	315 ±3%	≈234	≈100	RM5/I-3F3-A315
	1700 ±25%	≈1270	≈0	RM5/I-3F3

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3F4 des	100 ±3%	≈74	≈300	RM5/I-3F4-A100
	160 ±3%	≈119	≈200	RM5/I-3F4-A160
	250 ±3%	≈186	≈130	RM5/I-3F4-A250
	1000 ±25%	≈750	≈0	RM5/I-3F4

Core sets of high permeability grades

Clamping force 12 ±5 N.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3E1	3150 ±25%	≈2350	RM5/I-3E1
3E4	4500 +40/–30%	≈3350	RM5/I-3E4
3E25 sup	4975 ±25%	≈3700	RM5/I-3E25
3E27	4975 ±25%	≈3700	RM5/I-3E27
3E5	6700 +40/–30%	≈4980	RM5/I-3E5
3E6	9500 +40/–30%	≈7050	RM5/I-3E6

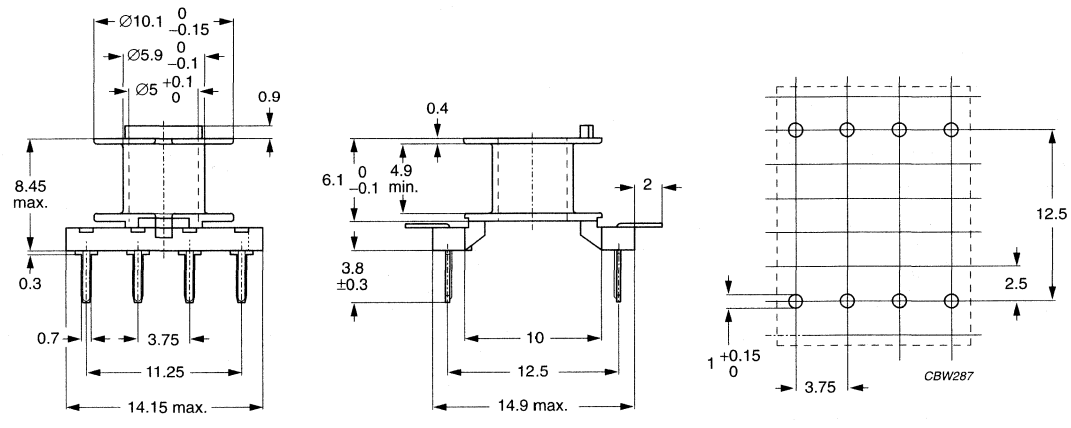
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ =10 mT; T = 100 °C
3B8	≥315	≤0.16	–	–	–	–
3C85	≥315	≤0.09	≤0.11	–	–	–
3C90	≥315	≤0.06	≤0.08	–	–	–
3F3	≥315	–	≤0.08	≤0.11	–	–
3F4	≥250	–	–	–	≤0.11	≤0.20

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E83005(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

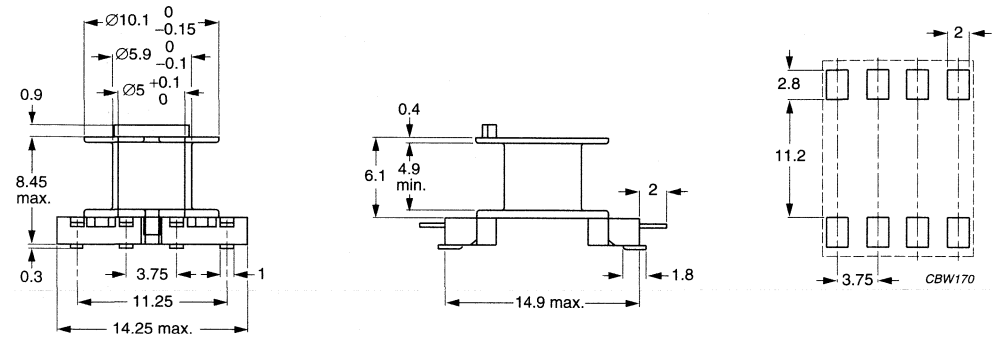
Fig.2 RM5/I coil former.

Winding data for RM5/I coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	9.8	4.9	24.9	CPV-RM5-1S-8PD

General data SMD coil former

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E83005(M)
Solder pad material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.3 SMD coil former for RM5/I.

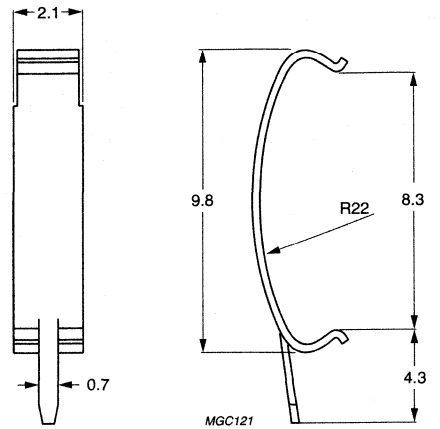
Winding data for RM5/I coil former (SMD)

NUMBER OF SECTIONS	NUMBER OF SOLDER PADS	WINDING AREA (mm^2)	WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	8	9.5	4.7	24.9	CPVS-RM5-1S-8P

MOUNTING PARTS

General data mounting clip with earth pin

ITEM	SPECIFICATION
Clamping force	≈6 N
Clip material	stainless steel (CrNi)
Clip plating	tin-lead alloy (SnPb)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM4/5/I

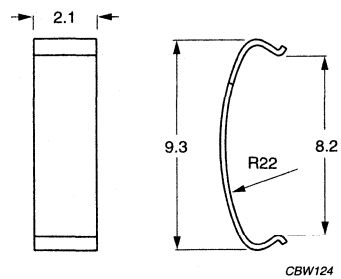


Dimensions in mm.

Fig.4 Mounting clip CLI/P-RM4/5/I.

General data mounting clip without earth pin

ITEM	SPECIFICATION
Clamping force	≈5 N
Clip material	stainless steel (CrNi)
Type number	CLI-RM5/I



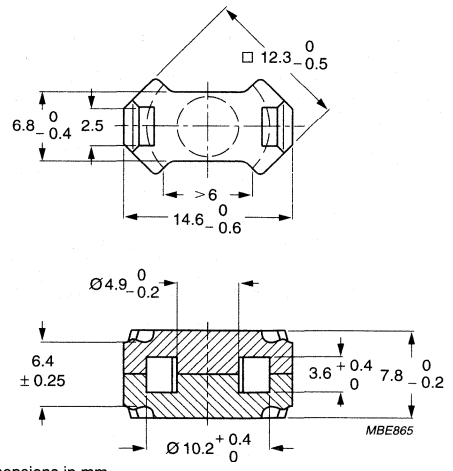
Dimensions in mm.

Fig.5 Mounting clip CLI-RM5/I.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.710	mm^{-1}
V_e	effective volume	430	mm^3
l_e	effective length	17.5	mm
A_e	effective area	24.5	mm^2
A_{min}	minimum area	18.1	mm^2
m	mass of set	≈2.2	g



Dimensions in mm.

Fig.1 RM5/ILP core set.

Core sets for general purpose transformers and power applications

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	2200 ±25%	≈1240	≈0	RM5/ILP-3C85
3C90 des	2200 ±25%	≈1240	≈0	RM5/ILP-3C90
3F3 des	2000 ±25%	≈1130	≈0	RM5/ILP-3F3
3F4 des	1250 ±25%	≈710	≈0	RM5/ILP-3F4

Core sets of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5 des	8500 +40/−30%	≈4800	≈0	RM5/ILP-3E5
3E6 des	11500 +40/−30%	≈6500	≈0	RM5/ILP-3E6

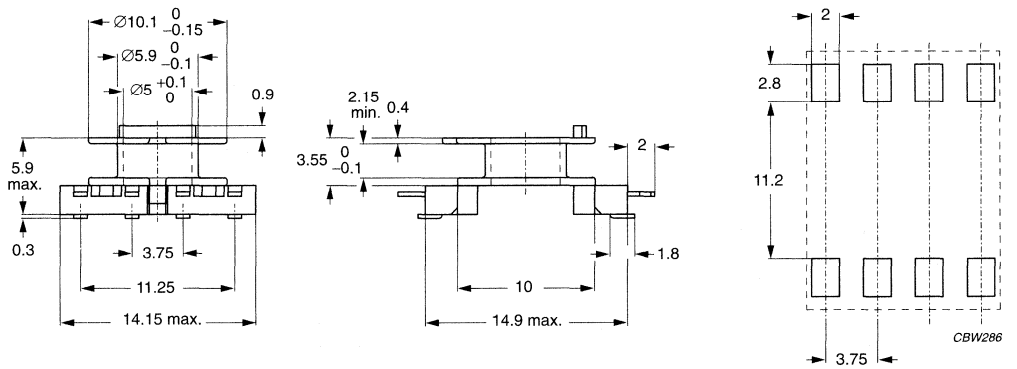
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C85	≥315	≤0.07	≤0.08	–	–	–
3C90	≥315	≤0.06	≤0.06	–	–	–
3F3	≥300	–	≤0.06	≤0.08	–	–
3F4	≥250	–	–	–	≤0.086	≤0.14

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number: E83005 (M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 RM5/ILP SMD coil former.

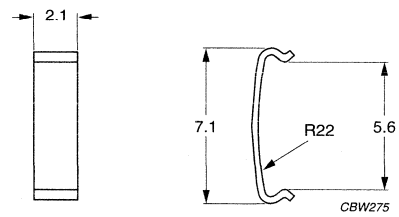
Winding data for 8-pads RM5/ILP SMD coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	4.65	2.3	24.9	CPVS-RM5/ILP-1S-8P

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈5 N
Clip material	stainless steel (CrNi)
Type number	CLI-RM5/ILP



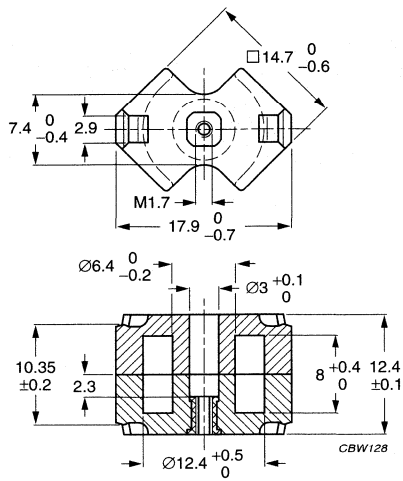
Dimensions in mm.

Fig.3 Mounting clip for RM5/ILP.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.810	mm^{-1}
V_e	effective volume	810	mm^3
l_e	effective length	25.6	mm
A_e	effective area	32.0	mm^2
A_{min}	minimum area	23.8	mm^2
m	mass of set	≈4.5	g



Dimensions in mm.

Fig.1 RM6R core set.

Core sets for filter applications

Clamping force 40 ±20 N.

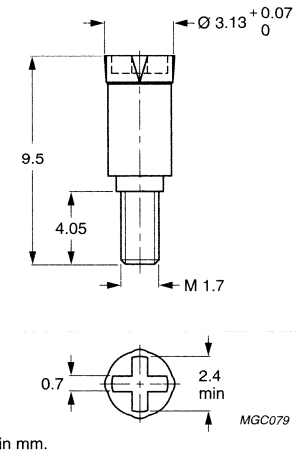
GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
4C6 sup	25 ±3%	≈16	≈2500	RM6R-4C6-E25/N	RM6R-4C6-E25
	40 ±3%	≈26	≈1000	RM6R-4C6-E40/N	RM6R-4C6-E40
	63 ±3%	≈41	≈400	RM6R-4C6-E63/N	RM6R-4C6-E63
	150 ±25%	≈97	≈0	–	RM6R-4C6
3D3 sup	40 ±3%	≈26	≈1200	RM6R-3D3-E40/N	RM6R-3D3-E40
	63 ±3%	≈41	≈700	RM6R-3D3-E63/N	RM6R-3D3-E63
	100 ±3%	≈65	≈400	RM6R-3D3-E100/N	RM6R-3D3-E100
	160 ±3%	≈103	≈200	RM6R-3D3-A160/N	RM6R-3D3-A160
	1000 ±25%	≈650	≈0	–	RM6R-3D3
3H3 sup	160 ±3%	≈103	≈230	RM6R-3H3-A160/N	RM6R-3H3-A160
	250 ±3%	≈161	≈110	RM6R-3H3-A250/N	RM6R-3H3-A250
	315 ±3%	≈203	≈90	RM6R-3H3-A315/N	RM6R-3H3-A315
	400 ±3%	≈258	≈70	RM6R-3H3-A400/N	RM6R-3H3-A400
	2200 ±25%	≈1420	≈0	–	RM6R-3H3
3H1 sup	160 ±3%	≈103	≈230	RM6R-3H1-A160/N	RM6R-3H1-A160
	250 ±3%	≈161	≈110	RM6R-3H1-A250/N	RM6R-3H1-A250
	315 ±3%	≈203	≈90	RM6R-3H1-A315/N	RM6R-3H1-A315
	400 ±3%	≈258	≈70	RM6R-3H1-A400/N	RM6R-3H1-A400
	630 ±5%	≈406	≈50	RM6R-3H1-A630/N	RM6R-3H1-A630
	1000 ±10%	≈650	≈25	RM6R-3H1-A1000/N	RM6R-3H1-A1000
	1250 ±10%	≈805	≈20	RM6R-3H1-A1250/N	RM6R-3H1-A1250
	2450 ±25%	≈1580	≈0	–	RM6R-3H1

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3B7 sup	100 ±3%	≈63	≈490	RM6R-3B7-E100/N	RM6R-3B7-E100
	160 ±3%	≈103	≈230	RM6R-3B7-A160/N	RM6R-3B7-A160
	250 ±3%	≈161	≈110	RM6R-3B7-A250/N	RM6R-3B7-A250
	315 ±3%	≈203	≈90	RM6R-3B7-A315/N	RM6R-3B7-A315
	400 ±3%	≈258	≈70	RM6R-3B7-A400/N	RM6R-3B7-A400
	2700 ±25%	≈1740	≈0	–	RM6R-3B7

INDUCTANCE ADJUSTER

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 RM6R inductance adjuster.

Inductance adjuster selection chart

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	ΔL/L %(1)	TYPES FOR MEDIUM ADJUSTMENT	ΔL/L %(1)	TYPES FOR HIGH ADJUSTMENT	ΔL/L %(1)
3H1; 3H3; 3B7	40	–	–	–	–	ADJ-RM6-GREEN	20
	63	–	–	ADJ-RM6-GREEN	14	ADJ-RM6-RED	22
	100	ADJ-RM6-GREEN	10	ADJ-RM6-RED	16	–	–
	160	ADJ-RM6-GREEN	6	ADJ-RM6-RED	10	ADJ-RM6-WHITE	19
	200	ADJ-RM6-RED	8	ADJ-RM6-WHITE	15	ADJ-RM6-VIOLET	18
	250	ADJ-RM6-WHITE	12	ADJ-RM6-VIOLET	14	ADJ-RM6-BROWN	20
	315	ADJ-RM6-WHITE	9	ADJ-RM6-BROWN	15	ADJ-RM6-BLACK	22
	400	ADJ-RM6-VIOLET	8	ADJ-RM6-BLACK	16	ADJ-RM6-GREY	30
3D3	40	–	–	–	–	ADJ-RM6-GREEN	20
	63	–	–	ADJ-RM6-GREEN	14	ADJ-RM6-RED	23
	100	ADJ-RM6-GREEN	9	ADJ-RM6-RED	16	ADJ-RM6-WHITE	28
	160	ADJ-RM6-RED	10	ADJ-RM6-WHITE	17	–	–

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	ΔL/L %(1)	TYPES FOR MEDIUM ADJUSTMENT	ΔL/L %(1)	TYPES FOR HIGH ADJUSTMENT	ΔL/L %(1)
4C6	25	–	–	–	–	ADJ-RM6-GREEN	20
	40	–	–	ADJ-RM6-GREEN	14	ADJ-RM6-RED	20
	63	ADJ-RM6-GREEN	8	ADJ-RM6-RED	12	–	–

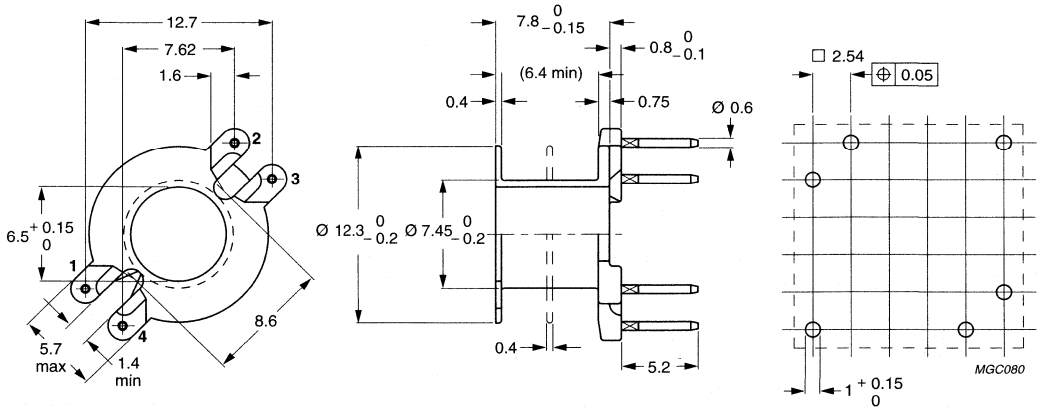
Note

1. Maximum adjustment range.

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with UL 94V-0; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, IEC 85 class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1

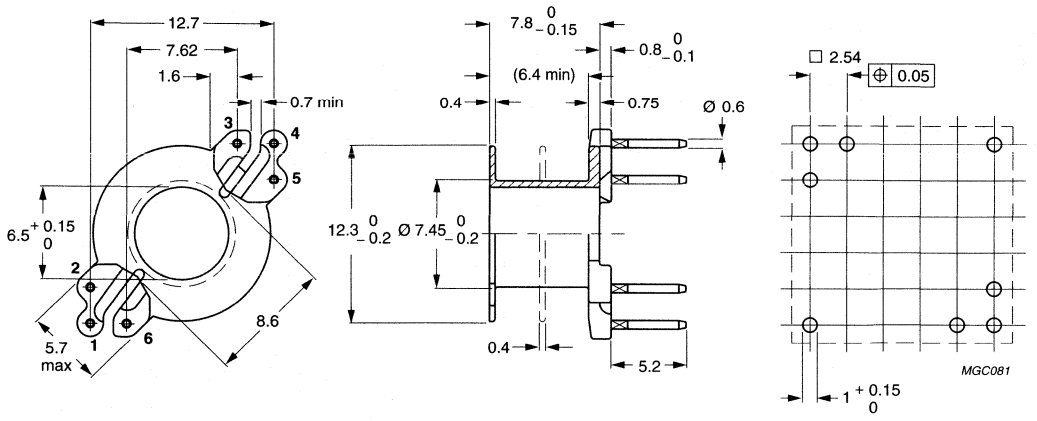


Dimensions in mm.

Fig.3 RM6R coil former; 4-pins.

Winding data for 4-pins RM6R coil former

NUMBER OF SECTIONS	NUMBER OF PINS	PIN POSITIONS USED	AVERAGE LENGTH OF TURN (mm)	WINDING AREA (mm^2)	WINDING WIDTH (mm)	TYPE NUMBER
1	4	all	30	15	6.4	CSV-RM6S/R-1S-4P
2	4	all	30	2 × 7.0	2 × 3.0	CSV-RM6S/R-2S-4P



Dimensions in mm.

Fig.4 RM6R coil former; 6-pins.

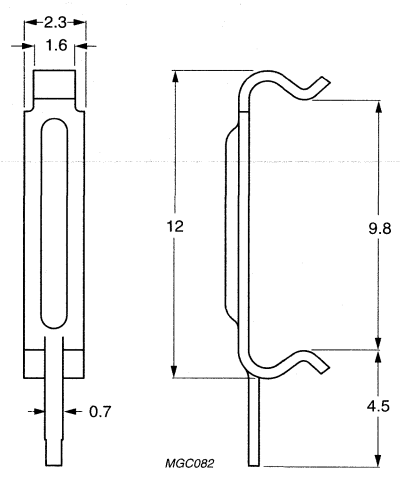
Winding data for 6-pins RM6R coil former

NUMBER OF SECTIONS	NUMBER OF PINS	PIN POSITIONS USED	AVERAGE LENGTH OF TURN (mm)	WINDING AREA (mm^2)	WINDING WIDTH (mm)	TYPE NUMBER
1	6	all	30	15	6.4	CSV-RM6R-1S-6P
2	6	all	30	2 × 7.0	2 × 3.0	CSV-RM6R-2S-6P

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈20 N
Clip material	steel
Clip plating	silver (Ag)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM6



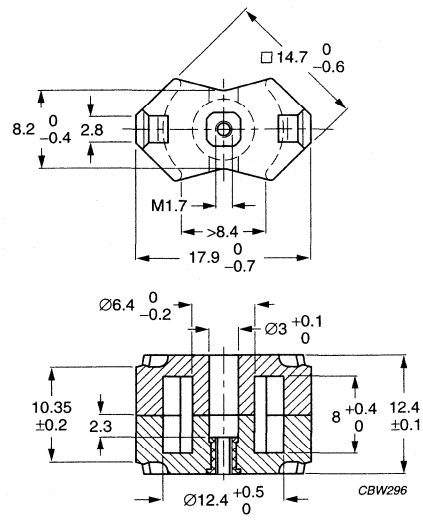
Dimensions in mm.

Fig.5 Mounting clip for RM6R.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.863	mm^{-1}
V_e	effective volume	840	mm^3
l_e	effective length	27.3	mm
A_e	effective area	31.0	mm^2
A_{min}	minimum area	23.8	mm^2
m	mass of set	≈4.5	g



Dimensions in mm.

Fig.1 RM6S core set.

Core sets for filter applications

Clamping force 40 ±20 N.

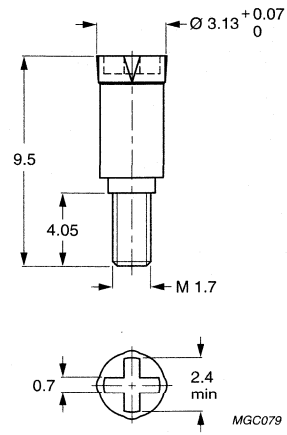
GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
4C6 sup	25 ±3%	≈17	≈2000	RM6S-4C6-E25/N	RM6S-4C6-E25
	40 ±3%	≈27	≈1000	RM6S-4C6-E40/N	RM6S-4C6-E40
	63 ±3%	≈43	≈400	RM6S-4C6-E63/N	RM6S-4C6-E63
	140 ±25%	≈96	≈0	–	RM6S-4C6
3D3	63 ±3%	≈43	≈700	RM6S-3D3-E63/N	RM6S-3D3-E63
	100 ±3%	≈69	≈400	RM6S-3D3-E100/N	RM6S-3D3-E100
	160 ±3%	≈110	≈200	RM6S-3D3-A160/N	RM6S-3D3-A160
	950 ±25%	≈650	≈0	–	RM6S-3D3
3H3	160 ±3%	≈110	≈230	RM6S-3H3-A160/N	RM6S-3H3-A160
	250 ±3%	≈171	≈110	RM6S-3H3-A250/N	RM6S-3H3-A250
	315 ±3%	≈216	≈90	RM6S-3H3-A315/N	RM6S-3H3-A315
	400 ±3%	≈274	≈70	RM6S-3H3-A400/N	RM6S-3H3-A400
	2100 ±25%	≈1440	≈0	–	RM6S-3H3

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3H1 sup	160 ±3%	≈110	≈230	RM6S-3H1-A160/N	RM6S-3H1-A160
	250 ±3%	≈171	≈110	RM6S-3H1-A250/N	RM6S-3H1-A250
	315 ±3%	≈216	≈90	RM6S-3H1-A315/N	RM6S-3H1-A315
	400 ±3%	≈274	≈70	RM6S-3H1-A400/N	RM6S-3H1-A400
	630 ±5%	≈430	≈50	RM6S-3H1-A630/N	RM6S-3H1-A630
	1000 ±10%	≈690	≈25	RM6S-3H1-A1000/N	RM6S-3H1-A1000
	1250 ±10%	≈860	≈20	RM6S-3H1-A1250/N	RM6S-3H1-A1250
	2300 ±25%	≈1580	≈0	–	RM6S-3H1
3B7 sup	160 ±3%	≈110	≈230	RM6S-3B7-A160/N	RM6S-3B7-A160
	250 ±3%	≈171	≈110	RM6S-3B7-A250/N	RM6S-3B7-A250
	315 ±3%	≈216	≈90	RM6S-3B7-A315/N	RM6S-3B7-A315
	400 ±3%	≈274	≈70	RM6S-3B7-A400/N	RM6S-3B7-A400
	630 ±5%	≈430	≈50	RM6S-3B7-A630/N	RM6S-3B7-A630
	1000 ±10%	≈690	≈25	RM6S-3B7-A1000/N	RM6S-3B7-A1000
	1250 ±10%	≈860	≈20	RM6S-3B7-A1250/N	RM6S-3B7-A1250
	2700 ±25%	≈1580	≈0	–	RM6S-3B7

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 RM6S inductance adjuster.

Inductance adjuster selection chart

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	ΔL/L %(1)	TYPES FOR MEDIUM ADJUSTMENT	ΔL/L %(1)	TYPES FOR HIGH ADJUSTMENT	ΔL/L %(1)
3H1; 3H3; 3B7	40	–	–	–	–	ADJ-RM6-GREEN	20
	63	–	–	ADJ-RM6-GREEN	14	ADJ-RM6-RED	22
	100	ADJ-RM6-GREEN	10	ADJ-RM6-RED	16	–	–
	160	ADJ-RM6-GREEN	6	ADJ-RM6-RED	11	ADJ-RM6-WHITE	19
	200	ADJ-RM6-RED	9	ADJ-RM6-WHITE	15	ADJ-RM6-VIOLET	19
	250	ADJ-RM6-WHITE	12	ADJ-RM6-VIOLET	14	ADJ-RM6-BROWN	20
	315	ADJ-RM6-WHITE	9	ADJ-RM6-BROWN	15	ADJ-RM6-BLACK	23
	400	ADJ-RM6-VIOLET	8	ADJ-RM6-BLACK	16	ADJ-RM6-GREY	26
3D3	40	–	–	–	–	ADJ-RM6-GREEN	19
	63	–	–	ADJ-RM6-GREEN	14	ADJ-RM6-RED	22
	100	ADJ-RM6-GREEN	9	ADJ-RM6-RED	15	ADJ-RM6-WHITE	27
	160	ADJ-RM6-RED	9	ADJ-RM6-WHITE	16	–	–
4C6	25	–	–	–	–	ADJ-RM6-GREEN	19
	40	–	–	ADJ-RM6-GREEN	14	ADJ-RM6-RED	21
	63	ADJ-RM6-GREEN	8	ADJ-RM6-RED	12	–	–

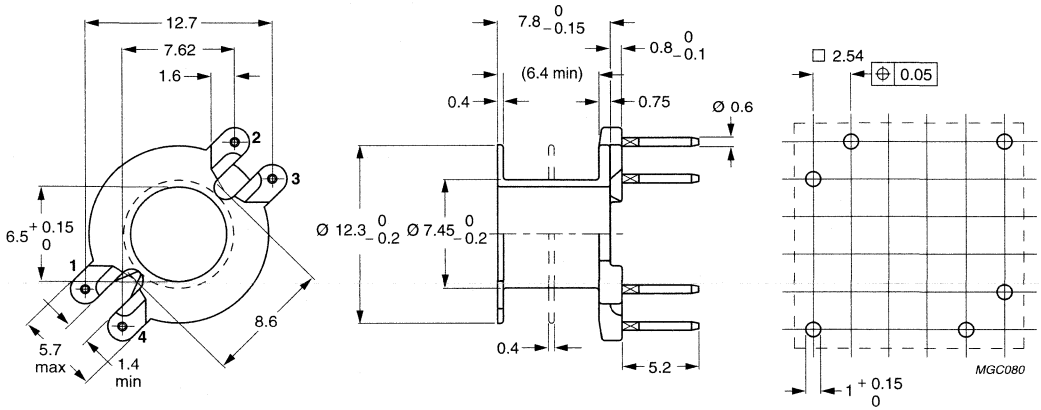
Note

1. Maximum adjustment range.

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1

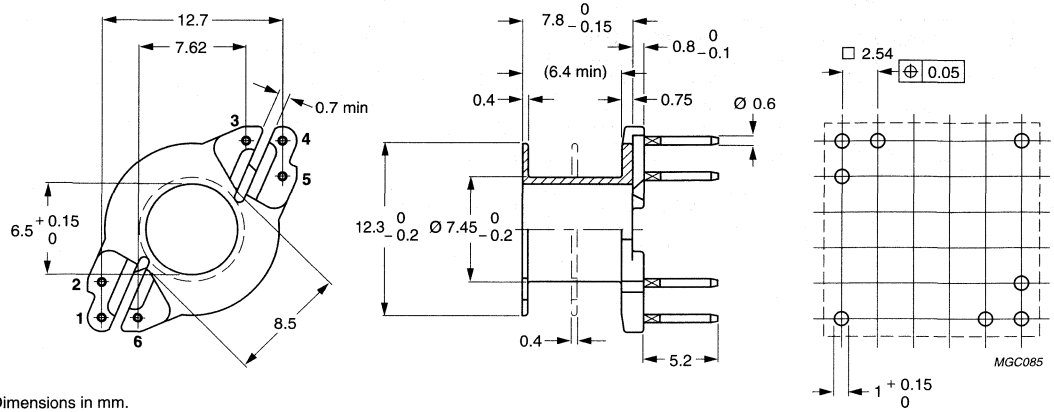


Dimensions in mm.

Fig.3 RM6S coil formerr; 4-pins.

Winding data for 4-pins RM6S coil former

NUMBER OF SECTIONS	NUMBER OF PINS	PIN POSITIONS USED	WINDING AREA (mm^2)	WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	4	all	15	6.4	30	CSV-RM6S/R-1S-4P
2	4	all	2 × 7.0	2 × 3.0	30	CSV-RM6S/R-2S-4P



Dimensions in mm.

Fig.4 RM6S coil formerr; 6-pins.

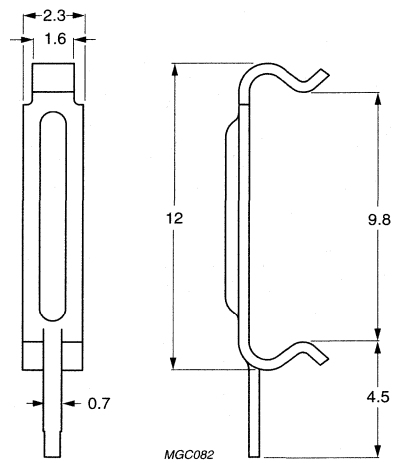
Winding data for 6-pins RM6S coil former

NUMBER OF SECTIONS	NUMBER OF PINS	PIN POSITIONS USED	WINDING AREA (mm^2)	WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	6	all	15	6.4	30	CSV-RM6S-1S-6P
2	6	all	2 × 7.0	2 × 3.0	30	CSV-RM6S-2S-6P

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈20 N
Clip material	stainless steel (CrNi)
Clip plating	silver (Ag)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM6



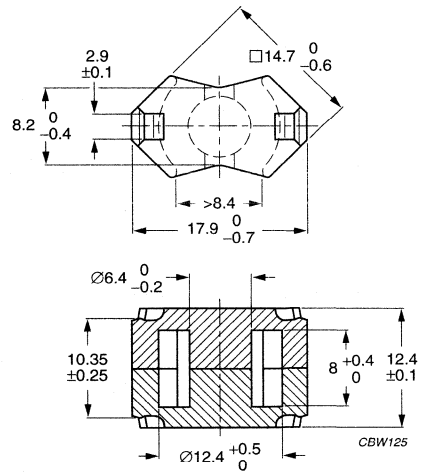
Dimensions in mm.

Fig.5 Mounting clip for RM6S.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.784	mm^{-1}
V_e	effective volume	1090	mm^3
l_e	effective length	29.2	mm
A_e	effective area	37.0	mm^2
A_{min}	minimum area	31.2	mm^2
m	mass of set	≈4.9	g



Dimensions in mm.

Fig.1 RM6S/I core set.

Core sets for general purpose transformers and power applications

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	63 ±3%	≈39	≈950	RM6S/I-3B8-A63
	100 ±3%	≈62	≈500	RM6S/I-3B8-A100
	160 ±3%	≈100	≈300	RM6S/I-3B8-A160
	250 ±3%	≈156	≈200	RM6S/I-3B8-A250
	2600 ±25%	≈1620	≈0	RM6S/I-3B8
3C81	63 ±3%	≈39	≈950	RM6S/I-3C81-E63
	100 ±3%	≈62	≈500	RM6S/I-3C81-A100
	160 ±3%	≈100	≈300	RM6S/I-3C81-A160
	250 ±3%	≈156	≈200	RM6S/I-3C81-A250
	315 ±3%	≈197	≈150	RM6S/I-3C81-A315
	3000 ±25%	≈1870	≈0	RM6S/I-3C81
3C85	63 ±3%	≈39	≈950	RM6S/I-3C85-A63
	100 ±3%	≈62	≈500	RM6S/I-3C85-A100
	160 ±3%	≈100	≈300	RM6S/I-3C85-A160
	250 ±3%	≈156	≈200	RM6S/I-3C85-A250
	315 ±3%	≈197	≈150	RM6S/I-3C85-A315
	400 ±3%	≈250	≈120	RM6S/I-3C85-A400
	630 ±5%	≈390	≈70	RM6S/I-3C85-A630
	2350 ±25%	≈1470	≈0	RM6S/I-3C85
3C90	2350 ±25%	≈1470	≈0	RM6S/I-3C90

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3D3 des	160 ±3%	≈100	≈300	RM6S/I-3D3-A160
	250 ±5%	≈156	≈200	RM6S/I-3D3-A250
	315 ±8%	≈197	≈150	RM6S/I-3D3-A315
	1050 ±25%	≈655	≈0	RM6S/I-3D3
3F3	63 ±3%	≈39	≈950	RM6S/I-3F3-A63
	100 ±3%	≈62	≈500	RM6S/I-3F3-A100
	160 ±3%	≈100	≈300	RM6S/I-3F3-A160
	250 ±3%	≈156	≈200	RM6S/I-3F3-A250
	315 ±3%	≈197	≈150	RM6S/I-3F3-A315
	2150 ±25%	≈1350	≈0	RM6S/I-3F3
3F4 des	63 ±3%	≈39	≈950	RM6S/I-3F4-A63
	100 ±3%	≈62	≈500	RM6S/I-3F4-A100
	160 ±3%	≈100	≈300	RM6S/I-3F4-A160
	250 ±3%	≈156	≈200	RM6S/I-3F4-A250
	315 ±3%	≈197	≈150	RM6S/I-3F4-A315
	1250 ±25%	≈780	≈0	RM6S/I-3F4
3H3 des	315 ±3%	≈197	≈150	RM6S/I-3H3-A315
	400 ±3%	≈250	≈120	RM6S/I-3H3-A400
	630 ±5%	≈390	≈70	RM6S/I-3H3-A630
	2350 ±25%	≈1470	≈0	RM6S/I-3H3

Core sets of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3E1	4100 ±25%	≈2600	RM6S/I-3E1
3E25 sup	6000 ±25%	≈3800	RM6S/I-3E25
3E27	6000 ±25%	≈3800	RM6S/I-3E27
3E4	5750 +40/–30%	≈3590	RM6S/I-3E4
3E5	8600 +40/–30%	≈5370	RM6S/I-3E5
3E6	12500 +40/–30%	≈7800	RM6S/I-3E6

Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3B8	≥315	≤0.30	–	–	–	–
3C81	≥315	≤0.22	–	–	–	–
3C85	≥315	≤0.17	≤0.20	–	–	–

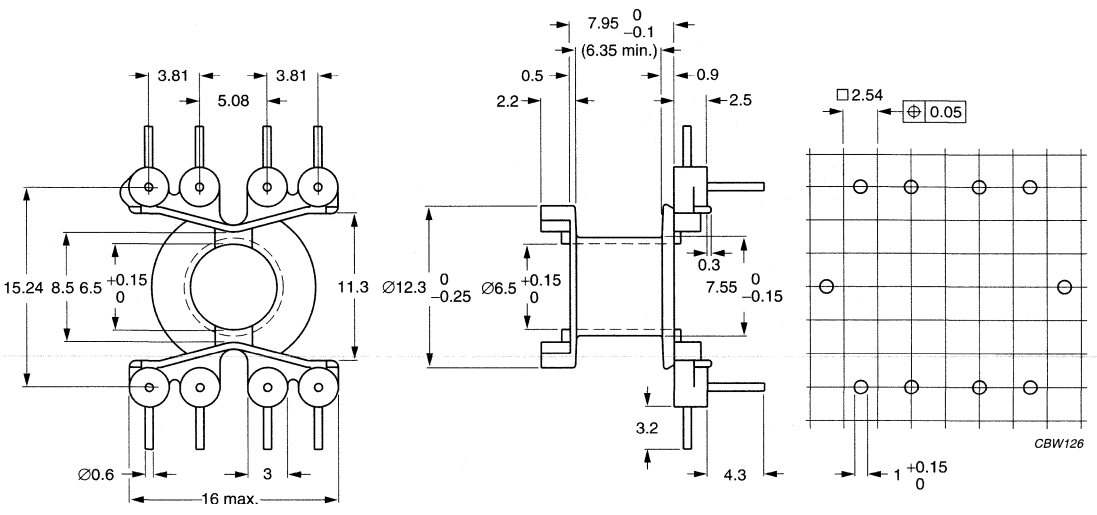
GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C90	≥315	≤0.12	≤0.14	–	–	–
3F3	≥315	–	≤0.14	≤0.20	–	–
3F4	≥250	–	–	–	≤0.22	≤0.35

COIL FORMERS

General data

For the information on other coil formers suitable for RM6S/I, see data sheet, *"RM6S"*.

PARAMETER	DESCRIPTION
Coil former material	polybutyleneterephthalate (PBT), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E45329(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

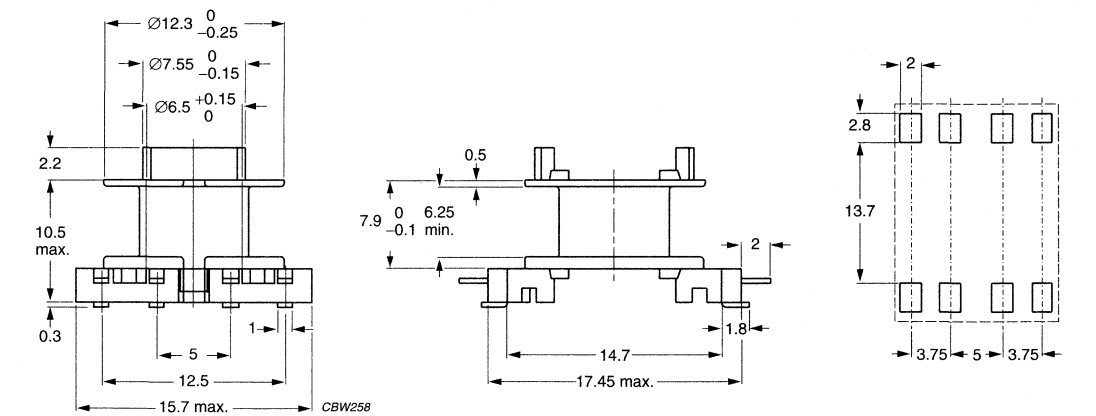
Fig.2 RM6S/I coil former; 8-pins (DIL).

Winding data for 8-pins RM6S/I coil former (DIL)

NUMBER OF SECTIONS	WINDING AREA (mm^2)	WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	15.7	6.2	31	CPV-RM6S/I-1S-8PD

General data SMD coil former

PARAMETER	SPECIFICATION
Coil former material	liquid crystal polymer (LCP), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E83005(M)
Solder pad material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.3 SMD coil former for RM6S/I.

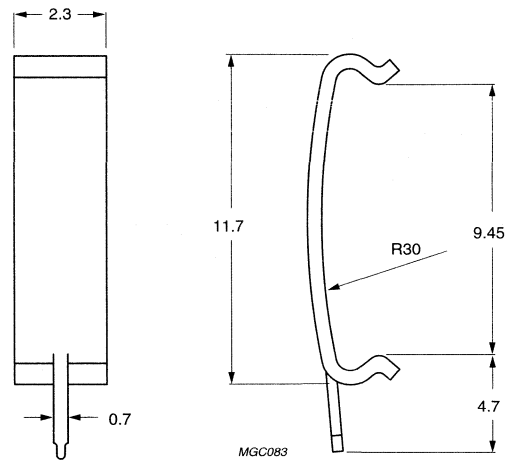
Winding data for RM6S/I coil former (SMD)

NUMBER OF SECTIONS	NUMBER OF SOLDER PADS	WINDING AREA (mm^2)	WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	8	14	6.25	31	CPVS-RM6S-1S-8P

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈10 N
Clip material	stainless steel (CrNi)
Clip plating	tin-lead alloy (SnPb)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM6/I

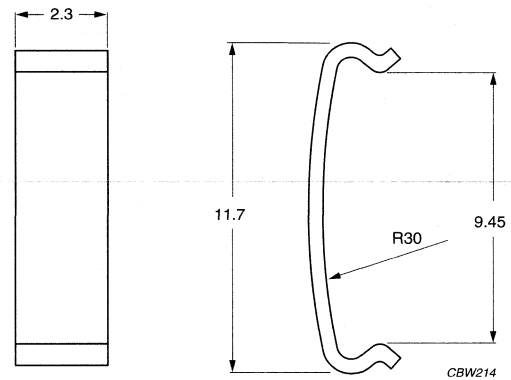


Dimensions in mm.

Fig.4 Mounting clip for RM6S/I.

General data mounting clip without earth pin

ITEM	SPECIFICATION
Clamping force	≈10 N
Clip material	stainless steel (CrNi)
Type number	CLI-RM6



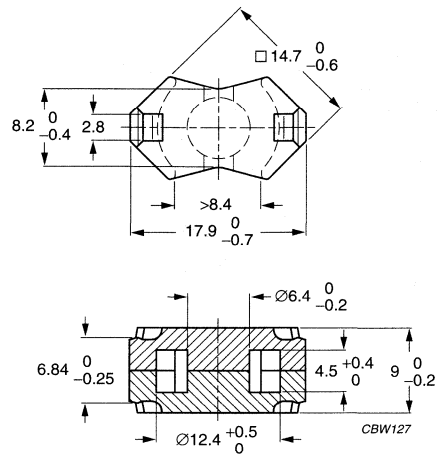
Dimensions in mm.

Fig.5 Mounting clip CLI-RM6S/I.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.580	mm^{-1}
V_e	effective volume	820	mm^3
l_e	effective length	21.8	mm
A_e	effective area	37.5	mm^2
A_{min}	minimum area	31.2	mm^2
m	mass of set	≈4.2	g



Dimensions in mm.

Fig.1 RM6S/ILP core set.

Core sets for general purpose transformers and power applications

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	2900 ±25%	≈1340	≈0	RM6S/ILP-3C85
3C90 des	2900 ±25%	≈1340	≈0	RM6SILP-3C90
3D3 des	160 ±3%	≈74	≈350	RM6S/ILP-3D3-A160
	250 ±5%	≈116	≈200	RM6S/ILP-3D3-A250
	315 ±5%	≈146	≈150	RM6S/ILP-3D3-A315
	1350 ±25%	≈625	≈0	RM6S/ILP-3D3
3F3 des	2700 ±25%	≈1250	≈0	RM6S/ILP-3F3
3F4 des	1600 ±25%	≈740	≈0	RM6S/ILP-3F4
3H3 des	315 ±3%	≈146	≈150	RM6S/ILP-3H3-A315
	400 ±5%	≈185	≈120	RM6S/ILP-3H3-A400
	630 ±8%	≈290	≈80	RM6S/ILP-3H3-A630
	2900 ±25%	≈1340	≈0	RM6S/ILP-3H3

Core sets of high permeability grades

Clamping force 20 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5 des	10500 +40/−30%	≈4850	≈0	RM6S/ILP-3E5
3E6 des	15000 +40/−30%	≈6930	≈0	RM6S/ILP-3E6

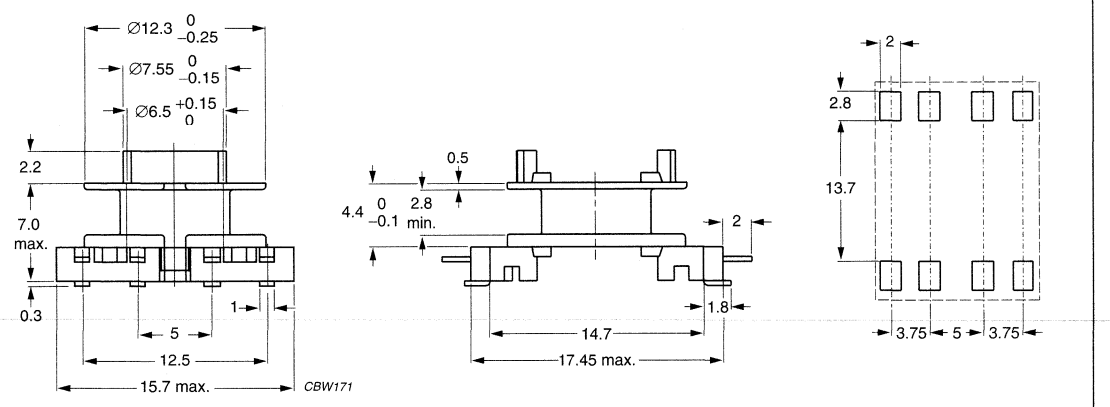
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C85	≥315	≤0.13	≤0.15	–	–	–
3C90	≥315	≤0.10	≤0.10	–	–	–
3F3	≥300	–	≤0.10	≤0.15	–	–
3F4	≥250	–	–	–	≤0.16	≤0.26

COIL FORMERS

General data

PARAMETER	DESCRIPTION
Coil former material	liquid crystal polymer (LCP), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E83005 (M)
Solder pad material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 SMD coil former for RM6S/ILP.

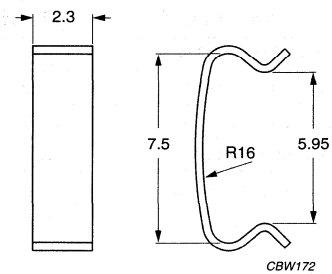
Winding data for RM6S/ILP coil former (SMD)

NUMBER OF SECTIONS	NUMBER OF SOLDER PADS	WINDING AREA (mm^2)	WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	8	6.4	2.8	31.0	CPVS-RM6S/LP-1S-8P

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈10 N
Clip material	stainless steel (CrNi)
Type number	CLI-RM6S/ILP



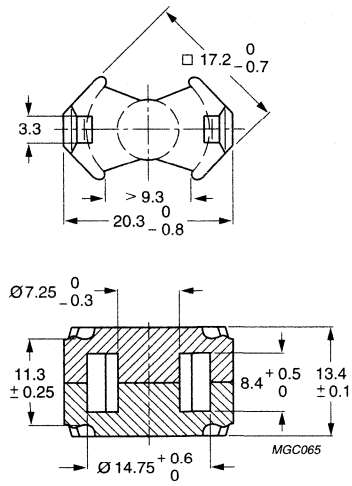
Dimensions in mm.

Fig.3 Mounting clip for RM6S/ILP.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.680	mm^{-1}
V_e	effective volume	1325	mm^3
l_e	effective length	30.0	mm
A_e	effective area	44.1	mm^2
A_{min}	minimum area	39.6	mm^2
m	mass of set	≈7.7	g



Dimensions in mm.

Fig.1 RM7/I core set.

Core sets for general purpose transformers and power applications

Clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	160 ±3%	≈89	≈400	RM7/I-3B8-A160
	250 ±3%	≈139	≈200	RM7/I-3B8-A250
	3000 ±25%	≈1670	≈0	RM7/I-3B8
3C85 sup	100 ±3%	≈56	≈800	RM7/I-3C85-A100
	160 ±3%	≈89	≈400	RM7/I-3C85-A160
	250 ±3%	≈139	≈200	RM7/I-3C85-A250
	2700 ±25%	≈1500	≈0	RM7/I-3C85
3C90 sup	2700 ±25%	≈1500	≈0	RM7/I-3C90
3F3 sup	100 ±3%	≈56	≈800	RM7/I-3F3-A100
	160 ±3%	≈89	≈400	RM7/I-3F3-A160
	250 ±3%	≈139	≈200	RM7/I-3F3-A250
	2500 ±25%	≈1390	≈0	RM7/I-3F3

Core sets of high permeability grades

Clamping force 25 ±10 N.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3E1 sup	4750 ±25%	≈2570	RM7/I-3E1
3E4 sup	6600 +40/–30%	≈3590	RM7/I-3E4
3E5 sup	10000 +40/–30%	≈5370	RM7/I-3E5

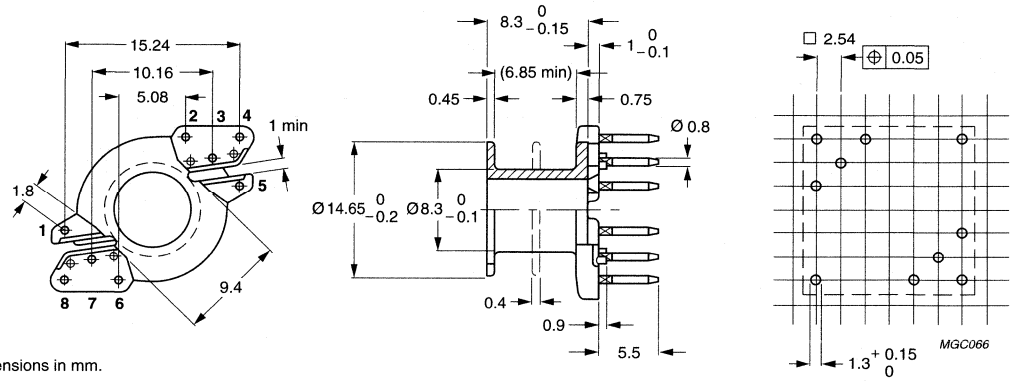
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3B8	≥315	≤0.40	–	–
3C85	≥315	≤0.20	≤0.24	–
3C90	≥315	≤0.15	≤0.15	–
3F3	≥315	–	≤0.15	≤0.25

COIL FORMER

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with UL 94V-0; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, IEC 85 class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 RM7/I coil former.

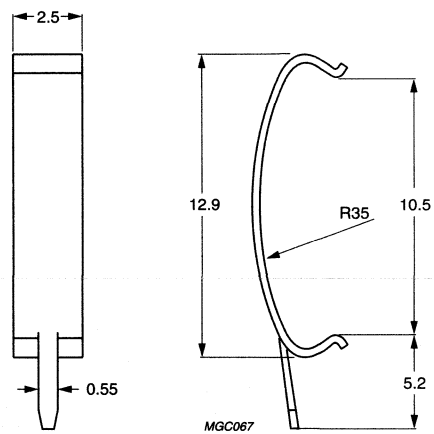
Winding data for RM7/I coil former

NUMBER OF SECTIONS	NUMBER OF PINS	PIN POSITIONS USED	AVERAGE LENGTH OF TURN (mm)	WINDING AREA (mm^2)	WINDING WIDTH (mm)	TYPE NUMBER
1	4	1, 2, 5, 6	35	21	6.85	CSV-RM7-1S-4P
1	8	all	35	21	6.85	CSV-RM7-1S-8P
2	8	all	35	2 × 9.8	2 × 3.2	CSV-RM7-2S-8P

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈20 N
Clip material	steel
Clip plating	tin-lead alloy (SnPb)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM7



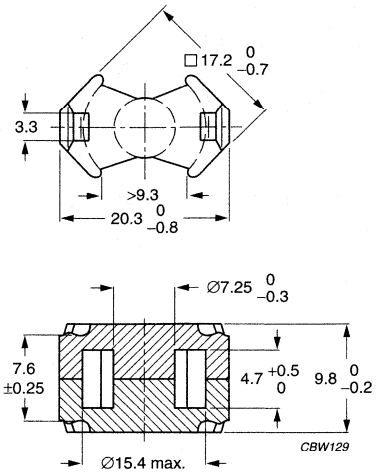
Dimensions in mm.

Fig.3 Mounting clip for RM7/I.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.520	mm^{-1}
V_e	effective volume	1 060	mm^3
l_e	effective length	23.5	mm
A_e	effective area	45.3	mm^2
A_{min}	minimum area	39.6	mm^2
m	mass of set	≈6.0	g



Dimensions in mm.

Fig.1 RM7/ILP core set.

Core sets for general purpose transformers and power applications

Clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 sup	3400 ±25%	≈1410	≈0	RM7/ILP-3C85
3C90 sup	3400 ±25%	≈1410	≈0	RM7/ILP-3C90
3F3 sup	3100 ±25%	≈1280	≈0	RM7/ILP-3F3
3F4 sup	1800 ±25%	≈740	≈0	RM7/ILP-3F4

Core sets of high permeability grades

Clamping force 40 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5 sup	13000 +40/−30%	≈5380	≈0	RM7/ILP-3E5
3E6 sup	18000 +40/−30%	≈7450	≈0	RM7/ILP-3E6

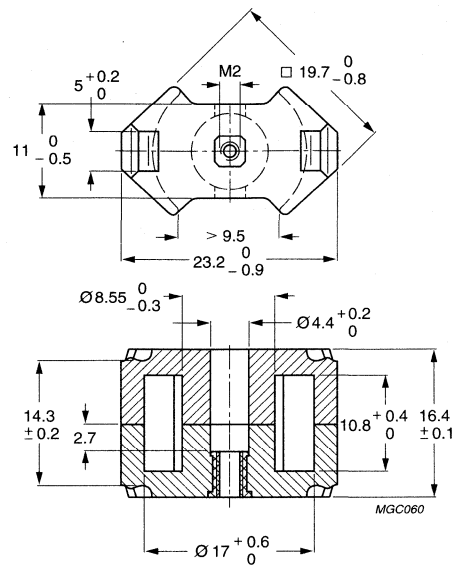
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C85	≥315	≤0.16	≤0.19	–	–	–
3C90	≥315	≤0.12	≤0.12	–	–	–
3F3	≥300	–	≤0.12	≤0.20	–	–
3F4	≥250	–	–	–	≤0.21	≤0.34

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.683	mm^{-1}
V_e	effective volume	1850	mm^3
l_e	effective length	35.5	mm
A_e	effective area	52.0	mm^2
A_{min}	minimum area	39.5	mm^2
m	mass of set	≈10.9	g



Dimensions in mm.

Fig.1 RM8 core set.

Core sets for filter applications

Clamping force 60 ±30 N.

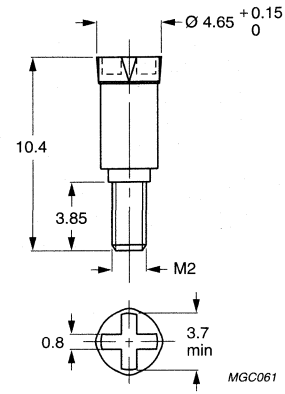
GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
4C6 sup	40 ±3%	≈22	≈2700	RM8-4C6-E40/N	RM8-4C6-E40
	63 ±3%	≈34	≈1200	RM8-4C6-E63/N	RM8-4C6-E63
	180 ±25%	≈97	≈0	–	RM8-4C6
3D3	100 ±3%	≈54	≈750	RM8-3D3-E100/N	RM8-3D3-E100
	160 ±3%	≈87	≈400	RM8-3D3-E160/N	RM8-3D3-E160
	1240 ±25%	≈670	≈0	–	RM8-3D3
3H3	250 ±3%	≈135	≈210	RM8-3H3-A250/N	RM8-3H3-A250
	315 ±3%	≈170	≈160	RM8-3H3-A315/N	RM8-3H3-A315
	400 ±3%	≈220	≈130	RM8-3H3-A400/N	RM8-3H3-A400
	630 ±5%	≈340	≈100	RM8-3H3-A630/N	RM8-3H3-A630
	2850 ±25%	≈1540	≈0	–	RM8-3H3
3H1 sup	250 ±3%	≈135	≈210	RM8-3H1-E250/N	RM8-3H1-E250
	315 ±3%	≈170	≈160	RM8-3H1-A315/N	RM8-3H1-A315
	400 ±3%	≈220	≈130	RM8-3H1-A400/N	RM8-3H1-A400
	630 ±5%	≈340	≈100	RM8-3H1-A630/N	RM8-3H1-A630
	3150 ±25%	≈1700	≈0	–	RM8-3H1

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3B7 sup	160 ±3%	≈90	≈480	RM8-3B7-E160/N	RM8-3B7-E160
	250 ±3%	≈135	≈210	RM8-3B7-E250/N	RM8-3B7-E250
	315 ±3%	≈170	≈160	RM8-3B7-A315/N	RM8-3B7-A315
	400 ±3%	≈220	≈130	RM8-3B7-A400/N	RM8-3B7-A400
	630 ±5%	≈340	≈100	RM8-3B7-A630/N	RM8-3B7-A630
	3400 ±25%	≈1830	≈0	–	RM8-3B7

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 RM8 inductance adjuster.

Inductance adjuster selection chart

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	ΔL/L %(1)	TYPES FOR MEDIUM ADJUSTMENT	ΔL/L %(1)	TYPES FOR HIGH ADJUSTMENT	ΔL/L %(1)
3H1; 3H3; 3B7	63	–	–	–	–	ADJ-P22/RM8-RED	24
	100	–	–	ADJ-P22/RM8-RED	16	ADJ-P22/RM8-ORANGE	21
	160	–	–	ADJ-P22/RM8-ORANGE	14	ADJ-P22/RM8-YELLOW	18
	250	ADJ-P22/RM8-RED	7	ADJ-P22/RM8-YELLOW	12	ADJ-P22/RM8-WHITE	18
	315	ADJ-P22/RM8-YELLOW	9	ADJ-P22/RM8-WHITE	13	ADJ-P22/RM8-BROWN	21
	400	ADJ-P22/RM8-YELLOW	7	ADJ-P22/RM8-WHITE	10	ADJ-P22/RM8-BROWN	15
	630	ADJ-P22/RM8-YELLOW	4	ADJ-P22/RM8-BROWN	8	ADJ-P22/RM8-BLACK	13
3D3	63	–	–	–	–	ADJ-P22/RM8-RED	23
	100	–	–	ADJ-P22/RM8-RED	15	ADJ-P22/RM8-ORANGE	22
	160	–	–	ADJ-P22/RM8-ORANGE	14	ADJ-P22/RM8-YELLOW	17
4C6	40	–	–	–	–	ADJ-P22/RM8-RED	23
	63	–	–	ADJ-P22/RM8-RED	17	ADJ-P22/RM8-ORANGE	21
	100	–	–	ADJ-P22/RM8-ORANGE	11	ADJ-P22/RM8-WHITE	19
	160	ADJ-P22/RM8-ORANGE	7	ADJ-P22/RM8-WHITE	12	–	–

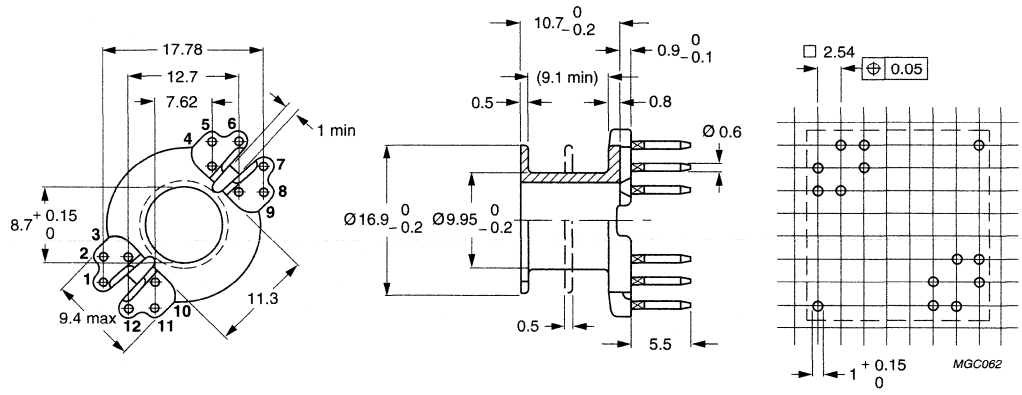
Note

1. Maximum adjustment range.

COIL FORMER

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with UL 94V-0; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, IEC 85 class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.3 RM8 coil former.

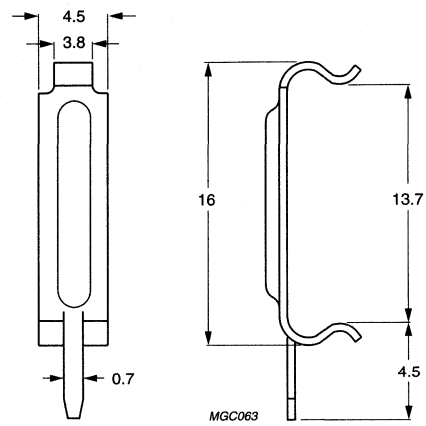
Winding data for RM8 coil former

NUMBER OF SECTIONS	NUMBER OF PINS	PIN POSITIONS USED	AVERAGE LENGTH OF TURN (mm)	WINDING AREA (mm^2)	WINDING WIDTH (mm)	TYPE NUMBER
1	8	1, 2, 5, 6, 7, 8, 11, 12	42	31	9.1	CSV-RM8-1S-8P
1	12	all	42	31	9.1	CSV-RM8-1S-12P
2	8	1, 2, 5, 6, 7, 8, 11, 12	42	2 × 14.5	2 × 4.3	CSV-RM8-2S-8P
2	12	all	42	2 × 14.5	2 × 4.3	CSV-RM8-2S-12P

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈30 N
Clip material	steel
Clip plating	silver (Ag)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM8



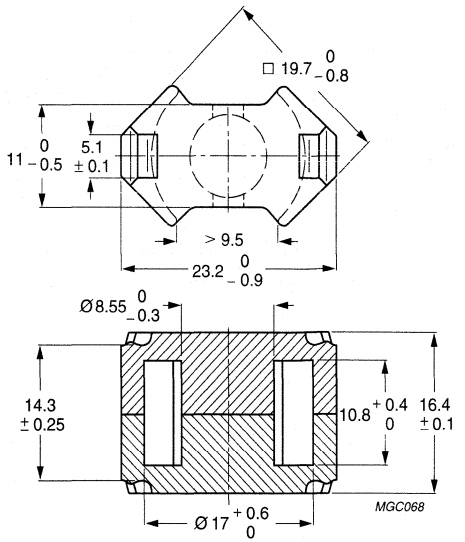
Dimensions in mm.

Fig.4 Mounting clip for RM8.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.604	mm^{-1}
V_e	effective volume	2440	mm^3
l_e	effective length	38.4	mm
A_e	effective area	63.0	mm^2
A_{min}	minimum area	55.4	mm^2
m	mass of set	≈12.0	g



Dimensions in mm.

Fig.1 RM8/I core set.

Core sets for general purpose transformers and power applications

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	160 ±3%	≈77	≈550	RM8/I-3B8-A160
	250 ±3%	≈120	≈300	RM8/I-3B8-A250
	315 ±3%	≈151	≈250	RM8/I-3B8-A315
	400 ±3%	≈192	≈180	RM8/I-3B8-A400
	3600 ±25%	≈1730	≈0	RM8/I-3B8
3C81	100 ±3%	≈50	≈1100	RM8/I-3C81-E100
	160 ±3%	≈77	≈550	RM8/I-3C81-A160
	250 ±3%	≈120	≈300	RM8/I-3C81-A250
	315 ±3%	≈151	≈250	RM8/I-3C81-A315
	400 ±3%	≈192	≈180	RM8/I-3C81-A400
	3400 ±25%	≈1630	≈0	RM8/I-3C81
3C85	100 ±3%	≈50	≈1100	RM8/I-3C85-A100
	160 ±3%	≈77	≈550	RM8/I-3C85-A160
	250 ±3%	≈120	≈300	RM8/I-3C85-A250
	315 ±3%	≈151	≈250	RM8/I-3C85-A315
	400 ±3%	≈192	≈180	RM8/I-3C85-A400
	3250 ±25%	≈1560	≈0	RM8/I-3C85

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C90	3250 ±25%	≈1560	≈0	RM8/I-3C90
3D3 des	250 ±3%	≈120	≈300	RM8/I-3D3-A250
	315 ±5%	≈151	≈250	RM8/I-3D3-A315
	400 ±5%	≈192	≈180	RM8/I-3D3-A400
	1400 ±25%	≈675	≈0	RM8/I-3D3
3F3	100 ±3%	≈50	≈1100	RM8/I-3F3-A100
	160 ±3%	≈77	≈550	RM8/I-3F3-A160
	250 ±3%	≈120	≈300	RM8/I-3F3-A250
	315 ±3%	≈151	≈250	RM8/I-3F3-A315
	400 ±3%	≈192	≈180	RM8/I-3F3-A400
	3000 ±25%	≈1440	≈0	RM8/I-3F3
3F4 des	100 ±3%	≈50	≈1100	RM8/I-3F4-A100
	160 ±3%	≈77	≈550	RM8/I-3F4-A160
	250 ±3%	≈120	≈300	RM8/I-3F4-A250
	315 ±3%	≈151	≈250	RM8/I-3F4-A315
	400 ±3%	≈192	≈180	RM8/I-3F4-A400
	1700 ±25%	≈820	≈0	RM8/I-3F4
3H3 des	400 ±3%	≈192	≈180	RM8/I-3H3-A400
	630 ±5%	≈302	≈115	RM8/I-3H3-A630
	1000 ±10%	≈480	≈70	RM8/I-3H3-A1000
	3250 ±25%	≈1560	≈0	RM8/I-3H3

Core sets of high permeability grades

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3E1	5800 ±25%	≈2800	RM8/I-3E1
3E25 sup	8000 ±25%	≈3800	RM8/I-3E25
3E27	8000 ±25%	≈3800	RM8/I-3E27
3E4	8000 +40/–30%	≈3800	RM8/I-3E4
3E5	12500 +40/–30%	≈6000	RM8/I-3E5
3E6	18000 +40/–30%	≈8650	RM8/I-3E6

Properties of core sets under power conditions

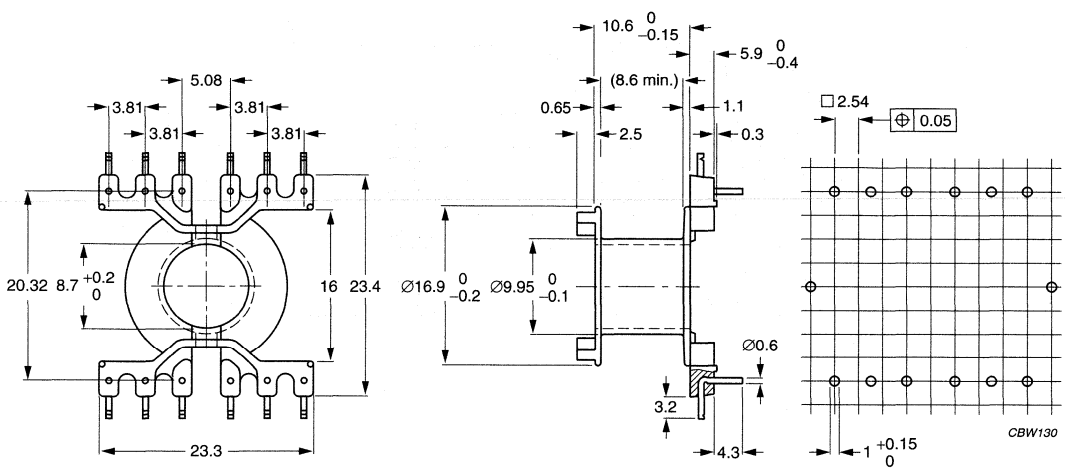
GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3B8	≥315	≤0.70	–	–	–	–
3C81	≥315	≤0.50	–	–	–	–
3C85	≥315	≤0.40	≤0.45	–	–	–
3C90	≥315	≤0.27	≤0.27	–	–	–
3F3	≥315	–	≤0.27	≤0.47	–	–
3F4	≥250	–	–	–	≤0.49	≤0.78

COIL FORMER

General data

For the information on another coil former suitable for RM8/I, see *"Data sheet: RM8"*.

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephthalate (PBT), glass-reinforced, flame retardant in accordance with UL 94V-0; UL file number E45329(R)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, IEC 85 class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 RM8/I coil former (DIL).

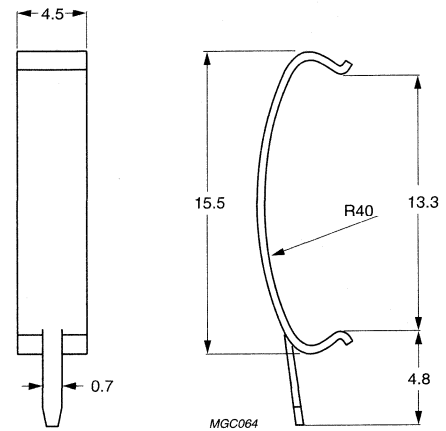
Winding data for RM8/I coil former (DIL)

NUMBER OF SECTIONS	AVERAGE LENGTH OF TURN (mm)	WINDING AREA (mm^2)	WINDING WIDTH (mm)	TYPE NUMBER
1	42	30.9	8.6	CPV-RM8/I-1S-12PD

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈15 N
Clip material	stainless steel
Clip plating	tin-lead alloy (SnPb)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM8/I

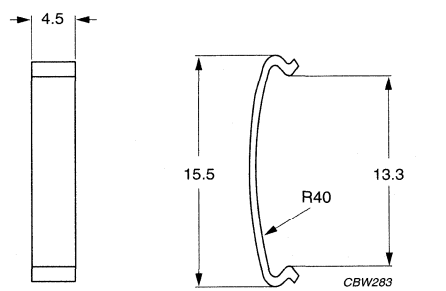


Dimensions in mm.

Fig.3 Mounting clip for RM8/I (CLI/P).

General data

ITEM	SPECIFICATION
Clamping force	≈15 N
Clip material	stainless steel
Type number	CLI-RM8/I



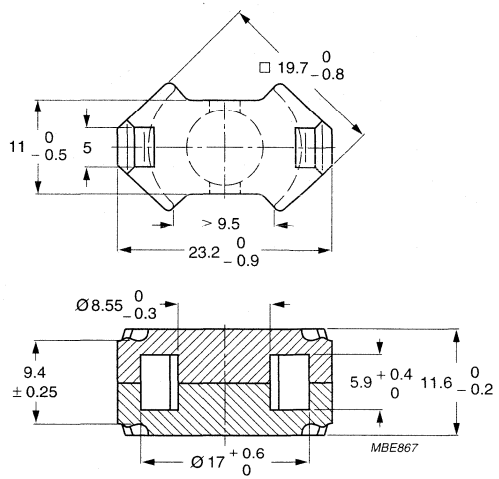
Dimensions in mm.

Fig.4 Mounting clip for RM8/I (CLI).

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.440	mm^{-1}
V_e	effective volume	1860	mm^3
l_e	effective length	28.7	mm
A_e	effective area	64.9	mm^2
A_{min}	minimum area	55.4	mm^2
m	mass of set	≈10	g



Dimensions in mm.

Fig.1 RM8/ILP core set.

Core sets for general purpose transformers and power applications

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	4100 ±25%	≈1440	≈0	RM8/ILP-3C85
3C90 des	4100 ±25%	≈1440	≈0	RM8/ILP-3C90
3D3 des	250 ±3%	≈88	≈400	RM8/ILP-3D3-A250
	315 ±3%	≈110	≈300	RM8/ILP-3D3-A315
	400 ±5%	≈140	≈200	RM8/ILP-3D3-A400
	1850 ±25%	≈650	≈0	RM8/ILP-3D3
3F3 des	3800 ±25%	≈1330	≈0	RM8/ILP-3F3
3F4 des	2200 ±25%	≈770	≈0	RM8/ILP-3F4
3H3 des	400 ±3%	≈140	≈200	RM8/ILP-3H3-A400
	630 ±5%	≈220	≈130	RM8/ILP-3H3-A630
	1000 ±8%	≈350	≈80	RM8/ILP-3H3-A1000
	4100 ±25%	≈1440	≈0	RM8/ILP-3H3

Core sets of high permeability grades

Clamping force 30 ±10 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5 des	16000 +40/−30%	≈5600	≈0	RM8/ILP-3E5
3E6 des	23000 +40/−30%	≈8050	≈0	RM8/ILP-3E6

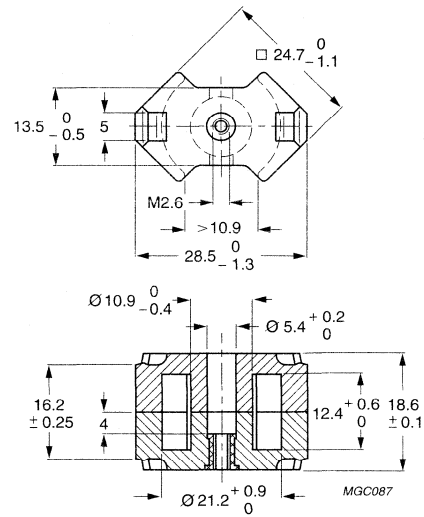
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C85	≥315	≤0.30	≤0.34	–	–	–
3C90	≥315	≤0.21	≤0.21	–	–	–
3F3	≥300	–	≤0.21	≤0.36	–	–
3F4	≥250	–	–	–	≤0.37	≤0.60

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.501	mm^{-1}
V_e	effective volume	3470	mm^3
l_e	effective length	41.7	mm
A_e	effective area	83.2	mm^2
A_{min}	minimum area	65.3	mm^2
m	mass of set	≈20	g



Dimensions in mm.

Fig.1 RM10 core set.

Core sets for filter applications

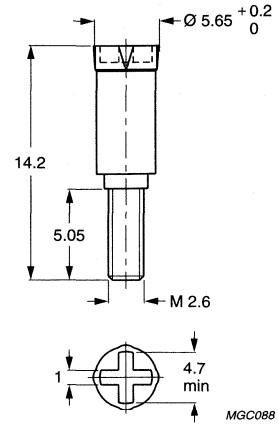
Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3H1 sup	250 ±3%	≈100	≈400	RM10-3H1-A250/N	RM10-3H1-A250
	315 ±3%	≈126	≈300	RM10-3H1-A315/N	RM10-3H1-A315
	400 ±3%	≈160	≈230	RM10-3H1-A400/N	RM10-3H1-A400
	630 ±3%	≈251	≈130	RM10-3H1-A630/N	RM10-3H1-A630
	4500 ±25%	≈1800	≈0	–	RM10-3H1
3B7 sup	250 ±3%	≈100	≈400	RM10-3B7-E250/N	RM10-3B7-E250
	315 ±3%	≈126	≈300	RM10-3B7-E315/N	RM10-3B7-E315
	400 ±3%	≈160	≈230	RM10-3B7-A400/N	RM10-3B7-E400
	630 ±3%	≈251	≈130	RM10-3B7-A630/N	RM10-3B7-A630
	1000 ±5%	≈400	≈90	–	RM10-3B7-A1000
	4765 ±25%	≈1900	≈0	–	RM10-3B7

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 RM10 inductance adjuster.

Inductance adjuster selection chart

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	ΔL/L %(1)	TYPES FOR MEDIUM ADJUSTMENT	ΔL/L %(1)	TYPES FOR HIGH ADJUSTMENT	ΔL/L %(1)
3H1	160	–	–	–	–	ADJ-P30/RM10-YELLOW	25
	250	–	–	ADJ-P30/RM10-YELLOW	16	–	–
	315	–	–	ADJ-P30/RM10-YELLOW	12	–	–
	400	–	–	ADJ-P30/RM10-YELLOW	11	–	–
	630	ADJ-P30/RM10-YELLOW	6	–	–	ADJ-P30/RM10-GREY	20

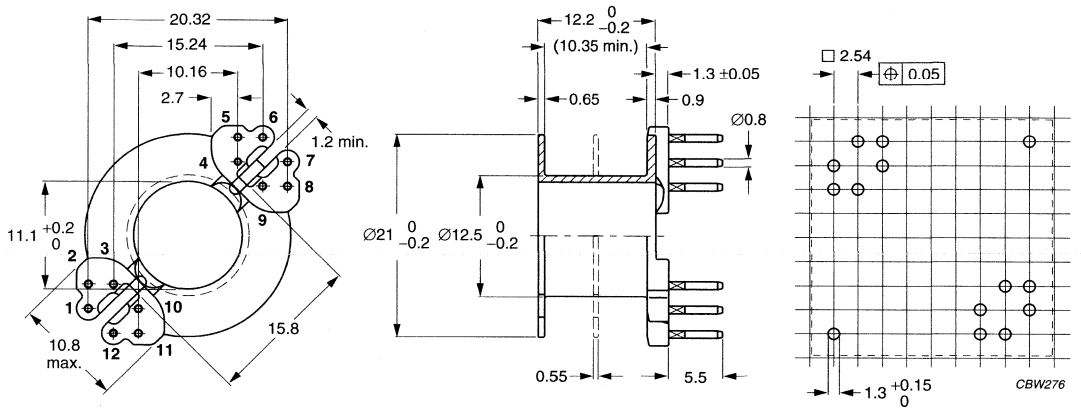
Note

1. Maximum adjustment range.

COIL FORMER

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass-reinforced, flame retardant in accordance with UL 94V-0; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, IEC 85 class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.3 RM10 coil former.

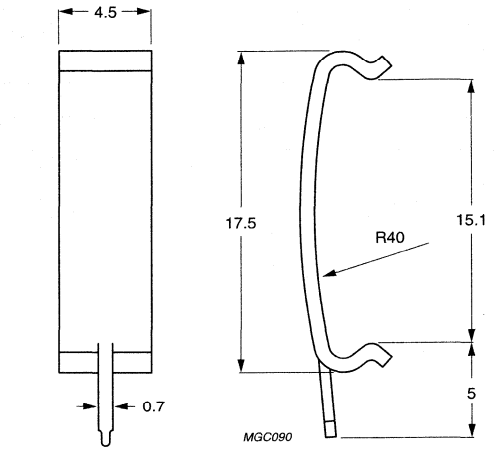
Winding data for RM10 coil former

NUMBER OF SECTIONS	NUMBER OF PINS	PIN POSITIONS USED	AVERAGE LENGTH OF TURN (mm)	WINDING AREA (mm^2)	WINDING WIDTH (mm)	TYPE NUMBER
1	5	3, 4, 6, 9, 10	52	43	10.4	CSV-RM10-1S-5P
1	8	1, 3, 4, 6, 7, 9, 10, 12	52	43	10.4	CSV-RM10-1S-8P
1	12	all	52	43	10.4	CSV-RM10-1S-12P
2	5	3, 4, 6, 9, 10	52	2 × 20.5	2 × 4.9	CSV-RM10-2S-5P
2	8	1, 3, 4, 6, 7, 9, 10, 12	52	2 × 20.5	2 × 4.9	CSV-RM10-2S-8P
2	12	all	52	2 × 20.5	2 × 4.9	CSV-RM10-2S-12P

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈30 N
Clip material	stainless steel
Clip plating	tin-lead alloy (SnPb)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM10/I



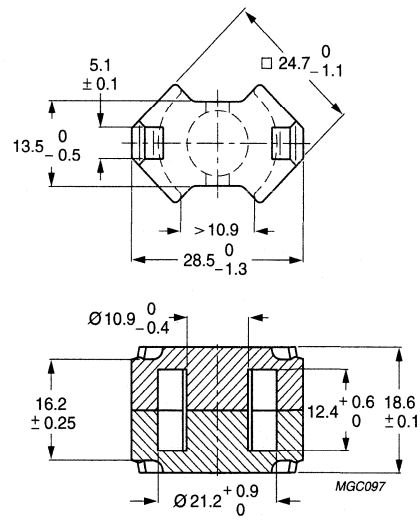
Dimensions in mm.

Fig.4 Mounting clip for RM10.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.462	mm^{-1}
V_e	effective volume	4310	mm^3
l_e	effective length	44.6	mm
A_e	effective area	96.6	mm^2
A_{min}	minimum area	80.9	mm^2
m	mass of set	≈22	g



Dimensions in mm.

Fig.1 RM10/I core set.

Core sets for general purpose transformers and power applications

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 (sup)	160 ±3%	≈59	≈900	RM10/I-3B8-A160
	250 ±3%	≈92	≈500	RM10/I-3B8-A250
	315 ±3%	≈116	≈400	RM10/I-3B8-A315
	400 ±3%	≈147	≈300	RM10/I-3B8-A400
	630 ±3%	≈232	≈150	RM10/I-3B8-A630
	4950 ±25%	≈1820	≈0	RM10/I-3B8
3C81	160 ±3%	≈59	≈900	RM10/I-3C81-E160
	250 ±3%	≈92	≈500	RM10/I-3C81-A250
	315 ±3%	≈116	≈400	RM10/I-3C81-A315
	400 ±3%	≈147	≈300	RM10/I-3C81-A400
	630 ±3%	≈232	≈150	RM10/I-3C81-A630
	5400 ±25%	≈2000	≈0	RM10/I-3C81
3C85	160 ±3%	≈59	≈900	RM10/I-3C85-A160
	250 ±3%	≈92	≈500	RM10/I-3C85-A250
	315 ±3%	≈116	≈400	RM10/I-3C85-A315
	400 ±3%	≈147	≈300	RM10/I-3C85-A400
	630 ±3%	≈232	≈150	RM10/I-3C85-A630
	4400 ±25%	≈1620	≈0	RM10/I-3C85
3C90	4400 ±25%	≈1620	≈0	RM10/I-3C90

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3D3 des	315 ±3%	≈116	≈400	RM10/I-3D3-A315
	400 ±5%	≈147	≈300	RM10/I-3D3-A400
	630 ±8%	≈232	≈150	RM10/I-3D3-A630
	1900 ±25%	≈700	≈0	RM10/I-3D3
3F3	160 ±3%	≈59	≈900	RM10/I-3F3-A160
	250 ±3%	≈92	≈500	RM10/I-3F3-A250
	315 ±3%	≈116	≈400	RM10/I-3F3-A315
	400 ±3%	≈147	≈300	RM10/I-3F3-A400
	630 ±3%	≈232	≈150	RM10/I-3F3-A630
	4050 ±25%	≈1490	≈0	RM10/I-3F3
3H3 des	400 ±3%	≈147	≈300	RM10/I-3H3-A400
	630 ±3%	≈232	≈150	RM10/I-3H3-A630
	1000 ±10%	≈368	≈120	RM10/I-3H3-A1000
	4400 ±25%	≈1620	≈0	RM10/I-3H3

Core sets of high permeability grades

GRADE	A_L [1] (nH)	μ_e	TYPE NUMBER
3E1	8000 ±25%	≈2900	RM10/I-3E1
3E25 sup	10700 ±25%	≈3880	RM10/I-3E25
3E27	10700 ±25%	≈3880	RM10/I-3E27
3E4	11000 +40/–30%	≈4040	RM10/I-3E4
3E5	16000 +40/–30%	≈5900	RM10/I-3E5

Note

1. Clamping force 60 ±20 N.

Properties of core sets under power conditions

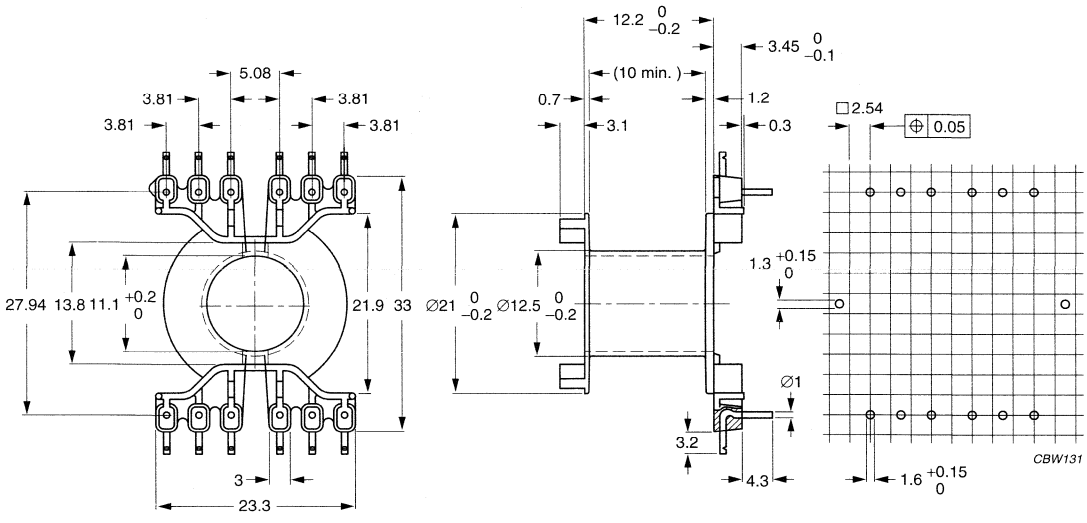
GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3B8	≥315	≤1.20	–	–
3C81	≥315	≤0.88	–	–
3C85	≥315	≤0.65	≤0.80	–
3C90	≥315	≤0.50	≤0.48	–
3F3	≥315	–	≤0.48	≤0.82

COIL FORMER

General data

For the information on another coil former suitable for RM10/I, see *"Data sheet: RM10"*.

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass-reinforced, flame retardant in accordance with UL 94V-0; UL file number E45329(R)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, IEC 85 class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 RM10/I coil former (DIL).

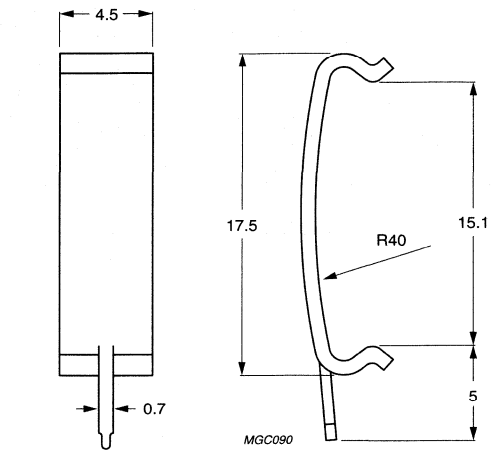
Winding data for RM10/I coil former (DIL)

NUMBER OF SECTIONS	AVERAGE LENGTH OF TURN (mm)	WINDING AREA (mm^2)	WINDING WIDTH (mm)	TYPE NUMBER
1	52	44.2	10.0	CPV-RM10/I-1S-12PD

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈30 N
Clip material	stainless steel
Clip plating	tin-lead alloy (SnPb)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM10/I



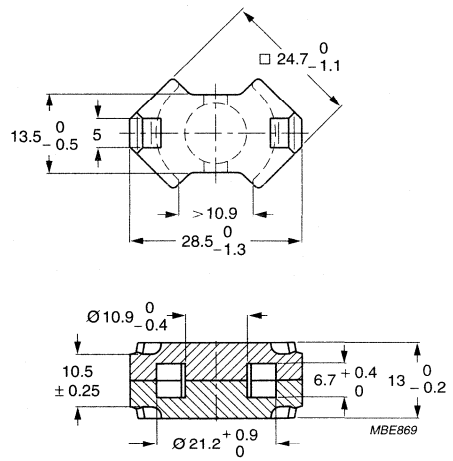
Dimensions in mm.

Fig.3 Mounting clip for RM10/I.

CORE SETS

Effective core parametersRM10/ILP

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.340	mm^{-1}
V_e	effective volume	3360	mm^3
l_e	effective length	33.9	mm
A_e	effective area	99.1	mm^2
A_{min}	minimum area	80.9	mm^2
m	mass of set	≈17	g



Dimensions in mm.

Fig.1 RM10/ILP core set.

Core sets for general purpose transformers and power applications

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	5600 ±25%	≈1510	≈0	RM10/ILP-3C85
3C90 des	5600 ±25%	≈1510	≈0	RM10/ILP-3C90
3D3 des	315 ±3%	≈85	≈500	RM10/ILP-3D3-A315
	400 ±3%	≈108	≈350	RM10/ILP-3D3-A400
	630 ±5%	≈170	≈200	RM10/ILP-3D3-A630
	2500 ±25%	≈675	≈0	RM10/ILP-3D3
3F3 des	5200 ±25%	≈1410	≈0	RM10/ILP-3F3
3F4 des	3000 ±25%	≈810	≈0	RM10/ILP-3F4
3H3 des	400 ±3%	≈108	≈350	RM10/ILP-3H3-A400
	630 ±3%	≈170	≈200	RM10/ILP-3H3-A630
	1000 ±5%	≈270	≈130	RM10/ILP-3H3-A1000
	5600 ±25%	≈1510	≈0	RM10/ILP-3H3

Core sets of high permeability grades

Clamping force 60 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5 des	22000 +40/−30%	≈5950	≈0	RM10/ILP-3E5
3E6 des	32000 +40/−30%	≈8660	≈0	RM10/ILP-3E6

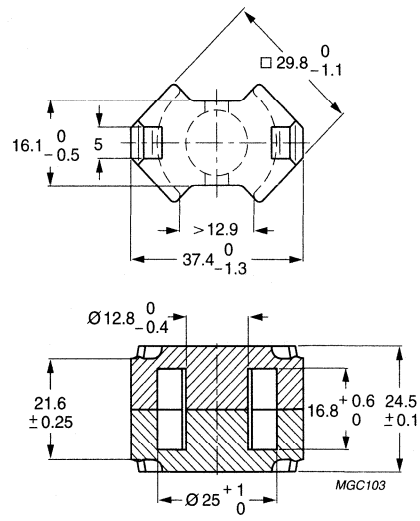
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C85	≥315	≤0.51	≤0.62	–	–	–
3C90	≥315	≤0.37	≤0.37	–	–	–
3F3	≥300	–	≤0.37	≤0.64	–	–
3F4	≥250	–	–	–	≤0.67	≤1.1

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.388	mm^{-1}
V_e	effective volume	8340	mm^3
l_e	effective length	56.6	mm
A_e	effective area	146	mm^2
A_{min}	minimum area	125	mm^2
m	mass of set	≈45	g



Dimensions in mm.

Fig.1 RM12/I core set.

Core sets for general purpose transformers and power applications

Clamping force 70 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	160 ±3%	≈49	≈1400	RM12/I-3B8-A160
	250 ±3%	≈77	≈800	RM12/I-3B8-A250
	315 ±5%	≈97	≈550	RM12/I-3B8-A315
	400 ±5%	≈123	≈450	RM12/I-3B8-A400
	6200 ±25%	≈1910	≈0	RM12/I-3B8
3C85	160 ±3%	≈49	≈1400	RM12/I-3C85-A160
	250 ±3%	≈77	≈800	RM12/I-3C85-A250
	315 ±5%	≈97	≈550	RM12/I-3C85-A315
	400 ±5%	≈123	≈450	RM12/I-3C85-A400
	630 ±5%	≈196	≈300	RM12/I-3C85-A630
	5500 ±25%	≈1700	≈0	RM12/I-3C85
3C90	5500 ±25%	≈1700	≈0	RM12/I-3C90
3F3	160 ±3%	≈49	≈1400	RM12/I-3F3-A160
	250 ±3%	≈77	≈800	RM12/I-3F3-A250
	315 ±5%	≈97	≈550	RM12/I-3F3-A315
	400 ±5%	≈123	≈450	RM12/I-3F3-A400
	630 ±5%	≈196	≈300	RM12/I-3F3-A630
	5050 ±25%	≈1560	≈0	RM12/I-3F3

Core sets of high permeability grades

Clamping force 70 ±20 N.

GRADE	A_L() (nH)	μ_e	TYPE NUMBER
3E1	9200 ±25%	≈2850	RM12/I-3E1
3E4	13300 +40/–30%	≈4100	RM12/I-3E4

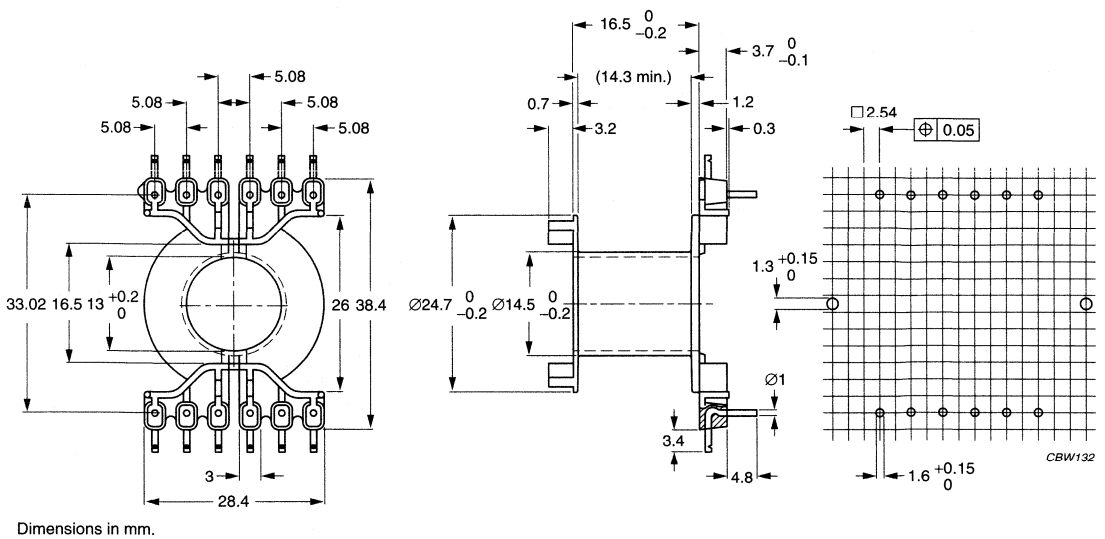
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3B8	≥315	≤2.35	–	–
3C85	≥315	≤1.30	≤1.50	–
3C90	≥315	≤0.92	≤0.92	–
3F3	≥315	–	≤0.92	≤1.60

COIL FORMER

General data

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass-reinforced, flame retardant in accordance with UL 94V-0; UL file number E45329(R)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, IEC 85 class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.2 RM12/I coil former (DIL).

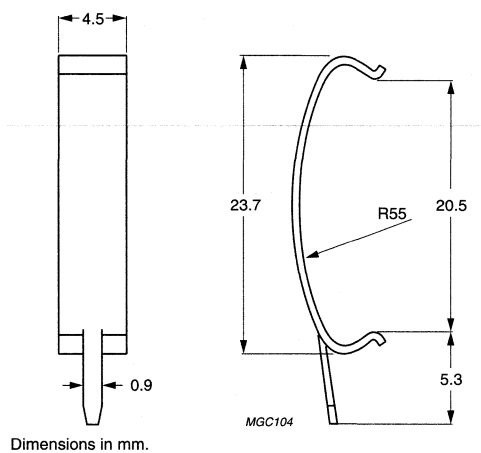
Winding data for RM12/I coil former (DIL)

NUMBER OF SECTIONS	AVERAGE LENGTH OF TURN (mm)	WINDING AREA (mm^2)	WINDING WIDTH (mm)	TYPE NUMBER
1	61	75.0	14.3	CPV-RM12/I-1S-12PD

MOUNTING PARTS

General data

ITEM	SPECIFICATION
Clamping force	≈35 N
Clip material	stainless steel
Clip plating	tin-lead alloy (SnPb)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM12/I



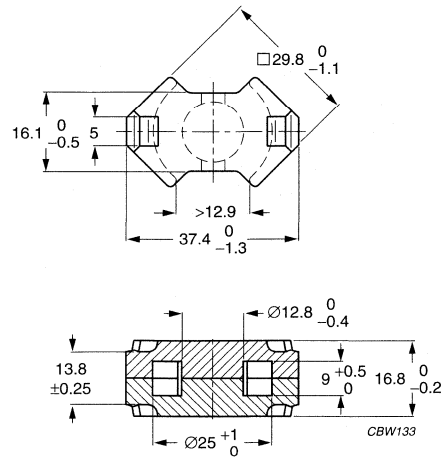
Dimensions in mm.

Fig.3 Mounting clip for RM12/I.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.280	mm^{-1}
V_e	effective volume	6200	mm^3
l_e	effective length	42	mm
A_e	effective area	148	mm^2
A_{min}	minimum area	125	mm^2
m	mass of set	≈34	g



Dimensions in mm.

Fig.1 RM12/ILP core set.

Core sets for general purpose transformers and power applications

Clamping force 70 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	7300 ±25%	≈1630	≈0	RM12/ILP-3C85
3C90 des	7300 ±25%	≈1630	≈0	RM12/ILP-3C90
3F3 des	6700 ±25%	≈1490	≈0	RM12/ILP-3F3
3F4 des	3600 ±25%	≈800	≈0	RM12/ILP-3F4

Core sets of high permeability grades

Clamping force 70 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5 des	28000 +40/−30%	≈6240	≈0	RM12/ILP-3E5
3E6 des	42000 +40/−30%	≈9360	≈0	RM12/ILP-3E6

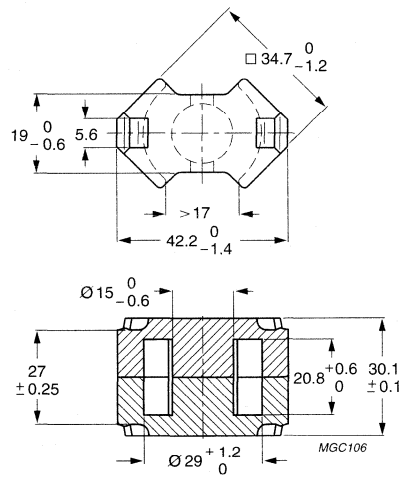
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C85	≥315	≤0.97	≤1.1	–	–	–
3C90	≥315	≤0.68	≤0.68	–	–	–
3F3	≥300	–	≤0.68	≤1.2	–	–
3F4	≥250	–	–	–	≤1.2	≤2.0

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.353	mm^{-1}
V_e	effective volume	13900	mm^3
l_e	effective length	70.0	mm
A_e	effective area	198	mm^2
A_{min}	minimum area	168	mm^2
m	mass of set	≈74	g



Dimensions in mm.

Fig.1 RM14/I core set.

Core sets for general purpose transformers and power applications

Clamping force 80 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3B8 sup	250 ±3%	≈70	≈950	RM14/I-3B8-A250
	315 ±3%	≈88	≈700	RM14/I-3B8-A315
	400 ±3%	112	≈550	RM14/I-3B8-A400
	630 ±5%	≈177	≈250	RM14/I-3B8-A630
	1000 ±5%	≈281	≈150	RM14/I-3B8-A1000
	7100 ±25%	≈1990	≈0	RM14/I-3B8
3C85	250 ±3%	≈70	≈950	RM14/I-3C85-A250
	315 ±3%	≈88	≈700	RM14/I-3C85-A315
	400 ±3%	112	≈550	RM14/I-3C85-A400
	630 ±5%	≈177	≈250	RM14/I-3C85-A630
	1000 ±5%	≈281	≈150	RM14/I-3C85-A1000
	6250 ±25%	≈1750	≈0	RM14/I-3C85
3C90	6250 ±25%	≈1750	≈0	RM14/I-3C90
3F3	250 ±3%	≈70	≈950	RM14/I-3F3-A250
	315 ±3%	≈88	≈700	RM14/I-3F3-A315
	400 ±3%	112	≈550	RM14/I-3F3-A400
	630 ±5%	≈177	≈250	RM14/I-3F3-A630
	1000 ±5%	≈281	≈150	RM14/I-3F3-A1000
	5700 ±25%	≈1600	≈0	RM14/I-3F3

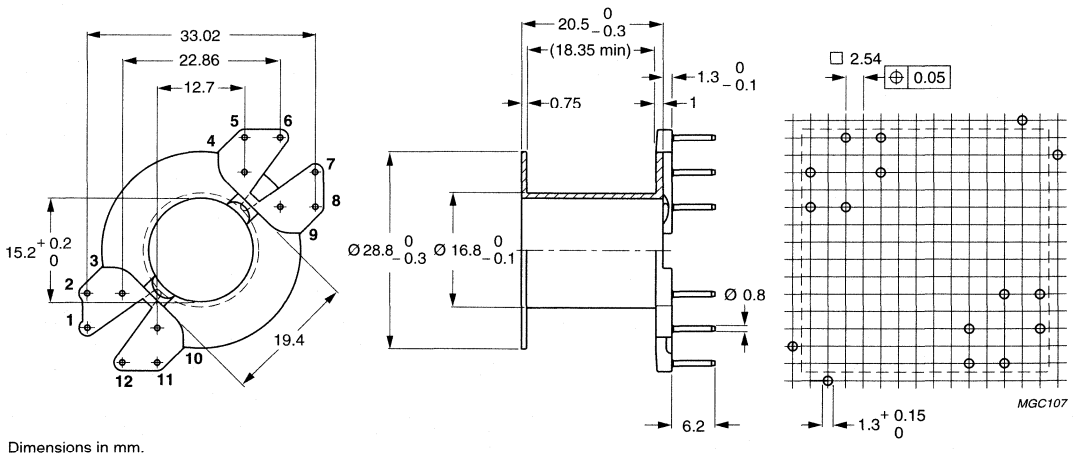
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3B8	≥315	≤3.90	–	–
3C85	≥315	≤2.15	≤2.50	–
3C90	≥315	≤1.55	≤1.55	–
3F3	≥315	–	≤1.55	≤2.65

COIL FORMERS

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass reinforced, flame retardant in accordance with UL 94V-0; UL file number E167521(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, IEC 85 class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

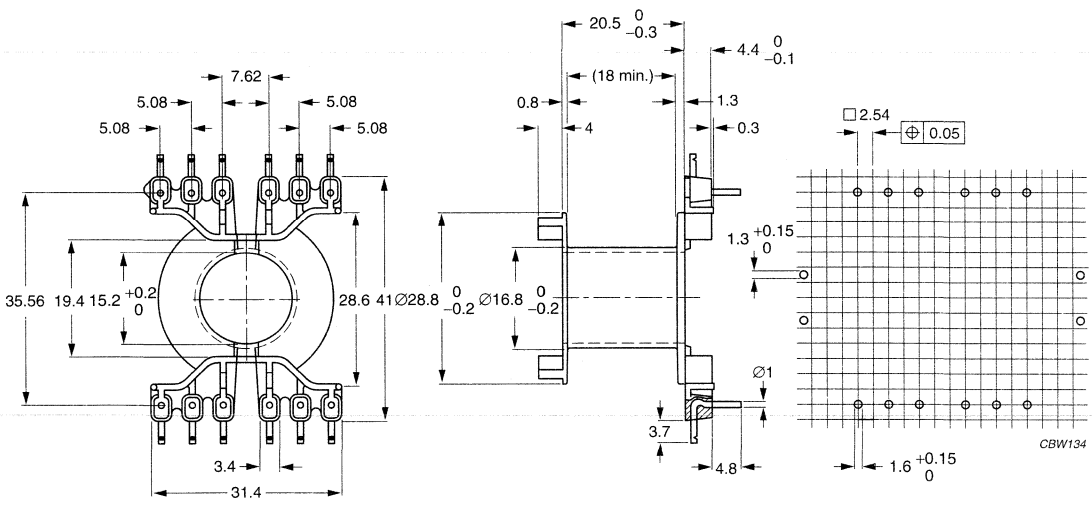
Fig.2 RM14/I coil former; 12-pins.

Winding data for 12-pins RM14/I coil former

NUMBER OF SECTIONS	NUMBER OF PINS	PIN POSITIONS USED	AVERAGE LENGTH OF TURN (mm)	WINDING AREA (mm^2)	WINDING WIDTH (mm)	TYPE NUMBER
1	10	1, 2, 3, 4, 6, 7, 9, 10, 11, 12	71	112	18.4	CSV-RM14-1S-10P
1	12	all	71	112	18.4	CSV-RM14-1S-12P

General data

PARAMETER	SPECIFICATION
Coil former material	polybutyleneterephtalate (PBT), glass-reinforced, flame retardent in accordance with UL 94V-0; UL file number E45329(R)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, IEC 85 class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1



Dimensions in mm.

Fig.3 RM14/I coil former; 12-pins (DIL).

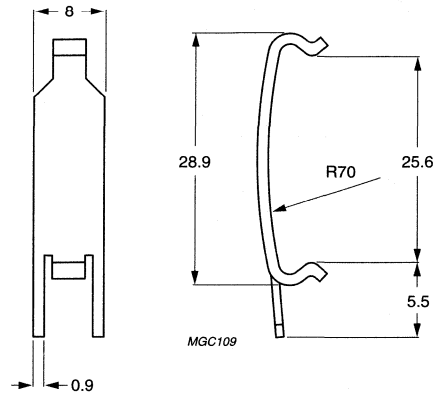
Winding data for 12-pins RM14/I coil former (DIL)

NUMBER OF SECTIONS	AVERAGE LENGTH OF TURN (mm)	WINDING AREA (mm^2)	WINDING WIDTH (mm)	TYPE NUMBER
1	71	111.0	18.0	CPV-RM14/I-1S-12PD

MOUNTING PARTS

General data mounting clip with earth pin

ITEM	SPECIFICATION
Clamping force	≈40 N
Clip material	stainless steel
Clip plating	tin-lead alloy (SnPb)
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1
Type number	CLI/P-RM14/I



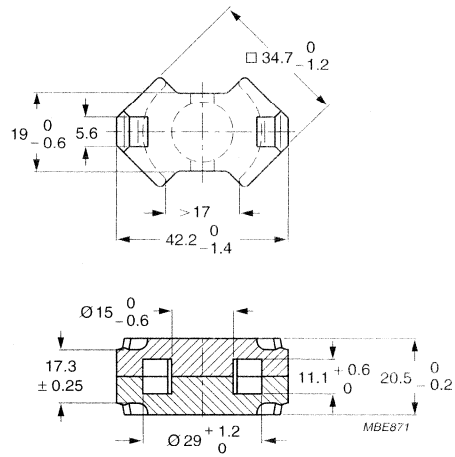
Dimensions in mm.

Fig.4 Mounting clip for RM14/I.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.250	mm^{-1}
V_e	effective volume	10230	mm^3
l_e	effective length	50.9	mm
A_e	effective area	201	mm^2
A_{min}	minimum area	168	mm^2
m	mass of set	≈55	g



Dimensions in mm.

Fig.1 RM14/ILP core set.

Core sets for general purpose transformers and power applications

Clamping force 80 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3C85 des	8400 ±25%	≈1670	≈0	RM14/ILP-3C85
3C90 des	8400 ±25%	≈1670	≈0	RM14/ILP-3C90
3F3 des	7700 ±25%	≈1530	≈0	RM14/ILP-3F3
3F4 des	4200 ±25%	≈840	≈0	RM14/ILP-3F4

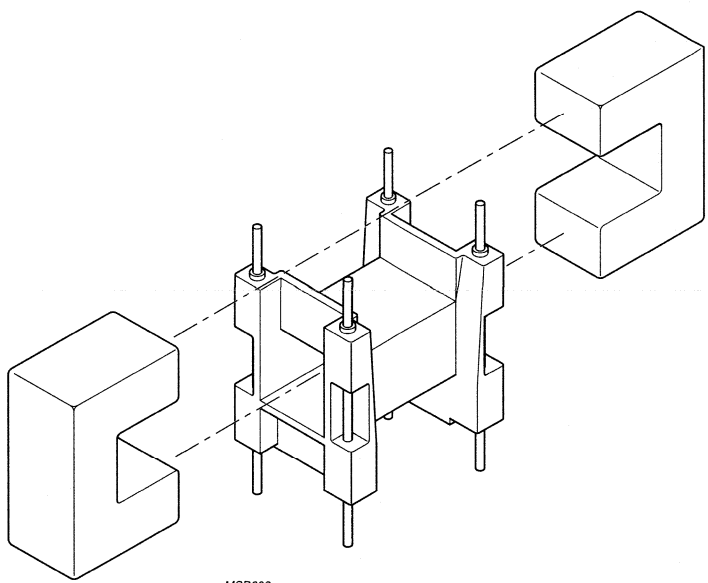
Core sets of high permeability grades

Clamping force 80 ±20 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER
3E5 des	32000 +40/–30%	≈6360	≈0	RM14/ILP-3E5
3E6 des	48000 +40/–30%	≈9550	≈0	RM14/ILP-3E6

Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at				
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C	f = 1 MHz; $\hat{B}$ = 30 mT; T = 100 °C	f = 3 MHz; $\hat{B}$ = 10 mT; T = 100 °C
3C85	≥315	≤1.6	≤1.8	–	–	–
3C90	≥315	≤1.2	≤1.2	–	–	–
3F3	≥300	–	≤1.2	≤2.0	–	–
3F4	≥250	–	–	–	≤2.0	≤3.3



MSB603

For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview U, I cores

CORE TYPE	V_e (mm^3)	A_e (mm^2)	MASS (g)
U10/8/3	309	8.07	0.9
U15/11/6	1680	32.3	4
I15/3/3	–	–	0.6
U20/16/7	3800	56	9
I20/6/5	–	–	3
U25/16/6	3380	40.3	8
I25/6/6	–	–	4.5
U25/20/13	9180	104	23.5
I25/7/7	–	–	6
U30/25/16	17900	161	43
U33/22/9	9490	86.5	24
U67/27/14	35200	204	85
U93/76/16	159000	448	400
I93/28/16	–	–	200
U93/52/30	217000	840	560
U93/76/30	297000	840	760
I93/28/30	–	–	370
I100/25/25	–	–	300
U100/57/25	199000	645	500

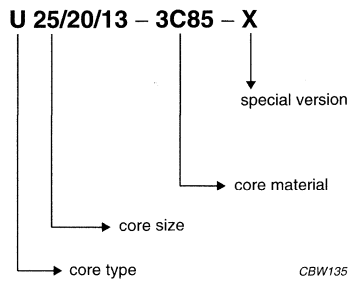


Fig.1 Type number structure for cores.

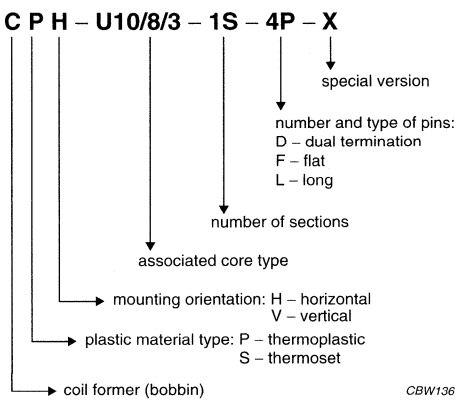


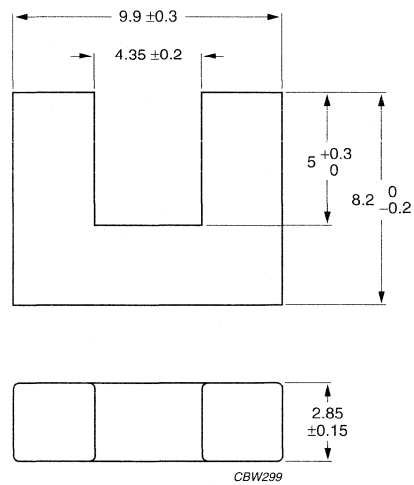
Fig.2 Type number structure for coil formers.

U cores and accessories U10/8/3

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	4.74	mm^{-1}
V_e	effective volume	309	mm^3
l_e	effective length	38.3	mm
A_e	effective area	8.07	mm^2
A_{min}	minimum area	7.91	mm^2
m	mass of core half	≈0.9	g



Dimensions in mm.

Fig.1 U10/8/3 core half.

Core halves

A_L measured in combination with a non-gapped core half.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C85	420 ±25%	≈1580	U10/8/3-3C85

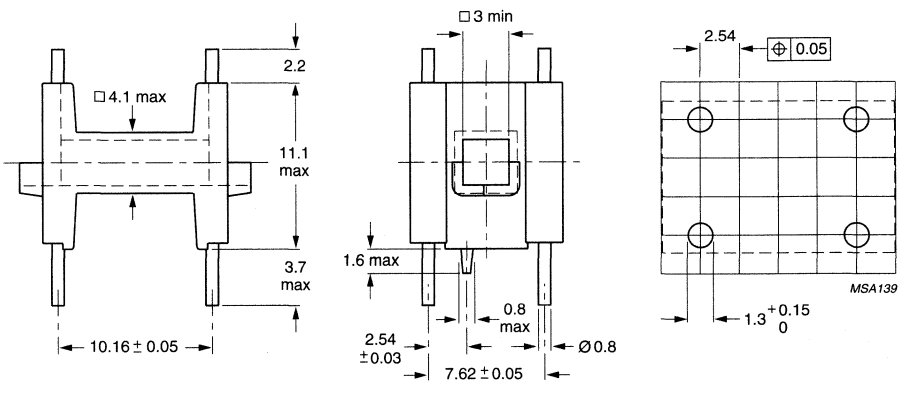
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 16 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥320	–	≤0.05	≤0.06

COIL FORMERS

General data 4-pins U10/8/3 coil former

PARAMETER	SPECIFICATION
Coil former material	polybuteleneterephtalate (PBT), glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E69578(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 U10/8/3 coil former; 4-pins.

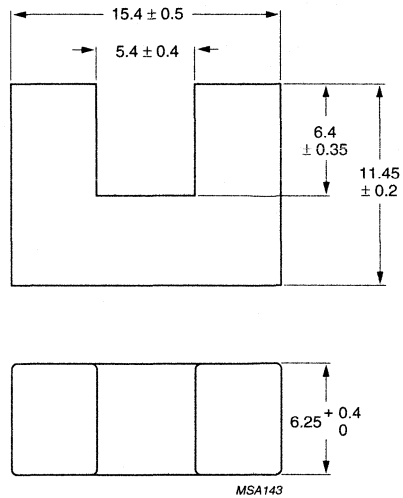
Winding data for 4-pins U10/8/3 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	28	8	30	CPH-U10/8/3-1S-4P

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.60	mm^{-1}
V_e	effective volume	1680	mm^3
l_e	effective length	52	mm
A_e	effective area	32.3	mm^2
m	mass of core half	≈4	g



Dimensions in mm.

Fig.1 U15/11/6 core half.

Core halves

A_L measured in combination with a non-gapped core half.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C85	1400 ±25%	≈1900	U15/11/6-3C85
3E25 des	3400 ±25%	≈4300	U15/11/6-3E25

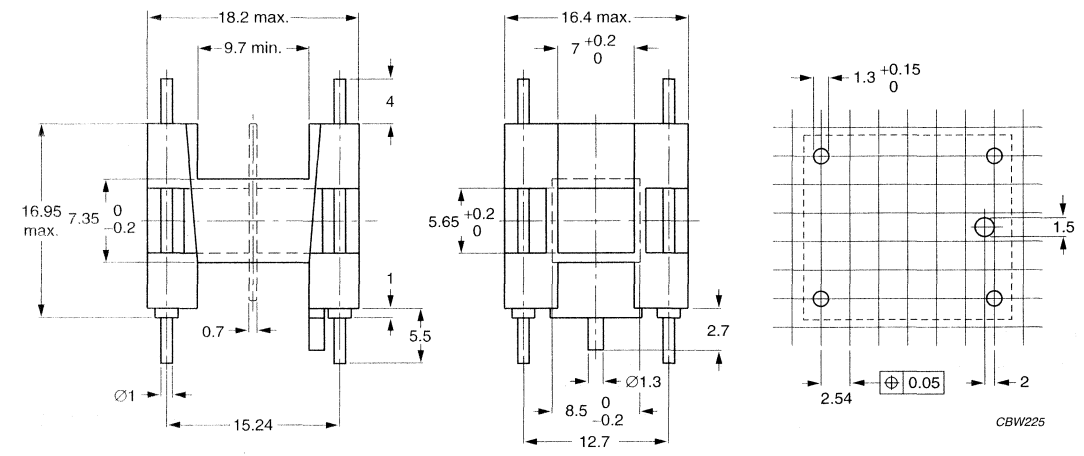
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 16 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥320	–	≤0.24	≤0.28

COIL FORMERS

General data 4-pins U15/11/6 coil former

PARAMETER	SPECIFICATION
Coil former material	polyamide 6.6, glass-reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E44716(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C, *"IEC 85"* class B
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 U15/11/6 coil former; 4-pins.

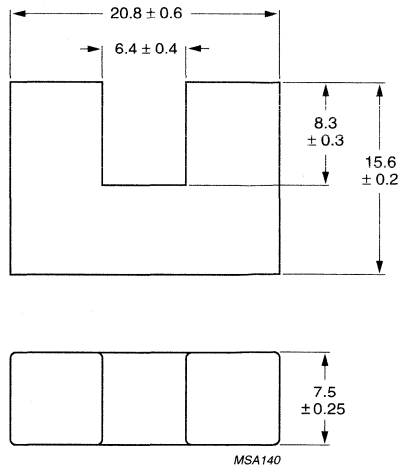
Winding data for 4-pins U15/11/6 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	38.7		46.6	CPH-U15/11/6-1S-4P
2	2 × 17.9	2 × 4.45	46.6	CPH-U15/11/6-2S-4P

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.21	mm^{-1}
V_e	effective volume	3800	mm^3
l_e	effective length	68	mm
A_e	effective area	56	mm^2
m	mass of core half	≈9	g



Dimensions in mm.

Fig.1 U20/16/7 core half.

Core halves

A_L measured in combination with a non-gapped core half.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C85	1900 ±25%	≈1950	U20/16/7-3C85
3E25 des	4800 ±25%	≈4600	U20/16/7-3E25

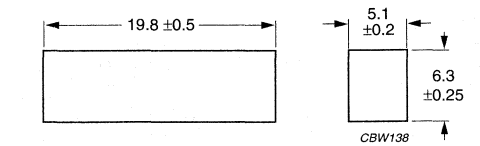
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 16 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥320	–	≤0.53	≤0.63

CORE

Ordering information

GRADE	TYPE NUMBER
3C85	I20/6/5-3C85



Dimensions in mm.

Fig.1 I20/6/5 core.

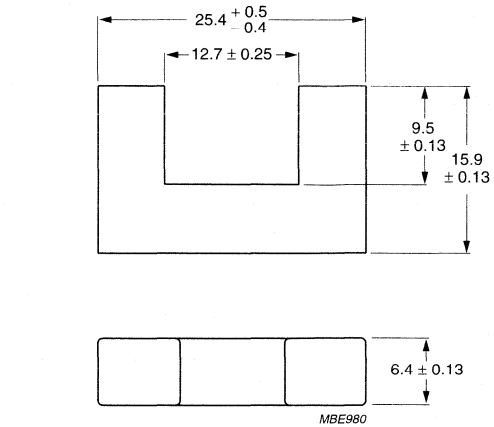
COIL FORMER

For coil former data, see data sheet, *"U15/11/6"*.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.07	mm^{-1}
V_e	effective volume	3380	mm^3
l_e	effective length	83.6	mm
A_e	effective area	40.3	mm^2
m	mass of core half	≈8	g



Dimensions in mm.

Fig.1 U25/16/6 core half.

Core halves

A_L measured in combination with a non-gapped core half.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C81	1400 ±25%	≈2300	U25/16/6-3C81
3E25 sup	2320 ±25%	≈3800	U25/16/6-3E25
3E27	2320 ±25%	≈3800	U25/16/6-3E27

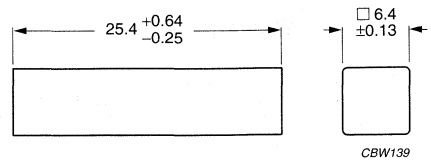
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 160 mT; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C81	≥320	≤0.40	–	–

CORE SETS

Effective core parameters measured in combination with U25/16/6

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.59	mm^{-1}
V_e	effective volume	2590	mm^3
l_e	effective length	64.3	mm
A_e	effective area	40.3	mm^2
m	mass of I core	≈4.5	g



Dimensions in mm.

Fig.1 I25/6/6 core.

Core halves

A_L measured in combination with *"U25/16/6"*.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C81 sup	1750 ±25%	≈2250	I25/6/6-3C81
3E25 sup	2500 ±25%	≈3200	I25/6/6-3E25
3E27 sup	2500 ±25%	≈3200	I25/6/6-3E27

Properties of core sets under power conditions

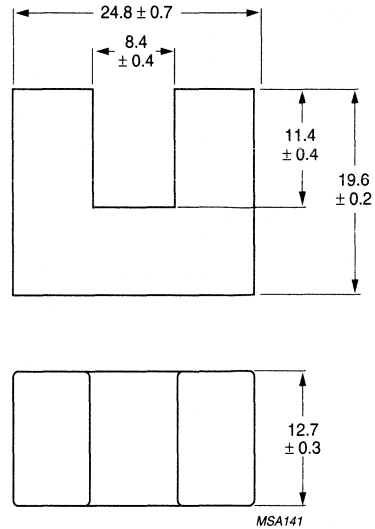
Measured in combination with *"U25/16/6"*.

GRADE	B (mT) at	CORE LOSS (W) at
	H = 250 A/m; f = 25 kHz; T = 100 °C	**f = 25 kHz; $\hat{B}$ = 160 mT; T = 100 °C**
3C81	≥330	≤0.53

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.85	mm^{-1}
V_e	effective volume	9180	mm^3
l_e	effective length	88.2	mm
A_e	effective area	104	mm^2
m	mass of core half	≈23.5	g



Dimensions in mm.

Fig.1 U25/20/13 core half.

Core halves

A_L measured in combination with a non-gapped core half.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C85	2900 ±25%	≈2000	U25/20/13-3C85
3E25 des	6300 ±25%	≈4300	U25/20/13-3E25

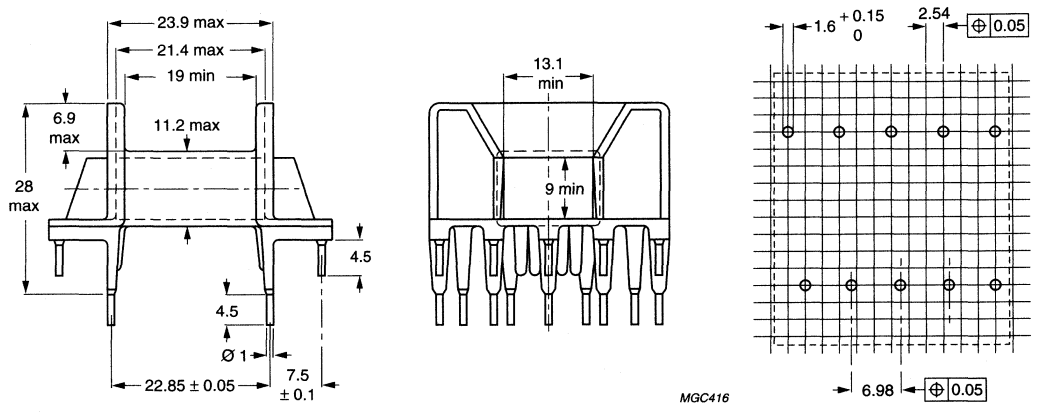
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥330	–	≤1.30	≤1.60

COIL FORMERS

General data 9-pins U25/20/13 coil former

PARAMETER	SPECIFICATION
Coil former material	polycarbonate (PC), glass-reinforced, flame retardant in accordance with *"UL 94V-1"*; UL file number E41613(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C, *"IEC 85"* class B
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 U25/20/13 coil former; 10-pins.

Winding data for 9-pins U25/20/13 coil former

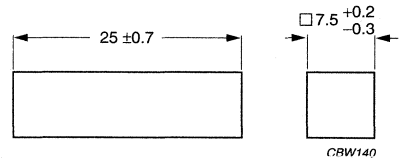
NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	131	19	73	CPH-U25/20/13-1S-10P

I cores and accessories I25/7/7

CORE

Ordering information

GRADE	TYPE NUMBER
3C85	I25/7/7-3C85



Dimensions in mm.

Fig.1 I25/7/7 core.

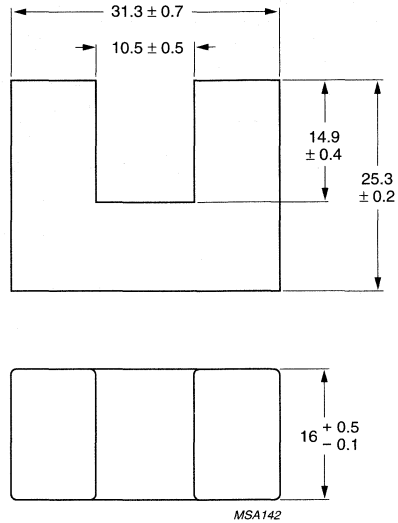
COIL FORMER

For coil former data, see data sheet, *"U20/16/7"*.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.690	mm^{-1}
V_e	effective volume	17900	mm^3
l_e	effective length	111	mm
A_e	effective area	161	mm^2
m	mass of core half	≈43	g



Dimensions in mm.

Fig.1 U30/25/16 core half.

Core halves

A_L measured in combination with a non-gapped core half.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C85	3700 ±25%	≈2000	U30/25/16-3C85

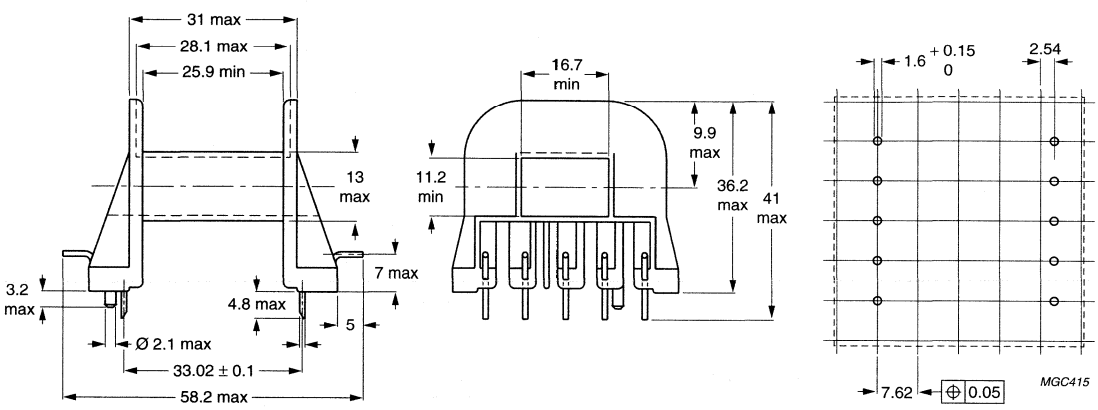
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 16 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥330	–	≤2.50	≤3.00

COIL FORMERS

General data 10-pins U30/25/16 coil former

PARAMETER	SPECIFICATION
Coil former material	polycarbonate (PC), glass-reinforced, flame retardant in accordance with *"UL 94V-1"*; UL file number E41613(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	130 °C, *"IEC 85"* class B
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s



Dimensions in mm.

Fig.2 U30/25/16 coil former; 10-pins.

Winding data for 10-pins U30/25/16 coil former

NUMBER OF SECTIONS	WINDING AREA (mm^2)	MINIMUM WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	230	25.9	97	CPH-U30/25/16-1S-10P

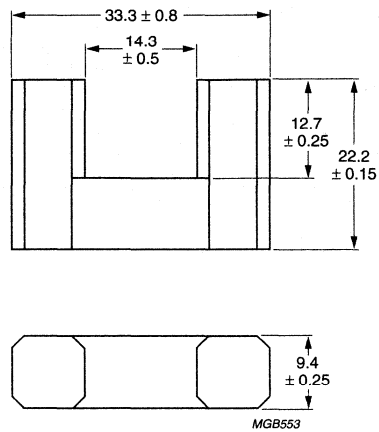
U cores and accessories

U33/22/9 (1F30)

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.27	mm^{-1}
V_e	effective volume	9490	mm^3
l_e	effective length	110	mm
A_e	effective area	86.5	mm^2
m	mass of core half	≈24	g



Dimensions in mm.

Fig.1 U33/22/9 core half.

Core half

A_L measured in combination with a non-gapped core half.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C81	2300 ±25%	≈2320	U33/22/9-3C81

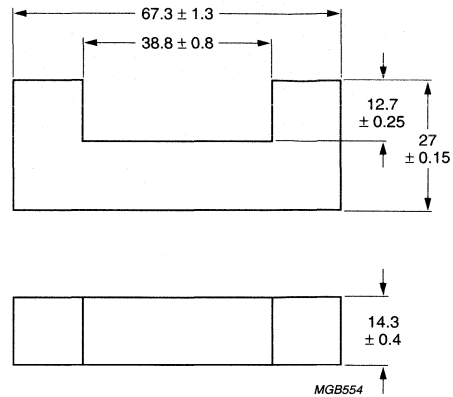
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 160 mT; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C81	≥330	≤1.1	–	–

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.850	mm^{-1}
V_e	effective volume	35200	mm^3
l_e	effective length	173	mm
A_e	effective area	204	mm^2
m	mass of core half	≈85	g



Dimensions in mm.

Fig.1 U67/27/14 core half.

Core half

A_L measured in combination with a non-gapped core half.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C81	3800 ±25%	≈2570	U67/27/14 -3C81

Properties of core sets under power conditions

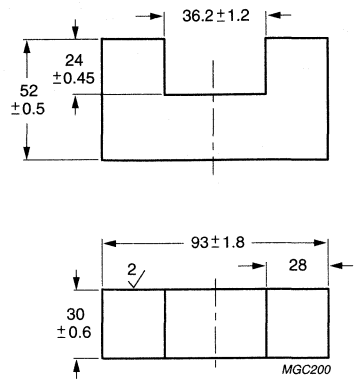
GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C81	≥330	≤7.1	–	–

U cores and accessories U93/52/30

U CORES

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.307	mm^{-1}
V_e	effective volume	217000	mm^3
l_e	effective length	258	mm
A_e	effective area	840	mm^2
m	mass of core half	≈560	g



Dimensions in mm.

Fig.1 U93/52/30 core half.

Core half

A_L measured on a combination of two u-cores.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C85	8700 ±25%	≈2100	U93/52/30-3C85

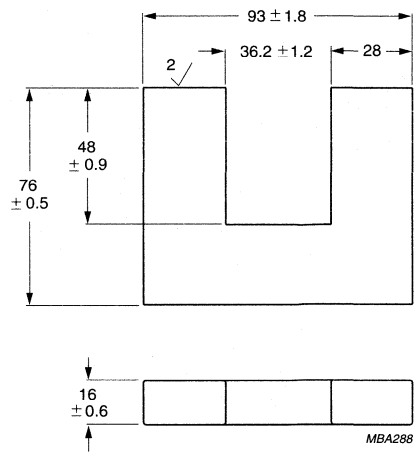
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥330	≤34	≤50

U CORES

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.790	mm^{-1}
V_e	effective volume	159000	mm^3
l_e	effective length	354	mm
A_e	effective area	448	mm^2
m	mass of core half	≈400	g



Dimensions in mm.

Fig.1 U93/76/16 core half.

Core half

A_L measured on a combination of two U-cores.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C85	3400 ±25%	≈2200	U93/76/16-3C85

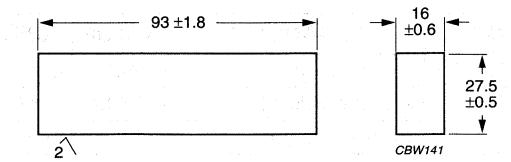
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥330	≤24	≤32

CORE SETS

Effective core parameters in combination with U93/76/16

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.576	mm^{-1}
V_e	effective volume	115000	mm^3
l_e	effective length	258	mm
A_e	effective area	447	mm^2
m	mass of core	≈200	g



Dimensions in mm.

Fig.1 I93/28/16 core.

Core data

A_L measured in combination with *"U93/76/16"*.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C85	4600 ±25%	≈2100	I93/28/16-3C85

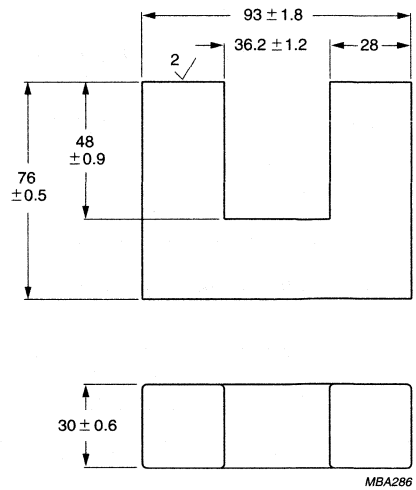
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥330	≤18	≤23

U CORES

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.421	mm^{-1}
V_e	effective volume	297000	mm^3
l_e	effective length	354	mm
A_e	effective area	840	mm^2
m	mass of core half	≈760	g



Dimensions in mm.

Fig.1 U93/76/30 core half.

Core halves

A_L measured on a combination of two U-cores.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C85	6400 ±25%	≈2200	U93/76/30-3C85
3C90	6400 ±25%	≈2200	U93/76/30-3C90

Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥330	≤47	≤67
3C90	≥330	≤35	≤50

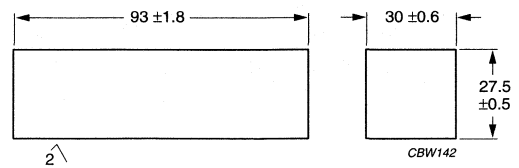
CORE SETS

Effective core parameters in combination with U93/52/30

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.251	mm^{-1}
V_e	effective volume	175000	mm^3
l_e	effective length	210	mm
A_e	effective area	836	mm^2
m	mass of core	≈370	g

Effective core parameters in combination with U93/76/30

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.307	mm^{-1}
V_e	effective volume	217000	mm^3
l_e	effective length	258	mm
A_e	effective area	840	mm^2
m	mass of core	≈370	g



Dimensions in mm.

Fig.1 I93/28/30 core.

Core data

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C85	10700 ±25%(1)	≈2150	I93/28/30-3C85
	8700 ±25%(2)	≈2150	
3C90	10700 ±25%(1)	≈2150	I93/28/30-3C90
	8700 ±25%(2)	≈2150	

Notes

1. Measured in combination with *"U93/52/30"*.
2. Measured in combination with *"U93/76/30"*.

Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥330	≤28.0(1)	≤40.0(1)
	≥330	≤34.0(2)	≤50.0(2)
3C90	≥330	≤21.0(1)	≤30.0(1)
	≥330	≤25.0(2)	≤37.0(2)

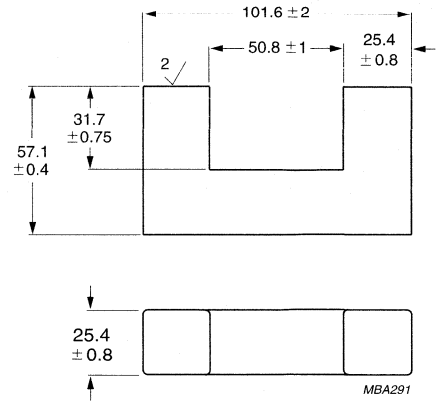
Notes

1. Measured in combination with *"U93/52/30"*.
2. Measured in combination with *"U93/76/30"*.

U CORES

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.478	mm^{-1}
V_e	effective volume	199 000	mm^3
l_e	effective length	308	mm
A_e	effective area	645	mm^2
m	mass of core half	≈500	g



Dimensions in mm.

Fig.1 U100/57/25 core half.

Core half

A_L measured on a combination of two U-cores.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C85	5500 ±25%	≈2200	U100/57/25-3C85
3C90	5500 ±25%	≈2200	U100/57/25-3C90

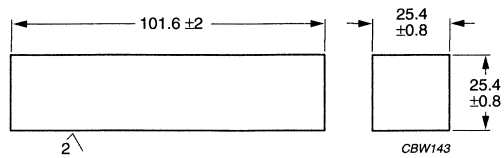
Properties of core sets under power conditions

GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥330	≤30	≤43
3C90	≥330	≤23	≤31

CORE SETS

Effective core parameters in combination with U100/57/25

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.379	mm^{-1}
V_e	effective volume	158000	mm^3
l_e	effective length	245	mm
A_e	effective area	645	mm^2
m	mass of core	≈300	g



Dimensions in mm.

Fig.1 I100/25/25 core.

Core data

A_L measured in combination with *"U100/57/25"*.

GRADE	A_L (nH)	μ_e	TYPE NUMBER
3C85	6700 ±25%	≈2150	I100/25/25-3C85
3C90	6700 ±25%	≈2150	I100/25/25-3C90

Properties of core sets under power conditions

Core loss measured in combination with *"U100/57/25"*.

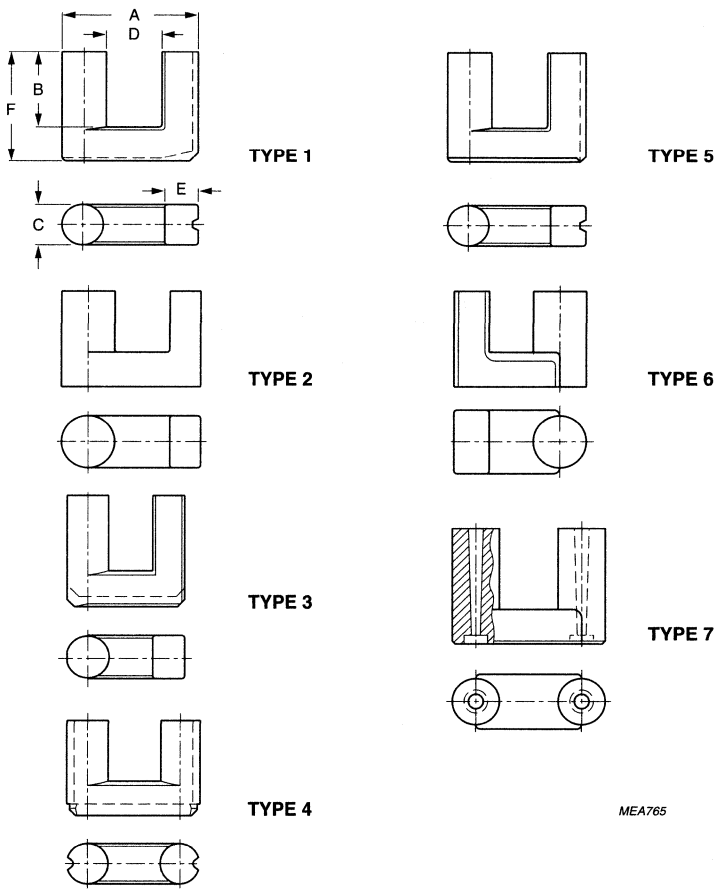
GRADE	B (mT) at	CORE LOSS (W) at	
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C
3C85	≥330	≤26	≤36
3C90	≥330	≤19	≤26

UR cores

For more information on Product Status Definitions, see page 3.

PRESENT TYPES AND ORDERING CODES

Our present selection is displayed in Table 2. In principle, any core shape can be supplied in all available grades. Other customized shapes can be manufactured on request.

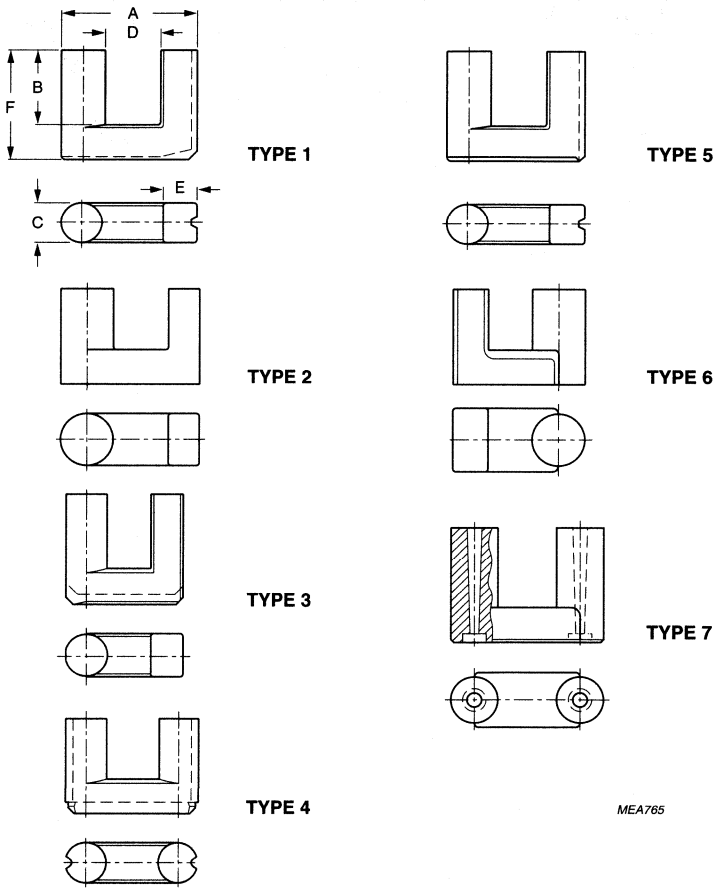


For dimensions see Table 1.

Fig.1 UR cores for line output transformers.

Table 1 Mechanical data

DESCRIPTION	SHAPE	DIMENSIONS (mm)						EFFECTIVE CORE PARAMETERS				
		A	B	C	D_{min}	E	F	C1 (mm^{-1})	V_e (mm^3)	l_e (mm)	A_e (mm^2)	MASS (g)
UR28/20/14	6	28.3	13.0	11.2	8.5	7.5	20.4	0.990	9460	97	98	25
UR35/28/13	5	35.2	18.8	12.7	13.1	9.3	28.3	1.100	15900	132	120	42
UR39/35/15	3	38.7	24.8	14.9	15.0	9.1	35.2	1.094	24300	163	149	64
UR42/21/12	4	41.8	11.1	11.9	18.2	11.9	20.6	1.09	11800	113	104	31
UR42/32/15	5	42.5	20.2	15.2	14.4	12.0	31.8	0.832	26670	149	179	69
UR43/34/16	2	42.1	24.0	15.8	15.7	9.6	34.0	0.982	27100	163	166	71
UR44/36/15	1	43.8	24.45	14.65	16.65	11.8	35.9	1.006	28700	170	169	71
UR47/36/16	5	47.55	23.8	15.95	18.25	12.6	35.7	0.900	33800	174	194	86
UR48/39/17	5	48.0	26.9	17.0	17.4	13.0	39.4	0.865	39990	186	215	99
UR64/29/14	4	64.0	18.1	13.8	36.1	13.8	29.5	1.26	27000	185	147	71
UR64/40/20	7	64.0	26.5	20.0	23.2	20.0	40.5	0.726	61000	210	290	160

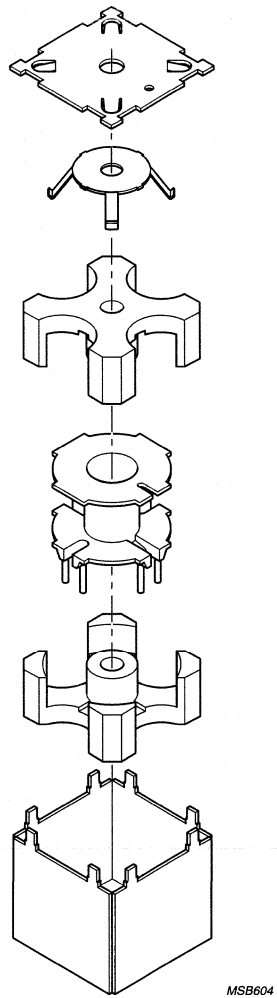


For type numbers see Table 2.

Fig.2 UR cores for line output transformers.

Table 2 Type numbers

SHAPE	TYPE NUMBERS		
	MATERIAL GRADE		
	3C81/3C85/3F3	3C15	3C30 des
6	UR28/20/14-3C85	–	UR28/20/14-3C30
5	–	UR35/28/13-3C15	UR35/28/13-3C30
3	–	UR39/35/15-3C15	UR39/35/15-3C30
4	UR42/21/12-3C81	–	–
5	–	UR42/32/15-3C15	UR42/32/15-3C30
2	–	UR43/34/16-3C15	UR43/34/16-3C30
1	–	UR44/36/15-3C15	UR44/36/15-3C30
5	–	UR47/36/16-3C15	UR47/36/16-3C30
5	–	UR48/39/17-3C15	UR48/39/17-3C30
4	UR64/29/14-3C81	–	–
7	UR64/40/20-3C85	–	–
7	UR64/40/20-3F3	–	–



For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview X cores

CORE TYPE	V_e (mm^3)	A_e (mm^2)	MASS (g)
X22	2510	66	12
X30	6360	114	38
X35	11000	164	58

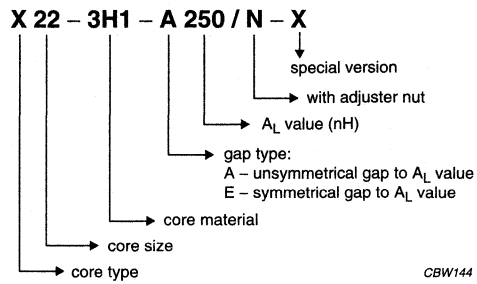


Fig.1 Type number structure for cores.

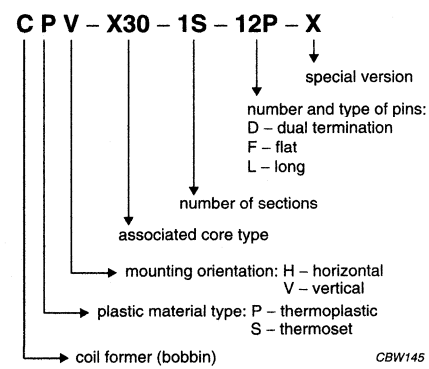
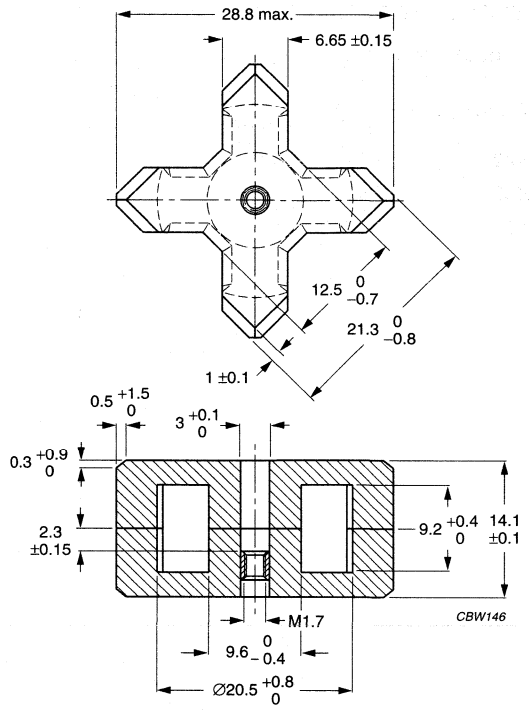


Fig.2 Type number structure for coil formers.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.575	mm^{-1}
V_e	effective volume	2510	mm^3
l_e	effective length	38.0	mm
A_e	effective area	66.0	mm^2
A_{min}	minimum area	62.1	mm^2
m	mass of set	≈12	g



Dimensions in mm.

Fig.1 X22 core set.

Core sets for filter and transformer applications

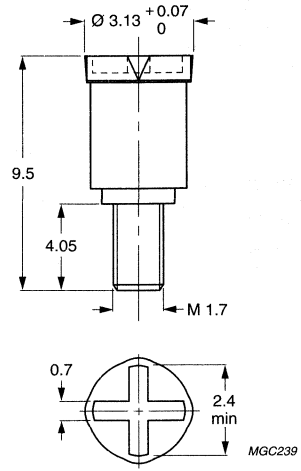
Clamping force 100 ±30 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3H1 sup	400 ±3%	≈180	≈200	X22-3H1-A400/N	X22-3H1-A400
	630 ±3%	≈290	≈120	X22-3H1-A630/N	X22-3H1-A630
	1000 ±10%	≈460	≈60	X22-3H1-A1000/N	X22-3H1-A1000
	3900 ±25%	≈1760	≈0	–	X22-3H1
4C6 sup	220 ±25%	≈100	≈0	–	X22-4C6
3D3 sup	1500 ±25%	≈680	≈0	–	X22-3D3
3B8 sup	3900 ±25%	≈1760	≈0	–	X22-3B8

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 X22 inductance adjuster.

Inductance adjuster selection chart

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	ΔL/L %(1)	TYPES FOR MEDIUM ADJUSTMENT	ΔL/L %(1)	TYPES FOR HIGH ADJUSTMENT	ΔL/L %(1)
3H1	160	–	–	ADJ-RM6-WHITE	20	–	–
	250	ADJ-RM6-WHITE	12	ADJ-RM6-VIOLET	15	ADJ-RM6-BROWN	21
	400	ADJ-RM6-WHITE	7	ADJ-RM6-BROWN	13	ADJ-RM6-BLACK	20
	630	ADJ-RM6-BROWN	7	ADJ-RM6-BLACK	10	ADJ-RM6-GREY	17

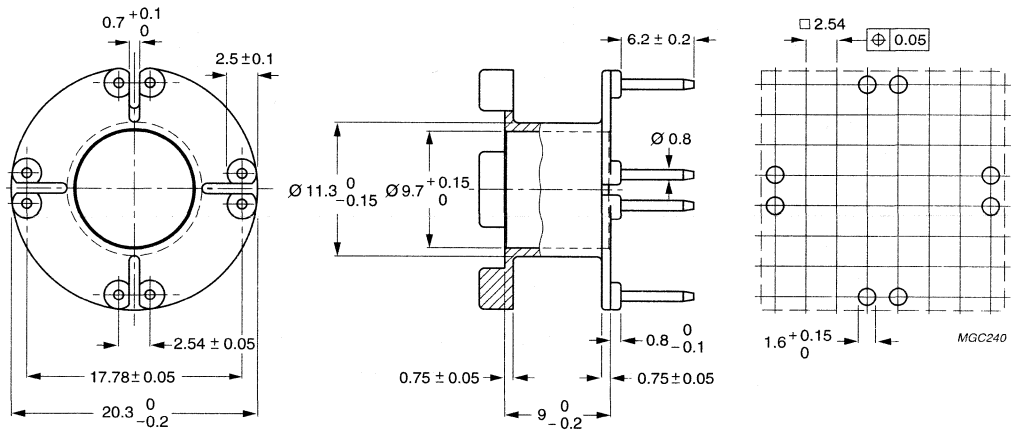
Note

1. Maximum adjustment range.

COIL FORMER

General data

PARAMETER	SPECIFICATION
Coil former material	phenolformaldehyde (PF), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E63312(M)
Pin material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	180 °C, *"IEC 85"* class H
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B, 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1, 235 °C, 2 s



Dimensions in mm.

Fig.3 X22 coil former; 8-pins.

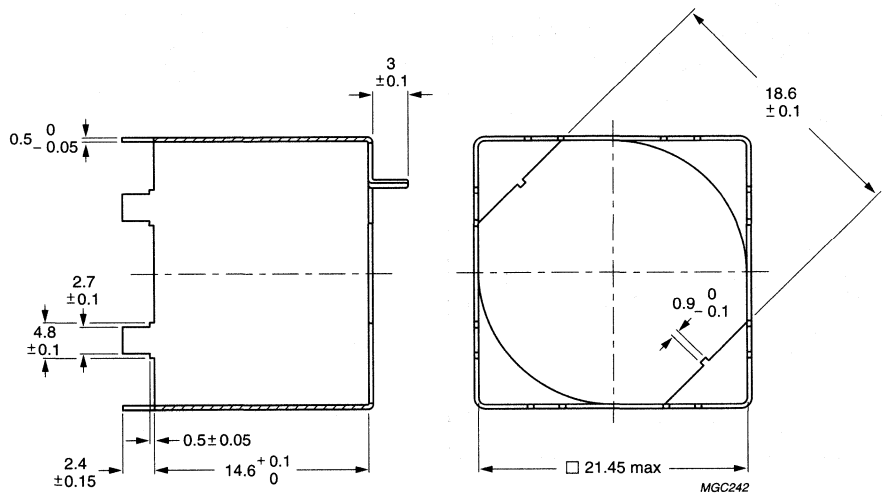
Winding data for X22 coil former

NUMBER OF SECTIONS	NUMBER OF PINS	PIN POSITIONS USED	WINDING AREA (mm^2)	WINDING WIDTH (mm)	AVERAGE LENGTH OF TURN (mm)	TYPE NUMBER
1	8	all	33.9	7.2	49	CSV-X22-1S-8P

MOUNTING PARTS

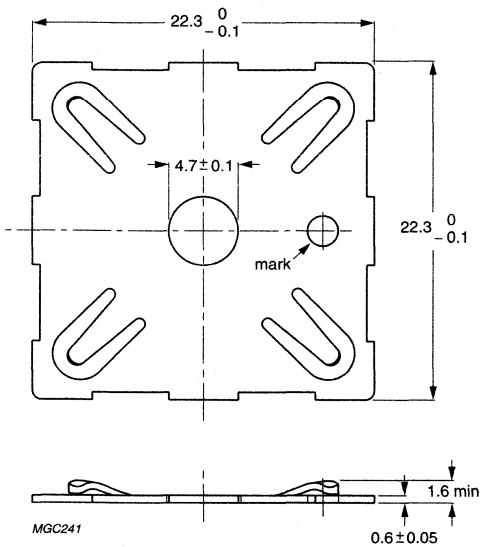
General data

ITEM	REMARKS	FIGURE	TYPE NUMBER
Container	copper zinc alloy (CuZn), Ni-plated	4	CON-X22
Cover	copper tin alloy (CuSn), Ni-plated	5	COV-X22



Dimensions in mm.

Fig.4 X22 container.



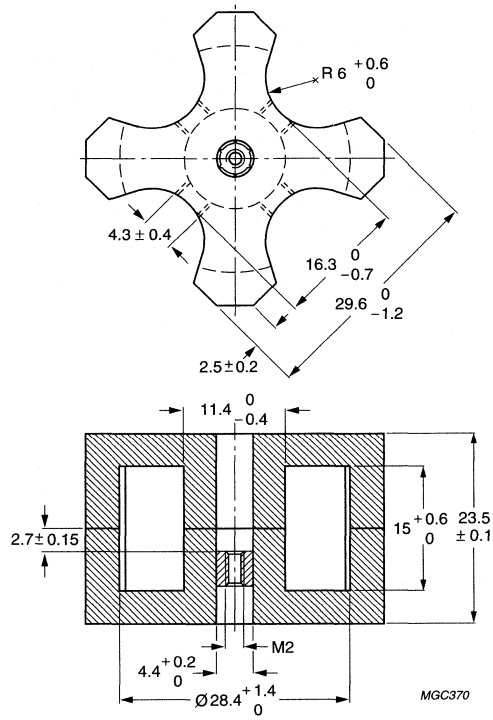
Dimensions in mm.

Fig.5 X22 cover.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.490	mm^{-1}
V_e	effective volume	6360	mm^3
l_e	effective length	55.8	mm
A_e	effective area	114	mm^2
A_{min}	minimum area	82.6	mm^2
m	mass of set	≈38	g



Dimensions in mm.

Fig.1 X30 core set.

Core sets for filter and transformer applications

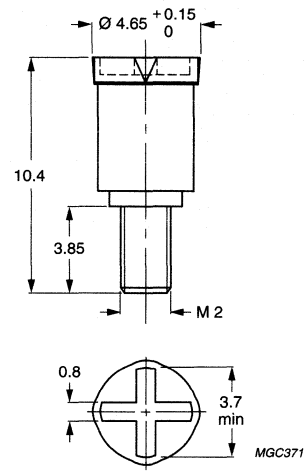
Clamping force 200 ±50 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3H1 sup	400 ±3%	≈150	≈250	X30-3H1-A400/N	X30-3H1-A400
	630 ±3%	≈250	≈170	X30-3H1-A630/N	X30-3H1-A630
	1000 ±10%	≈400	≈100	X30-3H1-A1000/N	X30-3H1-A1000
	1600 ±10%	≈625	≈50	X30-3H1-A1600/N	X30-3H1-A1600
	4900 ±25%	≈1960	≈0	–	X30-3H1
3B8 sup	4900 ±25%	≈1960	≈0	–	X30-3B8

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 X30 inductance adjuster.

Inductance adjuster selection chart

GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	ΔL/L %(1)	TYPES FOR MEDIUM ADJUSTMENT	ΔL/L %(1)	TYPES FOR HIGH ADJUSTMENT	ΔL/L %(1)
3H1	315	ADJ-P22/RM8-ORANGE	7	–	–	ADJ-P22/RM8-BROWN	20
	400	ADJ-P22/RM8-ORANGE	6	–	–	ADJ-P22/RM8-BROWN	16
	630	–		ADJ-P22/RM8-BROWN	10	ADJ-P22/RM8-BLACK	19
	1000	ADJ-P22/RM8-BROWN	5	ADJ-P22/RM8-BLACK	9	–	–
	1600	–		ADJ-P22/RM8-BLACK	5	–	–

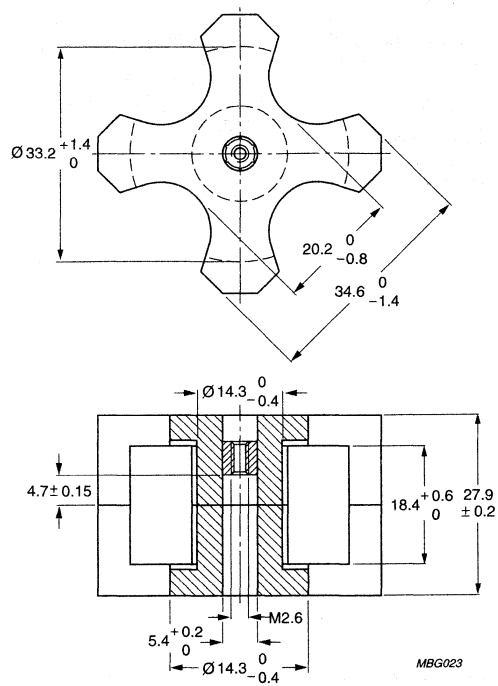
Note

1. Maximum adjustment range.

CORE SETS

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.410	mm^{-1}
V_e	effective volume	11000	mm^3
l_e	effective length	67.3	mm
A_e	effective area	164	mm^2
A_{min}	minimum area	132	mm^2
m	mass of set	≈58	g



Dimensions in mm.

Fig.1 X35 core set.

Core sets for filter and transformer applications

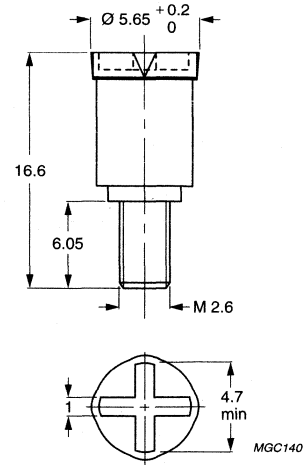
Clamping force 200 ±50 N.

GRADE	A_L (nH)	μ_e	AIR GAP (μm)	TYPE NUMBER (WITH NUT)	TYPE NUMBER (WITHOUT NUT)
3H1 sup	400 ±3%	≈130	≈500	X35-3H1-A400/N	X35-3H1-A400
	630 ±3%	≈200	≈300	X35-3H1-A630/N	X35-3H1-A630
	1000 ±3%	≈325	≈150	X35-3H1-A1000/N	X35-3H1-A1000
	1600 ±5%	≈500	≈80	X35-3H1-A1600/N	X35-3H1-A1600
	6050 ±25%	≈2000	≈0	–	X35-3H1
3B8 sup	6050 ±25%	≈2000	≈0	–	X35-3B8

INDUCTANCE ADJUSTERS

General data

PARAMETER	SPECIFICATION
Material of head and thread	polypropylene (PP), glass fibre reinforced
Maximum operating temperature	125 °C



Dimensions in mm.

Fig.2 X35 inductance adjuster.

Inductance adjuster selection chart sup (applies to all types)

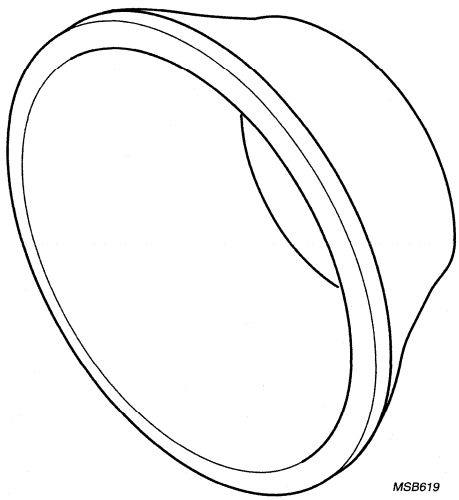
GRADE	A_L (nH)	TYPES FOR LOW ADJUSTMENT	ΔL/L %(1)	TYPES FOR MEDIUM ADJUSTMENT	ΔL/L %(1)	TYPES FOR HIGH ADJUSTMENT	ΔL/L %(1)
3H1	315	–	–	ADJ-P36/P42-WHITE	15	–	–
	400	–	–	ADJ-P36/P42-WHITE	12	–	–
	630	–	–	ADJ-P36/P42-WHITE	7	ADJ-P36/P42-GREY	34
	1000	–	–	ADJ-P36/P42-GREY	17	–	–
	1600	–	–	ADJ-P36/P42-GREY	9	–	–

Note

1. Maximum adjustment range.

Soft Ferrites

Yoke rings



For more information on Product Status Definitions, see page 3.

Yoke rings Hybrid range

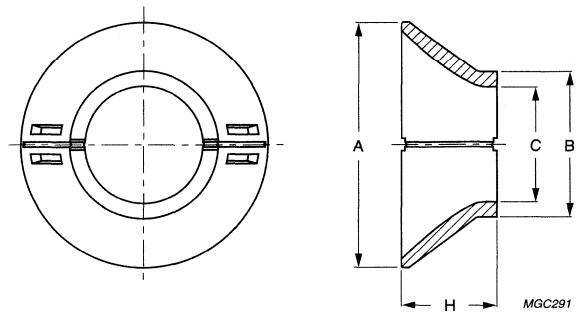
FEATURES

- Winding technology is direct
- Material grades 2A2/2A3 and 2B1.

Table 1 gives an indication of our manufacturing capability. All yoke rings are manufactured to specific customer requirements.

Tolerances are ±1% for normal applications.

Tolerances of less than ±1% can be considered for special applications.



For dimensions see Table 1.

Fig.1 Hybrid range.

Table 1 Product dimensions

YOKE RING	DIMENSIONS (mm)			
	FLARE (A)	NECK (B)	BORE (C)	HEIGHT (H)
YR46/40	89.80	59.80	46.00	40.00
YR48/42-A	89.00	66.00	48.00	42.00
YR48/42-B	92.00	60.00	48.00	42.00
YR48/44	100.00	62.00	48.00	44.50
YR48/46	90.00	61.00	48.20	46.00
YR48/48	92.00	62.00	48.00	48.00
YR50/39-B	102.30	64.26	50.52	38.85
YR51/33	89.00	62.00	51.00	33.00
YR51/36	92.00	66.50	51.37	36.00
YR51/39	109.00	62.80	50.80	39.00
YR52/29	97.75	67.50	52.00	29.20
YR52/38	108.00	70.00	52.00	38.00
YR52/42	108.85	65.00	52.00	42.00

Yoke rings Large consumer range

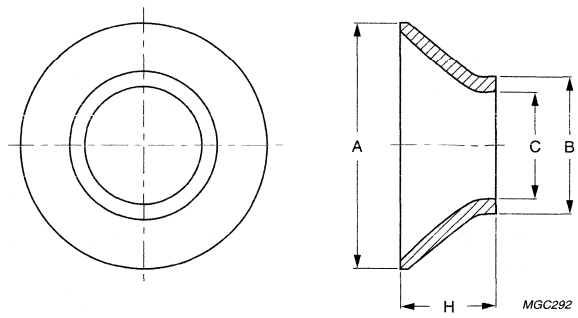
FEATURES

- Winding technology is indirect
- Material grade usually 3C2.

Table 1 gives an indication of our manufacturing capability. All yoke rings are manufactured to specific customer requirements.

Tolerances are ±1% for normal applications.

Tolerances of less than ±1% can be considered for special applications.



For dimensions see Table 1.

Fig.1 Large consumer range.

Table 1 Product dimensions

YOKE RING	DIMENSIONS (mm)			
	FLARE (A)	NECK (B)	BORE (C)	HEIGHT (H)
YR46/57	108.00	61.00	46.40	57.00
YR49/45	112.32	57.72	49.81	45.00
YR50/52	108.00	59.30	50.28	52.00
YR51/50-A	124.00	65.50	50.61	50.00
YR51/50-B	124.00	60.30	50.61	50.00
YR52/50	110.00	65.45	52.45	50.00
YR54/51	124.00	69.70	54.20	51.10

Yoke rings Minineck range

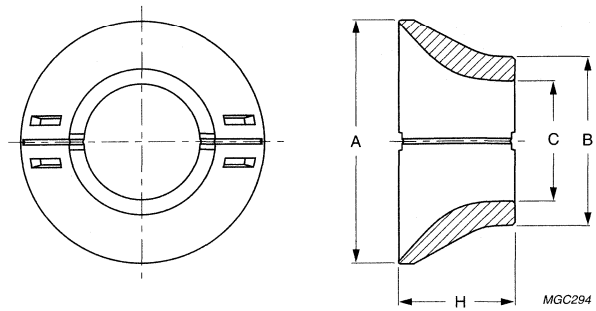
FEATURES

- Winding technology is direct
- Material grades 2A2/2A3 and 2B1.

Table 1 gives an indication of our manufacturing capability. All yoke rings are manufactured to specific customer requirements.

Tolerances are ±1% for normal applications.

Tolerances of less than ±1% can be considered for special applications.



For dimensions see Table 1.

Fig.1 Minineck range.

Table 1 Product dimensions

YOKE RING	DIMENSIONS (mm)			
	FLARE (A)	NECK (B)	BORE (C)	HEIGHT (H)
YR29/26	47.00	37.00	29.10	26.00
YR40/26	59.20	58.20	40.00	26.00
YR40/36	76.00	52.00	40.40	35.50
YR40/37	74.00	52.00	40.00	37.00
YR42/28	72.50	56.00	42.00	28.00
YR43/36	73.70	56.00	43.37	35.50

Yoke rings Monitor range

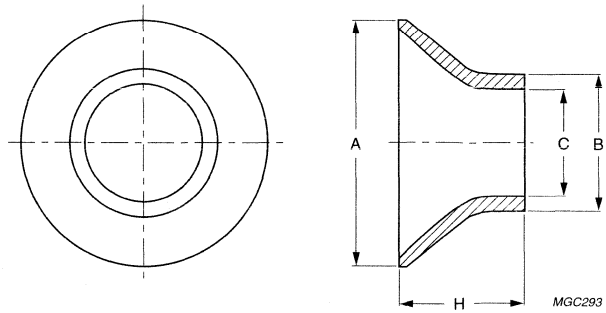
FEATURES

- Winding technology is direct
- Material grades usually 3C2 or 2B1.

Table 1 gives an indication of our manufacturing capability. All yoke rings are manufactured to specific customer requirements.

Tolerances are ±1% for normal applications.

Tolerances of less than ±1% can be considered for special applications.

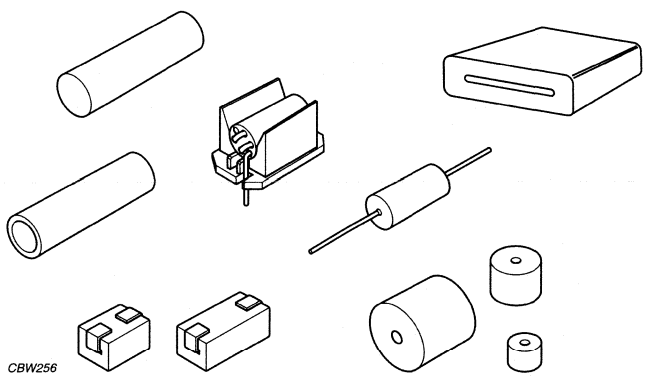


For dimensions see Table 1.

Fig.1 Monitor range.

Table 1 Product dimensions

YOKE RING	DIMENSIONS (mm)			
	FLARE (A)	NECK (B)	BORE (C)	HEIGHT (H)
YR39/44	89.00	56.50	38.90	44.50
YR40/33	76.00	52.00	40.40	33.00
YR46/46	88.00	59.84	45.98	46.00
YR46/48	90.00	65.00	46.00	48.00
YR46/50	90.00	60.00	46.26	50.00
YR46/54	94.00	58.00	46.00	54.00
YR49/43	90.80	61.30	49.00	42.50
YR51/48	92.00	67.20	51.85	48.00



For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview EMI-suppression products

CORE TYPE	DESCRIPTION
BC	bobbin core
CST	cable shield tubular
CSA	cable shield arcade
CSA-EN	cable shield arcade encapsulated
CSC	cable shield C-shape
CSC-EN	cable shield C-shape encapsulated
CSU	cable shield U-shape
CSU-EN	cable shield U-shape encapsulated
CLI-CSU	clip for CSU type
CSF	cable shield flat
BD	bead
BDW	bead on wire
MHC	multihole core circular
MHB	multihole core binocular
MHR	multihole core rectangular
ROD	rod
BDS	bead SMD
CMS	common mode choke SMD
WBS	wideband choke SMD
WBC	wideband choke
TUB	tube
T	toroid (ring core)
TC	toroid coated with parylene C
TL	toroid coated with lacquer
TN	toroid coated with nylon
TX	toroid coated with epoxy

BOBBIN CORES

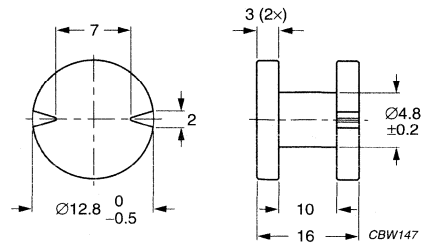
Type BC13/4.8/16

A_L measured with fully wound bobbin.

GRADE	A_L (nH)	TYPE NUMBER
3C85	50	BC13/4.8/16-3C85 sup

Winding data for BC13/4.8/16

WINDING AREA (mm^2)	AVERAGE LENGTH OF TURN (mm)
38.8	27.3



Dimensions in mm.

Fig.1 BC13/4.8/16.

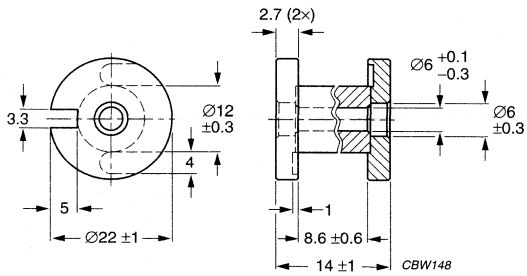
Type BC22/12/14

A_L measured with fully wound bobbin.

GRADE	A_L (nH)	TYPE NUMBER
3C85	86	BC22/12/14-3C85 sup

Winding data for BC22/12/14

WINDING AREA (mm^2)	AVERAGE LENGTH OF TURN (mm)
43.0	53.4



Dimensions in mm.

Fig.2 BC22/12/14.

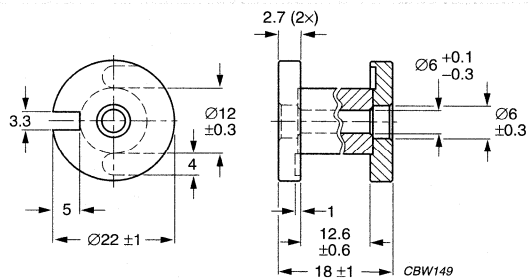
Type BC22/12/18

A_L measured with fully wound bobbin.

GRADE	A_L (nH)	TYPE NUMBER
3C85	85	BC22/12/18-3C85 sup

Winding data for BC22/12/18

WINDING AREA (mm^2)	AVERAGE LENGTH OF TURN (mm)
63.0	53.4



Dimensions in mm.

Fig.3 BC22/12/18.

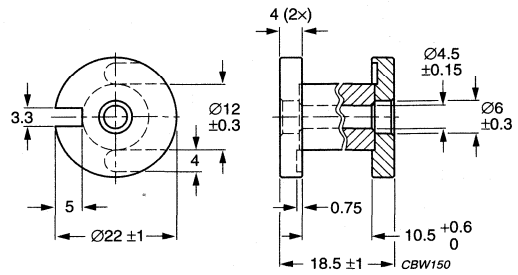
Type BC22/12/19

A_L measured with fully wound bobbin.

GRADE	A_L(nH)	TYPE NUMBER
3C85	91	BC22/12/19-3C85 sup

Winding data for BC22/12/19

WINDING AREA (mm^2)	AVERAGE LENGTH OF TURN (mm)
52.5	53.4



Dimensions in mm.

Fig.4 BC22/12/19.

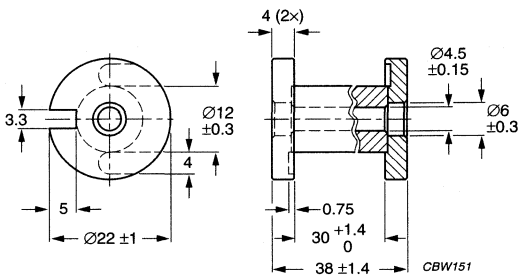
Type BC22/12/38

A_L measured with fully wound bobbin.

GRADE	A_L(nH)	TYPE NUMBER
3C85	74	BC22/12/38-3C85 sup

Winding data for BC22/12/38

WINDING AREA (mm^2)	AVERAGE LENGTH OF TURN (mm)
150	53.4



Dimensions in mm.

Fig.5 BC22/12/38.

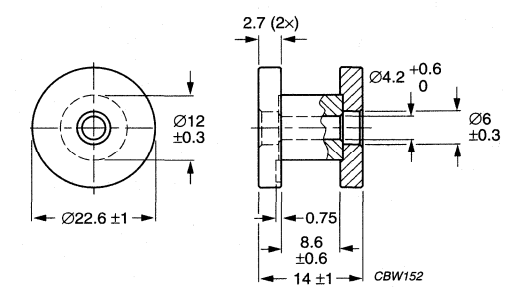
Type BC23/12/14

A_L measured with fully wound bobbin.

GRADE	A_L(nH)	TYPE NUMBER
3C85	86	BC23/12/14-3C85 sup

Winding data for BC23/12/14

WINDING AREA (mm^2)	AVERAGE LENGTH OF TURN (mm)
45.6	54.3

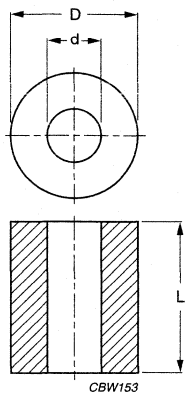


Dimensions in mm.

Fig.6 BC23/12/14.

CABLE SHIELDS FOR EMI SUPPRESSION

Tubular cable shields



For dimensions see Table 1. CBW153

Fig.1 Tubular cable shield.

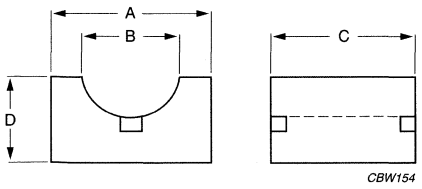
Table 1 Type numbers, dimensions and parameters; see Fig.1

TYPE NUMBER	DIMENSIONS			$\|Z\|_{typ}$(1) (Ω) at	
	D	d	L	25 MHz	100 MHz
CST7.8/5.3/9.8-3S4 des	7.8 ±0.2	5.3 +0.3	9.8 ±0.2	33	50
CST8.3/3.5/10-3S4 des	8.3 −0.4	3.5 +0.3	10 −0.6	70	96
CST9.5/4.8/6.4-4S2 des	9.5 ±0.25	4.75 ±0.25	6.35 ±0.35	23	50
CST9.5/4.8/10-4S2 des	9.5 ±0.25	4.75 ±0.25	10.4 ±0.25	53	80
CST9.5/4.8/19-4S2 des	9.5 ±0.25	4.75 ±0.25	19.05 ±0.7	100	145
CST9.5/5.1/15-3S4 des	9.5 ±0.3	5.1 ±0.15	14.5 ±0.45	66	110
CST9.7/5/5.1-4S2 des	9.65 ±0.25	5 ±0.2	5.05 −0.45	26	43
CST14/6.4/29-4S2 des	14.3 ±0.45	6.35 ±0.25	28.6 ±0.75	170	250
CST14/7.3/29-4S2 des	14.3 ±0.45	7.25 ±0.15	28.6 ±0.75	143	215
CST16/7.9/14-4S2 des	16.25 −0.75	7.9 ±0.25	14.3 ±0.35	70	113
CST16/7.9/29-4S2 des	16.25 −0.75	7.9 ±0.25	28.6 ±0.75	130	213
CST17/9.5/13-3S4 des	17.45 ±0.35	9.53 ±0.25	12.7 ±0.5	55	90
CST17/9.5/13-4S2 des	17.45 ±0.4	9.5 ±0.25	12.7 ±0.5	55	88
CST17/9.5/29-3S4 des	17.45 ±0.35	9.53 ±0.25	28.55 ±0.75	125	200
CST17/9.5/29-4S2 des	17.45 ±0.35	9.53 ±0.25	28.55 ±0.75	125	250
CST17/11/60-3S4 des	17.2 −1.2	11 ±0.5	60 −2.5	200	320
CST19/10/29-4S2 des	19 −0.65	10.15 ±0.25	28.6 ±0.75	128	196
CST19/11/12-3S4 des	19 ±0.4	10.6 ±0.3	11.5 ±0.4	50	75
CST26/13/29-4S2 des	25.9 ±0.75	12.8 ±0.25	28.3 ±0.8	145	225
CST29/19/7.5-4S2 des	29 ±0.75	19 ±0.5	7.5 ±0.25	28	47

Note

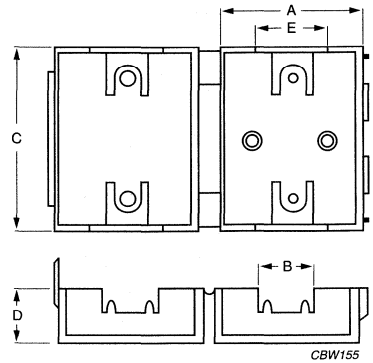
1. Minimum guaranteed impedance is $|Z|_{typ}$ −20%.

Round cable shields (split)



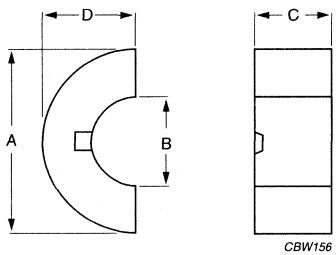
For dimensions see Table 2.

Fig.2 Shield (CSA) outline.



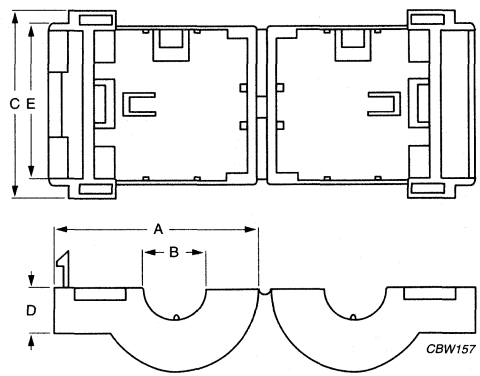
For dimensions see Table 2.

Fig.3 Nylon case.



For dimensions see Table 2.

Fig.4 Shield (CSC) outline.



For dimensions see Table 2.

Fig.5 Nylon case.

General data

ITEM	SPECIFICATION
Case material	polyamide (PA66), glass reinforced, flame retardant in accordance with *"UL94V-0"*; grade A82, colour black

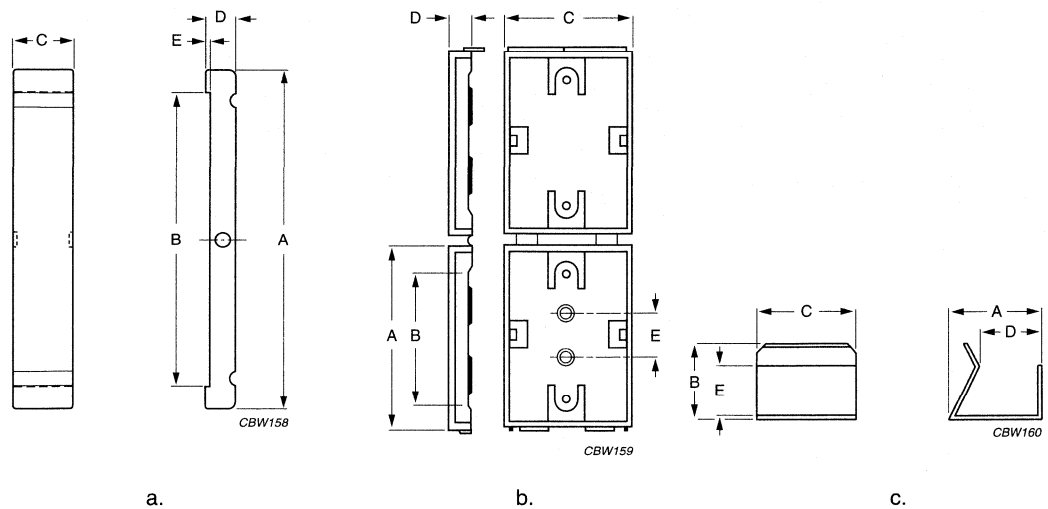
Table 2 Type numbers, dimensions and parameters; see Figs 2 to 3

TYPE NUMBER	FIG.	DIMENSIONS					$\|Z\|_{typ}$[1] (Ω) at	
		A	B	C	D	E	25 MHz	100 MHz
Round cable shields								
CSA15/7.5/29-4S2 des	2	15 ±0.25	6.6 ±0.3	28.6 ±0.8	7.5 ±0.15	–	165	275
CSA19/9.4/29-4S2 des	2	18.65 ±0.4	10.15 ±0.3	28.6 ±0.8	9.4 ±0.15	–	140	225
CSA26/13/29-4S2 des	2	25.9 ±0.5	13.05 ±0.3	28.6 ±0.8	12.8 ±0.25	–	155	250
CSC16/7.9/14-4S2 des	4	15.9 ±0.4	7.9 ±0.3	14.3 ±0.4	7.95 ±0.2	–	50	113
Round cable shields in matching nylon cases								
CSA15/7.5/29-4S2-EN des	2+3	17.9	7.0	32.3	9.2	9.0	165	275
Nylon case	3	17.9	7.0	32.3	9.2	9.0		
CSA19/9.4/29-4S2-EN des	2+3	22.1	10.2	32.3	11.7	9.0	140	225
Nylon case	3	22.1	10.2	32.3	11.7	9.0		
CSA26/13/29-4S2-EN des	2+3	29	13.4	32.5	14.8	18.0	155	250
Nylon case	3	29	13.4	32.5	14.8	18.0		
CSC16/7.9/14-4S2-EN des	4+3	24.7	7.6	22.8	10.2	17.8	50	113
Nylon case	3	24.7	7.6	22.8	10.2	17.8		

Note

1. Minimum guaranteed impedance is $|Z|_{typ}$ –20%.

Flat cable shields (split)



For dimensions see Table 3.

Fig.6 Outlines of flat cable shields (split) and accessories.

General data

ITEM	SPECIFICATION
Case material	polyamide (PA66), glass reinforced, flame retardant in accordance with *"UL94V-0"*; grade A82, colour black
Clip material	spring steel (0.5 mm), zinc plated

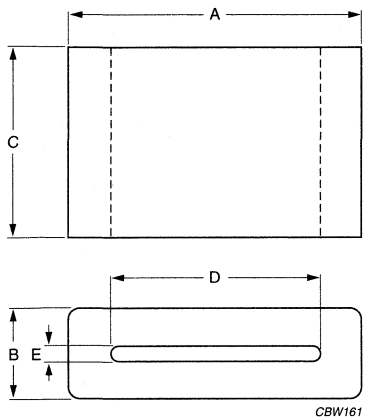
Table 3 Type numbers, dimensions and parameters; see Fig.6

TYPE NUMBER	FIG.	DIMENSIONS					$\|Z\|_{typ}$[1] (Ω) at	
		A	B	C	D	E	25 MHz	100 MHz
Flat cable shields (split)								
CSU45/6.4/29-4S2 des	6a	45.1 ±0.75	34.4 ±0.7	28.6 ±0.7	6.35 ±0.25	0.85 ±0.2	96	225
CSU76/6.4/13-3S4 des	6a	76.2 ±1.5	65.3 ±1.3	12.7 ±0.4	6.35 ±0.25	0.85 ±0.2	36	110
CSU76/6.4/15-3S4 des	6a	76.2 ±1.5	65.3 ±1.3	15.0 ±0.6	6.35 ±0.25	0.85 ±0.2	50	159
CSU76/6.4/29-4S2 des	6a	76.2 ±1.5	65.3 ±1.3	28.6 ±0.8	6.35 ±0.25	0.85 ±0.2	75	215
CSU76/6.4/29-3S4 des	6a	76.2 ±1.5	65.3 ±1.3	28.6 ±0.8	6.35 ±0.25	0.85 ±0.2	70	235
CLI-CSU6.4 des	6c	16.1	11.0	12.7	11.4	8.0	–	–
Flat cable shields in matching nylon cases								
CSU45/6.4/29-4S2-EN des	6a+b	49.5	34.3	32.3	8.1	20	96	225
Nylon case	6b	49.5	34.3	32.3	8.1	20	–	–
CSU76/6.4/29-4S2-EN des	6a+b	80.8	65.5	32.3	8.1	50.8	75	215
Nylon case	6b	80.8	65.5	32.3	8.1	50.8	–	–

Note

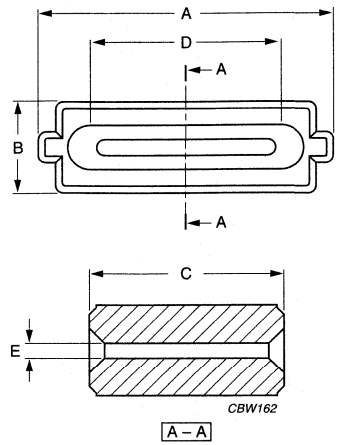
1. Minimum guaranteed impedance is $|Z|_{typ}$ –20%.

Flat cable shields



For dimensions see Table 4.

Fig.7 CSF38/12/25 outline.



For dimensions see Table 4.

Fig.8 CSF38/12/25 outline.

Table 4 Type numbers, dimensions and parameters; see Figs 7 and 8.

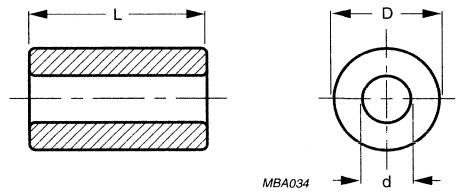
TYPE NUMBER	FIG.	DIMENSIONS					$\lvert Z \rvert_{typ}$ (1) (Ω) at	
		A	B	C	D	E	25 MHz	100 MHz
Flat cable shields								
CSF38/12/25-3S4	7	38.1 ±1.0	12.1 ±0.35	25.4 ±0.75	26.7 ±0.75	1.9 ±0.35	110	215
CSF38/12/15-3S4-S	7	38.5 ±0.6	12.1 ±0.4	25.4 ±0.8	26.8 ±0.8	1.9 ±0.4	98	196

Note

1. Minimum guaranteed impedance is $\lvert Z \rvert_{typ}$ –20%.

EMI SUPPRESSION BEADS

Colour marking: 4S2 has flash of yellow paint.



For dimensions see Table 1

Fig.1 EMI suppression bead.

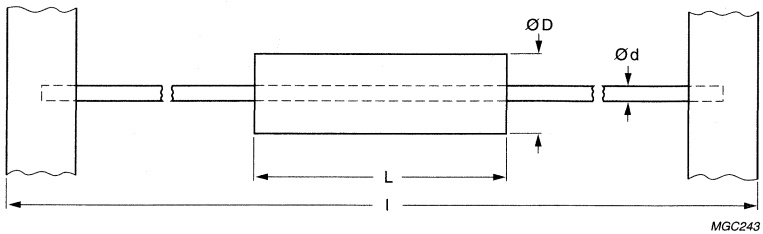
Table 1 Grades, parameters and type numbers; see Fig.1

GRADE	$\lvert Z_{typ} \rvert$ (Ω)[1] at frequency (MHz)							DIMENSIONS (mm)			TYPE NUMBER
	1	3	10	25	30	100	300	D	d	L	
3S1	24	48	49	–	39	33	29	3 ±0.1	0.7 +0.1	4 ±0.2	BD3/0.7/4-3S1 sup
	18	36	38	–	30	25	23	3 ±0.1	1 +0.1/–0.05	4 ±0.2	BD3/1/4-3S1 des
	41	90	91	–	74	63	55	3 ±0.1	1 +0.1/–0.05	10 ±0.3	BD3/1/10-3S1 sup
	34	65	66	–	53	45	40	5.1 –0.3	0.8 +0.1	4 ±0.2	BD5.1/0.8/4-3S1 sup
	16	28	40	–	33	28	25	5.1 –0.3	1.5 +0.15	4 ±0.2	BD5.1/1.5/4-3S1 des
	50	90	100	–	80	69	60	5.1 –0.3	1.5 +0.15	10 ±0.3	BD5.1/1.5/10-3S1 sup
	13	23	30	–	25	21	19	5.1 –0.3	2 +0.2	4 ±0.2	BD5.1/2/4-3S1
	36	64	76	–	61	53	46	5.1 –0.3	2 +0.2	10 ±0.3	BD5.1/2/10-3S1 sup
4S2	7	20	35	–	54	69	76	1.9 +0.2	0.8+0.2	9.75 –0.2	BD1.9/0.8/9.8-4S2 sup
	4	11	23	–	31	48	54	3 ±0.1	1 +0.1/–0.05	4 ±0.2	BD3/1/4-4S2 sup
	–	–	–	27	–	40	–	3.5 ±0.2	1.3 ±0.1	3.25 ±0.25	BD3.5/1.3/3.3-4S2 des
	–	–	–	47	–	60	–	3.5 ±0.2	1.3 ±0.1	6 ±0.25	BD3.5/1.3/6-4S2 des
	–	–	–	89	–	125	–	3.5 ±0.2	1.3 ±0.1	12.7 ±0.35	BD3.5/1.3/13-4S2 des
	15	50	94	–	138	213	238	5.1 –0.3	0.8+0.1	10 ±0.3	BD5.1/0.8/10-4S2 sup
	4	13	25	–	34	51	59	5.1 –0.3	1.5 +0.15	4 ±0.2	BD5.1/1.5/4-4S2
	9	31	56	–	85	130	145	5.1 –0.3	1.5 +0.15	10 ±0.3	BD5.1/1.5/10-4S2
	3	10	19	–	25	40	45	5.1 –0.3	2 +0.2	4 ±0.2	BD5.1/2/4-4S2 sup
			34	–	–	78	–	5.1 –0.3	2 +0.2	12.7 ±0.35	BD5.1/2/7.1-4S2 des
	8	19	38	–	64	100	111	5.1 –0.3	2 +0.2	10 ±0.3	BD5.1/2/10-4S2 sup
	–	–	–	135	–	200	–	6.35 ±0.15	2.95 ±0.45	25.4 ±0.75	BD6.4/3/25-4S2 des
	–	–	–	63	–	92	–	7.65 –0.25	2.25 ±0.25	7.55 ±0.25	BD7.7/2.3/7.6-4S2 des
	5	13	25	–	39	61	69	8 ±0.2	2 +0.2	4 ±0.2	BD8/2/4-4S2 sup
	3	10	19	–	28	43	48	8 ±0.2	3 +0.2	4 ±0.2	BD8/3/4-4S2
	8	25	50	–	69	106	119	8 ±0.2	3 +0.2	10 ±0.3	BD8/3/10-4S2

Note

1. Typical values at 100 MHz, $\lvert Z \rvert_{min}$ is –20%.

BEADS ON WIRE FOR EMI SUPPRESSION



For dimensions, see Table 1.
Taping standard in accordance with *"IEC 286, part 1"* and *"EIA-RS-296-D"*.

Fig.1 Bead on wire.

Table 1 Grades, parameters and type numbers; see Fig.1

GRADE	$\lvert Z_{typ} \rvert$ (Ω)(1) at frequency (MHz)							DIMENSIONS (mm)				TYPE NUMBER
	1	3	10	25	30	100	300	ØD	L	l	Ød	
3S4	–	–	–	–	–	43	–	3.5 ±0.2	3.5 –0.5	64.4	0.64	BDW3.5/3.5-3S4 sup
	6	23	60	–	88	100	81	3.5 ±0.2	6.0 ±0.25	75.0	0.64	BDW3.5/6-3S4-L63
4S2	4	13	24	–	36	58	65	3.5 ±0.2	3.5 –0.5	64.4	0.64	BDW3.5/3.5-4S2
	5	16	33	–	49	75	88	3.5 ±0.2	4.7 –0.5	64.4	0.64	BDW3.5/4.7-4S2
	–	–	–	54	–	82	–	3.5 ±0.25	5.25 ±0.25	64.4	0.64	BDW3.5/5.3-4S2 des
	6	21	44	–	66	100	119	3.5 ±0.2	6.0 ±0.25	64.4	0.64	BDW3.5/6-4S2 sup
	8	25	49	–	74	110	131	3.5 ±0.2	6.7 ±0.25	64.4	0.64	BDW3.5/6.7-4S2 sup
	9	28	55	–	84	131	150	3.5 ±0.2	7.6 ±0.35	64.4	0.64	BDW3.5/7.6-4S2 sup
	10	33	65	–	98	146	175	3.5 ±0.2	8.9 ±0.35	64.4	0.64	BDW3.5/8.9-4S2
	–	–	–	96	–	150	–	3.5 ±0.25	9.5 ±0.3	64.4	0.64	BDW3.5/9.5-4S2 des
	–	–	–	117	–	180	–	3.5 ±0.25	11.4 ±0.4	64.4	0.64	BDW3.5/11-4S2 des
	–	–	–	143	–	220	–	3.5 ±0.25	13.8 ±0.5	64.4	0.64	BDW3.5/14-4S2 des

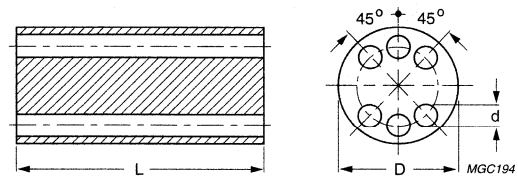
Note

1. Typical values at 100 MHz, $\lvert Z \rvert_{min}$ is –20%.

MULTI-HOLE CORES

Table 1 MHC6 grades, parameters and type numbers; see Fig.1

GRADE	DIMENSIONS (mm)			TYPE NUMBER
	D	d	L	
3S4	6 ±0.3	0.7 +0.2	10 ±0.5	MHC6-6/10-3S4
4B1	6 ±0.3	0.7 +0.2	10 ±0.5	MHC6-6/10-4B1
4S2	6 ±0.3	0.7 +0.2	10 ±0.5	MHC6-6/10-4S2 des



For dimensions see Table 1.

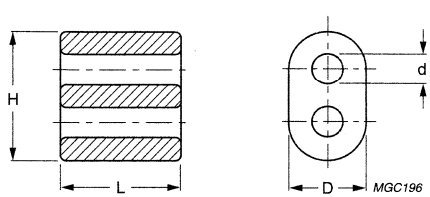
Fig.1 Multihole core circular (MHC6).

Table 2 MHB2 grades, parameters and type numbers; see Fig.2

GRADE	DIMENSIONS (mm)				TYPE NUMBER
	D	d	L	H	
4B1	8.5 –0.5	3.5 +0.5	8 ±0.3	14 ±0.5	MHB2-14/8.5/8-4B1 sup
	8.5 –0.5	3.5 +0.5	14 ±0.4	14 ±0.5	MHB2-14/8.5/14-4B1
	8.0 ±0.3	3 ±0.3	6 ±0.3	13 ±0.3	MHB2-13/8/6-4B1(1)
3C85	8.0 ±0.3	3 ±0.3	6 ±0.3	13 ±0.3	MHB2-13/8/6-3C85(1)

Note

1. Chamfered holes and sides.

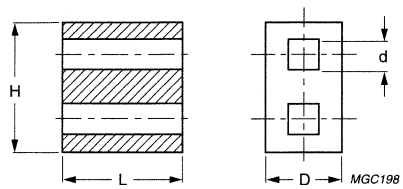


For dimensions see Table 2.

Fig.2 Multihole core binocular (MHB2).

Table 3 MHR2 grades, parameters and type numbers; see Fig.3

GRADE	DIMENSIONS (mm)				TYPE NUMBER
	D	d	L	H	
4A11	5.4 ±0.3	2.0 ±0.3	10.9 ±0.4	10.8 ±0.3	MHR2-11/5.4/11-4A11 sup
3C85	5.4 ±0.3	2.0 ±0.3	10.9 ±0.4	10.8 ±0.3	MHR2-11/5.4/11-3C85 sup

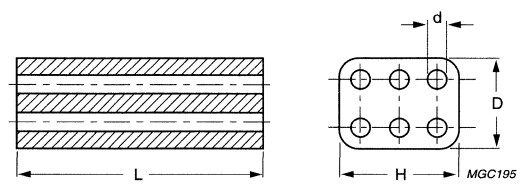


For dimensions see Table 3.

Fig.3 Multihole core rectangular (MHR2).

Table 4 MHR6 grades, parameters and type numbers; see Fig.4

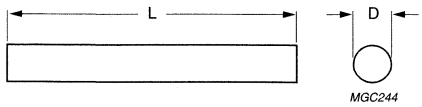
GRADE	DIMENSIONS (mm)				TYPE NUMBER
	D	d	L	H	
3B1	4 ±0.2	0.7 +0.3	10 ±0.5	6.1 ±0.3	MHR6-6.1/4/10-3B1 sup



For dimensions see Table 4.

Fig.4 Multihole core rectangular (MHR6).

RODS



For dimensions see Table 1.

Fig.1 Rod.

Table 1 Grades, parameters and type numbers; see Fig.1

DIMENSIONS (mm)		TYPE NUMBER		
D	**L**	**3B1**	**3S3**	**4B1**
2 −0.05	20 −0.9	ROD2/20-3B1-D sup	–	–
2.45 −0.2	20 −0.8	–	ROD2.5/20-3S3	–
3 −0.05	15 −0.8	–	–	ROD3/15-4B1-D sup
3 −0.3	20 ±0.4	–	ROD3/20-3S3	–
3 −0.05	20 −0.9	ROD3/20-3B1-D sup	–	ROD3/20-4B1-D sup
3 −0.05	25 −1.0	ROD3/25-3B1-D sup	–	–
3.3 ±0.10	17 ±0.3	–	ROD3.3/17-3S3 sup	–
4 −0.05	15 −0.8	ROD4/15-3B1-D sup	–	ROD4/15-4B1-D sup
4 −0.30	20 −0.5	–	ROD4/20-3S3	–
4 −0.05	25 −1.0	ROD4/25-3B1-D sup	–	–
5 −0.30	20 ±0.5	–	ROD5/20-3S3	–
5 −0.05	20 −0.9	ROD5/20-3B1-D sup	–	ROD5/20-4B1-D sup
5 −0.30	25 −1.0	–	ROD5/25-3S3	–
5 −0.05	25 −1.0	ROD5/25-3B1-D sup	–	–
5 −0.05	30 −1.2	ROD5/30-3B1-D sup	–	ROD5/30-4B1-D sup
5.2 −0.3	12.1 −0.7	–	ROD5.2/12-3S3 sup	–
5.25 −0.3	18 ±0.3	–	ROD5.3/18-3S3	–
5.3 −0.3	35 ±0.6	–	ROD5.3/35-3S3 sup	–
6 −0.30	25 ±0.6	–	ROD6/25-3S3	–
6 −0.30	30 ±0.9	–	ROD6/30-3S3 sup	–
6 −0.10	30 −1.2	ROD6/30-3B1-D sup	–	ROD6/30-4B1-D sup
6 −0.10	40 −1.6	–	–	ROD6/40-4B1-D sup
6 −0.10	50 ±1.0	–	–	ROD6/50-4B1-D sup
6.5 −0.30	25 ±0.6	–	ROD6.5/25-3S3	–
8 −0.5	25 ±0.75	–	ROD8/25-3S3 des	–
8 −0.40	50 ±1.0	ROD8/50-3B1 sup	–	ROD8/50-4B1 sup
8 −0.40	150 ±3.0	–	–	ROD8/150-4B1 sup
8 −0.40	200 ±4.0	ROD8/200-3B1 sup	–	
10 −0.50	200 ±4.0	ROD10/200-3B1 sup	–	ROD10/200-4B1 sup

SMD BEADS FOR EMI SUPPRESSION

General data

ITEM	SPECIFICATION
Strip material	copper (Cu), tin-lead (SnPb) plated
Solderability	*"IEC 68-2-58"*, Part 2, Test Ta, method 1
Taping method	*"IEC 286-3"* and *"EIA 481-1"*

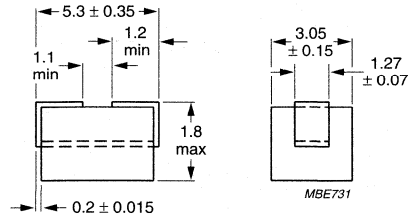
Grades, parameters and type numbers

GRADE	$\|Z\|$ (1) (Ω)	at f (MHz)	TYPE NUMBER
BDS 3/1.8/5.3; mass ≈0.1 g			
3S1	28	10	BDS 3/1.8/5.3-3S1 des
	33	25	
	25	100	
4S2	25	25	BDS 3/1.8/5.3-4S2 des
	38	100	
	45	300	
BDS 3/3/4.6; mass ≈0.15 g			
3S1	25	3	BDS3/3/4.6-3S1
	45	10	
	35	25	
4S2	30	25	BDS3/3/4.6-4S2
	50	100	
	55	300	
BDS 3/3/8.9; mass ≈0.3 g			
3S1	55	3	BDS 3/3/8.9-3S1
	80	10	
	55	25	
4S2	65	25	BDS 3/3/8.9-4S2
	100	100	
	110	300	
BDS 4.6/3/8.9; mass ≈0.5 g			
4S2	65	25	BDS 4.6/3/8.9-4S2
	100	100	
	110	300	

Notes

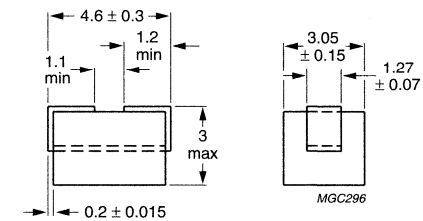
1. Typical values, $|Z|_{min}$ is −20%; DC resistance <0.6 mΩ.

Mechanical data



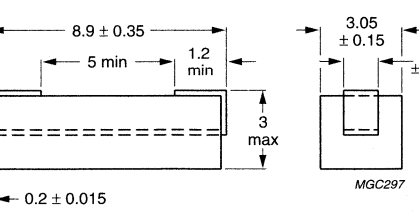
Dimensions in mm.

Fig.1 BDS 3/1.8/5.3.



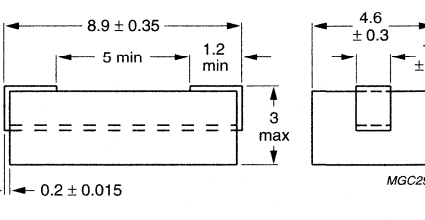
Dimensions in mm.

Fig.2 BDS 3/3/4.6.



Dimensions in mm.

Fig.3 BDS 3/3/8.9.



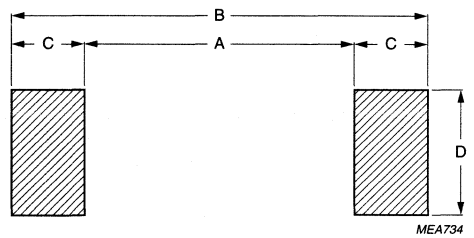
Dimensions in mm.

Fig.4 BDS 4.6/3/8.9.

RECOMMENDED DIMENSIONS OF SOLDER LANDS

Table 1 Reflow soldering

SIZE	DIMENSIONS (mm)			
	A	B	C	D
BDS 3/1.8/5.3	2.8	7.2	2.2	3.3
BDS 3/3/4.6	2.8	6.4	1.8	3.3
BDS 3/3/8.9	7.0	10.8	1.9	3.3
BDS 4.6/3/8.9	7.0	10.8	1.9	3.3



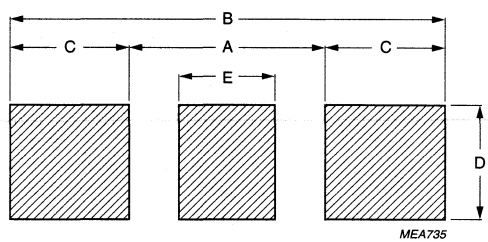
For dimensions see Table 1.

Dimensions of solder lands are based on a solder paste layer thickness of approximately 200 µm (≈0.7 mg solder paste per mm^2).

Fig.5 Reflow and vapour phase soldering.

Table 2 Wave soldering

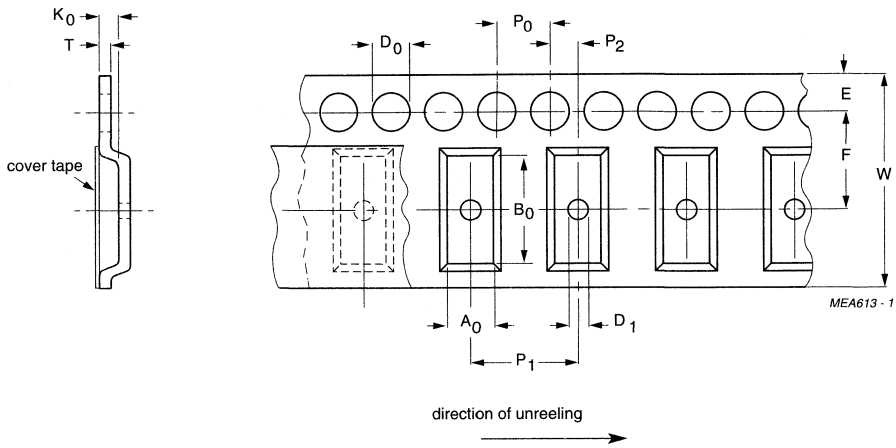
SIZE	DIMENSIONS (mm)				
	A	B	C	D	E
BDS 3/1.8/5.3	2.0	7.2	2.6	3.0	0.8
BDS 3/3/4.6	2.0	6.4	2.2	3.0	0.8
BDS 3/3/8.9	6.0	12.2	3.1	3.0	2.5
BDS 4.6/3/8.9	6.0	12.2	3.1	3.0	2.5



For dimensions see Table 2.

Fig.6 Wave soldering.

BLISTER TAPE AND REEL DIMENSIONS



For dimensions see Table 3.

Fig.7 Blister tape.

Table 3 Physical dimensions of blister tape; see Fig.7

SIZE	DIMENSIONS (mm)			
	BDS3/1.8/5.3	**BDS3/3/4.6**	**BDS3/3/8.9**	**BDS4.6/3/8.9**
A_0	3.25 ±0.1	3.45 ±0.1	3.45 ±0.1	5.1 ±0.1
B_0	5.85 ±0.1	5.1 ±0.1	9.4 ±0.1	9.4 ±0.1
K_0	2.0 ±0.1	3.1 ±0.1	3.1 ±0.1	3.1 ±0.1
T	0.3 ±0.05	0.25 ±10%	0.35 ±0.05	0.3 ±0.05
W	12.0 ±0.3	12.0 ±0.3	16.0 ±0.3	16.0 ±0.3
E	1.75 ±0.1	1.75 ±0.1	1.75 ±0.1	1.75 ±0.1
F	5.5 ±0.05	5.5 ±0.05	7.5 ±0.1	7.5 ±0.1
D_0	1.5 +0.1	1.5 +0.1	1.5 +0.1	1.5 +0.1
D_1	≥1.5	≥1.5	≥1.5	≥1.5
P_0	4.0 ±0.1	4.0 ±0.1	4.0 ±0.1	4.0 ±0.1
P_1	8.0 ±0.1	8.0 ±0.1	8.0 ±0.1	8.0 ±0.1
P_2	2.0 ±0.1	2.0 ±0.05	2.0 ±0.1	2.0 ±0.1

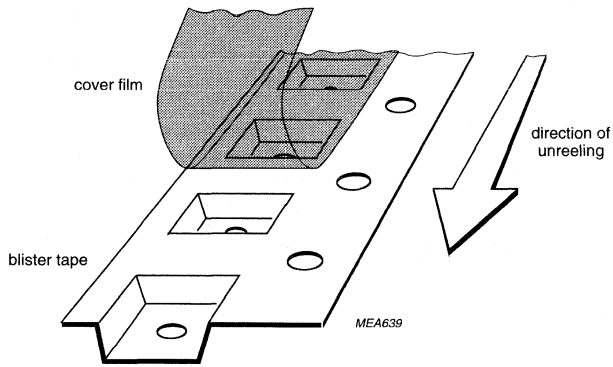
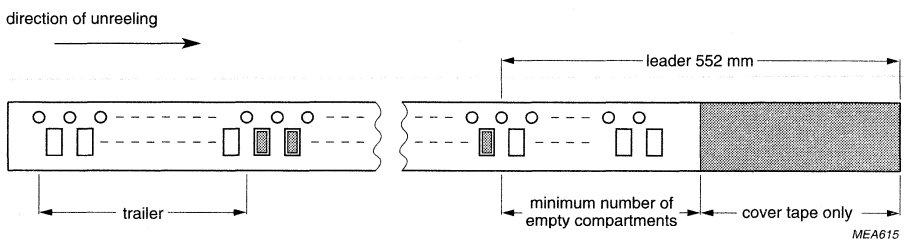
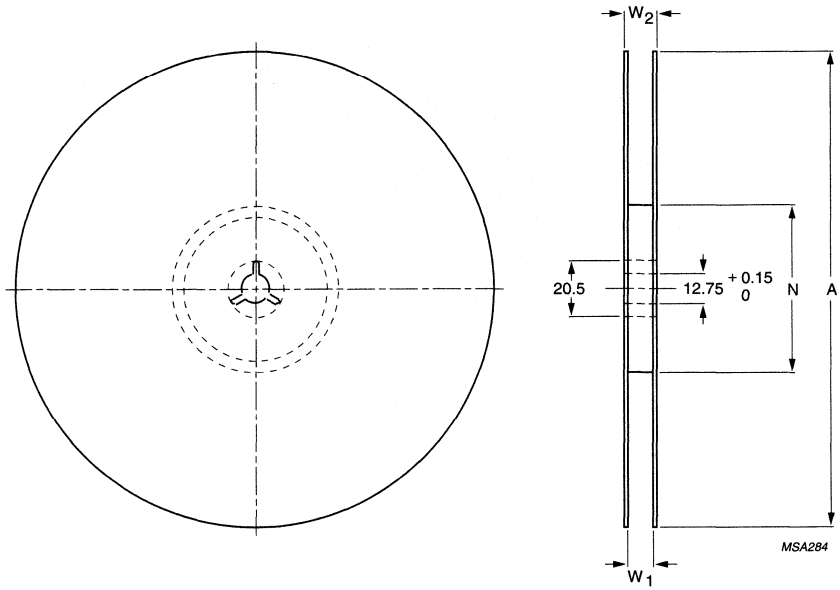


Fig.8 Construction of blister tape.



Leader: length of leader tape is 552 mm minimum covered with cover tape.
Trailer: 160 mm minimum (secured with tape).
Storage temperature range for tape: −25 to +45 °C.

Fig.9 Leader/trailer tape.



Dimensions in mm.
For dimensions see Table 4.

Fig.10 Reel.

Table 4 Reel dimensions; see Fig.10

SIZE	DIMENSIONS (mm)			
	A	N	W_1	W_2
12	330	100 ±5	12.4	≤16.4
16	330	100 ±5	16.4	≤20.4

SMD COMMON MODE CHOKES FOR EMI SUPPRESSION

General data

ITEM	SPECIFICATION
Strip material	copper (Cu), tin-lead (SnPb) plated
Solderability	*"IEC 68-2-58"*, Part 2, Test Ta, method 1
Taping method	*"IEC 286-A"* and *"EIA 481-A"*

Grades, parameters and type numbers

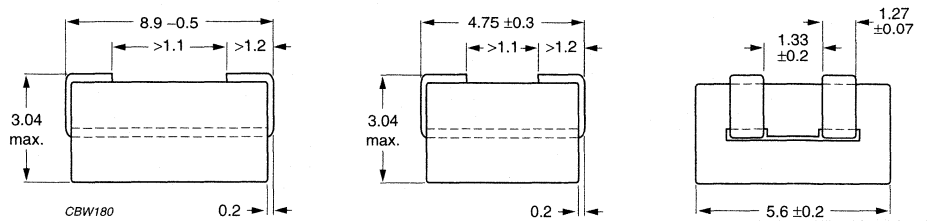
GRADE	$\|Z\|$ (1) (Ω)	at f (MHz)	TYPE NUMBER
CMS2-5.6/3/4.8; mass ≈0.3 g			
4S2	23	30	CMS2-5.6/3/4.8-4S2 des
	35	100	
	50	300	
CMS2-5.6/3/8.9; mass ≈0.6 g			
4S2	38	25	CMS2-5.6/3/8.9-4S2 des
	60	100	

GRADE	$\|Z\|$ (1) (Ω)	at f (MHz)	TYPE NUMBER
CMS4-11/3/4.8; mass ≈0.6 g			
4S2 inner channel	13	30	CMS4-11/3/4.8-4S2 des
	23	100	
	42	300	
4S2 outer channel	16	30	
	30	100	
	50	300	
CMS4-11/3/8.9; mass ≈1.1 g			
4S2 inner channel	25	25	CMS4-11/3/8.9-4S2 des
	45	100	
	82	300	
4S2 outer channel	27	25	
	58	100	
	97	300	

Note

1. Typical values, $|Z|_{min}$ is −20%.
   DC resistance <0.6 mΩ.

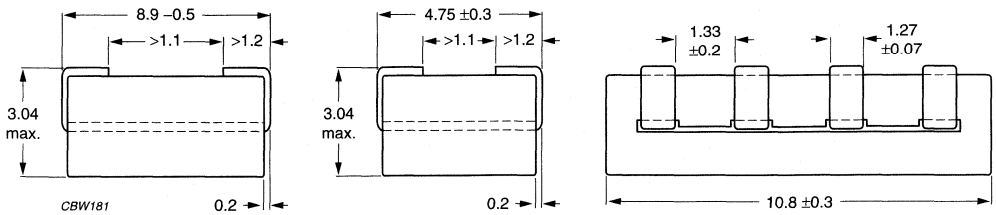
Mechanical data



a. CMS2-5.6/3/8.9 (side view) b. CMS2-5.6/3/4.8 (side view) Front view (a and b)

Dimensions in mm.

Fig.1 CMS2-5.6/3/4.8 and CMS2-5.6/3/8.9.

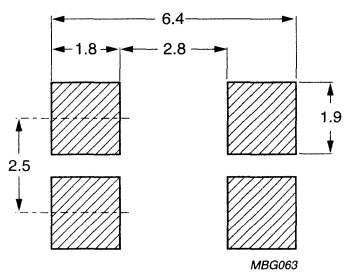


a. CMS4-11/3/8.9 (side view) b. CMS4-11/3/4.8 (side view) Front view (a and b)

Dimensions in mm.

Fig.2 CMS4-11/3/4.8 and CMS4-11/3/8.9.

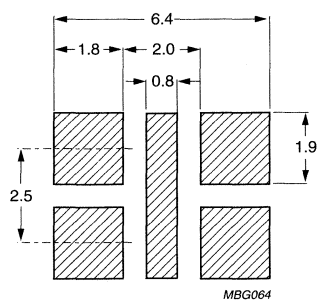
Recommended dimensions of solder lands



Dimensions in mm.

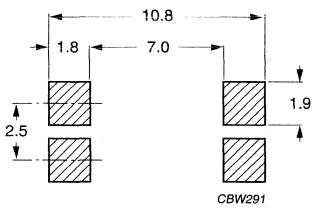
Dimensions of solder lands are based on a solder paste layer thickness of approximately 200 μm (≈0.7 mg solder paste per mm^2).

Fig.3 Solder lands for reflow soldering of CMS2-5.6/3/4.8.



Dimensions in mm.

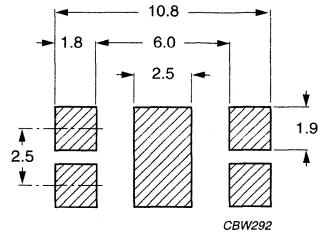
Fig.4 Solder lands for wave soldering of CMS2-5.6/3/4.8.



Dimensions in mm.

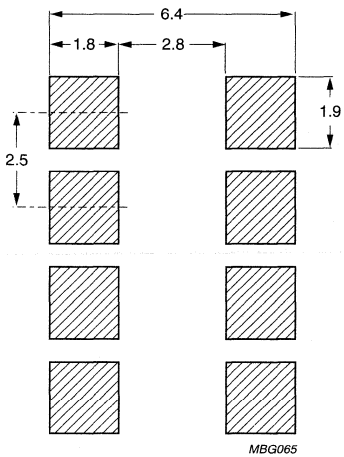
Dimensions of solder lands are based on a solder paste layer thickness of approximately 200 μm (≈0.7 mg solder paste per mm^2).

Fig.5 Solder lands for reflow soldering of CMS2-5.6/3/8.9.



Dimensions in mm.

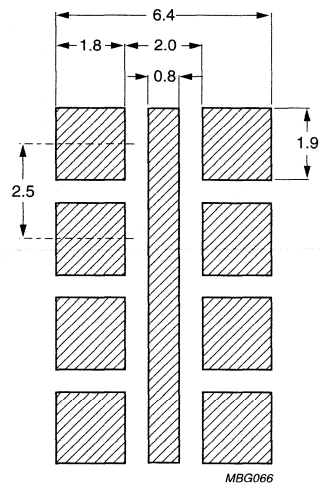
Fig.6 Solder lands for wave soldering of CMS2-5.6/3/8.9.



Dimensions in mm.

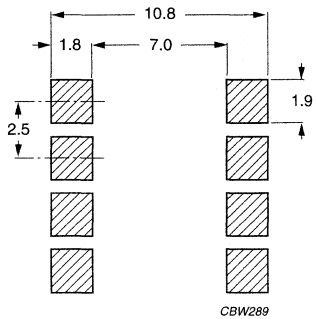
Dimensions of solder lands are based on a solder paste layer thickness of approximately 200 μm (≈0.7 mg solder paste per mm^2).

Fig.7 Solder lands for reflow soldering of CMS4-11/3/4.8.



Dimensions in mm.

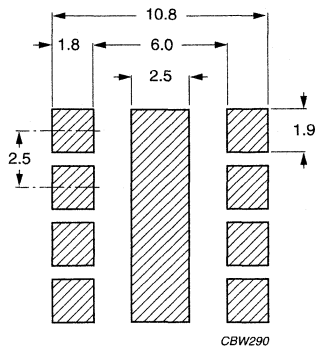
Fig.8 Solder lands for wave soldering of CMS4-11/3/4.8.



Dimensions in mm.

Dimensions of solder lands are based on a solder paste layer thickness of approximately 200 μm (≈0.7 mg solder paste per mm^2).

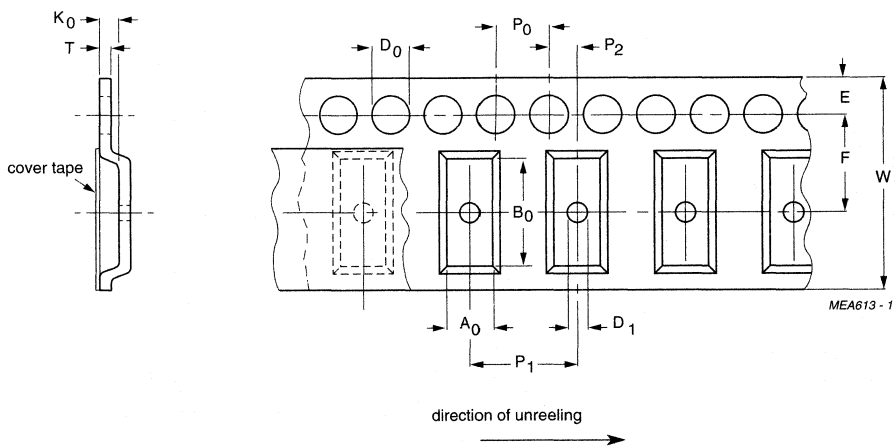
Fig.9 Solder lands for reflow soldering of CMS4-11/3/8.9.



Dimensions in mm.

Fig.10 Solder lands for wave soldering of CMS4-11/3/8.9.

BLISTER TAPE AND REEL DIMENSIONS



For dimensions see Table 1.

Fig.11 Blister tape.

Table 1 Physical dimensions of blister tape; see Fig.11

SIZE	DIMENSIONS (mm)			
	CMS2-5.6/3/4.8	**CMS2-5.6/3/8.9**	**CMS2-5.6/3/8.9**	**CMS4-11/3/8.9**
A_0	5.26	5.99	5.23	10.13
B_0	6.07	9.09	11.18	11.56
K_0	3.18	3.18	4.5	4.5
T	0.3	0.33	0.34	0.36
W	12	16	24	24
E	1.75	1.75	1.75	1.75
F	5.5	7.5	11.75	11.5
D_0	1.5	1.5	1.5	1.5
D_1	≥1.5	≥1.5	≥1.5	≥1.5
P_0	4.0	4.0	4.0	4.0
P_1	8.0	8.0	8.0	16.0
P_2	2.0	2.0	2.0	2.0

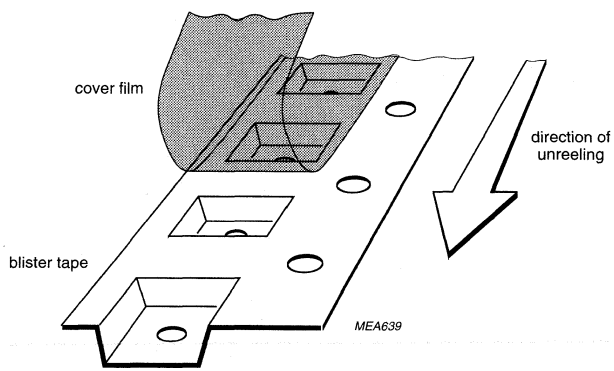
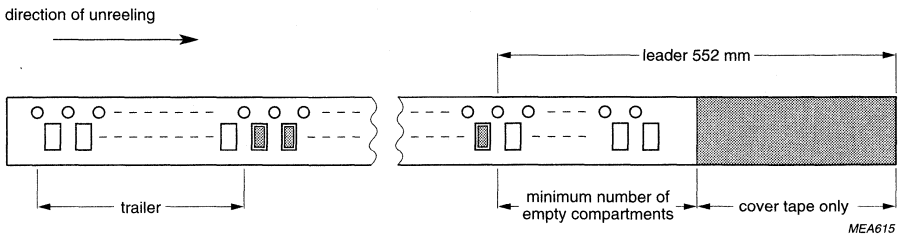
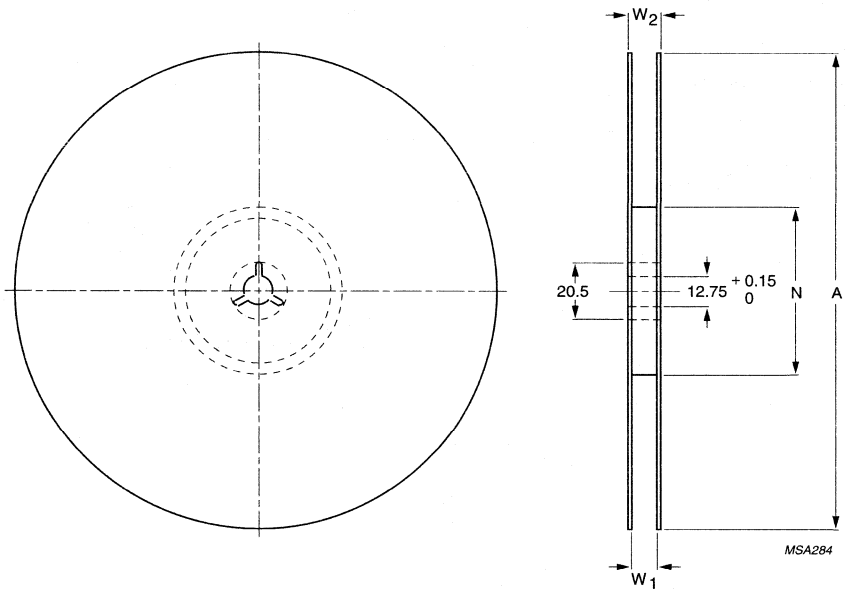


Fig.12 Construction of blister tape.



Leader: length of leader tape is 552 mm minimum covered with cover tape.
Trailer: 160 mm minimum (secured with tape).
Storage temperature range for tape: –25 to +45 °C.

Fig.13 Leader/trailer tape.



Dimensions in mm.
For dimensions see Table 2.

Fig.14 Reel.

Table 2 Reel dimensions; see Fig.14

SIZE	DIMENSIONS (mm)			
	A	N	W_1	W_2
12	330	100 ±5	12.4	≤16.4
16	330	100 ±5	16.4	≤20.4
24	330	100 ±5	24.4	≤28.4

SMD WIDEBAND CHOKES

SMD wideband choke WBS1.5-5/4.8/10

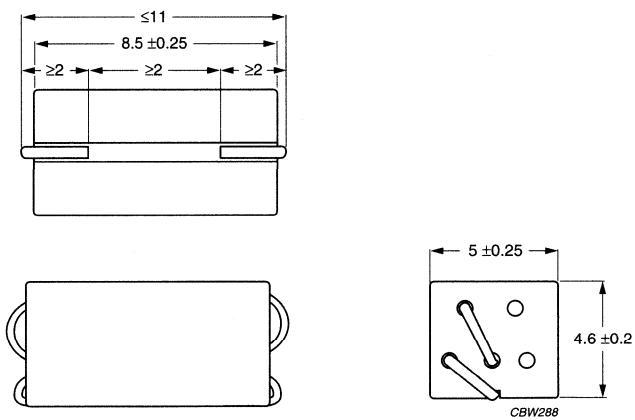
ITEM	SPECIFICATION
Strip material	copper (Cu), tin-lead (SnPb) plated
Solderability	*"IEC 68-2-58"*, Part 2, Test Ta, method 1
Mass	≈0.9 g
Taping method	*"IEC 286-A"* and *"EIA 481-A"*

Grades, parameters and type numbers; see Fig.1

GRADE	$\|Z\|^{(1)}$ (Ω)	at f (MHz)	TYPE NUMBER
3S4	230	10	WBS1.5-5/4.8/10-3S4
	400	50	
	430	100	
4B1	275	25	WBS1.5-5/4.8/10-4B1
	500	100	
	350	300	

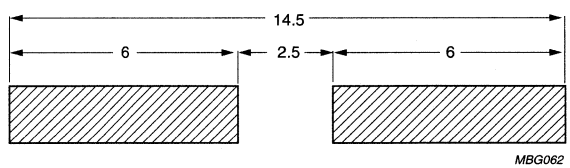
Note

1. Typical values, $|Z|_{min}$ is −20%; DC resistance <7.5 mΩ.



Dimensions in mm.

Fig.1 WBS1.5-5/4.8/10.



Dimensions of solder lands are based on a solder paste layer thickness of approximately 200 μm (≈0.7 mg solder paste per mm²).

Fig.2 Solder lands for reflow soldering of WBS1.5-5/4.8/10.

SMD wideband choke WBS2.5-5/4.8/10

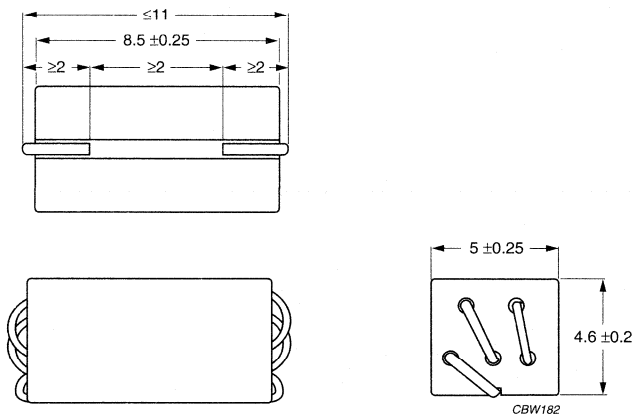
ITEM	SPECIFICATION
Strip material	copper (Cu), tin-lead (SnPb) plated
Solderability	*"IEC 68-2-58"*, Part 2, Test Ta, method 1
Mass	≈0.9 g
Taping method	*"IEC 286-A"* and *"EIA 481-A"*

Grades, parameters and type numbers; see Fig.3

GRADE	$\|Z\|$ (1) (Ω)	at f (MHz)	TYPE NUMBER
3S4	300	10	WBS2.5-5/4.8/10-3S4
	625	50	
	600	100	
4B1	485	25	WBS2.5-5/4.8/10-4B1
	850	100	
	350	300	

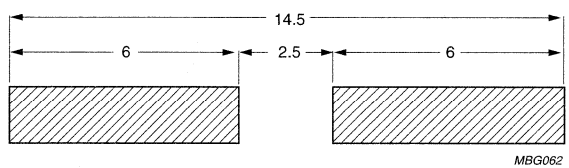
Note

1. Typical values, $|Z|_{min}$ is –20%; DC resistance <7.5 mΩ.



Dimensions in mm.

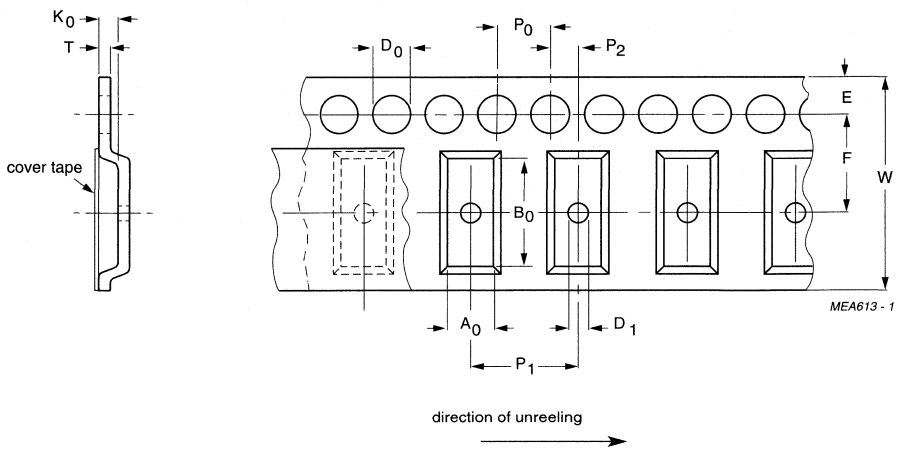
Fig.3 WBS1.5-5/4.8/10.



Dimensions of solder lands are based on a solder paste layer thickness of approximately 200 μm (≈0.7 mg solder paste per mm²).

Fig.4 Solder lands for reflow soldering of WBS2.5-5/4.8/10.

BLISTER TAPE AND REEL DIMENSIONS



For dimensions see Table 1.

Fig.5 Blister tape.

Table 1 Physical dimensions of blister tape; see Fig.5

SIZE	DIMENSIONS (mm)	
	WBS1.5-5/4.8/10	WBS2.5-5/4.8/10
A_0	5.51	5.51
B_0	11	11
K_0	5.03	5.03
T	0.36	0.36
W	24	24
E	1.75	1.75
F	11.5	11.5
D_0	1.5	1.5
D_1	≥1.5	≥1.5
P_0	4.0	4.0
P_1	8.0	8.0
P_2	2.0	2.0

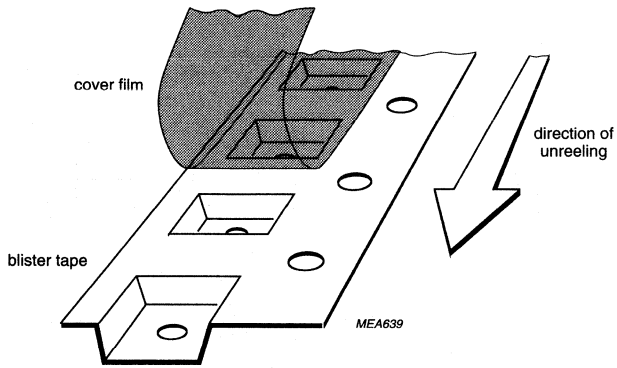
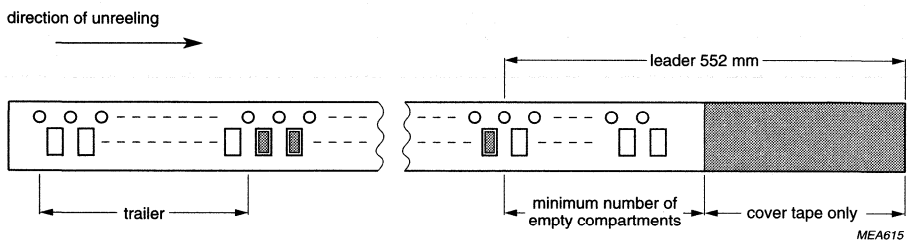
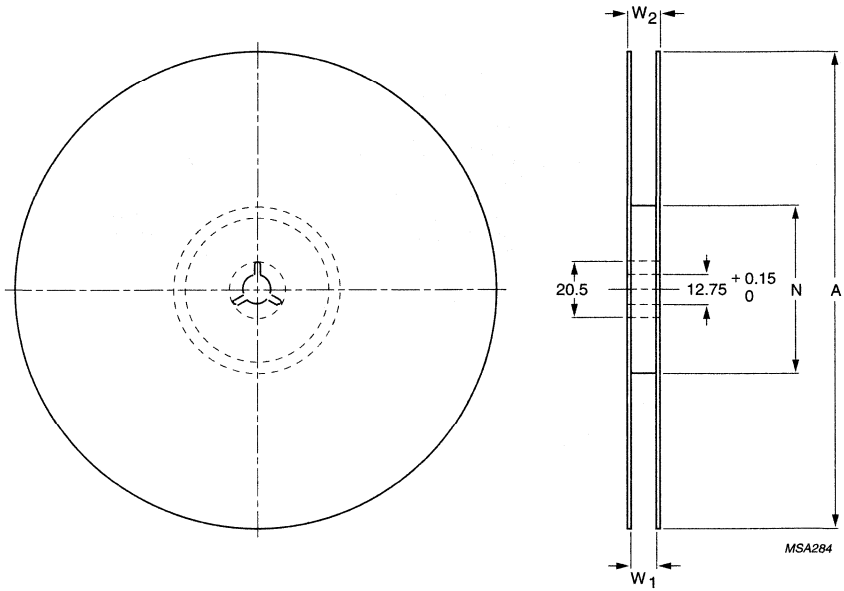


Fig.6 Construction of blister tape.



Leader: length of leader tape is 552 mm minimum covered with cover tape.
Trailer: 160 mm minimum (secured with tape).
Storage temperature range for tape: –25 to +45 °C.

Fig.7 Leader/trailer tape.



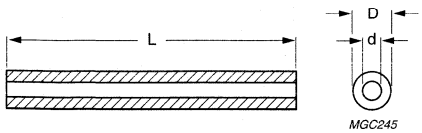
Dimensions in mm.
For dimensions see Table 2.

Fig.8 Reel.

Table 2 Reel dimensions; see Fig.8

SIZE	DIMENSIONS (mm)			
	A	N	W_1	W_2
24	330	100 ±5	24.4	≤28.4

TUBES



For dimensions see Table 1.

Fig.1 Tube.

Table 1 Grades, parameters and type numbers; see Fig.1

DIMENSIONS (mm)			TYPE NUMBER		
D	d	L	4B1	3B1	3C85
3.1 –0.02	1.3 +0.2	18.8 –0.5	–	TUB3.1/1.3/19-3B1-DL	–
3.5 –0.25	1.2 +0.15	15 –0.8	TUB3.5/1.2/15-4B1	–	–
3.5 ±0.2	1.3 +0.2	7.5 +0.5	–	TUB3.5/1.3/7.5-3B1 sup	–
3.55 ±0.15	1.3 +0.2	3.0 +0.5	–	TUB3.5/1.3/3-3B1 sup	–
3.7–0.4	1.2 +0.2	3.5 –0.5	TUB3.7/1.2/3.5-4B1	TUB3.7/1.2/3.5-3B1	–
3.8 ±0.1	2.8 ±0.1	8 ±0.55	TUB3.8/2.8/8-4B1	–	–
4.0 –0.25	1.6 +0.15	40 –1.6	TUB4/1.6/40-4B1 sup	–	–
4 ±0.2	2 ±0.2	5 ±0.5	–	TUB4/2/5-3B1	–
4 ±0.1	3 +0.2	9.45 +0.75	TUB4/3/9.5-4B1 sup	–	–
4.1 +0.1	2 +0.2	7 ±0.2	–	TUB4.1/2/7-3B1-D sup	–
4.1+0.1	2 +0.2	11 ±0.2	–	TUB4.1/2/11-3B1-D sup	–
4.15 –0.05	2 +0.2	12.2 –0.4	TUB4.2/2/12-4B1-DL sup	–	–
4.3 –0.2	2 +0.2	25.5 –1	TUB4.1/2/26-4B1 sup	–	–
4.3 –0.2	2 +0.2	15.4 –0.8	TUB4.3/2/15-4B1 sup	TUB4.3/2/15-3B1 sup	–
4.3 –0.2	2 +0.2	25.5 –1	–	TUB4.3/2/26-3B1 sup	–
5.0 –0.30	2.0 +0.2	50 ±1	–	–	TUB5/2/50-3C85
5.3 –0.2	3.0 +0.2	22.4 –0.8	–	TUB5.3/3/22-3B1 sup	–
6.0 –0.30	3.0 +0.20	20 –0.9	–	TUB6/3/20-3B1 sup	TUB6/3/20-3C85 sup
6.0 –0.30	3.0 +0.20	30 –1.2	–	–	TUB6/3/30-3C85 sup
8.0 –0.40	4.0 +0.30	20 –0.9	TUB8/4/20-4B1 sup	TUB8/4/20-3B1 sup	–
8.0 –0.40	4.0 +0.30	40 –1.6	–	TUB8/4/40-3B1 sup	–
9.5 ±0.3	6.5 ±0.2	17 +0.5/–0.4	–	TUB9.5/6.5/17-3B1	–
10.0 –0.50	4.2 +0.30	20 –0.9	–	TUB10/4.2/20-3B1 sup	–

WIDEBAND CHOKES FOR EMI SUPPRESSION

General data WBC1.5/A

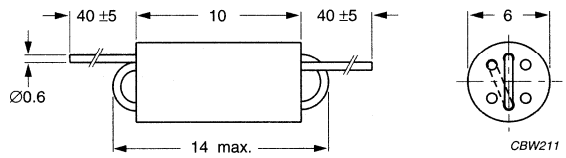
ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.1

GRADE	No. OF TURNS	|Z| at f		TYPE NUMBER
		(Ω)	(MHz)	
3S4	1.5	≥300	120	WBC1.5/A-3S4
4B1	1.5	≥350	250	WBC1.5/A-4B1
4S2	1.5	213(1)	10	WBC1.5/A-4S2 des
		400(1)	50	
		470(1)	100	

Note

1. Minimum guaranteed impedance is $|Z|_{typ}$ –20%.



Dimensions in mm.

Fig.1 WBC1.5/A.

General data WBC1.5/1.5/A

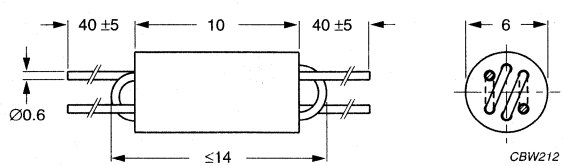
ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.2

GRADE	No. OF TURNS	|Z| at f		TYPE NUMBER
		(Ω)	(MHz)	
3S4	2 × 1.5	≥700(1)	50	WBC1.5/1.5/A-3S4
4B1	2 × 1.5	≥800(1)	110	WBC1.5/1.5/A-4B1
4S2	2 × 1.5	213(2)	10	WBC1.5/1.5/A-4S2
		400(2)	50	des
		470(2)	100	

Notes

1. \|Z\| measured with both windings connected in series.
2. Minimum guaranteed impedance is \|Z\|typ –20%; measured with one winding.



Dimensions in mm.

Fig.2 WBC1.5/1.5/A.

General data WBC2/R

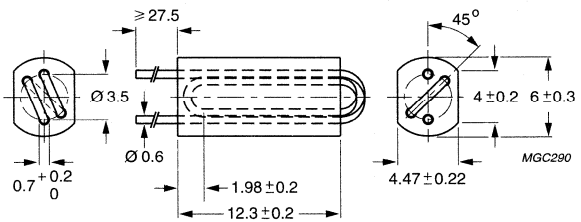
ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.3

GRADE	No. OF TURNS	$\|Z\|$ (1) at f		TYPE NUMBER
		(Ω)	(MHz)	
4S2	2	300	10	WBC2/R-4S2
		650	50	
		600	100	

Note

1. Minimum guaranteed impedance is $|Z|_{typ}$ –20%.



Dimensions in mm.

Fig.3 WBC2/R.

General data WBC2.5/A

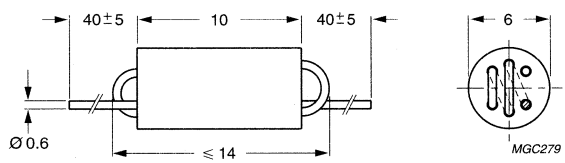
ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.4

GRADE	No. OF TURNS	$\|Z\|$ at f		TYPE NUMBER
		(Ω)	(MHz)	
3S4	2.5	≥600	50	WBC2.5/A-3S4
4B1	2.5	≥700	180	WBC2.5/A-4B1
4S2	2	400(1)	10	WBC2.5/A-4S2 des
		850(1)	50	
		725(1)	100	

Note

1. Minimum guaranteed impedance is $|Z|_{typ}$ –20%.



Dimensions in mm.

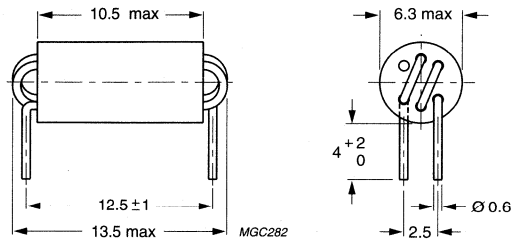
Fig.4 WBC2.5/A.

General data WBC2.5/R

ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.5

GRADE	No. OF TURNS	|Z| at f		TYPE NUMBER
		(Ω)	(MHz)	
3S4	2.5	≥600	50	WBC2.5/R-3S4
4B1	2.5	≥700	75	WBC2.5/R-4B1



Dimensions in mm.

Fig.5 WBC2.5/R.

General data WBC2.5/SP

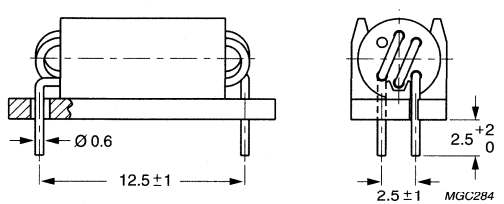
ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated
Support	polyamide (PA6.6) plate to allow mounting across circuit tracks; flame retardant in accordance with UL 94V-0
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.6

GRADE note 1	No. OF TURNS	|Z| at f		TYPE NUMBER
		(Ω)	(MHz)	
3S4	2.5	≥600	50	WBC2.5/SP-3S4 sup
4B1	2.5	≥700	75	WBC2.5/SP-4B1 sup

Note

1. Colour code 3S4 = blue, 4B1 = green.



Dimensions in mm.

Fig.6 WBC2.5/SP.

General data WBC3/R

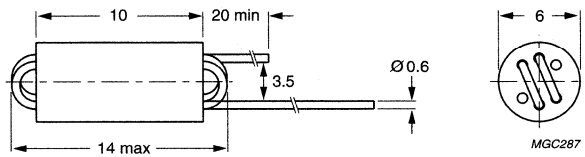
ITEM	SPECIFICATION
Wire material	copper (Cu), tin-lead (SnPb) plated
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1

Grades, parameters and type numbers; see Fig.7

GRADE	No. OF TURNS	$\|Z\|$ at f		TYPE NUMBER
		(Ω)	(MHz)	
3S4	2.5	≥650	63	WBC3/R-3S4
4B1	2.5	≥800	110	WBC3/R-4B1
4S2	2.5	500(1)	10	WBC3/R-4S2 des
		1000(1)	50	
		688(1)	100	

Note

1. Minimum guaranteed impedance is $|Z|_{typ}$ −20%.

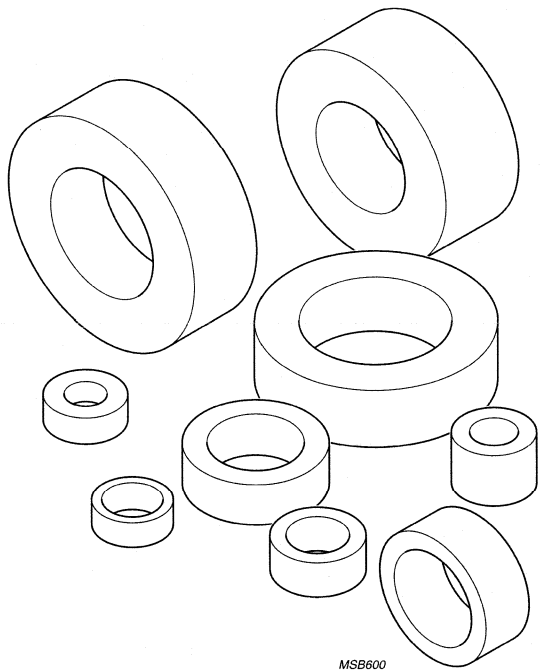


Dimensions in mm.

Fig.7 WBC3/R.

Soft Ferrites

Ferrite ring cores (toroids)



For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview Ferrite ring cores (toroids)

CORE TYPE	V_e (mm^3)	A_e (mm^3)	MASS (g)
TC2.5/1.3/0.8	2.3	0.41	0.012
TC2.5/1.3/1.3	4.29	0.76	0.022
TC2.5/1.5/0.8	2.21	0.37	0.012
TC2.5/1.5/1	2.73	0.45	0.014
T2.5/1.5/1-S	2.94	0.49	0.015
TC3.1/1.3/1.3	6.35	1.06	0.033
TC3.4/1.8/1.3	7.3	0.96	0.035
TC3.4/1.8/2	11.5	1.52	0.06
TC3.5/1.6/	8.3	1.15	0.043
TC3.9/2/1	7.5	0.87	0.039
TC3.9/2.2/1.3	9.2	1.0	0.045
TC4/2.2/1.1	8.8	0.96	0.04
TC4/2.2/1.3	9.8	1.07	0.05
TC4/2.2/1.6	12.9	1.40	0.06
TC4.8/2.3/1.3	15.1	1.48	0.075
TC5.8/3.1/1.5	26.1	2.00	0.13
TC6/4/2	30.2	1.97	0.15
TC6.3/3.8/2.5	46.5	3.06	0.23
TC7.6/3.2/4.8	147	9.84	0.7
TN9/6/3	102	4.44	0.5
TC9.5/4.8/3.2	148	7.16	0.7
TN10/6/4	188	7.8	0.95
TN13/7.5/5	368	12.2	1.8
TX13/7.1/4.8	358	12.1	1.8
TX13/7.9/6.4	434	13.9	2.2
TN14/9/5	430	12.3	2.1
TN14/9/9	774	22.1	3.8
TX16/9.1/4.7	548	14.7	2.7
TN16/9.6/6.3	760	19.7	3.8
TN19/11/10	1795	40.8	9.2
TN19/11/15	2692	61.2	13.8
TN20/10/7	1465	33.6	7.7
TX22/14/6.4	1330	24.6	6.5
TX22/14/13	2750	50.7	14
TN23/14/7	1722	30.9	8.4
TN25/15/10	2944	48.9	15

CORE TYPE	V_e (mm^3)	A_e (mm^3)	MASS (g)
TX25/15/9.5	2840	46.0	14
TN26/15/10	3360	55.9	17
TN26/15/20	6720	112	34
TN29/19/7.5	2700	36.9	13.5
TX29/19/7.6	2600	35.5	13
TN32/19/13	5820	76.5	29
TX36/23/10	5500	61.4	27
TX36/23/15	8410	93.8	40
TN36/23/10	5730	63.9	28
TN36/23/15	8600	95.9	42
TX39/20/13	9430	111	45
TL42/26/13	9860	95.8	53
TX51/32/19	21500	172	100
TL58/41/18	23200	152	110
TX61/36/13	21900	152	100
T63/38/25	46500	306	220
TX74/39/13	34300	208	170
TL87/54/14	46400	217	220
T102/66/15	68200	267	325
TL107/65/18	96200	370	456
T107/65/25	133000	514	680

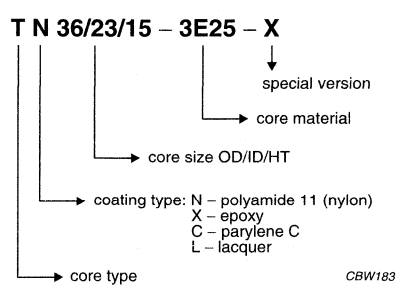


Fig.1 Type number structure for cores.

Ferrite ring cores (toroids) TC2.5/1.3/0.8

RING CORES (TOROIDS)

Effective core parameters

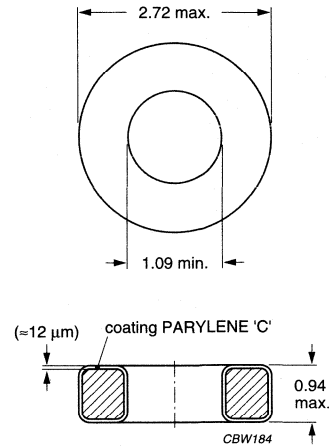
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	13.4	mm^{-1}
V_e	effective volume	2.3	mm^3
l_e	effective length	5.53	mm
A_e	effective area	0.41	mm^2
m	mass of core	≈0.012	g

Coating

The cores are coated with parylene C, flame retardant in accordance with *"UL 94V-0"*.

Isolation voltage

RMS isolation voltage: 750 V.



Dimensions in mm.

Fig.1 TC2.5/1.3/0.8 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3E5	795 ±30%	≈8500	TC2.5/1.3/0.8-3E5
3E6	940 ±30%	≈10000	TC2.5/1.3/0.8-3E6

Ferrite ring cores (toroids) TC2.5/1.3/1.3

RING CORES (TOROIDS)

Effective core parameters

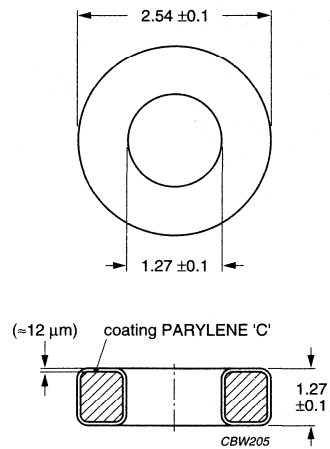
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	7.14	mm^{-1}
V_e	effective volume	4.29	mm^3
l_e	effective length	5.53	mm
A_e	effective area	0.76	mm^2
m	mass of core	≈0.022	g

Coating

The cores are coated with parylene C, flame retardant in accordance with *"UL 94V-0"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions (uncoated) in mm.

Fig.1 TC2.5/1.3/1.3 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
4A11 des	150 ±30%	≈850	TC2.5/1.3/1.3-4A11
3S4 des	300 ±25%	≈1700	TC2.5/1.3/1.3-3S4
3E6 des	1835 ±30%	≈10000	TC2.5/1.3/1.3-3E6(1)

Note

1. Maximum tolerances on mechanical dimensions are ±0.13 mm.

Ferrite ring cores (toroids) TC2.5/1.5/0.8

RING CORES (TOROIDS)

Effective core parameters

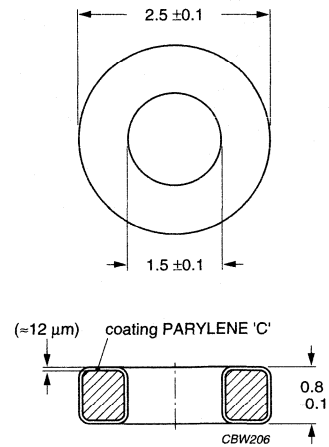
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	16.4	mm^{-1}
V_e	effective volume	2.21	mm^3
l_e	effective length	6.02	mm
A_e	effective area	0.37	mm^2
m	mass of core	≈0.012	g

Coating

The cores are coated with parylene C, flame retardant in accordance with *"UL 94V-0"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions (uncoated) in mm.

Fig.1 TC2.5/1.5/0.8 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3E6 des	765 ±30%	≈10000	TC2.5/1.5/0.8-3E6

Ferrite ring cores (toroids) TC2.5/1.5/1

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	13.5	mm^{-1}
V_e	effective volume	2.73	mm^3
l_e	effective length	6.06	mm
A_e	effective area	0.45	mm^2
m	mass of core	≈0.014	g

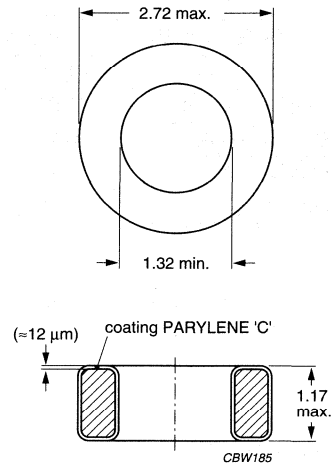
Coating

The cores are coated with parylene C.

Non-coated cores are available on request.

Isolation voltage

RMS isolation voltage: 750 V.



Dimensions in mm.

Fig.1 TC2.5/1.5/1 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3D3 sup	70 ±20%	≈750	TC2.5/1.5/1-3D3
3B7 sup	215 ±20%	≈2300	TC2.5/1.5/1-3B7
3E27	350 ±20%	≈3800	TC2.5/1.5/1-3E27
3E25 sup	350 ±20%	≈3800	TC2.5/1.5/1-3E25
3E6	930 ±30%	≈10000	TC2.5/1.5/1-3E6

Ferrite ring cores (toroids) TC2.5/1.5/1-S

RING CORES (TOROIDS)

Effective core parameters

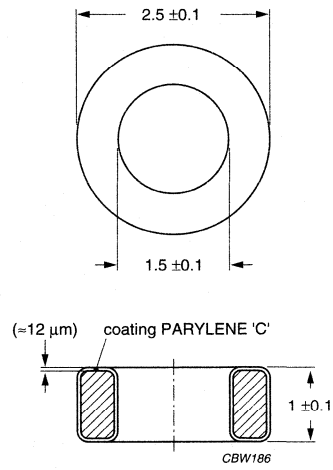
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	12.3	mm^{-1}
V_e	effective volume	2.94	mm^3
l_e	effective length	6.02	mm
A_e	effective area	0.489	mm^2
m	mass of core	≈0.015	g

Coating

The cores are coated with parylene C, flame retardant in accordance with *"UL 94V-0"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TC2.5/1.5/1-S ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
4A11 des	71 ±25%	≈700	TC2.5/1.5/1-4A11-S
3E5 des	920 ±30%	≈9000	TC2.5/1.5/1-3E5-S
3E6 des	1020 ±30%	≈10 000	TC2.5/1.5/1-3E6-S

Ferrite ring cores (toroids) TC3.1/1.3/1.3

RING CORES (TOROIDS)

Effective core parameters

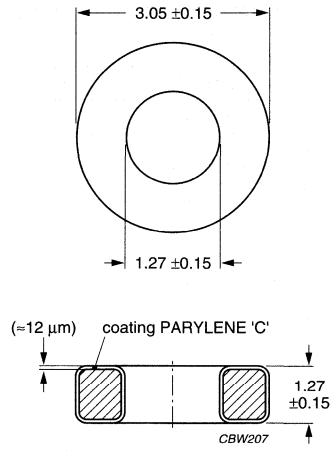
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	5.65	mm^{-1}
V_e	effective volume	6.35	mm^3
l_e	effective length	5.99	mm
A_e	effective area	1.06	mm^2
m	mass of core	≈0.033	g

Coating

The cores are coated with parylene C, flame retardant in accordance with *"UL 94V-0"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions (uncoated) in mm.

Fig.1 TC3.1/1.3/1.3 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
4A11 des	190 ±20%	≈850	TC3.1/1.3/1.3-4A11

Ferrite ring cores (toroids)

TC3.4/1.8/1.3 (135CT050)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	7.93	mm^{-1}
V_e	effective volume	7.3	mm^3
l_e	effective length	7.62	mm
A_e	effective area	0.96	mm^2
m	mass of core	≈0.035	g

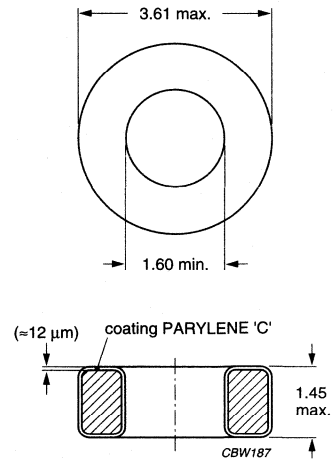
Coating

The cores are coated with parylene C.

Non-coated cores are available on request.

Isolation voltage

RMS isolation voltage: 750 V.



Dimensions in mm.

Fig.1 TC3.4/1.8/1.3 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3D3 sup	110 ±20%	≈750	TC3.4/1.8/1.3-3D3
3B7 sup	375 ±20%	≈2300	TC3.4/1.8/1.3-3B7
3E27	660 ±20%	≈4200	TC3.4/1.8/1.3-3E27
3E25 sup	660 ±20%	≈4200	TC3.4/1.8/1.3-3E25
3E6	1580 ±30%	≈10000	TC3.4/1.8/1.3-3E6

Ferrite ring cores (toroids) TC3.4/1.8/2

RING CORES (TOROIDS)

Effective core parameters

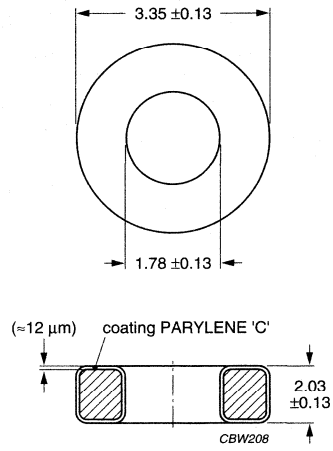
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	4.97	mm^{-1}
V_e	effective volume	11.5	mm^3
l_e	effective length	7.54	mm
A_e	effective area	1.52	mm^2
m	mass of core	≈0.06	g

Coating

The cores are coated with parylene C, flame retardant in accordance with *"UL 94V-0"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions (uncoated) in mm.

Fig.1 TC3.4/1.8/2 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3E25 des	1420 ±25%	≈5600	TC3.4/1.8/2-3E25

Ferrite ring cores (toroids) TC3.5/1.6/1.3

RING CORES (TOROIDS)

Effective core parameters

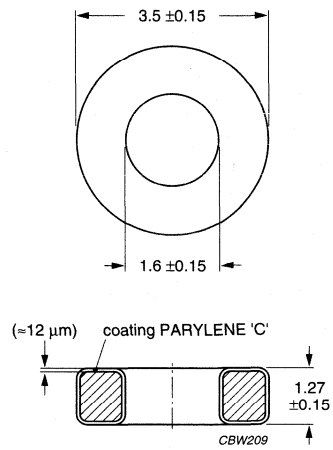
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	6.32	mm^{-1}
V_e	effective volume	8.3	mm^3
l_e	effective length	7.25	mm
A_e	effective area	1.15	mm^2
m	mass of core	≈0.043	g

Coating

The cores are coated with parylene C, flame retardant in accordance with *"UL 94V-0"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions (uncoated) in mm.

Fig.1 TC3.5/1.6/1.3 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3C11	862 ±20%	≈4300	TC3.5/1.6/1.3-3C11

Ferrite ring cores (toroids) TC3.9/2/1

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	9.99	mm^{-1}
V_e	effective volume	7.5	mm^3
l_e	effective length	8.67	mm
A_e	effective area	0.87	mm^2
m	mass of core	≈0.039	g

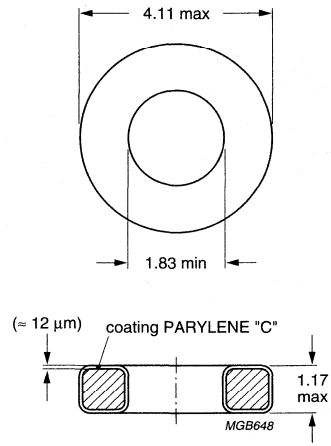
Coating

The cores are coated with parylene C.

Non-coated cores are available on request.

Isolation voltage

RMS isolation voltage: 750 V.



Dimensions in mm.

Fig.1 TC3.9/2/1 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3D3 sup	96 ±20%	≈750	TC3.9/2/1-3D3
3E6	1260 ±30%	≈10000	TC3.9/2/1-3E6

Ferrite ring cores (toroids)

TC3.9/2.2/1.3 (891CT050)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	9.20	mm^{-1}
V_e	effective volume	9.20	mm^3
l_e	effective length	9.20	mm
A_e	effective area	1.00	mm^2
m	mass of core	≈0.045	g

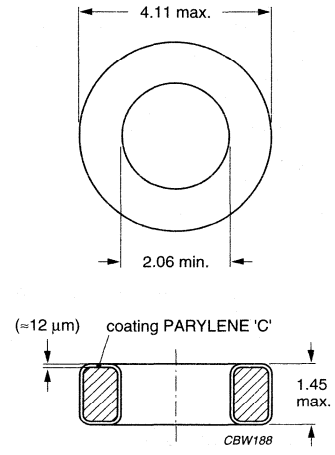
Coating

The cores are coated with parylene C.

Non-coated cores are available on request.

Isolation voltage

RMS isolation voltage: 750 V.



Dimensions in mm.

Fig.1 TC3.9/2.2/1.3 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3D3 sup	97 ±20%	≈750	TC3.9/2.2/1.3-3D3
3B7 sup	325 ±20%	≈2300	TC3.9/2.2/1.3-3B7
3E27	575 ±20%	≈4100	TC3.9/2.2/1.3-3E27
3E25 sup	575 ±20%	≈4100	TC3.9/2.2/1.3-3E25
3E6	1360 ±30%	≈10000	TC3.9/2.2/1.3-3E6

Ferrite ring cores (toroids) TC4/2.2/1.1

RING CORES (TOROIDS)

Effective core parameters

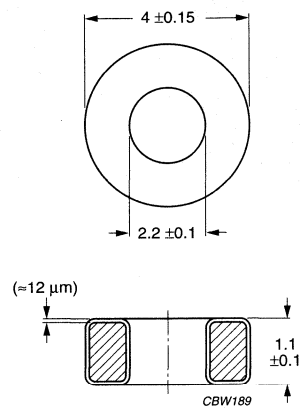
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	9.55	mm^{-1}
V_e	effective volume	8.82	mm^3
l_e	effective length	9.18	mm
A_e	effective area	0.961	mm^2
m	mass of core	≈0.04	g

Coating

The cores are coated with parylene C, flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions (uncoated) in mm.

Fig.1 TC4/2.2/1.1 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
4A11	92 ±25%	≈700	TC4/2.2/1.1-4A11
3F3	240 ±25%	≈1800	TC4/2.2/1.1-3F3
3E25	725 ±30%	≈5500	TC4/2.2/1.1-3E25
3E5	1120 ±30%	≈8500	TC4/2.2/1.1-3E5
3E6 des	1315 ±30%	≈10000	TC4/2.2/1.1-3E6

Ferrite ring cores (toroids) TC4/2.2/1.3

RING CORES (TOROIDS)

Effective core parameters

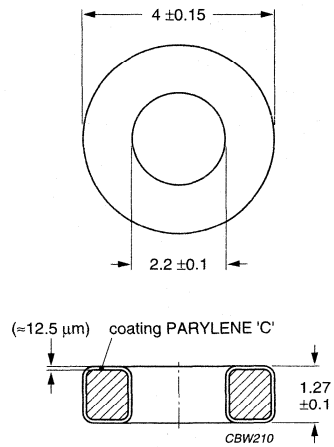
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	8.28	mm^{-1}
V_e	effective volume	10.2	mm^3
l_e	effective length	9.18	mm
A_e	effective area	1.11	mm^2
m	mass of core	≈0.05	g

Coating

The cores are coated with parylene C, flame retardant in accordance with *"UL 94V-0"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions (uncoated) in mm.

Fig.1 TC4/2.2/1.3 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
4A11 des	122 ±20%	≈800	TC4/2.2/1.3-4A11

Ferrite ring cores (toroids) TC4/2.2/1.6

RING CORES (TOROIDS)

Effective core parameters

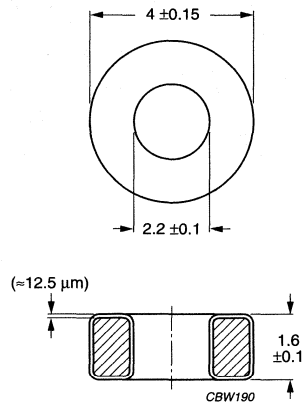
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	6.56	mm^{-1}
V_e	effective volume	12.9	mm^3
l_e	effective length	9.2	mm
A_e	effective area	1.4	mm^2
m	mass of core	≈0.06	g

Coating

The cores are coated with parylene C, flame retardant in accordance with *"UL 94V-0"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions without coating in mm.

Fig.1 TC4/2.2/1.6 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
4A11	134 ±25%	≈700	TC4/2.2/1.6-4A11
3S4 des	325 ±25%	≈1700	TC4/2.2/1.6-3S4
3F3	340 ±25%	≈1800	TC4/2.2/1.6-3F3
3E25	1050 ±30%	≈5500	TC4/2.2/1.6-3E25
3E5 des	1630 ±30%	≈8500	TC4/2.2/1.6-3E5
3E6 des	1915 ±30%	≈10000	TC4/2.2/1.6-3E6

Ferrite ring cores (toroids)

TC4.8/2.3/1.3 (213CT050)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	6.84	mm^{-1}
V_e	effective volume	15.1	mm^3
l_e	effective length	10.2	mm
A_e	effective area	1.49	mm^2
m	mass of core	≈0.075	g

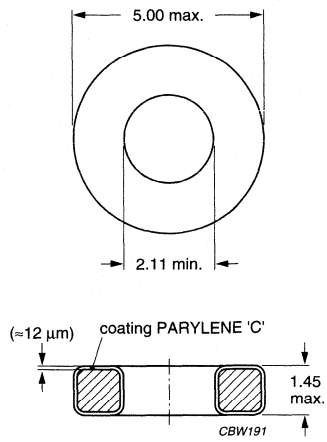
Coating

The cores are coated with parylene C.

Non-coated cores are available on request.

Isolation voltage

RMS isolation voltage: 750 V.



Dimensions in mm.

Fig.1 TC4.8/2.3/1.3 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3D3 sup	140 ±20%	≈750	TC4.8/2.3/1.3-3D3
3B7 sup	430 ±20%	≈2300	TC4.8/2.3/1.3-3B7
3E27	850 ±20%	≈4700	TC4.8/2.3/1.3-3E27
3E25 sup	850 ±20%	≈4700	TC4.8/2.3/1.3-3E25
3E6	1830 ±30%	≈10000	TC4.8/2.3/1.3-3E6

Ferrite ring cores (toroids)

TC5.8/3.1/1.5 (1041CT060)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	6.52	mm^{-1}
V_e	effective volume	26.1	mm^3
l_e	effective length	13.0	mm
A_e	effective area	2.00	mm^2
m	mass of core	≈0.13	g

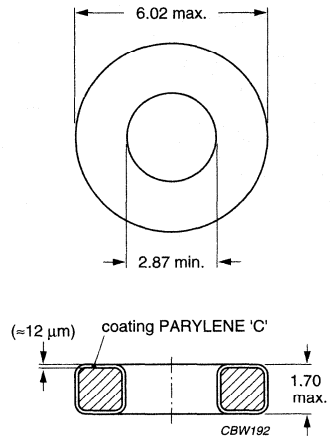
Coating

The cores are coated with parylene C.

Non-coated cores are available on request.

Isolation voltage

RMS isolation voltage: 750 V.



Dimensions in mm.

Fig.1 TC5.8/3.1/1.5 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3D3 sup	144 ±20%	≈750	TC5.8/3.1/1.5-3D3
3B7 sup	450 ±20%	≈2300	TC5.8/3.1/1.5-3B7
3E27	890 ±20%	≈4600	TC5.8/3.1/1.5-3E27
3E25 sup	890 ±20%	≈4600	TC5.8/3.1/1.5-3E25
3E6	1960 ±30%	≈10200	TC5.8/3.1/1.5-3E6

Ferrite ring cores (toroids) TC6/4/2

RING CORES (TOROIDS)

Effective core parameters

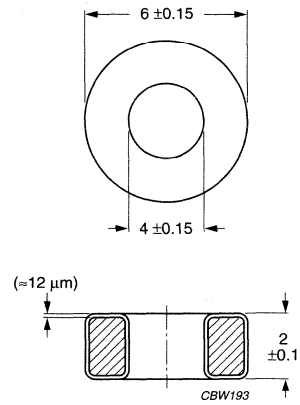
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	7.75	mm^{-1}
V_e	effective volume	30.2	mm^3
l_e	effective length	15.3	mm
A_e	effective area	1.97	mm^2
m	mass of core	≈0.15	g

Coating

The cores are coated with parylene C, flame retardant in accordance with *"UL 94V-0"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TC6/4/2 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
4C65	20 ±25%	≈125	TC6/4/2-4C65
4A11	114 ±25%	≈700	TC6/4/2-4A11
3S4 des	275 ±25%	≈1700	TC6/4/2-3S4
3F3	290 ±25%	≈1800	TC6/4/2-3F3
3E25	890 ±30%	≈5500	TC6/4/2-3E25
3E5	1380 ±30%	≈8500	TC6/4/2-3E5
3E6 des	1620 ±30%	≈10000	TC6/4/2-3E6

Ferrite ring cores (toroids) TC6.3/3.8/2.5

RING CORES (TOROIDS)

Effective core parameters

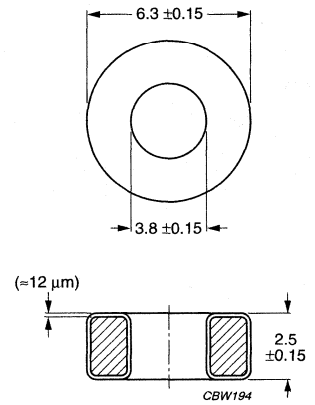
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	4.97	mm^{-1}
V_e	effective volume	46.5	mm^3
l_e	effective length	15.2	mm
A_e	effective area	3.06	mm^2
m	mass of core	≈0.23	g

Coating

The cores are coated with parylene C, flame retardant in accordance with *"UL 94V-0"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions (uncoated) in mm.

Fig.1 TC6.3/3.8/2.5 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
4A11	177 ±25%	≈700	TC6.3/3.8/2.5-4A11
3F3	450 ±25%	≈1800	TC6.3/3.8/2.5-3F3
3E25	1390 ±30%	≈5500	TC6.3/3.8/2.5-3E25
3E5	2150 ±30%	≈8500	TC6.3/3.8/2.5-3E5
3E6 des	2530 ±30%	≈10000	TC6.3/3.8/2.5-3E6
3E7 prot	3600 +30/−40%	≈12000	TC6.3/3.8/2.5-3E7

Ferrite ring cores (toroids) TC7.6/3.2/4.8

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.52	mm^{-1}
V_e	effective volume	147	mm^3
l_e	effective length	15.0	mm
A_e	effective area	9.84	mm^2
m	mass of core	≈0.7	g

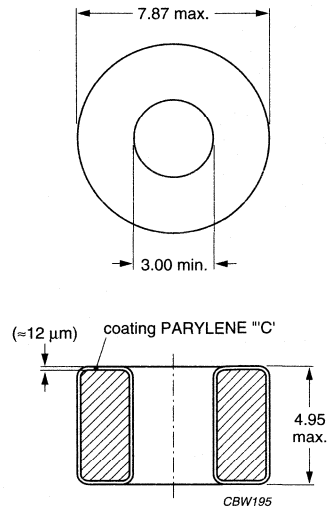
Coating

The cores are coated with parylene C.

Non-coated cores are available on request.

Isolation voltage

RMS isolation voltage: 750 V.



Dimensions in mm.

Fig.1 TC7.6/3.2/4.8 ring core.

Ring core data

GRADE	A_L (nH)	μ_I	TYPE NUMBER
3D3 sup	620 ±20%	≈750	TC7.6/3.2/4.8-3D3
3B7 sup	1900 ±20%	≈2300	TC7.6/3.2/4.8-3B7
3C81	2200 ±20%	≈2700	TC7.6/3.2/4.8-3C81
3E27	4100 ±20%	≈5000	TC7.6/3.2/4.8-3E27
3E25 sup	4100 ±20%	≈5000	TC7.6/3.2/4.8-3E25
3E6 des	8350 ±30%	≈10100	TC7.6/3.2/4.8-3E6(1)

Note

1. Parylene layer thickness ≈25 μm.

RING CORES (TOROIDS)

Effective core parameters

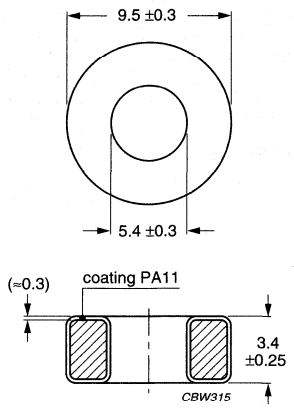
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	5.17	mm^{-1}
V_e	effective volume	102	mm^3
l_e	effective length	22.9	mm
A_e	effective area	4.44	mm^2
m	mass of core	≈0.5	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-0"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN9/6/3 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
4C65	30 ±25%	≈125	violet	TN9/6/3-4C65
4A11 sup	170 ±25%	≈700	pink	TN9/6/3-4A11
3R1 sup	–	≈800	black	TN9/6/3-3R1(1)
3F3	440 ±25%	≈1800	blue	TN9/6/3-3F3
3C85 sup	485 ±25%	≈2000	red	TN9/6/3-3C85
3E25	1340 ±30%	≈5500	orange	TN9/6/3-3E25
3E5	2070 ±30%	≈8500	yellow/white	TL9/6/3-3E5(2)
3E6 des	2435 ±30%	≈10000	–	TC9/6/3-3E6(3)

Notes

1. Due to the rectangular BH-loop of grade 3R1, inductance values strongly depend on the magnetic state of the ring core and measuring conditions. Therefore no A_L value is specified. For the application in magnetic amplifiers A_L is not a critical parameter.
2. Ring cores in grade 3E5 are lacquered (polyurethane) and have different dimensions: Outside diameter = 9.3 ±0.4 mm; inside diameter = 5.75 ±0.3 mm; height = 3.25 ±0.3 mm.
3. Ring cores in grade 3E6 are coated with parylene C and have different dimensions: Outside diameter = 9.0 ±0.2 mm; inside diameter = 6.0 ±0.2 mm; height = 3.0 ±0.15 mm.

WARNING
Do not use grade 3R1 cores close to their mechanical resonant frequency. For more information refer to *"3R1"* material specification in this data handbook.

Tag plate

General data

PARAMETER	SPECIFICATION
Tag plate material	liquid crystal polymer (LCP), glass reinforced, flame retardant in accordance with *"UL 94V-0"*; UL file number E83005 (M)
Solder pad material	copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated
Maximum operating temperature	155 °C, *"IEC 85"* class F
Resistance to soldering heat	*"IEC 68-2-20"*, Part 2, Test Tb, method 1B: 350 °C, 3.5 s
Solderability	*"IEC 68-2-20"*, Part 2, Test Ta, method 1: 235 °C, 2 s

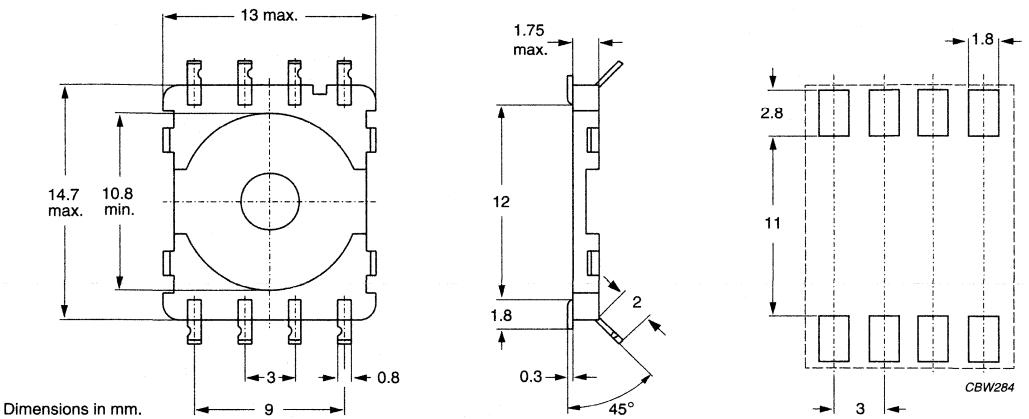


Fig.2 TN9/6/3 tag plate (SMD); 8-solder pads.

Type number informationfor TN9/6/3 tag plate (SMD) with 8 solder pads

NUMBER OF SOLDER PADS	TYPE NUMBER
8	TGPS9

Cover data

PARAMETER	SPECIFICATION
Cover material	polyamide (PA4.6) glass reinforced, flame retardant in accordance with *"UL 94V-0"*
Maximium operating temperature	130 °C, *"IEC 85"* class B
Type number	COV9

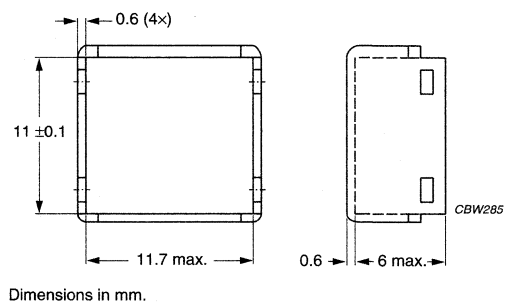


Fig.3 TN9/6/3 tag plate (SMD); 8-solder pads.

Ferrite ring cores (toroids)

TC9.5/4.8/3.2 (266CT125)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.89	mm^{-1}
V_e	effective volume	148	mm^3
l_e	effective length	20.7	mm
A_e	effective area	7.16	mm^2
m	mass of core	≈0.7	g

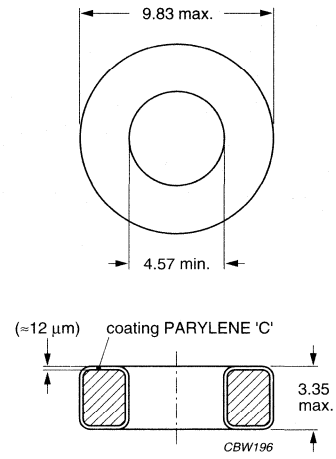
Coating

The cores are coated with parylene C.

Non-coated cores are available on request.

Isolation voltage

RMS isolation voltage: 750 V.



Dimensions in mm.

Fig.1 TC9.5/4.8/3.2 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3D3 sup	330 ±20%	≈750	TC9.5/4.8/3.2-3D3
3B7 sup	1000 ±20%	≈2300	TC9.5/4.8/3.2-3B7
3C81	1200 ±20%	≈2700	TC9.5/4.8/3.2-3C81
3E27	2135 ±20%	≈4900	TC9.5/4.8/3.2-3E27
3E25 sup	2135 ±20%	≈4900	TC9.5/4.8/3.2-3E25
3E6 des	4390 ±30%	≈10100	TC9.5/4.8/3.2-3E6
3E7 prot	5323 ±30%	≈12000	TC9.5/4.8/3.2-3E7

Ferrite ring cores (toroids) TN10/6/4

RING CORES (TOROIDS)

Effective core parameters

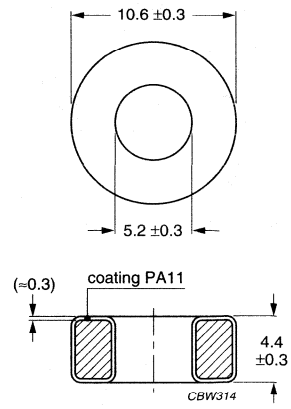
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	3.07	mm^{-1}
V_e	effective volume	188	mm^3
l_e	effective length	24.1	mm
A_e	effective area	7.8	mm^2
m	mass of core	≈0.95	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN10/6/4 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
4C65 sup	52 ±25%	≈125	violet	TN10/6/4-4C65
4A11	286 ±25%	≈700	pink	TN10/6/4-4A11
3F3 sup	740 ±25%	≈1800	blue	TN10/6/4-3F3
3C85 sup	820 ±25%	≈2000	red	TN10/6/4-3C85
3C11	1750 ±25%	≈4300	white	TN10/6/4-3C11
3E25 sup	2250 ±30%	≈5500	orange	TN10/6/4-3E25
3E5	3470 ±30%	≈8500	yellow/white	TL10/6/4-3E5(1)
3E6 des	4085 ±30%	≈10000	purple/white	TL10/6/4-3E6(1)

Note

1. Ring cores in grades 3E5 and 3E6 are lacquered (polyurethane) and have different dimensions: Outside diameter = 10.25 ±0.4 mm; inside diameter = 5.75 ±0.3 mm; height = 4.25 ±0.3 mm.

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.03	≤0.04	–
3F3	≥320	–	≤0.03	≤0.04

Ferrite ring cores (toroids)

TX13/7.1/4.8 (768XT188)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.43	mm^{-1}
V_e	effective volume	358	mm^3
l_e	effective length	29.5	mm
A_e	effective area	12.1	mm^2
m	mass of core	≈1.8	g

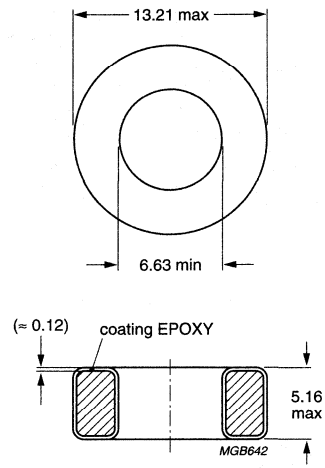
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX13/7.1/4.8 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3D3 sup	415 ±20%	≈750	–	TX13/7.1/4.8-3D3
3F3 des	990 ±20%	≈1800	blue	TX13/7.1/4.8-3F3
3C85	1100 ±20%	≈2000	red	TX13/7.1/4.8-3C85
3C81	1475 ±20%	≈2700	light blue	TX13/7.1/4.8-3C81
3E27	2750 ±20%	≈5000	green	TX13/7.1/4.8-3E27
3E25 sup	2750 ±20%	≈5000	orange	TX13/7.1/4.8-3E25
3E6	5400 ±30%	≈10400	purple	TX13/7.1/4.8-3E6

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.08	–	–
3C85	≥320	≤0.06	≤0.07	–
3F3	≥320	–	≤0.04	≤0.07

Ferrite ring cores (toroids) TN13/7.5/5

RING CORES (TOROIDS)

Effective core parameters

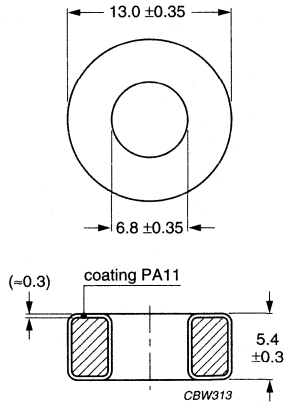
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.46	mm^{-1}
V_e	effective volume	368	mm^3
l_e	effective length	30.1	mm
A_e	effective area	12.2	mm^2
m	mass of core	≈1.8	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN13/7.5/5 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
4C65 sup	64 ±25%	≈125	violet	TN13/7.5/5-4C65
4A11 sup	360 ±25%	≈700	pink	TN13/7.5/5-4A11
3F4 sup	460 ±25%	≈900	beige	TN13/7.5/5-3F4
3F3 sup	900 ±25%	≈1800	blue	TN13/7.5/5-3F3
3C85	1000 ±25%	≈2000	red	TN13/7.5/5-3C85
3C11	2200 ±25%	≈4300	white	TN13/7.5/5-3C11
3E25	2810 ±30%	≈5500	orange	TN13/7.5/5-3E25
3E5	4340 ±30%	≈8500	yellow/white	TL13/7.5/5-3E5(1)
3E6 des	5095 ±30%	≈10000	purple/white	TL13/7.5/5-3E6(1)

Note

1. Ring cores in grades 3E5 and 3E6 are lacquered (polyurethane) and have different dimensions: Outside diameter = 12.75 ±0.4 mm; inside diameter = 7.25 ±0.35 mm; height = 5.25 ±0.3 mm.

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.06	≤0.07	–
3F3	≥320	–	≤0.04	≤0.07

Ferrite ring cores (toroids)

TX13/7.9/6.4 (204XT250)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.25	mm^{-1}
V_e	effective volume	434	mm^3
l_e	effective length	31.2	mm
A_e	effective area	13.9	mm^2
m	mass of core	≈2.2	g

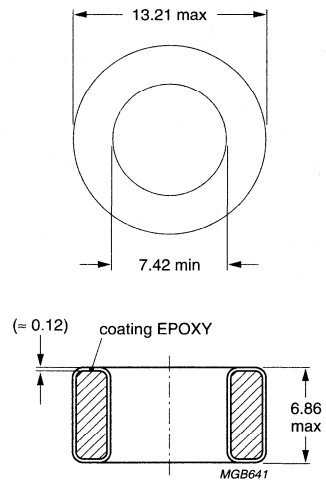
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX13/7.9/6.4 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 des	1100 ±20%	≈1800	blue	TX13/7.9/6.4-3F3
3C85	1200 ±20%	≈2000	red	TX13/7.9/6.4-3C85
3C81	1620 ±20%	≈2700	light blue	TX13/7.9/6.4-3C81
3E27	3000 ±20%	≈5000	green	TX13/7.9/6.4-3E27
3E25 sup	3000 ±20%	≈5000	orange	TX13/7.9/6.4-3E25
3E6	5900 ±30%	≈10600	purple	TX13/7.9/6.4-3E6

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.09	–	–
3C85	≥320	≤0.07	≤0.08	–
3F3	≥320	–	≤0.05	≤0.09

Ferrite ring cores (toroids) TN14/9/5

RING CORES (TOROIDS)

Effective core parameters

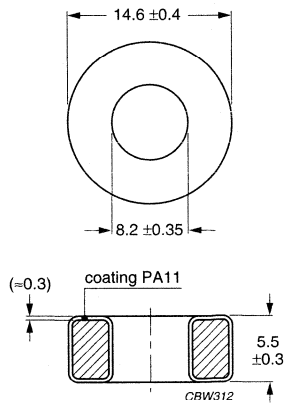
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.84	mm^{-1}
V_e	effective volume	430	mm^3
l_e	effective length	35	mm
A_e	effective area	12.3	mm^2
m	mass of core	≈2.1	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN14/9/5 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
4C65 sup	55 ±25%	≈125	violet	TN14/9/5-4C65
4A11 sup	310 ±25%	≈700	pink	TN14/9/5-4A11
3R1(1)	–	≈800	black	TN14/9/5-3R1
3F3 sup	790 ±25%	≈1800	blue	TN14/9/5-3F3
3C85	880 ±25%	≈2000	red	TN14/9/5-3C85
3C11 sup	1900 ±25%	≈4300	white	TN14/9/5-3C11
3E25	2430 ±30%	≈5500	orange	TN14/9/5-3E25
3E5(2) sup	3760 ±30%	≈8500	yellow/white	TL14/9/5-3E5
3E6(2) des	4415 ±30%	≈10000	purple/white	TL14/9/5-3E6

Notes

1. Due to the rectangular BH-loop of grade 3R1, inductance values strongly depend on the magnetic state of the ring core and measuring conditions. Therefore no A_L value is specified. For the application in magnetic amplifiers A_L is not a critical parameter.
2. Ring cores in grades 3E5 and 3E6 are lacquered (polyurethane) and have different dimensions: Outside diameter = 14.25 ±0.4 mm; inside diameter = 8.75 ±0.35 mm; height = 5.25 ±0.3 mm.

WARNING
Do not use grade 3R1 cores close to their mechanical resonant frequency. For more information refer to *"3R1"* material specification in this data handbook.

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.07	≤0.08	–
3F3	≥320	–	≤0.05	≤0.08

Ferrite ring cores (toroids) TN14/9/9

RING CORES (TOROIDS)

Effective core parameters

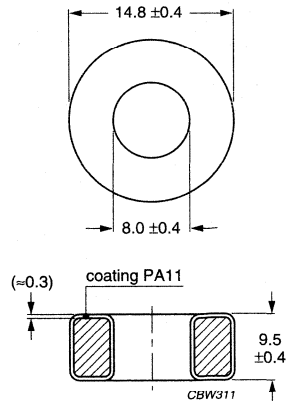
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.58	mm^{-1}
V_e	effective volume	774	mm^3
l_e	effective length	35	mm
A_e	effective area	22.1	mm^2
m	mass of core	≈3.8	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN14/9/9 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
4A11 sup	560 ±25%	≈700	pink	TN14/9/9-4A11
3F3 sup	1430 ±25%	≈1800	blue	TN14/9/9-3F3
3C85 sup	1600 ±25%	≈2000	red	TN14/9/9-3C85
3C11 sup	3400 ±25%	≈4300	white	TN14/9/9-3C11
3E25 sup	4370 ±30%	≈5500	orange	TN14/9/9-3E25
3E5(1) sup	6760 ±30%	≈8500	yellow/white	TL14/9/9-3E5
3E6(1) des	7955 ±30%	≈10000	purple/white	TL14/9/9-3E6

Note

1. Ring cores in grades 3E5 and 3E6 are lacquered (polyurethane) and have different dimensions: Outside diameter = 14.25 ±0.4 mm; Inside diameter = 8.75 ±0.35 mm; Height = 9.25 ±0.4 mm.

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °D	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.12	≤0.14	–
3F3	≥320	–	≤0.09	≤0.15

Ferrite ring cores (toroids)

TX16/9.1/4.7 (331XT185)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.53	mm^{-1}
V_e	effective volume	548	mm^3
l_e	effective length	37.2	mm
A_e	effective area	14.7	mm^2
m	mass of core	≈2.7	g

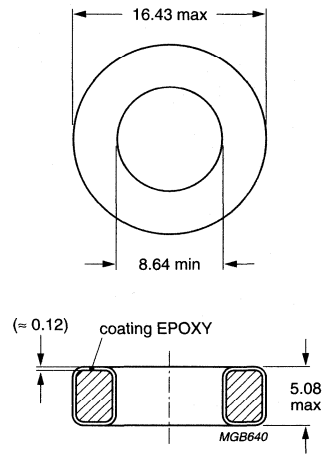
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX16/9.1/4.7 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 des	950 ±20%	≈1800	blue	TX16/9.1/4.7-3F3
3C85	1050 ±20%	≈2000	red	TX16/9.1/4.7-3C85
3C81	1400 ±20%	≈2700	light blue	TX16/9.1/4.7-3C81
3E27	2600 ±20%	≈5000	green	TX16/9.1/4.7-3E27
3E25 sup	2600 ±20%	≈5000	orange	TX16/9.1/4.7-3E25
3E6	5200 ±30%	≈10500	purple	TX16/9.1/4.7-3E6

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.11	–	–
3C85	≥320	≤.0.09	≤0.10	–
3F3	≥320	–	≤0.06	≤0.11

Ferrite ring cores (toroids) TN16/9.6/6.3

RING CORES (TOROIDS)

Effective core parameters

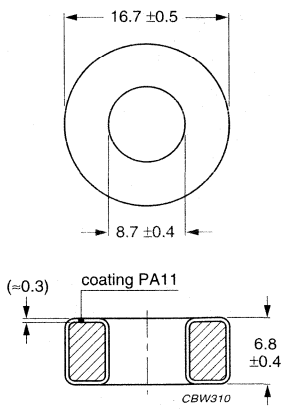
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.95	mm^{-1}
V_e	effective volume	760	mm^3
l_e	effective length	38.5	mm
A_e	effective area	19.7	mm^2
m	mass of core	≈3.8	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN16/9.6/6.3 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
4A11 sup	450 ±25%	≈700	pink	TN16/9.6/6.3-4A11
3F3 sup	1160 ±25%	≈1800	blue	TN16/9.6/6.3-3F3
3C85	1300 ±25%	≈2000	red	TN16/9.6/6.3-3C85
3C11	2700 ±25%	≈4300	white	TN16/9.6/6.3-3C11
3E25	3540 ±30%	≈5500	orange	TN16/9.6/6.3-3E25
3E5[1] sup	5470 ±30%	≈8500	yellow/white	TL16/9.6/6.3-3E5
3E6[1] des	6430 ±30%	≈10000	purple/white	TL16/9.6/6.3-3E6

Note

1. Ring cores in grades 3E5 and 3E6 are lacquered (polyurethane) and have different dimensions: Outside diameter = 16.25 ±0.5 mm; inside diameter = 9.35 ±0.4 mm; height = 6.55 ±0.4 mm.

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.12	≤0.14	–
3F3	≥320	–	≤0.09	≤0.15

Ferrite ring cores (toroids) TN19/11/10

RING CORES (TOROIDS)

Effective core parameters

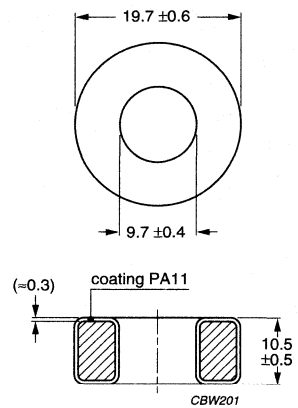
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.08	mm^{-1}
V_e	effective volume	1795	mm^3
l_e	effective length	44.0	mm
A_e	effective area	40.8	mm^2
m	mass of core	≈9.2	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN19/11/10 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3C85 sup	2330 ±25%	≈2000	red	TN19/11/10-3C85
3C11 sup	5000 ±25%	≈4300	white	TN19/11/10-3C11
3E25 sup	6420 ±25%	≈5500	orange	TN19/11/10-3E25

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.28	≤0.32	–

Ferrite ring cores (toroids) TN19/11/15

RING CORES (TOROIDS)

Effective core parameters

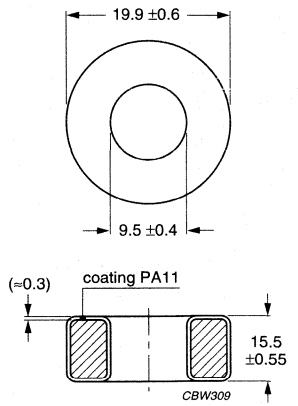
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.718	mm^{-1}
V_e	effective volume	2692	mm^3
l_e	effective length	44.0	mm
A_e	effective area	61.2	mm^2
m	mass of core	≈13.8	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN19/11/15 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3C85 sup	3500 ±25%	≈2000	red	TN19/11/15-3C85
3C11 sup	7500 ±25%	≈4300	white	TN19/11/15-3C11
3E25 sup	9630 ±25%	≈5500	orange	TN19/11/15-3E25

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.42	≤0.49	–

Ferrite ring cores (toroids) TN20/10/7

RING CORES (TOROIDS)

Effective core parameters

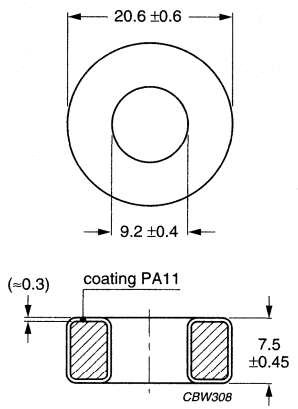
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.30	mm^{-1}
V_e	effective volume	1465	mm^3
l_e	effective length	43.6	mm
A_e	effective area	33.6	mm^2
m	mass of core	≈7.7	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN20/10/7 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
4C65 sup	121 ±25%	≈125	violet	TN20/10/7-4C65
3C85 sup	1950 ±25%	≈2000	red	TN20/10/7-3C85
3C11 sup	4150 ±25%	≈4300	white	TN20/10/7-3C11
3E25	5340 ±25%	≈5500	orange	TN20/10/7-3E25
3E5(1) sup	8250 ±30%	≈8500	yellow/white	TL20/10/7-3E5
3E6(1) des	9685 ±30%	≈10000	purple/white	TL20/10/7-3E6

Note

1. Ring cores in grades 3E5 and 3E6 are lacquered (polyurethane) and have different dimensions: Outside diameter = 20.25 ±0.6 mm; inside diameter = 9.75 ±0.4 mm; height = 7.25 ±0.45 mm.

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.23	≤0.27	–

Ferrite ring cores (toroids)

TX22/14/6.4 (846XT250)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.20	mm $^{-1}$
V_e	effective volume	1330	mm^3
l_e	effective length	54.2	mm
A_e	effective area	24.6	mm^2
m	mass of core	≈6.5	g

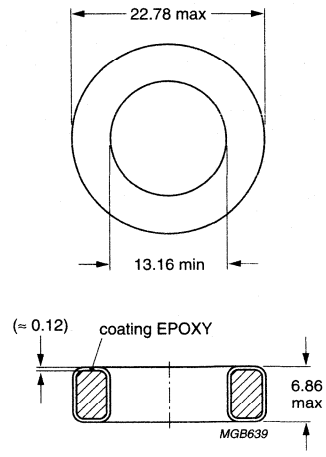
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX22/14/6.4 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 des	1100 ±20%	≈1800	blue	TX22/14/6.4-3F3
3C85	1220 ±20%	≈2000	red	TX22/14/6.4-3C85
3C81	1650 ±20%	≈2700	light blue	TX22/14/6.4-3C81
3E27	3055 ±20%	≈5300	green	TX22/14/6.4-3E27
3E25 sup	3055 ±20%	≈5300	orange	TX22/14/6.4-3E25
3E6	6000 ±30%	≈10500	purple	TX22/14/6.4-3E6

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.21	–	–
3C85	≥320	≤0.21	≤0.24	–
3F3	≥320	–	≤0.15	≤0.26

Ferrite ring cores (toroids)

TX22/14/13 (846XT500)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.07	mm^{-1}
V_e	effective volume	2750	mm^3
l_e	effective length	54.2	mm
A_e	effective area	50.7	mm^2
m	mass of core	≈14	g

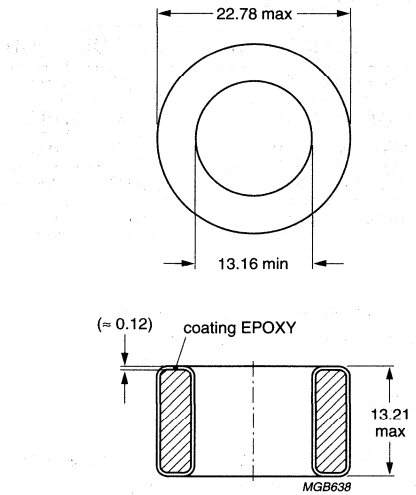
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX22/14/13 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 des	2200 ±20%	≈1800	blue	TX22/14/13-3F3
3C85	2440 ±20%	≈2000	red	TX22/14/13-3C85
3C81	3300 ±20%	≈2700	light blue	TX22/14/13-3C81
3E27	6110 ±20%	≈5000	green	TX22/14/13-3E27
3E25 sup	6110 ±20%	≈5000	orange	TX22/14/13-3E25
3E6	12080 ±30%	≈10300	purple	TX22/14/13-3E6

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.56	–	–
3C85	≥320	≤0.43	≤0.50	–
3F3	≥320	–	≤0.30	≤0.52

Ferrite ring cores (toroids) TN23/14/7

RING CORES (TOROIDS)

Effective core parameters

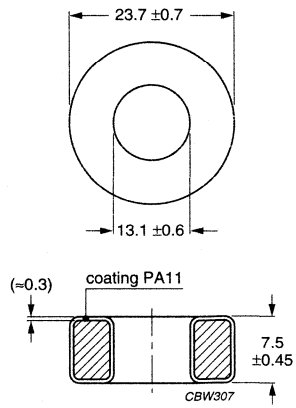
SYMBOL	PARAMETER	VALUE	UU
$\Sigma(l/A)$	core factor (C1)	1.81	mm^{-1}
V_e	effective volume	1722	mm^3
l_e	effective length	55.8	mm
A_e	effective area	30.9	mm^2
m	mass of core	≈8.4	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN23/14/7 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
4C65	87 ±25%	≈125	violet	TN23/14/7-4C65
4A11	485 ±25%	≈700	pink	TN23/14/7-4A11
3R1(1)	–	≈800	black	TN23/14/7-3R1
3F3 sup	1250 ±25%	≈1800	blue	TN23/14/7-3F3
3C85 sup	1400 ±25%	≈2000	red	TN23/14/7-3C85
3C11 sup	3000 ±25%	≈4300	white	TN23/14/7-3C11
3E25	3820 ±25%	≈5500	orange	TN23/14/7-3E25

Note

1. Due to the rectangular BH-loop of grade 3R1, inductance values strongly depend on the magnetic state of the ring core and measuring conditions. Therefore no A_L value is specified. For the application in magnetic amplifiers A_L is not a critical parameter.

WARNING
Do not use grade 3R1 cores close to their mechanical resonant frequency. For more information refer to *"3R1"* material specification in this data handbook.

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.27	≤0.31	–
3F3	≥320	–	≤0.19	≤0.33

Ferrite ring cores (toroids) TX25/15/9.5

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.44	mm^{-1}
V_e	effective volume	2840	mm^3
l_e	effective length	61.7	mm
A_e	effective area	46.0	mm^2
m	mass of core	≈14	g

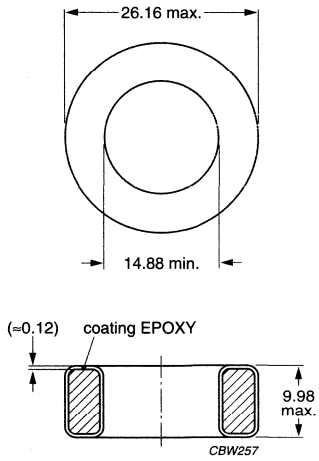
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX25/15/9.5 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 des	1665 ±20%	≈1800	blue	TX25/15/9.5-3F3
3C85	1850 ±20%	≈2000	red	TX25/15/9.5-3C85
3C81	2500 ±20%	≈2700	light blue	TX25/15/9.5-3C81
3E27	4650 ±20%	≈5000	green	TX25/15/9.5-3E27
3E25 sup	4650 ±20%	≈5000	orange	TX25/15/9.5-3E25
3E6	8730 ±30%	≈10000	purple	TX25/15/9.5-3E6

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.54	–	–
3C85	≥320	≤0.41	≤0.48	–
3F3	≥320	–	≤0.29	≤0.50

Ferrite ring cores (toroids) TN25/15/10

RING CORES (TOROIDS)

Effective core parameters

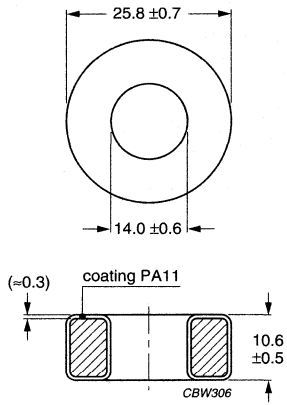
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.23	mm^{-1}
V_e	effective volume	2944	mm^3
l_e	effective length	60.2	mm
A_e	effective area	48.9	mm^2
m	mass of core	≈15	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN25/15/10 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 sup	1840 ±25%	≈1800	blue	TN25/15/10-3F3
3C85 sup	2050 ±25%	≈2000	red	TN25/15/10-3C85
3C11 sup	4400 ±25%	≈4300	white	TN25/15/10-3C11
3E25	5620 ±25%	≈5500	orange	TN25/15/10-3E25
3E5(1)	8680 ±30%	≈8500	yellow/white	TL25/15/10-3E5
3E6(1) des	10200 ±30%	≈10000	purple/white	TL25/15/10-3E6

Note

1. Ring cores in grades 3E5 and 3E6 are lacquered (polyurethane) and have different dimensions: Outside diameter = 25.25 ±0.7 mm; Inside diameter = 14.75 ±0.6 mm; Height = 10.25 ±0.5 mm.

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.46	≤0.53	–
3F3	≥320	–	≤0.53	≤0.56

Ferrite ring cores (toroids) TN26/15/10

RING CORES (TOROIDS)

Effective core parameters

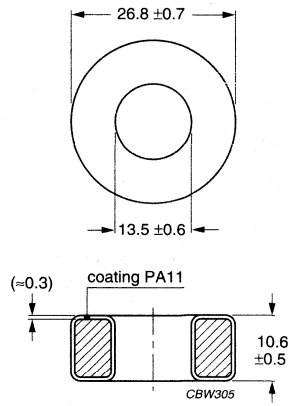
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.08	mm^{-1}
V_e	effective volume	3360	mm^3
l_e	effective length	60.1	mm
A_e	effective area	55.9	mm^2
m	mass of core	≈17	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN26/15/10 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3C85 sup	2300 ±25%	≈2000	red	TN26/15/10-3C85
3C11	5000 ±25%	≈4300	white	TN26/15/10-3C11
3E25	6420 ±25%	≈5500	orange	TN26/15/10-3E25

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.52	≤0.60	–

Ferrite ring cores (toroids) TN26/15/20

RING CORES (TOROIDS)

Effective core parameters

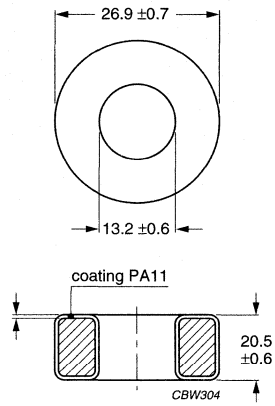
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.538	mm^{-1}
V_e	effective volume	6720	mm^3
l_e	effective length	60.1	mm
A_e	effective area	112	mm^2
m	mass of set	≈34	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN26/15/20 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3C85 sup	4700 ±25%	≈2000	red	TN26/15/20-3C85
3C11 sup	10000 ±25%	≈4300	white	TN26/15/20-3C11
3E25	12800 ±25%	≈5500	orange	TN26/15/20-3E25

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤1.1	≤1.2	–

Ferrite ring cores (toroids) TN29/19/7.5

RING CORES

Effective core parameters

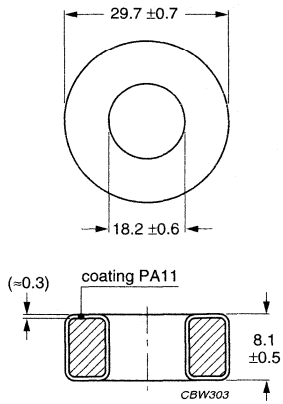
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.98	mm^{-1}
V_e	effective volume	2700	mm^3
l_e	effective length	73.2	mm
A_e	effective area	36.9	mm^2
m	mass of core	≈13.5	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN29/19/7.5 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3C85 sup	1300 ±25%	≈2000	red	TN29/19/7.5-3C85
3C11 sup	2700 ±25%	≈4300	white	TN29/19/7.5-3C11
3E25 sup	3550 ±25%	≈5500	orange	TN29/19/7.5-3E25
3E5(1) des	6340 ±30%	≈8500	yellow/white	TL29/19/7.5-3E5

Note

1. Ring cores in grades 3E5 are lacquered (polyurethane) and have different dimensions: Outside diameter = 29.25 ±0.7 mm; inside diameter = 18.75 ±0.6 mm; height = 7.75 ±0.5 mm.

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.42	≤0.49	–

Ferrite ring cores (toroids)

TX29/19/7.6 (502XT300)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.06	mm^{-1}
V_e	effective volume	2600	mm^3
l_e	effective length	73.2	mm
A_e	effective area	35.5	mm^2
m	mass of core	≈13	g

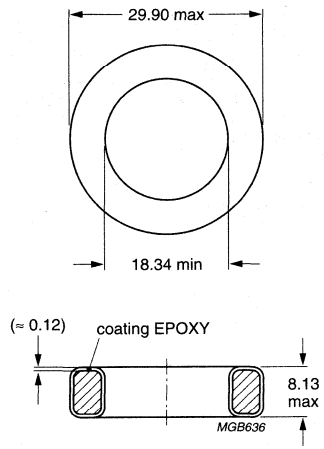
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX29/19/7.6 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 des	1160 ±20%	≈1900	blue	TX29/19/7.6-3F3
3C85	1290 ±20%	≈2100	red	TX29/19/7.6-3C85
3C81	1740 ±20%	≈2800	light blue	TX29/19/7.6-3C81
3E27	3225 ±20%	≈5300	green	TX29/19/7.6-3E27
3E25 sup	3225 ±20%	≈5300	orange	TX29/19/7.6-3E25
3E6	6340 ±30%	≈10400	purple	TX29/19/7.6-3E6

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤0.53	–	–
3C85	≥320	≤0.40	≤0.47	–
3F3	≥320	–	≤0.29	≤0.50

Ferrite ring cores (toroids) TN32/19/13

RING CORES (TOROIDS)

Effective core parameters

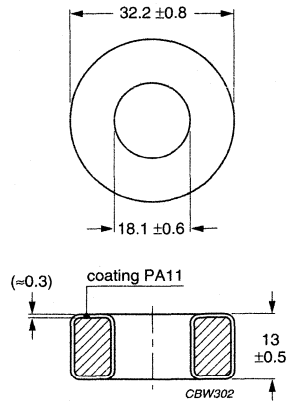
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.99	mm^{-1}
V_e	effective volume	5820	mm^3
l_e	effective length	76	mm
A_e	effective area	76.5	mm^2
m	mass of core	≈29	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN32/19/13 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 sup	2270 ±25%	≈1800	blue	TN32/19/13-3F3
3C85 sup	2530 ±25%	≈2000	red	TN32/19/13-3C85
3C11 sup	5450 ±25%	≈4300	white	TN32/19/13-3C11
3E25	6950 ±25%	≈5500	orange	TN32/19/13-3E25
3E5[1]	10700 ±30%	≈8500	yellow/white	TL32/19/13-3E5

Note

1. Ring cores in grade 3E5 are lacquered (polyurethane) and have different dimensions: Outside diameter = 31.75 ±0.8 mm; Inside diameter = 18.75 ±0.7 mm; Height = 12.75 ±0.5 mm.

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.90	≤1.1	–
3F3	≥320	–	≤0.64	≤1.1

Ferrite ring cores (toroids) TN36/23/10

RING CORES (TOROIDS)

Effective core parameters

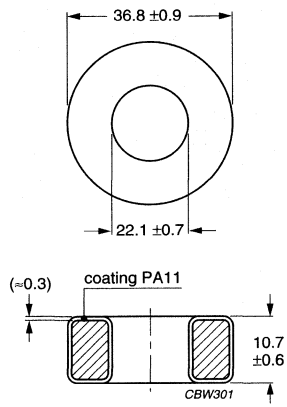
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.40	mm^{-1}
V_e	effective volume	5730	mm^3
l_e	effective length	89.6	mm
A_e	effective area	63.9	mm^2
m	mass of core	≈28	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN36/23/10 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
4C65 sup	112 ±25%	≈125	violet	TN36/23/10-4C65
3C85 sup	1800 ±25%	≈2000	red	TN36/23/10-3C85
3C11 sup	3900 ±25%	≈4300	white	TN36/23/10-3C11

Properties of core under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤0.89	≤1.1	–

Ferrite ring cores (toroids)

TX36/23/10 (500XT400)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.46	mm^{-1}
V_e	effective volume	5500	mm^3
l_e	effective length	89.7	mm
A_e	effective area	61.4	mm^2
m	mass of core	≈27	g

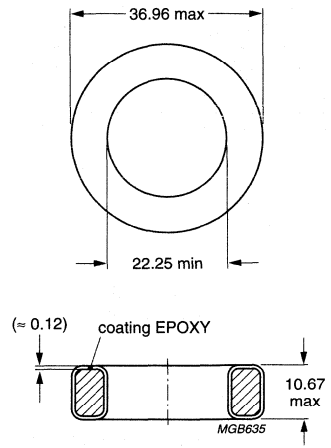
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX36/23/10 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 des	1635 ±20%	≈1900	blue	TX36/23/10-3F3
3C85	1820 ±20%	≈2100	red	TX36/23/10-3C85
3C81	2455 ±20%	≈2850	light blue	TX36/23/10-3C81
3E27	4545 ±20%	≈5300	green	TX36/23/10-3E27
3E25 sup	4545 ±20%	≈5300	orange	TX36/23/10-3E25
3E6	9090 ±30%	≈10600	purple	TX36/23/10-3E6

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤1.1	–	–
3C85	≥320	≤0.85	≤0.99	–
3F3	≥320	–	≤0.61	≤1.1

Ferrite ring cores (toroids) TN36/23/15

RING CORES (TOROIDS)

Effective core parameters

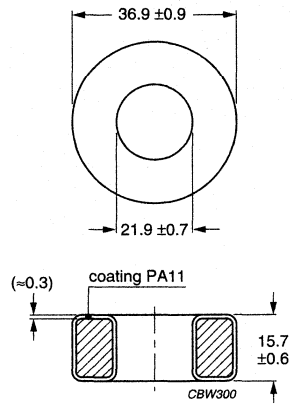
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.935	mm^{-1}
V_e	effective volume	8600	mm^3
l_e	effective length	89.6	mm
A_e	effective area	95.9	mm^2
m	mass of core	≈42	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN36/23/15 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
4C65	170 ±25%	≈125	violet	TN36/23/15-4C65
4A11 des	940 ±25%	≈700	uncoated	T36/23/15-4A11(1)
3R1 sup	–	≈800	black	TN36/23/15-3R1(2)
3S4 des	2285 ±25%	≈1700	uncoated	T36/23/15-3S4(1)
3F3 sup	2420 ±25%	≈1800	blue	TN36/23/15-3F3
3C85 sup	2700 ±25%	≈2000	red	TN36/23/15-3C85
3C11	5800 ±25%	≈4300	white	TN36/23/15-3C11
3E25	7390 ±25%	≈5500	orange	TN36/23/15-3E25
3E5	11400 ±30%	≈8500	yellow/white	TL36/23/15-3E5(3)

Notes

1. Uncoated ring cores have the following dimensions: outer dimension = 36 ±0.7 mm; inner dimension = 25 ±0.5 mm; height = 15 ±0.3 mm.
2. Due to the rectangular BH-loop of grade 3R1, inductance values strongly depend on the magnetic state of the ring core and measuring conditions. Therefore no A_L value is specified. For the application in magnetic amplifiers A_L is not a critical parameter.
3. Ring cores in grade 3E5 are lacquered (polyurethane) and have different dimensions:
   Outside diameter = 36.25 ±0.9 mm; inside diameter = 22.75 ±0.7 mm; height = 15.25 ±0.6 mm.

WARNING
Do not use grade 3R1 cores close to their mechanical resonant frequency. For more information refer to *"3R1"* material specification in this data handbook.

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤1.4	≤1.6	–
3F3	≥320	–	≤0.95	≤1.7

Ferrite ring cores (toroids)

TX36/23/15 (500XT600)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.96	mm^{-1}
V_e	effective volume	8410	mm^3
l_e	effective length	89.7	mm
A_e	effective area	93.8	mm^2
m	mass of core	≈40	g

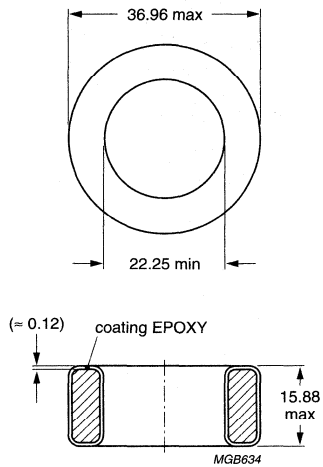
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX36/23/15 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 des	2450 ±20%	≈1800	blue	TX36/23/15-3F3
3C85	2720 ±20%	≈2000	red	TX36/23/15-3C85
3C81	3670 ±20%	≈2700	light blue	TX36/23/15-3C81
3E27	6800 ±20%	≈5000	green	TX36/23/15-3E27
3E25 sup	6800 ±20%	≈5000	orange	TX36/23/15-3E25
3E6	13600 ±30%	≈10400	purple	TX36/23/15-3E6

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤1.7	–	–
3C85	≥320	≤1.3	≤1.5	–
3F3	≥320	–	≤0.93	≤1.6

Ferrite ring cores (toroids)

TX39/20/13 (528XT500)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.76	mm^{-1}
V_e	effective volume	9430	mm^3
l_e	effective length	84.9	mm
A_e	effective area	111	mm^2
m	mass of core	≈45	g

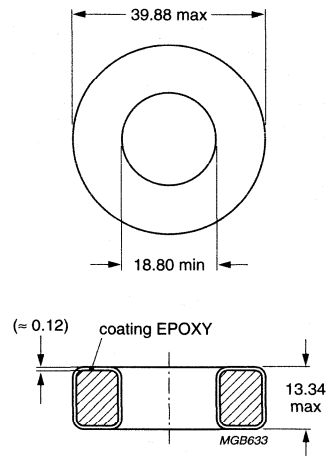
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX39/20/13 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 des	3150 ±20%	≈1800	blue	TX39/20/13-3F3
3C85	3480 ±20%	≈2000	red	TX39/20/13-3C85
3C81	4700 ±20%	≈2700	lightblue	TX39/20/13-3C81
3E27	8720 ±20%	≈5000	green	TX39/20/13-3E27
3E25 sup	8720 ±20%	≈5000	orange	TX39/20/13-3E25

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤1.9	–	–
3C85	≥320	≤1.5	≤1.7	–
3F3	≥320	–	≤1.1	≤1.8

Ferrite ring cores (toroids) TL42/26/13

RING CORES (TOROIDS)

Effective core parameters

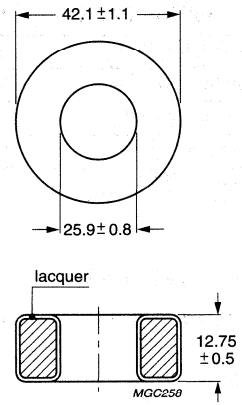
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.076	mm^{-1}
V_e	effective volume	9860	mm^3
l_e	effective length	103	mm
A_e	effective area	95.8	mm^2
m	mass of core	≈53	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TL42/26/13 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3C85 sup	2335 ±25%	≈2000	red/white	TL42/26/13-3C85
3C11 sup	5000 ±25%	≈4300	white	TL42/26/13-3C11
3E25	6425 ±25%	≈5500	orange/white	TL42/26/13-3E25
4A11 sup	810 ±25%	≈700	pink/white	TL42/26/13-4A11

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤1.5	≤1.8	–

Ferrite ring cores (toroids)

TX51/32/19 (400XT750)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.73	mm^{-1}
V_e	effective volume	21500	mm^3
l_e	effective length	125	mm
A_e	effective area	172	mm^2
m	mass of core	≈100	g

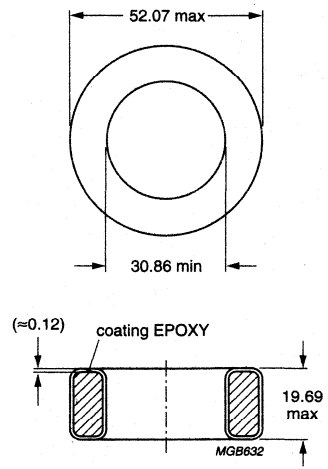
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX51/32/19 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 des	3200 ±20%	≈1800	blue	TX51/32/19-3F3
3C85	3555 ±20%	≈2000	red	TX51/32/19-3C85
3C81	4800 ±20%	≈2700	light blue	TX51/32/19-3C81
3E25	8890 ±20%	≈5000	orange	TX51/32/19-3E25
3E27	8890 ±20%	≈5000	green	TX51/32/19-3E27

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤4.4	–	–
3C85	≥320	≤3.4	≤3.9	–
3F3	≥320	–	≤2.4	≤4.1

Ferrite ring cores (toroids) TL58/41/18

RING CORES (TOROIDS)

Effective core parameters

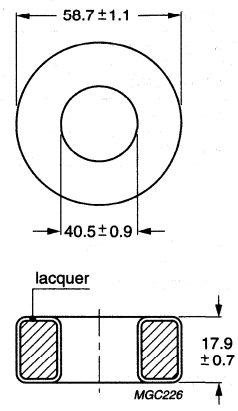
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.0	mm^{-1}
V_e	effective volume	23200	mm^3
l_e	effective length	152	mm
A_e	effective area	152	mm^2
m	mass of core	≈110	g

Coating

The cores are coated with polyurethane lacquer.

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TL58/41/18 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3C85	2575 ±25%	≈1800	red/white	TL58/41/18-3C85
3C11	5400 ±25%	≈2000	white	TL58/41/18-3C11
3E25 sup	6900 ±25%	≈4300	orange/white	TL58/41/18-3E25

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C85	≥320	≤3.6	≤4.2	–

Ferrite ring cores (toroids) TX61/36/13

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.95	mm^{-1}
V_e	effective volume	21900	mm^3
l_e	effective length	145	mm
A_e	effective area	152	mm^2
m	mass of core	≈100	g

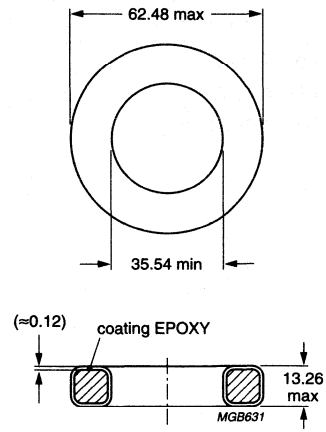
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX61/36/13 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 des	2430 ±20%	≈1800	blue	TX61/36/13-3F3
3C85	2700 ±20%	≈2000	red	TX61/36/13-3C85
3C81	3650 ±20%	≈2700	light blue	TX61/36/13-3C81
3E27	6750 ±25%	≈5000	green	TX61/36/13-3E27

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤4.5	–	–
3C85	≥320	≤3.4	≤4.0	–
3F3	≥320	–	≤2.4	≤4.2

Ferrite ring cores (toroids) T63/38/25

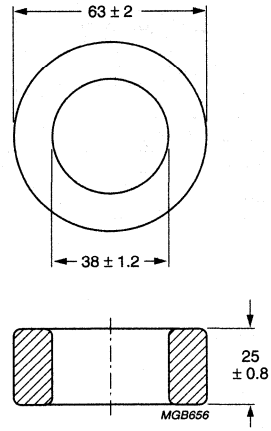
RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.497	mm^{-1}
V_e	effective volume	46500	mm^3
l_e	effective length	152	mm
A_e	effective area	306	mm^2
m	mass of core	≈220	g

Coating

Coated cores are available on request.



Dimensions in mm.

Fig.1 T63/38/25 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3E25	15165 ±25%	≈5 500	T63/38/25-3E25

Ferrite ring cores (toroids)

TX74/39/13 (144XT500)

RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.80	mm^{-1}
V_e	effective volume	34300	mm^3
l_e	effective length	165	mm
A_e	effective area	208	mm^2
m	mass of core	≈170	g

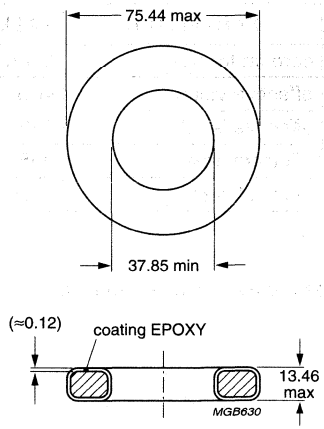
Coating

The cores are coated with epoxy.

Non-coated cores are available on request.

Isolation voltage

DC isolation voltage: 1000 V.



Dimensions in mm.

Fig.1 TX74/39/13 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F3 des	2900 ±20%	≈1800	blue	TX74/39/13-3F3
3C85	3220 ±20%	≈2000	red	TX74/39/13-3C85
3C81	4350 ±20%	≈2700	light blue	TX74/39/13-3C81
3E25	8060 ±20%	≈5000	orange	TX74/39/13-3E25
3E27	8060 ±20%	≈5000	green	TX74/39/13-3E27

Properties of cores under power conditions

GRADE	B (mT) at	CORE LOSS (W) at		
	H = 250 A/m; f = 25 kHz; T = 100 °C	f = 25 kHz; $\hat{B}$ = 200 mT; T = 100 °C	f = 100 kHz; $\hat{B}$ = 100 mT; T = 100 °C	f = 400 kHz; $\hat{B}$ = 50 mT; T = 100 °C
3C81	≥320	≤7.0	–	–
3C85	≥320	≤5.3	≤6.2	–
3F3	≥320	–	≤3.8	≤6.5

RING CORES (TOROIDS)

Effective core parameters

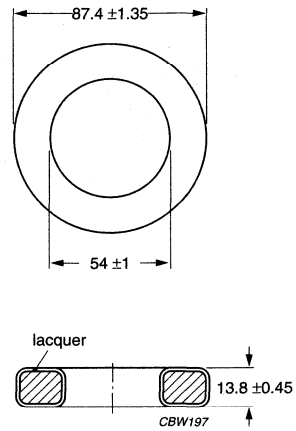
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.987	mm^{-1}
V_e	effective volume	46400	mm^3
l_e	effective length	214	mm
A_e	effective area	217	mm^2
m	mass of core	≈220	g

Coating

The cores are coated with polyurethane lacquer.

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TL87/54/14 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3C11 des	5470 ±25%	≈4300	TL87/54/14-3C11

Ferrite ring cores (toroids) T102/66/15

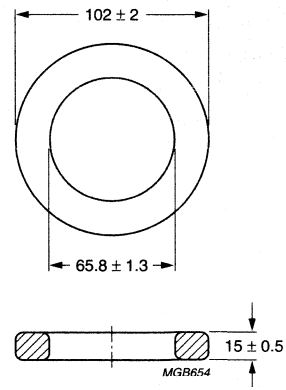
RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.956	mm^{-1}
V_e	effective volume	68200	mm^3
l_e	effective length	255	mm
A_e	effective area	267	mm^2
m	mass of core	≈325	g

Coating

Coated cores are available on request.



Dimensions in mm.

Fig.1 T102/66/15 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3C11 sup	5300 ±25%	≈4300	T102/66/15-3C11
3E25	7900 ±25%	≈5500	T102/66/15-3E25

Ferrite ring cores (toroids) TL107/65/18

RING CORES (TOROIDS)

Effective core parameters

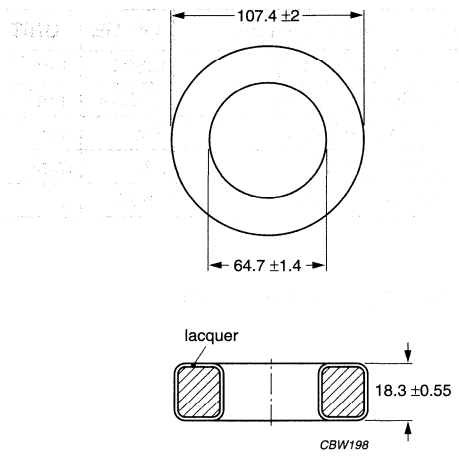
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.700	mm^{-1}
V_e	effective volume	96200	mm^3
l_e	effective length	259	mm
A_e	effective area	370	mm^2
m	mass of core	≈456	g

Coating

The cores are coated with polyurethane lacquer.

Isolation voltage

DC isolation voltage: 2000 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TL107/65/18 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
3F4 sup	1354 ±25%	≈750	–	T107/65/18-3F4(1)
3E25	9900 ±25%	≈5500	orange/white	TL107/65/18-3E25

Note

1. Non-coated. Dimensions for this core are: Outer dimension = 107 ±2 mm; inner dimension = 65 ±1.3 mm; heigth = 18 ±0.35 mm.

Ferrite ring cores (toroids) T107/65/25

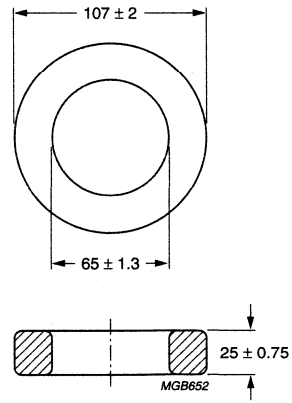
RING CORES (TOROIDS)

Effective core parameters

SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	0.504	mm^{-1}
V_e	effective volume	133000	mm^3
l_e	effective length	259	mm
A_e	effective area	514	mm^2
m	mass of core	≈680	g

Coating

Coated cores are available on request.



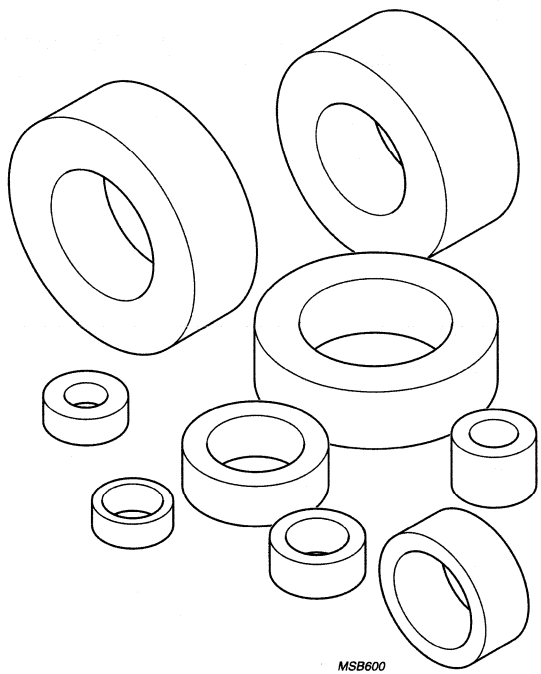
Dimensions in mm.

Fig.1 T107/65/25 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	TYPE NUMBER
3F4 sup	1870 ±25%	≈750	T107/65/25-3F4
3F3 sup	4485 ±25%	≈1800	T107/65/25-3F3

Soft Ferrites — Iron powder ring cores (toroids)



For more information on Product Status Definitions, see page 3.

PRODUCT OVERVIEW AND TYPE NUMBER STRUCTURE

Product overview iron powder ring cores (toroids)

CORE TYPE	V_e (mm^3)	A_e (mm^2)	MASS (g)
TN7.5/4.1/3	83.0	4.81	0.6
TN12/8/4.4	290	9.37	2
TN17/9.8/4.4	635	15.8	5
TN20/13/6	1020	20.4	7.5
TN24/15/7.5	1895	32.8	13
TN27/15/11	3720	60.4	25
TN33/20/11	5200	65.0	35

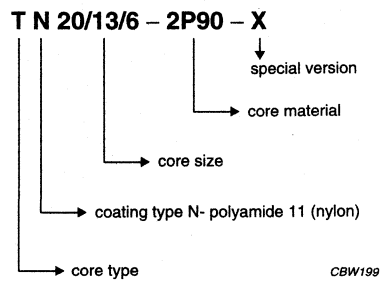


Fig.1 Type number structure for ring cores.

Iron powder ring cores (toroids) TN7.5/4.1/3

RING CORES (TOROIDS)

Effective core parameters

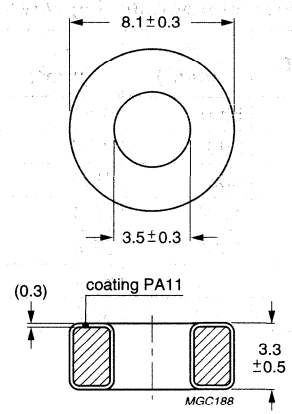
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	3.58	mm^{-1}
V_e	effective volume	83	mm^3
l_e	effective length	17.3	mm
A_e	effective area	4.81	mm^2
m	mass of core	≈0.6	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN7.5/4.1/3 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
2P40 sup	14 ±10%	≈40	dark yellow	TN7.5/4.1/3-2P40
2P50 sup	18 ±10%	≈50	dark blue	TN7.5/4.1/3-2P50
2P65 sup	23 ±10%	≈65	dark red	TN7.5/4.1/3-2P65
2P80 sup	28 ±10%	≈80	dark green	TN7.5/4.1/3-2P80
2P90 sup	30 ±10%	≈90	dark brown	TN7.5/4.1/3-2P90

Iron powder ring cores (toroids) TN12/8/4.4

RING CORES (TOROIDS)

Effective core parameters

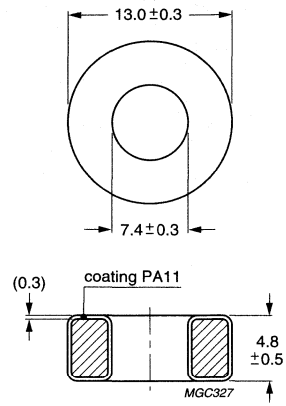
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	3.30	mm^{-1}
V_e	effective volume	290	mm^3
l_e	effective length	30.9	mm
A_e	effective area	9.37	mm^2
m	mass of core	≈2	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN12/8/4.4 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
2P40 sup	15 ±10%	≈40	dark yellow	TN12/8/4.4-2P40
2P50 sup	19 ±10%	≈50	dark blue	TN12/8/4.4-2P50
2P65 sup	25 ±10%	≈65	dark red	TN12/8/4.4-2P65
2P80 sup	31 ±10%	≈80	dark green	TN12/8/4.4-2P80
2P90 sup	33 ±10%	≈90	dark brown	TN12/8/4.4-2P90

Iron powder ring cores (toroids) TN17/9.8/4.4

RING CORES (TOROIDS)

Effective core parameters

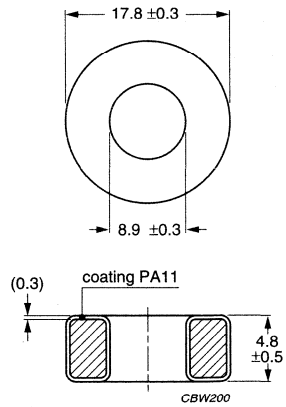
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.55	mm^{-1}
V_e	effective volume	635	mm^3
l_e	effective length	40.2	mm
A_e	effective area	15.8	mm^2
m	mass of core	≈5	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN17/9.8/4.4 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
2P40 sup	20 ±10%	≈40	dark yellow	TN17/9.8/4.4-2P40
2P50 sup	25 ±10%	≈50	dark blue	TN17/9.8/4.4-2P50
2P65 sup	32 ±10%	≈65	dark red	TN17/9.8/4.4-2P65
2P80 sup	40 ±10%	≈80	dark green	TN17/9.8/4.4-2P80
2P90 sup	42 ±10%	≈90	dark brown	TN17/9.8/4.4-2P90

Iron powder ring cores (toroids) TN20/13/6

RING CORES (TOROIDS)

Effective core parameters

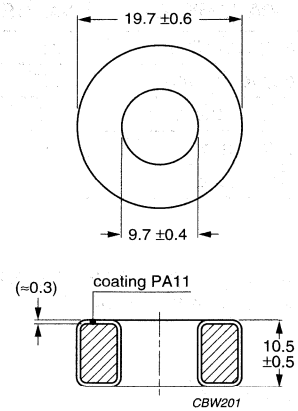
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	2.44	mm^{-1}
V_e	effective volume	1020	mm^3
l_e	effective length	49.9	mm
A_e	effective area	20.4	mm^2
m	mass of core	≈7.5	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN20/13/6 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
2P40 sup	21 ±10%	≈40	dark yellow	TN20/13/6-2P40
2P50 sup	26 ±10%	≈50	dark blue	TN20/13/6-2P50
2P65 sup	34 ±10%	≈65	dark red	TN20/13/6-2P65
2P80 sup	41 ±10%	≈80	dark green	TN20/13/6-2P80
2P90 sup	44 ±10%	≈90	dark brown	TN20/13/6-2P90

Iron powder ring cores (toroids) TN24/15/7.5

RING CORES (TOROIDS)

Effective core parameters

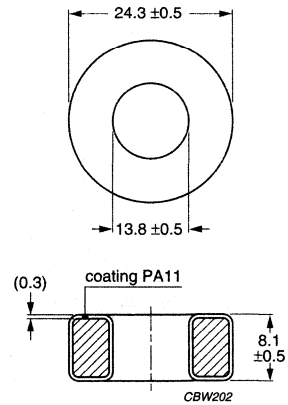
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.76	mm^{-1}
V_e	effective volume	1895	mm^3
l_e	effective length	57.8	mm
A_e	effective area	32.8	mm^2
m	mass of core	≈13	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN24/15/7.5 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
2P40 sup	29 ±10%	≈40	dark yellow	TN24/15/7.5-2P40
2P50 sup	36 ±10%	≈50	dark blue	TN24/15/7.5-2P50
2P65 sup	47 ±10%	≈65	dark red	TN24/15/7.5-2P65
2P80 sup	57 ±10%	≈80	dark green	TN24/15/7.5-2P80
2P90 sup	61 ±10%	≈90	dark brown	TN24/15/7.5-2P90

Iron powder ring cores (toroids) TN 27/15/11

RING CORES (TOROIDS)

Effective core parameters

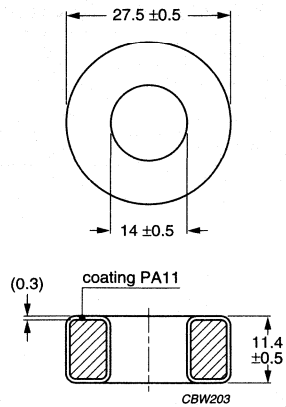
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.02	mm^{-1}
V_e	effective volume	3720	mm^3
l_e	effective length	61.6	mm
A_e	effective area	60.4	mm^2
m	mass of core	≈25	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN 27/15/11 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
2P40 sup	49 ±10%	≈40	dark yellow	TN27/15/11-2P40
2P50 sup	62 ±10%	≈50	dark blue	TN27/15/11-2P50
2P65 sup	80 ±10%	≈65	dark red	TN27/15/11-2P65
2P80 sup	94 ±10%	≈80	dark green	TN27/15/11-2P80
2P90 sup	105 ±10%	≈90	dark brown	TN27/15/11-2P90

Iron powder ring cores (toroids) TN33/20/11

RING CORES

Effective core parameters

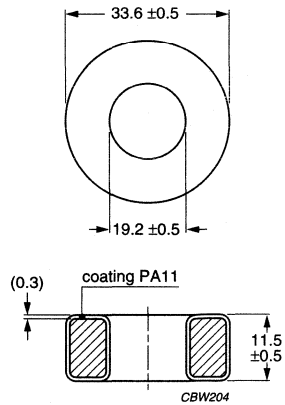
SYMBOL	PARAMETER	VALUE	UNIT
$\Sigma(l/A)$	core factor (C1)	1.23	mm^{-1}
V_e	effective volume	5200	mm^3
l_e	effective length	80.0	mm
A_e	effective area	65.0	mm^2
m	mass of core	≈35	g

Coating

The cores are coated with polyamide 11 (PA11), flame retardant in accordance with *"UL 94V-2"*.

Isolation voltage

DC isolation voltage: 1500 V.
Contacts are applied on the edge of the ring core, which is also the critical point for the winding operation.



Dimensions in mm.

Fig.1 TN33/20/11 ring core.

Ring core data

GRADE	A_L (nH)	μ_i	COLOUR CODE	TYPE NUMBER
2P40 sup	41 ±10%	≈40	dark yellow	TN33/20/11-2P40
2P50 sup	51 ±10%	≈50	dark blue	TN33/20/11-2P50
2P65 sup	67 ±10%	≈65	dark red	TN33/20/11-2P65
2P80 sup	82 ±10%	≈80	dark green	TN33/20/11-2P80
2P90 sup	87 ±10%	≈90	dark brown	TN33/20/11-2P90

Conversion list type number to 11NC

Product status definitions

STATUS	INDICATION	DEFINITION
Prototype	PROT	These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in	DES	These products are recommended for new designs.
Preferred	PREF	These products are recommended for use in current designs and are available via our sales channels.
Support	SUP	These products are **not** recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.
Obsolete	OBS	These products are obsolete.

Conversion list

Type number to 11NC

TYPE NUMBER	11NC	CPS
ADJ-P14-BROWN	43220213971	SUP
ADJ-P14-GREY	43220213979	SUP
ADJ-P14-ORANGE	43220213973	SUP
ADJ-P14-WHITE	43220213978	SUP
ADJ-P18-BROWN	43220213961	SUP
ADJ-P18-RED	43220213962	SUP
ADJ-P18-VIOLET	43220213967	SUP
ADJ-P18-WHITE	43220213968	SUP
ADJ-P18-YELLOW	43220213964	SUP
ADJ-P22/RM8-BLACK	43220213840	PREF
ADJ-P22/RM8-BROWN	43220213841	PREF
ADJ-P22/RM8-GREEN	43220213845	PREF
ADJ-P22/RM8-ORANGE	43220213843	PREF
ADJ-P22/RM8-RED	43220213842	PREF
ADJ-P22/RM8-WHITE	43220213848	PREF
ADJ-P22/RM8-YELLOW	43220213844	PREF
ADJ-P26-BROWN	43220213941	SUP
ADJ-P26-GREY	43220213949	SUP
ADJ-P26-RED	43220213942	SUP
ADJ-P26-WHITE	43220213948	SUP
ADJ-P30/RM10-GREY	43220213839	PREF
ADJ-P30/RM10-WHITE	43220213838	PREF
ADJ-P30/RM10-YELLOW	43220213834	PREF
ADJ-P36/P42-GREY	43220213929	SUP
ADJ-P36/P42-WHITE	43220213928	SUP
ADJ-P36/P42-YELLOW	43220213924	SUP
ADJ-P9/P11-BROWN	43220213981	SUP
ADJ-P9/P11-GREY	43220213989	SUP
ADJ-P9/P11-YELLOW	43220213984	SUP
ADJ-RM4/RM5-BLACK	43220213870	PREF
ADJ-RM4/RM5-BROWN	43220213871	PREF
ADJ-RM4/RM5-GREY	43220213879	PREF
ADJ-RM4/RM5-RED	43220213872	PREF
ADJ-RM6-BLACK	43220213860	PREF
ADJ-RM6-BROWN	43220213861	PREF
ADJ-RM6-GREEN	43220213865	PREF
ADJ-RM6-GREY	43220213869	PREF
ADJ-RM6-RED	43220213862	PREF
ADJ-RM6-VIOLET	43220213867	PREF
ADJ-RM6-WHITE	43220213868	PREF
BC13/4.8/16-3C85	43300303894	SUP

TYPE NUMBER	11NC	CPS
BC22/12/14-3C85	43300303648	SUP
BC23/12/14-3C85	43300303656	SUP
BC22/12/19-3C85	43300303619	SUP
BC22/12/18-3C85	43300303647	SUP
BC22/12/38-3C85	43300303634	SUP
BD1.9/0.8/9.8-4S2	43300303340	SUP
BD3/0.7/4-3S1	43300303210	SUP
BD3/0.7/4-4S2	43300303311	OBS
BD3/0.8/10-3S1	43300303211	OBS
BD3/0.8/10-4S2	43300303324	OBS
BD3/1/4-3S1	43300303212	DES
BD3/1/4-4S2	43300303312	SUP
BD3/1/10-3S1	43300303213	SUP
BD3/1/10-4S2	43300303321	OBS
BD3.5/1.3/3.3-4S2	43300304366	DES
BD3.5/1.3/6-4S2	43300304367	DES
BD3.5/1.3/13-4S2	43300304368	DES
BD5.1/0.8/4-3S1	43300303214	SUP
BD5.1/0.8/4-4S2	43300303313	OBS
BD5.1/0.8/10-3S1	43300303215	OBS
BD5.1/0.8/10-4S2	43300303326	SUP
BD5.1/1.5/4-3S1	43300303216	DES
BD5.1/1.5/4-4S2	43300303314	DES
BD5.1/1.5/10-3S1	43300303217	SUP
BD5.1/1.5/10-4S2	43300303322	DES
BD5.1/2/4-3S1	43300303218	PREF
BD5.1/2/4-4S2	43300303315	SUP
BD5.1/2/7.1-4S2	43300304374	DES
BD5.1/2/10-3S1	43300303219	SUP
BD5.1/2/10-4S2	43300303319	SUP
BD6.4/3/25-4S2	43300304369	DES
BD7.7/2.3/7.6-4S2	43300304370	DES
BD8/1.5/4-4S2	43300303316	OBS
BD8/1.5/10-4S2	43300303325	OBS
BD8/2/4-4S2	43300303317	SUP
BD8/2/10-4S2	43300303323	OBS
BD8/3/4-4S2	43300303318	PREF
BD8/3/10-4S2	43300303320	PREF
BDS3/1.8/5.3-3S1	43300303685	DES
BDS3/1.8/5.3-4S2	43300303682	DES
BDS3/3/4.6-3S1	43300303642	PREF

Conversion list

Type number to 11NC

TYPE NUMBER	11NC	CPS
BDS3/3/4.6-4S2	43300303629	PREF
BDS3/3/8.9-3S1	43300303645	PREF
BDS3/3/8.9-4S2	43300303630	PREF
BDS4.6/3/8.9-4S2	43300303652	PREF
BDW3.5/3.5-3S4	43300303878	DES
BDW3.5/3.5-4S2	43300303881	PREF
BDW3.5/4.7-4S2	43300303873	PREF
BDW3.5/5.3-4S2	43300304178	DES
BDW3.5/6-4S2	43300303874	SUP
BDW3.5/6-3S4-L63	43300303810	PREF
BDW3.5/6.7-4S2	43300303875	SUP
BDW3.5/7.6-4S2	43300303876	SUP
BDW3.5/8.9-4S2	43300303877	PREF
BDW3.5/9.5-4S2	43300304179	DES
BDW3.5/11-4S2	43300304180	DES
BDW3.5/14-4S2	43300304181	DES
BPL2-EC35	43350002717	PREF
BPL4-EC35	43350002718	PREF
BPL4-EC41	43350002720	PREF
BPL4-EC52	43350002722	PREF
BPL4-EC70	43350002724	PREF
CLA-EC35	43120212601	PREF
CLA-E20/10/5	43220212016	PREF
CLA-E30/15/7	43220212017	PREF
CLA-E42/21/15	43220210093	PREF
CLA-E55/28/21	43120212609	PREF
CLA-E65/32/27	43120212611	PREF
CLA-EP10	43220210148	PREF
CLA-EP13	43220213505	PREF
CLA-EP17	43220210144	PREF
CLA-EP20	43220210146	PREF
CLI-CSU6.4	43300312040	DES
CLI-E5.3/2.7/2	43220210137	PREF
CLI-E25/13/7	43220210040	PREF
CLI-EFD15	43220213514	PREF
CLI-EFD20	43220213515	PREF
CLI-EFD25	43220213516	PREF
CLI-EFD30	43220213517	PREF
CLI-EP7	43220210077	PREF
CLI-EP10	43220210078	PREF
CLI-EP13	43220210076	PREF

TYPE NUMBER	11NC	CPS
CLI-ETD29	43220213437	PREF
CLI-ETD34	43220213389	PREF
CLI-ETD39	43220213390	PREF
CLI-ETD44	43220213391	PREF
CLI-ETD49	43220213392	PREF
CLI-ETD54	43220210068	PREF
CLI-ETD59	43220210070	PREF
CLI-RM4/5/I	43220213494	PREF
CLI-RM4/5/LP	43220213509	PREF
CLI-RM6/I	43220213495	PREF
CLI-RM6/LP	43220210180	PREF
CLI-RM8	43220213497	PREF
CLI/P-EP7	43220210126	PREF
CLI/P-RM4/5/I	43220213429	PREF
CLI/P-RM4/5	43220213190	PREF
CLI/P-RM6	43220213178	PREF
CLI/P-RM6/I	43220213430	PREF
CLI/P-RM7	43130210395	PREF
CLI/P-RM8	43220213184	PREF
CLI/P-RM8/I	43220213431	PREF
CLI/P-RM10/I	43220213432	PREF
CLI/P-RM12/I	43220213491	PREF
CLI/P-RM14/I	43220213492	PREF
CLM-E5.3/2	43220210198	PREF
CLM-E14/PLT14	43220210161	DES
CLM-E18/PLT18	43220210162	DES
CLM-E22/PLT22	43220210163	DES
CLM-EFD10	43220210090	PREF
CLM-EFD12	43220210091	PREF
CLM-EFD15	43220210200	PREF
CLM-EFD20	43220210221	PREF
CLM-ER9.5	43220210152	PREF
CLM-ER11	43220210153	PREF
CLM-ER14.5	43220210154	PREF
CLM/TP-P9/5	43350002613	PREF
CLM/TP-P11/7	43350002614	PREF
CLM/TP-P14/8	43350002615	PREF
CLM/TP-P18/11	43350002617	PREF
CLM/TS-P22/13	43350002619	PREF
CLM/TP-P26/16	43350002633	PREF
CLM/TS-P30/19	43350002634	PREF

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
CLM/U-EC35	43350002716	PREF
CLM/U-EC41	43350002719	PREF
CLM/U-EC52	43350002721	PREF
CLM/U-EC70	43350002723	PREF
CMS2-5.6/3/4.8-4S2	43300303688	PREF
CMS2-5.6/3/8.9-4S2	43300304630	PREF
CMS4-11/3/4.8-4S2	43300303691	PREF
CMS4-11/3/8.9-4S2	43300304631	PREF
CON-P11/7	43220213051	PREF
CON-P14/8	43220213052	PREF
CON-P18/11	43220213053	PREF
CON-P22/13	43220213054	PREF
CON-P26/16	43220213055	PREF
CON-P30/19	43220213056	PREF
CON-P36/22	43220213057	PREF
CON-P42/29	43220213058	PREF
CON-X22	43220213004	PREF
COV9	43220210173	PREF
COV-E5.3/2	43220210199	PREF
COV-E6.3/2	43220210156	PREF
COV-X22	43220213023	PREF
CP-EC35-1S	43350002734	PREF
CP-EC41-1S	43350002735	PREF
CP-EC52-1S	43350002736	PREF
CP-EC70-1S	43350002737	PREF
CP-E13/6/6-1S	43350002693	PREF
CP-E19/8/5-1S	43350002694	PREF
CP-E19/8/9-1S	43350002695	PREF
CP-E20/10/5-1S	43120212843	PREF
CP-E25/10/6-1S	43350002696	PREF
CP-E30/15/7-1S-A	43350002697	PREF
CP-E30/15/7-1S	43120212855	PREF
CP-E34/14/9-1S	43350002698	PREF
CP-E41/16/12-1S	43350002699	PREF
CP-E42/21/15-1S-A	43350002700	PREF
CP-E42/21/15-1S	43120212862	PREF
CP-E42/21/20-1S	43350002701	PREF
CP-E47/20/16-1S	43350002702	PREF
CP-E55/28/21-1S-A	43350002703	PREF
CP-E55/28/21-1S	43120212871	PREF
CP-E56/24/19-1S	43350002704	PREF

TYPE NUMBER	11NC	CPS
CP-E65/32/27-1S	43120212872	PREF
CP-PQ20/16-1S-14P	43350002671	PREF
CP-PQ20/16-1S-14PD	43350002672	PREF
CP-PQ20/20-1S-14P	43350002673	PREF
CP-PQ20/20-1S-14PD	43350002674	PREF
CP-PQ26/20-1S-12P	43350002675	PREF
CP-PQ26/20-1S-12PD	43350002676	PREF
CP-PQ26/25-1S-12P	43350002677	PREF
CP-PQ26/25-1S-12PD	43350002678	PREF
CP-PQ32/20-1S-12P	43350002679	PREF
CP-PQ32/20-1S-12PD	43350002680	PREF
CP-PQ32/30-1S-12P	43350002681	PREF
CP-PQ32/30-1S-12PD	43350002682	PREF
CP-P7/4-1S	43220213299	PREF
CP-P7/4-1S-A	43350002599	PREF
CP-P9/5-1S-A	43350002600	PREF
CP-P9/5-1S	43220210234	PREF
CP-P11/7-1S	43220210235	PREF
CP-P11/7-1S-A	43350002601	PREF
CP-P11/7-2S-A	43350002602	PREF
CP-P11/7-3S-A	43350002603	PREF
CP-P14/8-1S	43220210236	PREF
CP-P14/8-1S-A	43350002604	PREF
CP-P14/8-2S	43220210237	PREF
CP-P14/8-2S-A	43350002605	PREF
CP-P14/8-3S-A	43350002606	PREF
CP-P18/11-1S	43220210238	PREF
CP-P18/11-1S-A	43350002607	PREF
CP-P18/11-2S	43220210239	PREF
CP-P18/11-3S	43220210240	PREF
CP-P18/11-2S-A	43350002608	PREF
CP-P18/11-3S-A	43350002609	PREF
CP-P22/13-1S-A	43350002610	PREF
CP-P22/13-1S	43220210241	PREF
CP-P22/13-2S-A	43350002611	PREF
CP-P22/13-2S	43220210242	PREF
CP-P22/13-3S	43220210243	PREF
CP-P22/13-3S-A	43350002612	PREF
CP-P26/16-1S-A	43350002620	PREF
CP-P26/16-2S-A	43350002621	PREF
CP-P26/16-3S-A	43350002622	PREF

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
CP-P26/16-1S	43220210244	PREF
CP-P26/16-2S	43220210245	PREF
CP-P26/16-3S	43220210246	PREF
CP-P30/19-1S-A	43350002623	PREF
CP-P30/19-2S-A	43350002624	PREF
CP-P30/19-3S-A	43350002625	PREF
CP-P30/19-1S	43220210247	PREF
CP-P30/19-2S	43220210248	PREF
CP-P30/19-3S	43220210249	PREF
CP-P36/22-1S-A	43350002626	PREF
CP-P36/22-2S-A	43350002627	PREF
CP-P36/22-3S-A	43350002628	PREF
CP-P36/22-1S	43220210250	PREF
CP-P36/22-2S	43220210251	PREF
CP-P36/22-3S	43220210252	PREF
CP-P42/29-1S-A	43350002629	PREF
CP-P42/29-2S-A	43350002630	PREF
CP-P42/29-1S	43220213042	PREF
CP-P42/29-2S	43220213043	PREF
CP-P66/56-1S	43350002631	PREF
CPCI-E20/6-1S-5P-U	43220210222	PREF
CPCO-E20/6-1S-5P-U	43220210223	PREF
CPH-EC35-1S-13P	43220213331	PREF
CPH-EFD15-1S-8P	43220210025	PREF
CPH-EFD20-1S-10P	43220210026	PREF
CPH-ETD29-1S-13P	43220210228	PREF
CPH-ETD34-1S-14P	43220210164	PREF
CPH-ETD39-1S-16P	43220210165	PREF
CPH-ETD44-1S-18P	43220210166	PREF
CPH-ETD49-1S-20P	43220210167	PREF
CPH-ETD54-1S-22P	43220210067	PREF
CPH-ETD59-1S-24P	43220210069	PREF
CPH-E13/7/4-1S-6P	43120212620	PREF
CPH-E16/8/5-1S-6P	43120212623	PREF
CPH-E19/8/5-1S-8P	43350002705	PREF
CPH-E20/10/6-1S-8P	43120212621	PREF
CPH-E25/10/6-1S-10P	43350002707	PREF
CPH-E25/13/7-1S-10P	43120210039	PREF
CPH-E32/16/9-1S-12P	43220212622	PREF
CPH-E34/14/9-1S-12P	43350002709	PREF
CPH-E41/17/12-1S-12P	43350002710	PREF

TYPE NUMBER	11NC	CPS
CPH-E42/15-1S-10P-A	43350002711	PREF
CPH-E42/21/15-1S-10P	43220213183	PREF
CPH-E42/20-1S-12PD	43350002712	PREF
CPH-E47/20/16-1S-12P	43350002713	PREF
CPH-E55/28/21-1S-14P	43350002714	PREF
CPH-E56/24/19-1S-12P	43350002715	PREF
CPH-U10//8/3-1S-4P	31221340259	PREF
CPH-U15/11/6-1S-4P	43220210158	PREF
CPH-U15/11/6-2S-4P	43220210159	PREF
CPHS-E5.3/2-1S-4P	43220210174	PREF
CPHS-E5.3/2-1S-6P	43220210136	PREF
CPHS-E6.3/2-1S-6P	43220210134	PREF
CPHS-E6.3/2-2S-6P	43220210135	PREF
CPHS-EFD10-1S-8P	43220210056	PREF
CPHS-EFD12-1S-8P	43220210057	PREF
CPHS-EFD15-1S-8P	43220210004	PREF
CPHS-EFD20-1S-10P	43220210007	PREF
CPHS-EP7-1S-6P	43220210120	PREF
CPV-E20/10/5-1S-6P	43220212029	PREF
CPV-E25/13/7-1S-6P	43120212854	PREF
CPV-P14/8-1S-4SPD	43350002635	PREF
CPV-P14/8-1S-4SPDL	43350002636	PREF
CPV-P14/8-1S-6PD	43350002637	PREF
CPV-P14/8-1S-6PDL	43350002638	PREF
CPV-P14/8-2S-4SPD	43350002639	PREF
CPV-P14/8-2S-4SPDL	43350002640	PREF
CPV-P14/8-2S-6PD	43350002641	PREF
CPV-P14/8-2S-6PDL	43350002642	PREF
CPV-P18/11-1S-6PD	43350002643	PREF
CPV-P18/11-1S-6PDL	43350002644	PREF
CPV-P18/11-2S-6PD	43350002645	PREF
CPV-P18/11-2S-6PDL	43350002646	PREF
CPV-P18/11-3S-6PD	43350002647	PREF
CPV-P18/11-3S-6PDL	43350002648	PREF
CPV-P22/13-1S-6PD	43350002652	PREF
CPV-P22/13-1S-6PDL	43350002653	PREF
CPV-P22/13-2S-6PD	43350002654	PREF
CPV-P22/13-2S-6PDL	43350002655	PREF
CPV-P22/13-3S-6PD	43350002656	PREF
CPV-P22/13-3S-6PDL	43350002657	PREF
CPV-P26/16-1S-6PD	43350002658	PREF

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CPV-P26/16-1S-6PDL	43350002659	PREF
CPV-P26/16-2S-6PD	43350002660	PREF
CPV-P26/16-2S-6PDL	43350002661	PREF
CPV-P26/16-3S-6PD	43350002662	PREF
CPV-P26/16-3S-6PDL	43350002663	PREF
CPV-P30/19-1S-6PD	43350002664	PREF
CPV-P30/19-1S-6PDL	43350002665	PREF
CPV-PT14/8-1S-6P	43350002667	PREF
CPV-PT23/11-1S-10P	43350002668	PREF
CPV-PT23/18-1S-10P	43350002669	PREF
CPV-PT30/19-1S-10P	43350002670	PREF
CPV-RM4-1S-6PD	43220210034	PREF
CPV-RM5-1S-8PD	43220210029	PREF
CPV-RM6S/I-1S-8PD	43220213404	PREF
CPV-RM8/I-1S-12PD	43220213405	PREF
CPV-RM10/I-1S-12PD	43220213406	PREF
CPV-RM12/I-1S-12PD	43220213411	PREF
CPV-RM14/I-1S-12PD	43220213407	PREF
CPVS-ER9.5-1S-8P	43220210149	PREF
CPVS-ER11-1S-10P	43220210150	PREF
CPVS-ER14.5-1S-10P	43220210151	PREF
CPVS-RM4-1S-6P	43220210054	PREF
CPVS-RM5-1S-8P	43220210230	PREF
CPVS-RM5/LP-1S-8P	43220210089	PREF
CPVS-RM6S-1S-8P	43220210019	PREF
CPVS-RM6S/LP-8P	43220210169	PREF
CSA15/7.5/29-4S2	43300304640	DES
CSA15/7.5/29-4S2-EN	43300304610	DES
CSA19/9.4/29-4S2	43300304642	DES
CSA19/9.4/29-4S2-EN	43300304611	DES
CSA26/13/29-4S2	43300304641	DES
CSA26/13/29-4S2-EN	43300304612	DES
CSC16/7.9/14-4S2	43300304645	DES
CSC16/7.9/14-4S2-EN	43300304613	DES
CSCI-ETD34-1S-7P	43220213423	PREF
CSCO-ETD34-1S-7P	43220213424	PREF
CSF38/12/25-3S4	43300303699	PREF
CSF38/12/25-3S4-S	43300303698	PREF
CSH-EC35-1S-11P	43220213341	PREF
CSH-EFD15-1S-8P	43220213520	PREF
CSH-EFD20-1S-8P	43220213522	PREF

TYPE NUMBER	11NC	CPS
CSH-EFD25-1S-10P	43220213524	PREF
CSH-EFD30-1S-12P	43220213525	PREF
CSH-EP7-1S-6P	43220210044	PREF
CSH-EP7-1S-6P-B	43220210155	PREF
CSH-EP7-2S-6P-T	43220210170	PREF
CSH-EP10-1S-8P	43220210046	PREF
CSH-EP13-1S-10P-T	43220210160	PREF
CSH-EP13-2S-10P	43220213506	PREF
CSH-EP17-1S-8P	43220210048	PREF
CSH-EP17-2S-8P	43220210049	PREF
CSH-EP20-1S-10P	43220210141	PREF
CSH-EP20-2S-10P	43220210142	PREF
CSH-E20/10/5-1S-8P	43220212024	PREF
CSH-E30/7-1S-10P-A	43350002708	PREF
CSH-E30/15/7-1S-10P	43220212025	PREF
CST7.8/5.3/9.8-3S4	43300304363	DES
CST8.3/3.5/10-3S4	43300303692	DES
CST9.5/4.8/6.4-4S2	43300304616	DES
CST9.5/4.8/10-4S2	43300304617	DES
CST9.5/4.8/19-4S2	43300304618	DES
CST9.5/5.1/15-3S4	43300304358	DES
CST9.7/5/5.1-4S2	43300304619	DES
CST14/6.4/29-4S2	43300304620	DES
CST14/7.3/29-4S2	43300304621	DES
CST16/7.9/14-4S2	43300304622	DES
CST16/7.9/29-4S2	43300304623	DES
CST17/9.5/13-3S4	43300304357	DES
CST17/9.5/29-4S2	43300304625	DES
CST17/11/60-3S4	43300304362	DES
CST19/10/29-4S2	43300304626	DES
CST17/9.5/29-3S4	43300304356	DES
CST19/11/12-3S4	43300304569	DES
CST26/13/29-4S2	43300304627	DES
CST29/19/7.5-4S2	43300304629	DES
CSU45/6.4/29-4S2	43300304643	DES
CSU45/6.4/29-4S2-EN	43300304614	DES
CSU76/6.4/13-3S4	43300303695	PREF
CSU76/6.4/15-3S4	43300303696	PREF
CSU76/6.4/29-3S4	43300303697	PREF
CSU76/6.4/29-4S2	43300304644	DES
CSU76/6.4/29-4S2-EN	43300304615	DES

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TYPE NUMBER	11NC	CPS
CSV-RM10-1S-5P	43220213472	PREF
CSV-RM10-1S-8P	43220213473	PREF
CSV-RM10-1S-12P	43220213476	PREF
CSV-RM10-2S-5P	43220213477	PREF
CSV-RM10-2S-8P	43220213478	PREF
CSV-RM10-2S-12P	43220213481	PREF
CSV-RM12-1S-12P	43220213482	PREF
CSV-RM14-1S-10P	43220213352	PREF
CSV-RM14-1S-12P	43220213353	PREF
CSV-RM4-1S-6P	43220210097	PREF
CSV-RM5-1S-4P	43220213445	PREF
CSV-RM5-1S-5P	43220213446	PREF
CSV-RM5-1S-6P	43220213447	PREF
CSV-RM5-2S-4P	43220213448	PREF
CSV-RM5-2S-5P	43220213449	PREF
CSV-RM5-2S-6P	43220213450	PREF
CSV-RM6R-1S-6P	43220213454	PREF
CSV-RM6R-2S-6P	43220213456	PREF
CSV-RM6S-1S-6P	43220213458	PREF
CSV-RM6S-2S-6P	43220213460	PREF
CSV-RM6S/R-1S-4P	43220213451	PREF
CSV-RM6S/R-2S-4P	43220213452	PREF
CSV-RM7/I-1S-4P	43220213461	PREF
CSV-RM7/I-1S-8P	43220213463	PREF
CSV-RM7/I-2S-8P	43220213465	PREF
CSV-RM8-1S-12P	43220213468	PREF
CSV-RM8-1S-8P	43220213467	PREF
CSV-RM8-2S-8P	43220213470	PREF
CSV-RM8-2S-12P	43220213471	PREF
CSV-X22-1S-8P	43220213287	PREF
E5.3/2.7/2-3E5	43220205273	PREF
E5.3/2.7/2-3E6	43220205274	PREF
E5.3/2.7/2-3F3	43220205277	PREF
E5.3/2.7/2-3F4	43220205278	DES
E6.3/2.9/2-3E1	43220205290	PREF
E6.3/2.9/2-3E5	43220205275	PREF
E6.3/2.9/2-3E6	43220205276	PREF
E6.3/2.9/2-3F3	43220205279	PREF
E6.3/2.9/2-3F4	43220205280	DES
E8.8/4.1/2-3E6	43220203543	PROT
E8.8/4.1/2-3F3	43220203544	PROT

TYPE NUMBER	11NC	CPS
E8.8/4.1/2-3F4	43220203545	PROT
E13/6/6-3C80	43350001001	OBS
E13/6/6-3C81	43350001007	PREF
E13/6/6-3C81-A63	43350001008	PREF
E13/6/6-3C81-A100	43350001009	PREF
E13/6/6-3C81-A160	43350001010	PREF
E13/6/6-3C81-A250	43350001011	PREF
E13/6/6-3C81-A315	43350001012	PREF
E13/6/6-3C85	43350001013	PREF
E13/6/6-3C85-A63	43350001014	PREF
E13/6/6-3C85-A100	43350001015	PREF
E13/6/6-3C85-A160	43350001016	PREF
E13/6/6-3C85-A250	43350001017	PREF
E13/6/6-3C85-A315	43350001018	PREF
E13/6/6-3C90	43350001019	PREF
E13/6/6-3E5	43350001543	PREF
E13/6/6-3E25	43350001541	SUP
E13/6/6-3E27	43350001542	PREF
E13/6/6-3F3	43350001025	DES
E13/6/6-3F3-A63	43350001026	DES
E13/6/6-3F3-A100	43350001027	DES
E13/6/6-3F3-A160	43350001028	DES
E13/6/6-3F3-A250	43350001029	DES
E13/6/6-3F3-A315	43350001030	DES
E13/7/4-3C85	43220203548	PREF
E13/7/4-3C85-G150	43220203549	PREF
E13/7/4-3C85-G50	43220203556	PREF
E13/7/4-3C85-G500	43220203557	PREF
E13/7/4-3C90	43220203424	PREF
E13/7/4-3E1	43220203421	PREF
E13/7/4-3E25	43220203422	DES
E13/7/4-3E27	43220203423	PROT
E13/7/4-3F3	43220203405	PREF
E13/7/4-3F3-G150	43220203558	PREF
E13/7/4-3F3-G50	43220203559	PREF
E13/7/4-3F3-G500	43220203560	PREF
E14/3.5/5-3E6	43220209142	DES
E14/3.5/5-3F3	43220209752	DES
E14/3.5-3F3-A25-E	43220209778	OBS
E14/3.5-3F3-A25-P	43220209783	OBS
E14/3.5-3F3-A40-E	43220209779	OBS

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TYPE NUMBER	11NC	CPS
E14/3.5-3F3-A40-P	43220209784	OBS
E14/3.5-3F3-A63-E	43220209780	DES
E14/3.5-3F3-A63-P	43220209785	DES
E14/3.5-3F3-A100-E	43220209781	DES
E14/3.5-3F3-A100-P	43220209786	DES
E14/3.5-3F3-A160-E	43220209782	DES
E14/3.5-3F3-A160-P	43220209787	DES
E14/3.5/5-3F4	43220209754	DES
E14/3.5-3F4-A25-E	43220209788	OBS
E14/3.5-3F4-A25-P	43220209793	OBS
E14/3.5-3F4-A40-E	43220209789	OBS
E14/3.5-3F4-A40-P	43220209794	OBS
E14/3.5-3F4-A63-E	43220209790	DES
E14/3.5-3F4-A63-P	43220209795	DES
E14/3.5-3F4-A100-E	43220209791	DES
E14/3.5-3F4-A100-P	43220209796	DES
E14/3.5-3F4-A160-E	43220209792	DES
E14/3.5-3F4-A160-P	43220209797	DES
E14/3.5/5/R-3E6	43220209138	DES
E14/3.5/5/R-3F3	43220209688	DES
E14/3.5/R-3F3-A63-E	43220209074	DES
E14/3.5/R-3F3-A63-P	43220209734	DES
E14/3.5/R-3F3-A100-E	43220209730	DES
E14/3.5/R-3F3-A100-P	43220209735	DES
E14/3.5/R-3F3-A160-E	43220209731	DES
E14/3.5/R-3F3-A160-P	43220209736	DES
E14/3.5/5/R-3F4	43220209689	DES
E14/3.5/R-3F4-A63-E	43220209739	DES
E14/3.5/R-3F4-A63-P	43220209744	DES
E14/3.5/R-3F4-A100-E	43220209740	DES
E14/3.5/R-3F4-A100-P	43220209745	DES
E14/3.5/R-3F4-A160-E	43220209741	DES
E14/3.5/R-3F4-A160-P	43220209746	DES
E16/8/5-3C85	43220205292	PREF
E16/8/5-3C85-G150	43220203561	PREF
E16/8/5-3C85-G50	43220203562	PREF
E16/8/5-3C85-G500	43220203563	PREF
E16/8/5-3C90	43220203542	PREF
E16/8/5-3E1	43220203417	PREF
E16/8/5-3E25	43220203540	DES
E16/8/5-3E27	43220203541	PROT

TYPE NUMBER	11NC	CPS
E16/8/5-3F3	43220203418	PREF
E16/8/5-3F3-G150	43220203564	PREF
E16/8/5-3F3-G50	43220203565	PREF
E16/8/5-3F3-G500	43220203566	PREF
E18/4/10-3E6	43220209148	DES
E18/4/10-3F3	43220209756	DES
E18/4-3F3-A100-E	43220209799	DES
E18/4-3F3-A100-P	43220209232	DES
E18/4-3F3-A160-E	43220209228	DES
E18/4-3F3-A160-P	43220209233	DES
E18/4-3F3-A250-E	43220209229	DES
E18/4-3F3-A250-P	43220209234	DES
E18/4-3F3-A315-E	43220209230	DES
E18/4-3F3-A315-P	43220209235	DES
E18/4/10-3F4	43220209758	DES
E18/4-3F4-A100-E	43220209237	DES
E18/4-3F4-A100-P	43220209242	DES
E18/4-3F4-A160-E	43220209238	DES
E18/4-3F4-A160-P	43220209243	DES
E18/4-3F4-A250-E	43220209239	DES
E18/4-3F4-A250-P	43220209244	DES
E18/4-3F4-A315-E	43220209240	DES
E18/4-3F4-A315-P	43220209245	DES
E18/4/10/R-3E6	43220209144	DES
E18/4/10/R-3F3	43220209676	DES
E18/4/R-3F3-A100-E	43220209748	DES
E18/4/R-3F3-A100-P	43220209642	DES
E18/4/R-3F3-A160-E	43220209749	DES
E18/4/R-3F3-A160-P	43220209643	DES
E18/4/R-3F3-A250-E	43220209639	DES
E18/4/R-3F3-A250-P	43220209644	DES
E18/4/R-3F3-A315-E	43220209640	DES
E18/4/R-3F3-A315-P	43220209645	DES
E18/4/10/R-3F4	43220209691	DES
E18/4/R-3F4-A100-E	43220209647	DES
E18/4/R-3F4-A100-P	43220209652	DES
E18/4/R-3F4-A160-E	43220209648	DES
E18/4/R-3F4-A160-P	43220209653	DES
E18/4/R-3F4-A250-E	43220209649	DES
E18/4/R-3F4-A250-P	43220209654	DES
E18/4/R-3F4-A315-E	43220209650	DES

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TYPE NUMBER	11NC	CPS
E18/4/R-3F4-A315-P	43220209655	DES
E19/8/5-3C80	43350001031	OBS
E19/8/5-3C81	43350001037	PREF
E19/8/5-3C81-A63	43350001038	PREF
E19/8/5-3C81-A100	43350001039	PREF
E19/8/5-3C81-A160	43350001040	PREF
E19/8/5-3C81-A250	43350001041	PREF
E19/8/5-3C81-A315	43350001042	PREF
E19/8/5-3C85	43350001043	PREF
E19/8/5-3C85-A63	43350001044	PREF
E19/8/5-3C85-A100	43350001045	PREF
E19/8/5-3C85-A160	43350001046	PREF
E19/8/5-3C85-A250	43350001047	PREF
E19/8/5-3C85-A315	43350001048	PREF
E19/8/5-3C90	43350001049	PREF
E19/8/5-3E5	43350001546	SUP
E19/8/5-3E25	43350001544	SUP
E19/8/5-3E27	43350001545	PREF
E19/8/5-3F3	43350001055	DES
E19/8/5-3F3-A63	43350001056	DES
E19/8/5-3F3-A100	43350001057	DES
E19/8/5-3F3-A160	43350001058	DES
E19/8/5-3F3-A250	43350001059	DES
E19/8/5-3F3-A315	43350001060	DES
E19/8/9-3C80	43350001061	OBS
E19/8/9-3C81	43350001067	PREF
E19/8/9-3C81-A100	43350001068	PREF
E19/8/9-3C81-A160	43350001069	PREF
E19/8/9-3C81-A250	43350001070	PREF
E19/8/9-3C81-A315	43350001071	PREF
E19/8/9-3C81-A400	43350001072	PREF
E19/8/9-3C85	43350001073	PREF
E19/8/9-3C85-A100	43350001074	PREF
E19/8/9-3C85-A160	43350001075	PREF
E19/8/9-3C85-A250	43350001076	PREF
E19/8/9-3C85-A315	43350001077	PREF
E19/8/9-3C85-A400	43350001078	PREF
E19/8/9-3C90	43350001079	PREF
E19/8/9-3E5	43350001549	SUP
E19/8/9-3E25	43350001547	SUP
E19/8/9-3E27	43350001548	PREF

TYPE NUMBER	11NC	CPS
E19/8/9-3F3	43350001085	DES
E19/8/9-3F3-A100	43350001086	DES
E19/8/9-3F3-A160	43350001087	DES
E19/8/9-3F3-A250	43350001088	DES
E19/8/9-3F3-A315	43350001089	DES
E19/8/9-3F3-A400	43350001090	DES
E20/10/5-3C11	43120203597	PREF
E20/10/5-3C30	43120205560	DES
E20/10/5-3C85	43120204539	PREF
E20/10/5-3C85-G150	43120204541	PREF
E20/10/5-3C85-G50	43120204540	PREF
E20/10/5-3C85-G500	43120204542	PREF
E20/10/5-3C90	43120205561	DES
E20/10/5-3E25	43120205654	DES
E20/10/5-3F3	43120204552	DES
E20/10/6-3C11	43120203556	PREF
E20/10/6-3C30	43120205562	DES
E20/10/6-3C85	43120204525	PREF
E20/10/6-3C85-G150	43120204527	PREF
E20/10/6-3C85-G50	43120204526	PREF
E20/10/6-3C85-G500	43120204528	PREF
E20/10/6-3F3	43120204554	DES
E20/10/6-3F3-G150	43120204566	DES
E20/10/6-3F3-G50	43120204565	DES
E20/10/6-3F3-G500	43120204567	DES
E20/10/6-3C90	43120205563	DES
E20/10/6-3E25	43120205655	DES
E22/6/16-3E6	43220209133	DES
E22/6/16-3F3	43220209760	DES
E22/6-3F3-A160-E	43220209246	DES
E22/6-3F3-A160-P	43220209055	DES
E22/6-3F3-A250-E	43220209247	DES
E22/6-3F3-A250-P	43220209056	DES
E22/6-3F3-A315-E	43220209248	DES
E22/6-3F3-A315-P	43220209057	DES
E22/6-3F3-A400-E	43220209249	DES
E22/6-3F3-A400-P	43220209058	DES
E22/6-3F3-A630-E	43220209054	DES
E22/6-3F3-A630-P	43220209059	DES
E22/6/16-3F4	43220209765	DES
E22/6-3F4-A160-E	43220209060	DES

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TYPE NUMBER	11NC	CPS
E22/6-3F4-A160-P	43220209065	DES
E22/6-3F4-A250-E	43220209061	DES
E22/6-3F4-A250-P	43220209066	DES
E22/6-3F4-A315-E	43220209062	DES
E22/6-3F4-A315-P	43220209067	DES
E22/6-3F4-A400-E	43220209063	DES
E22/6-3F4-A400-P	43220209068	DES
E22/6-3F4-A630-E	43220209064	DES
E22/6-3F4-A630-P	43220209069	DES
E22/6/16/R-3E6	43220209146	DES
E22/6/16/R-3F3	43220209677	DES
E22/6/R-3F3-A160-E	43220209656	DES
E22/6/R-3F3-A160-P	43220209661	DES
E22/6/R-3F3-A250-E	43220209657	DES
E22/6/R-3F3-A250-P	43220209662	DES
E22/6/R-3F3-A315-E	43220209658	DES
E22/6/R-3F3-A315-P	43220209663	DES
E22/6/R-3F3-A400-E	43220209659	DES
E22/6/R-3F3-A400-P	43220209664	DES
E22/6/R-3F3-A630-E	43220209660	DES
E22/6/R-3F3-A630-P	43220209665	DES
E22/6/16/R-3F4	43220209693	DES
E22/6/R-3F4-A160-E	43220209666	DES
E22/6/R-3F4-A160-P	43220209671	DES
E22/6/R-3F4-A250-E	43220209667	DES
E22/6/R-3F4-A250-P	43220209672	DES
E22/6/R-3F4-A315-E	43220209668	DES
E22/6/R-3F4-A315-P	43220209673	DES
E22/6/R-3F4-A400-E	43220209669	DES
E22/6/R-3F4-A400-P	43220209674	DES
E22/6/R-3F4-A630-E	43220209670	DES
E22/6/R-3F4-A630-P	43220209675	DES
E25/9/6-3C85	43120204406	PREF
E25/9/6-3C90	43120205565	DES
E25/9/6-3E25	43120204409	DES
E25/10/6-3C80	43350001091	OBS
E25/10/6-3C81	43350001097	PREF
E25/10/6-3C81-A100	43350001098	PREF
E25/10/6-3C81-A160	43350001099	PREF
E25/10/6-3C81-A250	43350001100	PREF
E25/10/6-3C81-A315	43350001101	PREF

TYPE NUMBER	11NC	CPS
E25/10/6-3C81-A400	43350001102	PREF
E25/10/6-3C85	43120204408	PREF
E25/10/6-3C85	43350001103	PREF
E25/10/6-3C85-A100	43350001104	PREF
E25/10/6-3C85-A160	43350001105	PREF
E25/10/6-3C85-A250	43350001106	PREF
E25/10/6-3C85-A315	43350001107	PREF
E25/10/6-3C85-A400	43350001108	PREF
E25/10/6-3C90	43120205567	DES
E25/10/6-3C90	43350001109	PREF
E25/10/6-3E5	43350001552	SUP
E25/10/6-3E27	43350001551	PREF
E25/10/6-3E25	43120204411	DES
E25/10/6-3F3	43350001115	DES
E25/10/6-3F3-A100	43350001116	DES
E25/10/6-3F3-A160	43350001117	DES
E25/10/6-3F3-A250	43350001118	DES
E25/10/6-3F3-A315	43350001119	DES
E25/10/6-3F3-A400	43350001120	DES
E25/13/7-3C11	43120204648	PREF
E25/13/7-3C30	43120205531	DES
E25/13/7-3C80	43350001121	OBS
E25/13/7-3C81	43350001127	PREF
E25/13/7-3C81-A160	43350001128	PREF
E25/13/7-3C81-A250	43350001129	PREF
E25/13/7-3C81-A315	43350001130	PREF
E25/13/7-3C81-A400	43350001131	PREF
E25/13/7-3C81-A630	43350001132	PREF
E25/13/7-3C85	43120204529	PREF
E25/13/7-3C85	43350001133	PREF
E25/13/7-3C85-A160	43350001134	PREF
E25/13/7-3C85-A250	43350001135	PREF
E25/13/7-3C85-A315	43350001136	PREF
E25/13/7-3C85-A400	43350001137	PREF
E25/13/7-3C85-A630	43350001138	PREF
E25/13/7-3C85-G150	43120204531	PREF
E25/13/7-3C85-G50	43120204530	PREF
E25/13/7-3C85-G500	43120204532	PREF
E25/13/7-3C90	43120205522	DES
E25/13/7-3C90	43350001139	DES
E25/13/7-3E25	43350001553	SUP

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
E25/13/7-3E27	43350001554	PREF
E25/13/7-3F3	43120204555	DES
E25/13/7-3F3	43350001145	DES
E25/13/7-3F3-A160	43350001146	DES
E25/13/7-3F3-A250	43350001147	DES
E25/13/7-3F3-A315	43350001148	DES
E25/13/7-3F3-A400	43350001149	DES
E25/13/7-3F3-A630	43350001150	DES
E25/13/7-3F3-G150	43120204570	DES
E25/13/7-3F3-G50	43120204569	DES
E25/13/7-3F3-G500	43120204571	DES
E25/16/6-3C85	43120204407	PREF
E25/16/6-3C90	43120205569	DES
E25/16/6-3E25	43120204410	DES
E30/15/7-3C11	43120204647	PREF
E30/15/7-3C30	43120205533	DES
E30/15/7-3C80	43350001151	OBS
E30/15/7-3C81	43350001157	PREF
E30/15/7-3C81-A160	43350001158	PREF
E30/15/7-3C81-A250	43350001159	PREF
E30/15/7-3C81-A315	43350001160	PREF
E30/15/7-3C81-A400	43350001161	PREF
E30/15/7-3C81-A630	43350001162	PREF
E30/15/7-3C85	43120204543	PREF
E30/15/7-3C85	43350001163	PREF
E30/15/7-3C85-A160	43350001164	PREF
E30/15/7-3C85-A250	43350001165	PREF
E30/15/7-3C85-A315	43350001166	PREF
E30/15/7-3C85-A400	43350001167	PREF
E30/15/7-3C85-A630	43350001168	PREF
E30/15/7-3C85-G100	43120204544	PREF
E30/15/7-3C85-G200	43120204545	PREF
E30/15/7-3C85-G500	43120204546	PREF
E30/15/7-3C85-G800	43120204547	PREF
E30/15/7-3C90	43120205540	DES
E30/15/7-3C90	43350001169	PREF
E30/15/7-3E25	43350001556	SUP
E30/15/7-3E27	43350001557	PREF
E30/15/7-3F3	43120204553	DES
E30/15/7-3F3	43350001175	DES
E30/15/7-3F3-A160	43350001176	DES

TYPE NUMBER	11NC	CPS
E30/15/7-3F3-A250	43350001177	DES
E30/15/7-3F3-A315	43350001178	DES
E30/15/7-3F3-A400	43350001179	DES
E30/15/7-3F3-A630	43350001180	DES
E30/15/7-3F3-G100	43120204564	DES
E30/15/7-3F3-G200	43120204568	DES
E30/15/7-3F3-G500	43120204577	DES
E30/15/7-3F3-G800	43120204581	DES
E31/13/9-3C80	43350001181	OBS
E31/13/9-3C81	43350001187	PREF
E31/13/9-3C81-A250	43350001188	PREF
E31/13/9-3C81-A315	43350001189	PREF
E31/13/9-3C81-A400	43350001190	PREF
E31/13/9-3C81-A630	43350001191	PREF
E31/13/9-3C81-A1000	43350001192	PREF
E31/13/9-3C85	43350001193	PREF
E31/13/9-3C85-A250	43350001194	PREF
E31/13/9-3C85-A315	43350001195	PREF
E31/13/9-3C85-A400	43350001196	PREF
E31/13/9-3C85-A630	43350001197	PREF
E31/13/9-3C85-A1000	43350001198	PREF
E31/13/9-3C90	43350001199	PREF
E31/13/9-3E25	43350001559	SUP
E31/13/9-3E27	43350001560	PREF
E31/13/9-3F3	43350001205	DES
E31/13/9-3F3-A250	43350001206	DES
E31/13/9-3F3-A315	43350001207	DES
E31/13/9-3F3-A400	43350001208	DES
E31/13/9-3F3-A630	43350001209	DES
E31/13/9-3F3-A1000	43350001210	DES
E32/6/20-3C85	43350001991	DES
E32/6-3C85-E160-E	43350001992	DES
E32/6-3C85-A160-P	43350002157	DES
E32/6-3C85-E250-E	43350001993	DES
E32/6-3C85-A250-P	43350002158	DES
E32/6-3C85-A315-E	43350001994	DES
E32/6-3C85-A315-P	43350002159	DES
E32/6-3C85-A400-E	43350001995	DES
E32/6-3C85-A400-P	43350002160	DES
E32/6-3C85-A630-E	43350001996	DES
E32/6-3C85-A630-P	43350002161	DES

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Type number to 11NC

TYPE NUMBER	11NC	CPS
E32/6/20-3F3	43350002003	DES
E32/6-3F3-E160-E	43350002004	DES
E32/6-3F3-A160-P	43350002169	DES
E32/6-3F3-E250-E	43350002005	DES
E32/6-3F3-A250-P	43350002170	DES
E32/6-3F3-A315-E	43350002006	DES
E32/6-3F3-A315-P	43350002171	DES
E32/6-3F3-A400-E	43350002007	DES
E32/6-3F3-A400-P	43350002172	DES
E32/6-3F3-A630-E	43350002008	DES
E32/6-3F3-A630-P	43350002173	DES
E32/6/20-3F4	43350002009	DES
E32/6-3F4-E160-E	43350002010	DES
E32/6-3F4-A160-P	43350002175	DES
E32/6-3F4-E250-E	43350002011	DES
E32/6-3F4-A250-P	43350002176	DES
E32/6-3F4-A315-E	43350002012	DES
E32/6-3F4-A315-P	43350002177	DES
E32/6-3F4-A400-E	43350002013	DES
E32/6-3F4-A400-P	43350002178	DES
E32/6-3F4-A630-E	43350002014	DES
E32/6-3F4-A630-P	43350002179	DES
E32/16/9-3C11	43120204649	PREF
E32/16/9-3C30	43120205572	DES
E32/16/9-3C85	43120204533	PREF
E32/16/9-3C85-G100	43120204534	PREF
E32/16/9-3C85-G200	43120204535	PREF
E32/16/9-3C85-G500	43120204536	PREF
E32/16/9-3C85-G800	43120204537	PREF
E32/16/9-3F3	43120204572	DES
E32/16/9-3F3-G100	43120204573	DES
E32/16/9-3F3-G200	43120204574	DES
E32/16/9-3F3-G500	43120204575	DES
E32/16/9-3F3-G800	43120204576	DES
E32/16/9-3C90	43120205573	DES
E32/16/9-3E25	43120205657	DES
E34/14/9-3C80	43350001211	OBS
E34/14/9-3C81	43350001217	PREF
E34/14/9-3C81-A250	43350001218	PREF
E34/14/9-3C81-A315	43350001219	PREF
E34/14/9-3C81-A400	43350001220	PREF

TYPE NUMBER	11NC	CPS
E34/14/9-3C81-A630	43350001221	PREF
E34/14/9-3C81-A1000	43350001222	PREF
E34/14/9-3C85	43350001223	PREF
E34/14/9-3C85-A250	43350001224	PREF
E34/14/9-3C85-A315	43350001225	PREF
E34/14/9-3C85-A400	43350001226	PREF
E34/14/9-3C85-A630	43350001227	PREF
E34/14/9-3C85-A1000	43350001228	PREF
E34/14/9-3C90	43350001229	PREF
E34/14/9-3E25	43350001562	SUP
E34/14/9-3E27	43350001563	PREF
E34/14/9-3F3	43350001235	DES
E34/14/9-3F3-A250	43350001236	DES
E34/14/9-3F3-A315	43350001237	DES
E34/14/9-3F3-A400	43350001238	DES
E34/14/9-3F3-A630	43350001239	DES
E34/14/9-3F3-A1000	43350001240	DES
E38/8/25-3C85	43350000162	DES
E38/8-3C85-E250-E	43350002016	DES
E38/8-3C85-A250-P	43350002181	DES
E38/8-3C85-E315-E	43350002017	DES
E38/8-3C85-A315-P	43350002182	DES
E38/8-3C85-E400-E	43350002018	DES
E38/8-3C85-A400-P	43350002183	DES
E38/8-3C85-A630-E	43350002019	DES
E38/8-3C85-A630-P	43350002184	DES
E38/8-3C85-A1000-E	43350002020	DES
E38/8-3C85-A1000-P	43350002185	DES
E38/8/25-3F3	43350000163	DES
E38/8-3F3-E250-E	43350002028	DES
E38/8-3F3-A250-P	43350002193	DES
E38/8-3F3-E315-E	43350002029	DES
E38/8-3F3-A315-P	43350002194	DES
E38/8-3F3-E400-E	43350002030	DES
E38/8-3F3-A400-P	43350002195	DES
E38/8-3F3-A630-E	43350002031	DES
E38/8-3F3-A630-P	43350002196	DES
E38/8-3F3-A1000-E	43350002032	DES
E38/8-3F3-A1000-P	43350002197	DES
E38/8/25-3F4	43350000164	DES
E38/8-3F4-E250-E	43350002034	DES

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TYPE NUMBER	11NC	CPS
E38/8-3F4-A250-P	43350002199	DES
E38/8-3F4-E315-E	43350002035	DES
E38/8-3F4-A315-P	43350002200	DES
E38/8-3F4-E400-E	43350002036	DES
E38/8-3F4-A400-P	43350002201	DES
E38/8-3F4-A630-E	43350002037	DES
E38/8-3F4-A630-P	43350002202	DES
E38/8-3F4-A1000-E	43350002038	DES
E38/8-3F4-A1000-P	43350002203	DES
E41/17/12-3C30	43120205576	DES
E41/17/12-3C80	43350001241	OBS
E41/17/12-3C81	43350001247	PREF
E41/17/12-3C81-E250	43350001248	PREF
E41/17/12-3C81-E315	43350001249	PREF
E41/17/12-3C81-A400	43350001250	PREF
E41/17/12-3C81-A630	43350001251	PREF
E41/17/12-3C81-A1000	43350001252	PREF
E41/17/12-3C85	43120204404	PREF
E41/17/12-3C85	43350001253	PREF
E41/17/12-3C85-E250	43350001254	PREF
E41/17/12-3C85-E315	43350001255	PREF
E41/17/12-3C85-A400	43350001256	PREF
E41/17/12-3C85-A630	43350001257	PREF
E41/17/12-3C85-A1000	43350001258	PREF
E41/17/12-3C90	43120205577	DES
E41/17/12-3C90	43350001259	PREF
E41/17/12-3E25	43350001565	SUP
E41/17/12-3E27	43350001566	PREF
E41/17/12-3F3	43350001265	DES
E41/17/12-3F3-E250	43350001266	DES
E41/17/12-3F3-E315	43350001267	DES
E41/17/12-3F3-A400	43350001268	DES
E41/17/12-3F3-A630	43350001269	DES
E41/17/12-3F3-A1000	43350001270	DES
E42/21/15-3C11	43120203598	PREF
E42/21/15-3C30	43120205535	DES
E42/21/15-3C80	43350001271	OBS
E42/21/15-3C81	43350001277	PREF
E42/21/15-3C81-E250	43350001278	PREF
E42/21/15-3C81-E315	43350001279	PREF
E42/21/15-3C81-A400	43350001280	PREF

TYPE NUMBER	11NC	CPS
E42/21/15-3C81-A630	43350001281	PREF
E42/21/15-3C81-A1000	43350001282	PREF
E42/21/15-3C85	43120203564	PREF
E42/21/15-3C85	43350001283	PREF
E42/21/15-3C85-E250	43350001284	PREF
E42/21/15-3C85-E315	43350001285	PREF
E42/21/15-3C85-A400	43350001286	PREF
E42/21/15-3C85-A630	43350001287	PREF
E42/21/15-3C85-A1000	43350001288	PREF
E42/21/15-3C85-G100	43120204548	PREF
E42/21/15-3C85-G200	43120203581	PREF
E42/21/15-3C85-G500	43120204549	PREF
E42/21/15-3C85-G800	43120204600	PREF
E42/21/15-3C90	43120205578	DES
E42/21/15-3C90	43350001289	PREF
E42/21/15-3E25	43350001568	SUP
E42/21/15-3E27	43350001569	PREF
E42/21/15-3F3	43120204550	DES
E42/21/15-3F3	43350001295	DES
E42/21/15-3F3-E250	43350001296	DES
E42/21/15-3F3-E315	43350001297	DES
E42/21/15-3F3-A400	43350001298	DES
E42/21/15-3F3-A630	43350001299	DES
E42/21/15-3F3-A1000	43350001300	DES
E42/21/15-3F3-G100	43120204582	DES
E42/21/15-3F3-G200	43120204583	DES
E42/21/15-3F3-G500	43120204584	DES
E42/21/15-3F3-G800	43120204585	DES
E42/21/20-3C30	43120205579	DES
E42/21/20-3C80	43350001301	OBS
E42/21/20-3C81	43350001307	PREF
E42/21/20-3C81-E250	43350001308	PREF
E42/21/20-3C81-E315	43350001309	PREF
E42/21/20-3C81-A400	43350001310	PREF
E42/21/20-3C81-A630	43350001311	PREF
E42/21/20-3C81-A1000	43350001312	PREF
E42/21/20-3C85	43120203565	PREF
E42/21/20-3C85	43350001313	PREF
E42/21/20-3C85-E250	43350001314	PREF
E42/21/20-3C85-E315	43350001315	PREF
E42/21/20-3C85-A400	43350001316	PREF

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Type number to 11NC

TYPE NUMBER	11NC	CPS
E42/21/20-3C85-A630	43350001317	PREF
E42/21/20-3C85-A1000	43350001318	PREF
E42/21/20-3C85-G100	43120204601	PREF
E42/21/20-3C85-G200	43120204602	PREF
E42/21/20-3C85-G500	43120204603	PREF
E42/21/20-3C85-G800	43120204604	PREF
E42/21/20-3C90	43120205580	DES
E42/21/20-3C90	43350001319	PREF
E42/21/20-3E25	43350001571	SUP
E42/21/20-3E27	43350001572	PREF
E42/21/20-3F3	43120204551	DES
E42/21/20-3F3	43350001325	DES
E42/21/20-3F3-E250	43350001326	DES
E42/21/20-3F3-E315	43350001327	DES
E42/21/20-3F3-A400	43350001328	DES
E42/21/20-3F3-A630	43350001329	DES
E42/21/20-3F3-A1000	43350001330	DES
E42/21/20-3F3-G100	43120204586	DES
E42/21/20-3F3-G200	43120204587	DES
E42/21/20-3F3-G500	43120204588	DES
E42/21/20-3F3-G800	43120204589	DES
E42/33/20-3C30	43120205581	DES
E42/33/20-3C85	43120204678	PREF
E42/33/20-3C90	43120205582	DES
E42/33/20-3F3	43120205100	DES
E43/10/28-3C85	43350000250	DES
E43/10-3C85-E250-E	43350002039	DES
E43/10-3C85-A250-P	43350002204	DES
E43/10-3C85-E315-E	43350002040	DES
E43/10-3C85-A315-P	43350002205	DES
E43/10-3C85-E400-E	43350002041	DES
E43/10-3C85-A400-P	43350002206	DES
E43/10-3C85-A630-E	43350002042	DES
E43/10-3C85-A630-P	43350002207	DES
E43/10-3C85-A1000-E	43350002043	DES
E43/10-3C85-A1000-P	43350002208	DES
E43/10/28-3F3	43350000251	DES
E43/10-3F3-E250-E	43350002050	DES
E43/10-3F3-A250-P	43350002215	DES
E43/10-3F3-E315-E	43350002051	DES
E43/10-3F3-A315-P	43350002216	DES

TYPE NUMBER	11NC	CPS
E43/10-3F3-E400-E	43350002052	DES
E43/10-3F3-A400-P	43350002217	DES
E43/10-3F3-A630-E	43350002053	DES
E43/10-3F3-A630-P	43350002218	DES
E43/10-3F3-A1000-E	43350002054	DES
E43/10-3F3-A1000-P	43350002219	DES
E43/10/28-3F4	43350000252	DES
E43/10-3F4-E250-E	43350002055	DES
E43/10-3F4-A250-P	43350002220	DES
E43/10-3F4-E315-E	43350002056	DES
E43/10-3F4-A315-P	43350002221	DES
E43/10-3F4-E400-E	43350002057	DES
E43/10-3F4-A400-P	43350002222	DES
E43/10-3F4-A630-E	43350002058	DES
E43/10-3F4-A630-P	43350002223	DES
E43/10-3F4-A1000-E	43350002059	DES
E43/10-3F4-A1000-P	43350002224	DES
E47/20/16-3C30	43120205585	DES
E47/20/16-3C80	43350001331	OBS
E47/20/16-3C81	43350001337	PREF
E47/20/16-3C81-E250	43350001338	PREF
E47/20/16-3C81-E315	43350001339	PREF
E47/20/16-3C81-E400	43350001340	PREF
E47/20/16-3C81-A630	43350001341	PREF
E47/20/16-3C81-A1000	43350001342	PREF
E47/20/16-3C85	43120204414	PREF
E47/20/16-3C85	43350001343	PREF
E47/20/16-3C85-E250	43350001344	PREF
E47/20/16-3C85-E315	43350001345	PREF
E47/20/16-3C85-E400	43350001346	PREF
E47/20/16-3C85-A630	43350001347	PREF
E47/20/16-3C85-A1000	43350001348	PREF
E47/20/16-3C90	43120205586	DES
E47/20/16-3C90	43350001349	PREF
E47/20/16-3E25	43350001574	SUP
E47/20/16-3E27	43350001575	PREF
E47/20/16-3F3	43350001355	DES
E47/20/16-3F3-E250	43350001356	DES
E47/20/16-3F3-E315	43350001357	DES
E47/20/16-3F3-E400	43350001358	DES
E47/20/16-3F3-A630	43350001359	DES

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TYPE NUMBER	11NC	CPS
E47/20/16-3F3-A1000	43350001360	DES
E50/27/15-3C81	43350001367	PREF
E50/27/15-3C81-E250	43350001368	PREF
E50/27/15-3C81-E315	43350001369	PREF
E50/27/15-3C81-E400	43350001370	PREF
E50/27/15-3C81-A630	43350001371	PREF
E50/27/15-3C81-A1000	43350001372	PREF
E50/27/15-3C85	43350001373	PREF
E50/27/15-3C85-E250	43350001374	PREF
E50/27/15-3C85-E315	43350001375	PREF
E50/27/15-3C85-E400	43350001376	PREF
E50/27/15-3C85-A630	43350001377	PREF
E50/27/15-3C85-A1000	43350001378	PREF
E50/27/15-3C90	43350001379	PREF
E55/28/21-3C11	43120204504	PREF
E55/28/21-3C30	43120205587	DES
E55/28/21-3C80	43350001391	OBS
E55/28/21-3C81	43350001397	PREF
E55/28/21-3C81-E315	43350001398	PREF
E55/28/21-3C81-E400	43350001399	PREF
E55/28/21-3C81-E630	43350001400	PREF
E55/28/21-3C81-A1000	43350001401	PREF
E55/28/21-3C81-A1600	43350001402	PREF
E55/28/21-3C85	43120203591	PREF
E55/28/21-3C85	43350001403	PREF
E55/28/21-3C85-E315	43350001404	PREF
E55/28/21-3C85-E400	43350001405	PREF
E55/28/21-3C85-E630	43350001406	PREF
E55/28/21-3C85-A1000	43350001407	PREF
E55/28/21-3C85-A1600	43350001408	PREF
E55/28/21-3C85-G1200	43120204607	PREF
E55/28/21-3C85-G150	43120204605	PREF
E55/28/21-3C85-G450	43120204606	PREF
E55/28/21-3C90	43120205588	DES
E55/28/21-3C90	43350001409	PREF
E55/28/21-3E25	43120205658	DES
E55/28/21-3E27	43350001935	PREF
E55/28/21-3F3	43120204590	DES
E55/28/21-3F3	43350004369	DES
E55/28/21-3F3-E315	43350001416	DES
E55/28/21-3F3-E400	43350001417	DES

TYPE NUMBER	11NC	CPS
E55/28/21-3F3-E630	43350001418	DES
E55/28/21-3F3-A1000	43350001419	DES
E55/28/21-3F3-A1600	43350001420	DES
E55/28/21-3F3-G1200	43120204593	DES
E55/28/21-3F3-G150	43120204591	DES
E55/28/21-3F3-G450	43120204592	DES
E55/28/25-3C85	43120203592	PREF
E55/28/25-3C85-G1500	43120204611	PREF
E55/28/25-3C85-G500	43120204610	PREF
E55/28/25-3C90	43120205590	DES
E55/28/25-3F3	43120204599	DES
E56/24/19-3C80	43350001421	OBS
E56/24/19-3C81	43350001427	PREF
E56/24/19-3C81-E315	43350001428	PREF
E56/24/19-3C81-E400	43350001429	PREF
E56/24/19-3C81-E630	43350001430	PREF
E56/24/19-3C81-A1000	43350001431	PREF
E56/24/19-3C81-A1600	43350001432	PREF
E56/24/19-3C85	43350001433	PREF
E56/24/19-3C85-E315	43350001434	PREF
E56/24/19-3C85-E400	43350001435	PREF
E56/24/19-3C85-E630	43350001436	PREF
E56/24/19-3C85-A1000	43350001437	PREF
E56/24/19-3C85-A1600	43350001438	PREF
E56/24/19-3C90	43350001439	PREF
E56/24/19-3E25	43350000157	SUP
E56/24/19-3E27	43350001578	PREF
E58/11/38-3C85	43350000276	DES
E58/11-3C85-E315-E	43350002060	DES
E58/11-3C85-A315-P	43350002225	DES
E58/11-3C85-E400-E	43350002061	DES
E58/11-3C85-A400-P	43350002226	DES
E58/11-3C85-E630-E	43350002062	DES
E58/11-3C85-A630-P	43350002227	DES
E58/11-3C85-A1000-E	43350002063	DES
E58/11-3C85-A1000-P	43350002228	DES
E58/11-3C85-A1600-E	43350002064	DES
E58/11-3C85-A1600-P	43350002229	DES
E58/11/38-3F3	43350000277	DES
E58/11-3F3-E315-E	43350002071	DES
E58/11-3F3-E315-P	43350002236	DES

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TYPE NUMBER	11NC	CPS
E58/11-3F3-E400-E	43350002072	DES
E58/11-3F3-A400-P	43350002237	DES
E58/11-3F3-E630-E	43350002073	DES
E58/11-3F3-A630-P	43350002238	DES
E58/11-3F3-A1000-E	43350002074	DES
E58/11-3F3-A1000-P	43350002239	DES
E58/11-3F3-A1600-E	43350002075	DES
E58/11-3F3-A1600-P	43350002240	DES
E58/11/38-3F4	43350000278	DES
E58/11-3F4-E315-E	43350002076	DES
E58/11-3F4-A315--P	43350002241	DES
E58/11-3F4-E400-E	43350002077	DES
E58/11-3F4-A400-P	43350002242	DES
E58/11-3F4-E630-E	43350002078	DES
E58/11-3F4-A630-P	43350002243	DES
E58/11-3F4-A1000-E	43350002079	DES
E58/11-3F4-A1000-P	43350002244	DES
E58/11-3F4-A1600-E	43350002080	DES
E58/11-3F4-A1600-P	43350002245	DES
E64/10/50-3C85	43350000264	DES
E64/10-3C85-E630-E	43350002081	DES
E64/10-3C85-A630-P	43350002246	DES
E64/10-3C85-E1000-E	43350002082	DES
E64/10-3C85-A1000-P	43350002247	DES
E64/10-3C85-A1600-E	43350002083	DES
E64/10-3C85-A1600-P	43350002248	DES
E64/10-3C85-A2500-E	43350002084	DES
E64/10-3C85-A2500-P	43350002249	DES
E64/10-3C85-A3150-E	43350002085	DES
E64/10-3C85-A3150-P	43350002250	DES
E64/10/50-3F3	43350000265	DES
E64/10-3F3-E630-E	43350002092	DES
E64/10-3F3-A630-P	43350002257	DES
E64/10-3F3-E1000-E	43350002093	DES
E64/10-3F3-A1000-P	43350002258	DES
E64/10-3F3-A1600-E	43350002094	DES
E64/10-3F3-A1600-P	43350002259	DES
E64/10-3F3-A2500-E	43350002095	DES
E64/10-3F3-A2500-P	43350002260	DES
E64/10-3F3-A3150-E	43350002096	DES
E64/10-3F3-A3150-P	43350002261	DES

TYPE NUMBER	11NC	CPS
E64/10/50-3F4	43350000266	DES
E64/10-3F4-E630-E	43350002097	DES
E64/10-3F4-A630-P	43350002262	DES
E64/10-3F4-E1000-E	43350002098	DES
E64/10-3F4-A1000-P	43350002263	DES
E64/10-3F4-A1600-E	43350002099	DES
E64/10-3F4-A1600-P	43350002264	DES
E64/10-3F4-A2500-E	43350002100	DES
E64/10-3F4-A2500-P	43350002265	DES
E64/10-3F4-A3150-E	43350002101	DES
E64/10-3F4-A3150-P	43350002266	DES
E65/32/27-3C11	43120204505	PREF
E65/32/27-3C30	43120205591	DES
E65/32/27-3C85	43120204612	PREF
E65/32/27-3C85-G1250	43120204615	PREF
E65/32/27-3C85-G150	43120204613	PREF
E65/32/27-3C85-G450	43120204614	PREF
E65/32/27-3C90	43120205548	DES
E65/32/27-3F3	43120204594	DES
E65/32/27-3F3-G1250	43120204597	DES
E65/32/27-3F3-G150	43120204595	DES
E65/32/27-3F3-G450	43120204596	DES
E71/33/32-3C30	43120205592	DES
E71/33/32-3C85	43120205503	PREF
E71/33/32-3C90	43120205593	DES
E71/33/32-3F3	43120205106	DES
E80/38/20-3C81	43350001487	PREF
E80/38/20-3C81-E315	43350001488	PREF
E80/38/20-3C81-E400	43350001489	PREF
E80/38/20-3C81-E630	43350001490	PREF
E80/38/20-3C81-A1000	43350001491	PREF
E80/38/20-3C81-A1600	43350001492	PREF
E80/38/20-3C85	43350001493	PREF
E80/38/20-3C85-E315	43350001494	PREF
E80/38/20-3C85-E400	43350001495	PREF
E80/38/20-3C85-E630	43350001496	PREF
E80/38/20-3C85-A1000	43350001497	PREF
E80/38/20-3C85-A1600	43350001498	PREF
E80/38/20-3C90	43350001499	PREF
E80/38/20-3F3	43350001505	DES
E80/38/20-3F3-E315	43350001506	DES

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TYPE NUMBER	11NC	CPS
E80/38/20-3F3-E400	43350001507	DES
E80/38/20-3F3-E630	43350001508	DES
E80/38/20-3F3-A1000	43350001509	DES
E80/38/20-3F3-A1600	43350001510	DES
EC35-3C80	43350001580	OBS
EC35-3C81	43350001586	SUP
EC35-3C81-E100	43350001587	SUP
EC35-3C81-E160	43350001588	SUP
EC35-3C81-A250	43350001589	SUP
EC35-3C81-A315	43350001590	SUP
EC35-3C81-A400	43350001591	SUP
EC35-3C85	43120204619	SUP
EC35-3C85	43350001592	SUP
EC35-3C85-E100	43350001593	SUP
EC35-3C85-E160	43350001594	SUP
EC35-3C85-A250	43350001595	SUP
EC35-3C85-A315	43350001596	SUP
EC35-3C85-A400	43350001597	SUP
EC41-3C80	43350001610	OBS
EC41-3C81	43350001616	SUP
EC41-3C81-E100	43350001617	SUP
EC41-3C81-E160	43350001618	SUP
EC41-3C81-E250	43350001619	SUP
EC41-3C81-A315	43350001620	SUP
EC41-3C81-A400	43350001621	SUP
EC41-3C85	43120204622	SUP
EC41-3C85	43350001622	SUP
EC41-3C85-E100	43350001623	SUP
EC41-3C85-E160	43350001624	SUP
EC41-3C85-E250	43350001625	SUP
EC41-3C85-A315	43350001626	SUP
EC41-3C85-A400	43350001627	SUP
EC52-3C80	43350001640	OBS
EC52-3C81	43350001646	SUP
EC52-3C81-E160	43350001647	SUP
EC52-3C81-E250	43350001648	SUP
EC52-3C81-E315	43350001649	SUP
EC52-3C81-A400	43350001650	SUP
EC52-3C81-A630	43350001651	SUP
EC52-3C85	43120204627	SUP
EC52-3C85	43350001652	SUP

TYPE NUMBER	11NC	CPS
EC52-3C85-E160	43350001653	SUP
EC52-3C85-E250	43350001654	SUP
EC52-3C85-E315	43350001655	SUP
EC52-3C85-A400	43350001656	SUP
EC52-3C85-A630	43350001657	SUP
EC70-3C80	43350001670	OBS
EC70-3C81	43350001676	SUP
EC70-3C81-E250	43350001677	SUP
EC70-3C81-E315	43350001678	SUP
EC70-3C81-E400	43350001679	SUP
EC70-3C81-A630	43350001680	SUP
EC70-3C81-A1000	43350001681	SUP
EC70-3C85	43120204631	SUP
EC70-3C85	43350001682	SUP
EC70-3C85-E250	43350001683	SUP
EC70-3C85-E315	43350001684	SUP
EC70-3C85-E400	43350001685	SUP
EC70-3C85-A630	43350001686	SUP
EC70-3C85-A1000	43350001687	SUP
EFD10-3E4-S	43220251440	DES
EFD10-3E5-S	43220251450	DES
EFD10-3F3-S	43220251400	DES
EFD10-3F3-A25-S	43220251401	DES
EFD10-3F3-A40-S	43220251402	DES
EFD10-3F3-A63-S	43220251403	DES
EFD10-3F4-S	43220251420	DES
EFD10-3F4-A25-S	43220251421	DES
EFD10-3F4-A40-S	43220251422	DES
EFD10-3F4-A63-S	43220251423	DES
EFD12-3E4-S	43220251540	DES
EFD12-3E5-S	43220251550	DES
EFD12-3F3-S	43220251500	DES
EFD12-3F3-A40-S	43220251501	DES
EFD12-3F3-A63-S	43220251502	DES
EFD12-3F3-A100-S	43220251503	DES
EFD12-3F4-S	43220251520	DES
EFD12-3F4-A40-S	43220251521	DES
EFD12-3F4-A63-S	43220251522	DES
EFD12-3F4-A100-S	43220251523	DES
EFD15-3E4-S	43220251640	PREF
EFD15-3E5-S	43220251660	PREF

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TYPE NUMBER	11NC	CPS
EFD15-3F3-S	43220251600	PREF
EFD15-3F3-A63-S	43220251601	PREF
EFD15-3F3-A100-S	43220251602	PREF
EFD15-3F3-A160-S	43220251603	PREF
EFD15-3F4-S	43220251620	DES
EFD15-3F4-A63-S	43220251621	DES
EFD15-3F4-A100-S	43220251622	DES
EFD15-3F4-A160-S	43220251623	DES
EFD20-3C30	43120204189	DES
EFD20-3C85	43120204155	PREF
EFD20-3C85	43350002891	PREF
EFD20-3C85-E63-S	43350002892	PREF
EFD20-3C85-A100-S	43350002893	PREF
EFD20-3C85-A160-S	43350002894	PREF
EFD20-3C85-A250-S	43350002895	PREF
EFD20-3C85-A315-S	43350002896	PREF
EFD20-3C90	43120204198	DES
EFD20-3F3	43120204108	DES
EFD20-3F3	43350001736	DES
EFD20-3F3-E63-S	43350001737	DES
EFD20-3F3-A100-S	43350005803	DES
EFD20-3F3-A160-S	43350001739	DES
EFD20-3F3-A250-S	43350005804	DES
EFD20-3F3-A315-S	43350001741	DES
EFD20-3F4	43120204146	DES
EFD25-3C30	43120204192	DES
EFD25-3C85	43120204120	PREF
EFD25-3C90	43120204180	DES
EFD25-3F3	43120204116	DES
EFD25-3F4	43120204161	DES
EFD30-3C30	43120204195	DES
EFD30-3C85	43120204128	PREF
EFD30-3C85	43350001772	PREF
EFD30-3C85-A100-S	43350001773	PREF
EFD30-3C85-A160-S	43350001774	PREF
EFD30-3C85-A250-S	43350001775	PREF
EFD30-3C85-A315-S	43350001776	PREF
EFD30-3C85-A400-S	43350001777	PREF
EFD30-3C90	43120204184	DES
EFD30-3F3	43120204124	DES
EFD30-3F3	43350001784	DES

TYPE NUMBER	11NC	CPS
EFD30-3F3-A100-S	43350001785	DES
EFD30-3F3-A160-S	43350001786	DES
EFD30-3F3-A250-S	43350001787	DES
EFD30-3F3-A315-S	43350001788	DES
EFD30-3F3-A400-S	43350001789	DES
EFD30-3F4	43120204166	DES
EP7-3C81	43350003521	PREF
EP7-3C81-E25	43350003522	PREF
EP7-3C81-A40	43350003523	PREF
EP7-3C81-A63	43350003524	PREF
EP7-3C81-A100	43350003525	PREF
EP7-3C81-A160	43350003526	PREF
EP7-3C85	43220250880	PREF
EP7-3C85	43350003529	PREF
EP7-3C85-E25	43220250881	PREF
EP7-3C85-E25	43350003530	PREF
EP7-3C85-A40	43220250882	PREF
EP7-3C85-A40	43350003531	PREF
EP7-3C85-A63	43220250887	PREF
EP7-3C85-A63	43350003532	PREF
EP7-3C85-A100	43220250883	PREF
EP7-3C85-A100	43350003533	PREF
EP7-3C85-A160	43220250885	PREF
EP7-3C85-A160	43350003534	PREF
EP7-3E1	43220250860	PREF
EP7-3E5	43220250820	PREF
EP7-3E5	43350000154	PREF
EP7-3E6	43220250830	PREF
EP7-3E25	43350003541	SUP
EP7-3E27	43350003542	PREF
EP7-3F3	43220250840	PREF
EP7-3F3	43350003535	PREF
EP7-3F3-E25	43220250845	PREF
EP7-3F3-E25	43350003536	PREF
EP7-3F3-A40	43220250846	PREF
EP7-3F3-A40	43350003537	PREF
EP7-3F3-A63	43220250847	PREF
EP7-3F3-A63	43350003538	PREF
EP7-3F3-A100	43220250848	PREF
EP7-3F3-A100	43350003539	PREF
EP7-3F3-A160	43220250843	PREF

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TYPE NUMBER	11NC	CPS
EP7-3F3-A160	43350003540	PREF
EP7-3F4	43220250850	DES
EP7-3F4-A100	43220250854	DES
EP7-3F4-A160	43220250855	DES
EP7-3H1	43220250810	SUP
EP7-3H1-A63	43220250813	SUP
EP7-3H1-A100	43220250814	SUP
EP7-3H1-A160	43220250815	SUP
EP7-3H3	43220250370	PREF
EP7-3H3-A63	43220250373	PREF
EP7-3H3-A100	43220250371	PREF
EP7-3H3-A160	43220250372	PREF
EP10-3C81	43350003543	PREF
EP10-3C81-E25	43350003544	PREF
EP10-3C81-A40	43350003545	PREF
EP10-3C81-A63	43350003546	PREF
EP10-3C81-A100	43350003548	PREF
EP10-3C81-A160	43350003549	PREF
EP10-3C85	43220250940	PREF
EP10-3C85	43350003550	PREF
EP10-3C85-A25	43220250941	PREF
EP10-3C85-E25	43350003551	PREF
EP10-3C85-A40	43220250942	PREF
EP10-3C85-A40	43350003552	PREF
EP10-3C85-A63	43220250943	PREF
EP10-3C85-A63	43350003553	PREF
EP10-3C85-A100	43220250944	PREF
EP10-3C85-A100	43350003554	PREF
EP10-3C85-A160	43220250945	PREF
EP10-3C85-A160	43350003555	PREF
EP10-3E1	43220250910	PREF
EP10-3E4	43220250981	PREF
EP10-3E25	43350003568	SUP
EP10-3E27	43350003569	PREF
EP10-3E5	43220250920	PREF
EP10-3E5	43350000155	PREF
EP10-3E6	43220250950	PREF
EP10-3F3	43220250960	PREF
EP10-3F3	43350003556	PREF
EP10-3F3-A25	43220250961	PREF
EP10-3F3-E25	43350003557	PREF

TYPE NUMBER	11NC	CPS
EP10-3F3-A40	43220250962	PREF
EP10-3F3-A40	43350003558	PREF
EP10-3F3-A63	43220250963	PREF
EP10-3F3-A63	43350003559	PREF
EP10-3F3-A100	43220250964	PREF
EP10-3F3-A100	43350003560	PREF
EP10-3F3-A160	43220250965	PREF
EP10-3F3-A160	43350003561	PREF
EP10-3F4	43220250930	DES
EP10-3F4-A63	43220250931	DES
EP10-3F4-A100	43220250932	DES
EP10-3F4-A160	43220250933	DES
EP13-3C81	43350003570	PREF
EP13-3C81-E40	43350003572	PREF
EP13-3C81-A63	43350003574	PREF
EP13-3C81-A100	43350003576	PREF
EP13-3C81-A160	43350003578	PREF
EP13-3C81-A250	43350003580	PREF
EP13-3C85	43220251014	PREF
EP13-3C85	43350003581	PREF
EP13-3C85-E40	43220251000	PREF
EP13-3C85-E40	43350003582	PREF
EP13-3C85-A63	43220251001	PREF
EP13-3C85-A63	43350003583	PREF
EP13-3C85-A100	43220251003	PREF
EP13-3C85-A100	43350003584	PREF
EP13-3C85-A160	43220251004	PREF
EP13-3C85-A160	43350003585	PREF
EP13-3C85-A250	43220251006	PREF
EP13-3C85-A250	43350003586	PREF
EP13-3E1	43220251033	PREF
EP13-3E4	43220251055	PREF
EP13-3E27	43350003595	PREF
EP13-3E25	43350003594	SUP
EP13-3E5	43220251077	PREF
EP13-3E5	43350000156	PREF
EP13-3E6	43220251020	PREF
EP13-3F3	43220251090	PREF
EP13-3F3	43350003587	PREF
EP13-3F3-E40	43220251091	PREF
EP13-3F3-E40	43350003588	PREF

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TYPE NUMBER	11NC	CPS
EP13-3F3-A63	43220251092	PREF
EP13-3F3-A63	43350003589	PREF
EP13-3F3-A100	43220251093	PREF
EP13-3F3-A100	43350003590	PREF
EP13-3F3-A160	43220251094	PREF
EP13-3F3-A160	43350003591	PREF
EP13-3F3-A250	43220251096	PREF
EP13-3F3-A250	43350003593	PREF
EP13-3F4	43220251040	DES
EP13-3F4-A160	43220251041	DES
EP13-3F4-A250	43220251042	DES
EP13-3F4-A315	43220251043	DES
EP17-3C81	43350003596	PREF
EP17-3C81-E63	43350003597	PREF
EP17-3C81-A100	43350003598	PREF
EP17-3C81-A160	43350003600	PREF
EP17-3C81-A250	43350003602	PREF
EP17-3C81-A315	43350003603	PREF
EP17-3C85	43350003604	PREF
EP17-3C85-E63	43350003605	PREF
EP17-3C85-A100	43350003606	PREF
EP17-3C85-A160	43350003607	PREF
EP17-3C85-A250	43350003608	PREF
EP17-3C85-A315	43350003609	PREF
EP17-3E25	43350003617	SUP
EP17-3E27	43350003618	PREF
EP17-3E5	43350000157	PREF
EP17-3F3	43350003611	PREF
EP17-3F3-E63	43350003612	PREF
EP17-3F3-A100	43350003613	PREF
EP17-3F3-A160	43350003614	PREF
EP17-3F3-A250	43350003615	PREF
EP17-3F3-A315	43350003616	PREF
EP20-3C81	43350003619	PREF
EP20-3C81-A160	43350003620	PREF
EP20-3C81-A250	43350003621	PREF
EP20-3C81-A315	43350003622	PREF
EP20-3C81-A400	43350003623	PREF
EP20-3C81-A630	43350003624	PREF
EP20-3C85	43350003625	PREF
EP20-3C85-A160	43350003626	PREF

TYPE NUMBER	11NC	CPS
EP20-3C85-A250	43350003627	PREF
EP20-3C85-A315	43350003628	PREF
EP20-3C85-A400	43350003629	PREF
EP20-3C85-A630	43350003630	PREF
EP20-3E25	43350003637	SUP
EP20-3E27	43350003638	PREF
EP20-3E5	43335000158	PREF
EP20-3F3	43350003631	PREF
EP20-3F3-A160	43350003632	PREF
EP20-3F3-A250	43350003633	PREF
EP20-3F3-A315	43350003634	PREF
EP20-3F3-A400	43350003635	PREF
EP20-3F3-A630	43350003636	PREF
ER9.5-3E5-S	43220258046	DES
ER9.5-3E6-S	43220258047	DES
ER9.5-3F3-S	43220258048	DES
ER9.5-3F3-A63-S	43220228002	DES
ER9.5-3F3-A100-S	43220228000	DES
ER9.5-3F3-A160-S	43220228001	DES
ER9.5-3F4-S	43220258049	DES
ER9.5-3F4-A40-S	43220228011	DES
ER9.5-3F4-A63-S	43220228012	DES
ER9.5-3F4-A100-S	43220228010	DES
ER11-3E5-S	43220258096	DES
ER11-3E6-S	43220258097	DES
ER11-3F3-S	43220258098	DES
ER11-3F3-A100-S	43220228050	DES
ER11-3F3-A160-S	43220228051	DES
ER11-3F3-A250-S	43220228052	DES
ER11-3F4-S	43220258099	DES
ER11-3F4-A63-S	43220228070	DES
ER11-3F4-A100-S	43220228071	DES
ER11-3F4-A160-S	43220228072	DES
ER14.5-3E6-S	43220228200	PROT
ER14.5-3F3-S	43220228220	PROT
ER14.5-3F4-S	43220228240	PROT
ER28-3C30	43120205600	DES
ER28-3C85	43120204419	PREF
ER28-3C90	43120205601	DES
ER28L-3C30	43120205602	DES
ER28L-3C85	43120204687	PREF

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TYPE NUMBER	11NC	CPS
ER28L-3C90	43120205603	DES
ER35-3C30	43120205511	DES
ER35-3C85	43120204641	PREF
ER35-3C90	43120205539	DES
ER40-3C30	43120205513	DES
ER40-3C85	43120204643	PREF
ER40-3C90	43120205604	DES
ER42-3C30	43120205515	DES
ER42-3C85	43120204639	PREF
ER42-3C90	43120205605	DES
ER42A-3C30	43120205606	DES
ER42A-3C85	43120204666	PREF
ER42A-3C90	43120205607	DES
ER48-3C30	43120204608	DES
ER48-3C85	43120205659	PREF
ER48-3C90	43120204609	DES
ER54-3C30	43120205610	DES
ER54-3C85	43120204670	PREF
ER54-3C90	43120205611	DES
ETD29-3C11	43120203789	OBS
ETD29-3C30	43120203979	DES
ETD29-3C85	43120203750	PREF
ETD29-3C85-G1000	43120203769	PREF
ETD29-3C85-G150	43120203752	PREF
ETD29-3C85-G350	43120203754	PREF
ETD29-3C85-G50	43120203751	PREF
ETD29-3C90	43120203992	DES
ETD29-3F3	43120203800	DES
ETD29-3F3-G1000	43120203808	DES
ETD29-3F3-G150	43120203806	DES
ETD29-3F3-G350	43120203807	DES
ETD29-3F3-G50	43120203805	DES
ETD34-3C30	43120203981	DES
ETD34-3C85	43120203720	PREF
ETD34-3C85-G100	43120203721	PREF
ETD34-3C85-G200	43120203722	PREF
ETD34-3C85-G500	43120203723	PREF
ETD34-3C85-G800	43120203724	PREF
ETD34-3C90	43120203993	DES
ETD34-3F3	43120203801	DES
ETD34-3F3-G100	43120203809	DES

TYPE NUMBER	11NC	CPS
ETD34-3F3-G200	43120203810	DES
ETD34-3F3-G500	43120203811	DES
ETD34-3F3-G800	43120203812	DES
ETD39-3C30	43120203983	DES
ETD39-3C85	43120203725	PREF
ETD39-3C85-G100	43120203726	PREF
ETD39-3C85-G200	43120203727	PREF
ETD39-3C85-G500	43120203728	PREF
ETD39-3C85-G800	43120203729	PREF
ETD39-3C90	43120204700	DES
ETD39-3F3	43120203802	DES
ETD39-3F3-G100	43120203813	DES
ETD39-3F3-G200	43120203814	DES
ETD39-3F3-G500	43120203815	DES
ETD39-3F3-G800	43120203816	DES
ETD44-3C30	43120203984	DES
ETD44-3C85	43120203730	PREF
ETD44-3C85-G100	43120203731	PREF
ETD44-3C85-G200	43120203732	PREF
ETD44-3C85-G500	43120203733	PREF
ETD44-3C85-G800	43120203734	PREF
ETD44-3C90	43120204701	DES
ETD44-3F3	43120203803	DES
ETD44-3F3-G100	43120203817	DES
ETD44-3F3-G200	43120203818	DES
ETD44-3F3-G500	43120203819	DES
ETD44-3F3-G800	43120203820	DES
ETD49-3C30	43120203986	DES
ETD49-3C85	43120203735	PREF
ETD49-3C85-G100	43120203736	PREF
ETD49-3C85-G200	43120203737	PREF
ETD49-3C85-G500	43120203738	PREF
ETD49-3C85-G800	43120203739	PREF
ETD49-3C90	43120204702	DES
ETD49-3F3	43120203804	DES
ETD49-3F3-G100	43120203821	DES
ETD49-3F3-G1400	43120203825	DES
ETD49-3F3-G200	43120203822	DES
ETD49-3F3-G500	43120203823	DES
ETD49-3F3-G800	43120203824	DES
ETD54-3C30	43120204703	DES

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TYPE NUMBER	11NC	CPS
ETD54-3C85	43120203792	PREF
ETD54-3C90	43120204704	DES
ETD54-3F3	43120203826	DES
ETD59-3C30	43120204705	DES
ETD59-3C85	43120203793	PREF
ETD59-3C90	43120204706	DES
ETD59-3F3	43120203827	DES
FIB	43220213072	PREF
H7-3E25-H	43220203302	OBS
H10-3E25-H	43220203304	OBS
H16-3E25-H	43220203303	OBS
H20-3E25-H	43220203300	OBS
IMP6/3/200-3C85	43300303121	OBS
IMP6/3/200-3B1	43300303119	OBS
IMP8/3/125-3B1	43300303097	OBS
IMP8/3/200-3C85	43300303122	OBS
IMP10/4.5/170-3B1	43300303099	OBS
IMP10/4.5/200-3C85	43300303123	OBS
IMP12/5.5/170-3B1	43300303125	OBS
IMP12/5.5/200-3C85	43300303124	OBS
I20/6/5-3C85	43120205304	PREF
I25/6/6-3C81	43350002270	SUP
I25/6/6-3E25	43350002304	SUP
I25/6/6-3E27	43350002305	SUP
I25/7/7-3C85	43120205305	PREF
I93/28/16-3C85	43120205301	PREF
I93/28/30-3C85	43120204370	PREF
I93/28/30-3C90	43120204397	DES
I100/25/25-3C85	43120204368	PREF
I100/25/25-3C90	43120204399	DES
M1.4/1.7-ADJ.TRIMMER	43220580326	PREF
M2.0/2.6-ADJ.TRIMMER	43220580327	PREF
MHB2-13/8/6-3C85	43130204005	PREF
MHB2-13/8/6-4B1	43130204003	PREF
MHB2-14/8.5/14-4B1	43120203152	PREF
MHB2-14/8.5/8-4B1	43120203157	SUP
MHC2-5.6/12-4B1	43300303274	OBS
MHC6-6/10-3S4	43120203150	PREF
MHC6-6/10-4B1	43120203155	PREF
MHC6-6/10-4S2	43300304170	DES
MHR2-11/5.4/11-3C85	43130202080	SUP

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MHR2-11/5.4/11-4A11	43130202057	SUP
MHR6-6.1/4/10-3B1	43120203153	SUP
NUT	43220213071	PREF
P7/4-3B7	43350000401	SUP
P7/4-3B7-A100	43350000402	SUP
P7/4-3B7-A160	43350000403	SUP
P7/4-3B9	43350000404	OBS
P7/4-3B9-A100	43350000405	OBS
P7/4-3B9-A160	43350000406	OBS
P7/4-3E5	43350000407	PREF
P7/4-3H1-A100	43220250704	OBS
P7/4-3H1-A63	43220250703	OBS
P7/4-3H1	43220250700	SUP
P9/5-3B7	43350000408	SUP
P9/5-3B7-A63	43350000410	SUP
P9/5-3B7-A63/N	43350000423	SUP
P9/5-3B7-A100	43220224104	SUP
P9/5-3B7-A100	43350000411	SUP
P9/5-3B7-A100/N	43220226104	SUP
P9/5-3B7-A100/N	43350000412	SUP
P9/5-3B7-A160	43350000413	SUP
P9/5-3B7-A160/N	43350000414	SUP
P9/5-3B9	43350000416	OBS
P9/5-3B9-A63	43350000418	OBS
P9/5-3B9-A63/N	43350000949	OBS
P9/5-3B9-A100	43350000419	OBS
P9/5-3B9-A100/N	43350000420	OBS
P9/5-3B9-A160	43350000421	OBS
P9/5-3B9-A160/N	43350000422	OBS
P9/5-3D3-E40	43220224142	SUP
P9/5-3D3-E40/N	43220226142	SUP
P9/5-3D3-E63	43220224143	SUP
P9/5-3D3-E63/N	43220226143	SUP
P9/5-3D3	43220224140	SUP
P9/5-3E5	43220224160	PREF
P9/5-3E5	43350000426	PREF
P9/5-3H1	43220224120	SUP
P9/5-3H1	43350004194	SUP
P9/5-3H1-A63	43220224123	SUP
P9/5-3H1-A63	43350004195	SUP
P9/5-3H1-A63/N	43220226123	SUP

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P9/5-3H1-A63/N	43350004199	SUP
P9/5-3H1-A100	43220224124	SUP
P9/5-3H1-A100	43350004196	SUP
P9/5-3H1-A100/N	43220226124	SUP
P9/5-3H1-A100/N	43350004200	SUP
P9/5-3H1-A160	43220224125	SUP
P9/5-3H1-A160	53350004197	SUP
P9/5-3H1-A160/N	43220226125	SUP
P9/5-3H1-A160/N	43350004201	SUP
P9/5-3H1-A250	43220224126	SUP
P9/5-3H1-A250	43350004198	SUP
P9/5-3H1-A250/N	43350004202	SUP
P9/5-3H1-A250/N	43220226126	SUP
P9/5-4C6	43220224179	SUP
P9/5-4C6-E16	43220224180	SUP
P9/5-4C6-E16/N	43220226180	SUP
P9/5-4C6-E25	43220224181	SUP
P9/5-4C6-E25/N	43220226181	SUP
P9/5-4C6-E40	43220224182	SUP
P9/5-4C6-E40/N	43220226182	SUP
P11/7-3B7	43220220000	SUP
P11/7-3B7	43350000438	SUP
P11/7-3B7-A100	43220220104	SUP
P11/7-3B7-A100	43350000439	SUP
P11/7-3B7-A100/N	43220222104	SUP
P11/7-3B7-A100/N	43350000449	SUP
P11/7-3B7-A160	43220220105	SUP
P11/7-3B7-A160	43350000441	SUP
P11/7-3B7-A160/N	43220222105	SUP
P11/7-3B7-A160/N	43350000450	SUP
P11/7-3B7-A250	43220220106	SUP
P11/7-3B7-A250	43350000442	SUP
P11/7-3B7-A250/N	43350000451	SUP
P11/7-3B8	43220220188	SUP
P11/7-3B8-A160	43220220191	SUP
P11/7-3B8-A100	43220220190	SUP
P11/7-3B8-A250	43220220192	SUP
P11/7-3B9	43350000445	OBS
P11/7-3B9-A100	43350000446	OBS
P11/7-3B9-A100/N	43350000452	OBS
P11/7-3B9-A160	43350000447	OBS

TYPE NUMBER	11NC	CPS
P11/7-3B9-A160/N	43350000453	OBS
P11/7-3B9-A250	43350000448	OBS
P11/7-3B9-A250/N	43350000454	OBS
P11/7-3C81	43350000427	PREF
P11/7-3C81-A100	43350000428	PREF
P11/7-3C81-A160	43350000429	PREF
P11/7-3C81-A250	43350000430	PREF
P11/7-3D3	43220220139	SUP
P11/7-3D3-E16	43220220140	SUP
P11/7-3D3-E16/N	43220222140	SUP
P11/7-3D3-E25	43220220141	SUP
P11/7-3D3-E25/N	43220222141	SUP
P11/7-3D3-E40	43220220142	SUP
P11/7-3D3-E40/N	43220222142	SUP
P11/7-3D3-E63	43220220143	SUP
P11/7-3D3-E63/N	43220222143	SUP
P11/7-3D3-A100	43220220144	SUP
P11/7-3D3-A100/N	43220222144	SUP
P11/7-3E4	43220220164	SUP
P11/7-3E5	43220220199	PREF
P11/7-3E5	43350000455	PREF
P11/7-3F3	43220220169	SUP
P11/7-3F3	43350000431	SUP
P11/7-3F3-A100	43220220171	SUP
P11/7-3F3-A100	43350000432	SUP
P11/7-3F3-A160	43220220172	SUP
P11/7-3F3-A160	43350000433	SUP
P11/7-3F3-A250	43220220173	SUP
P11/7-3F3-A250	43350000434	SUP
P11/7-3H1	43220220120	SUP
P11/7-3H1	43350004203	SUP
P11/7-3H1-A100	43220220124	SUP
P11/7-3H1-A100	43350004204	SUP
P11/7-3H1-A100/N	43220222124	SUP
P11/7-3H1-A100/N	43350004207	SUP
P11/7-3H1-A160	43220220125	SUP
P11/7-3H1-A160	43350004205	SUP
P11/7-3H1-A160/N	43220222125	SUP
P11/7-3H1-A160/N	43350004208	SUP
P11/7-3H1-A250	43220220126	SUP
P11/7-3H1-A250	43350004206	SUP

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P11/7-3H1-A250/N	43220222126	SUP
P11/7-3H1-A250/N	43350004209	SUP
P11/7-3H3	43220220150	SUP
P11/7-3H3-A160	43220220155	SUP
P11/7-3H3-A160/N	43220222155	SUP
P11/7-3H3-A250	43220220156	SUP
P11/7-3H3-A250/N	43220222156	SUP
P11/7-4C6	43220220179	SUP
P11/7-4C6-E25	43220220181	SUP
P11/7-4C6-E25/N	43220222181	SUP
P11/7-4C6-E40	43220220182	SUP
P11/7-4C6-E40/N	43220222182	SUP
P11/7/I-3C81	43350000875	PREF
P11/7/I-3C81-A63	43350000876	PREF
P11/7/I-3C81-A100	43350000877	PREF
P11/7/I-3C81-A160	43350000878	PREF
P11/7/I-3C81-A250	43350000879	PREF
P11/7/I-3C81-A315	43350000880	PREF
P11/7/I-3C85	43350000881	PREF
P11/7/I-3C85-A63	43350000882	PREF
P11/7/I-3C85-A100	43350000883	PREF
P11/7/I-3C85-A160	43350000884	PREF
P11/7/I-3C85-A250	43350000885	PREF
P11/7/I-3C85-A315	43350000886	PREF
P11/7/I-3F3	43350000887	PREF
P11/7/I-3F3-A63	43350000888	PREF
P11/7/I-3F3-A100	43350000889	PREF
P11/7/I-3F3-A160	43350000890	PREF
P11/7/I-3F3-A250	43350000891	PREF
P11/7/I-3F3-A315	43350000892	PREF
P14/8-3B7	43220220200	SUP
P14/8-3B7	43350000485	SUP
P14/8-3B7-E63	43350000486	SUP
P14/8-3B7-E63/N	43350000487	SUP
P14/8-3B7-E100	43220220304	SUP
P14/8-3B7-E100	43350000488	SUP
P14/8-3B7-E100/N	43220222304	SUP
P14/8-3B7-E100/N	43350000489	SUP
P14/8-3B7-A160	43220220305	SUP
P14/8-3B7-E160	43350000490	SUP
P14/8-3B7-A160/N	43220222305	SUP

TYPE NUMBER	11NC	CPS
P14/8-3B7-E160/N	43350000491	SUP
P14/8-3B7-A250	43220220306	SUP
P14/8-3B7-A250	43350000492	SUP
P14/8-3B7-A250/N	43220222306	SUP
P14/8-3B7-A250/N	43350000493	SUP
P14/8-3B7-A315	43220220307	SUP
P14/8-3B7-A315	43350000494	SUP
P14/8-3B7-A315/N	43220222307	SUP
P14/8-3B7-A315/N	43350000950	SUP
P14/8-3B8	43220220397	SUP
P14/8-3B8-A160	43220220385	SUP
P14/8-3B8-A250	43220220386	SUP
P14/8-3B8-A315	43220220387	SUP
P14/8-3B8-A400	43220220388	SUP
P14/8-3B8-A630	43220220389	SUP
P14/8-3B9	43350000491	OBS
P14/8-3B9-E63	43350000500	OBS
P14/8-3B9-E63/N	43350000951	OBS
P14/8-3B9-E100	43350000501	OBS
P14/8-3B9-E100/N	43350000502	OBS
P14/8-3B9-E160	43350000503	OBS
P14/8-3B9-E160/N	43350000504	OBS
P14/8-3B9-A250	43350000506	OBS
P14/8-3B9-A250/N	43350000507	OBS
P14/8-3B9-A315	43350000508	OBS
P14/8-3B9-A315/N	43350000952	OBS
P14/8-3C81	43350000456	PREF
P14/8-3C81-E63	43350000457	PREF
P14/8-3C81-A100	43350000458	PREF
P14/8-3C81-A160	43350000460	PREF
P14/8-3C81-A250	43350000462	PREF
P14/8-3C81-A315	43350000463	PREF
P14/8-3C85	43220220366	SUP
P14/8-3C85	43350000465	SUP
P14/8-3C85-E63	43220220350	SUP
P14/8-3C85-E63	43350000466	SUP
P14/8-3C85-A100	43220220371	SUP
P14/8-3C85-A100	43350000467	SUP
P14/8-3C85-A160	43220220367	SUP
P14/8-3C85-A160	43350000468	SUP
P14/8-3C85-A250	43220220368	SUP

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
P14/8-3C85-A250	43350000470	SUP
P14/8-3C85-A315	43220220369	SUP
P14/8-3C85-A315	43350000471	SUP
P14/8-3D3	43220220340	SUP
P14/8-3D3-E40	43220220342	SUP
P14/8-3D3-E40/N	43220222342	SUP
P14/8-3D3-E63	43220220343	SUP
P14/8-3D3-E63/N	43220222343	SUP
P14/8-3D3-E100	43220220344	SUP
P14/8-3D3-E100/N	43220222344	SUP
P14/8-3E1	43220220379	SUP
P14/8-3E4	43220220377	SUP
P14/8-3E5	43220220373	PREF
P14/8-3E5	43350000516	PREF
P14/8-3E25	43350000514	SUP
P14/8-3E27	43350000515	PREF
P14/8-3F3	43220220351	SUP
P14/8-3F3	43350000472	SUP
P14/8-3F3-E63	43350000473	SUP
P14/8-3F3-A100	43220220376	SUP
P14/8-3F3-A100	43350000475	SUP
P14/8-3F3-A160	43220220393	SUP
P14/8-3F3-A160	43350000476	SUP
P14/8-3F3-A250	43220220394	SUP
P14/8-3F3-A250	43350000478	SUP
P14/8-3F3-A315	43220220395	SUP
P14/8-3F3-A315	43350000479	SUP
P14/8-3F4	43220253300	SUP
P14/8-3F4-A160	43220253301	SUP
P14/8-3F4-A250	43220253302	SUP
P14/8-3F4-A315	43220253303	SUP
P14/8-3H1	43220220321	SUP
P14/8-3H1	43350004211	SUP
P14/8-3H1-A160	43220220325	SUP
P14/8-3H1-A160	43350004212	SUP
P14/8-3H1-A160/N	43220222325	SUP
P14/8-3H1-A160/N	43350004216	SUP
P14/8-3H1-A250	43220220326	SUP
P14/8-3H1-A250	43350004213	SUP
P14/8-3H1-A250/N	43220222326	SUP
P14/8-3H1-A250/N	43350004217	SUP

TYPE NUMBER	11NC	CPS
P14/8-3H1-A315	43220220327	SUP
P14/8-3H1-A315	43350004214	SUP
P14/8-3H1-A315/N	43220222327	SUP
P14/8-3H1-A315/N	43350004218	SUP
P14/8-3H1-A400	43220220328	SUP
P14/8-3H1-A400/N	43220222328	SUP
P14/8-3H1-A630	43220220330	SUP
P14/8-3H1-A630/N	43220222330	SUP
P14/8-3H3-A160	43220220355	SUP
P14/8-3H3-A160/N	43220222355	SUP
P14/8-3H3	43220220360	SUP
P14/8-3H3-A250	43220220356	SUP
P14/8-3H3-A250/N	43220222356	SUP
P14/8-3H3-A315	43220220357	SUP
P14/8-3H3-A315/N	43220222357	SUP
P14/8-3H3-A400	43220220358	SUP
P14/8-3H3-A400/N	43220222358	SUP
P14/8-4C6	43220220380	SUP
P14/8-4C6-E25	43220220381	SUP
P14/8-4C6-E25/N	43220222381	SUP
P14/8-4C6-E40	43220220382	SUP
P14/8-4C6-E40/N	43220222382	SUP
P14/8-4C6-E63	43220220383	SUP
P14/8-4C6-E63/N	43220222383	SUP
P14/8/I-3C81	43350000894	PREF
P14/8/I-3C81-A100	43350000895	PREF
P14/8/I-3C81-A160	43350000896	PREF
P14/8/I-3C81-A250	43350000897	PREF
P14/8/I-3C81-A315	43350000898	PREF
P14/8/I-3C81-A400	43350000899	PREF
P14/8/I-3C85	43350000900	PREF
P14/8/I-3C85-A100	43350000901	PREF
P14/8/I-3C85-A160	43350000902	PREF
P14/8/I-3C85-A250	43350000903	PREF
P14/8/I-3C85-A315	43350000904	PREF
P14/8/I-3C85-A400	43350000905	PREF
P14/8/I-3F3	43350000906	PREF
P14/8/I-3F3-A100	43350000907	PREF
P14/8/I-3F3-A160	43350000908	PREF
P14/8/I-3F3-A250	43350000909	PREF
P14/8/I-3F3-A315	43350000910	PREF

Conversion list

Type number to 11NC

TYPE NUMBER	11NC	CPS
P14/8/I-3F3-A400	43350000911	PREF
P18/11-3B7	43220220400	SUP
P18/11-3B7	43350000544	SUP
P18/11-3B7-E100	43220220504	SUP
P18/11-3B7-E100	43350000545	SUP
P18/11-3B7-E100/N	43220222504	SUP
P18/11-3B7-E100/N	43350000561	SUP
P18/11-3B7-E160	43220220505	SUP
P18/11-3B7-E160	43350000546	SUP
P18/11-3B7-E160/N	43220222505	SUP
P18/11-3B7-E160/N	43350000562	SUP
P18/11-3B7-A250	43220220506	SUP
P18/11-3B7-A250	43350000547	SUP
P18/11-3B7-A250/N	43220222506	SUP
P18/11-3B7-A250/N	43350000563	SUP
P18/11-3B7-A315	43220220507	SUP
P18/11-3B7-A315	43350000548	SUP
P18/11-3B7-A315/N	43220222507	SUP
P18/11-3B7-A315/N	43350000564	SUP
P18/11-3B7-A400	43220220508	SUP
P18/11-3B7-A400	43350000549	SUP
P18/11-3B7-A400/N	43220222508	SUP
P18/11-3B7-A400/N	43350000565	SUP
P18/11-3B7-A630	43220220510	SUP
P18/11-3B7-A630	43350000551	SUP
P18/11-3B7-A630/N	43220222510	SUP
P18/11-3B7-A630/N	43350000953	SUP
P18/11-3B8	43220220577	SUP
P18/11-3B8-A160	43220220591	SUP
P18/11-3B8-A250	43220220592	SUP
P18/11-3B8-A315	43220220590	SUP
P18/11-3B8-A400	43220220594	SUP
P18/11-3B8-A630	43220220595	SUP
P18/11-3B9	43350000552	OBS
P18/11-3B9-E100	43350000553	OBS
P18/11-3B9-E100/N	43350000561	OBS
P18/11-3B9-A250	43350000555	OBS
P18/11-3B9-A250/N	43350000568	OBS
P18/11-3B9-A315	43350000556	OBS
P18/11-3B9-A315/N	43350000569	OBS
P18/11-3B9-A400	43350000557	OBS

TYPE NUMBER	11NC	CPS
P18/11-3B9-A400/N	43350000570	OBS
P18/11-3C81	43350000517	PREF
P18/11-3C81-E100	43350000519	PREF
P18/11-3C81-A160	43350000521	PREF
P18/11-3C81-A250	43350000523	PREF
P18/11-3C81-A315	43350000524	PREF
P18/11-3C81-A400	43350000525	PREF
P18/11-3C85	43220220578	SUP
P18/11-3C85	43350000526	SUP
P18/11-3C85-E100	43220220572	SUP
P18/11-3C85-E100	43350000528	SUP
P18/11-3C85-A160	43220220586	SUP
P18/11-3C85-A160	43350000530	SUP
P18/11-3C85-A250	43220220587	SUP
P18/11-3C85-A250	43350000532	SUP
P18/11-3C85-A315	43220220588	SUP
P18/11-3C85-A315	43350000533	SUP
P18/11-3C85-A400	43220220589	SUP
P18/11-3C85-A400	43350000534	SUP
P18/11-3D3	43220220540	SUP
P18/11-3D3-E63	43220220543	SUP
P18/11-3D3-E63/N	43220222543	SUP
P18/11-3D3-E100	43220220544	SUP
P18/11-3D3-E100/N	43220222544	SUP
P18/11-3D3-E160	43220220545	SUP
P18/11-3D3-E160/N	43220222545	SUP
P18/11-3E1	43220220547	SUP
P18/11-3E4	43220220579	SUP
P18/11-3E5	43220253410	PREF
P18/11-3E5	43350000573	PREF
P18/11-3E25	43350000571	SUP
P18/11-3E27	43350000572	PREF
P18/11-3F3	43220220566	SUP
P18/11-3F3	43350000535	SUP
P18/11-3F3-A100	43220220567	SUP
P18/11-3F3-E100	43350000536	SUP
P18/11-3F3-A160	43220220568	SUP
P18/11-3F3-A160	43350000538	SUP
P18/11-3F3-A250	43220220569	SUP
P18/11-3F3-A250	43350000539	SUP
P18/11-3F3-A315	43220220570	SUP

Conversion list

Type number to 11NC

TYPE NUMBER	11NC	CPS
P18/11-3F3-A315	43350000540	SUP
P18/11-3F3-A400	43220220571	SUP
P18/11-3F3-A400	43350000541	SUP
P18/11-3F4	43220253400	SUP
P18/11-3F4-A160	43220253401	SUP
P18/11-3F4-A250	43220253402	SUP
P18/11-3F4-A315	43220253403	SUP
P18/11-3F4-A400	43220253404	SUP
P18/11-3H1	43220220521	SUP
P18/11-3H1	43350004221	SUP
P18/11-3H1-E160	43220220525	SUP
P18/11-3H1-E160	43350004222	SUP
P18/11-3H1-E160/N	43220222525	SUP
P18/11-3H1-A250	43220220526	SUP
P18/11-3H1-A250	43350004223	SUP
P18/11-3H1-A250/N	43220222526	SUP
P18/11-3H1-A315	43220220527	SUP
P18/11-3H1-A315	43220220527	SUP
P18/11-3H1-A315/N	43220222527	SUP
P18/11-3H1-A400	43220220528	SUP
P18/11-3H1-A400/N	43220222528	SUP
P18/11-3H1-A630	43220220530	SUP
P18/11-3H1-A630/N	43220222530	SUP
P18/11-3H3-E160	43220220555	SUP
P18/11-3H3-E160/N	43220222555	SUP
P18/11-3H3-A250	43220220556	SUP
P18/11-3H3-A250/N	43220222556	SUP
P18/11-3H3	43220220550	SUP
P18/11-3H3-A315	43220220557	SUP
P18/11-3H3-A315/N	43220222557	SUP
P18/11-3H3-A400	43220220558	SUP
P18/11-3H3-A400/N	43220222558	SUP
P18/11-3H3-A630	43220220560	SUP
P18/11-3H3-A630/N	43220222560	SUP
P18/11-4C6	43220220580	SUP
P18/11-4C6-E25	43220220581	SUP
P18/11-4C6-E25/N	43220222581	SUP
P18/11-4C6-E40	43220220582	SUP
P18/11-4C6-E40/N	43220222582	SUP
P18/11-4C6-E63	43220220583	SUP
P18/11-4C6-E63/N	43220222583	SUP

TYPE NUMBER	11NC	CPS
P18/11/I-3C81	43350000912	PREF
P18/11/I-3C81-A160	43350000913	PREF
P18/11/I-3C81-A250	43350000914	PREF
P18/11/I-3C81-A315	43350000915	PREF
P18/11/I-3C81-A400	43350000916	PREF
P18/11/I-3C81-A630	43350000917	PREF
P18/11/I-3C85	43350000918	PREF
P18/11/I-3C85-A160	43350000919	PREF
P18/11/I-3C85-A250	43350000920	PREF
P18/11/I-3C85-A315	43350000921	PREF
P18/11/I-3C85-A400	43350000922	PREF
P18/11/I-3C85-A630	43350000923	PREF
P18/11/I-3F3	43350000924	PREF
P18/11/I-3F3-A160	43350000925	PREF
P18/11/I-3F3-A250	43350000926	PREF
P18/11/I-3F3-A315	43350000927	PREF
P18/11/I-3F3-A400	43350000928	PREF
P18/11/I-3F3-A630	43350000929	PREF
P22/13-3B7	43220220600	SUP
P22/13-3B7	43350000613	SUP
P22/13-3B7-E160	43350000615	SUP
P22/13-3B7-E160/N	43220222705	SUP
P22/13-3B7-E160/N	43350000621	SUP
P22/13-3B7-E250	43220220706	SUP
P22/13-3B7-E250	43350000616	SUP
P22/13-3B7-E250/N	43220222706	SUP
P22/13-3B7-E250/N	43350000632	SUP
P22/13-3B7-A315	43350000617	SUP
P22/13-3B7-A315/N	43350000633	SUP
P22/13-3B7-A400	43220220708	SUP
P22/13-3B7-A400	43350000618	SUP
P22/13-3B7-A400/N	43220222708	SUP
P22/13-3B7-A400/N	43350000634	SUP
P22/13-3B7-A630	43350000620	SUP
P22/13-3B7-A630/N	43220222710	SUP
P22/13-3B7-A630/N	43350000635	SUP
P22/13-3B8	43220220797	SUP
P22/13-3B8-A160	43220220791	SUP
P22/13-3B8-A250	43220220792	SUP
P22/13-3B8-A315	43220220793	SUP
P22/13-3B8-A400	43220220794	SUP

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
P22/13-3B8-A630	43220220795	SUP
P22/13-3B9	43350000623	OBS
P22/13-3B9-E160	43350000625	OBS
P22/13-3B9-E160/N	43350000636	OBS
P22/13-3B9-E250	43350000626	OBS
P22/13-3B9-E250/N	43350000637	OBS
P22/13-3B9-A315	43350000627	OBS
P22/13-3B9-A315/N	43350000638	OBS
P22/13-3B9-A400	43350000628	OBS
P22/13-3B9-A400/N	43350000629	OBS
P22/13-3B9-A630	43350000631	OBS
P22/13-3B9-A630/N	43350000640	OBS
P22/13-3C81	43350000574	PREF
P22/13-3C81-A160	43350000579	PREF
P22/13-3C81-A250	43350000580	PREF
P22/13-3C81-A315	43350000581	PREF
P22/13-3C81-A400	43350000582	PREF
P22/13-3C81-A630	43350000585	PREF
P22/13-3C85	43220220777	SUP
P22/13-3C85	43350000586	SUP
P22/13-3C85-A160	43220220785	SUP
P22/13-3C85-A160	43350000589	SUP
P22/13-3C85-A250	43220220786	SUP
P22/13-3C85-A250	43350000590	SUP
P22/13-3C85-A315	43220220787	SUP
P22/13-3C85-A315	43350000600	SUP
P22/13-3C85-A400	43220220788	SUP
P22/13-3C85-A400	43350000601	SUP
P22/13-3C85-A630	43220220789	SUP
P22/13-3C85-A630	43350000603	SUP
P22/13-3D3-E40	43220220742	SUP
P22/13-3D3-E40/N	43220222742	SUP
P22/13-3D3-E63	43220220743	SUP
P22/13-3D3-E63/N	43220222743	SUP
P22/13-3D3-E100	43220220744	SUP
P22/13-3D3-E100/N	43220222744	SUP
P22/13-3D3-E160	43220220745	SUP
P22/13-3D3-E160/N	43220222745	SUP
P22/13-3D3	43220220740	SUP
P22/13-3E1	43220220772	SUP
P22/13-3E4	43220220773	SUP

TYPE NUMBER	11NC	CPS
P22/13-3E5	43220220750	PREF
P22/13-3E5	43350000643	PREF
P22/13-3E25	43350000641	SUP
P22/13-3E27	43350000642	PREF
P22/13-3F3	43220220764	SUP
P22/13-3F3	43350000604	SUP
P22/13-3F3-A160	43220220765	SUP
P22/13-3F3-A160	43350000607	SUP
P22/13-3F3-A250	43220220766	SUP
P22/13-3F3-A250	43350000608	SUP
P22/13-3F3-A315	43220220767	SUP
P22/13-3F3-A315	43350000609	SUP
P22/13-3F3-A400	43220220768	SUP
P22/13-3F3-A400	43350000610	SUP
P22/13-3F3-A630	43220220769	SUP
P22/13-3F3-A630	43350000612	SUP
P22/13-3F4	43220253500	SUP
P22/13-3F4-A160	43220253501	SUP
P22/13-3F4-A250	43220253502	SUP
P22/13-3F4-A315	43220253503	SUP
P22/13-3F4-A400	43220253504	SUP
P22/13-3F4-A630	43220253505	SUP
P22/13-3H1	43220220720	SUP
P22/13-3H1	43350004233	SUP
P22/13-3H1-E160	43220220725	SUP
P22/13-3H1-E160	43350004234	SUP
P22/13-3H1-E160/N	43220222725	SUP
P22/13-3H1-E160/N	43350004239	SUP
P22/13-3H1-E250	43220220726	SUP
P22/13-3H1-E250	43350004235	SUP
P22/13-3H1-E250/N	43220222726	SUP
P22/13-3H1-E250/N	43350004240	SUP
P22/13-3H1-A315	43220220727	SUP
P22/13-3H1-A315	43350004236	SUP
P22/13-3H1-E315/N	43220222727	SUP
P22/13-3H1-A315/N	43350004241	SUP
P22/13-3H1-A400	43220220728	SUP
P22/13-3H1-A400	43350004237	SUP
P22/13-3H1-A400/N	43220222728	SUP
P22/13-3H1-A400/N	43350004242	SUP
P22/13-3H1-A630	43220220730	SUP

Conversion list

Type number to 11NC

TYPE NUMBER	11NC	CPS
P22/13-3H1-A630	43350004238	SUP
P22/13-3H1-A630/N	43220222730	SUP
P22/13-3H1-A630/N	43350004243	SUP
P22/13-3H3	43220220759	SUP
P22/13-3H3-E160	43220220755	SUP
P22/13-3H3-E160/N	43220222755	SUP
P22/13-3H3-E250	43220220756	SUP
P22/13-3H3-E250/N	43220222756	SUP
P22/13-3H3-E315	43220220757	SUP
P22/13-3H3-E315/N	43220222757	SUP
P22/13-3H3-A400	43220220758	SUP
P22/13-3H3-A400/N	43220222758	SUP
P22/13-3H3-A630	43220220760	SUP
P22/13-3H3-A630/N	43220222760	SUP
P22/13-4C6	43220220779	SUP
P22/13-4C6-E25	43220220781	SUP
P22/13-4C6-E25/N	43220222781	SUP
P22/13-4C6-E40	43220220782	SUP
P22/13-4C6-E40/N	43220222782	SUP
P22/13-4C6-E63	43220220783	SUP
P22/13-4C6-E63/N	43220222783	SUP
P22/13/I-3C81	43350000930	PREF
P22/13/I-3C81-A250	43350000931	PREF
P22/13/I-3C81-A315	43350000932	PREF
P22/13/I-3C81-A400	43350000933	PREF
P22/13/I-3C81-A630	43350000934	PREF
P22/13/I-3C81-A1000	43350000935	PREF
P22/13/I-3C85	43350000936	PREF
P22/13/I-3C85-A250	43350000937	PREF
P22/13/I-3C85-A315	43350000938	PREF
P22/13/I-3C85-A400	43350000939	PREF
P22/13/I-3C85-A630	43350000940	PREF
P22/13/I-3C85-A1000	43350000941	PREF
P22/13/I-3F3	43350000943	PREF
P22/13/I-3F3-A250	43350000944	PREF
P22/13/I-3F3-A315	43350000945	PREF
P22/13/I-3F3-A400	43350000946	PREF
P22/13/I-3F3-A630	43350000947	PREF
P22/13/I-3F3-A1000	43350000948	PREF
P26/16-3B7	43220220800	SUP
P26/16-3B7	43350000675	SUP

TYPE NUMBER	11NC	CPS
P26/16-3B7-E160	43220220905	SUP
P26/16-3B7-E160	43350000200	SUP
P26/16-3B7-E160/N	43220222905	SUP
P26/16-3B7-E160/N	43350000688	SUP
P26/16-3B7-E250	43220220906	SUP
P26/16-3B7-E250	43350000202	SUP
P26/16-3B7-E250/N	43220222906	SUP
P26/16-3B7-E250/N	43350000689	SUP
P26/16-3B7-E315	43220220907	SUP
P26/16-3B7-E315	43350000204	SUP
P26/16-3B7-E315/N	43350000690	SUP
P26/16-3B7-E400	43220220908	SUP
P26/16-3B7-A400	43350000205	SUP
P26/16-3B7-E400/N	43220222908	SUP
P26/16-3B7-A400/N	43350000691	SUP
P26/16-3B7-A630	43220220910	SUP
P26/16-3B7-A630	43350000677	SUP
P26/16-3B7-A630/N	43220222910	SUP
P26/16-3B7-A630/N	43350000693	SUP
P26/16-3B8	43220220985	SUP
P26/16-3B8-A250	43220220986	SUP
P26/16-3B8-A315	43220220987	SUP
P26/16-3B8-A400	43220220988	SUP
P26/16-3B8-A630	43220220989	SUP
P26/16-3B9	43350000680	OBS
P26/16-3B9-E160	43350000201	OBS
P26/16-3B9-E160/N	43350000681	OBS
P26/16-3B9-E250	43350000203	OBS
P26/16-3B9-E250/N	43350000696	OBS
P26/16-3B9-E315	43350000682	OBS
P26/16-3B9-E315/N	43350000697	OBS
P26/16-3B9-A400	43350000683	OBS
P26/16-3B9-A400/N	43350000684	OBS
P26/16-3B9-A630	43350000686	OBS
P26/16-3B9-A630/N	43350000699	OBS
P26/16-3C81	43350000644	PREF
P26/16-3C81-E100	43350000645	PREF
P26/16-3C81-E160	43350000646	PREF
P26/16-3C81-A250	43350000649	PREF
P26/16-3C81-A315	43350000650	PREF
P26/16-3C81-A400	43350000651	PREF

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
P26/16-3C81-A630	43350000654	PREF
P26/16-3C85	43220220973	SUP
P26/16-3C85	43350000657	SUP
P26/16-3C85-E160	43220253025	SUP
P26/16-3C85-E160	43350000659	SUP
P26/16-3C85-A250	43220253026	SUP
P26/16-3C85-A250	43350000661	SUP
P26/16-3C85-A315	43220253027	SUP
P26/16-3C85-A315	43350000662	SUP
P26/16-3C85-A400	43220253028	SUP
P26/16-3C85-A400	43350000663	SUP
P26/16-3C85-A630	43220253030	SUP
P26/16-3C85-A630	43350000665	SUP
P26/16-3D3	43220220949	SUP
P26/16-3D3-E100	43220220944	SUP
P26/16-3D3-E100/N	43220222944	SUP
P26/16-3D3-E160	43220220945	SUP
P26/16-3D3-E160/N	43220222945	SUP
P26/16-3D3-E250	43220220946	SUP
P26/16-3D3-E250/N	43220222946	SUP
P26/16-3E1	43220220967	SUP
P26/16-3E4	43220220965	SUP
P26/16-3E5	43220220966	PREF
P26/16-3E5	43350000702	PREF
P26/16-3E25	43350000700	SUP
P26/16-3E27	43350000701	PREF
P26/16-3F3	43220220950	SUP
P26/16-3F3	43350000666	SUP
P26/16-3F3-E160	43220253045	SUP
P26/16-3F3-E160	43350000668	SUP
P26/16-3F3-A250	43220253046	SUP
P26/16-3F3-A250	43350000670	SUP
P26/16-3F3-A315	43220253047	SUP
P26/16-3F3-A315	43350000671	SUP
P26/16-3F3-A400	43220253048	SUP
P26/16-3F3-A400	43350000672	SUP
P26/16-3F3-A630	43220253050	SUP
P26/16-3F3-A630	43350000674	SUP
P26/16-3H1	43220220972	SUP
P26/16-3H1	43350004245	SUP
P26/16-3H1-E160	43220220925	SUP

TYPE NUMBER	11NC	CPS
P26/16-3H1-E160	43350004246	SUP
P26/16-3H1-E160/N	43220222925	SUP
P26/16-3H1-E160/N	43350004251	SUP
P26/16-3H1-E250	43220220926	SUP
P26/16-3H1-E250	43350004247	SUP
P26/16-3H1-E250/N	43220222926	SUP
P26/16-3H1-E250/N	43350004252	SUP
P26/16-3H1-E315	43220220927	SUP
P26/16-3H1-E315	43350004248	SUP
P26/16-3H1-E315/N	43220222927	SUP
P26/16-3H1-E315/N	43350004253	SUP
P26/16-3H1-E400	43220220928	SUP
P26/16-3H1-A400	43350004249	SUP
P26/16-3H1-E400/N	43220222928	SUP
P26/16-3H1-A400/N	43350004254	SUP
P26/16-3H1-A630	43220220930	SUP
P26/16-3H1-A630	43350004250	SUP
P26/16-3H1-A630/N	43220222930	SUP
P26/16-3H1-A630/N	43350004255	SUP
P26/16-3H3	43220220951	SUP
P26/16-3H3-E160	43220220955	SUP
P26/16-3H3-E160/N	43220222955	SUP
P26/16-3H3-E250	43220220956	SUP
P26/16-3H3-E250/N	43220222956	SUP
P26/16-3H3-E315	43220220957	SUP
P26/16-3H3-E315/N	43220222957	SUP
P26/16-3H3-E400	43220220958	SUP
P26/16-3H3-E400/N	43220222958	SUP
P26/16-3H3-A630	43220220960	SUP
P26/16-3H3-A630/N	43220222960	SUP
P26/16-4C6	43220220980	SUP
P26/16-4C6-E63	43220220983	SUP
P26/16-4C6-E63/N	43220222983	SUP
P26/16-4C6-E100	43220220984	SUP
P26/16-4C6-E100/N	43220222984	SUP
P26/16/I-3C81	43350000954	PREF
P26/16/I-3C81-A250	43350000955	PREF
P26/16/I-3C81-A315	43350000956	PREF
P26/16/I-3C81-A400	43350000957	PREF
P26/16/I-3C81-A630	43350000958	PREF
P26/16/I-3C81-A1000	43350000959	PREF

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Type number to 11NC

TYPE NUMBER	11NC	CPS
P26/16/I-3C85	43350000960	PREF
P26/16/I-3C85-A250	43350000961	PREF
P26/16/I-3C85-A315	43350000962	PREF
P26/16/I-3C85-A400	43350000963	PREF
P26/16/I-3C85-A630	43350000964	PREF
P26/16/I-3C85-A1000	43350000965	PREF
P26/16/I-3F3	43350000966	PREF
P26/16/I-3F3-A250	43350000967	PREF
P26/16/I-3F3-A315	43350000968	PREF
P26/16/I-3F3-A400	43350000969	PREF
P26/16/I-3F3-A630	43350000970	PREF
P26/16/I-3F3-A1000	43350000971	PREF
P30/19-3B7	43220221000	SUP
P30/19-3B7	43350000737	SUP
P30/19-3B7-E250	43220221106	SUP
P30/19-3B7-E250	43350000738	SUP
P30/19-3B7-E250/N	43220223106	SUP
P30/19-3B7-E250/N	43350000752	SUP
P30/19-3B7-E315	43220221107	SUP
P30/19-3B7-E315	43350000739	SUP
P30/19-3B7-E315/N	43350000753	SUP
P30/19-3B7-E400	43220221108	SUP
P30/19-3B7-E400	43350000740	SUP
P30/19-3B7-E400/N	43350000754	SUP
P30/19-3B7-A630	43220221110	SUP
P30/19-3B7-A630	43350000742	SUP
P30/19-3B7-A630/N	43220223110	SUP
P30/19-3B7-A630/N	43350000756	SUP
P30/19-3B7-A1000	43350000743	SUP
P30/19-3B7-A1000/N	43220223111	SUP
P30/19-3B7-A1000/N	43350000757	SUP
P30/19-3B8	43220221182	SUP
P30/19-3B8-A250	43220221184	SUP
P30/19-3B8-A315	43220221185	SUP
P30/19-3B8-A400	43220221186	SUP
P30/19-3B8-A630	43220221187	SUP
P30/19-3B9	43350000745	OBS
P30/19-3B9-E250	43350000746	OBS
P30/19-3B9-E250/N	43350000759	OBS
P30/19-3B9-E315	43350000747	OBS
P30/19-3B9-E315/N	43350000760	OBS

TYPE NUMBER	11NC	CPS
P30/19-3B9-E400	43350000748	OBS
P30/19-3B9-E400/N	43350000761	OBS
P30/19-3B9-A630	43350000750	OBS
P30/19-3B9-A630/N	43350000763	OBS
P30/19-3B9-A1000	43350000751	OBS
P30/19-3B9-A1000/N	43350000764	OBS
P30/19-3C81	43350000703	PREF
P30/19-3C81-E250	43350000709	PREF
P30/19-3C81-A315	43350000711	PREF
P30/19-3C81-A400	43350000712	PREF
P30/19-3C81-A630	43350000714	PREF
P30/19-3C81-A1000	43350000716	PREF
P30/19-3C85	43220221160	PREF
P30/19-3C85	43350000717	PREF
P30/19-3C85-A250	43220221164	PREF
P30/19-3C85-E250	43350000720	PREF
P30/19-3C85-A315	43220221165	PREF
P30/19-3C85-A315	43350000721	PREF
P30/19-3C85-A400	43220221166	PREF
P30/19-3C85-A400	43350000722	PREF
P30/19-3C85-A630	43220221167	PREF
P30/19-3C85-A630	43350000724	PREF
P30/19-3C85-A1000	43220221168	PREF
P30/19-3C85-A1000	43350000726	PREF
P30/19-3E1	43220221191	SUP
P30/19-3E4	43220221190	SUP
P30/19-3E5	43220221189	PREF
P30/19-3E5	43350000767	PREF
P30/19-3E25	43350000765	SUP
P30/19-3E27	43350000766	PREF
P30/19-3F3	43220221148	PREF
P30/19-3F3	43350000727	PREF
P30/19-3F3-A250	43220221151	PREF
P30/19-3F3-E250	43350000730	PREF
P30/19-3F3-A315	43220221152	PREF
P30/19-3F3-A315	43350000731	PREF
P30/19-3F3-A400	43220221153	PREF
P30/19-3F3-A400	43350000732	PREF
P30/19-3F3-A630	43220221154	PREF
P30/19-3F3-A630	43350000734	PREF
P30/19-3F3-A1000	43220221155	PREF

Conversion list

Type number to 11NC

TYPE NUMBER	11NC	CPS
P30/19-3F3-A1000	43350000736	PREF
P30/19-3H1	43220221120	SUP
P30/19-3H1	43350005811	SUP
P30/19-3H1-E250	43220221126	SUP
P30/19-3H1-E250	43350004412	SUP
P30/19-3H1-E250/N	43220223126	SUP
P30/19-3H1-E250/N	43350005856	SUP
P30/19-3H1-E315	43220221124	SUP
P30/19-3H1-E315	43350004413	SUP
P30/19-3H1-E315/N	43220223124	SUP
P30/19-3H1-E315/N	43350005857	SUP
P30/19-3H1-E400	43220221128	SUP
P30/19-3H1-E400	43350004414	SUP
P30/19-3H1-E400/N	43220223128	SUP
P30/19-3H1-E400/N	43350005858	SUP
P30/19-3H1-A630	43220221130	SUP
P30/19-3H1-A630	43350004415	SUP
P30/19-3H1-A630/N	43220223130	SUP
P30/19-3H1-A630/N	43350005855	SUP
P30/19-3H1-A1000	43220221131	SUP
P30/19-3H1-A1000	43350004416	SUP
P30/19-3H1-A1000/N	43220223131	SUP
P30/19-3H1-A1000/N	43350005820	SUP
P30/19-3H1-A1600	43220221132	SUP
P30/19-3H1-A1600/N	43220223132	SUP
P36/22-3B7	43220221200	SUP
P36/22-3B7	43350000795	SUP
P36/22-3B7-E315	43350000797	SUP
P36/22-3B7-E315/N	43350000814	SUP
P36/22-3B7-E400	43220221308	SUP
P36/22-3B7-E400	43350000798	SUP
P36/22-3B7-E400/N	43220223308	SUP
P36/22-3B7-E400/N	43350000815	SUP
P36/22-3B7-E630	43220221310	SUP
P36/22-3B7-E630	43350000800	SUP
P36/22-3B7-E630/N	43220223310	SUP
P36/22-3B7-E630/N	43350000817	SUP
P36/22-3B7-A1000	43350000801	SUP
P36/22-3B7-A1000/N	43220223311	SUP
P36/22-3B7-A1000/N	43350000818	SUP
P36/22-3B7-A1600	43220221312	SUP

TYPE NUMBER	11NC	CPS
P36/22-3B7-A1600	43350000802	SUP
P36/22-3B7-A1600/N	43350000819	SUP
P36/22-3B8	43220221378	SUP
P36/22-3B8-A250	43220221381	SUP
P36/22-3B8-A315	43220221382	SUP
P36/22-3B8-A400	43220221383	SUP
P36/22-3B8-A630	43220221384	SUP
P36/22-3B9	43350000803	OBS
P36/22-3B9-E315	43350000806	OBS
P36/22-3B9-E315/N	43350000822	OBS
P36/22-3B9-E400	43350000807	OBS
P36/22-3B9-E400/N	43350000823	OBS
P36/22-3B9-E630	43350000810	OBS
P36/22-3B9-E630/N	43350000825	OBS
P36/22-3B9-A1000	43350000811	OBS
P36/22-3B9-A1000/N	43350000826	OBS
P36/22-3B9-A1600	43350000812	OBS
P36/22-3B9-A1600/N	43350000972	OBS
P36/22-3C81	43350000768	PREF
P36/22-3C81-E315	43350000772	PREF
P36/22-3C81-E400	43350000773	PREF
P36/22-3C81-A630	43350000774	PREF
P36/22-3C81-A1000	43350000776	PREF
P36/22-3C81-A1600	43350000777	PREF
P36/22-3C85	43220221360	PREF
P36/22-3C85	43350000778	PREF
P36/22-3C85-A250	43220221364	PREF
P36/22-3C85-A315	43220221365	PREF
P36/22-3C85-E315	43350000781	PREF
P36/22-3C85-A400	43220221366	PREF
P36/22-3C85-E400	43350000782	PREF
P36/22-3C85-A630	43220221367	PREF
P36/22-3C85-A630	43350000783	PREF
P36/22-3C85-A1000	43220221368	PREF
P36/22-3C85-A1000	43350000784	PREF
P36/22-3C85-A1600	43220221369	PREF
P36/22-3C85-A1600	43350000785	PREF
P36/22-3E1	43220221396	SUP
P36/22-3E4	43220221397	SUP
P36/22-3E5	43220221395	PREF
P36/22-3E5	43350000829	PREF

Conversion list

Type number to 11NC

TYPE NUMBER	11NC	CPS
P36/22-3E25	43350000827	SUP
P36/22-3E27	43350000828	PREF
P36/22-3F3	43220221356	PREF
P36/22-3F3	43350000787	PREF
P36/22-3F3-A250	43220221351	PREF
P36/22-3F3-A315	43220221352	PREF
P36/22-3F3-E315	43350000790	PREF
P36/22-3F3-A400	43220221353	PREF
P36/22-3F3-E400	43350000791	PREF
P36/22-3F3-A630	43220221354	PREF
P36/22-3F3-A630	43350000792	PREF
P36/22-3F3-A1000	43220221355	PREF
P36/22-3F3-A1000	43350000793	PREF
P36/22-3F3-A1600	43350000794	PREF
P36/22-3H1	43220221320	SUP
P36/22-3H1	43350004418	SUP
P36/22-3H1-E315	43350004419	SUP
P36/22-3H1-E315/N	43350005860	SUP
P36/22-3H1-E400	43220221328	SUP
P36/22-3H1-E400	43350004420	SUP
P36/22-3H1-E400/N	43220223328	SUP
P36/22-3H1-E400/N	43350005778	SUP
P36/22-3H1-E630	43220221330	SUP
P36/22-3H1-E630	43350004421	SUP
P36/22-3H1-E630/N	43220223330	SUP
P36/22-3H1-E630/N	43350005861	SUP
P36/22-3H1-A1000	43220221331	SUP
P36/22-3H1-A1000	43350004422	SUP
P36/22-3H1-A1000/N	43220223331	SUP
P36/22-3H1-A1000/N	43350005779	SUP
P36/22-3H1-A1600	43220221332	SUP
P36/22-3H1-A1600	43350004423	SUP
P36/22-3H1-A1600/N	43220223332	SUP
P36/22-3H1-A1600/N	43350005859	SUP
P42/29-3B7	43220221400	SUP
P42/29-3B7	43350000857	SUP
P42/29-3B7-E315	43350000859	SUP
P42/29-3B7-E315/N	43350000865	SUP
P42/29-3B7-E400	43350000860	SUP
P42/29-3B7-E400/N	43220223508	SUP
P42/29-3B7-E400/N	43350000866	SUP

TYPE NUMBER	11NC	CPS
P42/29-3B7-E630	43350000862	SUP
P42/29-3B7-E630/N	43350000868	SUP
P42/29-3B7-A1000	43220221511	SUP
P42/29-3B7-A1000	43350000863	SUP
P42/29-3B7-A1000/N	43220223511	SUP
P42/29-3B7-A1000/N	43350000869	SUP
P42/29-3B7-A1600	43350000864	SUP
P42/29-3B7-A1600/N	43350000870	SUP
P42/29-3C81	43350000830	PREF
P42/29-3C81-E315	43350000973	PREF
P42/29-3C81-E400	43350000835	PREF
P42/29-3C81-A630	43350000836	PREF
P42/29-3C81-A1000	43350000838	PREF
P42/29-3C81-A1600	43350000839	PREF
P42/29-3C85	43220221590	PREF
P42/29-3C85	43350000840	PREF
P42/29-3C85-A315	43220221593	PREF
P42/29-3C85-E315	43350000843	PREF
P42/29-3C85-A400	43220221594	PREF
P42/29-3C85-E400	43350000844	PREF
P42/29-3C85-A630	43220221595	PREF
P42/29-3C85-A630	43350000845	PREF
P42/29-3C85-A1000	43220221596	PREF
P42/29-3C85-A1000	43350000847	PREF
P42/29-3C85-A1600	43220221597	PREF
P42/29-3C85-A1600	43350000848	PREF
P42/29-3F3	43220221580	PREF
P42/29-3F3	43350000849	PREF
P42/29-3F3-A315	43220221583	PREF
P42/29-3F3-E315	43350000852	PREF
P42/29-3F3-A400	43220221584	PREF
P42/29-3F3-E400	43350000853	PREF
P42/29-3F3-A630	43220221585	PREF
P42/29-3F3-A630	43350000854	PREF
P42/29-3F3-A1000	43220221586	PREF
P42/29-3F3-A1000	43350000856	PREF
P42/29-3F3-A1600	43220221587	PREF
P42/29-3F3-A1600	43350000974	PREF
P42/29-3H1	43220221520	SUP
P42/29-3H1	43350004425	SUP
P42/29-3H1-E315	43220221527	SUP

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Type number to 11NC

TYPE NUMBER	11NC	CPS
P42/29-3H1-E315	43350004426	SUP
P42/29-3H1-E315/N	43350005864	SUP
P42/29-3H1-E400	43350004427	SUP
P42/29-3H1-E400/N	43350005865	SUP
P42/29-3H1-E630	43220221530	SUP
P42/29-3H1-E630	43350004428	SUP
P42/29-3H1-E630/N	43220223530	SUP
P42/29-3H1-E630/N	43350005866	SUP
P42/29-3H1-A1000	43220221531	SUP
P42/29-3H1-E1000	43350004429	SUP
P42/29-3H1-A1000/N	43220223531	SUP
P42/29-3H1-E1000/N	43350005863	SUP
P42/29-3H1-A1600	43220221532	SUP
P42/29-3H1-A1600	43350004430	SUP
P42/29-3H1-A1600/N	43220223532	SUP
P42/29-3H1-A1600/N	43350005862	SUP
P66/56-3C81	43350000871	SUP
P66/56-3E1	43220221700	SUP
P66/56-3F3	43220221711	SUP
PH14/7.5-3H1	43220205480	SUP
PH26/9.2-3H1	43220205490	SUP
PH5.6/3.6-3D3	43220205421	PREF
PH7.4/3.9-3D3	43220205451	PREF
PH9.4/4.8-3D3	43220205471	PREF
PIN-EC	43350002738	PREF
PINH-EC	43350002739	PREF
PLT14/5/1.5-3E6	43220209143	DES
PLT14/5/1.5-3F3	43220209753	DES
PLT14/5/1.5-3F4	43220209755	DES
PLT14/5/1.5/S-3E6	43220209139	DES
PLT14/5/1.5/S-3F3	43220209681	DES
PLT14/5/1.5/S-3F4	43220209682	DES
PLT18/10/2-3E6	43220209149	DES
PLT18/10/2-3F3	43220209757	DES
PLT18/10/2-3F4	43220209759	DES
PLT18/10/2/S-3E6	43220209145	DES
PLT18/10/2/S-3F3	43220209678	DES
PLT18/10/2/S-3F4	43220209684	DES
PLT22/16/2.5-3E6	43220209134	DES
PLT22/16/2.5-3F3	43220209761	DES
PLT22/16/2.5-3F4	43220209766	DES

TYPE NUMBER	11NC	CPS
PLT22/16/2.5/S-3E6	43220209147	DES
PLT22/16/2.5/S-3F3	43220209679	DES
PLT22/16/2.5/S-3F4	43220209686	DES
PLT32/20/3-3F3	43350000145	DES
PLT32/20/3-3F4	43350000161	DES
PLT38/25/4-3C85	43350000165	DES
PLT38/25/4-3F3	43350000166	DES
PLT38/25/4-3F4	43350000167	DES
PLT43/28/4-3C85	43350000256	DES
PLT43/28/4-3F3	43350000257	DES
PLT43/28/4-3F4	43350000258	DES
PLT58/38/4-3C85	43350000273	DES
PLT58/38/4-3F3	43350000274	DES
PLT58/38/4-3F4	43350000275	DES
PLT64/50/5-3F3	43350000268	DES
PLT64/50/5-3F4	43350000269	DES
PQ20/16-3C81	43350003639	PREF
PQ20/16-3C81-A100	43350003640	PREF
PQ20/16-3C81-A160	43350003641	PREF
PQ20/16-3C81-A250	43350003642	PREF
PQ20/16-3C81-A315	43350003643	PREF
PQ20/16-3C81-A400	43350003644	PREF
PQ20/16-3C81-A630	43350003645	PREF
PQ20/16-3C85	43350003646	PREF
PQ20/16-3C85-A100	43350003647	PREF
PQ20/16-3C85-A160	43350003648	PREF
PQ20/16-3C85-A250	43350003649	PREF
PQ20/16-3C85-A315	43350003650	PREF
PQ20/16-3C85-A400	43350003652	PREF
PQ20/16-3C85-A630	43350003653	PREF
PQ20/16-3F3	43350003655	PREF
PQ20/16-3F3-A100	43350003656	PREF
PQ20/16-3F3-A160	43350003657	PREF
PQ20/16-3F3-A250	43350003658	PREF
PQ20/16-3F3-A315	43350003659	PREF
PQ20/16-3F3-A400	43350003660	PREF
PQ20/16-3F3-A630	43350003661	PREF
PQ20/20-3C81	43350003662	PREF
PQ20/20-3C81-A100	43350003663	PREF
PQ20/20-3C81-A160	43350003664	PREF
PQ20/20-3C81-A250	43350003665	PREF

Conversion list

Type number to 11NC

TYPE NUMBER	11NC	CPS
PQ20/20-3C81-A315	43350003666	PREF
PQ20/20-3C81-A400	43350003667	PREF
PQ20/20-3C81-A630	43350003668	PREF
PQ20/20-3C85	43350003669	PREF
PQ20/20-3C85-A100	43350003670	PREF
PQ20/20-3C85-A160	43350003671	PREF
PQ20/20-3C85-A250	43350003672	PREF
PQ20/20-3C85-A315	43350003673	PREF
PQ20/20-3C85-A400	43350003674	PREF
PQ20/20-3C85-A630	43350003675	PREF
PQ20/20-3F3	43350003676	PREF
PQ20/20-3F3-A100	43350003677	PREF
PQ20/20-3F3-A160	43350003678	PREF
PQ20/20-3F3-A250	43350003679	PREF
PQ20/20-3F3-A315	43350003680	PREF
PQ20/20-3F3-A400	43350003681	PREF
PQ20/20-3F3-A630	43350003682	PREF
PQ26/20-3C81	43350003683	PREF
PQ26/20-3C81-E160	43350003685	PREF
PQ26/20-3C81-E250	43350003686	PREF
PQ26/20-3C81-A315	43350003687	PREF
PQ26/20-3C81-A400	43350003688	PREF
PQ26/20-3C81-A630	43350003689	PREF
PQ26/20-3C81-A1000	43350003690	PREF
PQ26/20-3C85	43350003691	PREF
PQ26/20-3C85-E160	43350003693	PREF
PQ26/20-3C85-E250	43350003694	PREF
PQ26/20-3C85-A315	43350003695	PREF
PQ26/20-3C85-A400	43350003696	PREF
PQ26/20-3C85-A630	43350003697	PREF
PQ26/20-3C85-A1000	43350003698	PREF
PQ26/20-3F3	43350003699	PREF
PQ26/20-3F3-E160	43350003701	PREF
PQ26/20-3F3-E250	43350003702	PREF
PQ26/20-3F3-A315	43350003703	PREF
PQ26/20-3F3-A400	43350003704	PREF
PQ26/20-3F3-A630	43350003705	PREF
PQ26/20-3F3-A1000	43350003706	PREF
PQ26/25-3C81	43350003707	PREF
PQ26/25-3C81-E160	43350003709	PREF
PQ26/25-3C81-E250	43350003710	PREF

TYPE NUMBER	11NC	CPS
PQ26/25-3C81-A315	43350003711	PREF
PQ26/25-3C81-A400	43350003712	PREF
PQ26/25-3C81-A630	43350003713	PREF
PQ26/25-3C81-A1000	43350003714	PREF
PQ26/25-3C85	43350004479	PREF
PQ26/25-3C85-E160	43350003716	PREF
PQ26/25-3C85-E250	43350003717	PREF
PQ26/25-3C85-A315	43350003718	PREF
PQ26/25-3C85-A400	43350003719	PREF
PQ26/25-3C85-A630	43350003720	PREF
PQ26/25-3C85-A1000	43350003721	PREF
PQ26/25-3F3	43350003722	PREF
PQ26/25-3F3-E160	43350003724	PREF
PQ26/25-3F3-E250	43350003725	PREF
PQ26/25-3F3-A315	43350003726	PREF
PQ26/25-3F3-A400	43350003727	PREF
PQ26/25-3F3-A630	43350003728	PREF
PQ26/'25-3F3-A1000	43350003729	PREF
PQ32/20-3C81	43350003730	PREF
PQ32/20-3C81-E315	43350003731	PREF
PQ32/20-3C81-A400	43350003732	PREF
PQ32/20-3C81-A630	43350003733	PREF
PQ32/20-3C81-A1000	43350003734	PREF
PQ32/20-3C81-A1600	43350003735	PREF
PQ32/20-3C85	43350003736	PREF
PQ32/20-3C83-E315	43350003737	PREF
PQ32/20-3C83-A400	43350003738	PREF
PQ32/20-3C83-A630	43350003739	PREF
PQ32/20-3C83-A1000	43350003740	PREF
PQ32/20-3C85-A1600	43350003741	PREF
PQ32/20-3F3	43350003742	PREF
PQ32/20-3F3-E315	43350003743	PREF
PQ32/20-3F3-A400	43350003744	PREF
PQ32/20-3F3-A630	43350003745	PREF
PQ32/20-3F3-A1000	43350003746	PREF
PQ32/20-3F3-A1600	43350003747	PREF
PQ32/30-3C81	43350003748	PREF
PQ32/30-3C81-E315	43350003749	PREF
PQ32/30-3C81-A400	43350003750	PREF
PQ32/30-3C81-A630	43350003751	PREF
PQ32/30-3C81-A1000	43350003752	PREF

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
PQ32/30-3C81-A1600	43350003753	PREF
PQ32/30-3C85	43350003754	PREF
PQ32/30-3C85-E315	43350003755	PREF
PQ32/30-3C85-A400	43350003756	PREF
PQ32/30-3C85-A630	43350003757	PREF
PQ32/30-3C85-A1000	43350003758	PREF
PQ32/30-3C85-A1600	43350003759	PREF
PQ32/30-3F3	43350003760	PREF
PQ32/30-3F3-E315	43350003761	PREF
PQ32/30-3F3-A400	43350003762	PREF
PQ32/30-3F3-A630	43350003763	PREF
PQ32/30-3F3-A1000	43350003764	PREF
PQ32/30-3F3-A1600	43350003765	PREF
PQ35/35-3C81	43350003766	PREF
PQ35/35-3C81-E315	43350003767	PREF
PQ35/35-3C81-A400	43350003768	PREF
PQ35/35-3C81-A630	43350003769	PREF
PQ35/35-3C81-A1000	43350003770	PREF
PQ35/35-3C81-A1600	43350003771	PREF
PQ35/35-3C85	43350003772	PREF
PQ35/35-3C85-E315	43350003773	PREF
PQ35/35-3C85-A400	43350003774	PREF
PQ35/35-3C85-A630	43350003775	PREF
PQ35/35-3C85-A1000	43350003776	PREF
PQ35/35-3C85-A1600	43350003777	PREF
PQ35/35-3F3	43350003778	PREF
PQ35/35-3F3-E315	43350003779	PREF
PQ35/35-3F3-A400	43350003780	PREF
PQ35/35-3F3-A630	43350003781	PREF
PQ35/35-3F3-A1000	43350003782	PREF
PQ35/35-3F3-A1600	43350003783	PREF
PT14/8-3B7	43350003021	SUP
PT14/8/3B7-E63	43350003022	SUP
PT14/8-3B7-A100	43350003024	SUP
PT14/8-3B7-A160	43350003026	SUP
PT14/8-3B7-A250	43350003028	SUP
PT14/8-3B7-A315	43350003030	SUP
PT14/8-3B9	43350003031	OBS
PT14/8-3B9-E63	43350003032	OBS
PT14/8-3B9-A100	43350003034	OBS
PT14/8-3B9-A160	43350003036	OBS

TYPE NUMBER	11NC	CPS
PT14/8-3B9-A250	43350003038	OBS
PT14/8-3B9-A315	43350000976	OBS
PT14/8-3C81	43350003000	PREF
PT14/8-3C81-A63	43350003001	PREF
PT14/8-3C81-A100	43350003002	PREF
PT14/8-3C81-A160	43350003004	PREF
PT14/8-3C81-A250	43350003006	PREF
PT14/8-3C81-A315	43350003007	PREF
PT14/8-3C85	43350003009	PREF
PT14/8-3C85-A63	43350003010	PREF
PT14/8-3C85-A100	43350003011	PREF
PT14/8-3C85-A160	43350003012	PREF
PT14/8-3C85-A250	43350003013	PREF
PT14/8-3C85-A315	43350003014	PREF
PT14/8-3E5	43350003041	PREF
PT14/8-3E27	43350003040	PREF
PT14/8-3F3	43350003015	PREF
PT14/8-3F3-A63	43350003016	PREF
PT14/8-3F3-A100	43350003017	PREF
PT14/8-3F3-A160	43350003018	PREF
PT14/8-3F3-A250	43350003019	PREF
PT14/8-3F3-A315	43350003020	PREF
PT18/11-3B7	43350003060	SUP
PT18/11-3B7-E100	43350003061	SUP
PT18/11-3B7-E160	43350003062	SUP
PT18/11-3B7-A250	43350003063	SUP
PT18/11-3B7-A315	43350003064	SUP
PT18/11-3B7-A400	43350003065	SUP
PT18/11-3B9	43350003066	OBS
PT18/11-3B9-E100	43350003067	OBS
PT18/11-3B9-E160	43350003068	OBS
PT18/11-3B9-A250	43350003069	OBS
PT18/11-3B9-A315	43350003070	OBS
PT18/11-3B9-A400	43350003071	OBS
PT18/11-3C81	43350003042	PREF
PT18/11-3C81-A100	43350003043	PREF
PT18/11-3C81-A160	43350003044	PREF
PT18/11-3C81-A250	43350003045	PREF
PT18/11-3C81-A315	43350003046	PREF
PT18/11-3C81-A400	43350003047	PREF
PT18/11-3C85	43350003048	PREF

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
PT18/11-3C85-A100	43350003049	PREF
PT18/11-3C85-A160	43350003050	PREF
PT18/11-3C85-A250	43350003051	PREF
PT18/11-3C85-A315	43350003052	PREF
PT18/11-3C85-A400	43350003053	PREF
PT18/11-3E5	43350003073	PREF
PT18/11-3E27	43350003072	PREF
PT18/11-3F3	43350003054	PREF
PT18/11-3F3-A100	43350003055	PREF
PT18/11-3F3-A160	43350003056	PREF
PT18/11-3F3-A250	43350003057	PREF
PT18/11-3F3-A315	43350003058	PREF
PT18/11-3F3-A400	43350003059	PREF
PT23/11-3B9	43350003099	OBS
PT23/11-3B9-A160	43350003100	OBS
PT23/11-3B9-A250	43350003101	OBS
PT23/11-3B9-A315	43350003102	OBS
PT23/11-3B9-A400	43350003103	OBS
PT23/11-3B9-A630	43350003104	OBS
PT23/11-3C81	43350003074	PREF
PT23/11-3C81-A160	43350003075	PREF
PT23/11-3C81-A250	43350003076	PREF
PT23/11-3C81-A315	43350003077	PREF
PT23/11-3C81-A400	43350003079	PREF
PT23/11-3C81-A630	43350003080	PREF
PT23/11-3C85	43350003081	PREF
PT23/11-3C85-A160	43350003082	PREF
PT23/11-3C85-A250	43350003083	PREF
PT23/11-3C85-A315	43350003084	PREF
PT23/11-3C85-A400	43350003085	PREF
PT23/11-3C85-A630	43350003086	PREF
PT23/11-3E5	43350003106	PREF
PT23/11-3E27	43350003105	PREF
PT23/11-3F3	43350003087	PREF
PT23/11-3F3-A160	43350003088	PREF
PT23/11-3F3-A250	43350003089	PREF
PT23/11-3F3-A315	43350003090	PREF
PT23/11-3F3-A400	43350003091	PREF
PT23/11-3F3-A630	43350003092	PREF
PT23/18-3B9	43350003133	OBS
PT23/18-3B9-E160	43350003134	OBS

TYPE NUMBER	11NC	CPS
PT23/18-3B9-A250	43350003136	OBS
PT23/18-3B9-A315	43350003138	OBS
PT23/18-3B9-A400	43350003139	OBS
PT23/18-3B9-A630	43350003142	OBS
PT23/18-3C81	43350003107	PREF
PT23/18-3C81-A160	43350003108	PREF
PT23/18-3C81-A250	43350003110	PREF
PT23/18-3C81-A315	43350003111	PREF
PT23/18-3C81-A400	43350003112	PREF
PT23/18-3C81-A630	43350003014	PREF
PT23/18-3C85	43350003115	PREF
PT23/18-3C85-A160	43350003116	PREF
PT23/18-3C85-A250	43350003117	PREF
PT23/18-3C85-A315	43350003118	PREF
PT23/18-3C85-A400	43350003119	PREF
PT23/18-3C85-A630	43350003120	PREF
PT23/18-3E5	43350003144	PREF
PT23/18-3E27	43350003143	PREF
PT23/18-3F3	43350003121	PREF
PT23/18-3F3-A160	43350003122	PREF
PT23/18-3F3-A250	43350003123	PREF
PT23/18-3F3-A315	43350003124	PREF
PT23/18-3F3-A400	43350003125	PREF
PT23/18-3F3-A630	43350003126	PREF
PT30/19-3B7	43350003168	SUP
PT30/19-3B7-E315	43350003171	SUP
PT30/19-3B7-A400	43350003172	SUP
PT30/19-3B7-A630	43350003174	SUP
PT30/19-3B7-A1000	43350003176	SUP
PT30/19-3B7-A1600	43350003177	SUP
PT30/19-3B9	43350003178	OBS
PT30/19-3B9-E315	43350003181	OBS
PT30/19-3B9-A400	43350003182	OBS
PT30/19-3B9-A630	43350003184	OBS
PT30/19-3B9-A1000	43350003187	OBS
PT30/19-3B9-A1600	43350000978	OBS
PT30/19-3C81	43350003145	PREF
PT30/19-3C81-A315	43350003148	PREF
PT30/19-3C81-A400	43350003149	PREF
PT30/19-3C81-A630	43350003150	PREF
PT30/19-3C81-A1000	43350003152	PREF

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
PT30/19-3C81-A1600	43350003153	PREF
PT30/19-3C85	43350003155	PREF
PT30/19-3C85-A315	43350003156	PREF
PT30/19-3C85-A400	43350003157	PREF
PT30/19-3C85-A630	43350003158	PREF
PT30/19-3C85-A1000	43350003159	PREF
PT30/19-3C85-A1600	43350003160	PREF
PT30/19-3E5	43350003190	PREF
PT30/19-3E27	43350003189	PREF
PT30/19-3F3	43350003161	PREF
PT30/19-3F3-A315	43350003163	PREF
PT30/19-3F3-A400	43350003164	PREF
PT30/19-3F3-A630	43350003165	PREF
PT30/19-3F3-A1000	43350003166	PREF
PT30/19-3F3-A1600	43350003167	PREF
PTS14/8-3B7	43350003208	SUP
PTS14/8-3B7-E63	43350003209	SUP
PTS14/8-3B7-E100	43350003210	SUP
PTS14/8-3B7-A160	43350003211	SUP
PTS14/8-3B7-A250	43350003212	SUP
PTS14/8-3B7-A315	43350003213	SUP
PTS14/8-3B9	43350003214	OBS
PTS14/8-3B9-E63	43350003215	OBS
PTS14/8-3B9-E100	43350003216	OBS
PTS14/8-3B9-A160	43350003217	OBS
PTS14/8-3B9-A250	43350003218	OBS
PTS14/8-3B9-A315	43350003219	OBS
PTS14/8-3C81	43350003191	PREF
PTS14/8-3C81-A63	43350003192	PREF
PTS14/8-3C81-A100	43350003193	PREF
PTS14/8-3C81-A160	43350003194	PREF
PTS14/8-3C81-A250	43350003195	PREF
PTS14/8-3C81-A315	43350003196	PREF
PTS14/8-3C85	43350003197	PREF
PTS14/8-3C85-A63	43350003198	PREF
PTS14/8-3C85-A100	43350003199	PREF
PTS14/8-3C85-A160	43350003200	PREF
PTS14/8-3C85-A250	43350003201	PREF
PTS14/8-3C85-A315	43350003202	PREF
PTS14/8-3E5	43350003221	PREF
PTS14/8-3E27	43350003220	PREF

TYPE NUMBER	11NC	CPS
PTS14/8-3F3	43350002958	PREF
PTS14/8-3F3-A63	43350003203	PREF
PTS14/8-3F3-A100	43350003204	PREF
PTS14/8-3F3-A160	43350003205	PREF
PTS14/8-3F3-A250	43350003206	PREF
PTS14/8-3F3-A315	43350003207	PREF
PTS18/11-3B7	43350003240	SUP
PTS18/11-3B7-E100	43350003241	SUP
PTS18/11-3B7-E160	43350003242	SUP
PTS18/11-3B7-A250	43350003243	SUP
PTS18/11-3B7-A315	43350003244	SUP
PTS18/11-3B7-A400	43350003245	SUP
PTS18/11-3B9	43350003246	OBS
PTS18/11-3B9-E100	43350003247	OBS
PTS18/11-3B9-E160	43350003248	OBS
PTS18/11-3B9-A250	43350003249	OBS
PTS18/11-3B9-A315	43350003250	OBS
PTS18/11-3B9-A400	43350003251	OBS
PTS18/11-3C81	43350003222	PREF
PTS18/11-3C81-A100	43350003223	PREF
PTS18/11-3C81-A160	43350003224	PREF
PTS18/11-3C81-A250	43350003225	PREF
PTS18/11-3C81-A315	43350003226	PREF
PTS18/11-3C81-A400	43350003227	PREF
PTS18/11-3C85	43350003228	PREF
PTS18/11-3C85-A100	43350003229	PREF
PTS18/11-3C85-A160	43350003230	PREF
PTS18/11-3C85-A250	43350003231	PREF
PTS18/11-3C85-A315	43350003232	PREF
PTS18/11-3C85-A400	43350003233	PREF
PTS18/11-3E5	43350003253	PREF
PTS18/11-3E27	43350003252	PREF
PTS18/11-3F3	43350003234	PREF
PTS18/11-3F3-A100	43350003235	PREF
PTS18/11-3F3-A160	43350003236	PREF
PTS18/11-3F3-A250	43350003237	PREF
PTS18/11-3F3-A315	43350003238	PREF
PTS18/11-3F3-A400	43350003239	PREF
PTS23/11-3B9	43350003279	OBS
PTS23/11-3B9-E160	43350003280	OBS
PTS23/11-3B9-E250	43350003281	OBS

Conversion list

Type number to 11NC

TYPE NUMBER	11NC	CPS
PTS23/11-3B9-A315	43350003282	OBS
PTS23/11-3B9-A400	43350003283	OBS
PTS23/11-3B9-A630	43350003284	OBS
PTS23/11-3C81	43350003254	PREF
PTS23/11-3C81-A160	43350003255	PREF
PTS23/11-3C81-A250	43350003256	PREF
PTS23/11-3C81-A315	43350003257	PREF
PTS23/11-3C81-A400	43350003259	PREF
PTS23/11-3C81-A630	43350003260	PREF
PTS23/11-3C85	43350003261	PREF
PTS23/11-3C85-A160	43350003262	PREF
PTS23/11-3C85-A250	43350003263	PREF
PTS23/11-3C85-A315	43350003264	PREF
PTS23/11-3C85-A400	43350003265	PREF
PTS23/11-3C85-A630	43350003266	PREF
PTS23/11-3E5	43350003286	PREF
PTS23/11-3E27	43350003285	PREF
PTS23/11-3F3	43350003267	PREF
PTS23/11-3F3-A160	43350003268	PREF
PTS23/11-3F3-A250	43350003269	PREF
PTS23/11-3F3-A315	43350003270	PREF
PTS23/11-3F3-A400	43350003271	PREF
PTS23/11-3F3-A630	43350003272	PREF
PTS23/18-3B9	43350003310	OBS
PTS23/18-3B9-E160	43350003311	OBS
PTS23/18-3B9-E250	43350003312	OBS
PTS23/18-3B9-A315	43350003313	OBS
PTS23/18-3B9-A400	43350003314	OBS
PTS23/18-3B9-A630	43350003315	OBS
PTS23/18-3C81	43350003287	PREF
PTS23/18-3C81-A160	43350003288	PREF
PTS23/18-3C81-A250	43350003289	PREF
PTS23/18-3C81-A315	43350003290	PREF
PTS23/18-3C81-A400	43350003291	PREF
PTS23/18-3C81-A630	43350003292	PREF
PTS23/18-3C85	43350003293	PREF
PTS23/18-3C85-A160	43350003294	PREF
PTS23/18-3C85-A250	43350003295	PREF
PTS23/18-3C85-A315	43350003296	PREF
PTS23/18-3C85-A400	43350003297	PREF
PTS23/18-3C85-A630	43350003298	PREF

TYPE NUMBER	11NC	CPS
PTS23/18-3E5	43350003317	PREF
PTS23/18-3E27	43350003316	PREF
PTS23/18-3F3	43350003299	PREF
PTS23/18-3F3-A160	43350003300	PREF
PTS23/18-3F3-A250	43350003301	PREF
PTS23/18-3F3-A315	43350003302	PREF
PTS23/18-3F3-A400	43350003303	PREF
PTS23/18-3F3-A630	43350003304	PREF
PTS30/19-3B7	43350003337	SUP
PTS30/19-3B7-E315	43350003338	SUP
PTS30/19-3B7-E400	43350003339	SUP
PTS30/19-3B7-A630	43350003340	SUP
PTS30/19-3B7-A1000	43350003341	SUP
PTS30/19-3B7-A1600	43350003342	SUP
PTS30/19-3B9	43350003343	OBS
PTS30/19-3B9-A315	43350003344	OBS
PTS30/19-3B9-A400	43350003345	OBS
PTS30/19-3B9-A630	43350003346	OBS
PTS30/19-3B9-A1000	43350003347	OBS
PTS30/19-3B9-A1600	43350003348	OBS
PTS30/19-3C81	43350003318	PREF
PTS30/19-3C81-A315	43350003320	PREF
PTS30/19-3C81-A400	43350003321	PREF
PTS30/19-3C81-A630	43350003322	PREF
PTS30/19-3C81-A1000	43350003323	PREF
PTS30/19-3C81-A1600	43350003324	PREF
PTS30/19-3C85	43350003325	PREF
PTS30/19-3C85-A315	43350003326	PREF
PTS30/19-3C85-A400	43350003327	PREF
PTS30/19-3C85-A630	43350003328	PREF
PTS30/19-3C85-A1000	43350003329	PREF
PTS30/19-3C85-A1600	43350003330	PREF
PTS30/19-3E5	43350003350	PREF
PTS30/19-3E27	43350003349	PREF
PTS30/19-3F3	43350003331	PREF
PTS30/19-3F3-A315	43350003332	PREF
PTS30/19-3F3-A400	43350003333	PREF
PTS30/19-3F3-A630	43350003334	PREF
PTS30/19-3F3-A1000	43350003335	PREF
PTS30/19-3F3-A1600	43350003336	PREF
RM4-3D3	43220225739	PREF

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
RM4-3D3-A40	43220225742	PREF
RM4-3D3-A40/N	43220227742	PREF
RM4-3D3-A63	43220225743	PREF
RM4-3D3-A63/N	43220227743	PREF
RM4-3H1	43220225720	SUP
RM4-3H1-E40	43220225722	SUP
RM4-3H1-E40/N	43220227722	SUP
RM4-3H1-A63	43220225723	SUP
RM4-3H1-A63/N	43220227723	SUP
RM4-3H1-A100	43220225724	SUP
RM4-3H1-A100/N	43220227724	SUP
RM4-3H1-A160	43220225725	SUP
RM4-3H1-A160/N	43220227725	SUP
RM4-3H1-A250	43220225726	SUP
RM4-3H1-A250/N	43220227726	SUP
RM4-3H3	43220225750	PREF
RM4-3H3-A63	43220225753	PREF
RM4-3H3-A63/N	43220227753	PREF
RM4-3H3-A100	43220225754	PREF
RM4-3H3-A100/N	43220227754	PREF
RM4-3H3-A160	43220225755	PREF
RM4-3H3-A160/N	43220227755	PREF
RM4-4C6	43220225779	SUP
RM4-4C6-E16	43220225780	SUP
RM4-4C6-E16/N	43220227780	SUP
RM4-4C6-E25	43220225781	SUP
RM4-4C6-E25/N	43220227781	SUP
RM4-4C6-A40	43220225782	SUP
RM4-4C6-A40/N	43220227782	SUP
RM4/I-3E1	43220225770	PREF
RM4/I-3E4	43220225791	PREF
RM4/I-3E5	43220225775	PREF
RM4/I-3F3	43220225710	PREF
RM4/I-3F3-A100	43220225714	PREF
RM4/I-3F3-A160	43220225715	PREF
RM4/I-3F3-A250	43220225716	PREF
RM4/I-3F4	43220224600	DES
RM4/I-3F4-A100	43220224601	DES
RM4/I-3F4-A160	43220224602	DES
RM4/I-3F4-A250	43220224603	DES
RM4/ILP-3C85	43220225759	DES

TYPE NUMBER	11NC	CPS
RM4/ILP-3C90	43220225794	DES
RM4/ILP-3E5	43220225796	DES
RM4/ILP-3E6	43220225798	DES
RM4/ILP-3F3	43220225760	DES
RM4/ILP-3F4	43220225797	DES
RM5-3B7	43220225900	SUP
RM5-3B7	43350003351	SUP
RM5-3B7-E63	43220225903	SUP
RM5-3B7-E63	43350003352	SUP
RM5-3B7-E63/N	43220227903	SUP
RM5-3B7-E63/N	43350003357	SUP
RM5-3B7-E100	43220225904	SUP
RM5-3B7-E100	43350003353	SUP
RM5-3B7-E100/N	43220227904	SUP
RM5-3B7-E100/N	43350003358	SUP
RM5-3B7-A160	43220225905	SUP
RM5-3B7-A160	43350003354	SUP
RM5-3B7-A160/N	43220227905	SUP
RM5-3B7-A160/N	43350003359	SUP
RM5-3B7-A250	43220225906	SUP
RM5-3B7-A250	43350003355	SUP
RM5-3B7-A250/N	43220227906	SUP
RM5-3B7-A250/N	43350003360	SUP
RM5-3B7-A315	43220225907	SUP
RM5-3B7-A315	43350003356	SUP
RM5-3B7-A315/N	43220227907	SUP
RM5-3B7-A315/N	43350003361	SUP
RM5-3B9	43350003362	OBS
RM5-3B9-E63	43350003363	OBS
RM5-3B9-E63/N	43350003368	OBS
RM5-3B9-E100	43350003364	OBS
RM5-3B9-E100/N	43350003369	OBS
RM5-3B9-A160	43350003365	OBS
RM5-3B9-A160/N	43350003370	OBS
RM5-3B9-A250	43350003366	OBS
RM5-3B9-A250/N	43350003371	OBS
RM5-3B9-A315	43350003367	OBS
RM5-3B9-A315/N	43350003372	OBS
RM5-3D3	43220225940	PREF
RM5-3D3-E40	43220225942	PREF
RM5-3D3-E40/N	43220227942	PREF

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
RM5-3D3-A63	43220225943	PREF
RM5-3D3-A63/N	43220227943	PREF
RM5-3D3-A100	43220225944	PREF
RM5-3D3-E100/N	43220227944	PREF
RM5-3H1	43220225920	SUP
RM5-3H1-A160	43220225925	SUP
RM5-3H1-A160/N	43220227925	SUP
RM5-3H1-A250	43220225926	SUP
RM5-3H1-A250/N	43220227926	SUP
RM5-3H1-A315	43220225927	SUP
RM5-3H1-A315/N	43220227927	SUP
RM5-3H3	43220225970	PREF
RM5-3H3-A160	43220225955	PREF
RM5-3H3-A160/N	43220227955	PREF
RM5-3H3-A250	43220225956	PREF
RM5-3H3-A250/N	43220227956	PREF
RM5-3H3-A315	43220225957	PREF
RM5-3H3-A315/N	43220227957	PREF
RM5-3H3-A400	43220225958	PREF
RM5-3H3-A400/N	43220227958	PREF
RM5-4C6	43220225984	SUP
RM5-4C6-E16	43220225980	SUP
RM5-4C6-E16/N	43220227980	SUP
RM5-4C6-E25	43220225981	SUP
RM5-4C6-E25/N	43220227981	SUP
RM5-4C6-E40	43220225982	SUP
RM5-4C6-E40/N	43220227982	SUP
RM5-4C6-E63	43220225983	SUP
RM5-4C6-E63/N	43220227983	SUP
RM5/I-3B8	43220225946	SUP
RM5/I-3B8-A100	43220225947	SUP
RM5/I-3B8-A160	43220225948	SUP
RM5/I-3B8-A250	43220225949	SUP
RM5/I-3C85	43220250400	PREF
RM5/I-3C85	43350003445	PREF
RM5/I-3C85-A63	43220250403	PREF
RM5/I-3C85-A63	43350003446	PREF
RM5/I-3C85-A100	43220250404	PREF
RM5/I-3C85-A100	43350003447	PREF
RM5/I-3C85-A160	43220250405	PREF
RM5/I-3C85-A160	43350003448	PREF

TYPE NUMBER	11NC	CPS
RM5/I-3C85-A250	43220250406	PREF
RM5/I-3C85-A250	43350003449	PREF
RM5/I-3C85-A315	43220250407	PREF
RM5/I-3C85-A315	43350003450	PREF
RM5/I-3C90	43220250430	PREF
RM5/I-3E1	43220225990	PREF
RM5/I-3E4	43220225991	PREF
RM5/I-3E5	43220225992	PREF
RM5/I-3E5	43350003460	PREF
RM5/I-3E6	43220225916	PREF
RM5/I-3E25	43350003458	SUP
RM5/I-3E27	43350003459	PREF
RM5/I-3F3	43220250410	PREF
RM5/I-3F3	43350003451	PREF
RM5/I-3F3-A63	43220250413	PREF
RM5/I-3F3-A63	43350003452	PREF
RM5/I-3F3-A100	43220250414	PREF
RM5/I-3F3-A100	43350003453	PREF
RM5/I-3F3-A160	43220250415	PREF
RM5/I-3F3-A160	43350003454	PREF
RM5/I-3F3-A250	43220250416	PREF
RM5/I-3F3-A250	43350003455	PREF
RM5/I-3F3-A315	43220250417	PREF
RM5/I-3F3-A315	43350003456	PREF
RM5/I-3F4	43220250420	DES
RM5/I-3F4-A100	43220250421	DES
RM5/I-3F4-A160	43220250422	DES
RM5/I-3F4-A250	43220250423	DES
RM5/ILP-3C85	43220225917	DES
RM5/ILP-3C90	43220225913	DES
RM5/ILP-3E5	43220225919	DES
RM5/ILP-3E6	43220225914	DES
RM5/ILP-3F3	43220225918	DES
RM5/ILP-3F4	43220225915	DES
RM6R-3B7	43350003374	SUP
RM6R-3B7-E100	43220225504	SUP
RM6R-3B7-E100	43350003375	SUP
RM6R-3B7-E100/N	43220227504	SUP
RM6R-3B7-E100/N	43350003387	SUP
RM6R-3B7-A160	43220225505	SUP
RM6R-3B7-A160	43350003376	SUP

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
RM6R-3B7-A160/N	43220227505	SUP
RM6R-3B7-A160/N	43350003388	SUP
RM6R-3B7-A250	43220225506	SUP
RM6R-3B7-A250	43350003377	SUP
RM6R-3B7-A250/N	43220227506	SUP
RM6R-3B7-A250/N	43350003389	SUP
RM6R-3B7-A315	43220225507	SUP
RM6R-3B7-A315	43350003378	SUP
RM6R-3B7-A315/N	43220227507	SUP
RM6R-3B7-A315/N	43350003390	SUP
RM6R-3B7-A400	43220225508	SUP
RM6R-3B7-A400	43350003379	SUP
RM6R-3B7-A400/N	43220227508	SUP
RM6R-3B7-A400/N	43350003391	SUP
RM6R-3B9	43350003380	OBS
RM6R-3B9-E100	43350003382	OBS
RM6R-3B9-E100/N	43350003392	OBS
RM6R-3B9-A160	43350003383	OBS
RM6R-3B9-A160/N	43350003393	OBS
RM6R-3B9-A250	43350003384	OBS
RM6R-3B9-A250/N	43350003394	OBS
RM6R-3B9-A315	43350003385	OBS
RM6R-3B9-A315/N	43350003395	OBS
RM6R-3B9-A400	43350003386	OBS
RM6R-3B9-A400/N	43350003396	OBS
RM6R-3D3	43220225540	SUP
RM6R-3D3-E40	43220225542	SUP
RM6R-3D3-E40/N	43220227542	SUP
RM6R-3D3-E100	43220225544	SUP
RM6R-3D3-E100/N	43220227544	SUP
RM6R-3D3-A160	43220225545	SUP
RM6R-3D3-A160/N	43220227545	SUP
RM6R-3D3-E63	43220225543	SUP
RM6R-3D3-E63/N	43220227543	SUP
RM6R-3H1	43220225520	SUP
RM6R-3H1	43350005871	SUP
RM6R-3H1-A160	43220225525	SUP
RM6R-3H1-A160	43350005872	SUP
RM6R-3H1-A160/N	43220227525	SUP
RM6R-3H1-A250	43220225526	SUP
RM6R-3H1-A250	43350005873	SUP

TYPE NUMBER	11NC	CPS
RM6R-3H1-A250/N	43220227526	SUP
RM6R-3H1-A315	43220225527	SUP
RM6R-3H1-A315	43350005874	SUP
RM6R-3H1-A315/N	43220227527	SUP
RM6R-3H1-A400	43220225528	SUP
RM6R-3H1-A400	43350005875	SUP
RM6R-3H1-A400/N	43220227528	SUP
RM6R-3H1-A630	43220225530	SUP
RM6R-3H1-A630	43350005876	SUP
RM6R-3H1-A630/N	43220227530	SUP
RM6R-3H1-A1000	43220225531	SUP
RM6R-3H1-A1000/N	43220227531	SUP
RM6R-3H1-A1250	43220225539	SUP
RM6R-3H1-A1250/N	43220227539	SUP
RM6R-3H3	43220225562	SUP
RM6R-3H3-A160	43220225555	SUP
RM6R-3H3-A160/N	43220227555	SUP
RM6R-3H3-A250	43220225556	SUP
RM6R-3H3-A250/N	43220227556	SUP
RM6R-3H3-A315	43220225557	SUP
RM6R-3H3-A315/N	43220227557	SUP
RM6R-3H3-A400	43220225558	SUP
RM6R-3H3-A400/N	43220227558	SUP
RM6R-4C6	43220225566	SUP
RM6R-4C6-E25	43220225581	SUP
RM6R-4C6-E25/N	43220227581	SUP
RM6R-4C6-E40	43220225582	SUP
RM6R-4C6-E40/N	43220227582	SUP
RM6R-4C6-E63	43220225583	SUP
RM6R-4C6-E63/N	43220227583	SUP
RM6S-3B7	43220224700	SUP
RM6S-3B7-A160	43220224705	SUP
RM6S-3B7-A160/N	43220226705	SUP
RM6S-3B7-A250	43220224706	SUP
RM6S-3B7-A250/N	43220226706	SUP
RM6S-3B7-A315	43220224707	SUP
RM6S-3B7-A315/N	43220226707	SUP
RM6S-3B7-A400	43220224708	SUP
RM6S-3B7-A400/N	43220226708	SUP
RM6S-3B7-A630	43220224710	SUP
RM6S-3B7-A1250	43220224719	SUP

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
RM6S-3B7-A1250/N	43220226719	SUP
RM6S-3D3	43220224740	PREF
RM6S-3D3-E63	43220224743	PREF
RM6S-3D3-E63/N	43220226743	PREF
RM6S-3D3-E100	43220224744	PREF
RM6S-3D3-E100/N	43220226744	PREF
RM6S-3D3-A160	43220224745	PREF
RM6S-3D3-A160/N	43220226745	PREF
RM6S-3H1	43220224721	SUP
RM6S-3H1-A160	43220224725	SUP
RM6S-3H1-A160/N	43220226725	SUP
RM6S-3H1-A250	43220224726	SUP
RM6S-3H1-A250/N	43220226726	SUP
RM6S-3H1-A315	43220224727	SUP
RM6S-3H1-A315/N	43220226727	SUP
RM6S-3H1-A400	43220224728	SUP
RM6S-3H1-A400/N	43220226728	SUP
RM6S-3H1-A630	43220224730	SUP
RM6S-3H1-A630/N	43220226730	SUP
RM6S-3H1-A1000	43220224731	SUP
RM6S-3H1-A1000/N	43220226731	SUP
RM6S-3H1-A1250	43220224739	SUP
RM6S-3H1-A1250/N	43220226739	SUP
RM6S-3H3	43220224750	PREF
RM6S-3H3-A160	43220224755	PREF
RM6S-3H3-A160/N	43220226755	PREF
RM6S-3H3-A250	43220224756	PREF
RM6S-3H3-A250/N	43220226756	PREF
RM6S-3H3-A315	43220224757	PREF
RM6S-3H3-A315/N	43220226757	PREF
RM6S-3H3-A400	43220224758	PREF
RM6S-3H3-A400/N	43220226758	PREF
RM6S-4C6	43220224778	SUP
RM6S-4C6-E25	43220224781	SUP
RM6S-4C6-E25/N	43220226781	SUP
RM6S-4C6-E40	43220224782	SUP
RM6S-4C6-E40/N	43220226782	SUP
RM6S-4C6-E63	43220224783	SUP
RM6S-4C6-E63/N	43220226783	SUP
RM6S/I-3B8	43220224785	SUP
RM6S/I-3B8-A63	43220224772	SUP

TYPE NUMBER	11NC	CPS
RM6S/I-3B8-A100	43220224774	SUP
RM6S/I-3B8-A160	43220224773	SUP
RM6S/I-3B8-A250	43220224788	SUP
RM6S/I-3C81	43350003461	PREF
RM6S/I-3C81-A63	43350003462	PREF
RM6S/I-3C81-A100	43350003463	PREF
RM6S/I-3C81-A160	43350003464	PREF
RM6S/I-3C81-A250	43350003465	PREF
RM6S/I-3C81-A315	43350003466	PREF
RM6S/I-3C85	43220250500	PREF
RM6S/I-3C85	43350003468	PREF
RM6S/I-3C85-A63	43220250503	PREF
RM6S/I-3C85-A63	43350003469	PREF
RM6S/I-3C85-A100	43220250504	PREF
RM6S/I-3C85-A100	43350003470	PREF
RM6S/I-3C85-A160	43220250505	PREF
RM6S/I-3C85-A160	43350003471	PREF
RM6S/I-3C85-A250	43220250506	PREF
RM6S/I-3C85-A250	43350003472	PREF
RM6S/I-3C85-A315	43220250507	PREF
RM6S/I-3C85-A315	43350003473	PREF
RM6S/I-3C85-A400	43220250508	PREF
RM6S/I-3C85-A630	43220250509	PREF
RM6S/I-3C90	43220224747	PREF
RM6S/I-3D3	43220250540	DES
RM6S/I-3D3-A160	43220250541	DES
RM6S/I-3D3-A250	43220250542	DES
RM6S/I-3D3-A315	43220250543	DES
RM6S/I-3E1	43220224786	PREF
RM6S/I-3E4	43220224793	PREF
RM6S/I-3E5	43220224787	PREF
RM6S/I-3E6	43220224784	PREF
RM6S/I-3E25	43350003480	SUP
RM6S/I-3E27	43350003481	PREF
RM6S/I-3F3	43220250511	PREF
RM6S/I-3F3	43350003475	PREF
RM6S/I-3F3-A63	43220250513	PREF
RM6S/I-3F3-A63	43350003476	PREF
RM6S/I-3F3-A100	43220250514	PREF
RM6S/I-3F3-A100	43350003477	PREF
RM6S/I-3F3-A160	43220250515	PREF

Conversion list

Type number to 11NC

TYPE NUMBER	11NC	CPS
RM6S/I-3F3-A160	43350000191	PREF
RM6S/I-3F3-A250	43220250516	PREF
RM6S/I-3F3-A250	43350003478	PREF
RM6S/I-3F3-A315	43220250517	PREF
RM6S/I-3F3-A315	43350003479	PREF
RM6S/I-3F4	43220250530	DES
RM6S/I-3F4-A63	43220250531	DES
RM6S/I-3F4-A100	43220250532	DES
RM6S/I-3F4-A160	43220250533	DES
RM6S/I-3F4-A250	43220250534	DES
RM6S/I-3F4-A315	43220250535	DES
RM6S/I-3H3	43220250550	DES
RM6S/I-3H3-A315	43220250551	DES
RM6S/I-3H3-A400	43220224752	DES
RM6S/I-3H3-A630	43220224753	DES
RM6S/ILP-3C85	43220224770	DES
RM6S/ILP-3C90	43220224748	DES
RM6S/ILP-3D3	43220250545	DES
RM6S/ILP-3D3-A160	43220250546	DES
RM6S/ILP-3D3-A250	43220250547	DES
RM6S/ILP-3D3-A315	43220250548	DES
RM6S/ILP-3E5	43220250598	DES
RM6S/ILP-3E6	43220250599	DES
RM6S/ILP-3F3	43220224771	DES
RM6S/ILP-3F4	43220224749	DES
RM6S/ILP-3H3	43220224751	DES
RM6S/ILP-3H3-A315	43220250560	DES
RM6S/ILP-3H3-A400	43220250561	DES
RM6S/ILP-3H3-A630	43220250562	DES
RM7/I-3B8	43220250060	SUP
RM7/I-3B8-A160	43220250065	SUP
RM7/I-3B8-A250	43220250066	SUP
RM7/I-3C85	43220250040	SUP
RM7/I-3C85-A100	43220250044	SUP
RM7/I-3C85-A160	43220250045	SUP
RM7/I-3C85-A250	43220250046	SUP
RM7/I-3C90	43220250070	SUP
RM7/I-3E1	43220250099	SUP
RM7/I-3E4	43220250090	SUP
RM7/I-3E5	43220250095	SUP
RM7/I-3F3	43220250080	SUP

TYPE NUMBER	11NC	CPS
RM7/I-3F3-A100	43220250084	SUP
RM7/I-3F3-A160	43220250085	SUP
RM7/I-3F3-A250	43220250086	SUP
RM7/ILP-3C85	43220250096	SUP
RM7/ILP-3C90	43220250074	SUP
RM7/ILP-3E5	43220250094	SUP
RM7/ILP-3E6	43220250093	SUP
RM7/ILP-3F3	43220250098	SUP
RM7/ILP-3F4	43220250092	SUP
RM8-3B7	43350003397	SUP
RM8-3B7-E160	43350003398	SUP
RM8-3B7-E160/N	43220227105	SUP
RM8-3B7-E160/N	43350003411	SUP
RM8-3B7-E250	43220225106	SUP
RM8-3B7-A250	43350003399	SUP
RM8-3B7-E250/N	43220227106	SUP
RM8-3B7-A250/N	43350003412	SUP
RM8-3B7-A315	43220225107	SUP
RM8-3B7-A315	43350003400	SUP
RM8-3B7-A315/N	43220227107	SUP
RM8-3B7-A315/N	43350003413	SUP
RM8-3B7-A400	43220225108	SUP
RM8-3B7-A400	43350003401	SUP
RM8-3B7-A400/N	43220227108	SUP
RM8-3B7-A400/N	43350003414	SUP
RM8-3B7-A630	43220225110	SUP
RM8-3B7-A630	43350003402	SUP
RM8-3B7-A630/N	43220227110	SUP
RM8-3B7-A630/N	43350003415	SUP
RM8-3B9	43350003404	OBS
RM8-3B9-E160	43350003406	OBS
RM8-3B9-E160/N	43350003418	OBS
RM8-3B9-A250	43350003407	OBS
RM8-3B9-A250/N	43350003419	OBS
RM8-3B9-A315	43350003408	OBS
RM8-3B9-A315/N	43350003420	OBS
RM8-3B9-A400	43350003409	OBS
RM8-3B9-A400/N	43350003421	OBS
RM8-3B9-A630	43350003410	OBS
RM8-3B9-A630/N	43350003422	OBS
RM8-3D3	43220225140	PREF

Conversion list — Type number to 11NC

TYPE NUMBER	11NC	CPS
RM8-3D3-E100	43220225144	PREF
RM8-3D3-E100/N	43220227144	PREF
RM8-3D3-E160	43220225145	PREF
RM8-3D3-E160/N	43220227145	PREF
RM8-3H1	43220225120	SUP
RM8-3H1	43350005878	SUP
RM8-3H1-E250	43220225126	SUP
RM8-3H1-E250	43350005879	SUP
RM8-3H1-E250/N	43220227126	SUP
RM8-3H1-A315	43220225127	SUP
RM8-3H1-A315	43350005880	SUP
RM8-3H1-A315/N	43220227127	SUP
RM8-3H1-A400	43220225128	SUP
RM8-3H1-A400	43350005881	SUP
RM8-3H1-A400/N	43220227128	SUP
RM8-3H1-A630	43220225130	SUP
RM8-3H1-A630	43350005882	SUP
RM8-3H1-A630/N	43220227130	SUP
RM8-3H3	43220225170	PREF
RM8-3H3-A250	43220225156	PREF
RM8-3H3-A250/N	43220227156	PREF
RM8-3H3-A315	43220225157	PREF
RM8-3H3-A315/N	43220227157	PREF
RM8-3H3-A400	43220225158	PREF
RM8-3H3-A400/N	43220227158	PREF
RM8-3H3-A630	43220225160	PREF
RM8-3H3-A630/N	43220227160	PREF
RM8-4C6	43220225181	SUP
RM8-4C6-E40	43220225182	SUP
RM8-4C6-E40/N	43220227182	SUP
RM8-4C6-E63	43220225183	SUP
RM8-4C6-E63/N	43220227183	SUP
RM8/I-3B8	43220225146	SUP
RM8/I-3B8-A160	43220225147	SUP
RM8/I-3B8-A250	43220225148	SUP
RM8/I-3B8-A315	43220225149	SUP
RM8/I-3B8-A400	43220225150	SUP
RM8/I-3C81	43350003483	PREF
RM8/I-3C81-E100	43350003484	PREF
RM8/I-3C81-A160	43350003485	PREF
RM8/I-3C81-A250	43350003486	PREF

TYPE NUMBER	11NC	CPS
RM8/I-3C81-A315	43350003487	PREF
RM8/I-3C81-A400	43350003488	PREF
RM8/I-3C85	43220250120	PREF
RM8/I-3C85	43350003489	PREF
RM8/I-3C85-A100	43220250144	PREF
RM8/I-3C85-E100	43350003490	PREF
RM8/I-3C85-A160	43220250145	PREF
RM8/I-3C85-A160	43350003491	REF
RM8/I-3C85-A250	43220250146	PREF
RM8/I-3C85-A250	43350003492	PREF
RM8/I-3C85-A315	43220250147	PREF
RM8/I-3C85-A315	43350003493	PREF
RM8/I-3C85-A400	43220250148	PREF
RM8/I-3C85-A400	43350003494	PREF
RM8/I-3C90	43220250180	PREF
RM8/I-3D3	43220250130	DES
RM8/I-3D3-A250	43220250131	DES
RM8/I-3D3-A315	43220250132	DES
RM8/I-3D3-A400	43220250133	DES
RM8/I-3E1	43220225186	PREF
RM8/I-3E4	43220225187	PREF
RM8/I-3E5	43220225198	PREF
RM8/I-3E5	43350005868	PREF
RM8/I-3E6	43220250191	PREF
RM8/I-3E25	43350003497	SUP
RM8/I-3E27	43350003498	PREF
RM8/I-3F3	43220250160	PREF
RM8/I-3F3	43350003495	PREF
RM8/I-3F3-A100	43220250164	PREF
RM8/I-3F3-E100	43350003496	PREF
RM8/I-3F3-A160	43220250165	PREF
RM8/I-3F3-A160	43350000180	PREF
RM8/I-3F3-A250	43220250166	PREF
RM8/I-3F3-A250	43350000181	PREF
RM8/I-3F3-A315	43220250167	PREF
RM8/I-3F3-A315	43350000183	PREF
RM8/I-3F3-A400	43220250168	PREF
RM8/I-3F3-A400	43350000182	PREF
RM8/I-3F4	43220250170	DES
RM8/I-3F4-A100	43220250171	DES
RM8/I-3F4-A160	43220250172	DES

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Type number to 11NC

TYPE NUMBER	11NC	CPS
RM8/I-3F4-A250	43220250173	DES
RM8/I-3F4-A315	43220250174	DES
RM8/I-3F4-A400	43220250175	DES
RM8/I-3H3	43220225172	DES
RM8/I-3H3-A400	43220225173	DES
RM8/I-3H3-A630	43220225174	DES
RM8/I-3H3-A1000	43220225175	DES
RM8/ILP-3D3	43220250135	DES
RM8/ILP-3D3-A250	43220250136	DES
RM8/ILP-3D3-A315	43220250137	DES
RM8/ILP-3D3-A400	43220250138	DES
RM8/ILP-3E5	43220250198	DES
RM8/ILP-3E6	43220250199	DES
RM8/ILP-3F3	43220250128	DES
RM8/ILP-3F4	43220250129	DES
RM8/ILP-3H3	43220250185	DES
RM8/ILP-3H3-A400	43220250187	DES
RM8/ILP-3H3-A630	43220250188	DES
RM8/ILP-3H3-A1000	43220250186	DES
RM10-3B7	43350003423	SUP
RM10-3B7-E250	43350003424	SUP
RM10-3B7-E250/N	43350003435	SUP
RM10-3B7-E315	43350003425	SUP
RM10-3B7-E315/N	43350003436	SUP
RM10-3B7-A400	43350003426	SUP
RM10-3B7-A400/N	43350003437	SUP
RM10-3B7-A630	43350003427	SUP
RM10-3B7-A630/N	43350003438	SUP
RM10-3B7-A1000	43350003428	SUP
RM10-3B7-A1000/N	43350003439	SUP
RM10-3B9	43350003429	OBS
RM10-3B9-E250	43350003430	OBS
RM10-3B9-E250/N	43350003440	OBS
RM10-3B9-E315	43350003431	OBS
RM10-3B9-E315/N	43350003441	OBS
RM10-3B9-A400	43350003432	OBS
RM10-3B9-A400/N	43350003442	OBS
RM10-3B9-A630	43350003433	OBS
RM10-3B9-A630/N	43350003443	OBS
RM10-3B9-A1000	43350003434	OBS
RM10-3B9-A1000/N	43350003444	OBS

TYPE NUMBER	11NC	CPS
RM10-3H1	43220225020	SUP
RM10-3H1-A250	43220225026	SUP
RM10-3H1-A250/N	43220227026	SUP
RM10-3H1-A315	43220225027	SUP
RM10-3H1-A315/N	43220227027	SUP
RM10-3H1-A400	43220225028	SUP
RM10-3H1-A400/N	43220227028	SUP
RM10-3H1-A630	43220225030	SUP
RM10-3H1-A630/N	43220227030	SUP
RM10/I-3B8	43220225040	SUP
RM10/I-3B8-A160	43220225046	SUP
RM10/I-3B8-A250	43220225048	SUP
RM10/I-3B8-A315	43220225049	SUP
RM10/I-3B8-A400	43220225050	SUP
RM10/I-3B8-A630	43220225052	SUP
RM10/I-3C81	43350003500	PREF
RM10/I-3C81-E160	43350003501	PREF
RM10/I-3C81-A250	43350003502	PREF
RM10/I-3C81-A315	43350003503	PREF
RM10/I-3C81-A400	43350003504	PREF
RM10/I-3C81-A630	43350003505	PREF
RM10/I-3C85	43220225060	PREF
RM10/I-3C85	43350003506	PREF
RM10/I-3C85-A160	43220225099	PREF
RM10/I-3C85-E160	43350003507	PREF
RM10/I-3C85-A250	43220225086	PREF
RM10/I-3C85-A250	43350003508	PREF
RM10/I-3C85-A315	43220225087	PREF
RM10/I-3C85-A315	43350003509	PREF
RM10/I-3C85-A400	43220225088	PREF
RM10/I-3C85-A400	43350003510	PREF
RM10/I-3C85-A630	43220225089	PREF
RM10/I-3C85-A630	43350003511	PREF
RM10/I-3C90	43220250220	PREF
RM10/I-3D3	43220225015	DES
RM10/I-3D3-A315	43220225016	DES
RM10/I-3D3-A400	43220225017	DES
RM10/I-3D3-A630	43220225018	DES
RM10/I-3E1	43220225090	PREF
RM10/I-3E4	43220225093	PREF
RM10/I-3E5	43220225094	PREF

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TYPE NUMBER	11NC	CPS
RM10/I-3E5	43350005867	PREF
RM10/I-3E25	43350003518	SUP
RM10/I-3E27	43350003519	PREF
RM10/I-3F3	43220250260	PREF
RM10/I-3F3	43350003512	PREF
RM10/I-3F3-A160	43220250265	PREF
RM10/I-3F3-E160	43350003513	PREF
RM10/I-3F3-A250	43220250266	PREF
RM10/I-3F3-A250	43350003514	PREF
RM10/I-3F3-A315	43220250267	PREF
RM10/I-3F3-A315	43350003515	PREF
RM10/I-3F3-A400	43220250268	PREF
RM10/I-3F3-A400	43350003516	PREF
RM10/I-3F3-A630	43220250269	PREF
RM10/I-3F3-A630	43350003517	PREF
RM10/I-3H3	43220225010	DES
RM10/I-3H3-A400	43220225011	DES
RM10/I-3H3-A630	43220225012	DES
RM10/I-3H3-A1000	43220225013	DES
RM10/ILP-3C85	43220225082	DES
RM10/ILP-3C90	43220225079	DES
RM10/ILP-3D3	43220225001	DES
RM10/ILP-3D3-A315	43220225002	DES
RM10/ILP-3D3-A400	43220225003	DES
RM10/ILP-3D3-A630	43220225004	DES
RM10/ILP-3E5	43220225036	DES
RM10/ILP-3E6	43220225037	DES
RM10/ILP-3F3	43220225083	DES
RM10/ILP-3F4	43220225038	DES
RM10/ILP-3H3	43220225006	DES
RM10/ILP-3H3-A400	43220225007	DES
RM10/ILP-3H3-A630	43220225008	DES
RM10/ILP-3H3-A1000	43220225080	DES
RM12/I-3B8-A160	43220250645	SUP
RM12/I-3B8-A250	43220250646	SUP
RM12/I-3B8-A315	43220250647	SUP
RM12/I-3B8-A400	43220250648	SUP
RM12/I-3B8	43220250640	SUP
RM12/I-3C85	43220250600	PREF
RM12/I-3C85-A160	43220250605	PREF
RM12/I-3C85-A250	43220250606	PREF

TYPE NUMBER	11NC	CPS
RM12/I-3C85-A315	43220250607	PREF
RM12/I-3C85-A400	43220250608	PREF
RM12/I-3C85-A630	43220250610	PREF
RM12/I-3C90	43320250680	PREF
RM12/I-3E1	43220250670	PREF
RM12/I-3E4	43220250660	PREF
RM12/I-3F3	43220250620	PREF
RM12/I-3F3-A160	43220250625	PREF
RM12/I-3F3-A250	43220250626	PREF
RM12/I-3F3-A315	43220250627	PREF
RM12/I-3F3-A400	43220250628	PREF
RM12/I-3F3-A630	43220250629	PREF
RM12/ILP-3C85	43220250698	DES
RM12/ILP-3C90	43220250694	DES
RM12/ILP-3E5	43220250695	DES
RM12/ILP-3E6	43220250696	DES
RM12/ILP-3F3	43220250699	DES
RM12/ILP-3F4	43220250697	DES
RM14/I-3B8-A1000	43220250391	SUP
RM14/I-3B8-A250	43220250386	SUP
RM14/I-3B8-A315	43220250387	SUP
RM14/I-3B8-A400	43220250388	SUP
RM14/I-3B8-A630	43220250390	SUP
RM14/I-3B8	43220250380	SUP
RM14/I-3C85	43220250300	PREF
RM14/I-3C85-A250	43220250316	PREF
RM14/I-3C85-A315	43220250317	PREF
RM14/I-3C85-A400	43220250318	PREF
RM14/I-3C85-A630	43220250320	PREF
RM14/I-3C85-A1000	43220250321	PREF
RM14/I-3C90	43220250350	PREF
RM14/I-3F3	43220250360	PREF
RM14/I-3F3-A250	43220250366	PREF
RM14/I-3F3-A315	43220250367	PREF
RM14/I-3F3-A400	43220250368	PREF
RM14/I-3F3-A630	43220250370	PREF
RM14/I-3F3-A1000	43220250371	PREF
RM14/ILP-3C85	43220250398	DES
RM14/ILP-3C90	43220250394	DES
RM14/ILP-3E5	43220250395	DES
RM14/ILP-3E6	43220250396	DES

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TYPE NUMBER	11NC	CPS
RM14/ILP-3F3	43220250399	DES
RM14/ILP-3F4	43220250397	DES
ROD2/10-3B1-D	43300303133	OBS
ROD2/10-4B1-D	43300304021	OBS
ROD2/15-3B1-D	43300303134	OBS
ROD2/15-4B1-D	43300304022	OBS
ROD2/20-3B1-D	43300303145	SUP
ROD2/20-4B1-D	43300304054	OBS
ROD2.5/20-3S3	43300304268	PREF
ROD3/15-3B1-D	43300303135	OBS
ROD3/15-4B1-D	43300304023	SUP
ROD3/20-3B1-D	43300303136	SUP
ROD3/20-3S3	43300304266	PREF
ROD3/20-4B1-D	43300304024	SUP
ROD3/25-3B1-D	43300303147	SUP
ROD3/25-4B1-D	43300304055	OBS
ROD3.3/17-3S3	43300304257	SUP
ROD4/15-3B1-D	43300303137	SUP
ROD4/15-4B1-D	43300304025	SUP
ROD4/20-3B1-D	43300303138	OBS
ROD4/20-4B1-D	43300304026	OBS
ROD4/20-3S3	43300304272	PREF
ROD4/25-3B1-D	43300303149	SUP
ROD4/25-4B1-D	43300304056	OBS
ROD5/14-3S3	43300304263	OBS
ROD5/20-3S3	43300304262	PREF
ROD5/20-3B1-D	43300303139	SUP
ROD5/20-4B1-D	43300304027	SUP
ROD5/25-3B1-D	43300303140	SUP
ROD5/25-3S3	43300304254	PREF
ROD5/25-4B1-D	43300304028	OBS
ROD5/30-3B1-D	43300303151	SUP
ROD5/30-4B1-D	43300304057	SUP
ROD5.2/12-3S3	43300304280	SUP
ROD5.3/18-3S3	43300304256	PREF
ROD5.3/35-3S3	43300304271	SUP
ROD6/25-3S3	43300304265	PREF
ROD6/30-3B1-D	43300303141	SUP
ROD6/30-3S3	43300304267	PREF
ROD6/30-4B1-D	43300304029	SUP
ROD6/40-3B1-D	43300303142	OBS

TYPE NUMBER	11NC	CPS
ROD6/40-4B1-D	43300304030	SUP
ROD6/50-3B1-D	43300303153	OBS
ROD6/50-4B1-D	43300304058	SUP
ROD6.5/25-3S3	43300304253	PREF
ROD8/25-3S3	43300304294	DES
ROD8/50-3B1	43300303143	SUP
ROD8/50-4B1	43300304031	SUP
ROD8/150-3B1	43300303144	OBS
ROD8/150-4B1	43300304032	SUP
ROD8/200-3B1	43300303155	SUP
ROD8/200-4B1	43300304059	OBS
ROD10/200-3B1	43300303146	SUP
ROD10/200-4B1	43300303071	SUP
SAMPLEBOX1	43300322201	OBS
SAMPLEBOX2	43300322202	OBS
SAMPLEBOX3	43300322203	OBS
SAMPLEBOX4	43300322204	OBS
SAMPLEBOX5	43300322205	OBS
SAMPLEBOX6	43300322206	OBS
SAMPLEBOX7	43220208513	DES
SAMPLEBOX8	43350004097	DES
SAMPLEBOX9	43300322209	DES
SAMPLEBOX10	43300322210	DES
SAMPLEBOX11	43300322211	DES
SPR-EC35	43120212615	PREF
SPR-E20/10/5	43220212022	PREF
SPR-E25/13/7	43120212619	PREF
SPR-E30/15/7	43220212023	PREF
SPR-E42/21/15	43220210092	PREF
SPR-E55/28/21	43120212613	PREF
SPR-E65/32/27	43120212614	PREF
SPR-EP10	43220210147	PREF
SPR-EP13	43220213504	PREF
SPR-EP17	43220210143	PREF
SPR-EP20	43220210145	PREF
SPR-P11/7	43220213062	PREF
SPR-P14/8	43220213063	PREF
SPR-P18/11	43220213064	PREF
SPR-P22/13	43220213065	PREF
SPR-P26/16	43220213066	PREF
SPR-P30/19	43220213067	PREF

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TYPE NUMBER	11NC	CPS
SPR-P36/22	43220213068	PREF
SPR-P42/29	43220213069	PREF
T2.5/1.5/1-3E5-E	43300303514	OBS
T2.5/1.5/1-3F3-E	43300303513	SUP
T2.5/1.5/1-4A11-E	43300303405	SUP
T2.5/1.5/1-4C65-E	43300303472	SUP
T36/23/15-3S4	43300304858	DES
T36/23/15-4A11	43300303412	DES
T63/38/25-3E25	43300304564	PREF
T87/54/14-3C11	43300304532	PREF
T102/66/15-3C11	43300304573	SUP
T102/66/15-3E25	43300304553	PREF
T107/65/18-3F4	43300304538	SUP
T107/65/25-3F3	43300304578	SUP
T107/65/25-3F4	43300304579	SUP
TC2.5/1.3/0.8-4C65	43350001937	OBS
TC2.5/1.3/0.8-3E5	43350003802	PREF
TC2.5/1.3/0.8-3E6	43350003803	PREF
TC2.5/1.3/1.3-3E6	43300304734	DES
TC2.5/1.3/1.3-3S4	43300304519	DES
TC2.5/1.3/1.3-4A11	43300304744	DES
TC2.5/1.5/0.8-3E6	43300304733	DES
TC2.5/1.5/1-3B7	43350001476	SUP
TC2.5/1.5/1-3D3	43350001480	SUP
TC2.5/1.5/1-3E25	43350001477	SUP
TC2.5/1.5/1-3E27	43350001478	PREF
TC2.5/1.5/1-3E6	43350001479	PREF
TC2.5/1.5/1-4C65	43350001475	OBS
TC2.5/1.5/1-3E5-S	43300304761	DES
TC2.5/1.5/1-3E6-S	43300304580	DES
TC2.5/1.5/1-4A11-S	43300304760	DES
TC3.1/1.3/1.3-4A11	43300304731	DES
TC3.4/1.8/1.3-3B7	43350002453	SUP
TC3.4/1.8/1.3-3D3	43350002454	SUP
TC3.4/1.8/1.3-3E25	43350002450	SUP
TC3.4/1.8/1.3-3E27	43350002451	PREF
TC3.4/1.8/1.3-3E6	43350002452	PREF
TC3.4/1.8/1.3-4C65	43350002455	OBS
TC3.4/1.8/2-3E25	43300304762	DES
TC3.5/1.6/1.3-3C11	43300304712	PREF
TC3.9/2/1-3D3	43350001482	SUP
TC3.9/2/1-3E6	43350003805	PREF
TC3.9/2.2/1.3-3B7	43350002459	SUP
TC3.9/2.2/1.3-3D3	43350002460	SUP
TC3.9/2.2/1.3-3E25	43350002456	SUP
TC3.9/2.2/1.3-3E27	43350002457	PREF
TC3.9/2.2/1.3-3E6	43350002458	PREF
TC3.9/2.2/1.3-4C65	43350002461	OBS
TC4/2.2/1.1-3E5	43300304766	PREF
TC4/2.2/1.1-3E6	43300304581	DES
TC4/2.2/1.1-3E25	43300304765	PREF
TC4/2.2/1.1-3F3	43300304764	PREF
TC4/2.2/1.1-4A11	43300304763	PREF
TC4/2.2/1.3-4A11	43300304767	DES
TC4/2.2/1.6-3E25	43300304771	PREF
TC4/2.2/1.6-3E5	43300304723	DES
TC4/2.2/1.6-3E6	43300304582	DES
TC4/2.2/1.6-3F3	43300304770	PREF
TC4/2.2/1.6-3S4	43300304768	DES
TC4/2.2/1.6-4A11	43300304769	PREF
TC4.8/2.3/1.3-3B7	43350002465	SUP
TC4.8/2.3/1.3-3D3	43350002466	SUP
TC4.8/2.3/1.3-3E25	43350002462	SUP
TC4.8/2.3/1.3-3E27	43350002463	PREF
TC4.8/2.3/1.3-3E6	43350002464	PREF
TC4.8/2.3/1.3-4C65	43350002467	OBS
TC5.8/3.1/1.5-3B7	43350002471	SUP
TC5.8/3.1/1.5-3D3	43350002472	SUP
TC5.8/3.1/1.5-3E25	43350002468	SUP
TC5.8/3.1/1.5-3E27	43350002469	PREF
TC5.8/3.1/1.5-3E6	43350002470	PREF
TC5.8/3.1/1.5-4C65	43350002473	OBS
TC6/4/2-3E5	43300304775	PREF
TC6/4/2-3E6	43300304583	DES
TC6/4/2-3E25	43300304774	PREF
TC6/4/2-3F3	43300304717	PREF
TC6/4/2-3S4	43300304711	DES
TC6/4/2-4A11	43300304773	PREF
TC6/4/2-4C65	43300304772	PREF
TC6.3/3.8/2.5-3E5	43300304724	PREF
TC6.3/3.8/2.5-3E6	43300304584	DES
TC6.3/3.8/2.5-3E7	43300304726	PROT

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TYPE NUMBER	11NC	CPS
TC6.3/3.8/2.5-3E25	43300304778	PREF
TC6.3/3.8/2.5-3F3	43300304777	PREF
TC6.3/3.8/2.5-4A11	43300304776	PREF
TC7.6/3.2/4.8-3B7	43350002480	SUP
TC7.6/3.2/4.8-3C81	43350002474	PREF
TC7.6/3.2/4.8-3D3	43350002481	SUP
TC7.6/3.2/4.8-3E25	43350002477	SUP
TC7.6/3.2/4.8-3E27	43350002478	PREF
TC7.6/3.2/4.8-3E6	43300304779	DES
TC7.6/3.2/4.8-4C65	43350002482	OBS
TC9/6/3-3E6	43300304585	DES
TC9.5/4.8/3.2-3B7	43350002489	SUP
TC9.5/4.8/3.2-3C81	43350002486	PREF
TC9.5/4.8/3.2-3D3	43350002490	SUP
TC9.5/4.8/3.2-3E25	43350002483	SUP
TC9.5/4.8/3.2-3E27	43350002485	PREF
TC9.5/4.8/3.2-3E6	43300304748	DES
TC9.5/4.8/3.2-3E7	43300304741	PROT
TC9.5/4.8/3.2-4C65	43350002491	OBS
TGP-P11/7	43220213018	PREF
TGP-P14/8	43220213044	PREF
TGP-P18/11	43220213045	PREF
TGP-P22/13	43220213046	PREF
TGP-P26/16	43220213047	PREF
TGP-P30/19	43220213048	PREF
TGP-P36/22	43220213049	PREF
TGP-P42/29	43220213050	PREF
TGPS9-8P	43220210172	PREF
TL4/2.2/1.1-3E5	43300303761	OBS
TL4/2.2/1.6-3E5	43300303760	OBS
TL6/4/2-3E5	43300303763	SUP
TL6.3/3.8/2.5-3E5	43300303762	SUP
TL9/6/3-3E25	43300303719	SUP
TL10/6/4-3E5	43300303466	PREF
TL10/6/4-3E6	43300304586	DES
TL13/7.5/5-3E5	43300303764	SUP
TL13/7.5/5-3E6	43300304587	DES
TL14/9/5-3E5	43300303765	SUP
TL14/9/5-3E6	43300304588	DES
TL14/9/9-3E5	43300303766	SUP
TL14/9/9-3E6	43300304589	DES

TYPE NUMBER	11NC	CPS
TL16/9.6/6.3-3E5	43300303767	SUP
TL16/9.6/6.3-3E6	43300304590	DES
TL20/10/7-3E5	43300303525	SUP
TL20/10/7-3E6	43300304591	DES
TL25/15/10-3E5	43300303526	PREF
TL25/15/10-3E6	43300304592	DES
TL29/19/7.5-3E5	43300304840	DES
TL32/19/13-3E5	43300303527	PREF
TL36/23/15-3E5	43300303528	PREF
TL42/26/13-3C11	43300303522	SUP
TL42/26/13-3C85	43300303552	SUP
TL42/26/13-3E25	43300304521	PREF
TL42/26/13-4A11	43300304531	SUP
TL58/41/18-3C11	43300303520	PREF
TL58/41/18-3C85	43300303553	PREF
TL58/41/18-3E25	43300304515	SUP
TL87/54/14-3C11	43300304837	DES
TL107/65/18-3E25	43300304810	DES
TN7.5/4.1/3-2P40	43300306001	SUP
TN7.5/4.1/3-2P50	43300306008	SUP
TN7.5/4.1/3-2P65	43300306015	SUP
TN7.5/4.1/3-2P80	43300306022	SUP
TN7.5/4.1/3-2P90	43300306029	SUP
TN9/6/3-3C85	43300303580	SUP
TN9/6/3-3E25	43300303709	PREF
TN9/6/3-3F3	43300303791	PREF
TN9/6/3-3R1	43300303768	SUP
TN9/6/3-4A11	43300303439	SUP
TN9/6/3-4C65	43220209717	PREF
TN10/6/4-3C11	43300303450	PREF
TN10/6/4-3C85	43300303446	SUP
TN10/6/4-3E25	43300303458	SUP
TN10/6/4-3F3	43300303498	SUP
TN10/6/4-4A11	43300303488	PREF
TN10/6/4-4C65	43300303480	SUP
TN12/8/4.4-2P40	43300306002	SUP
TN12/8/4.4-2P50	43300306009	SUP
TN12/8/4.4-2P65	43300306016	SUP
TN12/8/4.4-2P80	43300306023	SUP
TN12/8/4.4-2P90	43300306030	SUP
TN13/7.5/5-3C11	43300303492	PREF

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TYPE NUMBER	11NC	CPS
TN13/7.5/5-3C85	43300303779	PREF
TN13/7.5/5-3E25	43300303710	PREF
TN13/7.5/5-3F3	43300303792	SUP
TN13/7.5/5-3F4	43300304527	SUP
TN13/7.5/5-4A11	43300303440	SUP
TN13/7.5/5-4C65	43300303481	SUP
TN14/9/5-3C11	43300303746	SUP
TN14/9/5-3C85	43300303745	PREF
TN14/9/5-3E25	43300303711	PREF
TN14/9/5-3F3	43300303793	SUP
TN14/9/5-3R1	43300303769	PREF
TN14/9/5-4A11	43300303441	SUP
TN14/9/5-4C65	43220209718	SUP
TN14/9/9-3C11	43300303505	SUP
TN14/9/9-3C85	43300303780	SUP
TN14/9/9-3E25	43300303712	SUP
TN14/9/9-3F3	43300303794	SUP
TN14/9/9-4A11	43300303442	SUP
TN16/9.6/6.3-3C11	43300303718	PREF
TN16/9.6/6.3-3C85	43300303781	PREF
TN16/9.6/6.3-3E25	43300303713	PREF
TN16/9.6/6.3-3F3	43300303795	SUP
TN16/9.6/6.3-4A11	43300303443	SUP
TN17/9.8/4.4-2P40	43300306003	SUP
TN17/9.8/4.4-2P50	43300306010	SUP
TN17/9.8/4.4-2P65	43300306017	SUP
TN17/9.8/4.4-2P80	43300306024	SUP
TN17/9.8/4.4-2P90	43300306031	SUP
TN19/11/10-3C11	43300303747	SUP
TN19/11/10-3C85	43300303491	SUP
TN19/11/10-3E25	43300303734	SUP
TN/19/11/15-3C11	43300303749	SUP
TN/19/11/15-3C85	43300303748	SUP
TN/19/11/15-3E25	43300303714	SUP
TN20/10/7-3C11	43300303451	SUP
TN20/10/7-3C85	43300303447	SUP
TN20/10/7-3E25	43300303459	PREF
TN20/10/7-4C65	43300303482	SUP
TN20/13/6-2P40	43300306004	SUP
TN20/13/6-2P50	43300306011	SUP
TN20/13/6-2P65	43300306018	SUP

TYPE NUMBER	11NC	CPS
TN20/13/6-2P80	43300306025	SUP
TN20/13/6-2P90	43300306032	SUP
TN23/14/7-3C11	43300303751	SUP
TN23/14/7-3C85	43300303750	SUP
TN23/14/7-3E25	43300303716	PREF
TN23/14/7-3F3	43300303499	SUP
TN23/14/7-3R1	43300303770	PREF
TN23/14/7-4A11	43300303444	PREF
TN23/14/7-4C65	43220209719	PREF
TN24/15/7.5-2P40	43300306005	SUP
TN24/15/7.5-2P50	43300306012	SUP
TN24/15/7.5-2P65	43300306019	SUP
TN24/15/7.5-2P80	43300306026	SUP
TN24/15/7.5-2P90	43300306033	SUP
TN25/15/10-3C11	43300303452	SUP
TN25/15/10-3C85	43300303448	SUP
TN25/15/10-3E25	43300303460	PREF
TN25/15/10-3F3	43300303500	SUP
TN26/15/10-3C11	43300303752	PREF
TN26/15/10-3C85	43300303783	SUP
TN26/15/10-3E25	43300303717	PREF
TN26/15/20-3C11	43300303753	SUP
TN26/15/20-3C85	43300303784	SUP
TN26/15/20-3E25	43300303754	PREF
TN27/15/11-2P40	43300306006	SUP
TN27/15/11-2P50	43300306013	SUP
TN27/15/11-2P65	43300306020	SUP
TN27/15/11-2P80	43300306027	SUP
TN27/15/11-2P90	43300306034	SUP
TN29/19/7.5-3C11	43300303758	SUP
TN29/19/7.5-3C85	43300303785	SUP
TN29/19/7.5-3E25	43300303423	SUP
TN32/19/13-3C11	43300303453	SUP
TN32/19/13-3C85	43300303449	SUP
TN32/19/13-3E25	43300303461	PREF
TN32/19/13-3F3	43300303501	SUP
TN33/20/11-2P40	43300306007	SUP
TN33/20/11-2P50	43300306014	SUP
TN33/20/11-2P65	43300306021	SUP
TN33/20/11-2P80	43300306028	SUP
TN33/20/11-2P90	43300306035	SUP

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TYPE NUMBER	11NC	CPS
TN36/23/10-3C11	43300303755	SUP
TN36/23/10-3C85	43300303786	SUP
TN36/23/10-4C65	43300303471	SUP
TN36/23/15-3C11	43300303756	PREF
TN36/23/15-3C85	43300303787	SUP
TN36/23/15-3E25	43300303422	PREF
TN36/23/15-3F3	43300303502	SUP
TN36/23/15-3R1	43300303431	SUP
TN36/23/15-4A11	43300303445	OBS
TN36/23/15-4C65	43220209720	PREF
TUB3.1/1.3/19-3B1-DL	31221349077	PREF
TUB3.5/1.2/15-4B1	43300304034	SUP
TUB3.5/1.2/15-3B1	43300303355	OBS
TUB3.5/1.2/15-3C85	43300303368	OBS
TUB3.5/1.2/15-4B1	43300304034	OBS
TUB3.5/1.3/3-3B1	43120203105	SUP
TUB3.5/1.3/7.5-3B1	43120203133	SUP
TUB3.7/1.2/3.5-3B1	43220203440	PREF
TUB3.7/1.2/3.5-4B1	43220203442	PREF
TUB3.8/2.8/8-4B1	43300304346	PREF
TUB4/1.6/15-3B1	43300303356	OBS
TUB4/1.6/15-3C85	43300303369	OBS
TUB4/1.6/15-4B1	43300304035	OBS
TUB4/1.6/40-3B1	43300303357	OBS
TUB4/1.6/40-3C85	43300303370	OBS
TUB4/1.6/40-4B1	43300304036	SUP
TUB4/2/5-3B1	43130201517	PREF
TUB4/3/9.5-4B1	43300304347	SUP
TUB4.1/2/7-3B1-D	43120203122	SUP
TUB4.1/2/11-3B1-D	43120203125	SUP
TUB4.1/2/26-4B1	31221049081	SUP
TUB4.2/2/12-4B1-DL	43220203445	SUP
TUB4.3/2/15-3B1	43220203675	SUP
TUB4.3/2/15-4B1	43300304331	SUP
TUB4.3/2/26-3B1	43220203678	SUP
TUB5/2/15-3B1	43300303358	OBS
TUB5/2/15-3C85	43300303371	OBS
TUB5/2/15-4B1	43300304037	OBS
TUB5/2/50-3B1	43300303359	OBS
TUB5/2/50-3C85	43300303372	PREF
TUB5/2/50-4B1	43300304038	OBS

TYPE NUMBER	11NC	CPS
TUB5.3/3/22-3B1	43220203681	SUP
TUB6/3/20-3B1	43300303360	SUP
TUB6/3/20-3C85	43300303373	SUP
TUB6/3/20-4B1	43300304039	OBS
TUB6/3/30-3B1	43300303361	OBS
TUB6/3/30-3C85	43300303374	SUP
TUB6/3/30-4B1	43300304040	OBS
TUB8/4/20-3B1	43300303362	SUP
TUB8/4/20-3C85	43300303375	OBS
TUB8/4/20-4B1	43300304041	SUP
TUB8/4/200-3C85	43300303345	OBS
TUB8/4/40-3B1	43300303363	SUP
TUB8/4/40-3C85	43300303376	OBS
TUB8/4/40-4B1	43300304042	OBS
TUB9.5/6.5/17-3B1	43130201518	PREF
TUB10/4.2/20-3B1	43300303364	SUP
TUB10/4.2/20-3C85	43300303377	OBS
TUB10/4.2/20-4B1	43300304043	OBS
TUB10/4.2/45-3B1	43300303365	OBS
TUB10/4.2/45-3C85	43300303378	OBS
TUB10/4.2/45-4B1	43300304044	OBS
TUB10/5/200-3C85	43300303346	OBS
TX13/7.1/4.8-3C81	43350002495	PREF
TX13/7.1/4.8-3C85	43350002496	PREF
TX13/7.1/4.8-3D3	43350002500	SUP
TX13/7.1/4.8-3E6	43300304859	DES
TX13/7.1/4.8-3E25	43350002492	SUP
TX13/7.1/4.8-3E27	43350002493	PREF
TX13/7.1/4.8-3F3	43350002498	PREF
TX13/7.1/4.8-4C65	43350002501	OBS
TX13/7.9/6.4-3C81	43350002505	PREF
TX13/7.9/6.4-3C85	43350002506	PREF
TX13/7.9/6.4-3E6	43300304860	DES
TX13/7.9/6.4-3E25	43350002502	SUP
TX13/7.9/6.4-3E27	43350002503	PREF
TX13/7.9/6.4-3F3	43350002508	PREF
TX13/7.9/6.4-4C65	43350002509	OBS
TX16/9.1/4.7-3C81	43350002513	PREF
TX16/9.1/4.7-3C85	43350002514	PREF
TX16/9.1/4.7-3E6	43350002512	PREF
TX16/9.1/4.7-3E25	43350002510	SUP

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TYPE NUMBER	11NC	CPS
TX16/9.1/4.7-3E27	43350002511	PREF
TX16/9.1/4.7-3F3	43350002516	PREF
TX22/14/6.4-3C81	43350002520	PREF
TX22/14/6.4-3C85	43350002521	PREF
TX22/14/6.4-3E6	43350002519	PREF
TX22/14/6.4-3E25	43350002517	SUP
TX22/14/6.4-3E27	43350002518	PREF
TX22/14/6.4-3F3	43350002523	PREF
TX22/14/6.4-4C65	43350002524	OBS
TX22/14/13-3C81	43350002528	PREF
TX22/14/13-3C85	43350002529	PREF
TX22/14/13-3E6	43350002527	PREF
TX22/14/13-3E25	43350002525	SUP
TX22/14/13-3E27	43350002526	PREF
TX22/14/13-3F3	43350002531	PREF
TX25/15/9.5-3C81	43350002535	PREF
TX25/15/9.5-3C85	43350002536	PREF
TX25/15/9.5-3E6	43350002534	PREF
TX25/15/9.5-3E25	43350002532	SUP
TX25/15/9.5-3E27	43350002533	PREF
TX25/15/9.5-3F3	43350002538	PREF
TX29/19/7.6-3C81	43350002542	PREF
TX29/19/7.6-3C85	43350002543	PREF
TX29/19/7.6-3E25	43350002539	SUP
TX29/19/7.6-3E27	43350002540	PREF
TX29/19/7.6-3E6	43350002541	PREF
TX29/19/7.6-3F3	43350002545	PREF
TX36/23/10-3C81	43350002549	PREF
TX36/23/10-3C85	43350002550	PREF
TX36/23/10-3E6	43350002548	PREF
TX36/23/10-3E25	43350002546	SUP
TX36/23/10-3E27	43350002547	PREF
TX36/23/10-3F3	43350002552	PREF
TX36/23/15-3C81	43350002556	PREF
TX36/23/15-3C85	43350002557	PREF
TX36/23/15-3E6	43350002555	PREF
TX36/23/15-3E25	43350002553	SUP
TX36/23/15-2E27	43350002554	PREF
TX36/23/15-3F3	43350002559	PREF
TX39/20/13-3C81	43350002563	PREF
TX39/20/13-3C85	43350002564	PREF

TYPE NUMBER	11NC	CPS
TX39/20/13-3E25	43350002560	SUP
TX39/20/13-3E27	43350002561	PREF
TX39/20/13-3F3	43350002566	PREF
TX39/20/13-4C65	43350002567	OBS
TX51/32/19-3C81	43350002570	PREF
TX51/32/19-3C85	43350002571	PREF
TX51/32/19-3E25	43350003902	SUP
TX51/32/19-3E27	43350002568	PREF
TX51/32/19-3F3	43350002573	PREF
TX61/36/13-3C81	43350002576	PREF
TX61/36/13-3C85	43350002577	PREF
TX61/36/13-3E27	43350005869	PREF
TX61/36/13-3F3	43350002579	PREF
TX74/39/13-3C81	43350002582	PREF
TX74/39/13-3C85	43350002583	PREF
TX74/39/13-3E25	43350003898	SUP
TX74/39/13-3E27	43350002580	PREF
TX74/39/13-3F3	43350002585	PREF
TX74/39/13-4C65	43350002586	OBS
U10/8/3-3C85	43220203810	PREF
U15/11/6-3C11	43120204311	OBS
U15/11/6-3C85	43120204329	PREF
U15/11/6-3E25	43120203382	DES
U20/16/7-3C11	43120204312	OBS
U20/16/7-3C85	43120204303	PREF
U20/16/7-3E25	43120203389	DES
U25/16/6-3C81	43350002267	PREF
U25/16/6-3E25	43350002302	SUP
U25/16/6-3E27	43350002303	PREF
U25/20/13-3C11	43120204313	OBS
U25/20/13-3C85	43120204330	PREF
U25/20/13-3E25	31123249134	DES
U30/25/16-3C11	43120204314	OBS
U30/25/16-3C85	43120204331	PREF
U33/22/9-3C81	43350002273	PREF
U67/27/14-3C81	43350000188	PREF
U93/52/30-3C85	43120205302	PREF
U93/76/16-3C85	43120205300	PREF
U93/76/30-3C85	43120204369	PREF
U93/76/30-3C90	43120204396	DES
U100/57/25-3C85	43120204367	PREF

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TYPE NUMBER	11NC	CPS
U100/57/25-3C90	43120204398	DES
UR28/20/14-3C85	43120204341	PREF
UR28/20/14-3C30	43120204372	DES
UR35/28/13-3C15	43120205306	PREF
UR35/28/13-3C30	43120204373	DES
UR35/28/13-3C90	43120204390	DES
UR39/35/15-3C15	43120204320	PREF
UR39/35/15-3C30	43120205307	DES
UR42/21/12-3C81	43350002277	SUP
UR42/32/15-3C15	43120205308	PREF
UR42/32/15-3C30	43120205309	DES
UR43/34/16-3C15	43120205310	PREF
UR43/34/16-3C30	43120205311	DES
UR44/36/15-3C15	43120204334	PREF
UR44/36/15-3C30	43120205312	DES
UR48/39/17-3C15	43120205315	PREF
UR48/39/17-3C30	43120205316	DES
UR64/29/14-3C81	43350002281	SUP
UR64/40/20-3C85	43120205317	PREF
UR64/40/20-3F3	43120204395	DES
WAS-CLM/TP-P14/8	43350002616	PREF
WAS-CLM/TP-P18/11	43350002618	PREF
WAS-CLM/TS-P22/13	43350002666	PREF
WBC1.5/A-3S4	43120203663	PREF
WBC1.5/A-4B1	43120203669	PREF
WBC1.5/A-4S2	43300304171	DES
WBC1.5/1.5/A-3S4	43120203665	PREF
WBC1.5/1.5/A-4A15	43300304146	OBS
WBC1.5/1.5/A-4B1	43120203671	PREF
WBC1.5/1.5/A-4S2	43300304172	DES
WBC2.5/A-3S4	43120203664	PREF
WBC2.5/A-3B1	43300304130	OBS
WBC2.5/A-4A15	43300304144	OBS
WBC2.5/A-4B1	43120203670	PREF
WBC2.5/A-4S2	43300304174	DES
WBC2.5/EA-3B1	43300304124	OBS
WBC2.5/EA-4B1	43300304125	OBS
WBC2.5/EAT-3B1	43300304122	OBS
WBC2.5/EAT-4B1	43300304123	OBS
WBC2.5/IR-3B1	43300303896	OBS
WBC2.5/IR-4B1	43300304107	OBS

TYPE NUMBER	11NC	CPS
WBC2.5/R-3S4	43300303808	SUP
WBC2.5/R-4B1	43300304118	SUP
WBC2.5/SA-3B1	43300304152	OBS
WBC2.5/SA-4B1	43300304153	OBS
WBC2.5/SP-3S4	43300304136	SUP
WBC2.5/SP-4B1	43300304143	SUP
WBC2/R-4A15	43300303618	OBS
WBC2/RT-4A15	43300304105	OBS
WBC3/ER-3S4	43300304126	OBS
WBC3/ER-4B1	43300304127	OBS
WBC3/ERT-3B1	43300304141	OBS
WBC3/ERT-4B1	43300304142	OBS
WBC3/R-3S4	43120203676	PREF
WBC3/R-4A15	43300304145	OBS
WBC3/R-4B1	43300304114	PREF
WBC3/R-4S2	43300304175	DES
WBS1.5-5/4.8/10-3S4	43300304176	DES
WBS1.5-5/4.8/10-4B1	43300304177	DES
WBS2.5-5/4.8/10-3S4	43300304166	DES
WBS2.5-5/4.8/10-4B1	43300304168	DES
X22-3B8	43220224560	SUP
X22-3D3	43220224540	SUP
X22-3H1	43220224520	SUP
X22-3H1-A400	43220224528	SUP
X22-3H1-A400/N	43220226528	SUP
X22-3H1-A630	43220224530	SUP
X22-3H1-A630/N	43220226530	SUP
X22-3H1-A1000	43220224531	SUP
X22-3H1-A1000/N	43220226531	SUP
X22-4C6	43220224580	SUP
X30-3B8	43220251320	SUP
X30-3H1	43220251300	SUP
X30-3H1-A400	43220221928	SUP
X30-3H1-A400/N	43220223928	SUP
X30-3H1-A630	43220221930	SUP
X30-3H1-A630/N	43220223930	SUP
X30-3H1-A1000	43220221931	SUP
X30-3H1-A1000/N	43220223931	SUP
X30-3H1-A1600	43220221932	SUP
X30-3H1-A1600/N	43220223932	SUP
X35-3B8	43220225300	SUP

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TYPE NUMBER	11NC	CPS
X35-3H1	43220225320	SUP
X35-3H1-E400	43220225328	SUP
X35-3H1-E400/N	43220227328	SUP
X35-3H1-E630	43220225330	SUP
X35-3H1-E630/N	43220227330	SUP
X35-3H1-A1000	43220225331	SUP
X35-3H1-A1000/N	43220227331	SUP
X35-3H1-A1600	43220225332	SUP
X35-3H1-A1600/N	43220227332	SUP

Conversion list
11NC to type number

Product status definitions

STATUS	INDICATION	DEFINITION
Prototype	PROT	These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change.
Design-in	DES	These products are recommended for new designs.
Preferred	PREF	These products are recommended for use in current designs and are available via our sales channels.
Support	SUP	These products are **not** recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.
Obsolete	OBS	These products are obsolete.

Conversion list

11NC to type number

11NC	TYPE NUMBER	CPS
31123249134	U25/20/13-3E25	DES
31221049081	TUB4.1/2/26-4B1	SUP
31221340259	CPH-U10//8/3-1S-4P	PREF
31221349077	TUB3.1/1.3/19-3B1-DL	PREF
43120203105	TUB3.5/1.3/3-3B1	SUP
43120203122	TUB4.1/2/7-3B1-D	SUP
43120203125	TUB4.1/2/11-3B1-D	SUP
43120203133	TUB3.5/1.3/7.5-3B1	SUP
43120203150	MHC6-6/10-3S4	PREF
43120203152	MHB2-14/8.5/14-4B1	PREF
43120203153	MHR6-6.1/4/10-3B1	SUP
43120203155	MHC6-6/10-4B1	PREF
43120203157	MHB2-14/8.5/8-4B1	SUP
43120203382	U15/11/6-3E25	DES
43120203389	U20/16/7-3E25	DES
43120203556	E20/10/6-3C11	PREF
43120203564	E42/21/15-3C85	PREF
43120203565	E42/21/20-3C85	PREF
43120203581	E42/21/15-3C85-G200	PREF
43120203591	E55/28/21-3C85	PREF
43120203592	E55/28/25-3C85	PREF
43120203597	E20/10/5-3C11	PREF
43120203598	E42/21/15-3C11	PREF
43120203663	WBC1.5/A-3S4	PREF
43120203664	WBC2.5/A-3S4	PREF
43120203665	WBC1.5/1.5/A-3S4	PREF
43120203669	WBC1.5/A-4B1	PREF
43120203670	WBC2.5/A-4B1	PREF
43120203671	WBC1.5/1.5/A-4B1	PREF
43120203676	WBC3/R-3S4	PREF
43120203720	ETD34-3C85	PREF
43120203721	ETD34-3C85-G100	PREF
43120203722	ETD34-3C85-G200	PREF
43120203723	ETD34-3C85-G500	PREF
43120203724	ETD34-3C85-G800	PREF
43120203725	ETD39-3C85	PREF
43120203726	ETD39-3C85-G100	PREF
43120203727	ETD39-3C85-G200	PREF
43120203728	ETD39-3C85-G500	PREF
43120203729	ETD39-3C85-G800	PREF
43120203730	ETD44-3C85	PREF

11NC	TYPE NUMBER	CPS
43120203731	ETD44-3C85-G100	PREF
43120203732	ETD44-3C85-G200	PREF
43120203733	ETD44-3C85-G500	PREF
43120203734	ETD44-3C85-G800	PREF
43120203735	ETD49-3C85	PREF
43120203736	ETD49-3C85-G100	PREF
43120203737	ETD49-3C85-G200	PREF
43120203738	ETD49-3C85-G500	PREF
43120203739	ETD49-3C85-G800	PREF
43120203750	ETD29-3C85	PREF
43120203751	ETD29-3C85-G50	PREF
43120203752	ETD29-3C85-G150	PREF
43120203754	ETD29-3C85-G350	PREF
43120203769	ETD29-3C85-G1000	PREF
43120203789	ETD29-3C11	OBS
43120203792	ETD54-3C85	PREF
43120203793	ETD59-3C85	PREF
43120203800	ETD29-3F3	DES
43120203801	ETD34-3F3	DES
43120203802	ETD39-3F3	DES
43120203803	ETD44-3F3	DES
43120203804	ETD49-3F3	DES
43120203805	ETD29-3F3-G50	DES
43120203806	ETD29-3F3-G150	DES
43120203807	ETD29-3F3-G350	DES
43120203808	ETD29-3F3-G1000	DES
43120203809	ETD34-3F3-G100	DES
43120203810	ETD34-3F3-G200	DES
43120203811	ETD34-3F3-G500	DES
43120203812	ETD34-3F3-G800	DES
43120203813	ETD39-3F3-G100	DES
43120203814	ETD39-3F3-G200	DES
43120203815	ETD39-3F3-G500	DES
43120203816	ETD39-3F3-G800	DES
43120203817	ETD44-3F3-G100	DES
43120203818	ETD44-3F3-G200	DES
43120203819	ETD44-3F3-G500	DES
43120203820	ETD44-3F3-G800	DES
43120203821	ETD49-3F3-G100	DES
43120203822	ETD49-3F3-G200	DES
43120203823	ETD49-3F3-G500	DES

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11NC	TYPE NUMBER	CPS
43120203824	ETD49-3F3-G800	DES
43120203825	ETD49-3F3-G1400	DES
43120203826	ETD54-3F3	DES
43120203827	ETD59-3F3	DES
43120203979	ETD29-3C30	DES
43120203981	ETD34-3C30	DES
43120203983	ETD39-3C30	DES
43120203984	ETD44-3C30	DES
43120203986	ETD49-3C30	DES
43120203992	ETD29-3C90	DES
43120203993	ETD34-3C90	DES
43120204108	EFD20-3F3	DES
43120204116	EFD25-3F3	DES
43120204120	EFD25-3C85	PREF
43120204124	EFD30-3F3	DES
43120204128	EFD30-3C85	PREF
43120204146	EFD20-3F4	DES
43120204155	EFD20-3C85	PREF
43120204161	EFD25-3F4	DES
43120204166	EFD30-3F4	DES
43120204180	EFD25-3C90	DES
43120204184	EFD30-3C90	DES
43120204189	EFD20-3C30	DES
43120204192	EFD25-3C30	DES
43120204195	EFD30-3C30	DES
43120204198	EFD20-3C90	DES
43120204303	U20/16/7-3C85	PREF
43120204311	U15/11/6-3C11	OBS
43120204312	U20/16/7-3C11	OBS
43120204313	U25/20/13-3C11	OBS
43120204314	U30/25/16-3C11	OBS
43120204320	UR39/35/15-3C15	PREF
43120204329	U15/11/6-3C85	PREF
43120204330	U25/20/13-3C85	PREF
43120204331	U30/25/16-3C85	PREF
43120204334	UR44/36/15-3C15	PREF
43120204341	UR28/20/14-3C85	PREF
43120204367	U100/57/25-3C85	PREF
43120204368	I100/25/25-3C85	PREF
43120204369	U93/76/30-3C85	PREF
43120204370	I93/28/30-3C85	PREF

11NC	TYPE NUMBER	CPS
43120204372	UR28/20/14-3C30	DES
43120204373	UR35/28/13-3C30	DES
43120204390	UR35/28/13-3C90	DES
43120204395	UR64/40/20-3F3	DES
43120204396	U93/76/30-3C90	DES
43120204397	I93/28/30-3C90	DES
43120204398	U100/57/25-3C90	DES
43120204399	I100/25/25-3C90	DES
43120204404	E41/17/12-3C85	PREF
43120204406	E25/9/6-3C85	PREF
43120204407	E25/16/6-3C85	PREF
43120204408	E25/10/6-3C85	PREF
43120204409	E25/9/6-3E25	DES
43120204410	E25/16/6-3E25	DES
43120204411	E25/10/6-3E25	DES
43120204414	E47/20/16-3C85	PREF
43120204419	ER28-3C85	PREF
43120204504	E55/28/21-3C11	PREF
43120204505	E65/32/27-3C11	PREF
43120204525	E20/10/6-3C85	PREF
43120204526	E20/10/6-3C85-G50	PREF
43120204527	E20/10/6-3C85-G150	PREF
43120204528	E20/10/6-3C85-G500	PREF
43120204529	E25/13/7-3C85	PREF
43120204530	E25/13/7-3C85-G50	PREF
43120204531	E25/13/7-3C85-G150	PREF
43120204532	E25/13/7-3C85-G500	PREF
43120204533	E32/16/9-3C85	PREF
43120204534	E32/16/9-3C85-G100	PREF
43120204535	E32/16/9-3C85-G200	PREF
43120204536	E32/16/9-3C85-G500	PREF
43120204537	E32/16/9-3C85-G800	PREF
43120204539	E20/10/5-3C85	PREF
43120204540	E20/10/5-3C85-G50	PREF
43120204541	E20/10/5-3C85-G150	PREF
43120204542	E20/10/5-3C85-G500	PREF
43120204543	E30/15/7-3C85	PREF
43120204544	E30/15/7-3C85-G100	PREF
43120204545	E30/15/7-3C85-G200	PREF
43120204546	E30/15/7-3C85-G500	PREF
43120204547	E30/15/7-3C85-G800	PREF

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11NC	TYPE NUMBER	CPS
43120204548	E42/21/15-3C85-G100	PREF
43120204549	E42/21/15-3C85-G500	PREF
43120204550	E42/21/15-3F3	DES
43120204551	E42/21/20-3F3	DES
43120204552	E20/10/5-3F3	DES
43120204553	E30/15/7-3F3	DES
43120204554	E20/10/6-3F3	DES
43120204555	E25/13/7-3F3	DES
43120204564	E30/15/7-3F3-G100	DES
43120204565	E20/10/6-3F3-G50	DES
43120204566	E20/10/6-3F3-G150	DES
43120204567	E20/10/6-3F3-G500	DES
43120204568	E30/15/7-3F3-G200	DES
43120204569	E25/13/7-3F3-G50	DES
43120204570	E25/13/7-3F3-G150	DES
43120204571	E25/13/7-3F3-G500	DES
43120204572	E32/16/9-3F3	DES
43120204573	E32/16/9-3F3-G100	DES
43120204574	E32/16/9-3F3-G200	DES
43120204575	E32/16/9-3F3-G500	DES
43120204576	E32/16/9-3F3-G800	DES
43120204577	E30/15/7-3F3-G500	DES
43120204581	E30/15/7-3F3-G800	DES
43120204582	E42/21/15-3F3-G100	DES
43120204583	E42/21/15-3F3-G200	DES
43120204584	E42/21/15-3F3-G500	DES
43120204585	E42/21/15-3F3-G800	DES
43120204586	E42/21/20-3F3-G100	DES
43120204587	E42/21/20-3F3-G200	DES
43120204588	E42/21/20-3F3-G500	DES
43120204589	E42/21/20-3F3-G800	DES
43120204590	E55/28/21-3F3	DES
43120204591	E55/28/21-3F3-G150	DES
43120204592	E55/28/21-3F3-G450	DES
43120204593	E55/28/21-3F3-G1200	DES
43120204594	E65/32/27-3F3	DES
43120204595	E65/32/27-3F3-G150	DES
43120204596	E65/32/27-3F3-G450	DES
43120204597	E65/32/27-3F3-G1250	DES
43120204599	E55/28/25-3F3	DES
43120204600	E42/21/15-3C85-G800	PREF

11NC	TYPE NUMBER	CPS
43120204601	E42/21/20-3C85-G100	PREF
43120204602	E42/21/20-3C85-G200	PREF
43120204603	E42/21/20-3C85-G500	PREF
43120204604	E42/21/20-3C85-G800	PREF
43120204605	E55/28/21-3C85-G150	PREF
43120204606	E55/28/21-3C85-G450	PREF
43120204607	E55/28/21-3C85-G1200	PREF
43120204608	ER48-3C30	DES
43120204609	ER48-3C90	DES
43120204610	E55/28/25-3C85-G500	PREF
43120204611	E55/28/25-3C85-G1500	PREF
43120204612	E65/32/27-3C85	PREF
43120204613	E65/32/27-3C85-G150	PREF
43120204614	E65/32/27-3C85-G450	PREF
43120204615	E65/32/27-3C85-G1250	PREF
43120204619	EC35-3C85	SUP
43120204622	EC41-3C85	SUP
43120204627	EC52-3C85	SUP
43120204631	EC70-3C85	SUP
43120204639	ER42-3C85	PREF
43120204641	ER35-3C85	PREF
43120204643	ER40-3C85	PREF
43120204647	E30/15/7-3C11	PREF
43120204648	E25/13/7-3C11	PREF
43120204649	E32/16/9-3C11	PREF
43120204666	ER42A-3C85	PREF
43120204670	ER54-3C85	PREF
43120204678	E42/33/20-3C85	PREF
43120204687	ER28L-3C85	PREF
43120204700	ETD39-3C90	DES
43120204701	ETD44-3C90	DES
43120204702	ETD49-3C90	DES
43120204703	ETD54-3C30	DES
43120204704	ETD54-3C90	DES
43120204705	ETD59-3C30	DES
43120204706	ETD59-3C90	DES
43120205100	E42/33/20-3F3	DES
43120205106	E71/33/32-3F3	DES
43120205300	U93/76/16-3C85	PREF
43120205301	I93/28/16-3C85	PREF
43120205302	U93/52/30-3C85	PREF

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11NC	TYPE NUMBER	CPS
43120205304	I20/6/5-3C85	PREF
43120205305	I25/7/7-3C85	PREF
43120205306	UR35/28/13-3C15	PREF
43120205307	UR39/35/15-3C30	DES
43120205308	UR42/32/15-3C15	PREF
43120205309	UR42/32/15-3C30	DES
43120205310	UR43/34/16-3C15	PREF
43120205311	UR43/34/16-3C30	DES
43120205312	UR44/36/15-3C30	DES
43120205315	UR48/39/17-3C15	PREF
43120205316	UR48/39/17-3C30	DES
43120205317	UR64/40/20-3C85	PREF
43120205503	E71/33/32-3C85	PREF
43120205511	ER35-3C30	DES
43120205513	ER40-3C30	DES
43120205515	ER42-3C30	DES
43120205522	E25/13/7-3C90	DES
43120205531	E25/13/7-3C30	DES
43120205533	E30/15/7-3C30	DES
43120205535	E42/21/15-3C30	DES
43120205539	ER35-3C90	DES
43120205540	E30/15/7-3C90	DES
43120205548	E65/32/27-3C90	DES
43120205560	E20/10/5-3C30	DES
43120205561	E20/10/5-3C90	DES
43120205562	E20/10/6-3C30	DES
43120205563	E20/10/6-3C90	DES
43120205565	E25/9/6-3C90	DES
43120205567	E25/10/6-3C90	DES
43120205569	E25/16/6-3C90	DES
43120205572	E32/16/9-3C30	DES
43120205573	E32/16/9-3C90	DES
43120205576	E41/17/12-3C30	DES
43120205577	E41/17/12-3C90	DES
43120205578	E42/21/15-3C90	DES
43120205579	E42/21/20-3C30	DES
43120205580	E42/21/20-3C90	DES
43120205581	E42/33/20-3C30	DES
43120205582	E42/33/20-3C90	DES
43120205585	E47/20/16-3C30	DES
43120205586	E47/20/16-3C90	DES

11NC	TYPE NUMBER	CPS
43120205587	E55/28/21-3C30	DES
43120205588	E55/28/21-3C90	DES
43120205590	E55/28/25-3C90	DES
43120205591	E65/32/27-3C30	DES
43120205592	E71/33/32-3C30	DES
43120205593	E71/33/32-3C90	DES
43120205600	ER28-3C30	DES
43120205601	ER28-3C90	DES
43120205602	ER28L-3C30	DES
43120205603	ER28L-3C90	DES
43120205604	ER40-3C90	DES
43120205605	ER42-3C90	DES
43120205606	ER42A-3C30	DES
43120205607	ER42A-3C90	DES
43120205610	ER54-3C30	DES
43120205611	ER54-3C90	DES
43120205654	E20/10/5-3E25	DES
43120205655	E20/10/6-3E25	DES
43120205657	E32/16/9-3E25	DES
43120205658	E55/28/21-3E25	DES
43120205659	ER48-3C85	PREF
43120210039	CPH-E25/13/7-1S-10P	PREF
43120212601	CLA-EC35	PREF
43120212609	CLA-E55/28/21	PREF
43120212611	CLA-E65/32/27	PREF
43120212613	SPR-E55/28/21	PREF
43120212614	SPR-E65/32/27	PREF
43120212615	SPR-EC35	PREF
43120212619	SPR-E25/13/7	PREF
43120212620	CPH-E13/7/4-1S-6P	PREF
43120212621	CPH-E20/10/6-1S-8P	PREF
43120212623	CPH-E16/8/5-1S-6P	PREF
43120212843	CP-E20/10/5-1S	PREF
43120212854	CPV-E25/13/7-1S-6P	PREF
43120212855	CP-E30/15/7-1S	PREF
43120212862	CP-E42/21/15-1S	PREF
43120212871	CP-E55/28/21-1S	PREF
43120212872	CP-E65/32/27-1S	PREF
43130201517	TUB4/2/5-3B1	PREF
43130201518	TUB9.5/6.5/17-3B1	PREF
43130202057	MHR2-11/5.4/11-4A11	SUP

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11NC	TYPE NUMBER	CPS
43130202080	MHR2-11/5.4/11-3C85	SUP
43130204003	MHB2-13/8/6-4B1	PREF
43130204005	MHB2-13/8/6-3C85	PREF
43130210395	CLI/P-RM7	PREF
43220203300	H20-3E25-H	OBS
43220203302	H7-3E25-H	OBS
43220203303	H16-3E25-H	OBS
43220203304	H10-3E25-H	OBS
43220203405	E13/7/4-3F3	PREF
43220203417	E16/8/5-3E1	PREF
43220203418	E16/8/5-3F3	PREF
43220203421	E13/7/4-3E1	PREF
43220203422	E13/7/4-3E25	DES
43220203423	E13/7/4-3E27	PROT
43220203424	E13/7/4-3C90	PREF
43220203440	TUB3.7/1.2/3.5-3B1	PREF
43220203442	TUB3.7/1.2/3.5-4B1	PREF
43220203445	TUB4.2/2/12-4B1-DL	SUP
43220203540	E16/8/5-3E25	DES
43220203541	E16/8/5-3E27	PROT
43220203542	E16/8/5-3C90	PREF
43220203543	E8.8/4.1/2-3E6	PROT
43220203544	E8.8/4.1/2-3F3	PROT
43220203545	E8.8/4.1/2-3F4	PROT
43220203548	E13/7/4-3C85	PREF
43220203549	E13/7/4-3C85-G150	PREF
43220203556	E13/7/4-3C85-G50	PREF
43220203557	E13/7/4-3C85-G500	PREF
43220203558	E13/7/4-3F3-G150	PREF
43220203559	E13/7/4-3F3-G50	PREF
43220203560	E13/7/4-3F3-G500	PREF
43220203561	E16/8/5-3C85-G150	PREF
43220203562	E16/8/5-3C85-G50	PREF
43220203563	E16/8/5-3C85-G500	PREF
43220203564	E16/8/5-3F3-G150	PREF
43220203565	E16/8/5-3F3-G50	PREF
43220203566	E16/8/5-3F3-G500	PREF
43220203675	TUB4.3/2/15-3B1	SUP
43220203678	TUB4.3/2/26-3B1	SUP
43220203681	TUB5.3/3/22-3B1	SUP
43220203810	U10/8/3-3C85	PREF

11NC	TYPE NUMBER	CPS
43220205273	E5.3/2.7/2-3E5	PREF
43220205274	E5.3/2.7/2-3E6	PREF
43220205275	E6.3/2.9/2-3E5	PREF
43220205276	E6.3/2.9/2-3E6	PREF
43220205277	E5.3/2.7/2-3F3	PREF
43220205278	E5.3/2.7/2-3F4	DES
43220205279	E6.3/2.9/2-3F3	PREF
43220205280	E6.3/2.9/2-3F4	DES
43220205290	E6.3/2.9/2-3E1	PREF
43220205292	E16/8/5-3C85	PREF
43220205421	PH5.6/3.6-3D3	PREF
43220205451	PH7.4/3.9-3D3	PREF
43220205471	PH9.4/4.8-3D3	PREF
43220205480	PH14/7.5-3H1	SUP
43220205490	PH26/9.2-3H1	SUP
43220208513	SAMPLEBOX7	DES
43220209054	E22/6-3F3-A630-E	DES
43220209055	E22/6-3F3-A160-P	DES
43220209056	E22/6-3F3-A250-P	DES
43220209057	E22/6-3F3-A315-P	DES
43220209058	E22/6-3F3-A400-P	DES
43220209059	E22/6-3F3-A630-P	DES
43220209060	E22/6-3F4-A160-E	DES
43220209061	E22/6-3F4-A250-E	DES
43220209062	E22/6-3F4-A315-E	DES
43220209063	E22/6-3F4-A400-E	DES
43220209064	E22/6-3F4-A630-E	DES
43220209065	E22/6-3F4-A160-P	DES
43220209066	E22/6-3F4-A250-P	DES
43220209067	E22/6-3F4-A315-P	DES
43220209068	E22/6-3F4-A400-P	DES
43220209069	E22/6-3F4-A630-P	DES
43220209074	E14/3.5/R-3F3-A63-E	DES
43220209133	E22/6/16-3E6	DES
43220209134	PLT22/16/2.5-3E6	DES
43220209138	E14/3.5/5/R-3E6	DES
43220209139	PLT14/5/1.5/S-3E6	DES
43220209142	E14/3.5/5-3E6	DES
43220209143	PLT14/5/1.5-3E6	DES
43220209144	E18/4/10/R-3E6	DES
43220209145	PLT18/10/2/S-3E6	DES

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11NC	TYPE NUMBER	CPS
43220209146	E22/6/16/R-3E6	DES
43220209147	PLT22/16/2.5/S-3E6	DES
43220209148	E18/4/10-3E6	DES
43220209149	PLT18/10/2-3E6	DES
43220209228	E18/4-3F3-A160-E	DES
43220209229	E18/4-3F3-A250-E	DES
43220209230	E18/4-3F3-A315-E	DES
43220209232	E18/4-3F3-A100-P	DES
43220209233	E18/4-3F3-A160-P	DES
43220209234	E18/4-3F3-A250-P	DES
43220209235	E18/4-3F3-A315-P	DES
43220209237	E18/4-3F4-A100-E	DES
43220209238	E18/4-3F4-A160-E	DES
43220209239	E18/4-3F4-A250-E	DES
43220209240	E18/4-3F4-A315-E	DES
43220209242	E18/4-3F4-A100-P	DES
43220209243	E18/4-3F4-A160-P	DES
43220209244	E18/4-3F4-A250-P	DES
43220209245	E18/4-3F4-A315-P	DES
43220209246	E22/6-3F3-A160-E	DES
43220209247	E22/6-3F3-A250-E	DES
43220209248	E22/6-3F3-A315-E	DES
43220209249	E22/6-3F3-A400-E	DES
43220209639	E18/4/R-3F3-A250-E	DES
43220209640	E18/4/R-3F3-A315-E	DES
43220209642	E18/4/R-3F3-A100-P	DES
43220209643	E18/4/R-3F3-A160-P	DES
43220209644	E18/4/R-3F3-A250-P	DES
43220209645	E18/4/R-3F3-A315-P	DES
43220209647	E18/4/R-3F4-A100-E	DES
43220209648	E18/4/R-3F4-A160-E	DES
43220209649	E18/4/R-3F4-A250-E	DES
43220209650	E18/4/R-3F4-A315-E	DES
43220209652	E18/4/R-3F4-A100-P	DES
43220209653	E18/4/R-3F4-A160-P	DES
43220209654	E18/4/R-3F4-A250-P	DES
43220209655	E18/4/R-3F4-A315-P	DES
43220209656	E22/6/R-3F3-A160-E	DES
43220209657	E22/6/R-3F3-A250-E	DES
43220209658	E22/6/R-3F3-A315-E	DES
43220209659	E22/6/R-3F3-A400-E	DES

11NC	TYPE NUMBER	CPS
43220209660	E22/6/R-3F3-A630-E	DES
43220209661	E22/6/R-3F3-A160-P	DES
43220209662	E22/6/R-3F3-A250-P	DES
43220209663	E22/6/R-3F3-A315-P	DES
43220209664	E22/6/R-3F3-A400-P	DES
43220209665	E22/6/R-3F3-A630-P	DES
43220209666	E22/6/R-3F4-A160-E	DES
43220209667	E22/6/R-3F4-A250-E	DES
43220209668	E22/6/R-3F4-A315-E	DES
43220209669	E22/6/R-3F4-A400-E	DES
43220209670	E22/6/R-3F4-A630-E	DES
43220209671	E22/6/R-3F4-A160-P	DES
43220209672	E22/6/R-3F4-A250-P	DES
43220209673	E22/6/R-3F4-A315-P	DES
43220209674	E22/6/R-3F4-A400-P	DES
43220209675	E22/6/R-3F4-A630-P	DES
43220209676	E18/4/10/R-3F3	DES
43220209677	E22/6/16/R-3F3	DES
43220209678	PLT18/10/2/S-3F3	DES
43220209679	PLT22/16/2.5/S-3F3	DES
43220209681	PLT14/5/1.5/S-3F3	DES
43220209682	PLT14/5/1.5/S-3F4	DES
43220209684	PLT18/10/2/S-3F4	DES
43220209686	PLT22/16/2.5/S-3F4	DES
43220209688	E14/3.5/5/R-3F3	DES
43220209689	E14/3.5/5/R-3F4	DES
43220209691	E18/4/10/R-3F4	DES
43220209693	E22/6/16/R-3F4	DES
43220209717	TN9/6/3-4C65	PREF
43220209718	TN14/9/5-4C65	SUP
43220209719	TN23/14/7-4C65	PREF
43220209720	TN36/23/15-4C65	PREF
43220209730	E14/3.5/R-3F3-A100-E	DES
43220209731	E14/3.5/R-3F3-A160-E	DES
43220209734	E14/3.5/R-3F3-A63-P	DES
43220209735	E14/3.5/R-3F3-A100-P	DES
43220209736	E14/3.5/R-3F3-A160-P	DES
43220209739	E14/3.5/R-3F4-A63-E	DES
43220209740	E14/3.5/R-3F4-A100-E	DES
43220209741	E14/3.5/R-3F4-A160-E	DES
43220209744	E14/3.5/R-3F4-A63-P	DES

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43220209745	E14/3.5/R-3F4-A100-P	DES
43220209746	E14/3.5/R-3F4-A160-P	DES
43220209748	E18/4/R-3F3-A100-E	DES
43220209749	E18/4/R-3F3-A160-E	DES
43220209752	E14/3.5/5-3F3	DES
43220209753	PLT14/5/1.5-3F3	DES
43220209754	E14/3.5/5-3F4	DES
43220209755	PLT14/5/1.5-3F4	DES
43220209756	E18/4/10-3F3	DES
43220209757	PLT18/10/2-3F3	DES
43220209758	E18/4/10-3F4	DES
43220209759	PLT18/10/2-3F4	DES
43220209760	E22/6/16-3F3	DES
43220209761	PLT22/16/2.5-3F3	DES
43220209765	E22/6/16-3F4	DES
43220209766	PLT22/16/2.5-3F4	DES
43220209778	E14/3.5-3F3-A25-E	OBS
43220209779	E14/3.5-3F3-A40-E	OBS
43220209780	E14/3.5-3F3-A63-E	DES
43220209781	E14/3.5-3F3-A100-E	DES
43220209782	E14/3.5-3F3-A160-E	DES
43220209783	E14/3.5-3F3-A25-P	OBS
43220209784	E14/3.5-3F3-A40-P	OBS
43220209785	E14/3.5-3F3-A63-P	DES
43220209786	E14/3.5-3F3-A100-P	DES
43220209787	E14/3.5-3F3-A160-P	DES
43220209788	E14/3.5-3F4-A25-E	OBS
43220209789	E14/3.5-3F4-A40-E	OBS
43220209790	E14/3.5-3F4-A63-E	DES
43220209791	E14/3.5-3F4-A100-E	DES
43220209792	E14/3.5-3F4-A160-E	DES
43220209793	E14/3.5-3F4-A25-P	OBS
43220209794	E14/3.5-3F4-A40-P	OBS
43220209795	E14/3.5-3F4-A63-P	DES
43220209796	E14/3.5-3F4-A100-P	DES
43220209797	E14/3.5-3F4-A160-P	DES
43220209799	E18/4-3F3-A100-E	DES
43220210004	CPHS-EFD15-1S-8P	PREF
43220210007	CPHS-EFD20-1S-10P	PREF
43220210019	CPVS-RM6S-1S-8P	PREF
43220210025	CPH-EFD15-1S-8P	PREF

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43220210026	CPH-EFD20-1S-10P	PREF
43220210029	CPV-RM5-1S-8PD	PREF
43220210034	CPV-RM4-1S-6PD	PREF
43220210040	CLI-E25/13/7	PREF
43220210044	CSH-EP7-1S-6P	PREF
43220210046	CSH-EP10-1S-8P	PREF
43220210048	CSH-EP17-1S-8P	PREF
43220210049	CSH-EP17-2S-8P	PREF
43220210054	CPVS-RM4-1S-6P	PREF
43220210056	CPHS-EFD10-1S-8P	PREF
43220210057	CPHS-EFD12-1S-8P	PREF
43220210067	CPH-ETD54-1S-22P	PREF
43220210068	CLI-ETD54	PREF
43220210069	CPH-ETD59-1S-24P	PREF
43220210070	CLI-ETD59	PREF
43220210076	CLI-EP13	PREF
43220210077	CLI-EP7	PREF
43220210078	CLI-EP10	PREF
43220210089	CPVS-RM5/LP-1S-8P	PREF
43220210090	CLM-EFD10	PREF
43220210091	CLM-EFD12	PREF
43220210092	SPR-E42/21/15	PREF
43220210093	CLA-E42/21/15	PREF
43220210097	CSV-RM4-1S-6P	PREF
43220210120	CPHS-EP7-1S-6P	PREF
43220210126	CLI/P-EP7	PREF
43220210134	CPHS-E6.3/2-1S-6P	PREF
43220210135	CPHS-E6.3/2-2S-6P	PREF
43220210136	CPHS-E5.3/2-1S-6P	PREF
43220210137	CLI-E5.3/2.7/2	PREF
43220210141	CSH-EP20-1S-10P	PREF
43220210142	CSH-EP20-2S-10P	PREF
43220210143	SPR-EP17	PREF
43220210144	CLA-EP17	PREF
43220210145	SPR-EP20	PREF
43220210146	CLA-EP20	PREF
43220210147	SPR-EP10	PREF
43220210148	CLA-EP10	PREF
43220210149	CPVS-ER9.5-1S-8P	PREF
43220210150	CPVS-ER11-1S-10P	PREF
43220210151	CPVS-ER14.5-1S-10P	PREF

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43220210152	CLM-ER9.5	PREF
43220210153	CLM-ER11	PREF
43220210154	CLM-ER14.5	PREF
43220210155	CSH-EP7-1S-6P-B	PREF
43220210156	COV-E6.3/2	PREF
43220210158	CPH-U15/11/6-1S-4P	PREF
43220210159	CPH-U15/11/6-2S-4P	PREF
43220210160	CSH-EP13-1S-10P-T	PREF
43220210161	CLM-E14/PLT14	DES
43220210162	CLM-E18/PLT18	DES
43220210163	CLM-E22/PLT22	DES
43220210164	CPH-ETD34-1S-14P	PREF
43220210165	CPH-ETD39-1S-16P	PREF
43220210166	CPH-ETD44-1S-18P	PREF
43220210167	CPH-ETD49-1S-20P	PREF
43220210169	CPVS-RM6S/LP-8P	PREF
43220210170	CSH-EP7-2S-6P-T	PREF
43220210172	TGPS9-8P	PREF
43220210173	COV9	PREF
43220210174	CPHS-E5.3/2-1S-4P	PREF
43220210180	CLI-RM6/LP	PREF
43220210198	CLM-E5.3/2	PREF
43220210199	COV-E5.3/2	PREF
43220210200	CLM-EFD15	PREF
43220210221	CLM-EFD20	PREF
43220210222	CPCI-E20/6-1S-5P-U	PREF
43220210223	CPCO-E20/6-1S-5P-U	PREF
43220210228	CPH-ETD29-1S-13P	PREF
43220210230	CPVS-RM5-1S-8P	PREF
43220210234	CP-P9/5-1S	PREF
43220210235	CP-P11/7-1S	PREF
43220210236	CP-P14/8-1S	PREF
43220210237	CP-P14/8-2S	PREF
43220210238	CP-P18/11-1S	PREF
43220210239	CP-P18/11-2S	PREF
43220210240	CP-P18/11-3S	PREF
43220210241	CP-P22/13-1S	PREF
43220210242	CP-P22/13-2S	PREF
43220210243	CP-P22/13-3S	PREF
43220210244	CP-P26/16-1S	PREF
43220210245	CP-P26/16-2S	PREF

11NC	TYPE NUMBER	CPS
43220210246	CP-P26/16-3S	PREF
43220210247	CP-P30/19-1S	PREF
43220210248	CP-P30/19-2S	PREF
43220210249	CP-P30/19-3S	PREF
43220210250	CP-P36/22-1S	PREF
43220210251	CP-P36/22-2S	PREF
43220210252	CP-P36/22-3S	PREF
43220212016	CLA-E20/10/5	PREF
43220212017	CLA-E30/15/7	PREF
43220212022	SPR-E20/10/5	PREF
43220212023	SPR-E30/15/7	PREF
43220212024	CSH-E20/10/5-1S-8P	PREF
43220212025	CSH-E30/15/7-1S-10P	PREF
43220212029	CPV-E20/10/5-1S-6P	PREF
43220212622	CPH-E32/16/9-1S-12P	PREF
43220213004	CON-X22	PREF
43220213018	TGP-P11/7	PREF
43220213023	COV-X22	PREF
43220213042	CP-P42/29-1S	PREF
43220213043	CP-P42/29-2S	PREF
43220213044	TGP-P14/8	PREF
43220213045	TGP-P18/11	PREF
43220213046	TGP-P22/13	PREF
43220213047	TGP-P26/16	PREF
43220213048	TGP-P30/19	PREF
43220213049	TGP-P36/22	PREF
43220213050	TGP-P42/29	PREF
43220213051	CON-P11/7	PREF
43220213052	CON-P14/8	PREF
43220213053	CON-P18/11	PREF
43220213054	CON-P22/13	PREF
43220213055	CON-P26/16	PREF
43220213056	CON-P30/19	PREF
43220213057	CON-P36/22	PREF
43220213058	CON-P42/29	PREF
43220213062	SPR-P11/7	PREF
43220213063	SPR-P14/8	PREF
43220213064	SPR-P18/11	PREF
43220213065	SPR-P22/13	PREF
43220213066	SPR-P26/16	PREF
43220213067	SPR-P30/19	PREF

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43220213068	SPR-P36/22	PREF
43220213069	SPR-P42/29	PREF
43220213071	NUT	PREF
43220213072	FIB	PREF
43220213178	CLI/P-RM6	PREF
43220213183	CPH-E42/21/15-1S-10P	PREF
43220213184	CLI/P-RM8	PREF
43220213190	CLI/P-RM4/5	PREF
43220213287	CSV-X22-1S-8P	PREF
43220213299	CP-P7/4-1S	PREF
43220213331	CPH-EC35-1S-13P	PREF
43220213341	CSH-EC35-1S-11P	PREF
43220213352	CSV-RM14-1S-10P	PREF
43220213353	CSV-RM14-1S-12P	PREF
43220213389	CLI-ETD34	PREF
43220213390	CLI-ETD39	PREF
43220213391	CLI-ETD44	PREF
43220213392	CLI-ETD49	PREF
43220213404	CPV-RM6S/I-1S-8PD	PREF
43220213405	CPV-RM8/I-1S-12PD	PREF
43220213406	CPV-RM10/I-1S-12PD	PREF
43220213407	CPV-RM14/I-1S-12PD	PREF
43220213411	CPV-RM12/I-1S-12PD	PREF
43220213423	CSCI-ETD34-1S-7P	PREF
43220213424	CSCO-ETD34-1S-7P	PREF
43220213429	CLI/P-RM4/5/I	PREF
43220213430	CLI/P-RM6/I	PREF
43220213431	CLI/P-RM8/I	PREF
43220213432	CLI/P-RM10/I	PREF
43220213437	CLI-ETD29	PREF
43220213445	CSV-RM5-1S-4P	PREF
43220213446	CSV-RM5-1S-5P	PREF
43220213447	CSV-RM5-1S-6P	PREF
43220213448	CSV-RM5-2S-4P	PREF
43220213449	CSV-RM5-2S-5P	PREF
43220213450	CSV-RM5-2S-6P	PREF
43220213451	CSV-RM6S/R-1S-4P	PREF
43220213452	CSV-RM6S/R-2S-4P	PREF
43220213454	CSV-RM6R-1S-6P	PREF
43220213456	CSV-RM6R-2S-6P	PREF
43220213458	CSV-RM6S-1S-6P	PREF

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43220213460	CSV-RM6S-2S-6P	PREF
43220213461	CSV-RM7/I-1S-4P	PREF
43220213463	CSV-RM7/I-1S-8P	PREF
43220213465	CSV-RM7/I-2S-8P	PREF
43220213467	CSV-RM8-1S-8P	PREF
43220213468	CSV-RM8-1S-12P	PREF
43220213470	CSV-RM8-2S-8P	PREF
43220213471	CSV-RM8-2S-12P	PREF
43220213472	CSV-RM10-1S-5P	PREF
43220213473	CSV-RM10-1S-8P	PREF
43220213476	CSV-RM10-1S-12P	PREF
43220213477	CSV-RM10-2S-5P	PREF
43220213478	CSV-RM10-2S-8P	PREF
43220213481	CSV-RM10-2S-12P	PREF
43220213482	CSV-RM12-1S-12P	PREF
43220213491	CLI/P-RM12/I	PREF
43220213492	CLI/P-RM14/I	PREF
43220213494	CLI-RM4/5/I	PREF
43220213495	CLI-RM6/I	PREF
43220213497	CLI-RM8	PREF
43220213504	SPR-EP13	PREF
43220213505	CLA-EP13	PREF
43220213506	CSH-EP13-2S-10P	PREF
43220213509	CLI-RM4/5/LP	PREF
43220213514	CLI-EFD15	PREF
43220213515	CLI-EFD20	PREF
43220213516	CLI-EFD25	PREF
43220213517	CLI-EFD30	PREF
43220213520	CSH-EFD15-1S-8P	PREF
43220213522	CSH-EFD20-1S-8P	PREF
43220213524	CSH-EFD25-1S-10P	PREF
43220213525	CSH-EFD30-1S-12P	PREF
43220213834	ADJ-P30/RM10-YELLOW	PREF
43220213838	ADJ-P30/RM10-WHITE	PREF
43220213839	ADJ-P30/RM10-GREY	PREF
43220213840	ADJ-P22/RM8-BLACK	PREF
43220213841	ADJ-P22/RM8-BROWN	PREF
43220213842	ADJ-P22/RM8-RED	PREF
43220213843	ADJ-P22/RM8-ORANGE	PREF
43220213844	ADJ-P22/RM8-YELLOW	PREF
43220213845	ADJ-P22/RM8-GREEN	PREF

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43220213848	ADJ-P22/RM8-WHITE	PREF
43220213860	ADJ-RM6-BLACK	PREF
43220213861	ADJ-RM6-BROWN	PREF
43220213862	ADJ-RM6-RED	PREF
43220213865	ADJ-RM6-GREEN	PREF
43220213867	ADJ-RM6-VIOLET	PREF
43220213868	ADJ-RM6-WHITE	PREF
43220213869	ADJ-RM6-GREY	PREF
43220213870	ADJ-RM4/RM5-BLACK	PREF
43220213871	ADJ-RM4/RM5-BROWN	PREF
43220213872	ADJ-RM4/RM5-RED	PREF
43220213879	ADJ-RM4/RM5-GREY	PREF
43220213924	ADJ-P36/P42-YELLOW	SUP
43220213928	ADJ-P36/P42-WHITE	SUP
43220213929	ADJ-P36/P42-GREY	SUP
43220213941	ADJ-P26-BROWN	SUP
43220213942	ADJ-P26-RED	SUP
43220213948	ADJ-P26-WHITE	SUP
43220213949	ADJ-P26-GREY	SUP
43220213961	ADJ-P18-BROWN	SUP
43220213962	ADJ-P18-RED	SUP
43220213964	ADJ-P18-YELLOW	SUP
43220213967	ADJ-P18-VIOLET	SUP
43220213968	ADJ-P18-WHITE	SUP
43220213971	ADJ-P14-BROWN	SUP
43220213973	ADJ-P14-ORANGE	SUP
43220213978	ADJ-P14-WHITE	SUP
43220213979	ADJ-P14-GREY	SUP
43220213981	ADJ-P9/P11-BROWN	SUP
43220213984	ADJ-P9/P11-YELLOW	SUP
43220213989	ADJ-P9/P11-GREY	SUP
43220220000	P11/7-3B7	SUP
43220220104	P11/7-3B7-A100	SUP
43220220105	P11/7-3B7-A160	SUP
43220220106	P11/7-3B7-A250	SUP
43220220120	P11/7-3H1	SUP
43220220124	P11/7-3H1-A100	SUP
43220220125	P11/7-3H1-A160	SUP
43220220126	P11/7-3H1-A250	SUP
43220220139	P11/7-3D3	SUP
43220220140	P11/7-3D3-E16	SUP

11NC	TYPE NUMBER	CPS
43220220141	P11/7-3D3-E25	SUP
43220220142	P11/7-3D3-E40	SUP
43220220143	P11/7-3D3-E63	SUP
43220220144	P11/7-3D3-A100	SUP
43220220150	P11/7-3H3	SUP
43220220155	P11/7-3H3-A160	SUP
43220220156	P11/7-3H3-A250	SUP
43220220164	P11/7-3E4	SUP
43220220169	P11/7-3F3	SUP
43220220171	P11/7-3F3-A100	SUP
43220220172	P11/7-3F3-A160	SUP
43220220173	P11/7-3F3-A250	SUP
43220220179	P11/7-4C6	SUP
43220220181	P11/7-4C6-E25	SUP
43220220182	P11/7-4C6-E40	SUP
43220220188	P11/7-3B8	SUP
43220220190	P11/7-3B8-A100	SUP
43220220191	P11/7-3B8-A160	SUP
43220220192	P11/7-3B8-A250	SUP
43220220199	P11/7-3E5	PREF
43220220200	P14/8-3B7	SUP
43220220304	P14/8-3B7-E100	SUP
43220220305	P14/8-3B7-A160	SUP
43220220306	P14/8-3B7-A250	SUP
43220220307	P14/8-3B7-A315	SUP
43220220321	P14/8-3H1	SUP
43220220325	P14/8-3H1-A160	SUP
43220220326	P14/8-3H1-A250	SUP
43220220327	P14/8-3H1-A315	SUP
43220220328	P14/8-3H1-A400	SUP
43220220330	P14/8-3H1-A630	SUP
43220220340	P14/8-3D3	SUP
43220220342	P14/8-3D3-E40	SUP
43220220343	P14/8-3D3-E63	SUP
43220220344	P14/8-3D3-E100	SUP
43220220350	P14/8-3C85-E63	SUP
43220220351	P14/8-3F3	SUP
43220220355	P14/8-3H3-A160	SUP
43220220356	P14/8-3H3-A250	SUP
43220220357	P14/8-3H3-A315	SUP
43220220358	P14/8-3H3-A400	SUP

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43220220360	P14/8-3H3	SUP
43220220366	P14/8-3C85	SUP
43220220367	P14/8-3C85-A160	SUP
43220220368	P14/8-3C85-A250	SUP
43220220369	P14/8-3C85-A315	SUP
43220220371	P14/8-3C85-A100	SUP
43220220373	P14/8-3E5	PREF
43220220376	P14/8-3F3-A100	SUP
43220220377	P14/8-3E4	SUP
43220220379	P14/8-3E1	SUP
43220220380	P14/8-4C6	SUP
43220220381	P14/8-4C6-E25	SUP
43220220382	P14/8-4C6-E40	SUP
43220220383	P14/8-4C6-E63	SUP
43220220385	P14/8-3B8-A160	SUP
43220220386	P14/8-3B8-A250	SUP
43220220387	P14/8-3B8-A315	SUP
43220220388	P14/8-3B8-A400	SUP
43220220389	P14/8-3B8-A630	SUP
43220220393	P14/8-3F3-A160	SUP
43220220394	P14/8-3F3-A250	SUP
43220220395	P14/8-3F3-A315	SUP
43220220397	P14/8-3B8	SUP
43220220400	P18/11-3B7	SUP
43220220504	P18/11-3B7-E100	SUP
43220220505	P18/11-3B7-E160	SUP
43220220506	P18/11-3B7-A250	SUP
43220220507	P18/11-3B7-A315	SUP
43220220508	P18/11-3B7-A400	SUP
43220220510	P18/11-3B7-A630	SUP
43220220521	P18/11-3H1	SUP
43220220525	P18/11-3H1-E160	SUP
43220220526	P18/11-3H1-A250	SUP
43220220527	P18/11-3H1-A315	SUP
43220220527	P18/11-3H1-A315	SUP
43220220528	P18/11-3H1-A400	SUP
43220220530	P18/11-3H1-A630	SUP
43220220540	P18/11-3D3	SUP
43220220543	P18/11-3D3-E63	SUP
43220220544	P18/11-3D3-E100	SUP
43220220545	P18/11-3D3-E160	SUP

11NC	TYPE NUMBER	CPS
43220220547	P18/11-3E1	SUP
43220220550	P18/11-3H3	SUP
43220220555	P18/11-3H3-E160	SUP
43220220556	P18/11-3H3-A250	SUP
43220220557	P18/11-3H3-A315	SUP
43220220558	P18/11-3H3-A400	SUP
43220220560	P18/11-3H3-A630	SUP
43220220566	P18/11-3F3	SUP
43220220567	P18/11-3F3-A100	SUP
43220220568	P18/11-3F3-A160	SUP
43220220569	P18/11-3F3-A250	SUP
43220220570	P18/11-3F3-A315	SUP
43220220571	P18/11-3F3-A400	SUP
43220220572	P18/11-3C85-E100	SUP
43220220577	P18/11-3B8	SUP
43220220578	P18/11-3C85	SUP
43220220579	P18/11-3E4	SUP
43220220580	P18/11-4C6	SUP
43220220581	P18/11-4C6-E25	SUP
43220220582	P18/11-4C6-E40	SUP
43220220583	P18/11-4C6-E63	SUP
43220220586	P18/11-3C85-A160	SUP
43220220587	P18/11-3C85-A250	SUP
43220220588	P18/11-3C85-A315	SUP
43220220589	P18/11-3C85-A400	SUP
43220220590	P18/11-3B8-A315	SUP
43220220591	P18/11-3B8-A160	SUP
43220220592	P18/11-3B8-A250	SUP
43220220594	P18/11-3B8-A400	SUP
43220220595	P18/11-3B8-A630	SUP
43220220600	P22/13-3B7	SUP
43220220706	P22/13-3B7-E250	SUP
43220220708	P22/13-3B7-A400	SUP
43220220720	P22/13-3H1	SUP
43220220725	P22/13-3H1-E160	SUP
43220220726	P22/13-3H1-E250	SUP
43220220727	P22/13-3H1-A315	SUP
43220220728	P22/13-3H1-A400	SUP
43220220730	P22/13-3H1-A630	SUP
43220220740	P22/13-3D3	SUP
43220220742	P22/13-3D3-E40	SUP

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43220220743	P22/13-3D3-E63	SUP
43220220744	P22/13-3D3-E100	SUP
43220220745	P22/13-3D3-E160	SUP
43220220750	P22/13-3E5	PREF
43220220755	P22/13-3H3-E160	SUP
43220220756	P22/13-3H3-E250	SUP
43220220757	P22/13-3H3-E315	SUP
43220220758	P22/13-3H3-A400	SUP
43220220759	P22/13-3H3	SUP
43220220760	P22/13-3H3-A630	SUP
43220220764	P22/13-3F3	SUP
43220220765	P22/13-3F3-A160	SUP
43220220766	P22/13-3F3-A250	SUP
43220220767	P22/13-3F3-A315	SUP
43220220768	P22/13-3F3-A400	SUP
43220220769	P22/13-3F3-A630	SUP
43220220772	P22/13-3E1	SUP
43220220773	P22/13-3E4	SUP
43220220777	P22/13-3C85	SUP
43220220779	P22/13-4C6	SUP
43220220781	P22/13-4C6-E25	SUP
43220220782	P22/13-4C6-E40	SUP
43220220783	P22/13-4C6-E63	SUP
43220220785	P22/13-3C85-A160	SUP
43220220786	P22/13-3C85-A250	SUP
43220220787	P22/13-3C85-A315	SUP
43220220788	P22/13-3C85-A400	SUP
43220220789	P22/13-3C85-A630	SUP
43220220791	P22/13-3B8-A160	SUP
43220220792	P22/13-3B8-A250	SUP
43220220793	P22/13-3B8-A315	SUP
43220220794	P22/13-3B8-A400	SUP
43220220795	P22/13-3B8-A630	SUP
43220220797	P22/13-3B8	SUP
43220220800	P26/16-3B7	SUP
43220220905	P26/16-3B7-E160	SUP
43220220906	P26/16-3B7-E250	SUP
43220220907	P26/16-3B7-E315	SUP
43220220908	P26/16-3B7-E400	SUP
43220220910	P26/16-3B7-A630	SUP
43220220925	P26/16-3H1-E160	SUP

11NC	TYPE NUMBER	CPS
43220220926	P26/16-3H1-E250	SUP
43220220927	P26/16-3H1-E315	SUP
43220220928	P26/16-3H1-E400	SUP
43220220930	P26/16-3H1-A630	SUP
43220220944	P26/16-3D3-E100	SUP
43220220945	P26/16-3D3-E160	SUP
43220220946	P26/16-3D3-E250	SUP
43220220949	P26/16-3D3	SUP
43220220950	P26/16-3F3	SUP
43220220951	P26/16-3H3	SUP
43220220955	P26/16-3H3-E160	SUP
43220220956	P26/16-3H3-E250	SUP
43220220957	P26/16-3H3-E315	SUP
43220220958	P26/16-3H3-E400	SUP
43220220960	P26/16-3H3-A630	SUP
43220220965	P26/16-3E4	SUP
43220220966	P26/16-3E5	PREF
43220220967	P26/16-3E1	SUP
43220220972	P26/16-3H1	SUP
43220220973	P26/16-3C85	SUP
43220220980	P26/16-4C6	SUP
43220220983	P26/16-4C6-E63	SUP
43220220984	P26/16-4C6-E100	SUP
43220220985	P26/16-3B8	SUP
43220220986	P26/16-3B8-A250	SUP
43220220987	P26/16-3B8-A315	SUP
43220220988	P26/16-3B8-A400	SUP
43220220989	P26/16-3B8-A630	SUP
43220221000	P30/19-3B7	SUP
43220221106	P30/19-3B7-E250	SUP
43220221107	P30/19-3B7-E315	SUP
43220221108	P30/19-3B7-E400	SUP
43220221110	P30/19-3B7-A630	SUP
43220221120	P30/19-3H1	SUP
43220221124	P30/19-3H1-E315	SUP
43220221126	P30/19-3H1-E250	SUP
43220221128	P30/19-3H1-E400	SUP
43220221130	P30/19-3H1-A630	SUP
43220221131	P30/19-3H1-A1000	SUP
43220221132	P30/19-3H1-A1600	SUP
43220221148	P30/19-3F3	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43220221151	P30/19-3F3-A250	PREF
43220221152	P30/19-3F3-A315	PREF
43220221153	P30/19-3F3-A400	PREF
43220221154	P30/19-3F3-A630	PREF
43220221155	P30/19-3F3-A1000	PREF
43220221160	P30/19-3C85	PREF
43220221164	P30/19-3C85-A250	PREF
43220221165	P30/19-3C85-A315	PREF
43220221166	P30/19-3C85-A400	PREF
43220221167	P30/19-3C85-A630	PREF
43220221168	P30/19-3C85-A1000	PREF
43220221182	P30/19-3B8	SUP
43220221184	P30/19-3B8-A250	SUP
43220221185	P30/19-3B8-A315	SUP
43220221186	P30/19-3B8-A400	SUP
43220221187	P30/19-3B8-A630	SUP
43220221189	P30/19-3E5	PREF
43220221190	P30/19-3E4	SUP
43220221191	P30/19-3E1	SUP
43220221200	P36/22-3B7	SUP
43220221308	P36/22-3B7-E400	SUP
43220221310	P36/22-3B7-E630	SUP
43220221312	P36/22-3B7-A1600	SUP
43220221320	P36/22-3H1	SUP
43220221328	P36/22-3H1-E400	SUP
43220221330	P36/22-3H1-E630	SUP
43220221331	P36/22-3H1-A1000	SUP
43220221332	P36/22-3H1-A1600	SUP
43220221351	P36/22-3F3-A250	PREF
43220221352	P36/22-3F3-A315	PREF
43220221353	P36/22-3F3-A400	PREF
43220221354	P36/22-3F3-A630	PREF
43220221355	P36/22-3F3-A1000	PREF
43220221356	P36/22-3F3	PREF
43220221360	P36/22-3C85	PREF
43220221364	P36/22-3C85-A250	PREF
43220221365	P36/22-3C85-A315	PREF
43220221366	P36/22-3C85-A400	PREF
43220221367	P36/22-3C85-A630	PREF
43220221368	P36/22-3C85-A1000	PREF
43220221369	P36/22-3C85-A1600	PREF

11NC	TYPE NUMBER	CPS
43220221378	P36/22-3B8	SUP
43220221381	P36/22-3B8-A250	SUP
43220221382	P36/22-3B8-A315	SUP
43220221383	P36/22-3B8-A400	SUP
43220221384	P36/22-3B8-A630	SUP
43220221395	P36/22-3E5	PREF
43220221396	P36/22-3E1	SUP
43220221397	P36/22-3E4	SUP
43220221400	P42/29-3B7	SUP
43220221511	P42/29-3B7-A1000	SUP
43220221520	P42/29-3H1	SUP
43220221527	P42/29-3H1-E315	SUP
43220221530	P42/29-3H1-E630	SUP
43220221531	P42/29-3H1-A1000	SUP
43220221532	P42/29-3H1-A1600	SUP
43220221580	P42/29-3F3	PREF
43220221583	P42/29-3F3-A315	PREF
43220221584	P42/29-3F3-A400	PREF
43220221585	P42/29-3F3-A630	PREF
43220221586	P42/29-3F3-A1000	PREF
43220221587	P42/29-3F3-A1600	PREF
43220221590	P42/29-3C85	PREF
43220221593	P42/29-3C85-A315	PREF
43220221594	P42/29-3C85-A400	PREF
43220221595	P42/29-3C85-A630	PREF
43220221596	P42/29-3C85-A1000	PREF
43220221597	P42/29-3C85-A1600	PREF
43220221700	P66/56-3E1	SUP
43220221711	P66/56-3F3	SUP
43220221928	X30-3H1-A400	SUP
43220221930	X30-3H1-A630	SUP
43220221931	X30-3H1-A1000	SUP
43220221932	X30-3H1-A1600	SUP
43220222104	P11/7-3B7-A100/N	SUP
43220222105	P11/7-3B7-A160/N	SUP
43220222124	P11/7-3H1-A100/N	SUP
43220222125	P11/7-3H1-A160/N	SUP
43220222126	P11/7-3H1-A250/N	SUP
43220222140	P11/7-3D3-E16/N	SUP
43220222141	P11/7-3D3-E25/N	SUP
43220222142	P11/7-3D3-E40/N	SUP

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11NC	TYPE NUMBER	CPS
43220222143	P11/7-3D3-E63/N	SUP
43220222144	P11/7-3D3-A100/N	SUP
43220222155	P11/7-3H3-A160/N	SUP
43220222156	P11/7-3H3-A250/N	SUP
43220222181	P11/7-4C6-E25/N	SUP
43220222182	P11/7-4C6-E40/N	SUP
43220222304	P14/8-3B7-E100/N	SUP
43220222305	P14/8-3B7-A160/N	SUP
43220222306	P14/8-3B7-A250/N	SUP
43220222307	P14/8-3B7-A315/N	SUP
43220222325	P14/8-3H1-A160/N	SUP
43220222326	P14/8-3H1-A250/N	SUP
43220222327	P14/8-3H1-A315/N	SUP
43220222328	P14/8-3H1-A400/N	SUP
43220222330	P14/8-3H1-A630/N	SUP
43220222342	P14/8-3D3-E40/N	SUP
43220222343	P14/8-3D3-E63/N	SUP
43220222344	P14/8-3D3-E100/N	SUP
43220222355	P14/8-3H3-A160/N	SUP
43220222356	P14/8-3H3-A250/N	SUP
43220222357	P14/8-3H3-A315/N	SUP
43220222358	P14/8-3H3-A400/N	SUP
43220222381	P14/8-4C6-E25/N	SUP
43220222382	P14/8-4C6-E40/N	SUP
43220222383	P14/8-4C6-E63/N	SUP
43220222504	P18/11-3B7-E100/N	SUP
43220222505	P18/11-3B7-E160/N	SUP
43220222506	P18/11-3B7-A250/N	SUP
43220222507	P18/11-3B7-A315/N	SUP
43220222508	P18/11-3B7-A400/N	SUP
43220222510	P18/11-3B7-A630/N	SUP
43220222525	P18/11-3H1-E160/N	SUP
43220222526	P18/11-3H1-A250/N	SUP
43220222527	P18/11-3H1-A315/N	SUP
43220222528	P18/11-3H1-A400/N	SUP
43220222530	P18/11-3H1-A630/N	SUP
43220222543	P18/11-3D3-E63/N	SUP
43220222544	P18/11-3D3-E100/N	SUP
43220222545	P18/11-3D3-E160/N	SUP
43220222555	P18/11-3H3-E160/N	SUP
43220222556	P18/11-3H3-A250/N	SUP

11NC	TYPE NUMBER	CPS
43220222557	P18/11-3H3-A315/N	SUP
43220222558	P18/11-3H3-A400/N	SUP
43220222560	P18/11-3H3-A630/N	SUP
43220222581	P18/11-4C6-E25/N	SUP
43220222582	P18/11-4C6-E40/N	SUP
43220222583	P18/11-4C6-E63/N	SUP
43220222705	P22/13-3B7-E160/N	SUP
43220222706	P22/13-3B7-E250/N	SUP
43220222708	P22/13-3B7-A400/N	SUP
43220222710	P22/13-3B7-A630/N	SUP
43220222725	P22/13-3H1-E160/N	SUP
43220222726	P22/13-3H1-E250/N	SUP
43220222727	P22/13-3H1-E315/N	SUP
43220222728	P22/13-3H1-A400/N	SUP
43220222730	P22/13-3H1-A630/N	SUP
43220222742	P22/13-3D3-E40/N	SUP
43220222743	P22/13-3D3-E63/N	SUP
43220222744	P22/13-3D3-E100/N	SUP
43220222745	P22/13-3D3-E160/N	SUP
43220222755	P22/13-3H3-E160/N	SUP
43220222756	P22/13-3H3-E250/N	SUP
43220222757	P22/13-3H3-E315/N	SUP
43220222758	P22/13-3H3-A400/N	SUP
43220222760	P22/13-3H3-A630/N	SUP
43220222781	P22/13-4C6-E25/N	SUP
43220222782	P22/13-4C6-E40/N	SUP
43220222783	P22/13-4C6-E63/N	SUP
43220222905	P26/16-3B7-E160/N	SUP
43220222906	P26/16-3B7-E250/N	SUP
43220222908	P26/16-3B7-E400/N	SUP
43220222910	P26/16-3B7-A630/N	SUP
43220222925	P26/16-3H1-E160/N	SUP
43220222926	P26/16-3H1-E250/N	SUP
43220222927	P26/16-3H1-E315/N	SUP
43220222928	P26/16-3H1-E400/N	SUP
43220222930	P26/16-3H1-A630/N	SUP
43220222944	P26/16-3D3-E100/N	SUP
43220222945	P26/16-3D3-E160/N	SUP
43220222946	P26/16-3D3-E250/N	SUP
43220222955	P26/16-3H3-E160/N	SUP
43220222956	P26/16-3H3-E250/N	SUP

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11NC	TYPE NUMBER	CPS
43220222957	P26/16-3H3-E315/N	SUP
43220222958	P26/16-3H3-E400/N	SUP
43220222960	P26/16-3H3-A630/N	SUP
43220222983	P26/16-4C6-E63/N	SUP
43220222984	P26/16-4C6-E100/N	SUP
43220223106	P30/19-3B7-E250/N	SUP
43220223110	P30/19-3B7-A630/N	SUP
43220223111	P30/19-3B7-A1000/N	SUP
43220223124	P30/19-3H1-E315/N	SUP
43220223126	P30/19-3H1-E250/N	SUP
43220223128	P30/19-3H1-E400/N	SUP
43220223130	P30/19-3H1-A630/N	SUP
43220223131	P30/19-3H1-A1000/N	SUP
43220223132	P30/19-3H1-A1600/N	SUP
43220223308	P36/22-3B7-E400/N	SUP
43220223310	P36/22-3B7-E630/N	SUP
43220223311	P36/22-3B7-A1000/N	SUP
43220223328	P36/22-3H1-E400/N	SUP
43220223330	P36/22-3H1-E630/N	SUP
43220223331	P36/22-3H1-A1000/N	SUP
43220223332	P36/22-3H1-A1600/N	SUP
43220223508	P42/29-3B7-E400/N	SUP
43220223511	P42/29-3B7-A1000/N	SUP
43220223530	P42/29-3H1-E630/N	SUP
43220223531	P42/29-3H1-A1000/N	SUP
43220223532	P42/29-3H1-A1600/N	SUP
43220223928	X30-3H1-A400/N	SUP
43220223930	X30-3H1-A630/N	SUP
43220223931	X30-3H1-A1000/N	SUP
43220223932	X30-3H1-A1600/N	SUP
43220224120	P9/5-3H1	SUP
43220224123	P9/5-3H1-A63	SUP
43220224124	P9/5-3H1-A100	SUP
43220224125	P9/5-3H1-A160	SUP
43220224126	P9/5-3H1-A250	SUP
43220224140	P9/5-3D3	SUP
43220224142	P9/5-3D3-E40	SUP
43220224143	P9/5-3D3-E63	SUP
43220224160	P9/5-3E5	PREF
43220224179	P9/5-4C6	SUP
43220224180	P9/5-4C6-E16	SUP

11NC	TYPE NUMBER	CPS
43220224181	P9/5-4C6-E25	SUP
43220224182	P9/5-4C6-E40	SUP
43220224520	X22-3H1	SUP
43220224528	X22-3H1-A400	SUP
43220224530	X22-3H1-A630	SUP
43220224531	X22-3H1-A1000	SUP
43220224540	X22-3D3	SUP
43220224560	X22-3B8	SUP
43220224580	X22-4C6	SUP
43220224600	RM4/I-3F4	DES
43220224601	RM4/I-3F4-A100	DES
43220224602	RM4/I-3F4-A160	DES
43220224603	RM4/I-3F4-A250	DES
43220224700	RM6S-3B7	SUP
43220224705	RM6S-3B7-A160	SUP
43220224706	RM6S-3B7-A250	SUP
43220224707	RM6S-3B7-A315	SUP
43220224708	RM6S-3B7-A400	SUP
43220224710	RM6S-3B7-A630	SUP
43220224719	RM6S-3B7-A1250	SUP
43220224721	RM6S-3H1	SUP
43220224725	RM6S-3H1-A160	SUP
43220224726	RM6S-3H1-A250	SUP
43220224727	RM6S-3H1-A315	SUP
43220224728	RM6S-3H1-A400	SUP
43220224730	RM6S-3H1-A630	SUP
43220224731	RM6S-3H1-A1000	SUP
43220224739	RM6S-3H1-A1250	SUP
43220224740	RM6S-3D3	PREF
43220224743	RM6S-3D3-E63	PREF
43220224744	RM6S-3D3-E100	PREF
43220224745	RM6S-3D3-A160	PREF
43220224747	RM6S/I-3C90	PREF
43220224748	RM6S/ILP-3C90	DES
43220224749	RM6S/ILP-3F4	DES
43220224750	RM6S-3H3	PREF
43220224751	RM6S/ILP-3H3	DES
43220224752	RM6S/I-3H3-A400	DES
43220224753	RM6S/I-3H3-A630	DES
43220224755	RM6S-3H3-A160	PREF
43220224756	RM6S-3H3-A250	PREF

Conversion list

11NC to type number

11NC	TYPE NUMBER	CPS
43220224757	RM6S-3H3-A315	PREF
43220224758	RM6S-3H3-A400	PREF
43220224770	RM6S/ILP-3C85	DES
43220224771	RM6S/ILP-3F3	DES
43220224772	RM6S/I-3B8-A63	SUP
43220224773	RM6S/I-3B8-A160	SUP
43220224774	RM6S/I-3B8-A100	SUP
43220224778	RM6S-4C6	SUP
43220224781	RM6S-4C6-E25	SUP
43220224782	RM6S-4C6-E40	SUP
43220224783	RM6S-4C6-E63	SUP
43220224784	RM6S/I-3E6	PREF
43220224785	RM6S/I-3B8	SUP
43220224786	RM6S/I-3E1	PREF
43220224787	RM6S/I-3E5	PREF
43220224788	RM6S/I-3B8-A250	SUP
43220224793	RM6S/I-3E4	PREF
43220225001	RM10/ILP-3D3	DES
43220225002	RM10/ILP-3D3-A315	DES
43220225003	RM10/ILP-3D3-A400	DES
43220225004	RM10/ILP-3D3-A630	DES
43220225006	RM10/ILP-3H3	DES
43220225007	RM10/ILP-3H3-A400	DES
43220225008	RM10/ILP-3H3-A630	DES
43220225010	RM10/I-3H3	DES
43220225011	RM10/I-3H3-A400	DES
43220225012	RM10/I-3H3-A630	DES
43220225013	RM10/I-3H3-A1000	DES
43220225015	RM10/I-3D3	DES
43220225016	RM10/I-3D3-A315	DES
43220225017	RM10/I-3D3-A400	DES
43220225018	RM10/I-3D3-A630	DES
43220225020	RM10-3H1	SUP
43220225026	RM10-3H1-A250	SUP
43220225027	RM10-3H1-A315	SUP
43220225028	RM10-3H1-A400	SUP
43220225030	RM10-3H1-A630	SUP
43220225036	RM10/ILP-3E5	DES
43220225037	RM10/ILP-3E6	DES
43220225038	RM10/ILP-3F4	DES
43220225040	RM10/I-3B8	SUP

11NC	TYPE NUMBER	CPS
43220225046	RM10/I-3B8-A160	SUP
43220225048	RM10/I-3B8-A250	SUP
43220225049	RM10/I-3B8-A315	SUP
43220225050	RM10/I-3B8-A400	SUP
43220225052	RM10/I-3B8-A630	SUP
43220225060	RM10/I-3C85	PREF
43220225079	RM10/ILP-3C90	DES
43220225080	RM10/ILP-3H3-A1000	DES
43220225082	RM10/ILP-3C85	DES
43220225083	RM10/ILP-3F3	DES
43220225086	RM10/I-3C85-A250	PREF
43220225087	RM10/I-3C85-A315	PREF
43220225088	RM10/I-3C85-A400	PREF
43220225089	RM10/I-3C85-A630	PREF
43220225090	RM10/I-3E1	PREF
43220225093	RM10/I-3E4	PREF
43220225094	RM10/I-3E5	PREF
43220225099	RM10/I-3C85-A160	PREF
43220225106	RM8-3B7-E250	SUP
43220225107	RM8-3B7-A315	SUP
43220225108	RM8-3B7-A400	SUP
43220225110	RM8-3B7-A630	SUP
43220225120	RM8-3H1	SUP
43220225126	RM8-3H1-E250	SUP
43220225127	RM8-3H1-A315	SUP
43220225128	RM8-3H1-A400	SUP
43220225130	RM8-3H1-A630	SUP
43220225140	RM8-3D3	PREF
43220225144	RM8-3D3-E100	PREF
43220225145	RM8-3D3-E160	PREF
43220225146	RM8/I-3B8	SUP
43220225147	RM8/I-3B8-A160	SUP
43220225148	RM8/I-3B8-A250	SUP
43220225149	RM8/I-3B8-A315	SUP
43220225150	RM8/I-3B8-A400	SUP
43220225156	RM8-3H3-A250	PREF
43220225157	RM8-3H3-A315	PREF
43220225158	RM8-3H3-A400	PREF
43220225160	RM8-3H3-A630	PREF
43220225170	RM8-3H3	PREF
43220225172	RM8/I-3H3	DES

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11NC	TYPE NUMBER	CPS
43220225173	RM8/I-3H3-A400	DES
43220225174	RM8/I-3H3-A630	DES
43220225175	RM8/I-3H3-A1000	DES
43220225181	RM8-4C6	SUP
43220225182	RM8-4C6-E40	SUP
43220225183	RM8-4C6-E63	SUP
43220225186	RM8/I-3E1	PREF
43220225187	RM8/I-3E4	PREF
43220225198	RM8/I-3E5	PREF
43220225300	X35-3B8	SUP
43220225320	X35-3H1	SUP
43220225328	X35-3H1-E400	SUP
43220225330	X35-3H1-E630	SUP
43220225331	X35-3H1-A1000	SUP
43220225332	X35-3H1-A1600	SUP
43220225504	RM6R-3B7-E100	SUP
43220225505	RM6R-3B7-A160	SUP
43220225506	RM6R-3B7-A250	SUP
43220225507	RM6R-3B7-A315	SUP
43220225508	RM6R-3B7-A400	SUP
43220225520	RM6R-3H1	SUP
43220225525	RM6R-3H1-A160	SUP
43220225526	RM6R-3H1-A250	SUP
43220225527	RM6R-3H1-A315	SUP
43220225528	RM6R-3H1-A400	SUP
43220225530	RM6R-3H1-A630	SUP
43220225531	RM6R-3H1-A1000	SUP
43220225539	RM6R-3H1-A1250	SUP
43220225540	RM6R-3D3	SUP
43220225542	RM6R-3D3-E40	SUP
43220225543	RM6R-3D3-E63	SUP
43220225544	RM6R-3D3-E100	SUP
43220225545	RM6R-3D3-A160	SUP
43220225555	RM6R-3H3-A160	SUP
43220225556	RM6R-3H3-A250	SUP
43220225557	RM6R-3H3-A315	SUP
43220225558	RM6R-3H3-A400	SUP
43220225562	RM6R-3H3	SUP
43220225566	RM6R-4C6	SUP
43220225581	RM6R-4C6-E25	SUP
43220225582	RM6R-4C6-E40	SUP

11NC	TYPE NUMBER	CPS
43220225583	RM6R-4C6-E63	SUP
43220225710	RM4/I-3F3	PREF
43220225714	RM4/I-3F3-A100	PREF
43220225715	RM4/I-3F3-A160	PREF
43220225716	RM4/I-3F3-A250	PREF
43220225720	RM4-3H1	SUP
43220225722	RM4-3H1-E40	SUP
43220225723	RM4-3H1-A63	SUP
43220225724	RM4-3H1-A100	SUP
43220225725	RM4-3H1-A160	SUP
43220225726	RM4-3H1-A250	SUP
43220225739	RM4-3D3	PREF
43220225742	RM4-3D3-A40	PREF
43220225743	RM4-3D3-A63	PREF
43220225750	RM4-3H3	PREF
43220225753	RM4-3H3-A63	PREF
43220225754	RM4-3H3-A100	PREF
43220225755	RM4-3H3-A160	PREF
43220225759	RM4/ILP-3C85	DES
43220225760	RM4/ILP-3F3	DES
43220225770	RM4/I-3E1	PREF
43220225775	RM4/I-3E5	PREF
43220225779	RM4-4C6	SUP
43220225780	RM4-4C6-E16	SUP
43220225781	RM4-4C6-E25	SUP
43220225782	RM4-4C6-A40	SUP
43220225791	RM4/I-3E4	PREF
43220225794	RM4/ILP-3C90	DES
43220225796	RM4/ILP-3E5	DES
43220225797	RM4/ILP-3F4	DES
43220225798	RM4/ILP-3E6	DES
43220225900	RM5-3B7	SUP
43220225903	RM5-3B7-E63	SUP
43220225904	RM5-3B7-E100	SUP
43220225905	RM5-3B7-A160	SUP
43220225906	RM5-3B7-A250	SUP
43220225907	RM5-3B7-A315	SUP
43220225913	RM5/ILP-3C90	DES
43220225914	RM5/ILP-3E6	DES
43220225915	RM5/ILP-3F4	DES
43220225916	RM5/I-3E6	PREF

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11NC to type number

11NC	TYPE NUMBER	CPS
43220225917	RM5/ILP-3C85	DES
43220225918	RM5/ILP-3F3	DES
43220225919	RM5/ILP-3E5	DES
43220225920	RM5-3H1	SUP
43220225925	RM5-3H1-A160	SUP
43220225926	RM5-3H1-A250	SUP
43220225927	RM5-3H1-A315	SUP
43220225940	RM5-3D3	PREF
43220225942	RM5-3D3-E40	PREF
43220225943	RM5-3D3-A63	PREF
43220225944	RM5-3D3-A100	PREF
43220225946	RM5/I-3B8	SUP
43220225947	RM5/I-3B8-A100	SUP
43220225948	RM5/I-3B8-A160	SUP
43220225949	RM5/I-3B8-A250	SUP
43220225955	RM5-3H3-A160	PREF
43220225956	RM5-3H3-A250	PREF
43220225957	RM5-3H3-A315	PREF
43220225958	RM5-3H3-A400	PREF
43220225970	RM5-3H3	PREF
43220225980	RM5-4C6-E16	SUP
43220225981	RM5-4C6-E25	SUP
43220225982	RM5-4C6-E40	SUP
43220225983	RM5-4C6-E63	SUP
43220225984	RM5-4C6	SUP
43220225990	RM5/I-3E1	PREF
43220225991	RM5/I-3E4	PREF
43220225992	RM5/I-3E5	PREF
43220226104	P9/5-3B7-A100/N	SUP
43220226123	P9/5-3H1-A63/N	SUP
43220226124	P9/5-3H1-A100/N	SUP
43220226125	P9/5-3H1-A160/N	SUP
43220226126	P9/5-3H1-A250/N	SUP
43220226142	P9/5-3D3-E40/N	SUP
43220226143	P9/5-3D3-E63/N	SUP
43220226180	P9/5-4C6-E16/N	SUP
43220226181	P9/5-4C6-E25/N	SUP
43220226182	P9/5-4C6-E40/N	SUP
43220226528	X22-3H1-A400/N	SUP
43220226530	X22-3H1-A630/N	SUP
43220226531	X22-3H1-A1000/N	SUP

11NC	TYPE NUMBER	CPS
43220226705	RM6S-3B7-A160/N	SUP
43220226706	RM6S-3B7-A250/N	SUP
43220226707	RM6S-3B7-A315/N	SUP
43220226708	RM6S-3B7-A400/N	SUP
43220226719	RM6S-3B7-A1250/N	SUP
43220226725	RM6S-3H1-A160/N	SUP
43220226726	RM6S-3H1-A250/N	SUP
43220226727	RM6S-3H1-A315/N	SUP
43220226728	RM6S-3H1-A400/N	SUP
43220226730	RM6S-3H1-A630/N	SUP
43220226731	RM6S-3H1-A1000/N	SUP
43220226739	RM6S-3H1-A1250/N	SUP
43220226743	RM6S-3D3-E63/N	PREF
43220226744	RM6S-3D3-E100/N	PREF
43220226745	RM6S-3D3-A160/N	PREF
43220226755	RM6S-3H3-A160/N	PREF
43220226756	RM6S-3H3-A250/N	PREF
43220226757	RM6S-3H3-A315/N	PREF
43220226758	RM6S-3H3-A400/N	PREF
43220226781	RM6S-4C6-E25/N	SUP
43220226782	RM6S-4C6-E40/N	SUP
43220226783	RM6S-4C6-E63/N	SUP
43220227026	RM10-3H1-A250/N	SUP
43220227027	RM10-3H1-A315/N	SUP
43220227028	RM10-3H1-A400/N	SUP
43220227030	RM10-3H1-A630/N	SUP
43220227105	RM8-3B7-E160/N	SUP
43220227106	RM8-3B7-E250/N	SUP
43220227107	RM8-3B7-A315/N	SUP
43220227108	RM8-3B7-A400/N	SUP
43220227110	RM8-3B7-A630/N	SUP
43220227126	RM8-3H1-E250/N	SUP
43220227127	RM8-3H1-A315/N	SUP
43220227128	RM8-3H1-A400/N	SUP
43220227130	RM8-3H1-A630/N	SUP
43220227144	RM8-3D3-E100/N	PREF
43220227145	RM8-3D3-E160/N	PREF
43220227156	RM8-3H3-A250/N	PREF
43220227157	RM8-3H3-A315/N	PREF
43220227158	RM8-3H3-A400/N	PREF
43220227160	RM8-3H3-A630/N	PREF

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11NC	TYPE NUMBER	CPS
43220227182	RM8-4C6-E40/N	SUP
43220227183	RM8-4C6-E63/N	SUP
43220227328	X35-3H1-E400/N	SUP
43220227330	X35-3H1-E630/N	SUP
43220227331	X35-3H1-A1000/N	SUP
43220227332	X35-3H1-A1600/N	SUP
43220227504	RM6R-3B7-E100/N	SUP
43220227505	RM6R-3B7-A160/N	SUP
43220227506	RM6R-3B7-A250/N	SUP
43220227507	RM6R-3B7-A315/N	SUP
43220227508	RM6R-3B7-A400/N	SUP
43220227525	RM6R-3H1-A160/N	SUP
43220227526	RM6R-3H1-A250/N	SUP
43220227527	RM6R-3H1-A315/N	SUP
43220227528	RM6R-3H1-A400/N	SUP
43220227530	RM6R-3H1-A630/N	SUP
43220227531	RM6R-3H1-A1000/N	SUP
43220227539	RM6R-3H1-A1250/N	SUP
43220227542	RM6R-3D3-E40/N	SUP
43220227543	RM6R-3D3-E63/N	SUP
43220227544	RM6R-3D3-E100/N	SUP
43220227545	RM6R-3D3-A160/N	SUP
43220227555	RM6R-3H3-A160/N	SUP
43220227556	RM6R-3H3-A250/N	SUP
43220227557	RM6R-3H3-A315/N	SUP
43220227558	RM6R-3H3-A400/N	SUP
43220227581	RM6R-4C6-E25/N	SUP
43220227582	RM6R-4C6-E40/N	SUP
43220227583	RM6R-4C6-E63/N	SUP
43220227722	RM4-3H1-E40/N	SUP
43220227723	RM4-3H1-A63/N	SUP
43220227724	RM4-3H1-A100/N	SUP
43220227725	RM4-3H1-A160/N	SUP
43220227726	RM4-3H1-A250/N	SUP
43220227742	RM4-3D3-A40/N	PREF
43220227743	RM4-3D3-A63/N	PREF
43220227753	RM4-3H3-A63/N	PREF
43220227754	RM4-3H3-A100/N	PREF
43220227755	RM4-3H3-A160/N	PREF
43220227780	RM4-4C6-E16/N	SUP
43220227781	RM4-4C6-E25/N	SUP

11NC	TYPE NUMBER	CPS
43220227782	RM4-4C6-A40/N	SUP
43220227903	RM5-3B7-E63/N	SUP
43220227904	RM5-3B7-E100/N	SUP
43220227905	RM5-3B7-A160/N	SUP
43220227906	RM5-3B7-A250/N	SUP
43220227907	RM5-3B7-A315/N	SUP
43220227925	RM5-3H1-A160/N	SUP
43220227926	RM5-3H1-A250/N	SUP
43220227927	RM5-3H1-A315/N	SUP
43220227942	RM5-3D3-E40/N	PREF
43220227943	RM5-3D3-A63/N	PREF
43220227944	RM5-3D3-E100/N	PREF
43220227955	RM5-3H3-A160/N	PREF
43220227956	RM5-3H3-A250/N	PREF
43220227957	RM5-3H3-A315/N	PREF
43220227958	RM5-3H3-A400/N	PREF
43220227980	RM5-4C6-E16/N	SUP
43220227981	RM5-4C6-E25/N	SUP
43220227982	RM5-4C6-E40/N	SUP
43220227983	RM5-4C6-E63/N	SUP
43220228000	ER9.5-3F3-A100-S	DES
43220228001	ER9.5-3F3-A160-S	DES
43220228002	ER9.5-3F3-A63-S	DES
43220228010	ER9.5-3F4-A100-S	DES
43220228011	ER9.5-3F4-A40-S	DES
43220228012	ER9.5-3F4-A63-S	DES
43220228050	ER11-3F3-A100-S	DES
43220228051	ER11-3F3-A160-S	DES
43220228052	ER11-3F3-A250-S	DES
43220228070	ER11-3F4-A63-S	DES
43220228071	ER11-3F4-A100-S	DES
43220228072	ER11-3F4-A160-S	DES
43220228200	ER14.5-3E6-S	PROT
43220228220	ER14.5-3F3-S	PROT
43220228240	ER14.5-3F4-S	PROT
43220250040	RM7/I-3C85	SUP
43220250044	RM7/I-3C85-A100	SUP
43220250045	RM7/I-3C85-A160	SUP
43220250046	RM7/I-3C85-A250	SUP
43220250060	RM7/I-3B8	SUP
43220250065	RM7/I-3B8-A160	SUP

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11NC	TYPE NUMBER	CPS
43220250066	RM7/I-3B8-A250	SUP
43220250070	RM7/I-3C90	SUP
43220250074	RM7/ILP-3C90	SUP
43220250080	RM7/I-3F3	SUP
43220250084	RM7/I-3F3-A100	SUP
43220250085	RM7/I-3F3-A160	SUP
43220250086	RM7/I-3F3-A250	SUP
43220250090	RM7/I-3E4	SUP
43220250092	RM7/ILP-3F4	SUP
43220250093	RM7/ILP-3E6	SUP
43220250094	RM7/ILP-3E5	SUP
43220250095	RM7/I-3E5	SUP
43220250096	RM7/ILP-3C85	SUP
43220250098	RM7/ILP-3F3	SUP
43220250099	RM7/I-3E1	SUP
43220250120	RM8/I-3C85	PREF
43220250128	RM8/ILP-3F3	DES
43220250129	RM8/ILP-3F4	DES
43220250130	RM8/I-3D3	DES
43220250131	RM8/I-3D3-A250	DES
43220250132	RM8/I-3D3-A315	DES
43220250133	RM8/I-3D3-A400	DES
43220250135	RM8/ILP-3D3	DES
43220250136	RM8/ILP-3D3-A250	DES
43220250137	RM8/ILP-3D3-A315	DES
43220250138	RM8/ILP-3D3-A400	DES
43220250144	RM8/I-3C85-A100	PREF
43220250145	RM8/I-3C85-A160	PREF
43220250146	RM8/I-3C85-A250	PREF
43220250147	RM8/I-3C85-A315	PREF
43220250148	RM8/I-3C85-A400	PREF
43220250160	RM8/I-3F3	PREF
43220250164	RM8/I-3F3-A100	PREF
43220250165	RM8/I-3F3-A160	PREF
43220250166	RM8/I-3F3-A250	PREF
43220250167	RM8/I-3F3-A315	PREF
43220250168	RM8/I-3F3-A400	PREF
43220250170	RM8/I-3F4	DES
43220250171	RM8/I-3F4-A100	DES
43220250172	RM8/I-3F4-A160	DES
43220250173	RM8/I-3F4-A250	DES
43220250174	RM8/I-3F4-A315	DES
43220250175	RM8/I-3F4-A400	DES
43220250180	RM8/I-3C90	PREF
43220250185	RM8/ILP-3H3	DES
43220250186	RM8/ILP-3H3-A1000	DES
43220250187	RM8/ILP-3H3-A400	DES
43220250188	RM8/ILP-3H3-A630	DES
43220250191	RM8/I-3E6	PREF
43220250198	RM8/ILP-3E5	DES
43220250199	RM8/ILP-3E6	DES
43220250220	RM10/I-3C90	PREF
43220250260	RM10/I-3F3	PREF
43220250265	RM10/I-3F3-A160	PREF
43220250266	RM10/I-3F3-A250	PREF
43220250267	RM10/I-3F3-A315	PREF
43220250268	RM10/I-3F3-A400	PREF
43220250269	RM10/I-3F3-A630	PREF
43220250300	RM14/I-3C85	PREF
43220250316	RM14/I-3C85-A250	PREF
43220250317	RM14/I-3C85-A315	PREF
43220250318	RM14/I-3C85-A400	PREF
43220250320	RM14/I-3C85-A630	PREF
43220250321	RM14/I-3C85-A1000	PREF
43220250350	RM14/I-3C90	PREF
43220250360	RM14/I-3F3	PREF
43220250366	RM14/I-3F3-A250	PREF
43220250367	RM14/I-3F3-A315	PREF
43220250368	RM14/I-3F3-A400	PREF
43220250370	EP7-3H3	PREF
43220250370	RM14/I-3F3-A630	PREF
43220250371	EP7-3H3-A100	PREF
43220250371	RM14/I-3F3-A1000	PREF
43220250372	EP7-3H3-A160	PREF
43220250373	EP7-3H3-A63	PREF
43220250380	RM14/I-3B8	SUP
43220250386	RM14/I-3B8-A250	SUP
43220250387	RM14/I-3B8-A315	SUP
43220250388	RM14/I-3B8-A400	SUP
43220250390	RM14/I-3B8-A630	SUP
43220250391	RM14/I-3B8-A1000	SUP
43220250394	RM14/ILP-3C90	DES

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11NC	TYPE NUMBER	CPS
43220250395	RM14/ILP-3E5	DES
43220250396	RM14/ILP-3E6	DES
43220250397	RM14/ILP-3F4	DES
43220250398	RM14/ILP-3C85	DES
43220250399	RM14/ILP-3F3	DES
43220250400	RM5/I-3C85	PREF
43220250403	RM5/I-3C85-A63	PREF
43220250404	RM5/I-3C85-A100	PREF
43220250405	RM5/I-3C85-A160	PREF
43220250406	RM5/I-3C85-A250	PREF
43220250407	RM5/I-3C85-A315	PREF
43220250410	RM5/I-3F3	PREF
43220250413	RM5/I-3F3-A63	PREF
43220250414	RM5/I-3F3-A100	PREF
43220250415	RM5/I-3F3-A160	PREF
43220250416	RM5/I-3F3-A250	PREF
43220250417	RM5/I-3F3-A315	PREF
43220250420	RM5/I-3F4	DES
43220250421	RM5/I-3F4-A100	DES
43220250422	RM5/I-3F4-A160	DES
43220250423	RM5/I-3F4-A250	DES
43220250430	RM5/I-3C90	PREF
43220250500	RM6S/I-3C85	PREF
43220250503	RM6S/I-3C85-A63	PREF
43220250504	RM6S/I-3C85-A100	PREF
43220250505	RM6S/I-3C85-A160	PREF
43220250506	RM6S/I-3C85-A250	PREF
43220250507	RM6S/I-3C85-A315	PREF
43220250508	RM6S/I-3C85-A400	PREF
43220250509	RM6S/I-3C85-A630	PREF
43220250511	RM6S/I-3F3	PREF
43220250513	RM6S/I-3F3-A63	PREF
43220250514	RM6S/I-3F3-A100	PREF
43220250515	RM6S/I-3F3-A160	PREF
43220250516	RM6S/I-3F3-A250	PREF
43220250517	RM6S/I-3F3-A315	PREF
43220250530	RM6S/I-3F4	DES
43220250531	RM6S/I-3F4-A63	DES
43220250532	RM6S/I-3F4-A100	DES
43220250533	RM6S/I-3F4-A160	DES
43220250534	RM6S/I-3F4-A250	DES

11NC	TYPE NUMBER	CPS
43220250535	RM6S/I-3F4-A315	DES
43220250540	RM6S/I-3D3	DES
43220250541	RM6S/I-3D3-A160	DES
43220250542	RM6S/I-3D3-A250	DES
43220250543	RM6S/I-3D3-A315	DES
43220250545	RM6S/ILP-3D3	DES
43220250546	RM6S/ILP-3D3-A160	DES
43220250547	RM6S/ILP-3D3-A250	DES
43220250548	RM6S/ILP-3D3-A315	DES
43220250550	RM6S/I-3H3	DES
43220250551	RM6S/I-3H3-A315	DES
43220250560	RM6S/ILP-3H3-A315	DES
43220250561	RM6S/ILP-3H3-A400	DES
43220250562	RM6S/ILP-3H3-A630	DES
43220250598	RM6S/ILP-3E5	DES
43220250599	RM6S/ILP-3E6	DES
43220250600	RM12/I-3C85	PREF
43220250605	RM12/I-3C85-A160	PREF
43220250606	RM12/I-3C85-A250	PREF
43220250607	RM12/I-3C85-A315	PREF
43220250608	RM12/I-3C85-A400	PREF
43220250610	RM12/I-3C85-A630	PREF
43220250620	RM12/I-3F3	PREF
43220250625	RM12/I-3F3-A160	PREF
43220250626	RM12/I-3F3-A250	PREF
43220250627	RM12/I-3F3-A315	PREF
43220250628	RM12/I-3F3-A400	PREF
43220250629	RM12/I-3F3-A630	PREF
43220250640	RM12/I-3B8	SUP
43220250645	RM12/I-3B8-A160	SUP
43220250646	RM12/I-3B8-A250	SUP
43220250647	RM12/I-3B8-A315	SUP
43220250648	RM12/I-3B8-A400	SUP
43220250660	RM12/I-3E4	PREF
43220250670	RM12/I-3E1	PREF
43220250694	RM12/ILP-3C90	DES
43220250695	RM12/ILP-3E5	DES
43220250696	RM12/ILP-3E6	DES
43220250697	RM12/ILP-3F4	DES
43220250698	RM12/ILP-3C85	DES
43220250699	RM12/ILP-3F3	DES

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43220250700	P7/4-3H1	SUP
43220250703	P7/4-3H1-A63	OBS
43220250704	P7/4-3H1-A100	OBS
43220250810	EP7-3H1	SUP
43220250813	EP7-3H1-A63	SUP
43220250814	EP7-3H1-A100	SUP
43220250815	EP7-3H1-A160	SUP
43220250820	EP7-3E5	PREF
43220250830	EP7-3E6	PREF
43220250840	EP7-3F3	PREF
43220250843	EP7-3F3-A160	PREF
43220250845	EP7-3F3-E25	PREF
43220250846	EP7-3F3-A40	PREF
43220250847	EP7-3F3-A63	PREF
43220250848	EP7-3F3-A100	PREF
43220250850	EP7-3F4	DES
43220250854	EP7-3F4-A100	DES
43220250855	EP7-3F4-A160	DES
43220250860	EP7-3E1	PREF
43220250880	EP7-3C85	PREF
43220250881	EP7-3C85-E25	PREF
43220250882	EP7-3C85-A40	PREF
43220250883	EP7-3C85-A100	PREF
43220250885	EP7-3C85-A160	PREF
43220250887	EP7-3C85-A63	PREF
43220250910	EP10-3E1	PREF
43220250920	EP10-3E5	PREF
43220250930	EP10-3F4	DES
43220250931	EP10-3F4-A63	DES
43220250932	EP10-3F4-A100	DES
43220250933	EP10-3F4-A160	DES
43220250940	EP10-3C85	PREF
43220250941	EP10-3C85-A25	PREF
43220250942	EP10-3C85-A40	PREF
43220250943	EP10-3C85-A63	PREF
43220250944	EP10-3C85-A100	PREF
43220250945	EP10-3C85-A160	PREF
43220250950	EP10-3E6	PREF
43220250960	EP10-3F3	PREF
43220250961	EP10-3F3-A25	PREF
43220250962	EP10-3F3-A40	PREF
43220250963	EP10-3F3-A63	PREF
43220250964	EP10-3F3-A100	PREF
43220250965	EP10-3F3-A160	PREF
43220250981	EP10-3E4	PREF
43220251000	EP13-3C85-E40	PREF
43220251001	EP13-3C85-A63	PREF
43220251003	EP13-3C85-A100	PREF
43220251004	EP13-3C85-A160	PREF
43220251006	EP13-3C85-A250	PREF
43220251014	EP13-3C85	PREF
43220251020	EP13-3E6	PREF
43220251033	EP13-3E1	PREF
43220251040	EP13-3F4	DES
43220251041	EP13-3F4-A160	DES
43220251042	EP13-3F4-A250	DES
43220251043	EP13-3F4-A315	DES
43220251055	EP13-3E4	PREF
43220251077	EP13-3E5	PREF
43220251090	EP13-3F3	PREF
43220251091	EP13-3F3-E40	PREF
43220251092	EP13-3F3-A63	PREF
43220251093	EP13-3F3-A100	PREF
43220251094	EP13-3F3-A160	PREF
43220251096	EP13-3F3-A250	PREF
43220251300	X30-3H1	SUP
43220251320	X30-3B8	SUP
43220251400	EFD10-3F3-S	DES
43220251401	EFD10-3F3-A25-S	DES
43220251402	EFD10-3F3-A40-S	DES
43220251403	EFD10-3F3-A63-S	DES
43220251420	EFD10-3F4-S	DES
43220251421	EFD10-3F4-A25-S	DES
43220251422	EFD10-3F4-A40-S	DES
43220251423	EFD10-3F4-A63-S	DES
43220251440	EFD10-3E4-S	DES
43220251450	EFD10-3E5-S	DES
43220251500	EFD12-3F3-S	DES
43220251501	EFD12-3F3-A40-S	DES
43220251502	EFD12-3F3-A63-S	DES
43220251503	EFD12-3F3-A100-S	DES
43220251520	EFD12-3F4-S	DES

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11NC	TYPE NUMBER	CPS
43220251521	EFD12-3F4-A40-S	DES
43220251522	EFD12-3F4-A63-S	DES
43220251523	EFD12-3F4-A100-S	DES
43220251540	EFD12-3E4-S	DES
43220251550	EFD12-3E5-S	DES
43220251600	EFD15-3F3-S	PREF
43220251601	EFD15-3F3-A63-S	PREF
43220251602	EFD15-3F3-A100-S	PREF
43220251603	EFD15-3F3-A160-S	PREF
43220251620	EFD15-3F4-S	DES
43220251621	EFD15-3F4-A63-S	DES
43220251622	EFD15-3F4-A100-S	DES
43220251623	EFD15-3F4-A160-S	DES
43220251640	EFD15-3E4-S	PREF
43220251660	EFD15-3E5-S	PREF
43220253025	P26/16-3C85-E160	SUP
43220253026	P26/16-3C85-A250	SUP
43220253027	P26/16-3C85-A315	SUP
43220253028	P26/16-3C85-A400	SUP
43220253030	P26/16-3C85-A630	SUP
43220253045	P26/16-3F3-E160	SUP
43220253046	P26/16-3F3-A250	SUP
43220253047	P26/16-3F3-A315	SUP
43220253048	P26/16-3F3-A400	SUP
43220253050	P26/16-3F3-A630	SUP
43220253300	P14/8-3F4	SUP
43220253301	P14/8-3F4-A160	SUP
43220253302	P14/8-3F4-A250	SUP
43220253303	P14/8-3F4-A315	SUP
43220253400	P18/11-3F4	SUP
43220253401	P18/11-3F4-A160	SUP
43220253402	P18/11-3F4-A250	SUP
43220253403	P18/11-3F4-A315	SUP
43220253404	P18/11-3F4-A400	SUP
43220253410	P18/11-3E5	PREF
43220253500	P22/13-3F4	SUP
43220253501	P22/13-3F4-A160	SUP
43220253502	P22/13-3F4-A250	SUP
43220253503	P22/13-3F4-A315	SUP
43220253504	P22/13-3F4-A400	SUP
43220253505	P22/13-3F4-A630	SUP

11NC	TYPE NUMBER	CPS
43220258046	ER9.5-3E5-S	DES
43220258047	ER9.5-3E6-S	DES
43220258048	ER9.5-3F3-S	DES
43220258049	ER9.5-3F4-S	DES
43220258096	ER11-3E5-S	DES
43220258097	ER11-3E6-S	DES
43220258098	ER11-3F3-S	DES
43220258099	ER11-3F4-S	DES
43220580326	M1.4/1.7-ADJ.TRIMMER	PREF
43220580327	M2.0/2.6-ADJ.TRIMMER	PREF
43300303071	ROD10/200-4B1	SUP
43300303097	IMP8/3/125-3B1	OBS
43300303099	IMP10/4.5/170-3B1	OBS
43300303119	IMP6/3/200-3B1	OBS
43300303121	IMP6/3/200-3C85	OBS
43300303122	IMP8/3/200-3C85	OBS
43300303123	IMP10/4.5/200-3C85	OBS
43300303124	IMP12/5.5/200-3C85	OBS
43300303125	IMP12/5.5/170-3B1	OBS
43300303133	ROD2/10-3B1-D	OBS
43300303134	ROD2/15-3B1-D	OBS
43300303135	ROD3/15-3B1-D	OBS
43300303136	ROD3/20-3B1-D	SUP
43300303137	ROD4/15-3B1-D	SUP
43300303138	ROD4/20-3B1-D	OBS
43300303139	ROD5/20-3B1-D	SUP
43300303140	ROD5/25-3B1-D	SUP
43300303141	ROD6/30-3B1-D	SUP
43300303142	ROD6/40-3B1-D	OBS
43300303143	ROD8/50-3B1	SUP
43300303144	ROD8/150-3B1	OBS
43300303145	ROD2/20-3B1-D	SUP
43300303146	ROD10/200-3B1	SUP
43300303147	ROD3/25-3B1-D	SUP
43300303149	ROD4/25-3B1-D	SUP
43300303151	ROD5/30-3B1-D	SUP
43300303153	ROD6/50-3B1-D	OBS
43300303155	ROD8/200-3B1	SUP
43300303210	BD3/0.7/4-3S1	SUP
43300303211	BD3/0.8/10-3S1	OBS
43300303212	BD3/1/4-3S1	DES

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43300303213	BD3/1/10-3S1	SUP
43300303214	BD5.1/0.8/4-3S1	SUP
43300303215	BD5.1/0.8/10-3S1	OBS
43300303216	BD5.1/1.5/4-3S1	DES
43300303217	BD5.1/1.5/10-3S1	SUP
43300303218	BD5.1/2/4-3S1	PREF
43300303219	BD5.1/2/10-3S1	SUP
43300303274	MHC2-5.6/12-4B1	OBS
43300303311	BD3/0.7/4-4S2	OBS
43300303312	BD3/1/4-4S2	SUP
43300303313	BD5.1/0.8/4-4S2	OBS
43300303314	BD5.1/1.5/4-4S2	DES
43300303315	BD5.1/2/4-4S2	SUP
43300303316	BD8/1.5/4-4S2	OBS
43300303317	BD8/2/4-4S2	SUP
43300303318	BD8/3/4-4S2	PREF
43300303319	BD5.1/2/10-4S2	SUP
43300303320	BD8/3/10-4S2	PREF
43300303321	BD3/1/10-4S2	OBS
43300303322	BD5.1/1.5/10-4S2	DES
43300303323	BD8/2/10-4S2	OBS
43300303324	BD3/0.8/10-4S2	OBS
43300303325	BD8/1.5/10-4S2	OBS
43300303326	BD5.1/0.8/10-4S2	SUP
43300303340	BD1.9/0.8/9.8-4S2	SUP
43300303345	TUB8/4/200-3C85	OBS
43300303346	TUB10/5/200-3C85	OBS
43300303355	TUB3.5/1.2/15-3B1	OBS
43300303356	TUB4/1.6/15-3B1	OBS
43300303357	TUB4/1.6/40-3B1	OBS
43300303358	TUB5/2/15-3B1	OBS
43300303359	TUB5/2/50-3B1	OBS
43300303360	TUB6/3/20-3B1	SUP
43300303361	TUB6/3/30-3B1	OBS
43300303362	TUB8/4/20-3B1	SUP
43300303363	TUB8/4/40-3B1	SUP
43300303364	TUB10/4.2/20-3B1	SUP
43300303365	TUB10/4.2/45-3B1	OBS
43300303368	TUB3.5/1.2/15-3C85	OBS
43300303369	TUB4/1.6/15-3C85	OBS
43300303370	TUB4/1.6/40-3C85	OBS

11NC	TYPE NUMBER	CPS
43300303371	TUB5/2/15-3C85	OBS
43300303372	TUB5/2/50-3C85	PREF
43300303373	TUB6/3/20-3C85	SUP
43300303374	TUB6/3/30-3C85	SUP
43300303375	TUB8/4/20-3C85	OBS
43300303376	TUB8/4/40-3C85	OBS
43300303377	TUB10/4.2/20-3C85	OBS
43300303378	TUB10/4.2/45-3C85	OBS
43300303405	T2.5/1.5/1-4A11-E	SUP
43300303412	T36/23/15-4A11	DES
43300303422	TN36/23/15-3E25	PREF
43300303423	TN29/19/7.5-3E25	SUP
43300303431	TN36/23/15-3R1	SUP
43300303439	TN9/6/3-4A11	SUP
43300303440	TN13/7.5/5-4A11	SUP
43300303441	TN14/9/5-4A11	SUP
43300303442	TN14/9/9-4A11	SUP
43300303443	TN16/9.6/6.3-4A11	SUP
43300303444	TN23/14/7-4A11	PREF
43300303445	TN36/23/15-4A11	OBS
43300303446	TN10/6/4-3C85	SUP
43300303447	TN20/10/7-3C85	SUP
43300303448	TN25/15/10-3C85	SUP
43300303449	TN32/19/13-3C85	SUP
43300303450	TN10/6/4-3C11	PREF
43300303451	TN20/10/7-3C11	SUP
43300303452	TN25/15/10-3C11	SUP
43300303453	TN32/19/13-3C11	SUP
43300303458	TN10/6/4-3E25	SUP
43300303459	TN20/10/7-3E25	PREF
43300303460	TN25/15/10-3E25	PREF
43300303461	TN32/19/13-3E25	PREF
43300303466	TL10/6/4-3E5	PREF
43300303471	TN36/23/10-4C65	SUP
43300303472	T2.5/1.5/1-4C65-E	SUP
43300303480	TN10/6/4-4C65	SUP
43300303481	TN13/7.5/5-4C65	SUP
43300303482	TN20/10/7-4C65	SUP
43300303488	TN10/6/4-4A11	PREF
43300303491	TN19/11/10-3C85	SUP
43300303492	TN13/7.5/5-3C11	PREF

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11NC	TYPE NUMBER	CPS
43300303498	TN10/6/4-3F3	SUP
43300303499	TN23/14/7-3F3	SUP
43300303500	TN25/15/10-3F3	SUP
43300303501	TN32/19/13-3F3	SUP
43300303502	TN36/23/15-3F3	SUP
43300303505	TN14/9/9-3C11	SUP
43300303513	T2.5/1.5/1-3F3-E	SUP
43300303514	T2.5/1.5/1-3E5-E	OBS
43300303520	TL58/41/18-3C11	PREF
43300303522	TL42/26/13-3C11	SUP
43300303525	TL20/10/7-3E5	SUP
43300303526	TL25/15/10-3E5	PREF
43300303527	TL32/19/13-3E5	PREF
43300303528	TL36/23/15-3E5	PREF
43300303552	TL42/26/13-3C85	SUP
43300303553	TL58/41/18-3C85	PREF
43300303580	TN9/6/3-3C85	SUP
43300303618	WBC2/R-4A15	OBS
43300303619	BC22/12/19-3C85	SUP
43300303629	BDS3/3/4.6-4S2	PREF
43300303630	BDS3/3/8.9-4S2	PREF
43300303634	BC22/12/38-3C85	SUP
43300303642	BDS3/3/4.6-3S1	PREF
43300303645	BDS3/3/8.9-3S1	PREF
43300303647	BC22/12/18-3C85	SUP
43300303648	BC22/12/14-3C85	SUP
43300303652	BDS4.6/3/8.9-4S2	PREF
43300303656	BC23/12/14-3C85	SUP
43300303682	BDS3/1.8/5.3-4S2	DES
43300303685	BDS3/1.8/5.3-3S1	DES
43300303688	CMS2-5.6/3/4.8-4S2	PREF
43300303691	CMS4-11/3/4.8-4S2	PREF
43300303692	CST8.3/3.5/10-3S4	DES
43300303695	CSU76/6.4/13-3S4	PREF
43300303696	CSU76/6.4/15-3S4	PREF
43300303697	CSU76/6.4/29-3S4	PREF
43300303698	CSF38/12/25-3S4-S	PREF
43300303699	CSF38/12/25-3S4	PREF
43300303709	TN9/6/3-3E25	PREF
43300303710	TN13/7.5/5-3E25	PREF
43300303711	TN14/9/5-3E25	PREF
43300303712	TN14/9/9-3E25	SUP
43300303713	TN16/9.6/6.3-3E25	PREF
43300303714	TN/19/11/15-3E25	SUP
43300303716	TN23/14/7-3E25	PREF
43300303717	TN26/15/10-3E25	PREF
43300303718	TN16/9.6/6.3-3C11	PREF
43300303719	TL9/6/3-3E25	SUP
43300303734	TN19/11/10-3E25	SUP
43300303745	TN14/9/5-3C85	PREF
43300303746	TN14/9/5-3C11	SUP
43300303747	TN19/11/10-3C11	SUP
43300303748	TN/19/11/15-3C85	SUP
43300303749	TN/19/11/15-3C11	SUP
43300303750	TN23/14/7-3C85	SUP
43300303751	TN23/14/7-3C11	SUP
43300303752	TN26/15/10-3C11	PREF
43300303753	TN26/15/20-3C11	SUP
43300303754	TN26/15/20-3E25	PREF
43300303755	TN36/23/10-3C11	SUP
43300303756	TN36/23/15-3C11	PREF
43300303758	TN29/19/7.5-3C11	SUP
43300303760	TL4/2.2/1.6-3E5	OBS
43300303761	TL4/2.2/1.1-3E5	OBS
43300303762	TL6.3/3.8/2.5-3E5	SUP
43300303763	TL6/4/2-3E5	SUP
43300303764	TL13/7.5/5-3E5	SUP
43300303765	TL14/9/5-3E5	SUP
43300303766	TL14/9/9-3E5	SUP
43300303767	TL16/9.6/6.3-3E5	SUP
43300303768	TN9/6/3-3R1	SUP
43300303769	TN14/9/5-3R1	PREF
43300303770	TN23/14/7-3R1	PREF
43300303779	TN13/7.5/5-3C85	PREF
43300303780	TN14/9/9-3C85	SUP
43300303781	TN16/9.6/6.3-3C85	PREF
43300303783	TN26/15/10-3C85	SUP
43300303784	TN26/15/20-3C85	SUP
43300303785	TN29/19/7.5-3C85	SUP
43300303786	TN36/23/10-3C85	SUP
43300303787	TN36/23/15-3C85	SUP
43300303791	TN9/6/3-3F3	PREF

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11NC	TYPE NUMBER	CPS
43300303792	TN13/7.5/5-3F3	SUP
43300303793	TN14/9/5-3F3	SUP
43300303794	TN14/9/9-3F3	SUP
43300303795	TN16/9.6/6.3-3F3	SUP
43300303808	WBC2.5/R-3S4	SUP
43300303810	BDW3.5/6-3S4-L63	PREF
43300303873	BDW3.5/4.7-4S2	PREF
43300303874	BDW3.5/6-4S2	SUP
43300303875	BDW3.5/6.7-4S2	SUP
43300303876	BDW3.5/7.6-4S2	SUP
43300303877	BDW3.5/8.9-4S2	PREF
43300303878	BDW3.5/3.5-3S4	DES
43300303881	BDW3.5/3.5-4S2	PREF
43300303894	BC13/4.8/16-3C85	SUP
43300303896	WBC2.5/IR-3B1	OBS
43300304021	ROD2/10-4B1-D	OBS
43300304022	ROD2/15-4B1-D	OBS
43300304023	ROD3/15-4B1-D	SUP
43300304024	ROD3/20-4B1-D	SUP
43300304025	ROD4/15-4B1-D	SUP
43300304026	ROD4/20-4B1-D	OBS
43300304027	ROD5/20-4B1-D	SUP
43300304028	ROD5/25-4B1-D	OBS
43300304029	ROD6/30-4B1-D	SUP
43300304030	ROD6/40-4B1-D	SUP
43300304031	ROD8/50-4B1	SUP
43300304032	ROD8/150-4B1	SUP
43300304034	TUB3.5/1.2/15-4B1	SUP
43300304034	TUB3.5/1.2/15-4B1	OBS
43300304035	TUB4/1.6/15-4B1	OBS
43300304036	TUB4/1.6/40-4B1	SUP
43300304037	TUB5/2/15-4B1	OBS
43300304038	TUB5/2/50-4B1	OBS
43300304039	TUB6/3/20-4B1	OBS
43300304040	TUB6/3/30-4B1	OBS
43300304041	TUB8/4/20-4B1	SUP
43300304042	TUB8/4/40-4B1	OBS
43300304043	TUB10/4.2/20-4B1	OBS
43300304044	TUB10/4.2/45-4B1	OBS
43300304054	ROD2/20-4B1-D	OBS
43300304055	ROD3/25-4B1-D	OBS

11NC	TYPE NUMBER	CPS
43300304056	ROD4/25-4B1-D	OBS
43300304057	ROD5/30-4B1-D	SUP
43300304058	ROD6/50-4B1-D	SUP
43300304059	ROD8/200-4B1	OBS
43300304105	WBC2/RT-4A15	OBS
43300304107	WBC2.5/IR-4B1	OBS
43300304114	WBC3/R-4B1	PREF
43300304118	WBC2.5/R-4B1	SUP
43300304122	WBC2.5/EAT-3B1	OBS
43300304123	WBC2.5/EAT-4B1	OBS
43300304124	WBC2.5/EA-3B1	OBS
43300304125	WBC2.5/EA-4B1	OBS
43300304126	WBC3/ER-3S4	OBS
43300304127	WBC3/ER-4B1	OBS
43300304130	WBC2.5/A-3B1	OBS
43300304136	WBC2.5/SP-3S4	SUP
43300304141	WBC3/ERT-3B1	OBS
43300304142	WBC3/ERT-4B1	OBS
43300304143	WBC2.5/SP-4B1	SUP
43300304144	WBC2.5/A-4A15	OBS
43300304145	WBC3/R-4A15	OBS
43300304146	WBC1.5/1.5/A-4A15	OBS
43300304152	WBC2.5/SA-3B1	OBS
43300304153	WBC2.5/SA-4B1	OBS
43300304166	WBS2.5-5/4.8/10-3S4	DES
43300304168	WBS2.5-5/4.8/10-4B1	DES
43300304170	MHC6-6/10-4S2	DES
43300304171	WBC1.5/A-4S2	DES
43300304172	WBC1.5/1.5/A-4S2	DES
43300304174	WBC2.5/A-4S2	DES
43300304175	WBC3/R-4S2	DES
43300304176	WBS1.5-5/4.8/10-3S4	DES
43300304177	WBS1.5-5/4.8/10-4B1	DES
43300304178	BDW3.5/5.3-4S2	DES
43300304179	BDW3.5/9.5-4S2	DES
43300304180	BDW3.5/11-4S2	DES
43300304181	BDW3.5/14-4S2	DES
43300304253	ROD6.5/25-3S3	PREF
43300304254	ROD5/25-3S3	PREF
43300304256	ROD5.3/18-3S3	PREF
43300304257	ROD3.3/17-3S3	SUP

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11NC	TYPE NUMBER	CPS
43300304262	ROD5/20-3S3	PREF
43300304263	ROD5/14-3S3	OBS
43300304265	ROD6/25-3S3	PREF
43300304266	ROD3/20-3S3	PREF
43300304267	ROD6/30-3S3	PREF
43300304268	ROD2.5/20-3S3	PREF
43300304271	ROD5.3/35-3S3	SUP
43300304272	ROD4/20-3S3	PREF
43300304280	ROD5.2/12-3S3	SUP
43300304294	ROD8/25-3S3	DES
43300304331	TUB4.3/2/15-4B1	SUP
43300304346	TUB3.8/2.8/8-4B1	PREF
43300304347	TUB4/3/9.5-4B1	SUP
43300304356	CST17/9.5/29-3S4	DES
43300304357	CST17/9.5/13-3S4	DES
43300304358	CST9.5/5.1/15-3S4	DES
43300304362	CST17/11/60-3S4	DES
43300304363	CST7.8/5.3/9.8-3S4	DES
43300304366	BD3.5/1.3/3.3-4S2	DES
43300304367	BD3.5/1.3/6-4S2	DES
43300304368	BD3.5/1.3/13-4S2	DES
43300304369	BD6.4/3/25-4S2	DES
43300304370	BD7.7/2.3/7.6-4S2	DES
43300304374	BD5.1/2/7.1-4S2	DES
43300304515	TL58/41/18-3E25	SUP
43300304519	TC2.5/1.3/1.3-3S4	DES
43300304521	TL42/26/13-3E25	PREF
43300304527	TN13/7.5/5-3F4	SUP
43300304531	TL42/26/13-4A11	SUP
43300304532	T87/54/14-3C11	PREF
43300304538	T107/65/18-3F4	SUP
43300304553	T102/66/15-3E25	PREF
43300304564	T63/38/25-3E25	PREF
43300304569	CST19/11/12-3S4	DES
43300304573	T102/66/15-3C11	SUP
43300304578	T107/65/25-3F3	SUP
43300304579	T107/65/25-3F4	SUP
43300304580	TC2.5/1.5/1-3E6-S	DES
43300304581	TC4/2.2/1.1-3E6	DES
43300304582	TC4/2.2/1.6-3E6	DES
43300304583	TC6/4/2-3E6	DES

11NC	TYPE NUMBER	CPS
43300304584	TC6.3/3.8/2.5-3E6	DES
43300304585	TC9/6/3-3E6	DES
43300304586	TL10/6/4-3E6	DES
43300304587	TL13/7.5/5-3E6	DES
43300304588	TL14/9/5-3E6	DES
43300304589	TL14/9/9-3E6	DES
43300304590	TL16/9.6/6.3-3E6	DES
43300304591	TL20/10/7-3E6	DES
43300304592	TL25/15/10-3E6	DES
43300304610	CSA15/7.5/29-4S2-EN	DES
43300304611	CSA19/9.4/29-4S2-EN	DES
43300304612	CSA26/13/29-4S2-EN	DES
43300304613	CSC16/7.9/14-4S2-EN	DES
43300304614	CSU45/6.4/29-4S2-EN	DES
43300304615	CSU76/6.4/29-4S2-EN	DES
43300304616	CST9.5/4.8/6.4-4S2	DES
43300304617	CST9.5/4.8/10-4S2	DES
43300304618	CST9.5/4.8/19-4S2	DES
43300304619	CST9.7/5/5.1-4S2	DES
43300304620	CST14/6.4/29-4S2	DES
43300304621	CST14/7.3/29-4S2	DES
43300304622	CST16/7.9/14-4S2	DES
43300304623	CST16/7.9/29-4S2	DES
43300304625	CST17/9.5/29-4S2	DES
43300304626	CST19/10/29-4S2	DES
43300304627	CST26/13/29-4S2	DES
43300304629	CST29/19/7.5-4S2	DES
43300304630	CMS2-5.6/3/8.9-4S2	PREF
43300304631	CMS4-11/3/8.9-4S2	PREF
43300304640	CSA15/7.5/29-4S2	DES
43300304641	CSA26/13/29-4S2	DES
43300304642	CSA19/9.4/29-4S2	DES
43300304643	CSU45/6.4/29-4S2	DES
43300304644	CSU76/6.4/29-4S2	DES
43300304645	CSC16/7.9/14-4S2	DES
43300304711	TC6/4/2-3S4	DES
43300304712	TC3.5/1.6/1.3-3C11	PREF
43300304717	TC6/4/2-3F3	PREF
43300304723	TC4/2.2/1.6-3E5	DES
43300304724	TC6.3/3.8/2.5-3E5	PREF
43300304726	TC6.3/3.8/2.5-3E7	PROT

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11NC	TYPE NUMBER	CPS
43300304731	TC3.1/1.3/1.3-4A11	DES
43300304733	TC2.5/1.5/0.8-3E6	DES
43300304734	TC2.5/1.3/1.3-3E6	DES
43300304741	TC9.5/4.8/3.2-3E7	PROT
43300304744	TC2.5/1.3/1.3-4A11	DES
43300304748	TC9.5/4.8/3.2-3E6	DES
43300304760	TC2.5/1.5/1-4A11-S	DES
43300304761	TC2.5/1.5/1-3E5-S	DES
43300304762	TC3.4/1.8/2-3E25	DES
43300304763	TC4/2.2/1.1-4A11	PREF
43300304764	TC4/2.2/1.1-3F3	PREF
43300304765	TC4/2.2/1.1-3E25	PREF
43300304766	TC4/2.2/1.1-3E5	PREF
43300304767	TC4/2.2/1.3-4A11	DES
43300304768	TC4/2.2/1.6-3S4	DES
43300304769	TC4/2.2/1.6-4A11	PREF
43300304770	TC4/2.2/1.6-3F3	PREF
43300304771	TC4/2.2/1.6-3E25	PREF
43300304772	TC6/4/2-4C65	PREF
43300304773	TC6/4/2-4A11	PREF
43300304774	TC6/4/2-3E25	PREF
43300304775	TC6/4/2-3E5	PREF
43300304776	TC6.3/3.8/2.5-4A11	PREF
43300304777	TC6.3/3.8/2.5-3F3	PREF
43300304778	TC6.3/3.8/2.5-3E25	PREF
43300304779	TC7.6/3.2/4.8-3E6	DES
43300304810	TL107/65/18-3E25	DES
43300304837	TL87/54/14-3C11	DES
43300304840	TL29/19/7.5-3E5	DES
43300304858	T36/23/15-3S4	DES
43300304859	TX13/7.1/4.8-3E6	DES
43300304860	TX13/7.9/6.4-3E6	DES
43300306001	TN7.5/4.1/3-2P40	SUP
43300306002	TN12/8/4.4-2P40	SUP
43300306003	TN17/9.8/4.4-2P40	SUP
43300306004	TN20/13/6-2P40	SUP
43300306005	TN24/15/7.5-2P40	SUP
43300306006	TN27/15/11-2P40	SUP
43300306007	TN33/20/11-2P40	SUP
43300306008	TN7.5/4.1/3-2P50	SUP
43300306009	TN12/8/4.4-2P50	SUP

11NC	TYPE NUMBER	CPS
43300306010	TN17/9.8/4.4-2P50	SUP
43300306011	TN20/13/6-2P50	SUP
43300306012	TN24/15/7.5-2P50	SUP
43300306013	TN27/15/11-2P50	SUP
43300306014	TN33/20/11-2P50	SUP
43300306015	TN7.5/4.1/3-2P65	SUP
43300306016	TN12/8/4.4-2P65	SUP
43300306017	TN17/9.8/4.4-2P65	SUP
43300306018	TN20/13/6-2P65	SUP
43300306019	TN24/15/7.5-2P65	SUP
43300306020	TN27/15/11-2P65	SUP
43300306021	TN33/20/11-2P65	SUP
43300306022	TN7.5/4.1/3-2P80	SUP
43300306023	TN12/8/4.4-2P80	SUP
43300306024	TN17/9.8/4.4-2P80	SUP
43300306025	TN20/13/6-2P80	SUP
43300306026	TN24/15/7.5-2P80	SUP
43300306027	TN27/15/11-2P80	SUP
43300306028	TN33/20/11-2P80	SUP
43300306029	TN7.5/4.1/3-2P90	SUP
43300306030	TN12/8/4.4-2P90	SUP
43300306031	TN17/9.8/4.4-2P90	SUP
43300306032	TN20/13/6-2P90	SUP
43300306033	TN24/15/7.5-2P90	SUP
43300306034	TN27/15/11-2P90	SUP
43300306035	TN33/20/11-2P90	SUP
43300312040	CLI-CSU6.4	DES
43300322201	SAMPLEBOX1	OBS
43300322202	SAMPLEBOX2	OBS
43300322203	SAMPLEBOX3	OBS
43300322204	SAMPLEBOX4	OBS
43300322205	SAMPLEBOX5	OBS
43300322206	SAMPLEBOX6	OBS
43300322209	SAMPLEBOX9	DES
43300322210	SAMPLEBOX10	DES
43300322211	SAMPLEBOX11	DES
43320250680	RM12/I-3C90	PREF
43335000158	EP20-3E5	PREF
43350000145	PLT32/20/3-3F3	DES
43350000154	EP7-3E5	PREF
43350000155	EP10-3E5	PREF

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11NC	TYPE NUMBER	CPS
43350000156	EP13-3E5	PREF
43350000157	E56/24/19-3E25	SUP
43350000157	EP17-3E5	PREF
43350000161	PLT32/20/3-3F4	DES
43350000162	E38/8/25-3C85	DES
43350000163	E38/8/25-3F3	DES
43350000164	E38/8/25-3F4	DES
43350000165	PLT38/25/4-3C85	DES
43350000166	PLT38/25/4-3F3	DES
43350000167	PLT38/25/4-3F4	DES
43350000180	RM8/I-3F3-A160	PREF
43350000181	RM8/I-3F3-A250	PREF
43350000182	RM8/I-3F3-A400	PREF
43350000183	RM8/I-3F3-A315	PREF
43350000188	U67/27/14-3C81	PREF
43350000191	RM6S/I-3F3-A160	PREF
43350000200	P26/16-3B7-E160	SUP
43350000201	P26/16-3B9-E160	OBS
43350000202	P26/16-3B7-E250	SUP
43350000203	P26/16-3B9-E250	OBS
43350000204	P26/16-3B7-E315	SUP
43350000205	P26/16-3B7-A400	SUP
43350000250	E43/10/28-3C85	DES
43350000251	E43/10/28-3F3	DES
43350000252	E43/10/28-3F4	DES
43350000256	PLT43/28/4-3C85	DES
43350000257	PLT43/28/4-3F3	DES
43350000258	PLT43/28/4-3F4	DES
43350000264	E64/10/50-3C85	DES
43350000265	E64/10/50-3F3	DES
43350000266	E64/10/50-3F4	DES
43350000268	PLT64/50/5-3F3	DES
43350000269	PLT64/50/5-3F4	DES
43350000273	PLT58/38/4-3C85	DES
43350000274	PLT58/38/4-3F3	DES
43350000275	PLT58/38/4-3F4	DES
43350000276	E58/11/38-3C85	DES
43350000277	E58/11/38-3F3	DES
43350000278	E58/11/38-3F4	DES
43350000401	P7/4-3B7	SUP
43350000402	P7/4-3B7-A100	SUP

11NC	TYPE NUMBER	CPS
43350000403	P7/4-3B7-A160	SUP
43350000404	P7/4-3B9	OBS
43350000405	P7/4-3B9-A100	OBS
43350000406	P7/4-3B9-A160	OBS
43350000407	P7/4-3E5	PREF
43350000408	P9/5-3B7	SUP
43350000410	P9/5-3B7-A63	SUP
43350000411	P9/5-3B7-A100	SUP
43350000412	P9/5-3B7-A100/N	SUP
43350000413	P9/5-3B7-A160	SUP
43350000414	P9/5-3B7-A160/N	SUP
43350000416	P9/5-3B9	OBS
43350000418	P9/5-3B9-A63	OBS
43350000419	P9/5-3B9-A100	OBS
43350000420	P9/5-3B9-A100/N	OBS
43350000421	P9/5-3B9-A160	OBS
43350000422	P9/5-3B9-A160/N	OBS
43350000423	P9/5-3B7-A63/N	SUP
43350000426	P9/5-3E5	PREF
43350000427	P11/7-3C81	PREF
43350000428	P11/7-3C81-A100	PREF
43350000429	P11/7-3C81-A160	PREF
43350000430	P11/7-3C81-A250	PREF
43350000431	P11/7-3F3	SUP
43350000432	P11/7-3F3-A100	SUP
43350000433	P11/7-3F3-A160	SUP
43350000434	P11/7-3F3-A250	SUP
43350000438	P11/7-3B7	SUP
43350000439	P11/7-3B7-A100	SUP
43350000441	P11/7-3B7-A160	SUP
43350000442	P11/7-3B7-A250	SUP
43350000445	P11/7-3B9	OBS
43350000446	P11/7-3B9-A100	OBS
43350000447	P11/7-3B9-A160	OBS
43350000448	P11/7-3B9-A250	OBS
43350000449	P11/7-3B7-A100/N	SUP
43350000450	P11/7-3B7-A160/N	SUP
43350000451	P11/7-3B7-A250/N	SUP
43350000452	P11/7-3B9-A100/N	OBS
43350000453	P11/7-3B9-A160/N	OBS
43350000454	P11/7-3B9-A250/N	OBS

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11NC	TYPE NUMBER	CPS
43350000455	P11/7-3E5	PREF
43350000456	P14/8-3C81	PREF
43350000457	P14/8-3C81-E63	PREF
43350000458	P14/8-3C81-A100	PREF
43350000460	P14/8-3C81-A160	PREF
43350000462	P14/8-3C81-A250	PREF
43350000463	P14/8-3C81-A315	PREF
43350000465	P14/8-3C85	SUP
43350000466	P14/8-3C85-E63	SUP
43350000467	P14/8-3C85-A100	SUP
43350000468	P14/8-3C85-A160	SUP
43350000470	P14/8-3C85-A250	SUP
43350000471	P14/8-3C85-A315	SUP
43350000472	P14/8-3F3	SUP
43350000473	P14/8-3F3-E63	SUP
43350000475	P14/8-3F3-A100	SUP
43350000476	P14/8-3F3-A160	SUP
43350000478	P14/8-3F3-A250	SUP
43350000479	P14/8-3F3-A315	SUP
43350000485	P14/8-3B7	SUP
43350000486	P14/8-3B7-E63	SUP
43350000487	P14/8-3B7-E63/N	SUP
43350000488	P14/8-3B7-E100	SUP
43350000489	P14/8-3B7-E100/N	SUP
43350000490	P14/8-3B7-E160	SUP
43350000491	P14/8-3B7-E160/N	SUP
43350000491	P14/8-3B9	OBS
43350000492	P14/8-3B7-A250	SUP
43350000493	P14/8-3B7-A250/N	SUP
43350000494	P14/8-3B7-A315	SUP
43350000500	P14/8-3B9-E63	OBS
43350000501	P14/8-3B9-E100	OBS
43350000502	P14/8-3B9-E100/N	OBS
43350000503	P14/8-3B9-E160	OBS
43350000504	P14/8-3B9-E160/N	OBS
43350000506	P14/8-3B9-A250	OBS
43350000507	P14/8-3B9-A250/N	OBS
43350000508	P14/8-3B9-A315	OBS
43350000514	P14/8-3E25	SUP
43350000515	P14/8-3E27	PREF
43350000516	P14/8-3E5	PREF

11NC	TYPE NUMBER	CPS
43350000517	P18/11-3C81	PREF
43350000519	P18/11-3C81-E100	PREF
43350000521	P18/11-3C81-A160	PREF
43350000523	P18/11-3C81-A250	PREF
43350000524	P18/11-3C81-A315	PREF
43350000525	P18/11-3C81-A400	PREF
43350000526	P18/11-3C85	SUP
43350000528	P18/11-3C85-E100	SUP
43350000530	P18/11-3C85-A160	SUP
43350000532	P18/11-3C85-A250	SUP
43350000533	P18/11-3C85-A315	SUP
43350000534	P18/11-3C85-A400	SUP
43350000535	P18/11-3F3	SUP
43350000536	P18/11-3F3-E100	SUP
43350000538	P18/11-3F3-A160	SUP
43350000539	P18/11-3F3-A250	SUP
43350000540	P18/11-3F3-A315	SUP
43350000541	P18/11-3F3-A400	SUP
43350000544	P18/11-3B7	SUP
43350000545	P18/11-3B7-E100	SUP
43350000546	P18/11-3B7-E160	SUP
43350000547	P18/11-3B7-A250	SUP
43350000548	P18/11-3B7-A315	SUP
43350000549	P18/11-3B7-A400	SUP
43350000551	P18/11-3B7-A630	SUP
43350000552	P18/11-3B9	OBS
43350000553	P18/11-3B9-E100	OBS
43350000555	P18/11-3B9-A250	OBS
43350000556	P18/11-3B9-A315	OBS
43350000557	P18/11-3B9-A400	OBS
43350000561	P18/11-3B7-E100/N	SUP
43350000561	P18/11-3B9-E100/N	OBS
43350000562	P18/11-3B7-E160/N	SUP
43350000563	P18/11-3B7-A250/N	SUP
43350000564	P18/11-3B7-A315/N	SUP
43350000565	P18/11-3B7-A400/N	SUP
43350000568	P18/11-3B9-A250/N	OBS
43350000569	P18/11-3B9-A315/N	OBS
43350000570	P18/11-3B9-A400/N	OBS
43350000571	P18/11-3E25	SUP
43350000572	P18/11-3E27	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350000573	P18/11-3E5	PREF
43350000574	P22/13-3C81	PREF
43350000579	P22/13-3C81-A160	PREF
43350000580	P22/13-3C81-A250	PREF
43350000581	P22/13-3C81-A315	PREF
43350000582	P22/13-3C81-A400	PREF
43350000585	P22/13-3C81-A630	PREF
43350000586	P22/13-3C85	SUP
43350000589	P22/13-3C85-A160	SUP
43350000590	P22/13-3C85-A250	SUP
43350000600	P22/13-3C85-A315	SUP
43350000601	P22/13-3C85-A400	SUP
43350000603	P22/13-3C85-A630	SUP
43350000604	P22/13-3F3	SUP
43350000607	P22/13-3F3-A160	SUP
43350000608	P22/13-3F3-A250	SUP
43350000609	P22/13-3F3-A315	SUP
43350000610	P22/13-3F3-A400	SUP
43350000612	P22/13-3F3-A630	SUP
43350000613	P22/13-3B7	SUP
43350000615	P22/13-3B7-E160	SUP
43350000616	P22/13-3B7-E250	SUP
43350000617	P22/13-3B7-A315	SUP
43350000618	P22/13-3B7-A400	SUP
43350000620	P22/13-3B7-A630	SUP
43350000621	P22/13-3B7-E160/N	SUP
43350000623	P22/13-3B9	OBS
43350000625	P22/13-3B9-E160	OBS
43350000626	P22/13-3B9-E250	OBS
43350000627	P22/13-3B9-A315	OBS
43350000628	P22/13-3B9-A400	OBS
43350000629	P22/13-3B9-A400/N	OBS
43350000631	P22/13-3B9-A630	OBS
43350000632	P22/13-3B7-E250/N	SUP
43350000633	P22/13-3B7-A315/N	SUP
43350000634	P22/13-3B7-A400/N	SUP
43350000635	P22/13-3B7-A630/N	SUP
43350000636	P22/13-3B9-E160/N	OBS
43350000637	P22/13-3B9-E250/N	OBS
43350000638	P22/13-3B9-A315/N	OBS
43350000640	P22/13-3B9-A630/N	OBS

11NC	TYPE NUMBER	CPS
43350000641	P22/13-3E25	SUP
43350000642	P22/13-3E27	PREF
43350000643	P22/13-3E5	PREF
43350000644	P26/16-3C81	PREF
43350000645	P26/16-3C81-E100	PREF
43350000646	P26/16-3C81-E160	PREF
43350000649	P26/16-3C81-A250	PREF
43350000650	P26/16-3C81-A315	PREF
43350000651	P26/16-3C81-A400	PREF
43350000654	P26/16-3C81-A630	PREF
43350000657	P26/16-3C85	SUP
43350000659	P26/16-3C85-E160	SUP
43350000661	P26/16-3C85-A250	SUP
43350000662	P26/16-3C85-A315	SUP
43350000663	P26/16-3C85-A400	SUP
43350000665	P26/16-3C85-A630	SUP
43350000666	P26/16-3F3	SUP
43350000668	P26/16-3F3-E160	SUP
43350000670	P26/16-3F3-A250	SUP
43350000671	P26/16-3F3-A315	SUP
43350000672	P26/16-3F3-A400	SUP
43350000674	P26/16-3F3-A630	SUP
43350000675	P26/16-3B7	SUP
43350000677	P26/16-3B7-A630	SUP
43350000680	P26/16-3B9	OBS
43350000681	P26/16-3B9-E160/N	OBS
43350000682	P26/16-3B9-E315	OBS
43350000683	P26/16-3B9-A400	OBS
43350000684	P26/16-3B9-A400/N	OBS
43350000686	P26/16-3B9-A630	OBS
43350000688	P26/16-3B7-E160/N	SUP
43350000689	P26/16-3B7-E250/N	SUP
43350000690	P26/16-3B7-E315/N	SUP
43350000691	P26/16-3B7-A400/N	SUP
43350000693	P26/16-3B7-A630/N	SUP
43350000696	P26/16-3B9-E250/N	OBS
43350000697	P26/16-3B9-E315/N	OBS
43350000699	P26/16-3B9-A630/N	OBS
43350000700	P26/16-3E25	SUP
43350000701	P26/16-3E27	PREF
43350000702	P26/16-3E5	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350000703	P30/19-3C81	PREF
43350000709	P30/19-3C81-E250	PREF
43350000711	P30/19-3C81-A315	PREF
43350000712	P30/19-3C81-A400	PREF
43350000714	P30/19-3C81-A630	PREF
43350000716	P30/19-3C81-A1000	PREF
43350000717	P30/19-3C85	PREF
43350000720	P30/19-3C85-E250	PREF
43350000721	P30/19-3C85-A315	PREF
43350000722	P30/19-3C85-A400	PREF
43350000724	P30/19-3C85-A630	PREF
43350000726	P30/19-3C85-A1000	PREF
43350000727	P30/19-3F3	PREF
43350000730	P30/19-3F3-E250	PREF
43350000731	P30/19-3F3-A315	PREF
43350000732	P30/19-3F3-A400	PREF
43350000734	P30/19-3F3-A630	PREF
43350000736	P30/19-3F3-A1000	PREF
43350000737	P30/19-3B7	SUP
43350000738	P30/19-3B7-E250	SUP
43350000739	P30/19-3B7-E315	SUP
43350000740	P30/19-3B7-E400	SUP
43350000742	P30/19-3B7-A630	SUP
43350000743	P30/19-3B7-A1000	SUP
43350000745	P30/19-3B9	OBS
43350000746	P30/19-3B9-E250	OBS
43350000747	P30/19-3B9-E315	OBS
43350000748	P30/19-3B9-E400	OBS
43350000750	P30/19-3B9-A630	OBS
43350000751	P30/19-3B9-A1000	OBS
43350000752	P30/19-3B7-E250/N	SUP
43350000753	P30/19-3B7-E315/N	SUP
43350000754	P30/19-3B7-E400/N	SUP
43350000756	P30/19-3B7-A630/N	SUP
43350000757	P30/19-3B7-A1000/N	SUP
43350000759	P30/19-3B9-E250/N	OBS
43350000760	P30/19-3B9-E315/N	OBS
43350000761	P30/19-3B9-E400/N	OBS
43350000763	P30/19-3B9-A630/N	OBS
43350000764	P30/19-3B9-A1000/N	OBS
43350000765	P30/19-3E25	SUP

11NC	TYPE NUMBER	CPS
43350000766	P30/19-3E27	PREF
43350000767	P30/19-3E5	PREF
43350000768	P36/22-3C81	PREF
43350000772	P36/22-3C81-E315	PREF
43350000773	P36/22-3C81-E400	PREF
43350000774	P36/22-3C81-A630	PREF
43350000776	P36/22-3C81-A1000	PREF
43350000777	P36/22-3C81-A1600	PREF
43350000778	P36/22-3C85	PREF
43350000781	P36/22-3C85-E315	PREF
43350000782	P36/22-3C85-E400	PREF
43350000783	P36/22-3C85-A630	PREF
43350000784	P36/22-3C85-A1000	PREF
43350000785	P36/22-3C85-A1600	PREF
43350000787	P36/22-3F3	PREF
43350000790	P36/22-3F3-E315	PREF
43350000791	P36/22-3F3-E400	PREF
43350000792	P36/22-3F3-A630	PREF
43350000793	P36/22-3F3-A1000	PREF
43350000794	P36/22-3F3-A1600	PREF
43350000795	P36/22-3B7	SUP
43350000797	P36/22-3B7-E315	SUP
43350000798	P36/22-3B7-E400	SUP
43350000800	P36/22-3B7-E630	SUP
43350000801	P36/22-3B7-A1000	SUP
43350000802	P36/22-3B7-A1600	SUP
43350000803	P36/22-3B9	OBS
43350000806	P36/22-3B9-E315	OBS
43350000807	P36/22-3B9-E400	OBS
43350000810	P36/22-3B9-E630	OBS
43350000811	P36/22-3B9-A1000	OBS
43350000812	P36/22-3B9-A1600	OBS
43350000814	P36/22-3B7-E315/N	SUP
43350000815	P36/22-3B7-E400/N	SUP
43350000817	P36/22-3B7-E630/N	SUP
43350000818	P36/22-3B7-A1000/N	SUP
43350000819	P36/22-3B7-A1600/N	SUP
43350000822	P36/22-3B9-E315/N	OBS
43350000823	P36/22-3B9-E400/N	OBS
43350000825	P36/22-3B9-E630/N	OBS
43350000826	P36/22-3B9-A1000/N	OBS

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350000827	P36/22-3E25	SUP
43350000828	P36/22-3E27	PREF
43350000829	P36/22-3E5	PREF
43350000830	P42/29-3C81	PREF
43350000835	P42/29-3C81-E400	PREF
43350000836	P42/29-3C81-A630	PREF
43350000838	P42/29-3C81-A1000	PREF
43350000839	P42/29-3C81-A1600	PREF
43350000840	P42/29-3C85	PREF
43350000843	P42/29-3C85-E315	PREF
43350000844	P42/29-3C85-E400	PREF
43350000845	P42/29-3C85-A630	PREF
43350000847	P42/29-3C85-A1000	PREF
43350000848	P42/29-3C85-A1600	PREF
43350000849	P42/29-3F3	PREF
43350000852	P42/29-3F3-E315	PREF
43350000853	P42/29-3F3-E400	PREF
43350000854	P42/29-3F3-A630	PREF
43350000856	P42/29-3F3-A1000	PREF
43350000857	P42/29-3B7	SUP
43350000859	P42/29-3B7-E315	SUP
43350000860	P42/29-3B7-E400	SUP
43350000862	P42/29-3B7-E630	SUP
43350000863	P42/29-3B7-A1000	SUP
43350000864	P42/29-3B7-A1600	SUP
43350000865	P42/29-3B7-E315/N	SUP
43350000866	P42/29-3B7-E400/N	SUP
43350000868	P42/29-3B7-E630/N	SUP
43350000869	P42/29-3B7-A1000/N	SUP
43350000870	P42/29-3B7-A1600/N	SUP
43350000871	P66/56-3C81	SUP
43350000875	P11/7/I-3C81	PREF
43350000876	P11/7/I-3C81-A63	PREF
43350000877	P11/7/I-3C81-A100	PREF
43350000878	P11/7/I-3C81-A160	PREF
43350000879	P11/7/I-3C81-A250	PREF
43350000880	P11/7/I-3C81-A315	PREF
43350000881	P11/7/I-3C85	PREF
43350000882	P11/7/I-3C85-A63	PREF
43350000883	P11/7/I-3C85-A100	PREF
43350000884	P11/7/I-3C85-A160	PREF

11NC	TYPE NUMBER	CPS
43350000885	P11/7/I-3C85-A250	PREF
43350000886	P11/7/I-3C85-A315	PREF
43350000887	P11/7/I-3F3	PREF
43350000888	P11/7/I-3F3-A63	PREF
43350000889	P11/7/I-3F3-A100	PREF
43350000890	P11/7/I-3F3-A160	PREF
43350000891	P11/7/I-3F3-A250	PREF
43350000892	P11/7/I-3F3-A315	PREF
43350000894	P14/8/I-3C81	PREF
43350000895	P14/8/I-3C81-A100	PREF
43350000896	P14/8/I-3C81-A160	PREF
43350000897	P14/8/I-3C81-A250	PREF
43350000898	P14/8/I-3C81-A315	PREF
43350000899	P14/8/I-3C81-A400	PREF
43350000900	P14/8/I-3C85	PREF
43350000901	P14/8/I-3C85-A100	PREF
43350000902	P14/8/I-3C85-A160	PREF
43350000903	P14/8/I-3C85-A250	PREF
43350000904	P14/8/I-3C85-A315	PREF
43350000905	P14/8/I-3C85-A400	PREF
43350000906	P14/8/I-3F3	PREF
43350000907	P14/8/I-3F3-A100	PREF
43350000908	P14/8/I-3F3-A160	PREF
43350000909	P14/8/I-3F3-A250	PREF
43350000910	P14/8/I-3F3-A315	PREF
43350000911	P14/8/I-3F3-A400	PREF
43350000912	P18/11/I-3C81	PREF
43350000913	P18/11/I-3C81-A160	PREF
43350000914	P18/11/I-3C81-A250	PREF
43350000915	P18/11/I-3C81-A315	PREF
43350000916	P18/11/I-3C81-A400	PREF
43350000917	P18/11/I-3C81-A630	PREF
43350000918	P18/11/I-3C85	PREF
43350000919	P18/11/I-3C85-A160	PREF
43350000920	P18/11/I-3C85-A250	PREF
43350000921	P18/11/I-3C85-A315	PREF
43350000922	P18/11/I-3C85-A400	PREF
43350000923	P18/11/I-3C85-A630	PREF
43350000924	P18/11/I-3F3	PREF
43350000925	P18/11/I-3F3-A160	PREF
43350000926	P18/11/I-3F3-A250	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350000927	P18/11/I-3F3-A315	PREF
43350000928	P18/11/I-3F3-A400	PREF
43350000929	P18/11/I-3F3-A630	PREF
43350000930	P22/13/I-3C81	PREF
43350000931	P22/13/I-3C81-A250	PREF
43350000932	P22/13/I-3C81-A315	PREF
43350000933	P22/13/I-3C81-A400	PREF
43350000934	P22/13/I-3C81-A630	PREF
43350000935	P22/13/I-3C81-A1000	PREF
43350000936	P22/13/I-3C85	PREF
43350000937	P22/13/I-3C85-A250	PREF
43350000938	P22/13/I-3C85-A315	PREF
43350000939	P22/13/I-3C85-A400	PREF
43350000940	P22/13/I-3C85-A630	PREF
43350000941	P22/13/I-3C85-A1000	PREF
43350000943	P22/13/I-3F3	PREF
43350000944	P22/13/I-3F3-A250	PREF
43350000945	P22/13/I-3F3-A315	PREF
43350000946	P22/13/I-3F3-A400	PREF
43350000947	P22/13/I-3F3-A630	PREF
43350000948	P22/13/I-3F3-A1000	PREF
43350000949	P9/5-3B9-A63/N	OBS
43350000950	P14/8-3B7-A315/N	SUP
43350000951	P14/8-3B9-E63/N	OBS
43350000952	P14/8-3B9-A315/N	OBS
43350000953	P18/11-3B7-A630/N	SUP
43350000954	P26/16/I-3C81	PREF
43350000955	P26/16/I-3C81-A250	PREF
43350000956	P26/16/I-3C81-A315	PREF
43350000957	P26/16/I-3C81-A400	PREF
43350000958	P26/16/I-3C81-A630	PREF
43350000959	P26/16/I-3C81-A1000	PREF
43350000960	P26/16/I-3C85	PREF
43350000961	P26/16/I-3C85-A250	PREF
43350000962	P26/16/I-3C85-A315	PREF
43350000963	P26/16/I-3C85-A400	PREF
43350000964	P26/16/I-3C85-A630	PREF
43350000965	P26/16/I-3C85-A1000	PREF
43350000966	P26/16/I-3F3	PREF
43350000967	P26/16/I-3F3-A250	PREF
43350000968	P26/16/I-3F3-A315	PREF

11NC	TYPE NUMBER	CPS
43350000969	P26/16/I-3F3-A400	PREF
43350000970	P26/16/I-3F3-A630	PREF
43350000971	P26/16/I-3F3-A1000	PREF
43350000972	P36/22-3B9-A1600/N	OBS
43350000973	P42/29-3C81-E315	PREF
43350000974	P42/29-3F3-A1600	PREF
43350000976	PT14/8-3B9-A315	OBS
43350000978	PT30/19-3B9-A1600	OBS
43350001001	E13/6/6-3C80	OBS
43350001007	E13/6/6-3C81	PREF
43350001008	E13/6/6-3C81-A63	PREF
43350001009	E13/6/6-3C81-A100	PREF
43350001010	E13/6/6-3C81-A160	PREF
43350001011	E13/6/6-3C81-A250	PREF
43350001012	E13/6/6-3C81-A315	PREF
43350001013	E13/6/6-3C85	PREF
43350001014	E13/6/6-3C85-A63	PREF
43350001015	E13/6/6-3C85-A100	PREF
43350001016	E13/6/6-3C85-A160	PREF
43350001017	E13/6/6-3C85-A250	PREF
43350001018	E13/6/6-3C85-A315	PREF
43350001019	E13/6/6-3C90	PREF
43350001025	E13/6/6-3F3	DES
43350001026	E13/6/6-3F3-A63	DES
43350001027	E13/6/6-3F3-A100	DES
43350001028	E13/6/6-3F3-A160	DES
43350001029	E13/6/6-3F3-A250	DES
43350001030	E13/6/6-3F3-A315	DES
43350001031	E19/8/5-3C80	OBS
43350001037	E19/8/5-3C81	PREF
43350001038	E19/8/5-3C81-A63	PREF
43350001039	E19/8/5-3C81-A100	PREF
43350001040	E19/8/5-3C81-A160	PREF
43350001041	E19/8/5-3C81-A250	PREF
43350001042	E19/8/5-3C81-A315	PREF
43350001043	E19/8/5-3C85	PREF
43350001044	E19/8/5-3C85-A63	PREF
43350001045	E19/8/5-3C85-A100	PREF
43350001046	E19/8/5-3C85-A160	PREF
43350001047	E19/8/5-3C85-A250	PREF
43350001048	E19/8/5-3C85-A315	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350001049	E19/8/5-3C90	PREF
43350001055	E19/8/5-3F3	DES
43350001056	E19/8/5-3F3-A63	DES
43350001057	E19/8/5-3F3-A100	DES
43350001058	E19/8/5-3F3-A160	DES
43350001059	E19/8/5-3F3-A250	DES
43350001060	E19/8/5-3F3-A315	DES
43350001061	E19/8/9-3C80	OBS
43350001067	E19/8/9-3C81	PREF
43350001068	E19/8/9-3C81-A100	PREF
43350001069	E19/8/9-3C81-A160	PREF
43350001070	E19/8/9-3C81-A250	PREF
43350001071	E19/8/9-3C81-A315	PREF
43350001072	E19/8/9-3C81-A400	PREF
43350001073	E19/8/9-3C85	PREF
43350001074	E19/8/9-3C85-A100	PREF
43350001075	E19/8/9-3C85-A160	PREF
43350001076	E19/8/9-3C85-A250	PREF
43350001077	E19/8/9-3C85-A315	PREF
43350001078	E19/8/9-3C85-A400	PREF
43350001079	E19/8/9-3C90	PREF
43350001085	E19/8/9-3F3	DES
43350001086	E19/8/9-3F3-A100	DES
43350001087	E19/8/9-3F3-A160	DES
43350001088	E19/8/9-3F3-A250	DES
43350001089	E19/8/9-3F3-A315	DES
43350001090	E19/8/9-3F3-A400	DES
43350001091	E25/10/6-3C80	OBS
43350001097	E25/10/6-3C81	PREF
43350001098	E25/10/6-3C81-A100	PREF
43350001099	E25/10/6-3C81-A160	PREF
43350001100	E25/10/6-3C81-A250	PREF
43350001101	E25/10/6-3C81-A315	PREF
43350001102	E25/10/6-3C81-A400	PREF
43350001103	E25/10/6-3C85	PREF
43350001104	E25/10/6-3C85-A100	PREF
43350001105	E25/10/6-3C85-A160	PREF
43350001106	E25/10/6-3C85-A250	PREF
43350001107	E25/10/6-3C85-A315	PREF
43350001108	E25/10/6-3C85-A400	PREF
43350001109	E25/10/6-3C90	PREF

11NC	TYPE NUMBER	CPS
43350001115	E25/10/6-3F3	DES
43350001116	E25/10/6-3F3-A100	DES
43350001117	E25/10/6-3F3-A160	DES
43350001118	E25/10/6-3F3-A250	DES
43350001119	E25/10/6-3F3-A315	DES
43350001120	E25/10/6-3F3-A400	DES
43350001121	E25/13/7-3C80	OBS
43350001127	E25/13/7-3C81	PREF
43350001128	E25/13/7-3C81-A160	PREF
43350001129	E25/13/7-3C81-A250	PREF
43350001130	E25/13/7-3C81-A315	PREF
43350001131	E25/13/7-3C81-A400	PREF
43350001132	E25/13/7-3C81-A630	PREF
43350001133	E25/13/7-3C85	PREF
43350001134	E25/13/7-3C85-A160	PREF
43350001135	E25/13/7-3C85-A250	PREF
43350001136	E25/13/7-3C85-A315	PREF
43350001137	E25/13/7-3C85-A400	PREF
43350001138	E25/13/7-3C85-A630	PREF
43350001139	E25/13/7-3C90	DES
43350001145	E25/13/7-3F3	DES
43350001146	E25/13/7-3F3-A160	DES
43350001147	E25/13/7-3F3-A250	DES
43350001148	E25/13/7-3F3-A315	DES
43350001149	E25/13/7-3F3-A400	DES
43350001150	E25/13/7-3F3-A630	DES
43350001151	E30/15/7-3C80	OBS
43350001157	E30/15/7-3C81	PREF
43350001158	E30/15/7-3C81-A160	PREF
43350001159	E30/15/7-3C81-A250	PREF
43350001160	E30/15/7-3C81-A315	PREF
43350001161	E30/15/7-3C81-A400	PREF
43350001162	E30/15/7-3C81-A630	PREF
43350001163	E30/15/7-3C85	PREF
43350001164	E30/15/7-3C85-A160	PREF
43350001165	E30/15/7-3C85-A250	PREF
43350001166	E30/15/7-3C85-A315	PREF
43350001167	E30/15/7-3C85-A400	PREF
43350001168	E30/15/7-3C85-A630	PREF
43350001169	E30/15/7-3C90	PREF
43350001175	E30/15/7-3F3	DES

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350001176	E30/15/7-3F3-A160	DES
43350001177	E30/15/7-3F3-A250	DES
43350001178	E30/15/7-3F3-A315	DES
43350001179	E30/15/7-3F3-A400	DES
43350001180	E30/15/7-3F3-A630	DES
43350001181	E31/13/9-3C80	OBS
43350001187	E31/13/9-3C81	PREF
43350001188	E31/13/9-3C81-A250	PREF
43350001189	E31/13/9-3C81-A315	PREF
43350001190	E31/13/9-3C81-A400	PREF
43350001191	E31/13/9-3C81-A630	PREF
43350001192	E31/13/9-3C81-A1000	PREF
43350001193	E31/13/9-3C85	PREF
43350001194	E31/13/9-3C85-A250	PREF
43350001195	E31/13/9-3C85-A315	PREF
43350001196	E31/13/9-3C85-A400	PREF
43350001197	E31/13/9-3C85-A630	PREF
43350001198	E31/13/9-3C85-A1000	PREF
43350001199	E31/13/9-3C90	PREF
43350001205	E31/13/9-3F3	DES
43350001206	E31/13/9-3F3-A250	DES
43350001207	E31/13/9-3F3-A315	DES
43350001208	E31/13/9-3F3-A400	DES
43350001209	E31/13/9-3F3-A630	DES
43350001210	E31/13/9-3F3-A1000	DES
43350001211	E34/14/9-3C80	OBS
43350001217	E34/14/9-3C81	PREF
43350001218	E34/14/9-3C81-A250	PREF
43350001219	E34/14/9-3C81-A315	PREF
43350001220	E34/14/9-3C81-A400	PREF
43350001221	E34/14/9-3C81-A630	PREF
43350001222	E34/14/9-3C81-A1000	PREF
43350001223	E34/14/9-3C85	PREF
43350001224	E34/14/9-3C85-A250	PREF
43350001225	E34/14/9-3C85-A315	PREF
43350001226	E34/14/9-3C85-A400	PREF
43350001227	E34/14/9-3C85-A630	PREF
43350001228	E34/14/9-3C85-A1000	PREF
43350001229	E34/14/9-3C90	PREF
43350001235	E34/14/9-3F3	DES
43350001236	E34/14/9-3F3-A250	DES

11NC	TYPE NUMBER	CPS
43350001237	E34/14/9-3F3-A315	DES
43350001238	E34/14/9-3F3-A400	DES
43350001239	E34/14/9-3F3-A630	DES
43350001240	E34/14/9-3F3-A1000	DES
43350001241	E41/17/12-3C80	OBS
43350001247	E41/17/12-3C81	PREF
43350001248	E41/17/12-3C81-E250	PREF
43350001249	E41/17/12-3C81-E315	PREF
43350001250	E41/17/12-3C81-A400	PREF
43350001251	E41/17/12-3C81-A630	PREF
43350001252	E41/17/12-3C81-A1000	PREF
43350001253	E41/17/12-3C85	PREF
43350001254	E41/17/12-3C85-E250	PREF
43350001255	E41/17/12-3C85-E315	PREF
43350001256	E41/17/12-3C85-A400	PREF
43350001257	E41/17/12-3C85-A630	PREF
43350001258	E41/17/12-3C85-A1000	PREF
43350001259	E41/17/12-3C90	PREF
43350001265	E41/17/12-3F3	DES
43350001266	E41/17/12-3F3-E250	DES
43350001267	E41/17/12-3F3-E315	DES
43350001268	E41/17/12-3F3-A400	DES
43350001269	E41/17/12-3F3-A630	DES
43350001270	E41/17/12-3F3-A1000	DES
43350001271	E42/21/15-3C80	OBS
43350001277	E42/21/15-3C81	PREF
43350001278	E42/21/15-3C81-E250	PREF
43350001279	E42/21/15-3C81-E315	PREF
43350001280	E42/21/15-3C81-A400	PREF
43350001281	E42/21/15-3C81-A630	PREF
43350001282	E42/21/15-3C81-A1000	PREF
43350001283	E42/21/15-3C85	PREF
43350001284	E42/21/15-3C85-E250	PREF
43350001285	E42/21/15-3C85-E315	PREF
43350001286	E42/21/15-3C85-A400	PREF
43350001287	E42/21/15-3C85-A630	PREF
43350001288	E42/21/15-3C85-A1000	PREF
43350001289	E42/21/15-3C90	PREF
43350001295	E42/21/15-3F3	DES
43350001296	E42/21/15-3F3-E250	DES
43350001297	E42/21/15-3F3-E315	DES

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11NC	TYPE NUMBER	CPS
43350001298	E42/21/15-3F3-A400	DES
43350001299	E42/21/15-3F3-A630	DES
43350001300	E42/21/15-3F3-A1000	DES
43350001301	E42/21/20-3C80	OBS
43350001307	E42/21/20-3C81	PREF
43350001308	E42/21/20-3C81-E250	PREF
43350001309	E42/21/20-3C81-E315	PREF
43350001310	E42/21/20-3C81-A400	PREF
43350001311	E42/21/20-3C81-A630	PREF
43350001312	E42/21/20-3C81-A1000	PREF
43350001313	E42/21/20-3C85	PREF
43350001314	E42/21/20-3C85-E250	PREF
43350001315	E42/21/20-3C85-E315	PREF
43350001316	E42/21/20-3C85-A400	PREF
43350001317	E42/21/20-3C85-A630	PREF
43350001318	E42/21/20-3C85-A1000	PREF
43350001319	E42/21/20-3C90	PREF
43350001325	E42/21/20-3F3	DES
43350001326	E42/21/20-3F3-E250	DES
43350001327	E42/21/20-3F3-E315	DES
43350001328	E42/21/20-3F3-A400	DES
43350001329	E42/21/20-3F3-A630	DES
43350001330	E42/21/20-3F3-A1000	DES
43350001331	E47/20/16-3C80	OBS
43350001337	E47/20/16-3C81	PREF
43350001338	E47/20/16-3C81-E250	PREF
43350001339	E47/20/16-3C81-E315	PREF
43350001340	E47/20/16-3C81-E400	PREF
43350001341	E47/20/16-3C81-A630	PREF
43350001342	E47/20/16-3C81-A1000	PREF
43350001343	E47/20/16-3C85	PREF
43350001344	E47/20/16-3C85-E250	PREF
43350001345	E47/20/16-3C85-E315	PREF
43350001346	E47/20/16-3C85-E400	PREF
43350001347	E47/20/16-3C85-A630	PREF
43350001348	E47/20/16-3C85-A1000	PREF
43350001349	E47/20/16-3C90	PREF
43350001355	E47/20/16-3F3	DES
43350001356	E47/20/16-3F3-E250	DES
43350001357	E47/20/16-3F3-E315	DES
43350001358	E47/20/16-3F3-E400	DES

11NC	TYPE NUMBER	CPS
43350001359	E47/20/16-3F3-A630	DES
43350001360	E47/20/16-3F3-A1000	DES
43350001367	E50/27/15-3C81	PREF
43350001368	E50/27/15-3C81-E250	PREF
43350001369	E50/27/15-3C81-E315	PREF
43350001370	E50/27/15-3C81-E400	PREF
43350001371	E50/27/15-3C81-A630	PREF
43350001372	E50/27/15-3C81-A1000	PREF
43350001373	E50/27/15-3C85	PREF
43350001374	E50/27/15-3C85-E250	PREF
43350001375	E50/27/15-3C85-E315	PREF
43350001376	E50/27/15-3C85-E400	PREF
43350001377	E50/27/15-3C85-A630	PREF
43350001378	E50/27/15-3C85-A1000	PREF
43350001379	E50/27/15-3C90	PREF
43350001391	E55/28/21-3C80	OBS
43350001397	E55/28/21-3C81	PREF
43350001398	E55/28/21-3C81-E315	PREF
43350001399	E55/28/21-3C81-E400	PREF
43350001400	E55/28/21-3C81-E630	PREF
43350001401	E55/28/21-3C81-A1000	PREF
43350001402	E55/28/21-3C81-A1600	PREF
43350001403	E55/28/21-3C85	PREF
43350001404	E55/28/21-3C85-E315	PREF
43350001405	E55/28/21-3C85-E400	PREF
43350001406	E55/28/21-3C85-E630	PREF
43350001407	E55/28/21-3C85-A1000	PREF
43350001408	E55/28/21-3C85-A1600	PREF
43350001409	E55/28/21-3C90	PREF
43350001416	E55/28/21-3F3-E315	DES
43350001417	E55/28/21-3F3-E400	DES
43350001418	E55/28/21-3F3-E630	DES
43350001419	E55/28/21-3F3-A1000	DES
43350001420	E55/28/21-3F3-A1600	DES
43350001421	E56/24/19-3C80	OBS
43350001427	E56/24/19-3C81	PREF
43350001428	E56/24/19-3C81-E315	PREF
43350001429	E56/24/19-3C81-E400	PREF
43350001430	E56/24/19-3C81-E630	PREF
43350001431	E56/24/19-3C81-A1000	PREF
43350001432	E56/24/19-3C81-A1600	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350001433	E56/24/19-3C85	PREF
43350001434	E56/24/19-3C85-E315	PREF
43350001435	E56/24/19-3C85-E400	PREF
43350001436	E56/24/19-3C85-E630	PREF
43350001437	E56/24/19-3C85-A1000	PREF
43350001438	E56/24/19-3C85-A1600	PREF
43350001439	E56/24/19-3C90	PREF
43350001475	TC2.5/1.5/1-4C65	OBS
43350001476	TC2.5/1.5/1-3B7	SUP
43350001477	TC2.5/1.5/1-3E25	SUP
43350001478	TC2.5/1.5/1-3E27	PREF
43350001479	TC2.5/1.5/1-3E6	PREF
43350001480	TC2.5/1.5/1-3D3	SUP
43350001482	TC3.9/2/1-3D3	SUP
43350001487	E80/38/20-3C81	PREF
43350001488	E80/38/20-3C81-E315	PREF
43350001489	E80/38/20-3C81-E400	PREF
43350001490	E80/38/20-3C81-E630	PREF
43350001491	E80/38/20-3C81-A1000	PREF
43350001492	E80/38/20-3C81-A1600	PREF
43350001493	E80/38/20-3C85	PREF
43350001494	E80/38/20-3C85-E315	PREF
43350001495	E80/38/20-3C85-E400	PREF
43350001496	E80/38/20-3C85-E630	PREF
43350001497	E80/38/20-3C85-A1000	PREF
43350001498	E80/38/20-3C85-A1600	PREF
43350001499	E80/38/20-3C90	PREF
43350001505	E80/38/20-3F3	DES
43350001506	E80/38/20-3F3-E315	DES
43350001507	E80/38/20-3F3-E400	DES
43350001508	E80/38/20-3F3-E630	DES
43350001509	E80/38/20-3F3-A1000	DES
43350001510	E80/38/20-3F3-A1600	DES
43350001541	E13/6/6-3E25	SUP
43350001542	E13/6/6-3E27	PREF
43350001543	E13/6/6-3E5	PREF
43350001544	E19/8/5-3E25	SUP
43350001545	E19/8/5-3E27	PREF
43350001546	E19/8/5-3E5	SUP
43350001547	E19/8/9-3E25	SUP
43350001548	E19/8/9-3E27	PREF

11NC	TYPE NUMBER	CPS
43350001549	E19/8/9-3E5	SUP
43350001551	E25/10/6-3E27	PREF
43350001552	E25/10/6-3E5	SUP
43350001553	E25/13/7-3E25	SUP
43350001554	E25/13/7-3E27	PREF
43350001556	E30/15/7-3E25	SUP
43350001557	E30/15/7-3E27	PREF
43350001559	E31/13/9-3E25	SUP
43350001560	E31/13/9-3E27	PREF
43350001562	E34/14/9-3E25	SUP
43350001563	E34/14/9-3E27	PREF
43350001565	E41/17/12-3E25	SUP
43350001566	E41/17/12-3E27	PREF
43350001568	E42/21/15-3E25	SUP
43350001569	E42/21/15-3E27	PREF
43350001571	E42/21/20-3E25	SUP
43350001572	E42/21/20-3E27	PREF
43350001574	E47/20/16-3E25	SUP
43350001575	E47/20/16-3E27	PREF
43350001578	E56/24/19-3E27	PREF
43350001580	EC35-3C80	OBS
43350001586	EC35-3C81	SUP
43350001587	EC35-3C81-E100	SUP
43350001588	EC35-3C81-E160	SUP
43350001589	EC35-3C81-A250	SUP
43350001590	EC35-3C81-A315	SUP
43350001591	EC35-3C81-A400	SUP
43350001592	EC35-3C85	SUP
43350001593	EC35-3C85-E100	SUP
43350001594	EC35-3C85-E160	SUP
43350001595	EC35-3C85-A250	SUP
43350001596	EC35-3C85-A315	SUP
43350001597	EC35-3C85-A400	SUP
43350001610	EC41-3C80	OBS
43350001616	EC41-3C81	SUP
43350001617	EC41-3C81-E100	SUP
43350001618	EC41-3C81-E160	SUP
43350001619	EC41-3C81-E250	SUP
43350001620	EC41-3C81-A315	SUP
43350001621	EC41-3C81-A400	SUP
43350001622	EC41-3C85	SUP

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11NC	TYPE NUMBER	CPS
43350001623	EC41-3C85-E100	SUP
43350001624	EC41-3C85-E160	SUP
43350001625	EC41-3C85-E250	SUP
43350001626	EC41-3C85-A315	SUP
43350001627	EC41-3C85-A400	SUP
43350001640	EC52-3C80	OBS
43350001646	EC52-3C81	SUP
43350001647	EC52-3C81-E160	SUP
43350001648	EC52-3C81-E250	SUP
43350001649	EC52-3C81-E315	SUP
43350001650	EC52-3C81-A400	SUP
43350001651	EC52-3C81-A630	SUP
43350001652	EC52-3C85	SUP
43350001653	EC52-3C85-E160	SUP
43350001654	EC52-3C85-E250	SUP
43350001655	EC52-3C85-E315	SUP
43350001656	EC52-3C85-A400	SUP
43350001657	EC52-3C85-A630	SUP
43350001670	EC70-3C80	OBS
43350001676	EC70-3C81	SUP
43350001677	EC70-3C81-E250	SUP
43350001678	EC70-3C81-E315	SUP
43350001679	EC70-3C81-E400	SUP
43350001680	EC70-3C81-A630	SUP
43350001681	EC70-3C81-A1000	SUP
43350001682	EC70-3C85	SUP
43350001683	EC70-3C85-E250	SUP
43350001684	EC70-3C85-E315	SUP
43350001685	EC70-3C85-E400	SUP
43350001686	EC70-3C85-A630	SUP
43350001687	EC70-3C85-A1000	SUP
43350001736	EFD20-3F3	DES
43350001737	EFD20-3F3-E63-S	DES
43350001739	EFD20-3F3-A160-S	DES
43350001741	EFD20-3F3-A315-S	DES
43350001772	EFD30-3C85	PREF
43350001773	EFD30-3C85-A100-S	PREF
43350001774	EFD30-3C85-A160-S	PREF
43350001775	EFD30-3C85-A250-S	PREF
43350001776	EFD30-3C85-A315-S	PREF
43350001777	EFD30-3C85-A400-S	PREF

11NC	TYPE NUMBER	CPS
43350001784	EFD30-3F3	DES
43350001785	EFD30-3F3-A100-S	DES
43350001786	EFD30-3F3-A160-S	DES
43350001787	EFD30-3F3-A250-S	DES
43350001788	EFD30-3F3-A315-S	DES
43350001789	EFD30-3F3-A400-S	DES
43350001935	E55/28/21-3E27	PREF
43350001937	TC2.5/1.3/0.8-4C65	OBS
43350001991	E32/6/20-3C85	DES
43350001992	E32/6-3C85-E160-E	DES
43350001993	E32/6-3C85-E250-E	DES
43350001994	E32/6-3C85-A315-E	DES
43350001995	E32/6-3C85-A400-E	DES
43350001996	E32/6-3C85-A630-E	DES
43350002003	E32/6/20-3F3	DES
43350002004	E32/6-3F3-E160-E	DES
43350002005	E32/6-3F3-E250-E	DES
43350002006	E32/6-3F3-A315-E	DES
43350002007	E32/6-3F3-A400-E	DES
43350002008	E32/6-3F3-A630-E	DES
43350002009	E32/6/20-3F4	DES
43350002010	E32/6-3F4-E160-E	DES
43350002011	E32/6-3F4-E250-E	DES
43350002012	E32/6-3F4-A315-E	DES
43350002013	E32/6-3F4-A400-E	DES
43350002014	E32/6-3F4-A630-E	DES
43350002016	E38/8-3C85-E250-E	DES
43350002017	E38/8-3C85-E315-E	DES
43350002018	E38/8-3C85-E400-E	DES
43350002019	E38/8-3C85-A630-E	DES
43350002020	E38/8-3C85-A1000-E	DES
43350002028	E38/8-3F3-E250-E	DES
43350002029	E38/8-3F3-E315-E	DES
43350002030	E38/8-3F3-E400-E	DES
43350002031	E38/8-3F3-A630-E	DES
43350002032	E38/8-3F3-A1000-E	DES
43350002034	E38/8-3F4-E250-E	DES
43350002035	E38/8-3F4-E315-E	DES
43350002036	E38/8-3F4-E400-E	DES
43350002037	E38/8-3F4-A630-E	DES
43350002038	E38/8-3F4-A1000-E	DES

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11NC	TYPE NUMBER	CPS
43350002039	E43/10-3C85-E250-E	DES
43350002040	E43/10-3C85-E315-E	DES
43350002041	E43/10-3C85-E400-E	DES
43350002042	E43/10-3C85-A630-E	DES
43350002043	E43/10-3C85-A1000-E	DES
43350002050	E43/10-3F3-E250-E	DES
43350002051	E43/10-3F3-E315-E	DES
43350002052	E43/10-3F3-E400-E	DES
43350002053	E43/10-3F3-A630-E	DES
43350002054	E43/10-3F3-A1000-E	DES
43350002055	E43/10-3F4-E250-E	DES
43350002056	E43/10-3F4-E315-E	DES
43350002057	E43/10-3F4-E400-E	DES
43350002058	E43/10-3F4-A630-E	DES
43350002059	E43/10-3F4-A1000-E	DES
43350002060	E58/11-3C85-E315-E	DES
43350002061	E58/11-3C85-E400-E	DES
43350002062	E58/11-3C85-E630-E	DES
43350002063	E58/11-3C85-A1000-E	DES
43350002064	E58/11-3C85-A1600-E	DES
43350002071	E58/11-3F3-E315-E	DES
43350002072	E58/11-3F3-E400-E	DES
43350002073	E58/11-3F3-E630-E	DES
43350002074	E58/11-3F3-A1000-E	DES
43350002075	E58/11-3F3-A1600-E	DES
43350002076	E58/11-3F4-E315-E	DES
43350002077	E58/11-3F4-E400-E	DES
43350002078	E58/11-3F4-E630-E	DES
43350002079	E58/11-3F4-A1000-E	DES
43350002080	E58/11-3F4-A1600-E	DES
43350002081	E64/10-3C85-E630-E	DES
43350002082	E64/10-3C85-E1000-E	DES
43350002083	E64/10-3C85-A1600-E	DES
43350002084	E64/10-3C85-A2500-E	DES
43350002085	E64/10-3C85-A3150-E	DES
43350002092	E64/10-3F3-E630-E	DES
43350002093	E64/10-3F3-E1000-E	DES
43350002094	E64/10-3F3-A1600-E	DES
43350002095	E64/10-3F3-A2500-E	DES
43350002096	E64/10-3F3-A3150-E	DES
43350002097	E64/10-3F4-E630-E	DES

11NC	TYPE NUMBER	CPS
43350002098	E64/10-3F4-E1000-E	DES
43350002099	E64/10-3F4-A1600-E	DES
43350002100	E64/10-3F4-A2500-E	DES
43350002101	E64/10-3F4-A3150-E	DES
43350002157	E32/6-3C85-A160-P	DES
43350002158	E32/6-3C85-A250-P	DES
43350002159	E32/6-3C85-A315-P	DES
43350002160	E32/6-3C85-A400-P	DES
43350002161	E32/6-3C85-A630-P	DES
43350002169	E32/6-3F3-A160-P	DES
43350002170	E32/6-3F3-A250-P	DES
43350002171	E32/6-3F3-A315-P	DES
43350002172	E32/6-3F3-A400-P	DES
43350002173	E32/6-3F3-A630-P	DES
43350002175	E32/6-3F4-A160-P	DES
43350002176	E32/6-3F4-A250-P	DES
43350002177	E32/6-3F4-A315-P	DES
43350002178	E32/6-3F4-A400-P	DES
43350002179	E32/6-3F4-A630-P	DES
43350002181	E38/8-3C85-A250-P	DES
43350002182	E38/8-3C85-A315-P	DES
43350002183	E38/8-3C85-A400-P	DES
43350002184	E38/8-3C85-A630-P	DES
43350002185	E38/8-3C85-A1000-P	DES
43350002193	E38/8-3F3-A250-P	DES
43350002194	E38/8-3F3-A315-P	DES
43350002195	E38/8-3F3-A400-P	DES
43350002196	E38/8-3F3-A630-P	DES
43350002197	E38/8-3F3-A1000-P	DES
43350002199	E38/8-3F4-A250-P	DES
43350002200	E38/8-3F4-A315-P	DES
43350002201	E38/8-3F4-A400-P	DES
43350002202	E38/8-3F4-A630-P	DES
43350002203	E38/8-3F4-A1000-P	DES
43350002204	E43/10-3C85-A250-P	DES
43350002205	E43/10-3C85-A315-P	DES
43350002206	E43/10-3C85-A400-P	DES
43350002207	E43/10-3C85-A630-P	DES
43350002208	E43/10-3C85-A1000-P	DES
43350002215	E43/10-3F3-A250-P	DES
43350002216	E43/10-3F3-A315-P	DES

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11NC	TYPE NUMBER	CPS
43350002217	E43/10-3F3-A400-P	DES
43350002218	E43/10-3F3-A630-P	DES
43350002219	E43/10-3F3-A1000-P	DES
43350002220	E43/10-3F4-A250-P	DES
43350002221	E43/10-3F4-A315-P	DES
43350002222	E43/10-3F4-A400-P	DES
43350002223	E43/10-3F4-A630-P	DES
43350002224	E43/10-3F4-A1000-P	DES
43350002225	E58/11-3C85-A315-P	DES
43350002226	E58/11-3C85-A400-P	DES
43350002227	E58/11-3C85-A630-P	DES
43350002228	E58/11-3C85-A1000-P	DES
43350002229	E58/11-3C85-A1600-P	DES
43350002236	E58/11-3F3-E315-P	DES
43350002237	E58/11-3F3-A400-P	DES
43350002238	E58/11-3F3-A630-P	DES
43350002239	E58/11-3F3-A1000-P	DES
43350002240	E58/11-3F3-A1600-P	DES
43350002241	E58/11-3F4-A315--P	DES
43350002242	E58/11-3F4-A400-P	DES
43350002243	E58/11-3F4-A630-P	DES
43350002244	E58/11-3F4-A1000-P	DES
43350002245	E58/11-3F4-A1600-P	DES
43350002246	E64/10-3C85-A630-P	DES
43350002247	E64/10-3C85-A1000-P	DES
43350002248	E64/10-3C85-A1600-P	DES
43350002249	E64/10-3C85-A2500-P	DES
43350002250	E64/10-3C85-A3150-P	DES
43350002257	E64/10-3F3-A630-P	DES
43350002258	E64/10-3F3-A1000-P	DES
43350002259	E64/10-3F3-A1600-P	DES
43350002260	E64/10-3F3-A2500-P	DES
43350002261	E64/10-3F3-A3150-P	DES
43350002262	E64/10-3F4-A630-P	DES
43350002263	E64/10-3F4-A1000-P	DES
43350002264	E64/10-3F4-A1600-P	DES
43350002265	E64/10-3F4-A2500-P	DES
43350002266	E64/10-3F4-A3150-P	DES
43350002267	U25/16/6-3C81	PREF
43350002270	I25/6/6-3C81	SUP
43350002273	U33/22/9-3C81	PREF

11NC	TYPE NUMBER	CPS
43350002277	UR42/21/12-3C81	SUP
43350002281	UR64/29/14-3C81	SUP
43350002302	U25/16/6-3E25	SUP
43350002303	U25/16/6-3E27	PREF
43350002304	I25/6/6-3E25	SUP
43350002305	I25/6/6-3E27	SUP
43350002450	TC3.4/1.8/1.3-3E25	SUP
43350002451	TC3.4/1.8/1.3-3E27	PREF
43350002452	TC3.4/1.8/1.3-3E6	PREF
43350002453	TC3.4/1.8/1.3-3B7	SUP
43350002454	TC3.4/1.8/1.3-3D3	SUP
43350002455	TC3.4/1.8/1.3-4C65	OBS
43350002456	TC3.9/2.2/1.3-3E25	SUP
43350002457	TC3.9/2.2/1.3-3E27	PREF
43350002458	TC3.9/2.2/1.3-3E6	PREF
43350002459	TC3.9/2.2/1.3-3B7	SUP
43350002460	TC3.9/2.2/1.3-3D3	SUP
43350002461	TC3.9/2.2/1.3-4C65	OBS
43350002462	TC4.8/2.3/1.3-3E25	SUP
43350002463	TC4.8/2.3/1.3-3E27	PREF
43350002464	TC4.8/2.3/1.3-3E6	PREF
43350002465	TC4.8/2.3/1.3-3B7	SUP
43350002466	TC4.8/2.3/1.3-3D3	SUP
43350002467	TC4.8/2.3/1.3-4C65	OBS
43350002468	TC5.8/3.1/1.5-3E25	SUP
43350002469	TC5.8/3.1/1.5-3E27	PREF
43350002470	TC5.8/3.1/1.5-3E6	PREF
43350002471	TC5.8/3.1/1.5-3B7	SUP
43350002472	TC5.8/3.1/1.5-3D3	SUP
43350002473	TC5.8/3.1/1.5-4C65	OBS
43350002474	TC7.6/3.2/4.8-3C81	PREF
43350002477	TC7.6/3.2/4.8-3E25	SUP
43350002478	TC7.6/3.2/4.8-3E27	PREF
43350002480	TC7.6/3.2/4.8-3B7	SUP
43350002481	TC7.6/3.2/4.8-3D3	SUP
43350002482	TC7.6/3.2/4.8-4C65	OBS
43350002483	TC9.5/4.8/3.2-3E25	SUP
43350002485	TC9.5/4.8/3.2-3E27	PREF
43350002486	TC9.5/4.8/3.2-3C81	PREF
43350002489	TC9.5/4.8/3.2-3B7	SUP
43350002490	TC9.5/4.8/3.2-3D3	SUP

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11NC	TYPE NUMBER	CPS
43350002491	TC9.5/4.8/3.2-4C65	OBS
43350002492	TX13/7.1/4.8-3E25	SUP
43350002493	TX13/7.1/4.8-3E27	PREF
43350002495	TX13/7.1/4.8-3C81	PREF
43350002496	TX13/7.1/4.8-3C85	PREF
43350002498	TX13/7.1/4.8-3F3	PREF
43350002500	TX13/7.1/4.8-3D3	SUP
43350002501	TX13/7.1/4.8-4C65	OBS
43350002502	TX13/7.9/6.4-3E25	SUP
43350002503	TX13/7.9/6.4-3E27	PREF
43350002505	TX13/7.9/6.4-3C81	PREF
43350002506	TX13/7.9/6.4-3C85	PREF
43350002508	TX13/7.9/6.4-3F3	PREF
43350002509	TX13/7.9/6.4-4C65	OBS
43350002510	TX16/9.1/4.7-3E25	SUP
43350002511	TX16/9.1/4.7-3E27	PREF
43350002512	TX16/9.1/4.7-3E6	PREF
43350002513	TX16/9.1/4.7-3C81	PREF
43350002514	TX16/9.1/4.7-3C85	PREF
43350002516	TX16/9.1/4.7-3F3	PREF
43350002517	TX22/14/6.4-3E25	SUP
43350002518	TX22/14/6.4-3E27	PREF
43350002519	TX22/14/6.4-3E6	PREF
43350002520	TX22/14/6.4-3C81	PREF
43350002521	TX22/14/6.4-3C85	PREF
43350002523	TX22/14/6.4-3F3	PREF
43350002524	TX22/14/6.4-4C65	OBS
43350002525	TX22/14/13-3E25	SUP
43350002526	TX22/14/13-3E27	PREF
43350002527	TX22/14/13-3E6	PREF
43350002528	TX22/14/13-3C81	PREF
43350002529	TX22/14/13-3C85	PREF
43350002531	TX22/14/13-3F3	PREF
43350002532	TX25/15/9.5-3E25	SUP
43350002533	TX25/15/9.5-3E27	PREF
43350002534	TX25/15/9.5-3E6	PREF
43350002535	TX25/15/9.5-3C81	PREF
43350002536	TX25/15/9.5-3C85	PREF
43350002538	TX25/15/9.5-3F3	PREF
43350002539	TX29/19/7.6-3E25	SUP
43350002540	TX29/19/7.6-3E27	PREF
43350002541	TX29/19/7.6-3E6	PREF
43350002542	TX29/19/7.6-3C81	PREF
43350002543	TX29/19/7.6-3C85	PREF
43350002545	TX29/19/7.6-3F3	PREF
43350002546	TX36/23/10-3E25	SUP
43350002547	TX36/23/10-3E27	PREF
43350002548	TX36/23/10-3E6	PREF
43350002549	TX36/23/10-3C81	PREF
43350002550	TX36/23/10-3C85	PREF
43350002552	TX36/23/10-3F3	PREF
43350002553	TX36/23/15-3E25	SUP
43350002554	TX36/23/15-2E27	PREF
43350002555	TX36/23/15-3E6	PREF
43350002556	TX36/23/15-3C81	PREF
43350002557	TX36/23/15-3C85	PREF
43350002559	TX36/23/15-3F3	PREF
43350002560	TX39/20/13-3E25	SUP
43350002561	TX39/20/13-3E27	PREF
43350002563	TX39/20/13-3C81	PREF
43350002564	TX39/20/13-3C85	PREF
43350002566	TX39/20/13-3F3	PREF
43350002567	TX39/20/13-4C65	OBS
43350002568	TX51/32/19-3E27	PREF
43350002570	TX51/32/19-3C81	PREF
43350002571	TX51/32/19-3C85	PREF
43350002573	TX51/32/19-3F3	PREF
43350002576	TX61/36/13-3C81	PREF
43350002577	TX61/36/13-3C85	PREF
43350002579	TX61/36/13-3F3	PREF
43350002580	TX74/39/13-3E27	PREF
43350002582	TX74/39/13-3C81	PREF
43350002583	TX74/39/13-3C85	PREF
43350002585	TX74/39/13-3F3	PREF
43350002586	TX74/39/13-4C65	OBS
43350002599	CP-P7/4-1S-A	PREF
43350002600	CP-P9/5-1S-A	PREF
43350002601	CP-P11/7-1S-A	PREF
43350002602	CP-P11/7-2S-A	PREF
43350002603	CP-P11/7-3S-A	PREF
43350002604	CP-P14/8-1S-A	PREF
43350002605	CP-P14/8-2S-A	PREF

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11NC	TYPE NUMBER	CPS
43350002606	CP-P14/8-3S-A	PREF
43350002607	CP-P18/11-1S-A	PREF
43350002608	CP-P18/11-2S-A	PREF
43350002609	CP-P18/11-3S-A	PREF
43350002610	CP-P22/13-1S-A	PREF
43350002611	CP-P22/13-2S-A	PREF
43350002612	CP-P22/13-3S-A	PREF
43350002613	CLM/TP-P9/5	PREF
43350002614	CLM/TP-P11/7	PREF
43350002615	CLM/TP-P14/8	PREF
43350002616	WAS-CLM/TP-P14/8	PREF
43350002617	CLM/TP-P18/11	PREF
43350002618	WAS-CLM/TP-P18/11	PREF
43350002619	CLM/TS-P22/13	PREF
43350002620	CP-P26/16-1S-A	PREF
43350002621	CP-P26/16-2S-A	PREF
43350002622	CP-P26/16-3S-A	PREF
43350002623	CP-P30/19-1S-A	PREF
43350002624	CP-P30/19-2S-A	PREF
43350002625	CP-P30/19-3S-A	PREF
43350002626	CP-P36/22-1S-A	PREF
43350002627	CP-P36/22-2S-A	PREF
43350002628	CP-P36/22-3S-A	PREF
43350002629	CP-P42/29-1S-A	PREF
43350002630	CP-P42/29-2S-A	PREF
43350002631	CP-P66/56-1S	PREF
43350002633	CLM/TP-P26/16	PREF
43350002634	CLM/TS-P30/19	PREF
43350002635	CPV-P14/8-1S-4SPD	PREF
43350002636	CPV-P14/8-1S-4SPDL	PREF
43350002637	CPV-P14/8-1S-6PD	PREF
43350002638	CPV-P14/8-1S-6PDL	PREF
43350002639	CPV-P14/8-2S-4SPD	PREF
43350002640	CPV-P14/8-2S-4SPDL	PREF
43350002641	CPV-P14/8-2S-6PD	PREF
43350002642	CPV-P14/8-2S-6PDL	PREF
43350002643	CPV-P18/11-1S-6PD	PREF
43350002644	CPV-P18/11-1S-6PDL	PREF
43350002645	CPV-P18/11-2S-6PD	PREF
43350002646	CPV-P18/11-2S-6PDL	PREF
43350002647	CPV-P18/11-3S-6PD	PREF

11NC	TYPE NUMBER	CPS
43350002648	CPV-P18/11-3S-6PDL	PREF
43350002652	CPV-P22/13-1S-6PD	PREF
43350002653	CPV-P22/13-1S-6PDL	PREF
43350002654	CPV-P22/13-2S-6PD	PREF
43350002655	CPV-P22/13-2S-6PDL	PREF
43350002656	CPV-P22/13-3S-6PD	PREF
43350002657	CPV-P22/13-3S-6PDL	PREF
43350002658	CPV-P26/16-1S-6PD	PREF
43350002659	CPV-P26/16-1S-6PDL	PREF
43350002660	CPV-P26/16-2S-6PD	PREF
43350002661	CPV-P26/16-2S-6PDL	PREF
43350002662	CPV-P26/16-3S-6PD	PREF
43350002663	CPV-P26/16-3S-6PDL	PREF
43350002664	CPV-P30/19-1S-6PD	PREF
43350002665	CPV-P30/19-1S-6PDL	PREF
43350002666	WAS-CLM/TS-P22/13	PREF
43350002667	CPV-PT14/8-1S-6P	PREF
43350002668	CPV-PT23/11-1S-10P	PREF
43350002669	CPV-PT23/18-1S-10P	PREF
43350002670	CPV-PT30/19-1S-10P	PREF
43350002671	CP-PQ20/16-1S-14P	PREF
43350002672	CP-PQ20/16-1S-14PD	PREF
43350002673	CP-PQ20/20-1S-14P	PREF
43350002674	CP-PQ20/20-1S-14PD	PREF
43350002675	CP-PQ26/20-1S-12P	PREF
43350002676	CP-PQ26/20-1S-12PD	PREF
43350002677	CP-PQ26/25-1S-12P	PREF
43350002678	CP-PQ26/25-1S-12PD	PREF
43350002679	CP-PQ32/20-1S-12P	PREF
43350002680	CP-PQ32/20-1S-12PD	PREF
43350002681	CP-PQ32/30-1S-12P	PREF
43350002682	CP-PQ32/30-1S-12PD	PREF
43350002693	CP-E13/6/6-1S	PREF
43350002694	CP-E19/8/5-1S	PREF
43350002695	CP-E19/8/9-1S	PREF
43350002696	CP-E25/10/6-1S	PREF
43350002697	CP-E30/15/7-1S-A	PREF
43350002698	CP-E34/14/9-1S	PREF
43350002699	CP-E41/16/12-1S	PREF
43350002700	CP-E42/21/15-1S-A	PREF
43350002701	CP-E42/21/20-1S	PREF

Conversion list

11NC to type number

11NC	TYPE NUMBER	CPS
43350002702	CP-E47/20/16-1S	PREF
43350002703	CP-E55/28/21-1S-A	PREF
43350002704	CP-E56/24/19-1S	PREF
43350002705	CPH-E19/8/5-1S-8P	PREF
43350002707	CPH-E25/10/6-1S-10P	PREF
43350002708	CSH-E30/7-1S-10P-A	PREF
43350002709	CPH-E34/14/9-1S-12P	PREF
43350002710	CPH-E41/17/12-1S-12P	PREF
43350002711	CPH-E42/15-1S-10P-A	PREF
43350002712	CPH-E42/20-1S-12PD	PREF
43350002713	CPH-E47/20/16-1S-12P	PREF
43350002714	CPH-E55/28/21-1S-14P	PREF
43350002715	CPH-E56/24/19-1S-12P	PREF
43350002716	CLM/U-EC35	PREF
43350002717	BPL2-EC35	PREF
43350002718	BPL4-EC35	PREF
43350002719	CLM/U-EC41	PREF
43350002720	BPL4-EC41	PREF
43350002721	CLM/U-EC52	PREF
43350002722	BPL4-EC52	PREF
43350002723	CLM/U-EC70	PREF
43350002724	BPL4-EC70	PREF
43350002734	CP-EC35-1S	PREF
43350002735	CP-EC41-1S	PREF
43350002736	CP-EC52-1S	PREF
43350002737	CP-EC70-1S	PREF
43350002738	PIN-EC	PREF
43350002739	PINH-EC	PREF
43350002891	EFD20-3C85	PREF
43350002892	EFD20-3C85-E63-S	PREF
43350002893	EFD20-3C85-A100-S	PREF
43350002894	EFD20-3C85-A160-S	PREF
43350002895	EFD20-3C85-A250-S	PREF
43350002896	EFD20-3C85-A315-S	PREF
43350002958	PTS14/8-3F3	PREF
43350003000	PT14/8-3C81	PREF
43350003001	PT14/8-3C81-A63	PREF
43350003002	PT14/8-3C81-A100	PREF
43350003004	PT14/8-3C81-A160	PREF
43350003006	PT14/8-3C81-A250	PREF
43350003007	PT14/8-3C81-A315	PREF

11NC	TYPE NUMBER	CPS
43350003009	PT14/8-3C85	PREF
43350003010	PT14/8-3C85-A63	PREF
43350003011	PT14/8-3C85-A100	PREF
43350003012	PT14/8-3C85-A160	PREF
43350003013	PT14/8-3C85-A250	PREF
43350003014	PT14/8-3C85-A315	PREF
43350003014	PT23/18-3C81-A630	PREF
43350003015	PT14/8-3F3	PREF
43350003016	PT14/8-3F3-A63	PREF
43350003017	PT14/8-3F3-A100	PREF
43350003018	PT14/8-3F3-A160	PREF
43350003019	PT14/8-3F3-A250	PREF
43350003020	PT14/8-3F3-A315	PREF
43350003021	PT14/8-3B7	SUP
43350003022	PT14/8/3B7-E63	SUP
43350003024	PT14/8-3B7-A100	SUP
43350003026	PT14/8-3B7-A160	SUP
43350003028	PT14/8-3B7-A250	SUP
43350003030	PT14/8-3B7-A315	SUP
43350003031	PT14/8-3B9	OBS
43350003032	PT14/8-3B9-E63	OBS
43350003034	PT14/8-3B9-A100	OBS
43350003036	PT14/8-3B9-A160	OBS
43350003038	PT14/8-3B9-A250	OBS
43350003040	PT14/8-3E27	PREF
43350003041	PT14/8-3E5	PREF
43350003042	PT18/11-3C81	PREF
43350003043	PT18/11-3C81-A100	PREF
43350003044	PT18/11-3C81-A160	PREF
43350003045	PT18/11-3C81-A250	PREF
43350003046	PT18/11-3C81-A315	PREF
43350003047	PT18/11-3C81-A400	PREF
43350003048	PT18/11-3C85	PREF
43350003049	PT18/11-3C85-A100	PREF
43350003050	PT18/11-3C85-A160	PREF
43350003051	PT18/11-3C85-A250	PREF
43350003052	PT18/11-3C85-A315	PREF
43350003053	PT18/11-3C85-A400	PREF
43350003054	PT18/11-3F3	PREF
43350003055	PT18/11-3F3-A100	PREF
43350003056	PT18/11-3F3-A160	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350003057	PT18/11-3F3-A250	PREF
43350003058	PT18/11-3F3-A315	PREF
43350003059	PT18/11-3F3-A400	PREF
43350003060	PT18/11-3B7	SUP
43350003061	PT18/11-3B7-E100	SUP
43350003062	PT18/11-3B7-E160	SUP
43350003063	PT18/11-3B7-A250	SUP
43350003064	PT18/11-3B7-A315	SUP
43350003065	PT18/11-3B7-A400	SUP
43350003066	PT18/11-3B9	OBS
43350003067	PT18/11-3B9-E100	OBS
43350003068	PT18/11-3B9-E160	OBS
43350003069	PT18/11-3B9-A250	OBS
43350003070	PT18/11-3B9-A315	OBS
43350003071	PT18/11-3B9-A400	OBS
43350003072	PT18/11-3E27	PREF
43350003073	PT18/11-3E5	PREF
43350003074	PT23/11-3C81	PREF
43350003075	PT23/11-3C81-A160	PREF
43350003076	PT23/11-3C81-A250	PREF
43350003077	PT23/11-3C81-A315	PREF
43350003079	PT23/11-3C81-A400	PREF
43350003080	PT23/11-3C81-A630	PREF
43350003081	PT23/11-3C85	PREF
43350003082	PT23/11-3C85-A160	PREF
43350003083	PT23/11-3C85-A250	PREF
43350003084	PT23/11-3C85-A315	PREF
43350003085	PT23/11-3C85-A400	PREF
43350003086	PT23/11-3C85-A630	PREF
43350003087	PT23/11-3F3	PREF
43350003088	PT23/11-3F3-A160	PREF
43350003089	PT23/11-3F3-A250	PREF
43350003090	PT23/11-3F3-A315	PREF
43350003091	PT23/11-3F3-A400	PREF
43350003092	PT23/11-3F3-A630	PREF
43350003099	PT23/11-3B9	OBS
43350003100	PT23/11-3B9-A160	OBS
43350003101	PT23/11-3B9-A250	OBS
43350003102	PT23/11-3B9-A315	OBS
43350003103	PT23/11-3B9-A400	OBS
43350003104	PT23/11-3B9-A630	OBS

11NC	TYPE NUMBER	CPS
43350003105	PT23/11-3E27	PREF
43350003106	PT23/11-3E5	PREF
43350003107	PT23/18-3C81	PREF
43350003108	PT23/18-3C81-A160	PREF
43350003110	PT23/18-3C81-A250	PREF
43350003111	PT23/18-3C81-A315	PREF
43350003112	PT23/18-3C81-A400	PREF
43350003115	PT23/18-3C85	PREF
43350003116	PT23/18-3C85-A160	PREF
43350003117	PT23/18-3C85-A250	PREF
43350003118	PT23/18-3C85-A315	PREF
43350003119	PT23/18-3C85-A400	PREF
43350003120	PT23/18-3C85-A630	PREF
43350003121	PT23/18-3F3	PREF
43350003122	PT23/18-3F3-A160	PREF
43350003123	PT23/18-3F3-A250	PREF
43350003124	PT23/18-3F3-A315	PREF
43350003125	PT23/18-3F3-A400	PREF
43350003126	PT23/18-3F3-A630	PREF
43350003133	PT23/18-3B9	OBS
43350003134	PT23/18-3B9-E160	OBS
43350003136	PT23/18-3B9-A250	OBS
43350003138	PT23/18-3B9-A315	OBS
43350003139	PT23/18-3B9-A400	OBS
43350003142	PT23/18-3B9-A630	OBS
43350003143	PT23/18-3E27	PREF
43350003144	PT23/18-3E5	PREF
43350003145	PT30/19-3C81	PREF
43350003148	PT30/19-3C81-A315	PREF
43350003149	PT30/19-3C81-A400	PREF
43350003150	PT30/19-3C81-A630	PREF
43350003152	PT30/19-3C81-A1000	PREF
43350003153	PT30/19-3C81-A1600	PREF
43350003155	PT30/19-3C85	PREF
43350003156	PT30/19-3C85-A315	PREF
43350003157	PT30/19-3C85-A400	PREF
43350003158	PT30/19-3C85-A630	PREF
43350003159	PT30/19-3C85-A1000	PREF
43350003160	PT30/19-3C85-A1600	PREF
43350003161	PT30/19-3F3	PREF
43350003163	PT30/19-3F3-A315	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350003164	PT30/19-3F3-A400	PREF
43350003165	PT30/19-3F3-A630	PREF
43350003166	PT30/19-3F3-A1000	PREF
43350003167	PT30/19-3F3-A1600	PREF
43350003168	PT30/19-3B7	SUP
43350003171	PT30/19-3B7-E315	SUP
43350003172	PT30/19-3B7-A400	SUP
43350003174	PT30/19-3B7-A630	SUP
43350003176	PT30/19-3B7-A1000	SUP
43350003177	PT30/19-3B7-A1600	SUP
43350003178	PT30/19-3B9	OBS
43350003181	PT30/19-3B9-E315	OBS
43350003182	PT30/19-3B9-A400	OBS
43350003184	PT30/19-3B9-A630	OBS
43350003187	PT30/19-3B9-A1000	OBS
43350003189	PT30/19-3E27	PREF
43350003190	PT30/19-3E5	PREF
43350003191	PTS14/8-3C81	PREF
43350003192	PTS14/8-3C81-A63	PREF
43350003193	PTS14/8-3C81-A100	PREF
43350003194	PTS14/8-3C81-A160	PREF
43350003195	PTS14/8-3C81-A250	PREF
43350003196	PTS14/8-3C81-A315	PREF
43350003197	PTS14/8-3C85	PREF
43350003198	PTS14/8-3C85-A63	PREF
43350003199	PTS14/8-3C85-A100	PREF
43350003200	PTS14/8-3C85-A160	PREF
43350003201	PTS14/8-3C85-A250	PREF
43350003202	PTS14/8-3C85-A315	PREF
43350003203	PTS14/8-3F3-A63	PREF
43350003204	PTS14/8-3F3-A100	PREF
43350003205	PTS14/8-3F3-A160	PREF
43350003206	PTS14/8-3F3-A250	PREF
43350003207	PTS14/8-3F3-A315	PREF
43350003208	PTS14/8-3B7	SUP
43350003209	PTS14/8-3B7-E63	SUP
43350003210	PTS14/8-3B7-E100	SUP
43350003211	PTS14/8-3B7-A160	SUP
43350003212	PTS14/8-3B7-A250	SUP
43350003213	PTS14/8-3B7-A315	SUP
43350003214	PTS14/8-3B9	OBS

11NC	TYPE NUMBER	CPS
43350003215	PTS14/8-3B9-E63	OBS
43350003216	PTS14/8-3B9-E100	OBS
43350003217	PTS14/8-3B9-A160	OBS
43350003218	PTS14/8-3B9-A250	OBS
43350003219	PTS14/8-3B9-A315	OBS
43350003220	PTS14/8-3E27	PREF
43350003221	PTS14/8-3E5	PREF
43350003222	PTS18/11-3C81	PREF
43350003223	PTS18/11-3C81-A100	PREF
43350003224	PTS18/11-3C81-A160	PREF
43350003225	PTS18/11-3C81-A250	PREF
43350003226	PTS18/11-3C81-A315	PREF
43350003227	PTS18/11-3C81-A400	PREF
43350003228	PTS18/11-3C85	PREF
43350003229	PTS18/11-3C85-A100	PREF
43350003230	PTS18/11-3C85-A160	PREF
43350003231	PTS18/11-3C85-A250	PREF
43350003232	PTS18/11-3C85-A315	PREF
43350003233	PTS18/11-3C85-A400	PREF
43350003234	PTS18/11-3F3	PREF
43350003235	PTS18/11-3F3-A100	PREF
43350003236	PTS18/11-3F3-A160	PREF
43350003237	PTS18/11-3F3-A250	PREF
43350003238	PTS18/11-3F3-A315	PREF
43350003239	PTS18/11-3F3-A400	PREF
43350003240	PTS18/11-3B7	SUP
43350003241	PTS18/11-3B7-E100	SUP
43350003242	PTS18/11-3B7-E160	SUP
43350003243	PTS18/11-3B7-A250	SUP
43350003244	PTS18/11-3B7-A315	SUP
43350003245	PTS18/11-3B7-A400	SUP
43350003246	PTS18/11-3B9	OBS
43350003247	PTS18/11-3B9-E100	OBS
43350003248	PTS18/11-3B9-E160	OBS
43350003249	PTS18/11-3B9-A250	OBS
43350003250	PTS18/11-3B9-A315	OBS
43350003251	PTS18/11-3B9-A400	OBS
43350003252	PTS18/11-3E27	PREF
43350003253	PTS18/11-3E5	PREF
43350003254	PTS23/11-3C81	PREF
43350003255	PTS23/11-3C81-A160	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350003256	PTS23/11-3C81-A250	PREF
43350003257	PTS23/11-3C81-A315	PREF
43350003259	PTS23/11-3C81-A400	PREF
43350003260	PTS23/11-3C81-A630	PREF
43350003261	PTS23/11-3C85	PREF
43350003262	PTS23/11-3C85-A160	PREF
43350003263	PTS23/11-3C85-A250	PREF
43350003264	PTS23/11-3C85-A315	PREF
43350003265	PTS23/11-3C85-A400	PREF
43350003266	PTS23/11-3C85-A630	PREF
43350003267	PTS23/11-3F3	PREF
43350003268	PTS23/11-3F3-A160	PREF
43350003269	PTS23/11-3F3-A250	PREF
43350003270	PTS23/11-3F3-A315	PREF
43350003271	PTS23/11-3F3-A400	PREF
43350003272	PTS23/11-3F3-A630	PREF
43350003279	PTS23/11-3B9	OBS
43350003280	PTS23/11-3B9-E160	OBS
43350003281	PTS23/11-3B9-E250	OBS
43350003282	PTS23/11-3B9-A315	OBS
43350003283	PTS23/11-3B9-A400	OBS
43350003284	PTS23/11-3B9-A630	OBS
43350003285	PTS23/11-3E27	PREF
43350003286	PTS23/11-3E5	PREF
43350003287	PTS23/18-3C81	PREF
43350003288	PTS23/18-3C81-A160	PREF
43350003289	PTS23/18-3C81-A250	PREF
43350003290	PTS23/18-3C81-A315	PREF
43350003291	PTS23/18-3C81-A400	PREF
43350003292	PTS23/18-3C81-A630	PREF
43350003293	PTS23/18-3C85	PREF
43350003294	PTS23/18-3C85-A160	PREF
43350003295	PTS23/18-3C85-A250	PREF
43350003296	PTS23/18-3C85-A315	PREF
43350003297	PTS23/18-3C85-A400	PREF
43350003298	PTS23/18-3C85-A630	PREF
43350003299	PTS23/18-3F3	PREF
43350003300	PTS23/18-3F3-A160	PREF
43350003301	PTS23/18-3F3-A250	PREF
43350003302	PTS23/18-3F3-A315	PREF
43350003303	PTS23/18-3F3-A400	PREF

11NC	TYPE NUMBER	CPS
43350003304	PTS23/18-3F3-A630	PREF
43350003310	PTS23/18-3B9	OBS
43350003311	PTS23/18-3B9-E160	OBS
43350003312	PTS23/18-3B9-E250	OBS
43350003313	PTS23/18-3B9-A315	OBS
43350003314	PTS23/18-3B9-A400	OBS
43350003315	PTS23/18-3B9-A630	OBS
43350003316	PTS23/18-3E27	PREF
43350003317	PTS23/18-3E5	PREF
43350003318	PTS30/19-3C81	PREF
43350003320	PTS30/19-3C81-A315	PREF
43350003321	PTS30/19-3C81-A400	PREF
43350003322	PTS30/19-3C81-A630	PREF
43350003323	PTS30/19-3C81-A1000	PREF
43350003324	PTS30/19-3C81-A1600	PREF
43350003325	PTS30/19-3C85	PREF
43350003326	PTS30/19-3C85-A315	PREF
43350003327	PTS30/19-3C85-A400	PREF
43350003328	PTS30/19-3C85-A630	PREF
43350003329	PTS30/19-3C85-A1000	PREF
43350003330	PTS30/19-3C85-A1600	PREF
43350003331	PTS30/19-3F3	PREF
43350003332	PTS30/19-3F3-A315	PREF
43350003333	PTS30/19-3F3-A400	PREF
43350003334	PTS30/19-3F3-A630	PREF
43350003335	PTS30/19-3F3-A1000	PREF
43350003336	PTS30/19-3F3-A1600	PREF
43350003337	PTS30/19-3B7	SUP
43350003338	PTS30/19-3B7-E315	SUP
43350003339	PTS30/19-3B7-E400	SUP
43350003340	PTS30/19-3B7-A630	SUP
43350003341	PTS30/19-3B7-A1000	SUP
43350003342	PTS30/19-3B7-A1600	SUP
43350003343	PTS30/19-3B9	OBS
43350003344	PTS30/19-3B9-A315	OBS
43350003345	PTS30/19-3B9-A400	OBS
43350003346	PTS30/19-3B9-A630	OBS
43350003347	PTS30/19-3B9-A1000	OBS
43350003348	PTS30/19-3B9-A1600	OBS
43350003349	PTS30/19-3E27	PREF
43350003350	PTS30/19-3E5	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350003351	RM5-3B7	SUP
43350003352	RM5-3B7-E63	SUP
43350003353	RM5-3B7-E100	SUP
43350003354	RM5-3B7-A160	SUP
43350003355	RM5-3B7-A250	SUP
43350003356	RM5-3B7-A315	SUP
43350003357	RM5-3B7-E63/N	SUP
43350003358	RM5-3B7-E100/N	SUP
43350003359	RM5-3B7-A160/N	SUP
43350003360	RM5-3B7-A250/N	SUP
43350003361	RM5-3B7-A315/N	SUP
43350003362	RM5-3B9	OBS
43350003363	RM5-3B9-E63	OBS
43350003364	RM5-3B9-E100	OBS
43350003365	RM5-3B9-A160	OBS
43350003366	RM5-3B9-A250	OBS
43350003367	RM5-3B9-A315	OBS
43350003368	RM5-3B9-E63/N	OBS
43350003369	RM5-3B9-E100/N	OBS
43350003370	RM5-3B9-A160/N	OBS
43350003371	RM5-3B9-A250/N	OBS
43350003372	RM5-3B9-A315/N	OBS
43350003374	RM6R-3B7	SUP
43350003375	RM6R-3B7-E100	SUP
43350003376	RM6R-3B7-A160	SUP
43350003377	RM6R-3B7-A250	SUP
43350003378	RM6R-3B7-A315	SUP
43350003379	RM6R-3B7-A400	SUP
43350003380	RM6R-3B9	OBS
43350003382	RM6R-3B9-E100	OBS
43350003383	RM6R-3B9-A160	OBS
43350003384	RM6R-3B9-A250	OBS
43350003385	RM6R-3B9-A315	OBS
43350003386	RM6R-3B9-A400	OBS
43350003387	RM6R-3B7-E100/N	SUP
43350003388	RM6R-3B7-A160/N	SUP
43350003389	RM6R-3B7-A250/N	SUP
43350003390	RM6R-3B7-A315/N	SUP
43350003391	RM6R-3B7-A400/N	SUP
43350003392	RM6R-3B9-E100/N	OBS
43350003393	RM6R-3B9-A160/N	OBS
43350003394	RM6R-3B9-A250/N	OBS
43350003395	RM6R-3B9-A315/N	OBS
43350003396	RM6R-3B9-A400/N	OBS
43350003397	RM8-3B7	SUP
43350003398	RM8-3B7-E160	SUP
43350003399	RM8-3B7-A250	SUP
43350003400	RM8-3B7-A315	SUP
43350003401	RM8-3B7-A400	SUP
43350003402	RM8-3B7-A630	SUP
43350003404	RM8-3B9	OBS
43350003406	RM8-3B9-E160	OBS
43350003407	RM8-3B9-A250	OBS
43350003408	RM8-3B9-A315	OBS
43350003409	RM8-3B9-A400	OBS
43350003410	RM8-3B9-A630	OBS
43350003411	RM8-3B7-E160/N	SUP
43350003412	RM8-3B7-A250/N	SUP
43350003413	RM8-3B7-A315/N	SUP
43350003414	RM8-3B7-A400/N	SUP
43350003415	RM8-3B7-A630/N	SUP
43350003418	RM8-3B9-E160/N	OBS
43350003419	RM8-3B9-A250/N	OBS
43350003420	RM8-3B9-A315/N	OBS
43350003421	RM8-3B9-A400/N	OBS
43350003422	RM8-3B9-A630/N	OBS
43350003423	RM10-3B7	SUP
43350003424	RM10-3B7-E250	SUP
43350003425	RM10-3B7-E315	SUP
43350003426	RM10-3B7-A400	SUP
43350003427	RM10-3B7-A630	SUP
43350003428	RM10-3B7-A1000	SUP
43350003429	RM10-3B9	OBS
43350003430	RM10-3B9-E250	OBS
43350003431	RM10-3B9-E315	OBS
43350003432	RM10-3B9-A400	OBS
43350003433	RM10-3B9-A630	OBS
43350003434	RM10-3B9-A1000	OBS
43350003435	RM10-3B7-E250/N	SUP
43350003436	RM10-3B7-E315/N	SUP
43350003437	RM10-3B7-A400/N	SUP
43350003438	RM10-3B7-A630/N	SUP

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350003439	RM10-3B7-A1000/N	SUP
43350003440	RM10-3B9-E250/N	OBS
43350003441	RM10-3B9-E315/N	OBS
43350003442	RM10-3B9-A400/N	OBS
43350003443	RM10-3B9-A630/N	OBS
43350003444	RM10-3B9-A1000/N	OBS
43350003445	RM5/I-3C85	PREF
43350003446	RM5/I-3C85-A63	PREF
43350003447	RM5/I-3C85-A100	PREF
43350003448	RM5/I-3C85-A160	PREF
43350003449	RM5/I-3C85-A250	PREF
43350003450	RM5/I-3C85-A315	PREF
43350003451	RM5/I-3F3	PREF
43350003452	RM5/I-3F3-A63	PREF
43350003453	RM5/I-3F3-A100	PREF
43350003454	RM5/I-3F3-A160	PREF
43350003455	RM5/I-3F3-A250	PREF
43350003456	RM5/I-3F3-A315	PREF
43350003458	RM5/I-3E25	SUP
43350003459	RM5/I-3E27	PREF
43350003460	RM5/I-3E5	PREF
43350003461	RM6S/I-3C81	PREF
43350003462	RM6S/I-3C81-A63	PREF
43350003463	RM6S/I-3C81-A100	PREF
43350003464	RM6S/I-3C81-A160	PREF
43350003465	RM6S/I-3C81-A250	PREF
43350003466	RM6S/I-3C81-A315	PREF
43350003468	RM6S/I-3C85	PREF
43350003469	RM6S/I-3C85-A63	PREF
43350003470	RM6S/I-3C85-A100	PREF
43350003471	RM6S/I-3C85-A160	PREF
43350003472	RM6S/I-3C85-A250	PREF
43350003473	RM6S/I-3C85-A315	PREF
43350003475	RM6S/I-3F3	PREF
43350003476	RM6S/I-3F3-A63	PREF
43350003477	RM6S/I-3F3-A100	PREF
43350003478	RM6S/I-3F3-A250	PREF
43350003479	RM6S/I-3F3-A315	PREF
43350003480	RM6S/I-3E25	SUP
43350003481	RM6S/I-3E27	PREF
43350003483	RM8/I-3C81	PREF

11NC	TYPE NUMBER	CPS
43350003484	RM8/I-3C81-E100	PREF
43350003485	RM8/I-3C81-A160	PREF
43350003486	RM8/I-3C81-A250	PREF
43350003487	RM8/I-3C81-A315	PREF
43350003488	RM8/I-3C81-A400	PREF
43350003489	RM8/I-3C85	PREF
43350003490	RM8/I-3C85-E100	PREF
43350003491	RM8/I-3C85-A160	REF
43350003492	RM8/I-3C85-A250	PREF
43350003493	RM8/I-3C85-A315	PREF
43350003494	RM8/I-3C85-A400	PREF
43350003495	RM8/I-3F3	PREF
43350003496	RM8/I-3F3-E100	PREF
43350003497	RM8/I-3E25	SUP
43350003498	RM8/I-3E27	PREF
43350003500	RM10/I-3C81	PREF
43350003501	RM10/I-3C81-E160	PREF
43350003502	RM10/I-3C81-A250	PREF
43350003503	RM10/I-3C81-A315	PREF
43350003504	RM10/I-3C81-A400	PREF
43350003505	RM10/I-3C81-A630	PREF
43350003506	RM10/I-3C85	PREF
43350003507	RM10/I-3C85-E160	PREF
43350003508	RM10/I-3C85-A250	PREF
43350003509	RM10/I-3C85-A315	PREF
43350003510	RM10/I-3C85-A400	PREF
43350003511	RM10/I-3C85-A630	PREF
43350003512	RM10/I-3F3	PREF
43350003513	RM10/I-3F3-E160	PREF
43350003514	RM10/I-3F3-A250	PREF
43350003515	RM10/I-3F3-A315	PREF
43350003516	RM10/I-3F3-A400	PREF
43350003517	RM10/I-3F3-A630	PREF
43350003518	RM10/I-3E25	SUP
43350003519	RM10/I-3E27	PREF
43350003521	EP7-3C81	PREF
43350003522	EP7-3C81-E25	PREF
43350003523	EP7-3C81-A40	PREF
43350003524	EP7-3C81-A63	PREF
43350003525	EP7-3C81-A100	PREF
43350003526	EP7-3C81-A160	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350003529	EP7-3C85	PREF
43350003530	EP7-3C85-E25	PREF
43350003531	EP7-3C85-A40	PREF
43350003532	EP7-3C85-A63	PREF
43350003533	EP7-3C85-A100	PREF
43350003534	EP7-3C85-A160	PREF
43350003535	EP7-3F3	PREF
43350003536	EP7-3F3-E25	PREF
43350003537	EP7-3F3-A40	PREF
43350003538	EP7-3F3-A63	PREF
43350003539	EP7-3F3-A100	PREF
43350003540	EP7-3F3-A160	PREF
43350003541	EP7-3E25	SUP
43350003542	EP7-3E27	PREF
43350003543	EP10-3C81	PREF
43350003544	EP10-3C81-E25	PREF
43350003545	EP10-3C81-A40	PREF
43350003546	EP10-3C81-A63	PREF
43350003548	EP10-3C81-A100	PREF
43350003549	EP10-3C81-A160	PREF
43350003550	EP10-3C85	PREF
43350003551	EP10-3C85-E25	PREF
43350003552	EP10-3C85-A40	PREF
43350003553	EP10-3C85-A63	PREF
43350003554	EP10-3C85-A100	PREF
43350003555	EP10-3C85-A160	PREF
43350003556	EP10-3F3	PREF
43350003557	EP10-3F3-E25	PREF
43350003558	EP10-3F3-A40	PREF
43350003559	EP10-3F3-A63	PREF
43350003560	EP10-3F3-A100	PREF
43350003561	EP10-3F3-A160	PREF
43350003568	EP10-3E25	SUP
43350003569	EP10-3E27	PREF
43350003570	EP13-3C81	PREF
43350003572	EP13-3C81-E40	PREF
43350003574	EP13-3C81-A63	PREF
43350003576	EP13-3C81-A100	PREF
43350003578	EP13-3C81-A160	PREF
43350003580	EP13-3C81-A250	PREF
43350003581	EP13-3C85	PREF

11NC	TYPE NUMBER	CPS
43350003582	EP13-3C85-E40	PREF
43350003583	EP13-3C85-A63	PREF
43350003584	EP13-3C85-A100	PREF
43350003585	EP13-3C85-A160	PREF
43350003586	EP13-3C85-A250	PREF
43350003587	EP13-3F3	PREF
43350003588	EP13-3F3-E40	PREF
43350003589	EP13-3F3-A63	PREF
43350003590	EP13-3F3-A100	PREF
43350003591	EP13-3F3-A160	PREF
43350003593	EP13-3F3-A250	PREF
43350003594	EP13-3E25	SUP
43350003595	EP13-3E27	PREF
43350003596	EP17-3C81	PREF
43350003597	EP17-3C81-E63	PREF
43350003598	EP17-3C81-A100	PREF
43350003600	EP17-3C81-A160	PREF
43350003602	EP17-3C81-A250	PREF
43350003603	EP17-3C81-A315	PREF
43350003604	EP17-3C85	PREF
43350003605	EP17-3C85-E63	PREF
43350003606	EP17-3C85-A100	PREF
43350003607	EP17-3C85-A160	PREF
43350003608	EP17-3C85-A250	PREF
43350003609	EP17-3C85-A315	PREF
43350003611	EP17-3F3	PREF
43350003612	EP17-3F3-E63	PREF
43350003613	EP17-3F3-A100	PREF
43350003614	EP17-3F3-A160	PREF
43350003615	EP17-3F3-A250	PREF
43350003616	EP17-3F3-A315	PREF
43350003617	EP17-3E25	SUP
43350003618	EP17-3E27	PREF
43350003619	EP20-3C81	PREF
43350003620	EP20-3C81-A160	PREF
43350003621	EP20-3C81-A250	PREF
43350003622	EP20-3C81-A315	PREF
43350003623	EP20-3C81-A400	PREF
43350003624	EP20-3C81-A630	PREF
43350003625	EP20-3C85	PREF
43350003626	EP20-3C85-A160	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350003627	EP20-3C85-A250	PREF
43350003628	EP20-3C85-A315	PREF
43350003629	EP20-3C85-A400	PREF
43350003630	EP20-3C85-A630	PREF
43350003631	EP20-3F3	PREF
43350003632	EP20-3F3-A160	PREF
43350003633	EP20-3F3-A250	PREF
43350003634	EP20-3F3-A315	PREF
43350003635	EP20-3F3-A400	PREF
43350003636	EP20-3F3-A630	PREF
43350003637	EP20-3E25	SUP
43350003638	EP20-3E27	PREF
43350003639	PQ20/16-3C81	PREF
43350003640	PQ20/16-3C81-A100	PREF
43350003641	PQ20/16-3C81-A160	PREF
43350003642	PQ20/16-3C81-A250	PREF
43350003643	PQ20/16-3C81-A315	PREF
43350003644	PQ20/16-3C81-A400	PREF
43350003645	PQ20/16-3C81-A630	PREF
43350003646	PQ20/16-3C85	PREF
43350003647	PQ20/16-3C85-A100	PREF
43350003648	PQ20/16-3C85-A160	PREF
43350003649	PQ20/16-3C85-A250	PREF
43350003650	PQ20/16-3C85-A315	PREF
43350003652	PQ20/16-3C85-A400	PREF
43350003653	PQ20/16-3C85-A630	PREF
43350003655	PQ20/16-3F3	PREF
43350003656	PQ20/16-3F3-A100	PREF
43350003657	PQ20/16-3F3-A160	PREF
43350003658	PQ20/16-3F3-A250	PREF
43350003659	PQ20/16-3F3-A315	PREF
43350003660	PQ20/16-3F3-A400	PREF
43350003661	PQ20/16-3F3-A630	PREF
43350003662	PQ20/20-3C81	PREF
43350003663	PQ20/20-3C81-A100	PREF
43350003664	PQ20/20-3C81-A160	PREF
43350003665	PQ20/20-3C81-A250	PREF
43350003666	PQ20/20-3C81-A315	PREF
43350003667	PQ20/20-3C81-A400	PREF
43350003668	PQ20/20-3C81-A630	PREF
43350003669	PQ20/20-3C85	PREF

11NC	TYPE NUMBER	CPS
43350003670	PQ20/20-3C85-A100	PREF
43350003671	PQ20/20-3C85-A160	PREF
43350003672	PQ20/20-3C85-A250	PREF
43350003673	PQ20/20-3C85-A315	PREF
43350003674	PQ20/20-3C85-A400	PREF
43350003675	PQ20/20-3C85-A630	PREF
43350003676	PQ20/20-3F3	PREF
43350003677	PQ20/20-3F3-A100	PREF
43350003678	PQ20/20-3F3-A160	PREF
43350003679	PQ20/20-3F3-A250	PREF
43350003680	PQ20/20-3F3-A315	PREF
43350003681	PQ20/20-3F3-A400	PREF
43350003682	PQ20/20-3F3-A630	PREF
43350003683	PQ26/20-3C81	PREF
43350003685	PQ26/20-3C81-E160	PREF
43350003686	PQ26/20-3C81-E250	PREF
43350003687	PQ26/20-3C81-A315	PREF
43350003688	PQ26/20-3C81-A400	PREF
43350003689	PQ26/20-3C81-A630	PREF
43350003690	PQ26/20-3C81-A1000	PREF
43350003691	PQ26/20-3C85	PREF
43350003693	PQ26/20-3C85-E160	PREF
43350003694	PQ26/20-3C85-E250	PREF
43350003695	PQ26/20-3C85-A315	PREF
43350003696	PQ26/20-3C85-A400	PREF
43350003697	PQ26/20-3C85-A630	PREF
43350003698	PQ26/20-3C85-A1000	PREF
43350003699	PQ26/20-3F3	PREF
43350003701	PQ26/20-3F3-E160	PREF
43350003702	PQ26/20-3F3-E250	PREF
43350003703	PQ26/20-3F3-A315	PREF
43350003704	PQ26/20-3F3-A400	PREF
43350003705	PQ26/20-3F3-A630	PREF
43350003706	PQ26/20-3F3-A1000	PREF
43350003707	PQ26/25-3C81	PREF
43350003709	PQ26/25-3C81-E160	PREF
43350003710	PQ26/25-3C81-E250	PREF
43350003711	PQ26/25-3C81-A315	PREF
43350003712	PQ26/25-3C81-A400	PREF
43350003713	PQ26/25-3C81-A630	PREF
43350003714	PQ26/25-3C81-A1000	PREF

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350003716	PQ26/25-3C85-E160	PREF
43350003717	PQ26/25-3C85-E250	PREF
43350003718	PQ26/25-3C85-A315	PREF
43350003719	PQ26/25-3C85-A400	PREF
43350003720	PQ26/25-3C85-A630	PREF
43350003721	PQ26/25-3C85-A1000	PREF
43350003722	PQ26/25-3F3	PREF
43350003724	PQ26/25-3F3-E160	PREF
43350003725	PQ26/25-3F3-E250	PREF
43350003726	PQ26/25-3F3-A315	PREF
43350003727	PQ26/25-3F3-A400	PREF
43350003728	PQ26/25-3F3-A630	PREF
43350003729	PQ26/'25-3F3-A1000	PREF
43350003730	PQ32/20-3C81	PREF
43350003731	PQ32/20-3C81-E315	PREF
43350003732	PQ32/20-3C81-A400	PREF
43350003733	PQ32/20-3C81-A630	PREF
43350003734	PQ32/20-3C81-A1000	PREF
43350003735	PQ32/20-3C81-A1600	PREF
43350003736	PQ32/20-3C85	PREF
43350003737	PQ32/20-3C83-E315	PREF
43350003738	PQ32/20-3C83-A400	PREF
43350003739	PQ32/20-3C83-A630	PREF
43350003740	PQ32/20-3C83-A1000	PREF
43350003741	PQ32/20-3C85-A1600	PREF
43350003742	PQ32/20-3F3	PREF
43350003743	PQ32/20-3F3-E315	PREF
43350003744	PQ32/20-3F3-A400	PREF
43350003745	PQ32/20-3F3-A630	PREF
43350003746	PQ32/20-3F3-A1000	PREF
43350003747	PQ32/20-3F3-A1600	PREF
43350003748	PQ32/30-3C81	PREF
43350003749	PQ32/30-3C81-E315	PREF
43350003750	PQ32/30-3C81-A400	PREF
43350003751	PQ32/30-3C81-A630	PREF
43350003752	PQ32/30-3C81-A1000	PREF
43350003753	PQ32/30-3C81-A1600	PREF
43350003754	PQ32/30-3C85	PREF
43350003755	PQ32/30-3C85-E315	PREF
43350003756	PQ32/30-3C85-A400	PREF
43350003757	PQ32/30-3C85-A630	PREF

11NC	TYPE NUMBER	CPS
43350003758	PQ32/30-3C85-A1000	PREF
43350003759	PQ32/30-3C85-A1600	PREF
43350003760	PQ32/30-3F3	PREF
43350003761	PQ32/30-3F3-E315	PREF
43350003762	PQ32/30-3F3-A400	PREF
43350003763	PQ32/30-3F3-A630	PREF
43350003764	PQ32/30-3F3-A1000	PREF
43350003765	PQ32/30-3F3-A1600	PREF
43350003766	PQ35/35-3C81	PREF
43350003767	PQ35/35-3C81-E315	PREF
43350003768	PQ35/35-3C81-A400	PREF
43350003769	PQ35/35-3C81-A630	PREF
43350003770	PQ35/35-3C81-A1000	PREF
43350003771	PQ35/35-3C81-A1600	PREF
43350003772	PQ35/35-3C85	PREF
43350003773	PQ35/35-3C85-E315	PREF
43350003774	PQ35/35-3C85-A400	PREF
43350003775	PQ35/35-3C85-A630	PREF
43350003776	PQ35/35-3C85-A1000	PREF
43350003777	PQ35/35-3C85-A1600	PREF
43350003778	PQ35/35-3F3	PREF
43350003779	PQ35/35-3F3-E315	PREF
43350003780	PQ35/35-3F3-A400	PREF
43350003781	PQ35/35-3F3-A630	PREF
43350003782	PQ35/35-3F3-A1000	PREF
43350003783	PQ35/35-3F3-A1600	PREF
43350003802	TC2.5/1.3/0.8-3E5	PREF
43350003803	TC2.5/1.3/0.8-3E6	PREF
43350003805	TC3.9/2/1-3E6	PREF
43350003898	TX74/39/13-3E25	SUP
43350003902	TX51/32/19-3E25	SUP
43350004097	SAMPLEBOX8	DES
43350004194	P9/5-3H1	SUP
43350004195	P9/5-3H1-A63	SUP
43350004196	P9/5-3H1-A100	SUP
43350004198	P9/5-3H1-A250	SUP
43350004199	P9/5-3H1-A63/N	SUP
43350004200	P9/5-3H1-A100/N	SUP
43350004201	P9/5-3H1-A160/N	SUP
43350004202	P9/5-3H1-A250/N	SUP
43350004203	P11/7-3H1	SUP

Conversion list

11NC to type number

11NC	TYPE NUMBER	CPS
43350004204	P11/7-3H1-A100	SUP
43350004205	P11/7-3H1-A160	SUP
43350004206	P11/7-3H1-A250	SUP
43350004207	P11/7-3H1-A100/N	SUP
43350004208	P11/7-3H1-A160/N	SUP
43350004209	P11/7-3H1-A250/N	SUP
43350004211	P14/8-3H1	SUP
43350004212	P14/8-3H1-A160	SUP
43350004213	P14/8-3H1-A250	SUP
43350004214	P14/8-3H1-A315	SUP
43350004216	P14/8-3H1-A160/N	SUP
43350004217	P14/8-3H1-A250/N	SUP
43350004218	P14/8-3H1-A315/N	SUP
43350004221	P18/11-3H1	SUP
43350004222	P18/11-3H1-E160	SUP
43350004223	P18/11-3H1-A250	SUP
43350004233	P22/13-3H1	SUP
43350004234	P22/13-3H1-E160	SUP
43350004235	P22/13-3H1-E250	SUP
43350004236	P22/13-3H1-A315	SUP
43350004237	P22/13-3H1-A400	SUP
43350004238	P22/13-3H1-A630	SUP
43350004239	P22/13-3H1-E160/N	SUP
43350004240	P22/13-3H1-E250/N	SUP
43350004241	P22/13-3H1-A315/N	SUP
43350004242	P22/13-3H1-A400/N	SUP
43350004243	P22/13-3H1-A630/N	SUP
43350004245	P26/16-3H1	SUP
43350004246	P26/16-3H1-E160	SUP
43350004247	P26/16-3H1-E250	SUP
43350004248	P26/16-3H1-E315	SUP
43350004249	P26/16-3H1-A400	SUP
43350004250	P26/16-3H1-A630	SUP
43350004251	P26/16-3H1-E160/N	SUP
43350004252	P26/16-3H1-E250/N	SUP
43350004253	P26/16-3H1-E315/N	SUP
43350004254	P26/16-3H1-A400/N	SUP
43350004255	P26/16-3H1-A630/N	SUP
43350004369	E55/28/21-3F3	DES
43350004412	P30/19-3H1-E250	SUP
43350004413	P30/19-3H1-E315	SUP
43350004414	P30/19-3H1-E400	SUP
43350004415	P30/19-3H1-A630	SUP
43350004416	P30/19-3H1-A1000	SUP
43350004418	P36/22-3H1	SUP
43350004419	P36/22-3H1-E315	SUP
43350004420	P36/22-3H1-E400	SUP
43350004421	P36/22-3H1-E630	SUP
43350004422	P36/22-3H1-A1000	SUP
43350004423	P36/22-3H1-A1600	SUP
43350004425	P42/29-3H1	SUP
43350004426	P42/29-3H1-E315	SUP
43350004427	P42/29-3H1-E400	SUP
43350004428	P42/29-3H1-E630	SUP
43350004429	P42/29-3H1-E1000	SUP
43350004430	P42/29-3H1-A1600	SUP
43350004479	PQ26/25-3C85	PREF
43350005778	P36/22-3H1-E400/N	SUP
43350005779	P36/22-3H1-A1000/N	SUP
43350005803	EFD20-3F3-A100-S	DES
43350005804	EFD20-3F3-A250-S	DES
43350005811	P30/19-3H1	SUP
43350005820	P30/19-3H1-A1000/N	SUP
43350005855	P30/19-3H1-A630/N	SUP
43350005856	P30/19-3H1-E250/N	SUP
43350005857	P30/19-3H1-E315/N	SUP
43350005858	P30/19-3H1-E400/N	SUP
43350005859	P36/22-3H1-A1600/N	SUP
43350005860	P36/22-3H1-E315/N	SUP
43350005861	P36/22-3H1-E630/N	SUP
43350005862	P42/29-3H1-A1600/N	SUP
43350005863	P42/29-3H1-E1000/N	SUP
43350005864	P42/29-3H1-E315/N	SUP
43350005865	P42/29-3H1-E400/N	SUP
43350005866	P42/29-3H1-E630/N	SUP
43350005867	RM10/I-3E5	PREF
43350005868	RM8/I-3E5	PREF
43350005869	TX61/36/13-3E27	PREF
43350005871	RM6R-3H1	SUP
43350005872	RM6R-3H1-A160	SUP
43350005873	RM6R-3H1-A250	SUP
43350005874	RM6R-3H1-A315	SUP

Conversion list — 11NC to type number

11NC	TYPE NUMBER	CPS
43350005875	RM6R-3H1-A400	SUP
43350005876	RM6R-3H1-A630	SUP
43350005878	RM8-3H1	SUP
43350005879	RM8-3H1-E250	SUP
43350005880	RM8-3H1-A315	SUP
43350005881	RM8-3H1-A400	SUP
43350005882	RM8-3H1-A630	SUP
53350004197	P9/5-3H1-A160	SUP

DATA HANDBOOK SYSTEM

Data handbook system

DATA HANDBOOK SYSTEM

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Our data handbook titles are listed here.

Display components

Book	*Title*
DC01	Colour Television Tubes
DC02	Monochrome Monitor Tubes and Deflection Units
DC03	Television Tuners, Coaxial Aerial Input Assemblies
DC04	Colour Monitor and Multimedia Tubes
DC05	Wire Wound Components

Magnetic products

MA01	Soft Ferrites
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MA04	Dry-reed Switches

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PA04	Variable Capacitors
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PA06b	Leaded Ceramic Capacitors
PA08	Fixed Resistors
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PA11	Quartz Oscillators

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Integrated circuits

Book	*Title*
IC01	Semiconductors for Radio, Audio and CD/DVD Systems
IC02	Semiconductors for Television and Video Systems
IC03	Semiconductors for Wired Telecom Systems
IC04	HE4000B Logic Family CMOS
IC05	Advanced Low-power Schottky (ALS) Logic
IC06	High-speed CMOS Logic Family
IC11	General-purpose/Linear ICs
IC12	I^2C Peripherals
IC13	Programmable Logic Devices (PLD)
IC14	8048-based 8-bit Microcontrollers
IC15	FAST TTL Logic Series
IC16	CMOS ICs for Clocks and Watches
IC17	Semiconductors for Wireless Communications
IC18	Semiconductors for In-Car Electronics
IC19	ICs for Data Communications
IC20	80C51-based 8-bit Microcontrollers
IC22	Multimedia ICs
IC23	BiCMOS Bus Interface Logic
IC24	Low Voltage CMOS & BiCMOS Logic
IC25	16-bit 80C51XA Microcontrollers (eXtended Architecture)
IC26	IC Circuit Packages
IC27	Complex Programmable Logic Devices

Discrete semiconductors

SC01	Small-signal and Medium-power Diodes
SC02	Power Diodes
SC03	Power Thyristors and Triacs
SC04	Small-signal Transistors
SC05	Video Transistors and Modules for Monitors
SC06	High-voltage and Switching NPN Power Transistors
SC07	Small-signal Field-effect Transistors
SC13a	PowerMOS Transistors including TOPFETs and IGBTs
SC13b	Small-signal and Medium-power MOS Transistors
SC14	RF Wideband Transistors
SC16	Wideband Hybrid IC Modules
SC17	Semiconductor Sensors
SC18	Discrete Semiconductor Packages
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Finland: ESPOO, Tel. +358 9 615800, Fax. +358 9 61580920
France: SURESNES, Tel. +33 1 40 99 6161, Fax. +33 1 40 99 6427
Germany: HAMBURG, Tel. +49 40 23 53 60, Fax. +49 40 23 536 300
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Indonesia: see Singapore
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Romania: see Italy
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Slovakia: see Austria
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