

ecom

Mobile Computing



Communication



Measuring & Calibration



Torches



2005

**Mobile solutions
for -treme tasks**

Our expertise is in ensuring your safety

Dear **ecom** customer,

The **ecom Group** is a world-wide supplier of portable equipment for industrial application in potentially-explosive areas.

The product range comprises portable handlamps and torches, auxiliary and test devices, data loggers, measuring equipment, calibrators and communication equipment such as two-way radios and mobile telephones.

Our robust, industrial-duty PDA, the **i.roc** x10-Ex, is the latest in our "**mobile computing**" product range and further closes the gap in I.T. communication. Mobile data recording utilising RFID and barcode, as well as W-LAN, Bluetooth and IRDA is now well and truly here!

Our development department designs our highly-professional hardware and as **ecom engineering**, also offers 'Ex' know-how in the form of external engineering services. **ecom WEBfactory** is our proprietary software house. **ecom WEBfactory** draws on extensive experience in the development of professional software for industrial use, designs software for our own products and also offers highly-professional software solutions to suit your particular requirements.

ecom engineering and **ecom WEBfactory** guarantee complete solutions from just one source.

ecom instruments is our largest division and comprises production, world-wide distribution and product support.

With more than 20 years experience in this industry, the **ecom Group** now looks after over 15,000 customers. The head office is based in Assamstadt, Germany and there are eight subsidiary companies located world-wide.

ecom instruments, **ecom engineering** and **ecom WEBfactory** are three strong pillars on which you can trust.

Professional hardware, software and a distribution service backed by professional product support - all from ecom!

Please contact us, we'll be happy to advise you.

Further information can also be found at: www.ecom-ex.com

Thank you

your

ecom Team

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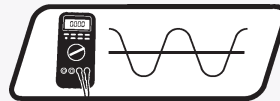
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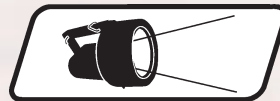


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Your complete solution under one roof



The development of the innovative business ecom instruments is distinguished by its reputation for professionalism, high competence and utmost reliability in the provision of intrinsically safe solutions to difficult tasks in hazardous areas.

Through their knowledge and extensive experience of intrinsic safety, the team of competent development engineers, advisers and project leaders provide an ideal partnership for the petro-chemical industry.



ecom engineering, established in January 2002 with 15 development engineers and technicians, offers:

- Comprehensive Ex-technology consulting
- Ex-modification of standard products
- Custom-made, customer-specific Ex-solutions



The name is what it stands for: engineering and software development for applications of automation. The regulation and management of processes as well as their control and supervision and the analysis and archiving of the relevant data are part of the core competences of **ecom WEBfactory**. Our company has outstanding knowledge of Internet communication.

ecom WEBfactory is the software developer within the **ecom group**





Ex-designation

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Ex designation

T6

Temperature Class:

Group II electrical operating devices are split into temperature classes according to the maximum surface temperatures at which the Ex-atmosphere can be achieved. Equipment is temperature classified as follows:

Maximum permitted housing or component temperature of the operating devices

T1	T2	T3	T4	T5	T6
450°C	300°C	200°C	135°C	100°C	85°C

IIC

Explosion groups:

The equipment group, amongst other items, appears again in this Designation Section. Group I comprises operating devices for coal mining where coal dust and methane atmospheres prevail.

Group II applies to the "aboveground" areas such as chemistry, petrochemistry, mills (dusts) etc. Due to the different minimum ignition energies of the various gases, there is a further division into the categories **IIA** to **IIC** for the ignition protection classes "personal safety", "pressure resistant casing" and "sand casing"

ia

CENELEC marking	Type of Gas	ignition energy/μJ
I	methane	280
IIA	propane	> 180
IIB	ethylene	60 ... 180
IIC	hydrogen	< 60

EEx

Type of protection:

In areas where the occurrence of an explosive mixture of flammable materials and air cannot be prevented by applying primary explosion protection, special measures for the prevention of ignition sources are to be taken. For example: separation (o, q, m), exclusion (p), special mech. construction (d, e), limitation of energy (ia, ib) or other methods (s).

Explosion protection certified to CENELEC de-jure standard EN 50...

Conformity designations:

The operating device complies with the valid EN de-jure standards.

"Ex"

The operating device comprises features that guarantee at least the same safety level as that required by the European Standards.

e.g.: *The operating device complies with the valid de-jure standards according to the world-wide IEC de-facto Standard.*

1G

Use in hazardous areas:

Equipment which are certified according to Directive 94/9/EC (ATEX 95 – replacing: ATEX 100a) regulations carries a special marking. The device group appears first, then the device category and finally the atmosphere reference: **(G)**as and **(D)**ust

II 1

For category II, the following classification applies:

Category 1 very high degree of safety

Safety is provided by 2 protective measures – even in cases of rarely occurring machine errors or 2 independent machine errors.

Application in zones 0, 1, 2 or 20, 21, 22, atmosphere G/D

Category 2 high degree of safety

sufficient safety in cases of frequent machine errors/ in cases of 1 error

Application in zones 1, 2 or 21, 22, atmosphere G/D

Category 3 normal degree of safety

sufficient safety in cases of failure-free operation

Application in zone 2/22, atmosphere G/D* (*non-conductive dusts)



Prototype tested in accordance with RL 94/9/EG

(General provisions for the design and testing of electrical equipment which are designed for the ex-range)

ATEX (Atmosphere Explosive)

94/9/EC Directive

Harmonises legal provisions of member states for devices and protection systems for designated use in potentially explosive areas.

New: ATEX 95 (Old: ATEX 100a)

1999/92/CE Directive

Minimum requirements for improving the health and safety protection of the worker at risk from explosive atmospheres.

New: ATEX 137 (Old: ATEX 118a)

Designation examples:

Use in gaseous atmospheres: II 1 G EEx ia IIC T4

Use in dusty atmospheres: II 2 D T90°C IP64

Use for mining applications: I M2 EEx ia I

Max. surface temperature

(Data for devices used in areas rendered potentially explosive by dust - rarely also used in gas ex marking.)

Maximum temperature of a surface during a machine error (normal operation in the case of category 3 devices) that can be reached by the ex atmosphere.

Evaluation by the user:

- Limit temperature 1 = 2/3 of min. ignition temperature of dust present
- Limit temperature 2 = min. glow temperature of dust present minus 75k (applies for layer thicknesses of up to 5mm)

The smaller value for the limit temperature must be above the indicated max. surface temperature of the device.

IP Code

(Data only for devices used in areas rendered potentially explosive by dust)

Figure 1 Contact and foreign body protection:

- 5 = Protection against dust deposits
- 6 = protection against dust penetration

Figure 2 Water protection

Protection against:

- 0 = (no protection)
- 1 = vertically falling drip water
- 2 = drip water on operating device inclined to 15°
- 3 = spray water
- 4 = spray water
- 5 = jet water
- 6 = strong jet water
- 7 = temporary immersion
- 8 = continuous immersion



Device group

- I = Mining
- II = all other explosive areas

Category

- 1 = can be used in Zones 0 or 20
- 2 = can be used in Zones 1 or 21
- 3 = can be used in Zones 2 or 22
- M1 = Mining
(In case of firedamp, continuation of operation is possible)
- M2 = Mining
(Must be switched off in case of firedamp)

Atmosphere

- G = Gas
 - D = Dust
- (Mining – no details)

Types of ignition protection:

- o = Oil immersion
- p = pressurisation
- q = Powder filling
- d = Pressure-proof housing
- e = Increased safety
- ia = Intrinsic safety
(required for Zone 0*)
*depends on device category
- ib = Intrinsic safety
(adequate for Zone 1 (+2))
- m = Encapsulation
- s = Special protection
- n = Normal operation under normal conditions
(for Zone 2 only)
- nA = non-sparking
- nC = protected contacts
- nR = vapour-proof housing
- nL = limited energy
- nP = simplified

Temperature classes:

(Max. temperature of a surface that gas can penetrate in the event of device failure. Should not be used in dust-ex-markings.)

- T1 = 450°C
- T2 = 300°C
- T3 = 200°C
- T4 = 135°C
- T5 = 100°C
- T6 = 85°C

Explosion group

(Data only for devices used in areas rendered potentially explosive by gas)

- I = Methane (mining)
- IIA = Propane
- IIB = Ethylene
- IIC = most dangerous group
(e.g. hydrogen)



Ex designation

Explosion Protection

The important principles for integrated safety explosion protection are as follows:

1. Measures are taken to avoid hazardous atmospheres whenever possible.
2. Measures are taken which prevent the ignition of hazardous atmospheres.
3. Measures are taken which limit the explosive effect to a safe degree.

This differs from:

Primary explosive protection:

These are precautions taken to prevent or restrict the formation of hazardous explosive atmospheres.

Secondary explosive protection:

This covers the second group of measures, which are intended to prevent the ignition of an atmosphere that is capable of exploding.

Definition in accordance with 1999/92/EC Directive (ATEX 137)	Reference values (not standardised)	Zone	A device from the following device category <u>must</u> be used (see 1999/92/EC – ATEX 137 Directive):	e
Area in which a potentially explosive atmosphere as a mixture of air and flammable gases, vapours or mists is present either frequently or over a prolonged period.	> 1000 h/a	0	1	G
Area in which under normal operation a potentially explosive atmosphere as a mixture of air and flammable gases, vapours or mists can occasionally form.	10 ... 1000 h/a	1	2 (IG also possible)	G
Area in which under normal operation a potentially explosive atmosphere as a mixture of air and flammable gases, vapours or mists is not normally present but may occur for just a short period.	<10 h/a	2	3 (IG, 2G also possible)	G
Area in which a potentially explosive atmosphere in the form of a cloud of flammable air-borne dust is present either constantly, over prolonged periods or frequently.	> 1000 h/a	20	1	D
Area in which under normal operation a potentially explosive atmosphere in the form of a cloud of flammable air-borne dust can occasionally form.	10 ... 1000 h/a	21	2 (ID also possible)	D
Area in which under normal operation a potentially explosive atmosphere in the form of a cloud of flammable air-borne dust is not normally present although may occur for just a short period	<10 h/a	22	3 (ID, 2D also possible)	D

Ex designation

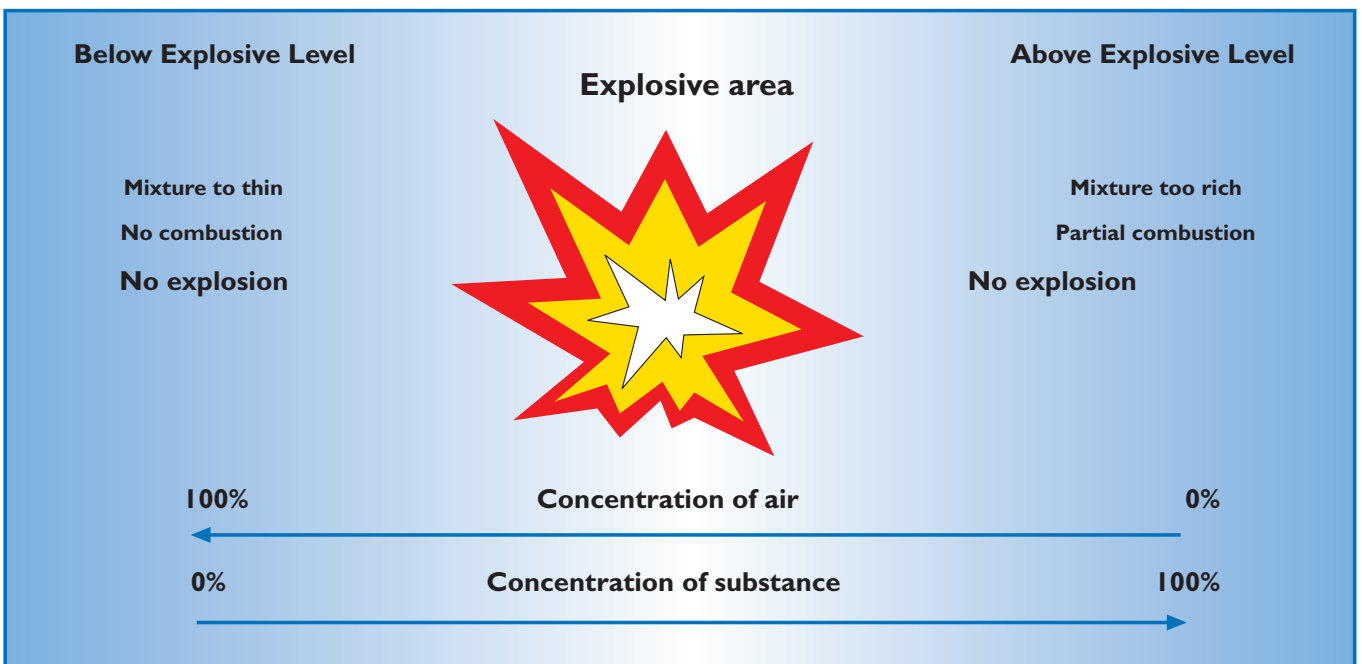
Division into Temperature Classes

The temperature class indication can be guaranteed only if the ambient temperature specified for the operating device is respected (see Technical Data or Rating Plate). Strict compliance is a mandatory requirement.

Once the maximum surface temperature of any apparatus reaches the ignition temperature of the surrounding hazardous atmosphere an explosion can occur.

Because of this, all equipment classified to Group II is divided into temperature classes. To allow for the possibility of potential hazardous atmospheres, the lowest ignition temperature must always be higher than the maximum surface temperature.

Temperature classes of flammable gases and vapours and permitted surface temperatures of the operating device in accordance with DIN EN 50014						
Temperature class	T1	T2	T3	T4	T5	T6
Ignition temperature in °C	>450	>300	>200	>135	>100	>85
Maximum Surface temperature in °C	450	300	200	135	100	85
E.g.	Propane Methane Ammonia	Ethylene Alcohols Acetylene	Petrol Solvents	Ethylether Acetaldehyde	-	Carbon- disulphide



Explosions are dependent on many parameters.

For only atmospheric conditions and pure substances sufficient comparative values and data are shown. An explosion can only occur where a flammable substance in the form of gases, vapours, smoke and dust exists along with sufficient oxygen to support combustion and there is a source of ignition.

e.g.

- Hydrogen 4,0 to 77,0 % in air
- Ammonia 15,4 to 33,6 % in air

- Propane
- Methane

- 1,7 to 10,6 % in air
- 4,4 to 16,5 % in air



Fundamentals of dust explosion protection

Fundamental principles:

The manufacturer of operating devices for areas rendered potentially explosive through dust must indicate the maximum surface temperature of all devices that dust can penetrate (usually expressed in °C – indication of the temperature class should be avoided here). This temperature is part of the dust Ex-designation.

Designation examples:

II 2 D T90°C IP64

(If the ignition protection type is based on the housing, the housing protection rating should also be stated as an IP Code).
or II 2 D Ex iaD 2I T96°C

(This device has already been approved according to the new IEC de-jure standard "Intrinsic Dust Safety) – "iaD". This de-jure standard specifies that the designation also contains the corresponding zone – in this case 2I)

Dust explosion protection – temperature:

Combustion and explosion parameters for dusts depend on their condition. Parameters that affect combustion and explosion behaviour include particle size, particle shape, water content, purity and where applicable the content of the flammable solvents. The particle size distribution and the mean value (value for average particle size) should also be known.

In accordance with 1999/92/EG Directive (ATEX 137, replacing ATEX 118a), the system operator / employer is obliged to make a hazard assessment and must therefore be aware of the minimum glow temperature of the dust.

There are simple calculations to determine the two "temperatures" and they are carried out thus:

- Limit temperature 1 = 2/3 of minimum ignition temperature
- Limit temperature 2 = minimum ignition temperature* minus 75°K

These two limit temperatures must now be examined to confirm which guarantees the greater safety.

Example 1:

Minimum ignition temperature = +330°C, minimum glow temperature = +300°C:

- Limit temperature 1 = $\frac{2}{3} \times +330^\circ\text{C} = +220^\circ\text{C}$
- Limit temperature 2 = $+300^\circ\text{C} - 75^\circ\text{K} = +225^\circ\text{C}$

Greater safety: Limit temperature (1) = +220°C

Here a device with a max. surface temperature in the event of failure $\leq +220^\circ\text{C}$ must be used. As stated, the device designation includes a corresponding value.

Example 2: Minimum ignition temperature = +186°C, minimum glow temperature = +180°C:

- Limit temperature 1 = $\frac{2}{3} \times +186^\circ\text{C} = +124^\circ\text{C}$
- Limit temperature 2 = $+180^\circ\text{C} - 75^\circ\text{K} = +105^\circ\text{C}$

Greater safety: Limit temperature (2) = +105°C

Here a device with a max. surface temperature in the event of failure $\leq +105^\circ\text{C}$ must be used.

*The value for the glow temperature applies with a dust layer thickness of 5mm. The temperature safety distance must be increased for larger layer thicknesses.

Special case – Category 3 devices

In contrast to Category 1 and 2 devices, potential hazards in the event of failure (e.g. short circuiting, connection break etc.) do not have to be considered for Category 3 devices (for use only in Zones 2 respectively 22). The device is evaluated only in respect of hazards during normal operation. It is relatively unlikely that the device should fail at the same time as a short-term explosive atmosphere is present. No EC Type Approval Test Certificate is therefore required for Category 3 operating devices. The manufacturer may confirm that the operating device complies with the relevant standard. Nonetheless, even Category 3 devices are still tested by a certified centre and ecom is then awarded a declaration of conformity.

(- Of course, Category 2 operating devices also offer significantly greater safety in Zones 2 respectively 22.)

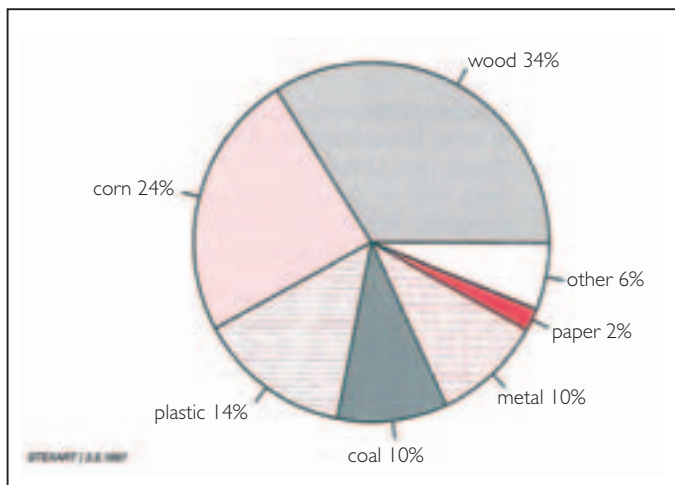
Fundamentals of dust explosion protection

Dust explosions – albeit of a predominantly minor nature – occur relatively frequently.

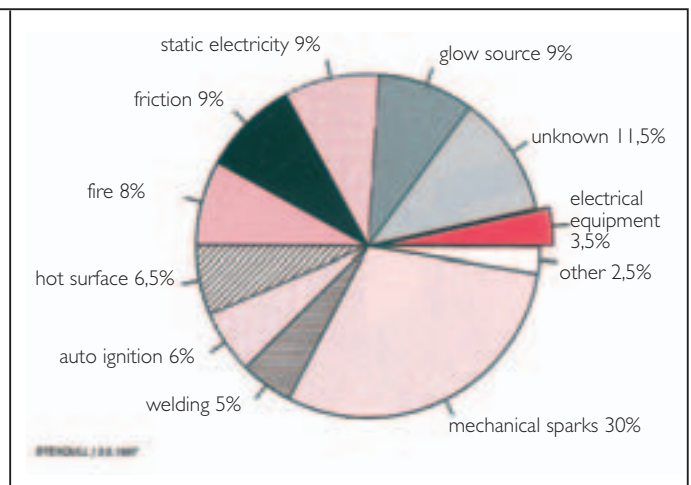
A leaflet issued by the Government Safety Organisation of the Federal Republic of Germany states:

“According to documentation published by property insurers, it can be assumed that an average of one dust explosion per day occurs in the Federal Republic of Germany; around one in four of these explosions are caused by foodstuff or animal feed dusts.”

Dust explosions are a world-wide problem. Between 1980 and 1990 in the USA, for example, some 200 serious foodstuff or animal feed related dust explosions were recorded, causing 54 deaths, 256 injuries and property damage amounting to 165 million US dollars.



**Figure 1.1
Dust explosions by dust type

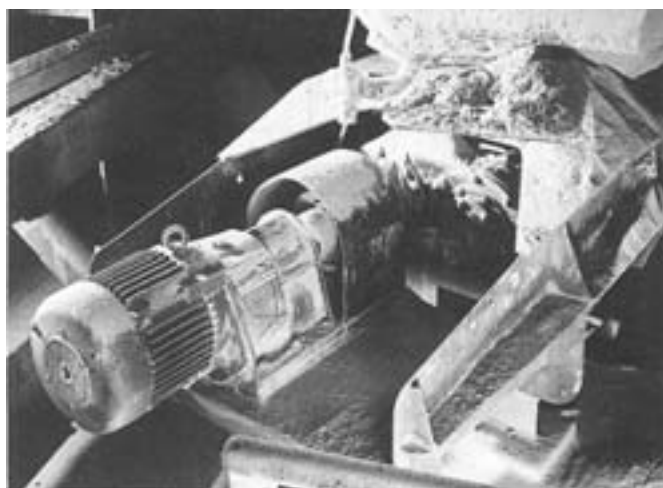


**Figure 1.2
Ignition sources by electrical operating device type

Electrical operating devices represent only a small proportion of the ignition sources found to cause dust explosions – not least due to the safety stipulations in the regulations for erecting electrical plants in potentially-explosive areas.

The introduction of the (Regulation on electrical plants in potentially-explosive areas) – ElexV" [1.4] in 1980 specified a type examination certificate for electrical operating devices used in Zone 10 (from 01.07.2003 in Zones 20 and 21).

“Dust explosion-protected” operating devices, the surface temperatures of which lies below the acceptable limit for standardised dust thickness of 5mm, can, despite the existence of an official test certificate, become a danger source if, contrary to the conditions, they become covered or completely encased with a thick layer of dust.



Dust explosion protection therefore, more than gas explosion protection, depends on the correct device option, the application conditions and a regular monitoring and maintenance routine.

**Figure 1.3
Example of heavy dust deposits on a screw conveyor.

** Pictures graphics and some text extracts with the kind approval of Danfoss Bauer GmbH and the author of the article entitled "Explosion protection for gear motors", Helmut Greiner.



Types of ignition protection

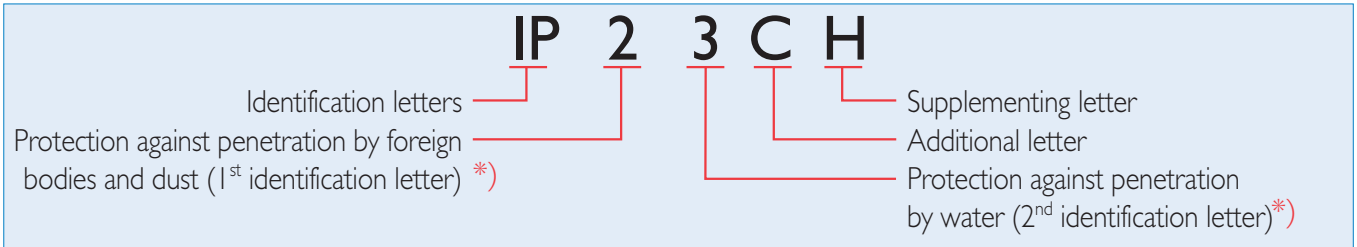
Ignition protection type "n"

Ignition protection type n is applicable only for Category 3 operating devices used in areas rendered potentially explosive by gases. Because only normal operation and no equipment failures are considered here, small differences occur in the designation for ignition protection type:

- nA non-sparking electrical equipment (revolving machines, fuses, lamps, gauges and equipment with low energy)
- nC Sparking equipment or equipment with hot surface under operating conditions (closed indexing mechanism and non-ignitable components, air-tight equipment, leak-proof sealed equipment.
- nR vapour-proof casing
- nL equipment and circuit with limited energy
- nP simplified overpressure casing

Form of ignition protection	Schematic description	Basic principle	standard
General		General provisions for the design and testing of electrical equipment which is designed for the ex range	EN 50014
Increased safety	e 	Only applies to equipment or the components of which usually do not generate sparks or arcs, do not adopt dangerous temperatures and the mains voltage of which does not exceed 1 kV.	EN 50 019 IEC 60 079-7 FM 3600 UL 2279
Pressure-proof casing	d 	In the case of an ignition inside the casing, the explosion is contained within the casing.	EN 50 018 IEC 60 079-1 FM 3620 UL 2279
Pressurisation	p 	ignition source is sealed in by an ignition protection gas which is under overpressure (mind. 0.5 mbar) Ignition protection gas – the environment atmosphere cannot enter.	EN 50016 IEC 60 079-2 FM 3620 NFPA 496
Intrinsic safety	i 	By restriction of the energy in the circuit the development of inadmissibly high temperatures, ignition sparks and arcs are avoided.	EN 50 020 IEC 60 079-11 FM 3610 UL 2279
	Explanation in detail:	ia = Application in zones 0, 1, 2* ib = Application in zones 1, 2* [ia] = Application of the corresponding equipment in zones 0, 1, 2* [ib] = Application of the corresponding equipment in zones 1, 2* (*depends on device category)	
Oil immersion	o 	Equipment or parts of the equipment are put into an oil casing – by which they are separated from the ex atmosphere	EN 50 015 IEC 60 079-6 FM 3600 UL 2279
Powder filling	q 	ignition source encased by fine-grained sand – the environment ex atmosphere cannot be ignited by an arc.	EN 50 017 IEC 60 079-18 FM 3600
Encapsulation	m 	By encapsulating the ignition source into a grouting material, it cannot ignite an ex atmosphere.	EN 50 028 IEC 60 079-18 FM 3600 UL 2279
Non-incendive	n zone 2 In this form of ignition protection multiple methods of ignition protection are combined.	Slightly simplified application of other zone-2 forms of ignition protection – "n" stands for "non-incendive"	EN 50 021 IEC 60 079-15

IP Degree of protection



*) Should no degree of protection be specified, then the characters are replaced with the letter X e.g. **IP X4**

1. ident letter	Degree of protection	Symbol
0	No protection	
1	Protection against penetration by large foreign bodies, $\varnothing > 50$ mm No protection against intentional access	
2	Protection against small foreign bodies, $\varnothing > 12,5$ mm, exclusion of fingers or similar objects	
3	Protection against small foreign bodies, $\varnothing > 2,5$ mm, exclusion of tools, wires or similar objects	
4	Protection against grainy foreign bodies, $\varnothing > 1$ mm, exclusion of tools, wires or similar objects	
5	Protection against dust deposits (dust protected), complete exclusion of access.	
6	Totally protection against dust deposits (dust protected), complete exclusion of access.	

2. ident letter	Degree of protection	Symbol
0	No protection	
1	Protection against drops of water falling vertically (water drop)	
2	Protection against water falling at an angle (water drop), inclined at 15° to the normal operating position	
3	Protection against water spray, up to 60° from the vertical	
4	Protection against water splashes from any direction	
5	Protection against water jet from any direction	
6	Protection against heavy sea or strong water jet (Flooding protection)	
7	Protection against submersion in water at a certain pressure and for a certain period	
8	Protection against continuous submersion in water	

Additional letter	Significance (facultative)
A	Back of the hand
B	Finger
C	Tools
D	Wire

Supplementing letter	Significance (facultative)
H	High voltage apparatus
M	Machine running
S	Machine not running
W	Weather conditions



Division into zones

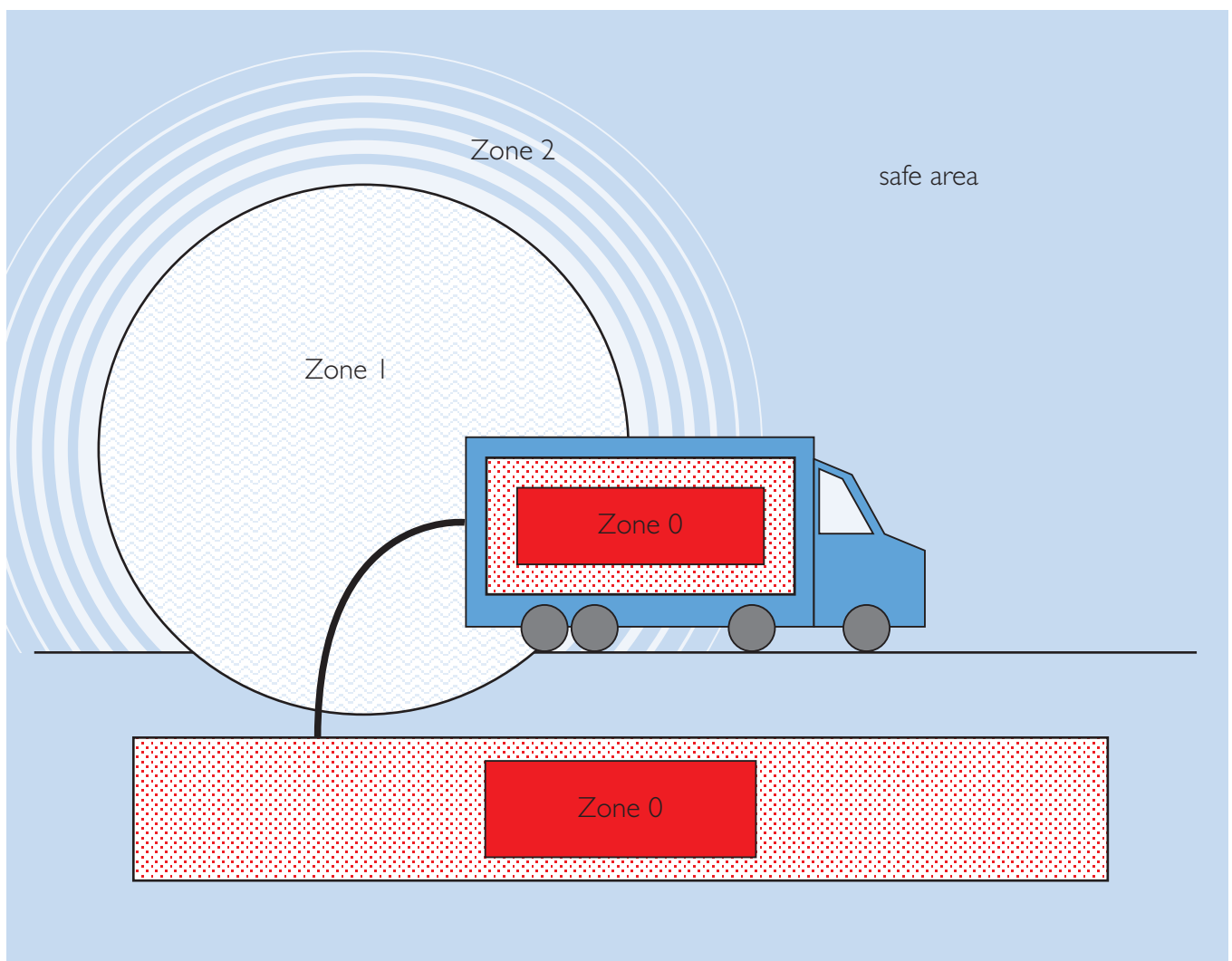
Safety is our 1st priority

At all places where inflammable substances are produced, processed, transported or stored, safety is extremely important – especially in the chemical and petrochemical industry, in oil and natural gas production and in mining.

In order to provide the highest level of safety possible, most states' legislations have developed corresponding conditions in the form of laws, regulations and standards. In the course of globalisation, enormous progress could be made in uniform guidelines for explosion protection. It is the European Union that is leading the way: The 94/9/EG guideline lays the foundation for a complete unification. As of 01 July 2003, all new devices must be approved in accordance with this guideline.

Meaning of the zone classification:

- Zone 0/20:** Danger is always present, for a long time or frequently
- Zone 1/21:** Danger is occasionally present
- Zone 2/22:** Danger is seldom present or present for a short time



Quality Assurance - Production

Physikalisch-Technische Bundesanstalt



(German national metrology institute providing scientific and technical services)
Braunschweig and Berlin



(1) **Notice**
of the recognition of the quality assurance of the production

(2) Devices or protective systems or components for the conventional use in explosive areas –
Guideline 94/9/EG



(3) Notice Number: **PTB 97 ATEX Q013-3**

(4) Product group(s): Test devices, tools, calibrators, gauges, registers and communication in the determining form of ignition protection “intrinsic safety” as well as the forms of ignition protection “pressure resistant casing”, “increased safety”, “sand casing” und “grouting casing”

The centre in question keeps a list of the EG prototype verification certificates, that this notice applies to.

(5) Applicant: ecom instruments GmbH
Industriestraße 2, 97959 Assamstadt, Deutschland

(6) Manufacturer: ecom instruments GmbH
Industriestraße 2, 97959 Assamstadt, Deutschland

(7) The Physikalisch-Technische Bundesanstalt (PTB), named centre no. 0102 for appendix IV in accordance with article 9 of the guideline of the Council of the European Communities 94/9/EG of 23 March 1994, informs the applicant of the fact that the manufacturer has a quality assurance system for the production that complies with appendix IV of this guideline.

(8) This notice is based on a confidential audit report no. 03-23343, certified on 2003-12-05. The notice is valid until 2006-10-05 and can be retracted if the manufacturer does not fulfill the requirements of appendix IV anymore.

The results of the regular inspection of the quality assurance system are part of this notice.

(9) In accordance with article 10 (1) guideline 94/9/EG the identification number 0102 is to be stated behind the CE-marking of the PTB as the named centre, that takes effect in the production surveillance phase.

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor



Braunschweig, 5. Dezember 2003

Seite 1/1



ZERTIFIKAT ♦ CERTIFICATE ♦ 認證證書 ♦ CERTIFIKAT ♦ CERTIFICADO ♦ CERTIFICAT



CERTIFICATE

The Certification Body
of TÜV Management Service GmbH

certifies that

**ecom instruments GmbH
&
ecom engineering GmbH**

Industriestraße 2
D-97959 Assamstadt

has established and applies

**ecom instruments:
Sales and Manufacturing of Measuring Instrumentation
and Systems for Explosion Hazardous Areas**

**ecom engineering:
Development of Measuring Instrumentation and
Systems for Explosion Hazardous Areas**

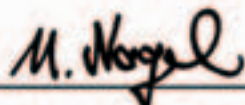
ein Qualitätsmanagementsystem
eingeführt hat und anwendet.

An audit was performed, Report No. **70021515**
Proof has been furnished that the requirements
according to

ISO 9001: 2000

are fulfilled. The certificate is valid until **2008-02-06**

Certificate Registration No. **12 100 15975 TMS**


München, 2005-02-11



TGA-ZM-07-92

TÜV Management Service GmbH - TÜV SÜD Gruppe - Zertifizierstelle - Ridlerstrasse 65 - 80339 München - Germany



Mobile Computing



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Mobile Computing / Possible applications

Trend-setting success

The success of our industrial PDA **i.roc** x10 is an excellent example of how the use of mobile solutions can help optimise profitability and efficiency of your company.

Irrespective of the size and type of business, there exists opportunities to further optimise production flow and data transfer. Customised and wisely applied mobile information technology can detect and utilise these opportunities, thus making the company more profitable.

For the process control level this means identifying and diagnosing faults always, and everywhere, in order to subsequently make the right decision for the further flow of production.

On management level intelligent information systems can avoid standstill and scrap, improve the performance of the production and thus guide the company to higher efficiency.

Application of state-of-the-art technology

The X-Scale processor, the operator interface featuring Windows mobile 2003, the impact resistant TFT display with touch-screen function and the extensive equipment make the **i.roc** x10 a perfect tool.

The **i.roc** product concept is impressive, with its innovative power and flexibility allowing the early adoption and application of new ways of working in Ex-areas. The long term product strategy with HP further guarantees investment security for our clients.

Versatility by flexibility

ecom instruments already provide customised and flexible solutions for mobile applications in a variety of industries and economy in co-operation with partners such as HP, Deister electronics, microsensys and Barcodat.

If you have a requirement for a tailored solution - please contact us.



Intrinsically-SAFE PDA **i.roc** 61 * -Ex with barcode imager module (see page 24)

Possible applications

- | | |
|----------------------------|---------------------------------|
| • Visualising of processes | • Logistics |
| • Water treatment | • Management Information System |
| • Maintenance | • Mobile internet access |
| • Quality assurance | • Commissioning |
| • Service sector | • BOS |



Ex-safe PDA **i.roc** 51 * -Ex while process visualising (see **ecom Webfactory** pages 82-88)



Industrial PDA **i.roc** 41 * as production data acquisition terminal (PDA)

Mobile Computing / Highlights

Concept

Many PDAs provide the possibility to integrate barcode scanners or RFID reading devices via CF card slot. The **i.roc** x10 features the considerably more flexible way of integrating modules by interface into an individually designed casing. The dust proof. The dustproof and water-proof casing, consisting of three parts, facilitates customised hardware.

Active and passive RFID Tags

Especially when using RFID the customer and his application finally decide which kind of frequency, tags and reading devices are used. In cooperation with solution partners **ecom instruments** has developed optimised RFID modules especially for mobile application. These guarantee the highest level of flexibility and freedom of decision.

2D bar code image scanner

All common linear bar codes as well as 2D codes with high amounts of data and integrated security features, such as Aztec or DataMatrix, can be read directly.

Complete labels can easily and rapidly be scanned using the integrated CMOS camera. According to the needs and requirements of the client also other reading systems, like classic laser scanners, can be applied.

Interfaces

With the demand for efficiency of production and logistics, it is essential that high quality radio transmission solutions are available. The **i.roc** x10 provides...area, so that the latest technology can be applied. Depending on individual requirements, different ways of communication can be selected on the **i.roc** x10.

Online access can allow direct access into the company. Both WLAN and Bluetooth interfaces are integrated as standard, allowing serial point to point connections or network access.



Handwriting recognition for verification of data



Bluetooth connection for data transfer

Highlights

- ruggedised (robust, IP65)
- flexibly applicable
- extensive equipment
- individual solutions for customers (even for low quantity requirements)
- integrated WLAN and Bluetooth
- handwriting recognition
- one-hand operation
- open system platform for easy integration

powered by



Radio transmission techniques like WLAN allow wireless control as well as working from a distance



Technical description

Extended front housing

for options such as Barcode-Imager and RFID Reader or other customer specific Modules

Dust- and water-tight, housing IP 65



LED indicators for charging and connectivity status

3,5" TFT display with 64,000 colours depth protected by a Makrolon™ panel

System software Windows Mobile 2003 for easy integration of applications

Standard keyboard with 5-way navigation field and 5 programmable keys

Microphone and loudspeaker



Optional Hand Loop for safe and secure handling in all weathers

Intrinsically Safe Ruggedised-PDA i.roc



Standard front housing
Compact, lightweight,
ergonomic

Attachment points for
optional holders

integrated Bluetooth 1.1
Class 2 interface



integrated WLAN card
IEEE 802.11b compatible

Infrared port
IrDA 1.1 (115,2 KB/s)

Convenient yet secure - 2 slots
for stylus pens

Battery charging socket with
integrated USB port connection





Technical data *i.roc 61* -Ex, 51* -Ex, 41**

Housing

Protection class	IP 65 (immersion for brief periods)
Housing:	Anti-static, non-corroding housing
Shock resistance:	1 m onto concrete

Dimensions

L x W x D:	175 x 88 x 49 mm
	max. 215 x 88 x 49 mm

Weight

<i>i.roc 61* -Ex:</i>	approx. 825 grams
<i>i.roc 51* -Ex:</i>	approx. 550 grams
<i>i.roc 41*:</i>	approx. 550 grams

Temperature ranges

Storage temp. range:	-10°C +60°C
Admissible Charging temp. range:	0°C +45°C
Working temp. range <i>i.roc 61* -Ex / 51* -Ex:</i>	-10°C +50°C
Working temp. range <i>i.roc 41*:</i>	-10°C +60°C

Relative humidity

Operation	up to 80% r.h.
Storage	up to 80% r.h.

Maximum altitude

Operation	up to 4,572 m
Storage	up to 12,192 m

Processor

Intel® XScale™-technology-based 400 MHz processor

Power supply

Rechargeable lithium-ion battery (1800 mAh)

Note:

The battery's service life depends on the user's operating habits and the PDA's configuration. The use of radio modules and background lighting significantly reduces service life. (Larger batteries available on request)

Memory

RAM	64 MB SDRAM (55 MB available)
ROM	32 MB Flash ROM memory
	2.8 MB iPAQ File Store (NVRAM)

TFT colour display

Resolution:	(W x H) 240 x 320 pixels
Dot-pitch:	0.24 mm (0.01")
Screen diagonal:	89 mm (3.5")
Display type:	64K (16 bit) transfective colour TFT with LED background lighting

Keyboard

On/off – switch, reset keys, 5 programmable function keys, 5-way navigation field (customised design possible on request)

Stylus Quantity two (included in standard delivery)

System upgrade

Integrated SD slot, supports SD/MMC standard, SDIO-ready

Note: In the Ex-versions 51* -Ex and 61* -Ex, the customer may not exchange this card. To exchange the card, the device must be sent to the manufacturer. With the 41* version, the card can be exchanged by the user.

Operating system

Microsoft Windows Mobile 2003 software for Pocket PC - Premium Edition

Standard applications

Calendar, contacts, voice recorder, notes, Pocket Word (with character recognition), Pocket Excel, Pocket Internet Explorer, Windows Media Player 9 (MP3, audio

and video streaming), calculator, Microsoft Reader (eBooks), File Explorer, pictures, terminal services client, VPN client, infrared beaming

Language:

Standard: English (other languages on request)

Hardware and software development

HTML, XML

SDK for MS Visual Studio, MS Embedded Visual C++ and Java

HDK - Hardware Development Kit

Microsoft .NET Compact Framework

JVM - Java Virtual Machine

Standard protocol APIs for Windows sockets (Windows CE)

Infrared specification

Specification:	IrDA 1.1
Transmission rate:	115.2 KB/s

Bluetooth specification*

Bluetooth specification	1.1 compliant (2.4-GHz ISM)
System interface	high-speed UART processor interface
User interface	Bluetooth Manager
Device type	Class II, 4 dBm transmitter power; typically 5m in an industrial environment
Reception sensitivity:	-78 dBm

WLAN specification*

Network standard:	IEEE 802 Part 11b (802.11b)
Frequency band:	2.4000 - 2.4835 GHz (EU) 2.4465 - 2.4835 GHz (France) 2.4000 - 2.497 GHz (Japan)
Antenna:	embedded inverted F antenna
WEP security:	64/128-bit compatible with IEEE 802.11
Network architecture:	ad hoc (peer to peer) Infrastructure (access points required)
Modulation:	DBPSK, DQPSK, CCK
Receiver packet error rate:	11 Mbps: <-80 dBm, 5.5 Mbps: <-82 dBm, 2 Mbps: <-86 dBm, 1 Mbps: <-89 dBm
Reception strength:	-10dBm (1/2/5.5/11 Mbps)
Transmitter power (max.):	15 dBm (FCC SARS requirements)
Power management:	On/off monitoring by operating system Connection icon, power save mode
Power consumption:	Send mode: < 380 mA Receive mode: < 280 mA
Power safe mode:	802.11 compatible
Protocols:	CSMA/CA (collision avoidance) with ACK, TCP/IP, IPX/SPX, UDP
SAR:	1.0 mW/g
Data throughput:	>4.5 Mbps
Range:	80 metre typically in open spaces
Certificates:	Contains all certificates required for supported countries (WECA Wi-Fi)

Note:

A WLAN standard infrastructure, additional Bluetooth-enabled units and a service contract with a wireless carrier may be required for wireless communication to function. A separate contract is required for GSM Internet use. Your carrier can inform you on the availability and extent of the offer. Some web contents may not be available. Other wireless cards and accessories available on request.

Intrinsically-Safe RFID Bluetooth reading pen

The **RFBT x10 -Ex** is the latest innovation among RFID reading pens and completes the **i.roc** range of equipment for short distance transponder solutions within and outside the Ex-area.

This pen allows the **i.roc** to also run RFID applications without the integrated reader. The wireless Bluetooth connection between the pen and the **i.roc** enables the user to read the transponder even in locations that are difficult to gain access to. Also tags directly bedded into metal can be read.



Reading the maintenance history of a pump via an embedded tag in the casing.

Technical Data RFBT-Ex 10:

Transponder systems and chips: ISO 15693 customised, iID® -2000
TELID®, Tag-it®, I-CODE® SLI, EM4135, my-D® on inquiry, I-CODE®,
Ario® (RO), EM4006 (EM4006 (please ask for the supported transponder
commands))

Functionality: Short distance read/write access as well as read-only access, both versions work
via either online connection or a macro programmed data transfer

RFID Air Interfaces: 13.56 MHz RFID low-distance transponder; integrated antenna, high speed mode
and fast mode, no anti-collision

Wireless HOST Interface: Bluetooth 2.4 GHz, class 2, range up to 5m, serial emulation with
iID® mobile engine

	Type 72.001	Type 32.001	Type 72.101	Type 32.101
Operation Mode:	online communication		macro command packet communication	
RFID Antenna:	K3	A8	K3	A8
Transponder:	mic3-64,D5-TAGs, MINTAGspecial, D7-TAGs	ISO 15693 LABEL TELID3T	mic3-64,TELID2T D7-TAG (EM4135) EM4006	mic3-2k ISO 15693 LABEL TELID3T

Dimension: pen-shaped, diameter approx. 15 mm, length approx. 135 mm
Casing material: metal

Display: 2 LED for display of condition and communication status

Energy supply: ecom specific battery type

Operation duration: >5000 h standby or > 2000 read/write cycles, depending on application

Operation temperature: -10°C ... +50°C

Storage temperature: -25°C ... +70°C

Protection class: IP 65



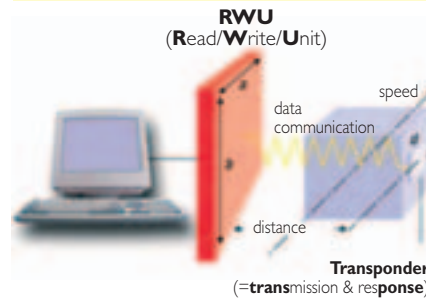
Intrinsically-safe RFID module

Flexible in application and robust, RFID write/read systems provide for quick and reliable identification of objects at various distances.

Primarily developed for application in production, commerce and logistics, the user memory has up to 2kb, depending on the type of transponder, which allows for the recording of information relating to the product to be stored without having to be connected to an external database.



Basics of RFID technology



Radio Frequency IDentification (RFID) comprises wireless data transfer on the physical basis of electro-magnetic alternating fields. A RFID system consists of a transponder and a mobile or stationary write/read unit with antenna. Transponders feature a micro chip and a coil/antenna in different casings (plastics, glass, coins, key holders, smart label) and work within different frequency ranges.

With regard to power supply transponders are distinguished as:

- active (with battery for own power supply)
- passive (power supply for data transfer inductive from write/read unit)



During field operation while inspecting system parts.

Wherever the mobile storage of data is required, e.g. for object identification, service or storage management, the RFID module is the ideal solution.

- Integration into already existing systems is possible.
- relatively wide reading-range
- anti-collision, logging by more than one transponder in the field
- software updates possible

Technical data: RF x10 –Ex (13.56 MHz)

Operation frequency:	13.56 MHz
Write/Read range:	up to 80 mm, depending on transponder type and environment
Speed of data transmission:	about 26 kB/sec.
Writing transponder:	< 50 ms per block
Reading transponder:	< 50 ms per block
Transponder types:	ISO 15693, Tag-I, I-CODE, EM, SLI, HFI, LRI and Infineon

Technical data: RF x11 –Ex (125 KHz)

Operation frequency:	125 KHz (134 KHz on request)
Write/Read range:	up to 80 mm, depending on transponder type and environment
Transponder types:	UNIQUE, HITAG-I, HITAG-S, TROVAN, TIRIS, EM 4x25, EM 4x70, Q5 (other types on request)
Special features:	Software loader for firmware update provides highest flexibility for customer applications

Intrinsically-Safe RFID transponder

Basics RFID transponder

The transfer of data to the transponder - also called "Tag" - is realised through electromagnetic waves. They are received by an antenna and stored on a chip. This happens inductively at low frequencies and per radio transmission at higher frequencies. The distance, from which a "tag" can be read, varies according to environmental circumstances, transmitter performance and the frequency band that is used. In Europe two frequencies are mainly used for so-called "passive tags" (transponders without integrated power supply): the high frequency range (HF) with 13.56 MHz, working with a reading distance of up to 1 metre, and the ultra-high frequency range (UHF) with 868 MHz and a reading distance of up to 3 metres. Both frequency ranges have their advantages and disadvantages, depending on the kind of application.



As a rule a RFID "tag" consists of antenna, analogue circuit for receipt and transmission (transponder), digital circuit and permanent memory. If there is additionally a power supply integrated, we call it "active transponders". "Passive transponders" without integrated power supply are used most frequently. In order to be able to exactly identify and trace products and loading equipment within the logistic chain, convenient "serial numbers" have to be allocated. They have to be unique in the world and they must not be repeated. For this reason a standard was developed exclusively: the data is stored on the chip as EPC (Electronic Product Code). This code contains encrypted information about producer and product. When this "tag" is included into a label, it is called "smart label". The "smart label" stores electronic information and additionally clearly displays all necessary information on the front side.

RFID-Transponder: RDC 30/50 sli disk

Our black coin-shaped epoxy disc tag is a transponder laminated in glass fibre-reinforced epoxy material.

The epoxy disc tag provides outstanding performance and durability in harsh environmental conditions.

There are different formats and dimensions available. The disk tag can also be supplied with centre holes.



physical

protection class	IP66
epoxy type	EP 121
dirt,dust,water	resistant
operating temperature	-25°C to +75°C
storage temperature	-25°C to +75°C
humidity	suitable for indoor and outdoor use
dimensions	diameter 30 / 50 mm (+/- 0.2 mm)
	thickness 1.0 mm (+/- 0.2 mm)
UV radiation	high stability against sunlight

RFID-Transponder: RDC 50 sli metall

The flexible and robust transponders are designed for the fast and easy identification of objects. They can be equipped with several chipsets for 13,56 MHz RFID-systems, either as "read-only" or as "read/write".

Designed specifically for industry, where metal structures are predominant.



physical

protection class	IP68
housing materia	PET (complete covered)
dirt,dust,water	resistant
operating temperature	-20°C to +70°C
storage temperature	-30°C to +80°C
humidity	suitable for indoor and outdoor use
dimensions	diameter 50 mm (+/- 0.2 mm)
	thickness 10.0 mm (+/- 0.2 mm)
UV radiation	high stability against sunlight

The transponder types presented here can be supplied with chips of various thicknesses for different frequencies for application in the Ex-area. For more information about the transponder see page 28.



Intrinsically-Safe barcode imager module



Example: check of goods issue

- Support of linear, stacked and matrix codes
- Illumination of the scan area and aim-marking
- CMOS-based picture processing chip
- Omni-directional reading
- No moveable parts

The automatic recording and implementing of data to a wide range of concepts is of increasing importance. It is demanded to store as much data as possible in a space as small as possible. In addition it must be possible to read and process this data reliably. Nowadays there are approximately 30 symbologies on the market. The optional integrable CMOS Barcode Imager BCx10-Ex fitted to the **i.roc** x10 can read all common barcodes, such as ID linear codes, 2D stacked /matrix codes, OCR fonts, postal codes. This module comprises an omni-directional (360°) scanning range and a double coloured "aimer" that marks the scanning area. It is also possible to record black-and-white pictures with 640x320 pixel resolution.

Two main types of barcode reading devices are distinguished. There are laser scanners that record the barcode by means of a reading line. This is more than sufficient for one-dimensional codes, since one line contains all information. After the introduction of two-dimensional codes the laser scanners were improved in a way in which deflection mirrors create a second scan line that is generated at a certain angle. This way it is possible to read stacked two-dimensional codes. The second type of device is called an "area imager". Integrated picture record modules record the barcode as if taking a photo. Then software algorithms are applied to find the barcode area within the picture, to recognise type and turning position and finally to identify the bar code. This makes it also possible to read matrix codes.



Application of the industrial PDA's **i.roc** 41* in a shipping department.

Technical data BC x10 -Ex:

readable bar codes:

2D: PDF417, MicroPDF417, MaxiCode, Data Matrix, QR Code, Aztec, Aztec Mesas, Code 49, EANUCC Composite

Linear: Code 39, Code 128, Codabar, UPC, EAN, Interleaved 2 of 5, Reduced Space Symbology, Code 93, Codablock F,

Postal: Postnet, Planet Code, British, Canadian, Japanese, KIX (Netherlands)

OCR Fonts: OCR-A and OCR-B

Focus: (17.8cm) from front panel (nominal)

Operation area:

	8 mil linear (.020cm)	10 mil PDF417 (.025cm)	13 mil UPC (.033cm)	15 mil PDF417 (.038cm)	15 mil Data Matrix (.038cm)	35 mil MaxiCode (.089cm)
Close	(8.9cm)	(7.9cm)	(6.4cm)	(8.9cm)	(9.4cm)	(5.1cm)
Distant	(19.3cm)	(22.9cm)	(31.8cm)	(28.4cm)	(16.5cm)	(33cm)

Scan area: 360°

Viewing angle: ±40°

Surround.light: 535 to 100,000 lux (sun light)

Accessories and virtual Keyboard

The extensive range of accessories (leather carry case, hand strap, USB data transfer set, car holder, additional batteries, charging cable, etc.) further enhances the application and use of the *i.roc*.

Here is just a selection of accessories currently available. If you have a specific requirement - please contact us.

USB 10x Transmission Box



The USB x10 data transmission box is a device for the transmission of data between the *ecom* PDA *i.roc* x10 -Ex and a computer with USB interface for application in the non-Ex-area.

Leather bag with belt loop and carrying strap



The leather bag combines comfort in carrying and perfect handling.

Docking stations

The USB docking stations facilitate the frequent synchronisation of data by providing easy insertion and removal of the PDAs. Simultaneous charging secures that there is always a maximum battery charge available.

Handle



Ergonomically sound handling using the screw-on type handle broadens the possibilities of functions and applications.

Hand strap



This hand strap reduces handling fatigue and helps prevent accidental dropping.

Charging adapter for vehicles



The *i.roc* can also be recharged in cars using the charging adapter LGx10 car.

Keyboard



Especially for PDAs for industrial use a reliable and easy method of recording data is required. Responding to these requirements *ecom instruments* decided to take a new road – with virtual full-screen keyboards.

Worn and dirty keypads, ingress of dust and contaminants and a lack of keypad illumination are now no longer a problem.

- three different layouts (numeric, alpha, special) available
- fast-switch key



Perfectly designed for data input whilst wearing gloves.



Client specific solutions

Today it is more important than ever that there is a flexible approach to meeting client requirements.

ecom instruments offers this flexibility for clients projects - large or small. Not all projects require a high number of units and need only an individual and customised solution. Small challenging solutions in particular demand dedicated application. On this and the following pages we showcase the versatility of the **i.roc's** x10 by way of projects of clients that have been realised already. Many of these solutions are now part of our standard portfolio.

Contact us. We are more than willing to give you further information in a personal conversation.



Client specific **125 kHz RFID Module** with directed antenna for the detection of transponders that are embedded in metal

RFID module for transponder in metal

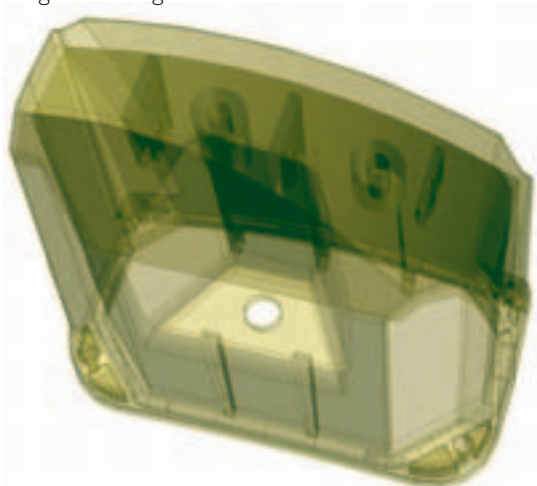
The client's requirements were phrased in a brief and specific way: 125 kHz transponders, embedded in metal, should be identified reliably and at high installation depths. This became possible by way of cooperation with a partner who had specialised in special antennas with a directed field. These LF-antennas emit a very strong concentrated field to the front, into the direction of the tip.

One of the greatest challenges in this project was the installation and fixing of the rod antenna. In principle it was essential to comply with the mechanical demands towards the mechanics of the Ex-regulations, e.g. the 10fold drop test onto one single area without causing damage to the Ex-protection, but at the same time retaining a practicle and ergonomic device.

By way of cooperation and coordination of the three involved development departments, RFID Lösungs Partner (RFID Solution Partner), electronic development and mechanical construction as well as experience in the use of such methods this solution was put into practice.

868 Mhz radio module

Here, one of the main problems was the installation of an omni-directional rod antenna. In addition, it was interesting that the radio module that was to be used, was bigger than a certain mechanical size, which made it impossible to fall back on the previous solution. Finally, the project was realised by the vertical installation of the blanks and the mechanical protection of the antenna. In addition, the radio module was of a size and dimensions that meant it was necessary to re-design the casing.



CAD production drawing



Finished upper part of casing with integrated shock resistant antenna fixation for the enclosing of **868 MHz Ex-radio modules**.

Client specific solutions



Dust- and waterproof (IP 65) serial interface with 9-pole D-SUB plug

Non-Ex: RS 232 interface

With this serial interface port many of our clients are now able to connect a wide variety of peripheral devices.



Non-Ex: Class 1 Bluetooth Module

High scope if a radio contact is used, global use without national restrictions as with WLAN 802.11b, total robustness and interference resistance, combined with a PDA that is easy to use – that was the profile of demand when the project was started. All this was put into practise by way of installation of a Class 1 Bluetooth radio module. The Bluetooth interface still is one of the most secure radio contacts, it can be switched to "invisibility"-mode and cannot be "seen" by anyone anymore and changes the frequency 1600 times per second in the 2.4 GHz band, which is approved all over the world.

Bluetooth Class 1 Module

integrated into the casing with scope of 100m

The high scope (100m) and the simple inclusion of the counterpart in the client's hardware that was existent already, was the reason not to include an internal Bluetooth Class 2 interface (max 10m scope) and to install this Class 1 Module. The client's application that is easy to configure also makes it possible that the end customer can react fast to changes during use.

Mining: headset jack for VOIP

How can my colleague, located 600m above me in the operation centre, contact me? Now this question is quite easy to answer: via an **i.roc** with compatible headset included into a WLAN-Network.

This has been made possible by an installation of an 802.11 Access Point, a small VOIP (Voice over IP) software solution and a helmet-headset for the **i.roc**. Now the miners who are in possession of an **i.roc**, no matter if its main purpose is for the identification of machinery or for the collection of data, can also now make calls with it in the same way as with a mobile phone - and all from underground!



Variety via flexibility

This is only a selection of options that have already been realised.

Also for you and your application **ecom instruments** can be the flexible partner for the realisation of such a solution.

Note:

Some of the solutions that have been presented on this site and solutions given have not been developed for Ex-zones. For application in Ex-zones only those modules with the designation "Ex" in the title (for example BC x10 -Ex) are allowed to be used.



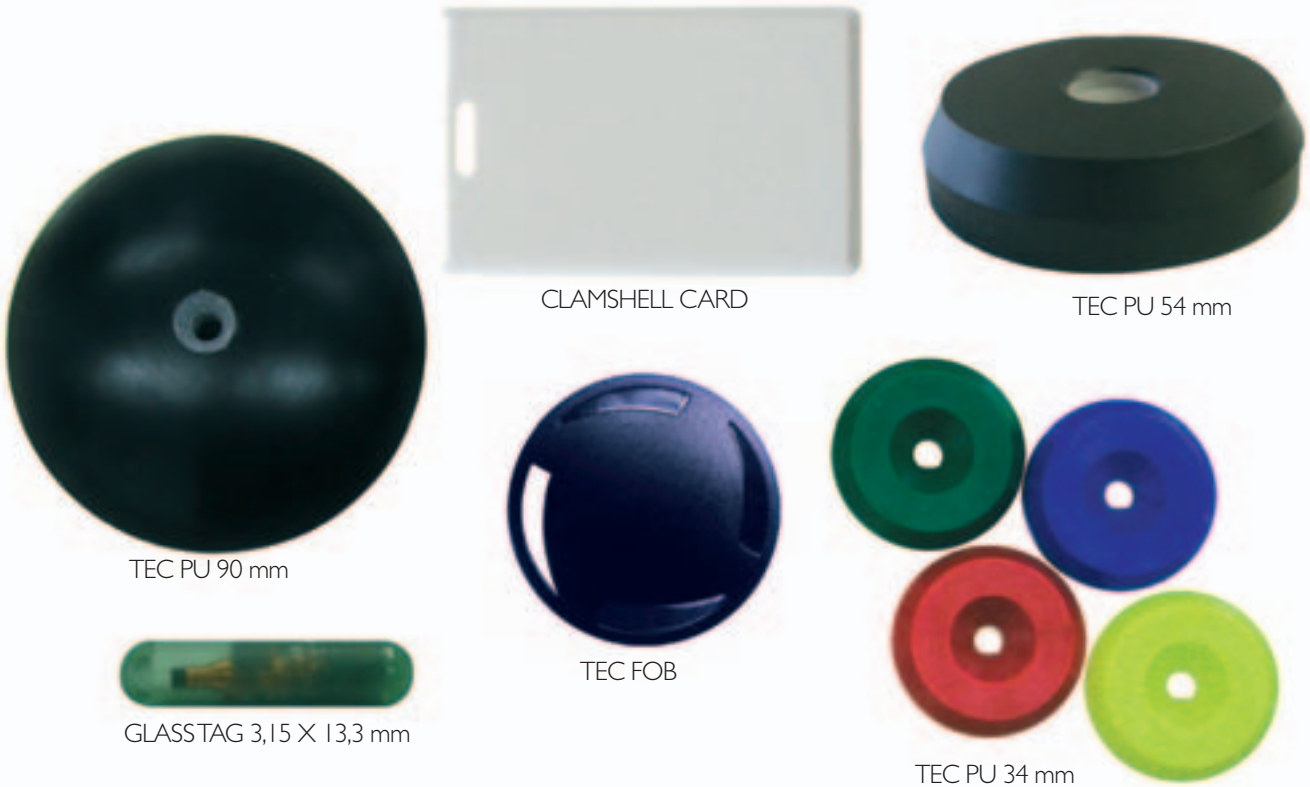
Transponder concept

Transponder short description:

A transponder receives input signals and responds automatically. The term transponder is a combination of the terms transmitter and responder. Transponder can be active and passive, whereas the difference lies in the method of power supply. Passive transponders or tags are operated by the indicated energy of the electromagnetic field of the active transmitter. Active transponders, however, have their own power supply. A transponder makes it possible to identify unambiguously an object via its UID (individual number that every tag carries).

ecom instruments offers a vast variety of very different tags for industrial environments. Each of these transponders is optimised for the scanners we are providing. In order to provide the greatest variety possible, there are very different kinds of chip sets and types in different forms of casing. Therefore a corresponding tag can be delivered for almost every application and purpose. Some of them are also available as off-the-shelf products directly ex stock.

For example the PU Tag. It is available in 3 different sizes and forms. With diameters from 34 mm, over 54 mm up to 90 mm. Special attention has been paid to the chemical resistance and the big reach of application concerning temperatures. Thanks to the special PU grouting and casing (IP 67) they can resist temperatures of up to 120°C and most acids and bases used in industrial processes. On this page we can only show you a small selection of the possible transponders. Please contact us if you would like to discuss in further detail the complete available range.



s = standard
u = upon request
n = not available

		Chip type											
		Low Frequency								High Frequency			
		410x Unique	5555 Q5	5557	4x50 Titan	HITAG 1	HITAG 2	MIFARE Standard	HITAGS 2048	SLI	Tag-It	i-code	ISO 15693
Transponder name	CLAMSHELL CARD	s	u	s	n	u	n	n	u	u	u	u	u
	TEC PU 34 mm TAG	s	u	u	u	u	u	u	u	s	u	u	u
	TEC PU 54 mm TAG	s	u	u	s	u	u	u	u	s	u	u	u
	TEC PU 90 mm TAG	s	u	u	u	u	u	u	u	s	u	u	u
	GLASSTAG 3,15 mm	s	s	n	u	n	n	n	u	n	n	n	n
	TEC FOB 42 mm	s	s	s	u	u	u	u	u	s	u	u	u
	RDC 30/50 sli disk	n	n	n	n	n	n	n	n	s	u	u	u
	RDC 50 sli metall	n	n	n	n	n	n	n	n	s	u	u	u

Certifications Ruggedized-PDA i.roc x10

Certification	Model	Memory	Additional Features	Part-No.
ATEX Zone 1	<i>i.roc</i> 610-Ex			AS002766
“	<i>i.roc</i> 611-Ex	+ 256 MB		AS002761
“	<i>i.roc</i> 612-Ex	+ 512 MB		AS002762
Mining	<i>i.roc</i> 613-Ex			AS002763
“	<i>i.roc</i> 614-Ex	+ 256 MB		AS002764
“	<i>i.roc</i> 615-Ex	+ 512 MB		AS002765
FM Class I/Div. 1	<i>i.roc</i> 617-Ex			AS002767
“	<i>i.roc</i> 618-Ex	+ 256 MB		AS002768
“	<i>i.roc</i> 619-Ex	+ 512 MB		AS002769
ATEX Zone 2	<i>i.roc</i> 510-Ex			AS002776
“	<i>i.roc</i> 511-Ex	+ 256 MB		AS002771
“	<i>i.roc</i> 512-Ex	+ 512 MB		AS002772
FM Class 2/Div. 2	<i>i.roc</i> 517-Ex			AS002777
“	<i>i.roc</i> 518-Ex	+ 256 MB		AS002778
“	<i>i.roc</i> 519-Ex	+ 512 MB		AS002779
Ruggedized	<i>i.roc</i> 410-Ex			AS002786
“	<i>i.roc</i> 411-Ex	+ 256 MB		AS002781
“	<i>i.roc</i> 412-Ex	+ 512 MB		AS002782
“	<i>i.roc</i> 413-Ex		3600 mAh Akku	AS002789
“	<i>i.roc</i> 414-Ex	+ 256 MB	“	AS002790
“	<i>i.roc</i> 415-Ex	+ 512 MB	“	AS002791
Accessories (suitable for all of the above versions)				
Leather case with belt holder and shoulder strap				A0002777
Hand loop				A0002778
USB data transmission set				A0002779
Barcode Imager BC x10 -Ex				A0002774
RFID Module RF x10 -Ex				A0002773
Vehicle / in-car charger LGx10-car				A0002792



Intrinsically Safe PDA i.roc 61* -Ex Zone 1



Intrinsically Safe PDA i.roc 51* -Ex Zone 2



Ruggedised PDA i.roc 41*

Ex-data i.roc 61* -Ex:

Ex designation
 Ⓢ II 2G EEx ia IIC T4
 Ⓢ II 2D T99°C IP 65
 ZELM 04 ATEX 0200



Ex-data i.roc 51* -Ex:

Ex designation
 Ⓢ II 3G EEx nL IIC T4
 Ⓢ II 3D T55°C IP 65
 ZELM 04 ATEX 3201





Intrinsically-Safe Barcode Handscanner SC 900-Ex



This mobile unit for barcode data processing with its simple design and robust construction is ideal for use in Ex-hazardous areas.

Compatible with almost all barcodes used, this device can scan from a distance of up to 38 cm – with its size allowing even the most awkwardly positioned barcodes to be easily accessed.

Simple Operation

Operation is easy and simple. With the light scan beam the barcode is located, read and a signal confirms successful data capture. With the IrDA interface, received data can then be downloaded to a PC for processing, analysing and monitoring.

Exact records

The integral clock and calendar means that every data capture can be accurately documented. It is therefore possible to provide a record and checkpoint for critical safety components by utilising barcodes and the SC 900-Ex scanner. The LCD display and keypad also gives the possibility of bidirectional data transmission.

Applications

With the SC 900-Ex the vast majority of barcodes in use today can be read and processed. This means that the uses of the equipment are wide ranging – from the recording of items, components and machines to manual recording systems or container specific data memory.

With a standard operating system it is possible for the barcode scanner, with its explosion protection, to be adapted to exact individual needs and therefore, even in hazardous areas, comprehensive mobile data capture is now possible.

Technical data:

Processor:	32-Bit RISC CPU
Memory:	8 MB RAM
LCD-display:	128 x 64 pixels with background lighting and variably adjustable character sizes.
Keyboard:	26 operation buttons
Laser:	Semi-conductor Laser
Resolution:	0,15 mm
Scan frequency:	max. 150 Scans/sec.
Maximum Scanning Distance:	~ 38 cm
Interface:	IrDA Ver. 1,2
Battery type:	2 x LR6/AA
Operating time:	~ 100 hours
Working temperature range:	-5°C...+40°C
Storage temperature range:	-20°C...+55°C
Weight:	~ 250 g
Dimensions:	69 x 173 x 32 mm

Handheld barcode scanner for electronic data processing and data administration in Ex-hazardous areas.

- high accuracy
- simple operation
- quick response time
- timing function
- LCD-Display

Ex-data:

Ex designation:
 Ⓜ II 2 G EEx ia IIC T4

EC-Certificate of conformity:
 TÜV 00 ATEX 1568 X

Standard delivery:

SC 900-Ex incl. leather case, battery and Demosoftware (english)

Accessories:

Communication set Cradle DT 960 IO incl. AC/DC Adapter DT 9020 ADP-G, RS-232 cable Dt-787 AX
 Unit-to-unit cable DT-788 RSC



Barcode Compatibility:

- | | |
|--------|---------------------|
| • EAN | • ITF |
| • JAN | • Code 39 |
| • UPC | • Code 93 |
| • WPC | • Code 128 |
| • NW-7 | • MSI |
| • IATA | • Industrial 2 of 5 |



Communication



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I.S. Bluetooth Headset / I.S. GSM Call Alert	Ex-BT 300 / VIB-Ex I	34
I.S. Two-Way Radio	Ex-PMR 500	35
I.S. Digital dictating device	Voice-Ex 180	36
I.S. Pager	Ex-Pager A5	37



Explosion-Protected Mobile Phone ME 45-Ex



With a shock resistant rubber casing the ME 45-Ex is designed to withstand the rigours of use in Ex-hazardous areas.

A special coating on the keypad and sealing in the battery compartment provide additional protection against the ingress of water spillages and dust.

The extensive features and functions of the ME 45-Ex are quickly and easily accessed via the large, high resolution graphical amber coloured display.

With GPRS data transmission and the WAP 1.2 browser facility, information can be quickly accessed and utilised. Supported by "Intelligent Typing" (T9) and easy synchronisation with PC based organisers (MS Outlook™) management of address and organizer information is simple.

A robust, yet stylish and slim design combined with high functionality, makes this mobile phone equally and ideally suitable for use either outside on site, or in the office and laboratory.

The dual band ME 45-Ex with GPRS offers outstanding performance and functionality from a compact and robust device - making it ideal for use in work environments where an explosion protected mobile phone is required.

Ex-data:

Ex-designation:

⊕ II 3G EEx nCL IIC T6

⊕ II 3D T75°C IP54

EC Certificate of Conformity:
ZELM 02 ATEX 3119

Standard delivery:

- ME 45-Ex (supplied without SIM card)
- Battery charger - UK Pin

Accessories:

- Replacement Battery
- Battery charger - Euro Pin
- Headset PTT
- Desktop charging station

- Robust - dustproof and water resistant
- Zone 2 and also for Dust Ex-Zone 22
- Voice activated dialing and memo
- Data and fax modem
- Infrared interface (IrDA)
- Intelligent typing (T9)
- Large high resolution display
- Address book and organizer
- Synchronisation with MS Outlook™

The ME 45-Ex is ideal for those who have to work in Ex-hazardous areas classified as Zone 2. With the added choice of either using the "Handsfree" mode or by utilising the optional Headset accessory - safe and effective communication in the work place is further enhanced.

Technical specification:

GSM class	4 (2 Watt)
Frequency	880 – 960 MHz
GSM class	1 (1 Watt)
Frequency	1.710 – 1.880 MHz
Display	7 line, high resolution, amber coloured
Operating temperature range	-10°C ... 55°C
Stand-by time	max. 300 hours
Talk time	max. 6 hours
Power supply	Ex-AMH Z2 (Li-Ion [840 mAh])
Power output	3,6 Volt
Charging time (for 100% capacity)	approx 2 hours
Antenna	Integrated
Dimensions	109 x 46 x 21 mm (volume 76 ccm)
Weight	approx 99g
IP protection rating	IP 54

Intrinsically-Safe Mobile Phone Ex-Handy 04



Combining the latest in i.s. and communication technologies, this mobile phone provides both permanent telephonic availability and Data communications, making this product indispensable for safe and effective working in Ex-hazardous areas.

The Ex-Handy 04 is a robust mobile phone that provides unparalleled Data and Voice communication functions in the Ex-hazardous area. Fast Data transmission via HSCSD (maximum 43.2 kbit/s in receiving direction) and GPRS (maximum 40.2 kbit/s in receiving direction) are just two of the many features of the Ex-Handy 04. With GPRS fast access to mobile internet services is available practically wherever you are. In addition, the Infrared interface enables the use of suitable PDA and Notebook devices to be utilised in Ex-hazardous areas. An integrated WAP browser (version 1.2.1) allows for fast and uncomplicated access to the mobile internet.

Functions:

- Triband mobile phone - communication via three networks on five continents
 - Java™-Technology for fast download of programmes
 - GPRS (General Packet Radio Service)
 - HSCSD (High Speed Data Transmission)
 - Bluetooth
 - Integral faxmodem
 - WAP2 1.2.1 - Browser
 - User defined and time controlled profiles
 - Up to 500 telephone book entries each with 3 call numbers and a text area
 - High resolution full-graphic display with backlighting
 - Dynamic display, automatic adjustment of the display for optimum readability
 - Infrared interface
 - Voice controlled selection facility for up to 10 names
- * Operating time can vary depending on the network settings, SIM cards and the application.

The Ex-Handy 04:

Whether in Europe, Asia, Australia or America, the Ex-Handy 04 operates worldwide on three different network frequencies and automatically chooses the optimum GSM network on all continents.

Ex-data:

Ex-designation:
 II 2 G EEx ib IICT4

EC-Certificate of conformity:
 ZELM 02 ATEX 0107

Standard delivery:

- Ex-Handy 04 for GSM networks (supplied without SIM card)
- LGH 04 battery charger - UK Pin
- Leather case
- Ex-AMH 04 Ex-battery

Accessories:

- Desktop charging station DCH 9 (without charger)
- Spare Ex-AMH 04 battery module
- LGH 04 battery charger - Euro Pin

Complementary Products, e.g. ecom **i.roc** x10



Technical specification:

Network type:	Triband
Networks:	GSM 900 / GSM 1800 / GSM 1900
Transmitter power:	≤ 2 Watt / ≤ 1 Watt / ≤ 1 Watt
Operating temperature range:	0°C ... +40°C
Storage temperature range:	-5°C ... +50°C
Dimensions:	129 x 47 x 31 mm
Power supply:	Ex-AMH 04
Weight:	~ 140 g
Stand-by time:	max. 360 h
Talk time:	max. 6 h*



Intrinsically-Safe Bluetooth Headset Ex-BT 300



The Bluetooth Headset Ex-BT 300 is ideal for all users who need room to move or do not want cables to hinder them in their freedom of movement or when working in Ex-hazardous areas, but still expect excellent speech quality. The Ex-BT 300 can be linked by the Bluetooth connection to a mobile telephone up to 10 m away.

Scope of supply:

- Ex-BT 300
- Charger LG Ex-BT 300

Features

- Highly sensitive directional microphone for clear voice transmission.
- The detachable receiver offers high wearing comfort and excellent reception since it adjusts perfectly to the ear.
- The ergonomically designed flexible ear clip fits comfortably and safely on the right or left ear.

Ex-data:

Ex designation:

Ⓔ II 2 G EEx ia IIC T4

EC-Certificate of conformity:

ZELM 03 ATEX 0152 X

- Easy adjustment of the desired volume through integrated controls

Technical data:

Compatibility:	Bluetooth 1.1
A list of the currently compatible mobile phones can be obtained at the following Internet address: http://www.gnnetcom.de (Please note that not all compatible mobile phones can be used in Ex-hazardous areas.)	
Range:	10 m to the mobile telephone
Ambient temperature T _a :	-10°C ... +50°C
Storage temperature:	-10°C ... +60°C
Power supply:	internal Ex-battery pack
Duration of operation:	approx. 4 hours (continuous operation) approx. 150 hours (stand-by)
Dimensions:	105 x 26 x 16 mm
Weight:	approx. 26g

Intrinsically-Safe GSM Call Alert VIB-Ex I

The Ex-GSM call indicator recognizes all incoming calls for mobile telephones on the broadcast bands of 900MHz and 1800 MHz used for digital mobile telephones. Operating within a range of up to 0,5 metre of the mobile phone - when a call is recognized, the GSM call indicator starts to signal the call optically and/or by vibration - depending on the preferred type of signal alert required.



Features

- Compatible with all Ex-mobile phones
- Indicates incoming calls discreetly through flashing LED and/or vibration.
- Suitable for use with both D-network (GSM 900) and E-network (GSM 1800) mobile telephones.

Ex-data:

Ex designation:

Ⓔ II 2 G EEx ia IIC T4

EC-Certificate of conformity:

ZELM 03 ATEX 0148 X

- Replaceable battery
- Vibration alarm function can be switched either on or off.

Technical data and specifications:

Compatibility:	all D and E network mobile telephones
Call indication:	Flashing LED and/or Vibration
Frequency range:	900 MHz / 1800 MHz
Size:	21 x 49 mm, (diameter 17.5mm)
Weight:	20g
Operating voltage:	3,0V
Operating temperature:	-10°C ... +55°C
Storage temperature:	-10°C ... +55°C
Range:	maximum 0,5 m
Power supply:	2 x 1.5V round cell batteries
Standby time:	approx. 600 hours (depending on the selected operating mode)

Standard delivery:

- VIB-Ex I
- Batteries

Intrinsically-Safe Two-Way-Radio Ex-PMR 1000

Communication in Ex-areas

Safe and reliable communication is an important aspect in Ex-hazardous areas. Stringent requirements have to be satisfied by all radio transceivers used, to ensure a safe communication, even over long distances.

The ecom Ex-PMR 1000 portable radio transceiver was developed specifically for this purpose. Featuring ATEX certification in protection class Ex II 2 G Eex ib IIC T4 or Ex II 3 D T I 30°C IP 54, the device complies with the very latest standards and can be used in Zones 1 and 2, or 22.

The frequency band ranging from 446.000 MHz to 446.100 MHz was opened for public use by the ERC with the publication of its decision ERC/DEC/(98) 25, 26, 27 dated 1 December 1998. All handheld devices with fixed antenna which operate in this frequency range conform to the ETS 300296 licensing standard and are allowed to be used license- and charge-free in many European countries.

The Ex-PMR 1000 fulfils the rigid specifications of IP54 and therefore meets the high demand for industrial ruggedness and reliability especially for applications in Ex-hazardous areas.

The maximum transmission power is limited to 500 mW ERP, giving a range of up to 5 km. The CTCSS and DCS pilot tone systems are configured for selective analogue and digital coding. A variety of pilot tones enables users to communicate within groups. All functions of the radio unit can be easily preconfigured via PC using the optional software kit.



The Ex-PMR 1000 is a license and charge-free two-way radio for wireless communication in Ex-hazardous areas.

- 8 channels
- DCS selective call for transmission and reception
- Up to 5 km range
- Scan function
- Approved for dust-Ex-areas (zone 22)
- Squelch tail elimination (9 levels)
- TOT (transmission time limit)
- Battery save function
- IP54 protection rating

Ex-data:

Ex-designation:

⊕ II 2 G EEx ib IIC T4

⊕ II 3D T I 30°C IP54

Type examination certificate:

ZELM 05 ATEX 0271

Standard delivery:

- Radio unit Ex-PMR 1000
- Ex-battery pack Ex-AM PMR 1000
- Belt clip for Ex-PMR 1000
- Charger LS PMR 1000
- Power supply unit PS PMR 1000
- Operating instructions

Optional accessories:

- Leather carrying case
- Remote speaker / microphone combination Ex-HS 01
- Spare battery pack
- Charging Set
- Software kit

Technical data:

Frequency range: 446,00625 - 446,09375 MHz

Sensitivity: approx. 0,25 μ V at 12 dB SINAD

Channel spacing: 12,5 kHz

Max. transmission power: 500 mW ERP

IP protection: IP 54

Battery: Rechargeable lithium ion

Ambient temp.: -20°C ... +50°C

Operating time: approx. 12 hours (90% standby, 5%TX, 5%RX)

Weight: approx. 430g

Intrinsically-Safe Two-Way-Radio Ex-PMR 500

Communication in Ex - areas

The Ex-PMR 500 radio transceiver was developed as a low-cost alternative for communication in Ex-hazardous areas. This device is used for servicing, maintenance and repairs in chemical plants, refineries, tank farms and other such Ex-hazardous areas.

Communication in Ex-hazardous areas is an important safety aspect. Stringent requirements have to be satisfied by all radio transceivers that are used there, to ensure that a bidirectional flow of information is possible in the field at any time, even over long distances. The Ecom Ex-PMR 500 handportable radio transceiver was developed specifically for this purpose. This device operates in the licence and charge-free PMR 446 radio range. Featuring Atex certification for the II 2 G EEx ia IIC T4 type of protection, the transceiver complies with the very latest standards and can be used unrestrictedly in Categories 2 and 3 (Zones 1 and 2). The frequency band from 446.000 MHz to 446.100 MHz was authorized by the regulatory body for posts and telecommunications (RegTP) with the publication of its administrative order 142/1999 dated November 3rd, 1999. All devices which operate in this frequency range and conform to the ETS 300296 licensing standard are allowed to be used charge-free. The band was also authorised for other European countries. Equipment operated in Germany must be identified by a German licence mark. A CE mark alone is not sufficient. The Ex-PMR 500 now enables the frequency band to be utilised for industrial purposes as well and specifically in potentially explosive atmospheres. Since Cenelec is also in force in most of the countries for which the authorization was issued, this is a logical step.

The PMR 446 radio service represents an alternative to FreeNet and LPD radio, the commercial radiotelephony systems. Although the frequencies do not have primary service status, the level of frequency utilisation in the 446 MHz range is still very low, so that disturbances are extremely uncommon. The 446.00625 MHz to 446.09375 MHz band.



There is room for eight frequency modulation channels for voice transmission in the 446.00625 MHz to 446.09375 MHz band. Their technical specification is described in the ETS 300296 standard. Only handportable devices are approved. The aerial must be an integral element, in other words not removable. The CTCSS and DCS pilot tone systems are configured for selective analogue and digital coding. A variety of tones (call numbers) are thus possible in CTCSS Mode 47 and DCS Mode 83.

Technical data:

Frequency range:	446,00625 – 446,09375 MHz
Receiver:	double superhet with 1.ZF 21,4 MHz and 2.ZF 455 KHz
Sensitivity:	approx. 0,2 µV by 12 dB S/N ratio
Channel spacing:	12,5 KHz

The Ex-PMR 500 is a Two-Way-Radio for wireless communication in Ex-hazardous areas which needs no licence* or fee payment (* in many European countries)

- 8 channels
- DCS selective call for transmission and reception
- up to 5km range
- clone -facility
- built-in VOX-function
- scan function
- emergency call / alarm button
- out-of-range detection
- backlit multifunction display

Ex-data:

Ex designation:

Ⓜ II 2 G EEx ia IIC T4

EC-Certificate of conformity:

TÜV 01 ATEX 1713 X

Standard delivery:

Ex-PMR 500 with leather case incl.

Ex-Battery pack AM 500

Accessories:

Charger LT 500 for Ex-PMR 500

Earplug with integrated microphone

CMP 123-Ex

Speaker-/ microphone-combination ML 03



Transmitter power: 500 mW EIRP

Spurious and / harmonic waves: better than -60 dB

Audio output power: 0,5 mW max at 16 Ω

Power supply: rechargeable Ni-MH battery

Operating time: approx. 7 - 12 hours

(90% standby, 5% TX, 5% RX)

Weight: approx. 410 g



Intrinsically-Safe Digital Dictating Device Voice-Ex 180



Thanks to its total recording time of 180 min. and 3 different files, the Voice-Ex is an ideal recording device for storing important voice messages in Ex-areas.

Priorities for the individual messages can be set by selecting different files and a continuous overview is guaranteed by the appointment record management.

The simple and fast operation as well as the control over the individual functions and an overview of the files can be monitored on the LCD display. Date, time and several special features such as waking signal or speech-activated recording can be easily selected via the main menu. Battery condition and the time remaining which includes the passages already recorded can be simultaneously displayed by pressing a key.

Technical data:

Ambient temperature T_a : -20°C ... +50°C

Power supply: 2 x LR0 As per IEC, AAA (type approved batteries)

Operating time: approx. 40 hours (continuous recording)

Dimensions: 115 x 48,2 x 15 mm (L x B x H)

Weight: approx. 83g (with batteries)

Housing: silver coloured plastic

IP protection: IP 30

The Voice-Ex 180 is a digital dictating device for recording voice messages in Ex-hazardous areas of Zones 2 and I in accordance with Directive 1999/92/EC (ATEX 137).

- 3 files, A, B, and S, each with 100 speech passages can be stored
- recording time 67 min. (SP) or 180 min. (LP)
- 16 MB flash memory
- appointment function
- fast replay, skip forward
- waking signal / appointment record reminder
- Active voice recording

Ex-data:

Ex designation:

Ex II 2 G EEx ia IIC T4

EC-Certificate of conformity:

TÜV 01 ATEX 1733 X



The Voice-Ex 180 is ideal for important voice recordings in Ex-hazardous areas!

Intrinsically Safe Ex-Pager A5



Reliable messaging in Ex-Zones
The Ex-Pager A5 is an ideal device for permanent and safe contact availability, e.g. when inside laboratories, production plants or refineries - anywhere when there are restrictions on using other communication devices. Messages are effected securely and rapidly, whether as tone-numeric or alphanumeric.

The Ex-Pager is a compact, robust and easy to operate communication unit for use in Ex-hazardous areas. In industrial environments, the Ex-pager is ideal for service, maintenance and manufacturing management information. As well as messages, signals notifying violation of measurement limit values and system status information can be received on the pager. Messages can be sent to the pager user via an operator, PC modem, Internet, e-mail or speech. The user can be contacted - but can decide for themselves how important the message is. The large capacity memory provides the Ex-Pager with space for up to 16 messages, with each message having up to 80 characters.

The Ex-Pager is easily clipped to a jacket pocket or belt, leaving hands free for safe and effective communication in the work place.

All of this makes the Ex-Pager A5 an economical yet powerful and compact addition to an intrinsically safe communication system.

Features

- Reception of tone, numeric or alphanumeric messages
- Operating time over 1200 hours
- 16-character alphanumeric illuminated LCD
- Space for 16 messages (80 characters)
- Write protection for 8 messages
- Message time stamp
- Date and time
- Rugged housing
- Simple 3 button operation

Ex-Daten:

Ex designation:
 Ⓢ II 2 G EEx ia IIC T4

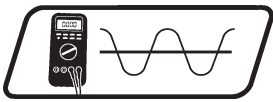
EC-Certificate of conformity:
 TÜV 98 ATEX 1326

Standard delivery:

- Ex-Pager A5 (466.075 MHz)
- Belt Clip Holster
- Battery

Technical data:

Power supply:	1 x Battery: Type I, 5V AAA IEC LR03
Operating time:	approx. 1200 hours
Operating temperature:	-20°C to +40°C
Weight:	approx. 66 g (incl. Battery)
Dimensions:	49 x 71 x 20 mm (HxWxD)



ecom instruments is expanding its competencies

ecom instruments, the company known worldwide as the specialist for devices and auxiliaries of professional quality for the Ex-area, is expanding its range of products. Besides its existing Ex-range, ***ecom instruments*** now also provide products for the "non-Ex" area in the future.

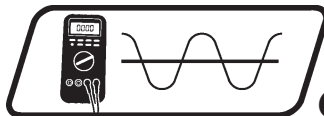
In the past we have been frequently asked if we could supply our products as standard "non-Ex" versions. Consequently, with this in mind, ***ecom instruments*** are pleased to be now able to offer to you a range of "non-Ex" products – backed, of course, by ecom's reputation for high quality and service.

As part of this development, we have further strengthened our co-operations with well known business partners world-wide. Companies such as **Fluke**, arguably the most well known and respected manufacturer of measuring technology for industry.

Fluke is also our partner for Ex-safe devices - so creating a partnership between ***ecom instruments*** and **Fluke** for the benefit of you, the user.

Therefore, in the future we trust that ***ecom instruments*** will become a well known and reliable partner - both inside and outside of Ex-areas.





Measuring & Calibration in Ex-zones



Measuring

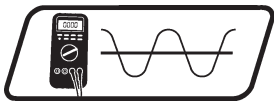
I.S. Multimeter	Ex-DM 1000	40-41
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Intrinsically-Safe Multimeter Ex-DM 1000



The Ex-DM 1000 multimeter is a high performance measurement device for exacting industrial and electronic applications within and outside Ex-hazardous areas of zone 2 & zone 1 according to Directive 1999/92/EC (ATEX 137).

- 11 functions to choose from
- 4 1/2 digit display with bar indicator
- Distinct background lighting
- Min / max / avg. function
- Splash-proof & Dust-proof
- CAT III 1000 Volt as of EN 61010-1

Ex-Data:

Ex designation:
 Ⓜ II 2 G EEx ia IIC T4

EC-Certificate of conformity:
 TÜV 01 ATEX 1658 x

Standard delivery:

Ex-DM 1000 with measuring leads,
 Crocodile clips and holster

Accessories:

Carry case
 DKD-Certificate for all ranges
 Calibration-Certificate
 Leather carry case

The Ex-DM 1000 offers all the functions of a high performance measurement instrument for both within and outside explosion-endangered areas of zone 2 & zone 1 according to ATEX*. This safety feature is complemented by testing in accordance with EN 61010-1 test for CAT III 1000V and the easily replaceable fuse (400mA and 10A-ranges). The "input-alert" facility ensures that the selected range corresponds with the attached measuring sockets.

Technical data:

A/D converter	40 measurings per second
Reference temperature range	+18°C ... +28°C
Operating temperature range	-20°C ... +50°C
Storage temperature range	-40°C ... +60°C
Reference humidity range	0 ... 80% relative humidity (0 ... 35°C)
Battery	9V-block as of IEC 6LR61 (according to specification)
Battery life	approx. 400 hours
Dimensions (LxWxH) with holster	201 x 98 x 50 mm
Weight	approx. 715 g

Combi device

The industrial areas of application of the Ex-DM 1000 are in the conventional electrical engineering fields as well as in the Ex-areas for measurement, control and maintenance of installations. The perfect technique enables applications which are state-of-the-art today and which this multi-device easily masters in everyday industrial life.



fast, reliable, accurate

*Complying with the parameters and maximum values specified and approved.

With the explosion-protected digital multimeter Ex-DM 1000, ecom offers the best that measurement technology has to offer, also for the Ex-area. Safe, powerful, easy to use and with all these features approved by the Technical Monitoring Association, it guarantees a high degree of long-term investment and working safety. The multirange meter Ex-DM 1000 with the Ex-classification EX II 2G Eex ia IICT4 according to ATEX (Technical Monitoring Association approval TÜV 01 ATEX 1658 X) satisfies a large number of applications both within and outside Ex-hazardous areas.

FLEXIBILITY THROUGH EX-PROTECTION

For the first time, an instrument is available which complies with the new ATEX standard (from the middle of 2003 the new Ex-standard) with additional approval for the connection to intrinsically-safe and non intrinsically safe electrical circuits. For the user this means that with the Ex-DM 1000, parameters of max. 65V and max. 5A in intrinsically-safe circuits are permissible and measurements up to max. 1000V and max. 10A on non-intrinsically-safe circuits are possible and permissible. Measurements up to max. 1000V and max. 10A on non intrinsically-safe circuits (in pressure encapsulated housings or Ex-three phase power sockets) assume that the existing safety regulations are adhered to.

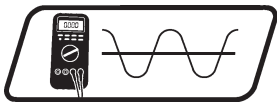
INDISPENSABLE

Conventional practical design and functional features combined with reliable robust technology and a high degree of safety make the Ex-DM 1000 an indispensable companion for MSR technicians, engineers and those responsible for maintenance and commissioning within and outside of Ex-hazardous areas.

Specification

DC Voltage	Range	400mV.....1000V
	Resolution	0,1 mV.....1V
	Accuracy	±0,05.....±0,1% + 1 Digit
	Input Impedance	10 MΩ; <100pF
	Overload protection	1000 V RMS
AC Voltage	Range	400mV.....1000V
	Resolution	0,1 mV....1V
	Accuracy	±0,7+2% +2....20 Digit
	Input Impedance	10 MΩ;<100pF
	Overload protection	1000 V RMS
Direct Current	Range	400µA.....10A
	Resolution	0,1 µA.....10mA
	Accuracy	±0,2.....±0,4% + 2Digit
Alternating Current	Range	400µA....10A
	Resolution	0,1 µA.....10mA
	Accuracy	±1% + 2.....4Digit
Resistance	Range	400Ω.....40MΩ
	Resolution	0,1 Ω.....0,01 MΩ
	Accuracy	±0,2.....±1% + 1.....3Digit
	Overload protection	1000V RMS
Conductance	Range	40,00nS
	Resolution	0,01nS
Continuity Test	Level	k. A.
	Overload protection	1000V RMS
Diode Test	Voltage	3V
	Accuracy	±2% + 1 Digit
Frequency	Range	199,99Hz.....<200kHz
	Resolution	0,01 Hz.....0,1Hz
	Accuracy	±0,005% + 1Digit
Duty cycle	Range	0,0.....99,9%
Capacity	Range	5nF.....5µF
	Resolution	0,01nF.....0,01µF
	Accuracy	±1.....±1,9% + 3Digit
Remark	Measurements in Ex-hazardous area: $U_i \leq 65V, I_i \leq 5A$ Measurements outside Ex-hazardous area: $U_i \leq 1000V, I_i \leq 10A$	





Intrinsically-Safe Non-Contact Temperature Meter Ex-MX 2



The intrinsically-safe non-contact temperature meter Ex-MX 2 is a robust, highly reliable and easy to use instrument for measuring the temperature of objects that are difficult to access, are moving or are as material on conveyor belts.

Operation could not be simpler: sight the object, press the trigger and read the temperature off the display immediately. The need to use the time consuming practice of focusing or calibration is now a thing of the past.

The laser sighting allows exact areas - even on distant objects - to be pinpointed, so that high accuracy and an exact capture of a specific area can be guaranteed. The Emissivity-Factor of 0.1 to 1.5 can be variably adjusted by increments of 0.01. This enables high measuring accuracy with only the emitted radiation part of a body being calculated from a cluster of emitted, reflected and transmitted radiation. Constant information about the actual temperature as well as minimum and maximum temperature values are displayed along with a graphical trend of the previous 10 readings and also the condition of the battery.

The backlit display enables readings to be taken even when used in dark environments and poor light conditions. The benefit of this simple yet robust device is that temperature monitoring as part of routine maintenance or manufacturing procedures can be easily carried out over a wide temperature range of -30 to +900°C and with an high accuracy .

The Ex-MX 2 now allows high precision, repeat accuracy of temperature monitoring tasks to be carried out safely within the Ex-hazardous area.

For non-contact temperature measurement and monitoring of temperature processes in Ex-hazardous areas.

- Temperature range: from -30 to +900°C
- Quick response time: 250 ms
- Simple operation: trigger action
- Trend display: recall of previous 10 readings
- Reliable: laser circuitry provides measurement mark diameter
- Measure from Zone 1 into Zone 0

Ex-data:

Ex designation:
 Ⓢ II 2 G EEx ia IIC T4

EC-Certificate of Conformity:
 TÜV 00 ATEX 1597 X



Technical data:

Temperature range:	-30°C ... +900°C	Ambient operating range:	0°C ... +50°C - with laser max. +45°C
Accuracy: (25°C)	±0,75% measured value or ±0,75K, of reading whichever is greater (±2K for measured object under -5°C)	Storage temperature:	-20°C ... +50°C
System failure: (at 25°C ± 25K)	<0,05K/K or <0,05%/K, of reading whichever is greater	Relative humidity:	10-95% r.H. at up to 30°C
Repeatability:	±0.5% measured value or ±0,5K of reading whichever is greater (95%)	Battery:	2x IEC LR6/AA respectively R6/AA
Response time:	250 ms	Dimensions:	200 x 170 x 50mm
Indication elimination:	0.1°C with temperature	Weight:	450g
Emissivity adjustment:	0.10 to 1.50 (0.01 incremental)	Spectral response:	8 to 14 μm
Display:	actual temperature minimum temperature maximum temperature graphical trend (previous 10 readings) warning symbol emissivity level battery condition	Laser:	class 2 laser

Intrinsically-Safe Non-Contact Temperature Meter Ex-MP 4

For non-contact temperature measurement and monitoring of temperature processes in Ex-hazardous areas.

- high accuracy
- simple operation
- quick response time
- laser target sighting
- Measure from Zone I into Zone 0

Ex-data:

Ex designation:
 II 2 G EEx ia IICT4

EC-Certificate of Conformity:
 TÜV 00 ATEX 1580 X

Low maintenance and non invasive

- The temperature of the object being measured is not affected by the procedure.
- Non contact of the detector means no wear and tear.
- No fixing or fastening points required on either the object or equipment.

Hard to reach objects and moving materials

- The optics of the pyrometer are aimed at the object to be measured and with the laser sighting it is possible for both small and distant objects to be targeted.
- Hazardous and aggressive materials can be safely measured - and without fear of damaging the equipment.
- The compact size of the pyrometer allows it to be used in even the most awkward positions, with only a clear line of sight to the target area being required.
- With direct contact measurement, poor heat conduction or heat capacity of the object can prevent insufficient heat flow to a measuring device.



The intrinsically-safe non-contact temperature measuring equipment Ex-MP 4 is a robust yet exceedingly handy and easy to use instrument for temperature measuring in hazardous areas.

The benefits of non-contact measurement

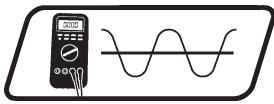
- Increased safety when determining the temperature of fast moving objects.
- No antennas mean that frictional heat cannot affect the measurement.
- No mark or blemish is left on the object being measured.

Response time

- Fast and accurate. Pyrometers respond to emitted energy and are around 20 to 1000 times quicker than traditional direct contact thermometers.

Technical data:

Temperature range:	from -18°C to +260°C (0°F to 500°F)	Emissivity:	preset 0.95
Display resolution:	0.5°C (1.0 F)	Optics D/L:	=1/6
Target sighting:	Laser (class 2)	Spectral response:	7 to 18 μm
Accuracy:	-18°C ... -1°C ±3°C (at 23°C)	Ambient operating range:	0°C...+50°C
	-1°C ... +260°C	Storage temperature range:	-20°C...+65°C
	± 2°C or ± 2% of reading	(without battery)	
Repeatability:	- whichever is greater, ± 2% of reading or ± 2°C	Relative humidity:	10 to 95% r.H. non-condensing at up to 30 deg C
	- whichever is greater	Power supply:	9V alkaline battery type IEC 6LR61
Response time:	500 msec	Dimensions:	152 x 101 x 38mm
		Weight:	~ 200 g



Intrinsically-Safe Data Logger Ex 171-0 / Ex 171-3



For the recording, processing and documentation of temperature and humidity levels in Ex-hazardous areas.

- Memory capacity:
Up to a maximum of 55,000 measurements (20,000 at version 171-3)
- Real-time storage capability
- RS 232 serial interface
- Robust housing
- Simple, straightforward & easy to use

Ex-data:

Ex designation
 Ex II 2 G EEx ia IIC T4

EC-Certificate of conformity:
 TÜV 00 ATEX 1586

Standard delivery:

Ex 171-0 incl. internal temperature probe, battery, startmagnet and calibration-certificate

Ex 171-3 incl. internal temperature probe, humidity probe, battery, startmagnet and calibration-certificate

Accessories:

Comsoft 3 (without Interface), 4 Languages (German; English; French; Italian)
 Comsoft 3 Version 2 | CFR I |
 Interface for Comsoft 3

The data logger series Ex 171-0 / 171-3 is used for the measuring and storing of temperature and humidity levels in hazardous areas. The robustly designed metal casing that houses the equipment ensures constantly high measurable accuracy over a wide temperature range even under extremely harsh industrial conditions. With its precise measuring and documentation capabilities the Ex171 series has wide ranging applications in the petro-chemical and pharmaceutical manufacturing industries. Particularly in pharmaceutical production, the parameters of temperature and humidity are of critical and vital importance as they effect product quality both during and after the production process. With sensitive products, for

example, possible damage can occur due to incorrect storage. This type of situation can be easily monitored and interrogated with the use of the EX171 series of data loggers. Complete data analysis and data-integration with other programs is carried out through the use of the menu-driven software based on Windows 3.1. Once outside of the hazardous area, data can then be easily transferred into a PC by means of the straightforward serial interface.

Technical data:	Ex 171-0
Measurements	Temperature
Reading recorder	Internal NTC-aerial
Measurement range	-35°C...+70°C
Resolution	0,1°C
Accuracy	± 0,5°C ≤ +40°C ± 0,6°C > +40°C
Measuring interval	2sec...24h
Memory	55.000
Protection rating	IP68
Power supply	Lithium battery size AA
Housing	Anodised aluminium
Dimensions	131 x 68 x 26 mm
Ambient temperature	-35°C...+70°C
Storage temperature	-40°C...+85°C
Software	Windows 3.1

	Ex 171-3
Measurements	Temperature
Reading recorder	Internal NTC-aerial
Measurement range	-10°C...+50°C
Resolution	0,1°C
Accuracy	± 0,4°C
Measuring interval	2sec...24h
Memory	20.000
Protection rating	IP65
Power supply	Lithium battery size AA
Housing	Anodised aluminium
Dimensions	131 x 68 x 72 mm
Ambient temperature	-10°C...+50°C
Storage temperature	-40°C...+85°C
Software	Windows 3.1

Intrinsically-Safe Surface Temperature Measuring Device Ex-TP 20



the temperature is transferred optimally into the Type K (NiCr-Ni) thermal converter.

The ergonomic design of the device makes single-handed use easy, with the simple control buttons enabling the temperature reading to be monitored on a constant basis or for the reading to be "held".

Switching between C and F scale values is simple and the large display means that temperatures are easy to read - even under difficult conditions. All of which goes to making the Ex-TP 20 the perfect device for use in Mining, Gas and Dust-Ex zone areas.

The perfect handheld device for fast checking of surface temperatures of equipment and component parts in Ex-hazardous areas.

- Quick and simple operation
- Compact and robust
- Energy-saving technology

- **Dust Ex-zone 20**
- **Gas zone 0**
- **Mining M I**

Application:
Chemical and pharmaceutical manufacture. Petrochemical and mining industries.

- Temperature monitoring**
- on pumps and conveyors
 - of surface temperature on components
 - of ball bearing temperature on bearings

Ex-data:
 Ex designation:
 Ⓢ II 1 GD EEx ia IICT4
 Ⓢ I M1 EEx ia IP 65

EC-Certificate of conformity:
 ISSeP 03 ATEX 036X

- Standard delivery:**
- Ex-TP 20
 - including batteries

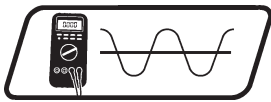
The Ex-TP20 is a reliable, robust temperature measuring device for use in Ex-hazardous areas. Meeting the needs and requirements that are demanded for optimum use, the device is capable of precise measuring up to +200C and is certified for use in any classified Ex-zone.

Compact in size, the device's robust housing provides an IP protection level of 65 and is designed to precisely read the surface temperature of a component within a temperature range of -40C to +200C.

Spring-mounted, the flexible silicon temperature measuring surface adjusts easily - even to rough surfaces - so that

Technical data and specifications:

Operating range T _a :	0°C ... +50°C
IP protection:	IP 65
Dimensions:	165 x 50 x 21 mm
Weight:	approx. 100g (with batteries)
Sensor type:	TC type K
Measuring range:	-40°C ... +200°C
Reaction time:	approx. 15 sec.
Accuracy:	< 1.5°C
Resolution:	±1°C
Measurement application:	Contact measurement at max. 10° from the vertical
Battery operating time:	approx. 2000 hours
Batteries / power supply:	3 x LR03 AAA by IEC



Intrinsically-Safe Sensor-Temperature Measuring Unit Ex-Pt 720

The Ex-PT 720 is designed for easy and accurate measurements in explosion-endangered areas up to Zone 0.

The simple operation and the large clearly-readable display enable a wide field of application. The compact and light weight design allows for easy one handed operation.



For accurate and easy measurement of temperature in Ex-hazardous areas up to Zone 0.

- high accuracy
- handy size
- digital display
- Measurement from Zone I into Zone 0
- measurement range
-50 ... +400°C / -58°F ... +752°F

Operation:

ON / OFF button, HOLD button
°C / °F changeover
Auto-Off after 10 min. (excl. HOLD)

Display:

3 digit
large display
LOW-batt. display
sensor break detection

Ex data:

Ex designation:
Ⓔ II 2(1) G EEx ia IIC T4

EC-Certificate of conformity:
TÜV 01 ATEX 1757 X

Standard delivery:

Ex-Pt 720 with carrying strap

Accessories:

- leather case

Sensors on request

- immersion sensor
- insertion sensor
- surface sensor

Technical data:

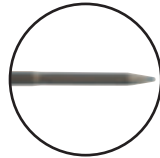
Measuring sensor:	Pt 100 / 4 wire		
Measurement range		-50°C ... +400°C	-58°F ... +752°F
Accuracy :	± 0,2°C	-50°C ... +199,9°C	-58°F ... +390°F
(± 1 Digit)	± 0,2% v. Mw.	+200°C ... +400°C	+390°F ... +752°F
Resolution:	0,1°C	-50°C ... +199,9°C	-58°F ... +390°F
	1°C	+200°C ... +400°C	+390°F ... +752°F
System accuracy with immersion/insertion sensor			
(± 1 Digit)	± 0,6°C	-50°C ... +100°C	-58°F ... +210°F
	± 0,5% v. Mw.	+100°C ... +400°C	+210°F ... +752°F
Operating temperature:		-10°C ... +50°C	+14°F ... 122°F
Storage temperature:		-20°C ... +70°C	-5°F ... 130°F
Unit dimensions:	190 x 57 x 42 mm		
Weight:	approx. 200 g with battery		
Power supply:	1 x standard 9V battery block (IEC 6LR61)		
Battery life:	approx. 100h		
Protective rating:	IP 54		



Standard probes Ex-Pt 720

Standard probe

0628 1232:



measurement range:	-50°C ... 400°C
accuracy:	class A
Ex-Zones:	2, I
probe dimensions:	110mm x 4mm (w x ø)
sensor dimensions:	30mm x 3,2mm (w x ø)
response time (99%):	12 Sec.

Surface probe

0628 1932:



measurement range:	-50°C ... 400°C
accuracy:	class B
Ex-Zones:	2, I
probe dimensions:	110mm x 4mm (w x ø)
sensor dimensions:	3,2mm (ø)
response time (99%):	40 Sec.

Stainless-steel probe

0628 2232:



measurement range:	-50°C ... 400°C
accuracy:	class A
Ex-Zones:	2, I, 0
probe dimensions:	125mm x 4mm (w x ø)
sensor dimensions:	15 x 3mm (w x ø)
response time (99%):	10 Sec

Drone Tank probe

0628 2432:



measurement range:	-50°C ... 400°C
accuracy:	class A
Ex-Zones:	2, I, 0
probe dimensions:	235mm x 25mm (w x ø)
weight:	400g (without cable)
response time (99%):	10 Sec
cable:	25 m

Special probes Ex-Pt 720

Immersion / insertion probe

0600 9999 measurement range:	-50°C ... 400°C
0628 1232: accuracy:	class A
Ex-Zones:	2, I
probe dimensions:	>50mm x >4mm (w x ø)
sensor dimensions:	>30mm x >3,2mm (w x ø)
response time (99%):	12 Sec.

Stainless-steel insertion probe

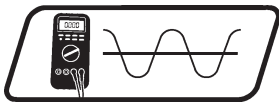
0600 9999 measurement range:	-50°C ... 400°C
0628 2232: accuracy:	class A
Ex-Zones:	2, I, 0
probe dimensions:	>50mm x >4mm (w x ø)
sensor dimensions:	>15 x >3mm (w x ø)
response time (99%):	10 Sec.

Surface probe

0600 9999 measurement range:	-50°C ... 400°C
0628 1932: accuracy:	class B
Ex-Zones:	2, I
probe dimensions:	>50 mm x >4mm (w x ø)
sensor dimensions:	>9 mm (ø)
response time (99%):	40 Sec.

Drone Tank probe

0600 9999 measurement range:	-50°C ... 400°C
0628 2432: accuracy:	class A
Ex-Zones:	2, I, 0
probe dimensions:	235mm x 25mm (w x ø)
weight:	400g (without cable)
response time (99%):	10 Sec
cable:	1 ... 50 m



Intrinsically-Safe Ultrasonic Wall Thickness Gauge 1071-Ex



The calibration functionality of the instrument means that adjustments can be made to compensate for the type of material being measured, this is done by one of two ways:

1. entering the sound velocity of the corresponding material
2. measuring a material with known thickness and adjusting the instrument to that reference.

These adjusted parameters then stay in the memory even when switching off the instrument. Display resolution and sensitivity are also fully adjustable and as with all the other functions, are easily selected from the straightforward menu.

For checking minimum wall thickness of pipes and tanks in Ex-hazardous areas

Ranges:

- standard probe: 1,5 to 250 mm
- mini probe: 0,7 to 25 mm
- low frequency probe: 5 to 400 mm

Probes can be changed in Ex-zones

Accuracy $\pm 0,05$ mm

Functions:

- limit value guides and monitoring
- adjustable sensitivity
- easy to use
- energy saving mode

With the 1071-Ex measurements of wall thicknesses can be made quickly and accurately in the range of 0,7 to 400 mm.

There are three different probes available to cover this wide measuring range, each of which can be easily and conveniently changed inside the hazardous area.

- standard probe: 1,5 to 250 mm
- mini probe: 0,7 to 25 mm
- low frequency probe: 5 to 400 mm

Due to its compact size and operating time of over 200 hours this easy to use instrument is essential whenever the continuous supervision of minimum wall thicknesses is required.

For example, it is possible to check the thickness of protective coats or for the erosion of pipe or tank walls even while the plant is operating.

By using the limit value guides, minimum and maximum values can be set and are registered by an audible signal.

Technical data:

Ingress protection:	IP54
Dimensions:	120 x 65 x 25 mm
Weight:	150 g
Operating temperature:	-10 °C to 40 °C
Storage temperature:	-20°C to 60°C (without batteries)
Supply:	2 x primary cells AA to IEC LR6
Working time:	200 hours continuous operation 1-2 years stand-by operation permitted in zone I
Instrument:	operation permitted in zone O
Probes:	can be exchanged in hazardous areas standard sensor operating temperature up to 200°C for a short time
Contact gel:	perfect connection between sensor and material
Vulcollan film:	prevents wear of probe if it is used on rough surfaces

Ex-data:

Ex designation:
 II 2 (1) G EEx ia IIC T4

EC-Certificate of conformity:
 PTB 97 ATEX 2231 X

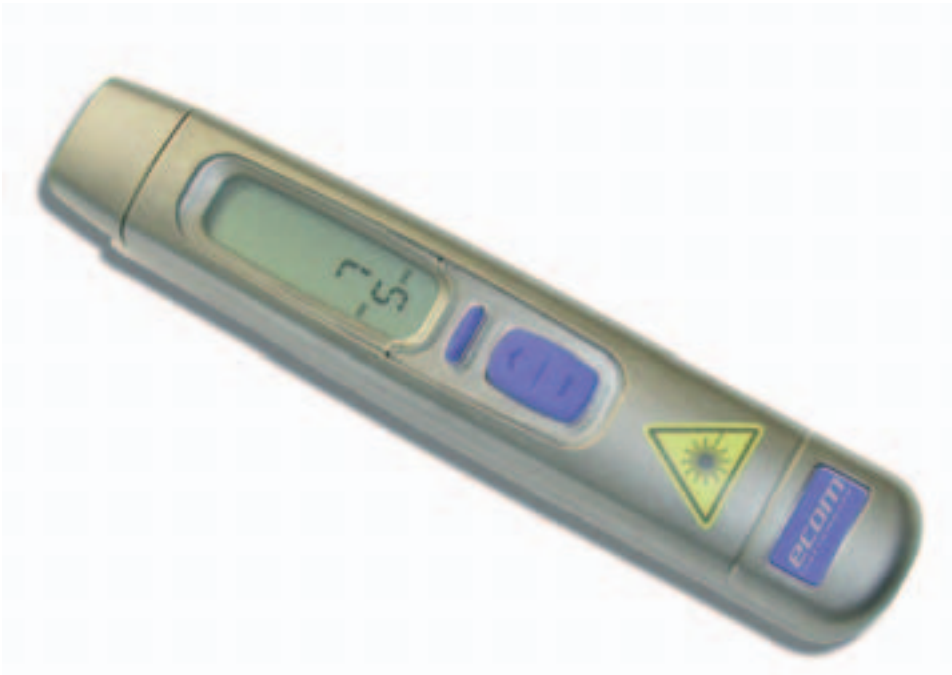
Standard delivery:

Echometer 1071-Ex incl. primary cells, case and 100 ml of ultrasound couplant gel

Options & Accessories:

- Standard probe DSE 10,4 / 6 PB 4
- Handle-collar for standard probe
- Vulcollan films (10 pcs.) for DSE 10,4 / 6 PB 4
- Low frequency probe DSE 18 / 25 PB 1,5
- Handle-collar for low frequency probe
- Vulcollan films (10 pcs.) for DSE 18/25 PB 1,5
- Mini probe DSE 4,2 / 4 PB 8
- Vulcollan films (10 pcs.) for DSE 4,2 / 4 PB 8
- ECHOTRACE ultrasound couplant gel 500 ml

Intrinsically-Safe Laser Tachometer Ex-Tacho 10



The Ex-Tacho 10 is ideal for fast laser-accurate measurement of the revolution of a shaft (either with or without contact) and speed (utilising the special adapter) in Zone 1. The simple 3 push-button operation and the large clearly-readable display with over-head facility enables a wide, flexible field of application. This light-weight device provides an easy one handed operation and facilitates the carrying-out of measurements after which it can be stowed away in the tool box or jacket pocket.

Applications are to be found in the process-control field for the contactless measurement of the revolutions of a shaft at a safe distance using a laser beam. For boiler mixers, the rotor speed can be read-off from the drive shaft at a safe distance and documented. Motor revolutions can be acquired contactlessly in the immediate vicinity without having to open or remove safety fittings such as covers or protective grills. The duration of pulses or the intervals between them can be simply, easily and accurately ascertained. Data can be simply acquired within Ex-protected areas without having to switch machines off because laser-accurate measurements can be made at a safe distance through protective devices thus complying with safety regulations. The transport speed of conveyor belts can be exactly measured using the add-on adapter and thus directly recorded in the documentation.

Technical data:

Measuring system:	optical / laser reflection	
Laser class:	2	
Measuring function:		
Rotational speed:	rpm	rps
Speed:	m / min.	m / sec.
	yd / min	yd / sec.
	ft / min	ft / sec.
Time interval:	sec.	
Measurement range:	3 ... 99.999 rpm 0.005 ... 1.666 rps autoselect	
Accuracy: (at rate)	0.01% ± 1 digit	
Resolution:	0.001 digit or ± 1 digit fest (selectable) (in the autorange)	
Measurement angle:	max. ± 80° to the measurement object	
Measurement distance:	max. 2 m	
Operating temperature:	-20°C ... + 40°C	
Storage temperature:	-20°C ... + 40°C	
Dimensions:	215 (260) × 40 × 40 mm w/o (with) adapter	
Weight:	approx. 360 g with battery	
Power supply:	4 x Duracell Procell AAA alkaline	
Battery-Low:	display	
Battery life:	approx. 6 months	

For the accurate and fast measurement of shaft rotation or speed with or without contact.

- high accuracy
- handy size
- digital display
also for over-head measurement
- types of measurement – revolution, speed
- measurement range 3 ... 99.999 rpm


Operation:

- ON button – Auto-Off after 1 min.
- HOLD function for 1 min. after releasing button
- Programming function using 3 buttons
- Statistic functions (min./max./average)

Display:

- 5 digit
- large display
- LOW-batt. display
- pulse recognition
- function mode

Ex-data:

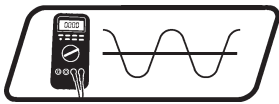
Ex designation:
 II 2 G EEx ia IICT4

EC-Certificate of conformity:
 BAS02ATEX2159X

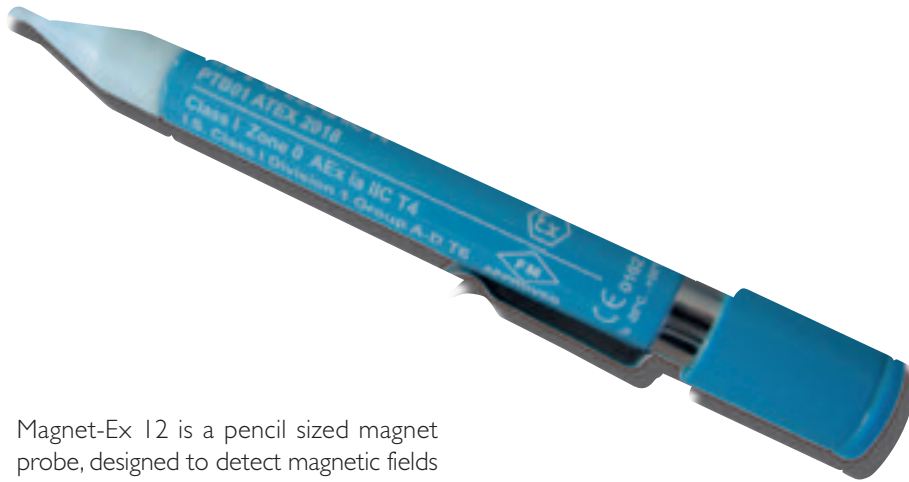
Standard delivery:

Ex-Tacho 10, batteries and test certificate





Intrinsically-Safe Magnet Probe Magnet-Ex 12

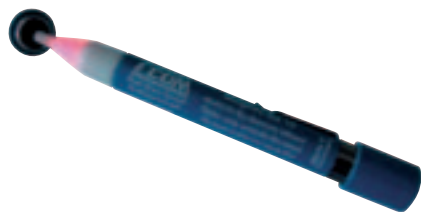


Magnet-Ex 12 is a pencil sized magnet probe, designed to detect magnetic fields in hazardous areas. Within seconds it is possible to detect whether or not a solenoid valve is electrically activated.

Connection to electronic circuitry or opening of terminal boxes is rendered unnecessary.

The highly sensitive probe point of the Magnet-Ex 12 only needs to be brought near the coil of a solenoid valve, if the probe shows a red light this indicates that the magnet is activated. In the same manner tests can be carried out on flowmeters or any other equipment that is working magnetically, even when located in hazardous areas.

The Magnet-Ex 12 comes with an integral test magnet that is securely fitted in such a way that it cannot be easily lost. Using this magnet, tests can be carried out to establish the working state of both unit and batteries.



After any check the Magnet-Ex 12 will automatically switch off if it is no longer being used. This ensures a long battery life.

The clip attached to the instrument's side secures it from accidental loss and allows the maintenance engineer to easily carry it at all times.

Technical data:

Detectable magnetic fields:	alternating, direct and permanent fields
Detection:	no contact with test object required
Indication:	optical, built-in LED
Power supply:	2 x standard batteries AAA according to IEC LR03 or NiCd-rechargeable batteries
Working temperature:	-20°C ... +50°C
Storage temperature:	-40°C ... +60°C
Ingress protection:	IP 54
Casing material:	metal/plastic probe point
Dimension:	150 x Ø 18 mm
Weight:	60g (batteries included)

For testing solenoid valves, relays, transformers and flow-meters in Ex-hazardous areas.

Properties:

- highly sensitive
- no contact with test object required
- resistant to dirt

Indication:

- optical

Built-in test magnet:

- for testing Magnet-Ex 12
- for battery check

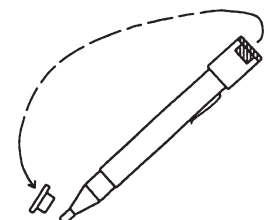
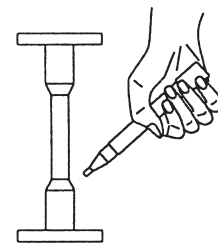
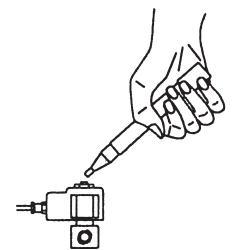
Ex-data:

Ex designation:

⊕ II 2 G EEx ia IIC T4

EC-Certificate of Conformity:

PTB 01 ATEX 2018



Intrinsically-Safe Continuity Tester Ex-DT 12

Continuity tester with acoustic and optical indication for fast testing of electrical continuity in Ex-hazardous areas.



Actual size

The Ex-DT 12 Intrinsically-Safe continuity tester is a handy and robust testing device for use in Ex-hazardous areas. The electronics are housed in the test probe, which means that both hands are free to be able to carry out the test operation.

Application:

- Testing of wiring and electrical contacts
- Testing of resistances
- Testing of capacities
- Testing of inductivities
- Establishing the transmitting direction of semi-conductors

Ex-Daten:

Ex-designation:
 I 2 G EEx ia IICT4

EC-Certificate of Conformity:
 TÜV 03 ATEX 2120



The combination of optical and acoustic indication allows usage even in noisy environments.

Standard delivery:

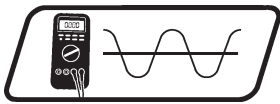
- Ex-DT 12
- 2 protective caps
- 2 x LR03 (AAA) batteries

Accessories:

- Protective caps
- Spare battery LR03(AAA)

Technical data:

Working temperature:	-20°C ... +50°C
Resistance:	10Ω - 450kΩ
Inductivity test:	10mH – 1H
Capacity test:	0.5μF – 1000μF
Diode test:	2 diode sections
Max. external inductivity	1H
Max. external capacity	1000F
Max. error output flow I _o	5mA
Max. error output voltage U _o	3.3V
Max. external voltage resistance outside of ex-zone	U _m = 420V _{eff}
Duration of operation:	approx. 20h (continuous)
Visual readout:	4 x LED (in test probe)
Acoustic readout:	loudspeaker
Test probe dimensions:	50 x 180 mm (1 x)
(Minus pol)	
Overall length:	1,40 m (test probe to test probe)
Weight:	approx. 200g (including batteries)
Power supply:	2 x LR03 to IEC



Intrinsically-Safe Solar Pocket Calculator TI-36 Ex SOLAR



Power supply:

- Solar panel
- no batteries required
- no environmental pollution

Display:

- 10 significant figures
- 2-figure exponent

Fixed physical constants:

- Speed of light
- Electron charge

Ex-data:

Ex designation:
 Ⓜ II 2 G EEx ia IIC T4

EC-Certificate of Conformity:
 PTB 01 ATEX 2133

The TI-36 EX SOLAR is a solar-powered pocket calculator for use in hazardous areas. It allows computations and calculations to be performed as soon as there is sufficient light on the solar panel.

The unit switches on automatically and provides 160 operations, which are displayed to a maximum of 10 significant figures (plus a 2-figure exponent). The internal display register contains three data memories.

Simple operations such as percentage calculations can be performed as well as calculations involving metric conversion systems and physical constants.

A case is provided in which the calculator can be placed to protect it from damage.

The built-in solar panel makes an active contribution to environmental protection, as no batteries are required. At the same time, the user has a unit that is always ready for use.

Mathematic functions:

- Algebraic Operating System
- Pending Operations and Parentheses
- Correcting Entry Errors
- Basic Operations
- Repeated Calculations
- Percentage Operations
- Memory Operations
- Reciprocals, Powers and Roots
- Logarithms and Antilogarithms
- Angle Units
- Deg/Min/Sec and Decimal Degrees
- Trigonometric functions
- Polar/Rectangular Conversions
- Physical Constants
- Metric Conversions
- Hyperbolic Functions
- Combinations, Permutations and Factorials
- Statistic Modes
- One-Variable Statistics
- Two-Variable Statistics
- Fractions
- Number-System Modes
- Boolean Logic Operations

Technical data:

Power supply:	solar
Working temperature:	-10°C ... +40°C
Storage temperature:	-20°C ... +50°C
Weight:	approx. 110g
Dimensions:	70 x 140 x 10 mm
Memory:	3 data memories
Display:	10 significant figures, 2-figure exponent

I.S. (Radio Time Signal Controlled) Wall Clocks Ex-Time 40/50 (35)



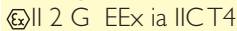
These intrinsically safe wall clocks, Ex-Time 40 and 50, are driven by a Quartz accurate movement, powered by a LR 14 type battery. When necessary, e. g. for summer to winter time, adjustments can be quickly and simply made. An integral bracket enables the clock to be easily fixed to a wall. With two different sizes to choose from, the optimum size for site requirements is now available.

Please note: Battery changes must only be done outside of the Ex-hazardous area.

For precise time in Ex-areas:

- Quartz movement
- Robust metal casing
- Available in two different sizes

Ex-Data:

Ex designation:


EC-Certificate of Conformity:
 PTB 02 ATEX 2197 X



I.S. Class I Division 1 Groups A;B;C;D T4

Accessories:

Spare battery type LR 14

Technical Data	Ex-Time 40	Ex-Time 50
Operating Temperature:	0°C ... +50°C	
Battery operating life:	1 year	
Clock Movement:	Quartz	
Accuracy:	+15 / -5 Seconds	
Power Supply:	1 x LR 14 (according to IEC)	
Weight:	approx. 2,0 kg	approx. 3,5 kg
Dimensions:	400 x 60 mm	500 x 70 mm



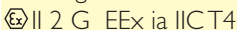
The Ex-Time 35 i.s. wall radio clock receives time signals from the DCF77, Germany's official time signal transmitter located at Mainflingen near Frankfurt via 77.5 KHz long-wave.

The transmitter itself receives time pulses from the world's most accurate clock, the caesium time base of the PTB [Physical Technical Federal Institute] in Braunschweig. Its precision guarantees that it would take one million years for a cyclical deviation of 1 second to occur. The Ex-Time 35 receives the signal via an

Accuracy to a second in Ex-hazardous areas: Radio time signal controlled wall clock from ecom.

- Absolute precise time thanks to DCF 77 time signal
- Highly sensitive integral aerial
- Automatic changeover between summer and winter time
- Stylish but tough metal housing

Ex-data:

Ex designation:


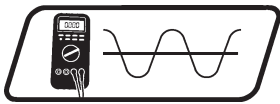
EC-Certificate of conformity:
 TÜV 01 ATEX 1712

Technical data:	
Aerial:	Highly sensitive integrated double aerial
Receiving:	integrated DCF 77 receiver
Frequency:	77,5 kHz
Broadcast range:	approx. 1500 km from Frankfurt (Germany)
Self monitoring:	once per hour
Operating temperature:	-20°C ... +40°C
Synchronisation with time signal:	every hour
Typical battery life:	approx. 5 years
Battery:	acc.to IEC LR 14
Housing (frame):	aluminium
Weight:	approx 1500 g
Ingress protection:	IP 54
Dimensions:	350 x 70 mm

integrated antenna anywhere that a portable radio can obtain a useful reception over long-wave.

The microprocessor integrated into the Ex-radio clock processes the received time signals and fully automatically controls the dial. This eliminates the tedious adjustment from STANDARD TIME to SUMMER TIME.

The radio clock is powered by a battery that under normal usage has a life of several years. Battery replacement is extremely simple although must be done outside of the ex-zone.



Intrinsically Safe Digital Camera Ex-Cam 01



For high quality pictures in Ex-hazardous areas.

- 3,2 Megapixel (2048 x 1536 pixel resolution)
- 128 MB memory card
- 4x Digital Zoom Lens
- Stylish Compact Design
- Robust Housing - High IP 64 Rating

Ex-Data:

Ex-Designation:

Ⓢ II 2 G EEx ib IICT4

Ⓢ II 2 D T70°C IP 64

EC Certificate of Conformity:

ZELM 03 ATEX 0188



NI Class I Division 2 Group A-D T6

Ex-Data (Ex-Cam 01 M):

Ex-designation:

Ⓢ I M2 EEx ib I

EC Certificate of Conformity:

IBExU 04 ATEX 1110

A robust yet compact aluminium housing (note: the Ex-CAM01 M is a brass metal housing) and a high IP protection rating of IP 64 makes the Ex-Cam 01 ideal for use in Ex-hazardous areas.

The 2" TFT colour monitor provides a clear and easy to use viewfinder - which also indicates the resolution setting along with the number of remaining pictures that can be taken and remaining battery capacity. The non-removable 128 MB SD memory card enables up to 70 pictures to be taken - even with the highest resolution setting. With the integrated time/date stamp function every picture and AVI can be documented.

Data transfer to a PC and the charging of the internal battery unit is via the USB-docking station (this being done outside of the Ex-hazardous area).



Scope of supply:

- Camera
- Battery
- Software








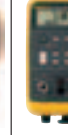
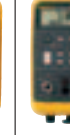




Accessories:

- USB-docking station
- USB-extension cable
- Leather carry case

Technical Data:

Operating Temperature T _a :	0°C ... +40°C
Chip resolution:	3.2 Megapixel (2048 x 1536 Pixel)
Zoom:	4x Digital Zoom
Memory:	128 MB (SD Card), Non-removeable
Focus range:	80 cm >
Monitor:	2" TFT Colour-Display
Sensor:	1/1.8" CCD-Chip
White balance:	automatic, manual (4 Modes)
Dimensions:	110 x 90 x 32 mm
Weight:	approx. 400g; 850g (Ex-Cam 01 M)
IP protection rating:	IP 64
Movie / Recording mode:	AVI (Motion JPEG)

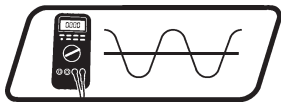
Summary of Calibrators

	Digital Multimeter	Multifunction Process Calibrator			Documenting Process Calibrators			Pressure Calibrators			Process Meter		Loop Calibrators	
														
Model	Ex-DM 1000	MCAL 4200	725	744	743B	741B	CP 400/420	718 100G	718 30G	PTC 400	789	MA 400	707	
See page	40-41	62	57-58	68-69	68-69	68-69	65	56	56	64	67	63	59	
Measure														
V dc	1000V	30V	30V	300V	300V	300V	30V			75 mV	1000V	30V	28V	
V ac (true-rms)	1000V			300V	300V	300V					1000V			
Resistance	40 MΩ	4 kΩ	3200 Ω	11 kΩ	11 kΩ	11 kΩ				3,2 kΩ	40 MΩ			
A dc	10 A	24 mA	24 mA	110 mA	110 mA	110 mA	24 mA	24 mA	24 mA		30 mA	24 mA	24 mA 1 A	
A ac	10 A										•			
Frequency	200 kHz	10 kHz	10 kHz	50 kHz	50 kHz	50 kHz					20 kHz			
Pressure		•	• ¹	• ¹	• ¹	• ¹	2bar/ 200 bar	100 psig/ 7 bar ²	30 psig/ 2 bar ²					
Temperature: RTDs		8 types	7 types	8 types	8 types	8 types	3 types ³			8 types				
Temperature: TCs		13 types	10 types	11 types	11 types	11 types				10 types				
Capacitance	5μF													
Source/Simulate														
V dc		20V	10V	15V	15V	15V				75 mV				
Resistance		4 kΩ	3200 Ω	11 kΩ	11 kΩ	11 kΩ				3,2 kΩ				
mA dc / % scale		24 mA	24 mA	22 mA	22 mA	22 mA					24 mA	24 mA	24 mA	
mA source; auto step, auto ramp		•	•	•	•	•					•	•	•	
Frequency		10 kHz	10 kHz	50 kHz	50 kHz	50 kHz								
Temperature: RTDs		8 types	7 types	8 types	8 types	8 types				8 types				
Temperature: TCs		13 types	10 types	11 types	11 types	11 types				10 types				
Record														
Min Max	•			•	•	•		•	•		•	•		
Hold	•							•	•		•			
As Found / As Left Results				•	•	•								
Log Data				•	•	•								
Upload Data to PC				•	•	•								
Features														
24V Loop Supply		•	•	•	•	•	•	•	•		•	•	•	
Hart Communication		•		•			•				•	•		
Integrated Hand Pressure Pump								•	•					
Available as Ex-version	Ex and Standard		•					•	•				•	

1. Fluke 700 Pressure Modules required. See page 60

2. Either the internal sensor or a Fluke 700 Pressure Module may be used, see page 60

3. And customized



Intrinsically-Safe Pressure Calibrator 718Ex



The new ecom 718Ex Intrinsically Safe Pressure Calibrator is a new, powerful intrinsically safe, self contained pressure calibrator for usage in Explosion endangered areas. The ecom 718Ex offers:

- Built-in pressure/vacuum hand pump, with vernier and bleed valve
- Pressure measurement to 0.05 % of full span, using an internal pressure sensor
- Pressure measurement to 200 bar using any of the 8 intrinsically safe Fluke 700PEx Pressure Modules
- Wide range of selectable measurement units for pressure
- Pressure switch test function
- Min/Max hold functions

Pump Up the Pressure!

Ex-data:

Ex designation:
 Ⓜ II 1G EEx ia IIC T4

EC-Certificate of conformity:
 Kema 04 ATEX 1061 X



I.S. Class I Div. I Groups A-D, T4

Standard delivery:

- 718Ex
- Protective red holster
- Test leads
- Test clips
- Media filter

Accessories:

- Intrinsically safe pressure module 700PEx (see page 60)

Measure current	Model	Range	Resolution	Accuracy
	ecom-718Ex- 30G or 100G	0 - 24 mA	0.001 mA	0.02% rdg ± 2 counts

Temp Coeff. -10 to 18 °C, 28 to 55 °C: ± 0.005 % of range per °C

Specifications (Summary Specifications (18 °C to 28 °C, one year))

Measure pressure	Model	Range	Resolution	Accuracy	Over pressure	Media
Using internal pressure module	ecom-718Ex-30G	-830 mbar to 2 bar	0.0001 bar	0.05% FS.	3x FS	Non corrosive gases
	ecom-718Ex-100G	-830 mbar to 7 bar	0.001 bar	0.05% FS	2x FS	Non corrosive gases
With external pressure modules	ecom-718Ex 30G or 100G	Up to 200 bar	Depending pressure module (see detailed specification)			

Temp Coeff. -10 to 18 °C, 28 to 55 °C ± 0.01 % of range per °C

Supported pressure units PSI, in. H₂O (4 °C), in. H₂O (20 °C), kPa, cm H₂O (4 °C), cm H₂O (20 °C), bar, mbar, kg/cm², mmHg, inch Hg

Source pressure	Model	Range
Using built in pump	ecom-718Ex-30G / ecom-718Ex -100G	0 to 2 bar / 0 to 7 bar

Technical specifications:

Power	One 9-volt alkaline battery type-approved
Battery life	4 to 20 hours, depending on functions used
Pressure input	1/8 in. NPT pressure fitting
Pressure module input	LEMO connector
Operating temperature	-10 °C to 55 °C
Non-operating temperature	-40 °C to 60 °C
Relative humidity (% RH operating without condensation)	95 % (10 to 30 °C); 75 % (30 to 40 °C); 45 % (40 to 50 °C); 35 % (50 to 55 °C)
Size with holster (HxVxD)	216 mm x 94 mm x 66 mm
Weight with holster	992 g



Also available as a standard 'non-Ex' unit.

Intrinsically-Safe Multifunction Process Calibrator 725Ex



- Two channel simultaneous source and measure capability for calibration of transmitters
- Power transmitters with internal loop supply
- Store frequently-used test setups for later use
- Pressure measurement to 3,000 psi/200 bar using any of the 8 intrinsically safe ecom 700PEX Pressure Modules
- Pressure switch test function to capture set, reset and deadband values

Simply powerful intrinsically safe calibration tool

Ex-Data:

Ex designation:
 Ex II 1G EEx ia IIB 171 °C

EC-Certificate of Conformance:
 KEMA 04 ATEX 1303X



I.S. Class I, Division I Groups B-D, 171 °C

The new ecom 725Ex Intrinsically Safe Multifunction Process Calibrator is powerful yet easy-to-use. Combined with the new ecom 700PEX Pressure Modules, the 725Ex is able to calibrate almost any process instrument likely to need service in an area where explosive gasses may be present. The ecom 725Ex Intrinsically Safe Calibrator is a powerful, new intrinsically safe, multifunction calibration solution that offers:

Standard delivery:

- 725Ex
- protective red holster
- Test leads
- Test clips
- one pair of stackable test leads
- NIST traceable calibration certificate

Accessories:

- Intrinsically safe pressure module 700PEX (see page 60)

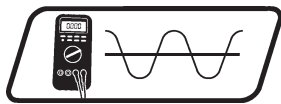
- Measure volts dc, mA, RTDs, thermocouples, frequency and ohms
- Source or simulate volts dc, mA, RTDs, thermocouples, frequency and ohms



Summary Specifications: (18°C to 28°C for one year)

Function Measure or Source	Range	Resolution	Accuracy	Notes
Voltage	0 to 100 mV	0.01 mV	0.02 % R _{dg} + 2 LSD	Max load, 1 mA
	0 to 10V (source)	0.001 V		
	0 to 30V (measure)	0.001 V		
mA	0 to 24	0.001 mA	0.02 % R _{dg} + 2 LSD	Max load, 500 Ω @ 20 mA
mV (TC terminals)	-10.00 mV to +75.00 mV	0.01 mV	0.025 % or range + 1 LSD	
Resistance	15 Ω to 3200 Ω (source)	0.01 Ω to 0.1 Ω	0.10 Ω to 1.0 Ω	
	0 Ω to 3200 Ω (measure)	0.01 Ω to 0.1 Ω	0.10 Ω to 1.0 Ω	
Frequency	2.0 to 1000.0 CPM	0.1 CPM	± 0.05 %	For frequency source waveform is 5V p-p squarewave, -0.1 V offset
	1 to 1000 Hz	1 Hz	± 0.05 %	
	1 to 10.0 kHz	0.1 kHz	± 0.25 %	
Loop supply	12V	N/A	10 %	

Temperature coefficient: -10°C to 18°C, 28°C to 55°C, ±0.005% of range per °C



Intrinsically-Safe Multifunction Process Calibrator 725Ex

General Specifications:

Maximum Voltage:	30 V
Temperature:	-40°C to 71°C (storage), 10°C to 55°C (operating)
Relative humidity:	95 % (10 to 30°C); 75 % (30 to 40°C); 45 % (40 to 50°C); 35 % (50 to 55°C)
Size (HxWxD):	200 x 96 x 47 mm
Weight:	650 g
Battery:	Four AA alkaline batteries. Battery life: 25 hours typical

Thermocouple accuracy specifications:

RTD Types, Ranges and Accuracies

		Measure (4 wire)	Source
Ni 120	-80°C to 260°C	0.2°C	0.2°C
Pt 100 - 385	-200°C to 800°C	0.33°C	0.33°C
Pt 100 - 3926	-200°C to 630°C	0.3°C	0.3°C
Pt 100 - 3926 (JIS)	-200°C to 630°C	0.3°C	0.3°C
Pt 200 - 385	-200°C to 250°C	0.2°C	0.2°C
	250°C to 630°C	0.8°C	0.8°C
Pt 500 - 385	-200°C to 500°C	0.3°C	0.3°C
	500°C to 630°C	0.4°C	0.4°C
Pt 1000 - 385	-200°C to 100°C	0.2°C	0.2°C
	100°C to 630°C	0.3°C	0.2°C

Resolution

RTD	0.1°F, 0.1°F
-----	--------------

Features:

Simultaneous Function Capability	Channel A	Channel B
24.000 mA DC	M	M or S
24.000 mA DC with loop supply	M	
100.00 mV DC		M or S
30.000 V DC Measure	M	
20.000 V DC Measure		M or S
10.000 V DC Source		
Source: 15 to 3200 Ω, Measure 0 to 3200 Ω		M or S
Thermocouple J, K, E, R, S, B, L, U, N		M or S
RTD Ni 120; Pt 100 (392); Pt 100 (JIS); Pt 100, 200, 500, 1000 (385)		M or S
Pressure (using ecom 700PEX modules)	M	M used as S
Frequency; Squarewave, 1 CPM to 10 kHz; fixed amplitude 5V p-p		M or S

M = Measure S = Source / Simulate

Thermocouple accuracy specifications:

Thermocouple	Measure or source	
J	-200 to 0°C	1.0°C
	0 to 1200°C	0.7°C
K	-200 to 0°C	1.2°C
	0 to 1370°C	0.78°C
T	-200 to 0°C	1.0°C
	0 to 400°C	0.8°C
E	-200 to 0°C	1.0°C
	0 to 950°C	0.7°C
R	-20 to 0°C	2.5°C
	0 to 500°C	1.8°C
	500 to 1750°C	1.4°C
S	-20 to 0°C	2.5°C
	0 to 500°C	1.8°C
	500 to 1750°C	1.5°C
B	600 to 800°C	2.2°C
	800 to 1000°C	1.8°C
	100 to 1800°C	1.4°C
L	-200 to 0°C	0.85°C
	0 to 900°C	0.7°C
U	-200 to 0°C	1.1°C
	0 to 400°C	0.75°C
N	200 to 0°C	1.5°C
	0 to 400°C	0.9°C

Resolution

J, K, T, E, L, N, U	0.1°C, 0.1°F
B, R, S	1°C, 1°F

Notes

Accuracy specifications include 0.2°C cold junction uncertainty



Also available as a standard 'non-Ex' unit.

Intrinsically Safe Loop Calibrator 707Ex



The 707Ex is an intrinsically safe loop calibrator for use in explosion endangered areas. The ecom 707Ex is certified in accordance with the ATEX directive (Ex II 2 G EEx ia IICT4) in Zones 1 and 2. The 707Ex is also certified to operate in accordance with Factory Mutual N.I. Class 1, Division 2 areas Group A-D.

- Large display and simple, quick-click push rotary button for easy one-handed operation.
- Simultaneous mA and % readout for quick, easy, interpretation of readings.
- mA accuracy of 0.015%
- 1 μ A resolution for mA source, simulate and measure.
- Push button with 25% steps for fast, easy linearity checks.
- 0-100% "span check" for fast confirmation of zero and span.
- Internal loop supply, so you can power and read a transmitter at the same time without carrying a DMM.
- Measures V dc to 28 V.
- 0-20 mA or 4-20 mA default start up modes.
- HART[®] compatible resistance is connected in series with the loop supply for compatibility with HART communicators.

The fast, one-handed tool for loop checks in Ex zones

Ex-Data:

Ex designation:
 Ⓜ II 2G EEx ia IICT4

EC-Certificate of Conformity:
 ZELM 02 ATEX 0120 X



N.I. Class 1, Division 2, Groups A-D



Technical data:

Maximum voltage	28 volts
Non-operating temperature	-30 to 60°C
Operating temperature	-10 to 50°C
Relative humidity	0 to 95% (0 to 30°C); 0 to 75% (30 to 40°C); 45% (40°C to 50°C)
Size (HxWxD) with holster	164 mm x 75 mm x 47 mm (6.4 in x 2.9 in x 1.9 in)
Weight	350 g (12.3 oz); with holster
Battery	One 9 V alkaline
Battery life	18 hours typical, at 12 mA

Technical data (Summary specifications (18 °C to 28 °C, one year))

Function	Range	Resolution	Accuracy
Voltage measure	0 to 28 V	0,001 V	±(0,015% R _{dg} + 2 counts)
mA measure	0 to 24 mA	0,001 mA	±(0,015% R _{dg} + 2 LSD)
mA source ¹	0 to 24 mA	0,001 mA	±(0,015% R _{dg} + 2 LSD)
mA simulate ²	0 to 24 mA	0,001 mA	±(0,015% R _{dg} + 2 LSD)
Loop supply	24 V Gleichstrom	n/a	24 V ± 1 V dc, no load

Temperature Coefficient, -10 to 18°C, 28 to 55°C: ± 0,005% of range per °C;

¹ Max load, 700 Ohms at 20 mA

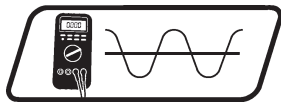
² Max applied voltage for simulation, 28 V

Accessories:

- 707Ex
- Holster
- Safety designed test leads
- Alligator test clips



Also available as a standard 'non-Ex' unit.



Intrinsically Safe Pressure Module 700PEX



To measure a wide range of pressure in an explosive endangered area the range of pressure modules is extended with 8 ATEX compliant models. These models are compatible with the ecom 718Ex intrinsically safe pressure calibrator and the intrinsically safe multifunction process calibrator 725Ex.

- Ranges from 2.5 mbar to 200 bar
- Very high accuracy up to 0.025%
- Compatible with ecom 718Ex and 725Ex
- Rugged cases protect the modules in harsh environments

Choice of gauge, differential and absolute modules

Ex-Data:

Ex designation:
 Ⓜ II 1G EEx ia IICT4

EC-Certificate of Conformity:
 KEMA 04 ATEX 1102 X



I.S. Class I, Div. I, Groups A-D, T4

Pressure Module Specifications

Model	Range (approx)	Resolution	Reference Uncertainty (23 ± 3°C)	High Side media	Low Side media	Fitting material	Max overpressure ²
Differential							
ecom-700P01Ex	25 mbar	0.01 mbar	0.2%	Dry ¹	Dry	316 SS	3x
ecom-700P24Ex	1000 mbar	0.1 mbar	0.03%	316 SS	Dry	316 SS	3x
Gage							
ecom-700P05Ex	2 bar	0.1 mbar	0.03%	316 SS	N/A	316 SS	3x
ecom-700P06Ex	7 bar	0.7 mbar	0.03%	316 SS	N/A	316 SS	3x
ecom-700P27Ex	20 bar	1 mbar	0.03%	316 SS	N/A	316 SS	3x
ecom-700P09Ex	100 bar	10 mbar	0.03%	316 SS	N/A	316 SS	2x
Absolute							
ecom-700PA4Ex	1000bar	0.1 mbar	0.05%	316 SS	N/A	316 SS	3x
High							
ecom-700P29Ex	200 bar	0.01 bar	0.05%	C276	N/A	C276	2x

¹ "Dry" indicates dry air or non-corrosive gas as compatible media. "316 SS" indicates media compatible with Type 316 Stainless Steel. "C276" indicates media compatible with Hastelloy C276.

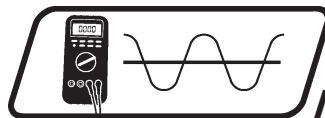
² Maximum overpressure specification includes common mode pressure.

Technical Data:

Pressure module output	LEMO connector
Operating temperature	0°C to 50°C
Non-operating temperature	-40 to 60°C
Relative humidity (% RH operating without condensation)	95% (10 to 30°C); 75% (30 to 40°C); 45% (40 to 50°C); 35% (50 to 55°C)
Vibration	Random, 2 g, 5-500 Hz

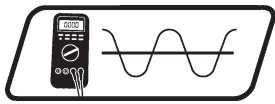


Also available as a standard 'non-Ex' unit.



Measuring & Calibration Ruggedised versions

Multifunction Calibrator	MCAL 4200	62
Loop Calibrator	MA 400	63
Universal Temperature Calibrator	PTC 400	64
Pressure Calibrator	CP 400 / 420	65
Digital Pressure Test Gauge	CP 440	66
ProcessMeter	789	67
Documenting Process Calibrator	Serie 740B	68-69
Infrared-Thermometer	63, 66, 68	70



Multi-Function Calibrator MCAL 4200



The ecom MCAL 4200 Multi-Function Calibrator provides a feature set unmatched in high accuracy, hand-held calibrators in its price range. The MCAL 4200 Calibrator provides the functions and accuracy associated with fixed-installation, laboratory instruments, and has everything needed for virtually any calibration task. Measure and source thermocouples, RTDs, current, voltage, and frequency, and source pulse trains. A communications port compatible with Fluke 700 Series and Fluke pressure modules is provided, as is an isolated mAV read-back circuit. Arrow keys, direct numeric keypad entry, and three software-driven function buttons, plus a large backlit, menu-driven graphics display combine to provide a highly intuitive, simple yet powerful operator interface. Built-in 250 Ohm resistor for Hart™ compatibility, compatibility with smart transmitters and PLCs, full fuseless protection, and a serial communications port for full control with ASCII commands, are just some of the additional features that make the MCAL 4200 the single, most indispensable tool available for virtually any calibration task.

Features:

- Measure and source T/Cs (13 types), RTDs (13 types), Ohms, current, voltage, frequency; source pulse trains
- All source modes can be programmed with dedicated setpoints to speed calibration and linearity tests
- Isolated mA/V read-back circuit for complete transmitter calibration
- Highest accuracy in class to 0.015% of reading
- Pressure module communication port compatible with ecom 700 Series and ecom pressure modules
- **Standard delivery:**
 - MCAL 4200
 - Test leads
 - 4-AA alkaline batteries
 - NIST Certificate
- Built-in 24V supply can drive 4 – 20mA loops up to 1000 Ohms
- **Accessories:**
 - Carrying case
- Direct entry of custom RTD coefficients (R0, A, B, C)

Specifications (23 °C ±5 °C unless otherwise noted)

Voltage Read and Source		
Source		0.000 to 20.000 VDC
Read	Isolated	0.000 to 30.000 VDC
	Non-isolated	0.000 to 20.000 VDC
Thermocouple mV		
Read and Source		-10.000 to +75.000 mV
Current (mA)		
Source and read		0.000 to 24.000 mA
Frequency (1 to 20V selectable amplitude)		
CPM Source and Read		2.0 to 600.0 CPM
Hz Source and Read		1.0 to 1000.0 Hz
kHz Source and Read		1.0 to 10.00 kHz
Pulse (Source only; 1 to 20V selectable amplitude)		
Pulses		1 to 30,000.0
		2 CPM to 10 kHz
Ohms	Source	5.0 to 4000 Ohms
	Read	0.00 to 4000.0 Ohms
Thermocouple Read and Source		J, K, T, E, R, S, B, C, XK, BP, L U, N
RTD Read and Source		Ni120, Pt100, Pt100, Pt100, Pt200, Pt500, Pt1000, Cu10, YSI400, Cu50, Cu100, Pt385, Pt385
Operating Temperature		-10°C to +50°C
Storage Temperature		-20°C to +70°C
Stability		±0.005% of reading/°C outside of 23 °C ±5°C
Batteries		4x AA; alkaline or optional rechargeable
Dimensions		220.9 x 106.6 x 58.4 mm
Weight		863 g
Accuracy	Voltage	±0.015% of reading, ±2 mV
	Thermocouple mV	±0.02% of reading, ±10 μV
Thermocouple Errors		0,2°C ... 1,2°C (depends on thermocouple)
RTD Read and Source		0,1°C ... 1,4°C (depends on RTD)
Read and Source		
Current (mA)		±0.015% of reading, ±2 μA
400 Ohm Range		±0.025% of reading, ±0.05 Ω
4000 Ohm Range		±0.025% of reading, ±0.5 Ω

MA 400 Precision Loop Calibrator



Features:

- Very high accuracy – $\pm 0.015\%$ of reading
- Very high resolution – 0.001 mA
- % Error function – eliminates manual error calculation
- Extended adjustment range - digital knob and user-selectable decade output allow both large and incremental (0.001 mA step) output changes
- Built-in 250 Ohm resistor facilitates calibration of Hart™ devices
- Remote calibration through Automatic Step and Ramp functions
- Simulates, powers, and measures two-wire transmitters

Standard delivery:

- MA 400 Precision Loop Calibrator
- Test leads
- 9V battery
- NIST Certificate

Accessories:

- Rechargeable battery
- Carrying case

The ecom MA 400 Precision Loop Calibrator provides significantly extended performance when compared to any competitive calibrator. With an accuracy of 0.015% of reading, with 0.001 mA resolution, the MA 400 has the highest accuracy in its class. Unique features, such as a "% Error" function, which eliminates manual error calculation and allows the display of the actual versus ideal error at any calibration point, put the MA 400 way beyond similar instruments.

The ecom MA 400 can simulate, power, and measure two-wire transmitters. With automatic Step and Ramp functions, the MA 400 enables remote calibration of 4-20 mA devices.

Specifications (25°C unless otherwise noted)

Input

Current Range	0.000 to 24.000 mA -25.00 to +125.00 %
Voltage (Reading)	0 to 28 VDC
Input Protection	fuseless, up to 250 VAC

Output

Source/Simulate Range	0.000 to 24.000 mA -25.00 to +125.00 %
Drive Capability	1200 Ohm without Hart 950 Ohm with Hart
Loop Supply Voltage	24 VDC
Range Select	Decade Incremental to 0.001 mA steps

Resolution

Resolution	1 μ A
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Accuracy

Accuracy	$\pm 0.015\%$ of reading $\pm 2 \mu$ A
----------	--

Temperature Range

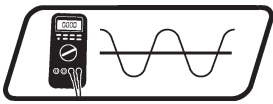
Operating	-10 to +55 °C
Storage	-20 to +70 °C

Power Requirements

Battery	9V, one required
AC Adapter	optional

Mechanical

Dimensions	14.47 cm x 8.00 cm x 3.63 cm
Weight	340 gms



PTC 400 Universal Temperature Calibrator



Features:

- Calibrate thermocouples and RTDs with one unit
- Direct keyboard entry or scroll control of output
- User-defined setpoints
- High accuracy $\pm 0.4^{\circ}\text{C}$ J/T/C and $\pm 0.3^{\circ}\text{C}$ 4W PT385 RTD; all errors included
- Ten (10) T/C types and eight (8) RTD types including PT 385 (1,000 Ohm) and Cu (10 Ohm)
- Store up to nine (9) setpoints for each output function
- RS232 interface

The PTC 400 Precision Temperature Calibrator is an ideal device to handle all of your temperature calibration needs in a truly rugged, low-cost package. It combines virtually all widely used thermocouples and RTDs in one device — you'll never have to worry about finding a temperature device you can't calibrate. This is especially true when calibrating "smart" or pulsed RTD transmitters, where many other calibrators fail to work or operate at reduced accuracy specs. The PTC 400 handles those applications with ease.

Standard delivery:

- PTC 400
- Test leads
- 4 AA alkaline batteries
- NIST-traceable certificate

Accessories:

- Carrying case

Specifications (23 °C \pm 5 °C unless otherwise noted)

Range

T/C	J, K, T, E, R, S, N, B, L, U including -10 to 75 mV range
RTD	Pt 385 (100, 200, 500, 1000 Ohms) Pt 392, JIS, Ni120, Cu10, YSI 400
Ohm	0.0 to 400.0 Ω 400 to 3,200 Ω
mV	-10 to +75
RTD IEX-Range	0.01 to 3 mA
RTD Frequency Response	10 ms; works with all pulsed transmitters

Thermocouple Read and Source

Kind	J, K, T, E, R, S, B, L, U, N
Accuracy	0,4°C 2,4°C (depends on thermocouple)
Accuracy mV Read/Source	0.014 % \pm 2

RTD Read and source

Kind	Ni120 (672), Pt 100 (385), Pt 100 (3926), Pt 100 (3916), Pt 200 (385), Pt 500 (385), Pt 1000 (385), Cu10, YSI400
Accuracy	0,2°C 2,2°C (depends on RTD)

Environmental

Operating Temperature	-10 to +50 °C
Storage Temperature	-20 to +60 °C

Power Requirements

Batteries	4 AA Alkaline cells
Operating time	30 hrs.

Mechanical

Dimensions	220.9 x 106.6 x 58.4 mm
Weight	849 gms

CP 400 / 420 Pressure Calibrator



The CP 400 / 420 Dual Sensor Pressure Calibrator provides unmatched pressure measurement flexibility with 0.025% FS accuracy on both internal, isolated, stainless steel pressure sensors.

An external pressure module connection supports all BetaPort -P pressure modules for even greater measurement capability. A Pt100 RTD input is provided for temperature measurements accurate to 0.1 °C (0.2 °F). In addition, the CP 400 / 420 measures 4-20 mA loop current and up to 30VDC.

An internal 24V Loop Power Supply can power a transmitter under test. The CP 400 / 420 supports up to Gas Flow Calibration/Custody Transfer three simultaneous measurements in any combination, including three pressure measurements. With simultaneous display of two pressure and an RTD temperature measurement, the CP 400 / 420 is ideal for gas flow calibration (custody transfer) applications.

The CP 400 / 420 is available in two standard configurations – 15 psi/1500 psi or 30 psi/3000 psi ranges – or customized with any two ranges selected from 5, 15, 100, 300, 500, 1000, 3000, 5000, or 10,000 psi.

Features:

- Two isolated, stainless steel, pressure sensors with 0.025% F.S. accuracy
- Temperature-compensation ensures accuracy in field applications
- External pressure module connection supports all BETA Port-P pressure modules (25 ranges) for even more measurement capability
- Pt100 RTD input for temperature measurement, accurate to 0.1°C (0.2°F)
- Measure 4-20 mA input
- Internal 24 V Loop Power Supply can power a transmitter under test
- Measure up to 30V DC
- % Error and damping functions
- Large graphic style LCD with backlight Display can be configured to display up to 3 inputs simultaneously (i.e. pressure 1, pressure 2, and RTD or any combination of inputs)
- Switch test on Pressure 1, Pressure 2, or external pressure module
- Up to five frequently used setups to be stored; last setup automatically recalled on power-up

Standard delivery:

- CP 400 / 420
- Soft case
- Batteries
- NIST-traceable certificate
- Test leads

Accessories:

- BetaPort-P Pressure Module Adapter
- Pressure Modules

Specifications:

Ranges

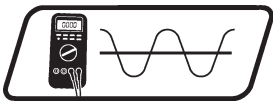
Available Pressure (select any two)	5 psi, 15, psi, 30, psi, 100 psi, 300 psi, 500 psi, 1000 psi, 3000 psi, 5000 psi, 10,000 psi
mA	0 to 24.000 mA
Volts	0 to 30.000 VDC
RTD	-40°C to 105°C
Engineering Units	psi, bar, mbar, kPa, kgcm ² , cmH ₂ O@4°C, cmH ₂ O@20°C, mH ₂ O@4°C, mH ₂ O@ 20°C, inH ₂ O@4°C, inH ₂ O@20°C, inH ₂ O@60°F, mmHg@0°C, inHg@0°C, ftH ₂ O@4°C, ftH ₂ O@20°C, ftH ₂ O@60°F

Accuracy

Pressure	15 psi to 3000 psi	±0.025% F.S.; for all ranges
	5, 5000, 10,000 psi	±0.035% F.S.
mA		±0.015% of rdg ±0.002mA
Volts		±0.015% of reading ±0.002V
RTD (ohms)		±0.015% of rdg ±0.02 ohms; or ±0.1°C @ 0°C for Pt100
Temperature Effect		No effect on accuracy on all functions from 15°C to 35°C; Add ±0.002% F.S./°C for temps outside of 15°C to 35°C

Technical data:

Operating Temperature:	-10 °C to +50 °C
Storage Temperature:	-20 °C to +60 °C
Battery:	Four (4) standard AA cells
Battery Life:	>35 hours, typical usage
Dimensions:	211 x 99 x 46 mm
Weight:	0.567 kg
Connectors/Ports	Pressure - two, 1/8" NPT BetaPort-P pressure module; RTD



Digital Pressure Test Gauge CP 440



The CP 440 Digital Pressure Test Gauge takes the concept of an analog Test Gauge, and brings it to a new level, as only Beta Calibrators can do.

The CP 440 combines the accuracy of digital technology with the simplicity of an analog gauge, and achieves performance, ease-of-use, and a feature set unmatched in the pressure measurement world. Setup of the CP 440 is fast and straight-forward, through a menu-driven display, with minimal text, and intuitive functions, that is simple enough to allow the gauge to be used anywhere in the world, without the need for multilingual displays. The availability of optional sanitary seals that meet 3A standards per specification 37-01 allow the gauge to be used in virtually any application.

Features:

- Very high accuracy compared to analog test gauges; $\pm 0.05\%$ F. S.; temperature compensated
- Temperature compensated accuracy over 0 to 50 °C
- Eight (8) standard pressure ranges
- Displays in 18 standard or fully custom engineering units
- Displays ambient temperature in °C or °F

- Large, back-lit, 5-1/2 digit display with 0.65" high digits and 20 segment bar graph
- Rugged stainless steel case meets NEMA 4/IP65
- Password-protected "through the keypad" calibration
- MIN/MAX recall
- Adjustable TARE zeros large system offsets
- User-configurable sample rate maximizes measurement performance and battery life
- User-configurable damping smooths readings from pulsating/plant air sources
- Auto Shut-off for extended battery life
- Low battery indicator

Standard delivery:

- CP 440
- Batteries

Accessories:

- Rubber Boot
- External 24 VDC Power Input
- Sanitary Seal



Specifications (0 °C to +50 °C, unless otherwise noted)

Input Ranges:	15 psi/1 BAR, 30 psi/2 BAR, 100 psi/7 BAR, 500 psi/30 BAR, 1,000 psi/70 BAR, 3,000 psi/200 BAR, 5,000 psi/300 BAR, 10,000 psi/700 BAR
Accuracy:	$\pm 0.05\%$ FS Positive Pressure $\pm 0.25\%$ FS Vacuum/500 psi and below
Temperature Compensation:	0 °C to +50 °C to rated accuracy
Standard Engineering Units:	PSI, Bar, Kg/cm ² , inH ₂ O (4°C, 20°C or 60°F), ft H ₂ O (4°C, 20°C or 60°F), cmH ₂ O (4°C and 20°C), mH ₂ O (4°C and 20°C), Kpa, mBAR, inHg, mmHg, TORR
Media Compatibility:	liquids and gases compatible with 316 stainless steel
Operating Temperature:	-10 °C to +55 °C
Storage:	-20 °C to +70 °C
Dimensions:	127 x 111 x 38 mm
Input Port:	1/4" male NPT
Display:	5 Digits, 16.5 mm height Bar Graph – 0 to 100% in 20 segments
Battery:	three size AA alkaline batteries
Battery Life:	1,500 hours without backlight; 2,000 hours at slow sample rate; battery life can be displayed on bar graph to indicate the amount of time left

ProcessMeter 789



Combining the two tools frequently used by every instrumentation technician, the ecom 789 Process Meter will be at home in every instrumentation technician's toolbox. The ecom Process Meter combine a DMM and a Loop Calibrator in one rugged, handheld tool.

With its built-in 24V loop supply it reduces the need for taking a separate power supply when doing off-line transmitter testing.

Features:

- DMM and Loop Calibrator in one tool
- Precision 1000 V, 440 mA True RMS Digital Multimeter
- DC current source and Loop Calibrator
- 24V Loop power supply
- Min/Max / Average / Hold / Relative Modes
- Diode Test and Continuity Beeper

- Manual Step (100%, 25%, Coarse, Fine) plus Auto Step and Auto Ramp
- Simultaneous mA and % of scale read out
- Externally accessible battery / fuses
- HART mode setting with loop power and a built-in 250 Ω resistor
- 0% and 100% buttons to toggle between 4 and 20 mA sourcing for a quick span check

Safety Conformance

All inputs are protected to EN61010-CAT III 1000V, CSA, UL and TÜV.

Double your working power!



Standard delivery:

- 789 ProcessMeter
- TL71 Hard point test lead set
- AC72 Alligator clips
- Four 9V AA alkaline batteries

Technical Data:

Voltage measurements

Range:	0-1000 V AC or DC
Resolution:	0.1 mV to 1,0V
Accuracy:	0.1 % R _{dg} + 1 LSD (V DC)

Current measurements

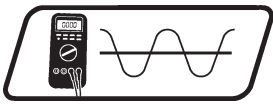
Range:	0 - 1 A	0 - 30 mA
Resolution:	1 mA	0,001 mA
Accuracy:	0.2 % + 2 LSD	0.05 % + 2 LSD

Current sourcing

Range:	0 - 20 mA or 4 - 24 mA
Accuracy:	0.05 % of span

Other specifications

Max drive capability:	1200 Ω
Loop power:	24V
Resistance measurement:	To 40 MΩ, 0.2 % + 1 LSD
Frequency:	To 19.999 kHz, 0.005 % + 1 LSD
Continuity:	Beeps for resistance < 100 Ω
Span Check:	Yes
Battery life:	140 hours typical 10 hours sourcing: 12 mA
Size (HxWxD):	203 mm x 100 mm x 50 mm
Weight:	600 g



740 Series Documenting Process Calibrators



Standard delivery:

Fluke 741B / 743B / 744

- TL224 Industrial test leads (2 sets)
- AC220 Test clips (2 sets)
- TP220 Test probes (1 set)
- BP7217 Battery pack
- BC7217 Battery charger
- NIST Traceable calibration certificate
- Serial port cable (only 743B / 744)
- DPC/TRACK Sample Version with free PC communication utility software (only 743B / 744).

Accessories:

- Pressure modules (see page 60)



The 740 series Documenting Process Calibrators are rugged, handheld tools for the calibration and troubleshooting of process control instrumentation. These calibrators:

- Calibrate temperature, pressure, voltage, current, resistance, and frequency
- Simultaneously measure and source
- Automatically capture calibration results
- Document procedures and results to meet ISO 9000, EPA, FDA, OSHA, and other government requirements
- Measure / simulate eleven types of thermocouples and eight RTDs
- Store up to 8,000 readings in data logging mode (743B +744 only)
- PC interface (743B +744 only)
- Operates in English, French, German, Italian, and Spanish
- Four types of built-in automated calibration procedures; linear transmitter; square root devices, one and two-point limit switches
- User entered values allow users to capture readings measured or sourced by other devices
- Custom units permit capturing data in measurement units not directly supported by the calibrator, e.g. ppm or rpm. Optional shunt supports mA/mA applications
- Built in calculator (four functions plus SQRT) permits readings to be recalled from the measurement function, or to store calculation results to a source function
- Handling of fast pulsed RTD transmitters and PLCs, with pulses as short as 1 ms.

Calibrators as versatile as you need them to be.

741B: A complete documenting calibrator

The 741B is the economical choice for plants that don't use PCs or that require traditional paper forms. It has storage capacity for a day's calibration and measurement data. When you're back at the shop, recall the data on-screen to fill out calibration forms.

743B: More memory, plus a PC interface and data logging

The 743B has all the capabilities of the 741B plus a PC interface that lets you download procedures, lists, and instructions created with software—or upload data for printing, archiving, and analysis. With its expanded memory, the 743B can hold a full week of calibrations and procedures.

744: Get HART-ability

The Fluke 744 offers all of the capabilities of the 743B, plus the ability to calibrate, maintain, and troubleshoot HART instrumentation with just one tool. This rugged, reliable tool offers:

- Integrated HART communication functions, permitting you to monitor, control, and calibrate HART instrumentation.
- NiMH battery with 3500 mA hour life and battery indicator.

Instrumentation Management Software

The Fluke 743B and 744 are compatible with Fluke 700SW DPC/TRACK software and with software from Blue Mountain, Cornerstone, Fisher-Rosemont, Honeywell, Yokogawa, Prime Technologies and OnTime Support.

Safety Conformance

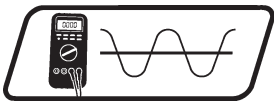
All inputs are protected to EN61010-1 CAT II 300V. CSA listed.

740 Series Documenting Process Calibrators

Specifications

Voltage DC		
Measure:	110.000 mV 300V	0.025 % 0.05 %
Source:	110.000 mV 15,0000V	0.01 % 0.005 %
Voltage AC (20 Hz 5 kHz)		
Measure:	1.1000 300V	0.5 % 10 % + 5 20
Current DC		
Measure:	30.000 mA / 110.00 mA	0.01 % + 0.015% / 0.01 % + 0.015% *
Source:	22.000 mA (Source) / 22.000 mA (Simulate)	0.01 % + 0.015 % / 0.02 % + 0.03 %*
Resistance		
Measure:	11.000 Ω 11.000 k Ω	0.05 % 0.1 % + 50 m Ω 10 Ω
Source:	11.000 Ω 11.000 k Ω	0.01 % 0.03 % + 20 m Ω 5 Ω
Frequency		
Measure:	1.00 50.00 kHz	0.05 Hz 50 Hz
Source:	0.00 Hz 50.000 kHz	0.01 Hz 5 Hz
Pressure		
Accuracy from 0.025 % of range using any of 29 pressure modules. Modules available for differential, gauge, vacuum, absolute, dual and high pressure.		
RTDs		
Measure accuracy:	Cu 10, Pt 100, Pt 200, Pt 500, Pt 1000, CU 120 0,3°C 1,0°C For 2- and 3-wire measurement, add 0.4 °C	
Source accuracy:	Cu 10, Pt 100, Pt 200, Pt 500, Pt 1000, CU 120 0,1°C 1°C For 2- and 3-wire simulation, add 0.4 °C	
Thermocouples		
Measure accuracy:	E, N, J, L, KLT, U, B, R, S, C 0.3°C 2°C ¹	
Measure accuracy:	0.2°C 0.8°C ¹ ¹ Accuracy with external cold junction, for internal junction add 0.2 °C	
Ramp functions		
Source functions:	Voltage, current, resistance, frequency, temperature	
Rate:	4 steps / second	
Loop power function		
Voltage:	Selectable, 24V or 28V	
Maximum current:	22 mA, short circuit protected	
Maximum input voltage:	30V DC	
Step functions		
Source functions:	Voltage, current, resistance, frequency, temperature	
Manual step:	Selectable step, change with arrow buttons	
Autostep:	Fully programmable for function, start delay, stepvalue, time per step, repeat	
Operating temperature:	-10 °C to +50 °C (except frequency and AC), -20 °C to +50 °C (except frequency and AC)	
Storage temperature:	-20 °C to +60 °C	
Dust / water resistance:	Meets IP 52, IEC 529	
Size:	236 x 130 x 236 x 61 mm	
Weight:	1,4 kg	
Batteries:	NiCd: 7,2V, 1,7 Ah	
Battery life:	~8 hours typical	
Side port connections:	Pressure module connector; connection for optional battery eliminator	
Data storage capacity:	1 day of calibration results	

* (% of reading + % of full scale)



Handheld Infrared Thermometers 63, 66, 68



With so many interconnected systems and delicate load balances in industrial plants these days, any number of things can go wrong. By instituting regular predictive and preventive maintenance, you can spot trouble before it happens and greatly reduce the chances of system failure.

The trick is finding a way to efficiently monitor all of those systems. That's where infrared thermometers come in handy. Changes in heat often indicate failure, and infrared thermometers make it easy to take frequent, quick temperature measurements.

Features:

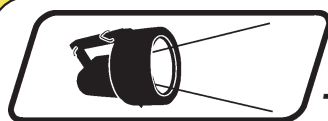
- High-resolution optics
- High accuracy: 1 %
- Backlit display
- 12-point data logging (only 66/68)
- Selectable MAX, MIN, DIF and AVG functions that display values instantly with Hi/Lo Alarm (only 66/68)
- Adjustable emissivity for more accurate temperature measurements (only 66/68)

For electrical troubleshooting and predictive/preventive maintenance



Technical data:

	63	66	68
Range:	-32°C +535°C	-32°C +600°C	-32°C 760°C
Emissivity:	Fixed at 0.95	Digitally adjustable (from 0.1 to 1.0)	Digitally adjustable (from 0.1 to 1.0)
Accuracy (at Ta: 23 25°C):			
-32°C -26°C	± 3°C	± 3°C	± 3°C
-26°C -18°C	± 2.5°C	± 2.5°C	± 2.5°C
-18°C +23°C	± 2°C	± 2°C	± 2°C
+23°C +510°C	± 1 % of reading or ± 1°C - whichever is greater		
> 510°C	± 1.5 % of reading	± 1 % of reading or ± 1°C - whichever is greater	
Resolution:	0.2°C	0.1°C	0.1°C
Response time:	500 msec	500 msec	500 msec
Operating temperature:	0 +50°C	0 +50°C	0 +50°C
Storage temperature:	0 +50°C	0 +50°C	0 +50°C
Weight:	320g	320g	320g
Dimensions:	200 x 160 x 55 mm	200 x 160 x 55 mm	200 x 160 x 55 mm
Battery:	9V alkaline battery or NiCd	9V alkaline battery or NiCd	9V alkaline battery or NiCd
Repeatability:	± 0,5 % of reading or ± 1°C - whichever is greater		



Torches



I.S. LED Pocket Torch	Lite-Ex LED 30	72
I.S. LED Pocket Torch	Lite-Ex HL 10 & 30 / 50 N	73
I.S. Torches	Lite-Ex 15, 20, 23, 25	74
I.S. Rubber Cased Torch	Lite-Ex HD 10	75
I.S. Handlamp	H-251 A	76
I.S. Handlamp	H-4 DCA	77
I.S. LED Pocket Torch / I.S. Mini Pocket Torch	Lite-Ex LED 8 / Ex-Penlight	78
I.S. Flashing Indicator	Lite-Tracker - LT-103 E	79
I.S. Laser-Pointer	Ex-Point 02 A	80

Intrinsically-Safe LED torch Lite-Ex PL 30



The Lite-Ex PL 30 LED high performance torch is especially designed to withstand daily use in industrial environments and with the new 'ring-switch' mechanism, operation is made quickly and easily.

- Ex-zone 0 / 20
- 1x high performance LED (3-watt)
- 4000 Lux
- Robust housing
- High protection rating of IP 65

The ecom Lite-Ex PL 30 LED torch gives unrivalled high performance.

The 3-watt LED unit is powered by 3 x LR14 batteries, providing many hours of use. With a high IP65 protection rating, the anti-static polymer housing of the unit is ergonomically designed to be comfortably and securely held - even in the most difficult conditions.

Switching on the torch could not be easier - simply twist the 'ring-switch'. This innovative switch mechanism means that even when wearing gloves the user can easily operate the torch and because it is a 'non-contact' mechanism the need for repair is reduced - saving time and money.

The LED torch Ex-PL 30* is available as an intrinsically safe version for use in Ex-zone 0/20 and also in a rugged version for use in the non-Ex area.

Ex-data:

Ex-designation:

⊕ II 1 G EEx ia IICT4

⊕ II 1 D T130°C IP 65

EC-Certificate of conformity:

ZELM 05 ATEX 0272 X

Standard delivery:

- Lite-Ex PL 30
- c/w batteries

Accessories:

- Spare batteries

Technical data

Ambient

temperatureTa: -20°C ... +50°C

Light source: 1x 3-Watt LED

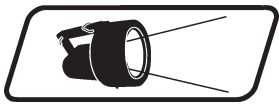
Power supply: 3x LR 14 batteries
(type-tested)

Weight: approx. 550g

Protection rating: IP 65

Dimensions: 55/42 x 220 mm





Intrinsically-Safe LED pocket torch Lite-Ex LED 30



The Lite-Ex LED 30 is a compact, robust and easily operated LED-Torch, certified in accordance with ATEX for use in Ex-hazardous areas classified as Zone 2, 1 and 0 as well as 22 and 21.

- Operating time 80 hours
- Robust metal housing
- 3-LED's with reflectors
- LED life expectancy up to 100.000 operating hours
- Certified for use in Dust Ex-Zones 22 and 21

Ex-data:

Ex-designation:

⊕ II 1 G EEx ia IIC T4

⊕ II 2 D T90°C IP 52

EC-Certificate of conformity:

ZELM 02 ATEX 0104



I.S. Class I Division 1 Group A,B,C,D T4

Standard delivery:

- Lite-Ex LED 30
- Batteries
- Nylon case
- Wrist strap

Accessories:

- Spare battery LR 1
- Leather holster

Technical Data:

Ambient temperature Ta:	-20°C +50°C
Storage temperature:	-20°C +60°C
Operating time:	80 hours
Power supply:	3 x LR 1 as per IEC (type proofed batteries)
Weight:	approx. 160 g (with batteries)
Dimensions:	140 x 26 mm (L x ø)



Compact and easy to handle, the Lite-Ex LED 30 is ideal for inspection lighting in Ex-hazardous areas.

Intrinsically Safe LED pocket torch Lite-Ex HL 10 & 30/50 N



The Lite-Ex HL is a range of compact pocket torches - ABS-plastic bodied, they are ideal for use in Ex-hazardous areas classified as Zones 1, 2 and 22 according to Richtlinie 1999/92/EG (ATEX 137).

- Compact and handy design
- Plastic housing
- Certified for use in Dust Ex-Zone 22
- Available in 3 different versions (1, 3 & 5 LED's)



With 3 different versions to choose from, you can now select a size and type that best suits your specific requirements. Please note: Battery exchange must be done outside of the Ex-hazardous area.



Ex-data:

Ex designation:

⊕ II 2G EEx ia IIC T4

⊕ II 3D T56°C IP 54

EC-Certificate of conformity:

ZELM 03 ATEX 0187

Standard delivery:

- Lite-Ex HL
- Batteries
- Operating instructions

Technical data:

Operating Temperature:	Lite-Ex HL 10	-10°C.....+50°C
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	Lite-Ex HL 30 / 50 N	-5°C.....+50°C
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Power supply/

Batteries:	Lite-Ex HL 10	3 x LR03 to IEC, AAA
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	Lite-Ex HL 30 / 50 N	3 x LR6 to IEC, AA
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Operating time:	Lite-Ex HL 10	approx. 50 h
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	Lite-Ex HL 30 N	approx. 100 h
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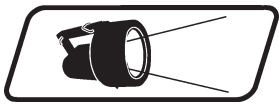
	Lite-Ex HL 50 N	approx. 70 h
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Dimensions:	Lite-Ex HL 10	162 x 21 mm
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	Lite-Ex HL 30 / 50 N	185 x 38 mm
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Weight:	Lite-Ex HL 10	approx. 100 g
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	Lite-Ex HL 30 / 50 N	approx. 200 g
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Intrinsically-Safe Torches Lite-Ex 15, 20, 23, 25



Lite-Ex ..

.....*non-sparking aircraft aluminium!*

The ultimate range of intrinsically-safe torches - with handy features such as adjustable beam focus, anti-roll device and integrated spare bulb. Housed in a solid metal casing that has integral rubber rings to provide a sure grip in hazardous areas.

Ex-data:

Ex designation:

Ⓜ II 2 G EEx e ia IIC T4

EC-Certificate of conformity:

TÜV 99 ATEX 1409

Accessories:

Lite-Ex 25

- Leather carry case, spare lens
- Spare bulb type AC2C/2D/BB

Lite-Ex 23

- Leather carry case, spare lens
- Spare bulb type AC2C/2D/BB

Lite-Ex 20

- Leather carry case, spare lens
- Spare bulb type AC2300/BB

Lite-Ex 15

- Leather carry case, spare lens
- Spare bulb type AC2640/BB

Technical data:

	Lite-Ex 25	Lite-Ex 23	Lite-Ex 20	Lite-Ex 15
Ambient temperature Ta:	-40°C +40°C	-40°C +40°C	-40°C +40°C	-40°C +40°C
Power supply:	2 x LR 20	2 x LR 14	3 x LR6	2 x LR6
Bulb:	AMPERCELL AC2C/2D/BB	AMPERCELL AC2C/2D/BB	AMPERCELL AC2300/BB	AMPERCELL AC2640/BB
Operating time:	up to 17 h	up to 9 h	up to 5 h	up to 4,5 h
Ingress protection:	IP 54	IP 54	IP 54	IP 54
Weight:	approx 740 g	approx 420 g	approx 152 g	approx 120 g

Intrinsically-Safe Rubber Cased Torch Lite-Ex HD 10



A torch designed and suitable for use in Ex-hazardous areas

- Shock resistant bulb
- Rugged and shock proof housing
- Practical hand loop

Ex-data:

Ex designation:
 Ⓜ II 2 G EEx ia e IICT4

EC-Certificate of conformity:
 TÜV 00 ATEX 1556

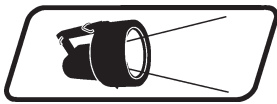
Accessories:

- Leather carry case
- Spare bulb type KPR 102



Technical data:

Ambient temperature Ta:	-20°C+40°C
Power supply:	2 x LR6/AA
Bulb:	KPR102-Sonca / KPR104-Philips / 2127 OSRAM
Operating time:	up to 3,5 h
Ingress protection:	IP 65
Dimensions:	165 x 44 mm
Weight:	approx 200 g



Intrinsically-Safe rechargeable Safety Handlamp H-251 A



The safety lamp H-251 A is a powerful rechargeable torch for Ex-hazardous areas of zone 2 and 1 as well as zone 22 and 21 according to Directive 1999/92/EC (ATEX 137).

- Long-life Krypton light bulb
- Robust, shockproof anti-static casing
- Battery discharge protection feature
- 900 Lux light intensity
- Emergency light function

Ex-data:

Ex designation:

Ⓔ II 2 GD EEx e ib IICT4 IP 66 T1 35°C

EC-Certificate of conformity:

BAS 01 ATEX 2188

Thanks to its robust, shockproof, plastic casing, the H-251 A Safety Handlamp withstands the harshest conditions. An ideal solution for emergency lighting or safety services. Providing light over a large area for investigation and inspection work.

Standard delivery:

- H-251 A incl. storage battery pack H-66

Accessories:

- Charger type C-251 HV (115/230V AC)
- Charger type C-251 LV (12-32V DC)
- Spare bulb type H-69
- Spare battery pack H-66

Technical data:

Ambient temperature Ta:	-20°C ... +40°C
Storage temperature:	-20°C ... +40°C
Operating time:	up to 7 hours
Dimensions:	190 x 130 (L x ø)
Weight:	approx. 1750 g (with storage battery pack)
IP protection:	IP 66
Power supply:	Ex-storage battery pack "H-66"
Battery data:	4V; 5Ah; 500 loading cycles, over discharge and short circuit protection
Bulb:	Halogen with at least 3,75 V and max. 0,75 A type H-69



Intrinsically-Safe, Safety Handlamp H-4 DCA



The safety lamp H-4 DCA is a powerful torch for Ex-hazardous areas of zone 2 and 1 as well as zone 22 and 21 according to Directive 1999/92/EC (ATEX 137).

- Long-life Halogen light bulb
- Robust, shockproof, anti-static casing
- Intensity of light - 960 Lux (2°) 5m

Ex-data:

Ex designation:

Ⓜ II 2 GD EEx e ib IIC T4 IP 66 T1 35°C

EC-Certificate of conformity:
BAS 01 ATEX 2187

Standard delivery:

- H-4 DC A incl. batteries

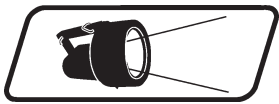
Accessories:

- Spare bulb

Technical data:

Ambient temperature Ta:	-20°C ...+40°C
Storage temperature:	-20°C ...+40°C
Operating time:	max. 20 hours
Dimensions:	190 x 130 (L x ø)
Weight:	approx. 1400 g (with battery pack)
Ingress protection:	IP 66
Power supply:	4 x LR20/R20
Bulb:	Halogen 4,8V and 0,5 A type H-141





Intrinsically-Safe LED pocket torch Lite-Ex LED 8

Easy to use, compact and always on hand, the Lite-Ex LED 8 pocket torch ideal for close-range lighting.



The Lite-Ex LED 8 is a compact, robust and easily operated LED pocket torch for close range lighting in Ex-hazardous areas of Zones 2 and 1 according to Directive 1999/92/EC (ATEX 137).

- Operating time >100 hours
- Robust metal housing
- LED life expectancy up to 100,000 operating hours
- Safety clip prevents unintentional switch-on
- Easy to use thanks to its small size

Technical data:

Ambient temperature Ta:	-20°C ... +50°C
Storage temperature:	-20°C ... +50°C
Power supply:	3 x LR 44 as per IEC (type approved batteries)
Ingress protection:	IP 54
Weight:	35 g (with batteries)
Dimensions:	66 x 14 mm (L x ø)

Ex-data:

Ex designation:
 Ⓜ II 2 G EEx ia IICT4
 EC-Certificate of conformity:
 TÜV 01 ATEX 1692

Accessories:

- Spare white light emitting diode
- Spare battery LR 44

Intrinsically-Safe mini pocket torch Ex-Penlight



The Ex-Penlight with its handy ballpoint pen shape is ideal for close range lighting in the Ex-hazardous area.

Whether it is a poorly lit distribution box or conduit box in a dark corner, with this Ex-safe mini pocket torch you can bring everything into the right light. It can be comfortably carried in a jacket or shirt pocket and its clip ensures secure retention.

Provides a spotlight in the Ex-area when carrying out testing work in restricted places.

- robust and reliable
- ballpoint pen format, fits in a jacket pocket
- simple, practical, one hand operation
- secure retaining clip

Technical data:

Ambient temperature Ta:	-20°C +40°C
Light source:	Filament Bulb type 222
Battery supply:	2 x LR03
IP protective rating:	IP 54
Operating life	approx. 4 hours
Dimensions:	147 x 11,6 mm
Weight:	approx. 60 g

Ex-data:

Ex designation:
 Ⓜ II 2 G EEx e ia IICT4
 EC-Certificate of conformity:
 TÜV 99 ATEX 1512

Accessories:

- Spare light bulb Type 222

Intrinsically-Safe Flashing Indicator Lite-Tracker LT-103E



This device indicates the exact position of a person or warns of a dangerous area in Ex-hazardous areas.

- Ultra-bright LED light source
- Uni-directional light output
- Tough polycarbonate case
- Small and lightweight
- Safe for Zones 0, 1 and 2

The Lite-Tracker is a flashing visual indicator intended to show the position of personnel working in areas of bad visibility. It is a small lightweight unit fitted with two primary batteries which feed an extremely bright LED light source which, with its blinking flashing effect, penetrates darkness and smoke. The scattering lens fitted enables the Lite-Tracker to spread the light over a wide angle.

Thanks to its "Ia" ignition-protective rating for inherent safety approval according to Directive 1999/92/EC (ATEX 137) the Lite Tracker may be used in Ex-hazardous areas of Zones 0, 1 and 2.

The Lite-Tracker is operated by two AAA primary cells. Alkaline batteries type LR03 are recommended on account of their long-lasting power which enables the Lite Tracker to function for up to 50 hours at optimum brightness.

The light produced by three extremely bright LED light sources is intensified and scattered by a prismatic material thus giving the entire light source an enhanced brightness. At night and without obstructions, the Lite Tracker can be seen at a distance of at least 1 km.

Technical data:

Ambient temperature Ta:	-20°C ... +40°C
Light source:	LED
Batteries:	2 x LR03 (AAA)
Operating time:	approx. 50 hours
Protective rating:	IP 67
Dimensions:	40 x 45 x 65 mm
Weight:	approx. 100g

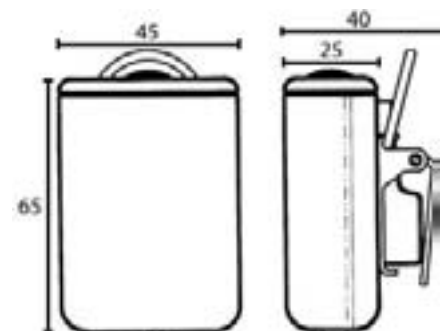
The electronic circuit and cells are housed in a two-part polycarbonate case that is sealed to prevent the ingress of dirt and moisture.

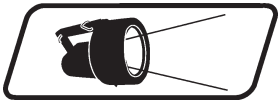
The Lite-Tracker has the IP 67 protection rating and can thus be immersed for a short time in water.

The Lite-Tracker can be securely attached to the user with either a steel clip for gripping thick firm clothing or alternatively with a "D" ring to a suitable loop.

Ex-Data:

Ex designation:
 Ⓜ II 1 G EEx ia IIC T4
 EC-Certificate of conformity:
 BAS99ATEX I 202





Intrinsically-Safe Laser-Pointer Ex-Point 02A



LASER PRODUCT

The Ex-Point 02A laser beam pointer is a handy sized device ideal for highlighting objects whilst in an Ex-hazardous area. Inaccessible and moving parts on plant and machinery can be identified safely during inspections without interruption of the process or endangering personnel. Operation is simple -pressing a button produces a bright illuminated point, which is visible over a long distance. For example, pipework can be then highlighted to show an installation crew where the object to be replaced or repaired is located. With a robust metal housing in a handy pen size with retaining clip, the Ex-Point 02 is easily carried in a shirt or coat pocket.

The laser pointer is also certified for use in dust-Ex areas zoned as 22 and 21. Power is supplied from 2 x LR03 (AAA) type-approved batteries.



Precision pointing over distance.....

Features

- Robust metal housing
- **Dust-Ex zones 22 and 21**
- Laser class 2
- Lightweight
- with retaining clip

Ex-data:

Ex designation:
 Ⓜ II 2 G EEx ia IICT4
 Ⓜ II 2 D Ex iaD 21 T130°C
 EC-Certificate of conformity:
 ZELM 03 ATEX 0137

Standard delivery:

- Ex-Point 02A
- batteries 2 x LR03 (AAA)

Accessories:

- replacement battery LR03

Technical data:

Wavelength:	630 - 670nm
Output:	<1mW
Laser class:	2
Ambient temperature:	-10°C ... +40°C
Batteries:	2 x LR03 (AAA) type-approved
Operating time:	approx. 80h (continuous operation)
Dimensions:	140 x 12 mm
Weight:	approx. 60g (with batteries)



Overview of data and processes

Webfactory® Unlimited access

Nowadays high-performance process visualisation needs to be applicable across borders. With WEBfactory® you are perfectly informed, always and anywhere. Open interfaces allow shared applications with real-time data exchange.

The adjustment of the system is executed by default HTML editors. WEBfactory® knows many languages, also in various character chains (e.g. Cyrillic) and thus

connects project teams all over the world. WEBfactory® uses Microsoft SQL 2000 standards as uniform database for all parameterisation and archiving data. This saves you costs and you benefit from enhancements of the standard software. Using the freely parameterisable data logger you document process-relevant data in a database almost in real-time. No matter if curves or bar charts, with

WEBfactory® you choose the most familiar way of displaying, set it as trend display and analyse the saved processing data as well as online data using different types of diagrams. The powerful AlarmManager administers



The core of WEBfactory®

Design Manager

- Management of processing data
- Parameterisation of signals such as logging, alerting
- Selection of the OPC server
- User management
- Alarm editor

Libraries

- ActiveX-Controls
- HTML elements
- Symbol library

Front Page Add-On

- Comfortable image creation using Microsoft Frontpage 2003
- Support WEBfactory®-specific functions
- Direct access to all processing variables

Testing centre

- Testing of visualisation pages in simulation mode
- Emulation of all processing variables
- Signal distribution to all connected clients

Fast data exchange

An intelligent transaction algorithm guarantees all process values and user inputs corresponding to the actual state of the system at all times. The processing is event-controlled. This provides for conducting of switching commands or set-point setting without delay and reduces the network load to a minimum.

Standard editors for project design

The supply of WEBfactory® includes a powerful HTML editor as well as with PlugIn for Microsoft Frontpage 2003. Both input aids are adjusted to WEBfactory and both facilitate the creation of visualisation pages by featuring a user-friendly menu. "Compiling" is unnecessary. The pages can be used immediately.

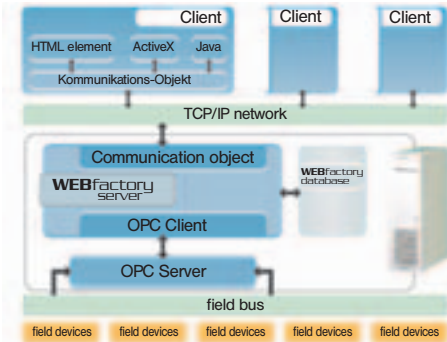
Open interfaces for shared applications

The standard package includes a wide range of possibilities for communication and software interfaces. Thus you realise your applications without adjustments for intranet or internet.

WEBfactory supports communication devices such as modems, routers, dial connections, fixed lines and radio transmissions as well as DCOM, HTTP, XML and SOAP protocols.

Defined and documented programming interfaces facilitate the extension by customised applications and software components (ActiveXLibs) from third parties.

Overview of data and processes



There are high-performance add-ons available for WEBfactory® (see the following pages for details):

The **WEBfactory® Mobile Edition** allows the downloading of process information from all over the world onto your mobile device, e.g. PDA. Hereby it does not matter which process transfer system generated the data. With the Mobile Edition you are not only independent location-wise but also independent from the software manufacturer.

WEBfactory® InetPro for secure communication via the internet. InetPro works with internet standards and optimally uses the technological advantages. The communication component on the side of the client supports both technologies (DCOM and HTTP). The module is fully compatible with older versions and supports Microsoft Windows XP Service Pack 2.

Using the **WEBfactory® Redundancy Module** you parallel couple various individual WEBfactory® systems for surveillance. The switch-over is conducted shock-free and without any loss of data. The Redundancy Module provides for even more security for critical applications. The configuration is easy. All functions are completely integrated in WEBfactory®. The automatic synchronising after re-initiation is important too.

Using the **WEBfactory® MessengerPro Module** for distribution of operation and fault messages you manage any number of calling lists, operation plans and alerting charts. MessengerPro supports all common

means of information such as SMS, fax, email, voice, etc. Confirmation can be obtained by telephone or mobile. For all sent messages the module communicates via ISDN or analogue modems.

Using the **WEBfactory® Maintenance Module** you create maintenance schedules for technical systems fast and reliably. The management of the maintenance schedules is effected via a database. You can save any number of maintenance schedules, aggregates or areas and define the maintenance intervals as time interval, operation meter or fixed points in time. Like all WEBfactory® modules the Maintenance Module is also network-applicable by integration in HTML browser interfaces.

The software components (OPC server; WEBfactory server; the configuration software of the WEBfactory server; HTTP server for HTML pages; database and internet browser) can be run on a computer or can be shared accordingly in a network.

The database access required for the evaluation of process or archive data is carried out through XML. The supplied free database software by Microsoft can also be replaced by the standard Microsoft SQL server.

For access authorisations all internet and common Windows security standards can be applied. Each signal transmitted by the server can be encoded in various security levels and protected by passwords to avoid unauthorised access. The security settings of Microsoft Windows XP Service pack 2 are fully supported.

The structure of WEBfactory® allows different ways of configuration. These provide for requests and actions from a distance both inside the company network and over the internet. For the internet connection no additional programming has to be done.

Also the license policy of WEBfactory® is user-friendly. Everybody, wishing to use the systems for their projects, just needs to buy a developer license, similar to CAD systems. This means that engineering companies or plant constructors are able to realise various projects without consequential costs.



WEBfactory® is the modular flexible visualisation software to manage, save and distribute processing information in real-time

- Reliable processing access via the internet worldwide
- No run-time license costs
- Extensive software package in modular design
- Easiest project management using standard HTML
- Optimal support of PDAs, Smart Devices and Wireless LAN



Maintenance Module

High system availability by database based scheduling of maintenance procedures

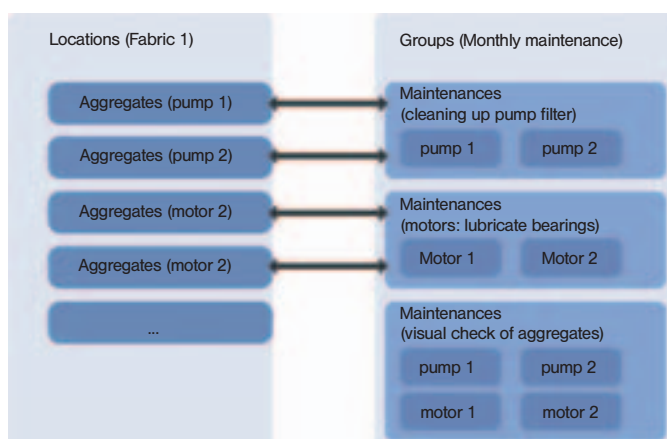
Increasing productivity through preventive maintenance

Through scheduled maintenance of systems or aggregates you can increase the availability of means of production and thus provide for a high productivity of your production. The WEBfactory® Maintenance Module is a tool for creating maintenance schedules for your systems fast and reliably. These provide information in time about upcoming maintenance or service works and allow specific adjustment of the production planning.

Don't leave it to chance. Schedule your decisions using the WEBfactory® Maintenance Module. Early indicators in the area of maintenance help to avoid unnecessary maintenance or repair costs.

WEBfactory® Maintenance Module

- Investment security through creation of maintenance schedules according to requirements
- Database based management of maintenance schedules
- Network-applicable through integration in HTML browser interfaces
- Print-out of maintenance schedules on standard printer
- Any number of maintenance schedules, aggregates or areas to be saved
- Maintenance intervals to be defined as time intervals, operation meters or fixed points in time
- Adding of comments to a maintenance unit



Redundancy Module

More security for critical applications by using redundant systems

Parallel data security

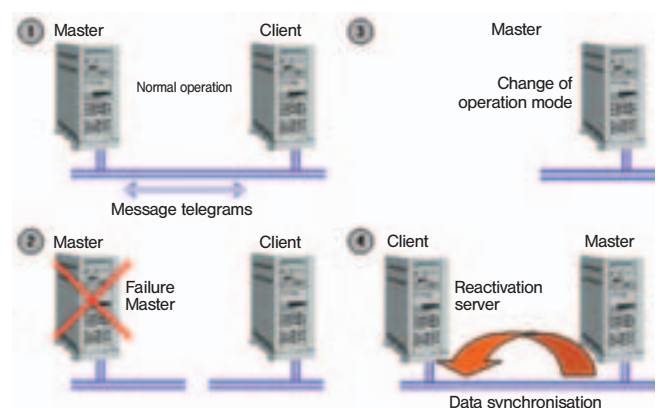
A failure of important system components is time-intensive and costly. The WEBfactory® Redundancy Module is a powerful application which makes sure that you will cope with critical situations, such as the breakdown of a server, without loss of data. Using the Redundancy Module two coupled individual WEBfactory® systems can be run parallel for surveillance purposes. All data is redundantly available in normal operation mode on both autarkic systems.

During breakdown of one of the two servers the second server automatically takes control of the system. After reactivation of the faulty server the data is automatically synchronised with the intact server.

Through parallel recording mode you survive a server breakdown without loss of data and can proceed as normal working with your archives or other historic data. This ensures that you can operate at all times and your data is absolutely incorruptible.

Redundancy Module

- Smooth switch-over
- More security for critical applications
- Easy configuration
- Complete integration in WEBfactory®
- Automatic synchronisation after reactivation



Messenger Pro

To be mobile and always perfectly informed

Alerting in time secures investments

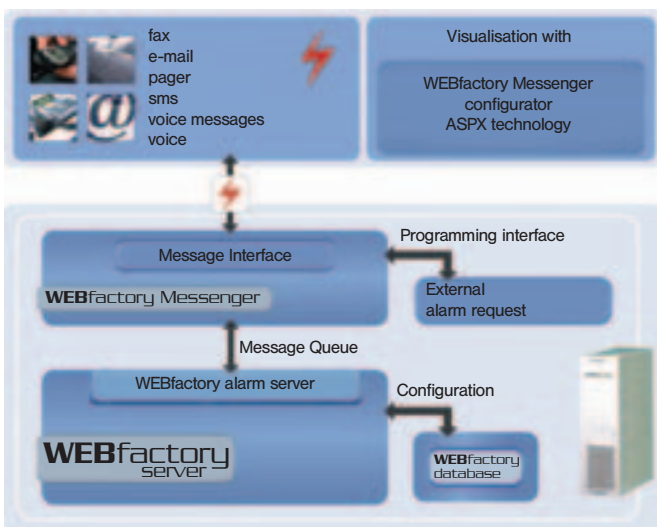
A standstill costs a lot of money. Nowadays fast and reliable alerting for the security of your systems and machines has become indispensable.

The WEBfactory® MessengerPro informs all relevant persons in the company in time about occurred problems and thus guarantees you taking the right measures.

On the basis of actual Microsoft.NET technology you adjust your disposition schedules or alerting hierarchies network-wide to the current needs.

MessengerPro

- Management of any number of calling lists, disposition schedules and alerting plans
- All common ways of information supported, such as SMS, fax, email, voice, etc.
- Confirmation by telephone or mobile
- Supports ISDN and analogue modems
- Archive for all sent messages



InetPro

High Performance Module for communication over the internet and complex network structures

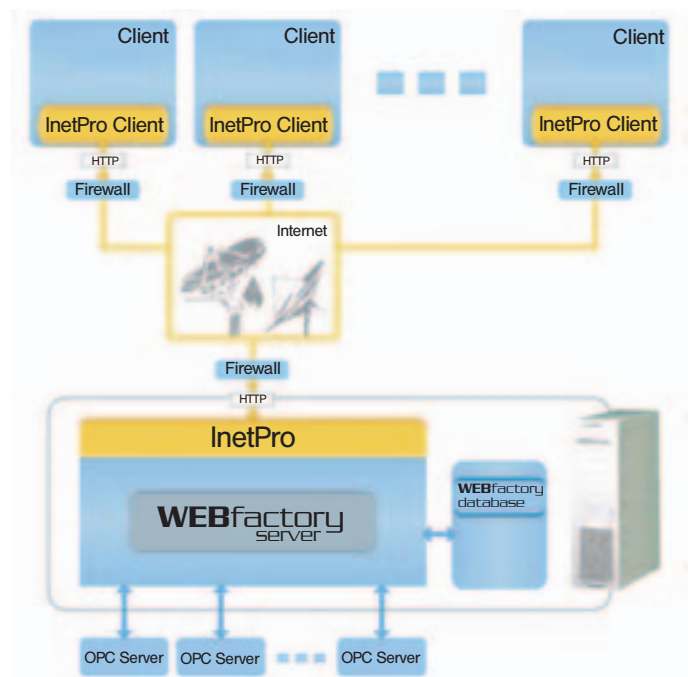
Reliable and fast data exchange over the internet

Almost every day new varieties of viruses and Trojans are circulated. More and more rigorous security regulations are developed within companies. For the protection of the IT infrastructure and data in a company the application of very restrictive firewalls is compulsory.

InetPro is a powerful module for secure communication by internet and supports all security-relevant network components, e.g. firewalls.

InetPro

- Management of internet standards
- Fully compatible with older versions
- Technical advantages are used optimally





Perfectly informed, always and anywhere

The process is always “with you”

Until now, the users of process control systems were bound to stationary terminals. This strongly restricted the staff in their need to be mobile. WEBfactory® Mobile Edition moves the process onto PDAs or other mobile computers and substitutes or replaces the common display terminals.

WEBfactory® Mobile Edition is a data concentrator for service staff and allows observing and operating of processes from any location in the company.

WEBfactory® Mobile Edition provides for the data to be displayed and for

interaction with a whole range of process visualising systems, such as WinCC, InTouch, CitectSCADA and InTeelution. The concerted forward switching of alerts diminishes the reaction times of the staff to seconds.



Do you have manufacturing sites all over the world?

Not only the big corporate groups but also many medium-sized companies are moving their production partially abroad. Not all of them are happy with their decision to relocate the production. There are language and culture barriers, different time zones, which make communication more difficult. Of course, those companies cannot refer to that in case something goes wrong.

Are you keeping many different software systems in your "software zoo"?

Not using them could mean not being compatible anymore with the rest of the world. We are talking about the large

number of new software products, which are supposed to facilitate our lives. But they are also creating new problems. Some software providers like to raise barriers, which make the access from other areas more difficult.

How can you work profitably despite of high costs?

We have to identify the cost drivers. Only if we honestly examine the cost situation in the company it is possible to improve the profit situation. For instance, costs that were the result of somebody reacting too late to a production event and thus creating more damages than necessary. Or have a look at the needless investments that we had to make up to now, in order to keep the processes transparent for the user.

Do you have to react more quickly to the demands of the market?

The customer has become very demanding. All of you know what we are talking about: *order: today, delivery: best yesterday...*

Companies can be really fast only if they have perfectly organised their processes. There is no space for chance anymore!

Our answer:

WEBfactory® Mobile Edition

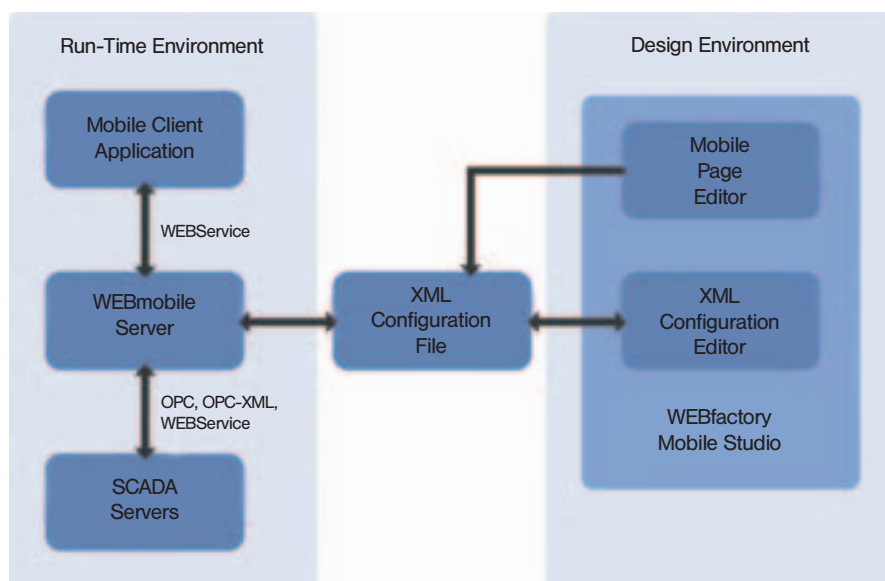
Mobile Edition

Mode of operation

The "Mobile Server" communicates with the Mobile Clients via default protocols and default transmission ways (WLAN, Bluetooth, etc.). To use WEBfactory® Mobile Edition no Java run-time environment is required. All devices that use the Microsoft operation system "Pocket PC" are suitable as "Mobile Clients". The transmission is secured. The user is informed by a warning message about interrupted connections of the PDA to the Mobile Server. A Mobile Client can communicate with various WEBfactory® Mobile Servers.

Mobile Edition

- High performance solution for process observance and control
- Runs on all mobile devices using Microsoft "Pocket PC®"
- No Java run-time environment required
- Display of process data from various process control systems
- Comfortable project management within a few minutes using the integrated development environment "Mobile Studio"



The creation of process flow images for the Mobile Device is done in a couple of minutes. Using the comfortable development environment of "Mobile Studio" in addition to an extensive library of graphic symbols, also non-professionals can generate and easily modify "their view of the process".

The Mobile Server communicates with the process control via web services and OPC XML DA. WEBfactory® Mobile Edition is compatible with various common systems, such as:

- Siemens WinCC
- In Touch
- CitectSCADA
- Intellution

We are preparing for more systems. Please contact us.



WEBfactory scope of supply and services

Software

WEBfactory Professional	Complete package for developer workplace. Any number of run-time licenses can be generated.
WEBfactory Standard	WEBfactory Standard is an individual license for a developer workplace, including three support calls.
WEBfactory Standard Plus	WEBfactory Standard is an individual license for a developer workplace, including three support calls. In addition you are provided with an individual license for individual modules (WEBfactory Redundancy, WEBfactory Maintenance, WEBfactory Messenger Pro)

Additional Modules

- WEBfactory Redundancy Module**
- WEBfactory Maintenance Module**
- WEBfactory MessengerPro**
- WEBfactory InetPro**

Mobile Edition

Standard License for Mobile Server	(1 server)
Professional License for Mobile Server	(1 server including 5 clients and 1 day training in our company)
License for Client with possibility to access Mobile Server	

Service / Support

- WEBfactory software hotline and update agreement**
- WEBfactory Redundancy Module hotline and update agreement**
- WEBfactory Maintenance Module hotline and update agreement**
- WEBfactory MessengerPro Module hotline and update agreement**

Services

- Workshop “ Basics for project developers”**
- Workshop “WEBfactory in heterogenic networks”**
- Workshop “WEBfactory Mobile Edition”**



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Services for product realisation	91
Customised development	92



***ecom engineering
has the solution!***

Evaluating innovations and developing new products and processes – fast and focused on the market.

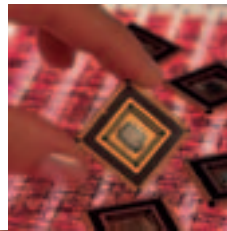
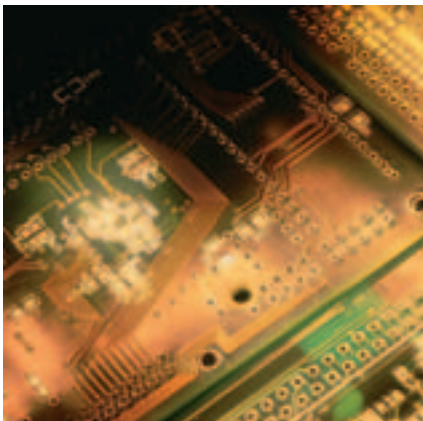
That is our benchmark.

The increasing complexity of measurement and calibration technology, Mobile Computing and telecommunication technology has lead to the development of engineering methods that tailor to a greater extent the objectives and demands of users.

Project Engineering

The project engineering team of ***ecom engineering*** focuses on the planning, control and surveillance of challenging technological projects. We provide our clients with an efficient tool to critically optimise time, resources and costs.

Within the scope of project control, problems can be avoided by risk evaluation and action monitoring from the start and possibilities for optimising can be organised beforehand. During all sequences of the development the ***ecom*** client will find our specialists to be a highly qualified coordination and contact partner. Thus the ***ecom*** team effectively reduces interface problems in complex international projects.

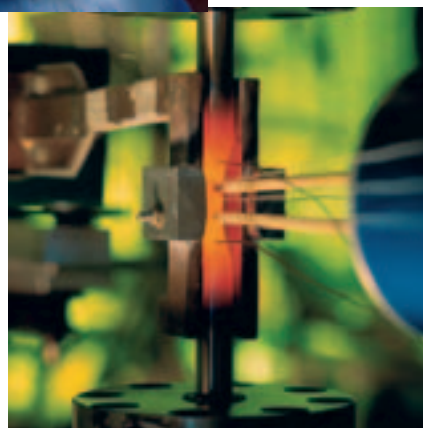


We develop innovative products for our clients and in co-operation with them. Therefore we are the ideal strategic and system-compatible outsourcing partner for high and middle end engineering: fast reactions, highly flexible and with high performance on any level, from the most detailed task to complex solutions for systems.

Our clients then have the advantage of customer-oriented project execution during the whole development process, from project definition to the start of production. The consequent viewing and observance of the whole process as well as the support with differentiated measures accelerates and optimises every single step between idea and realisation.

ecom engineering, established in 2002 with 15 development engineers and technicians, offers:

- complete technological consultancy
- modification of standard products
- tailored, customised solutions



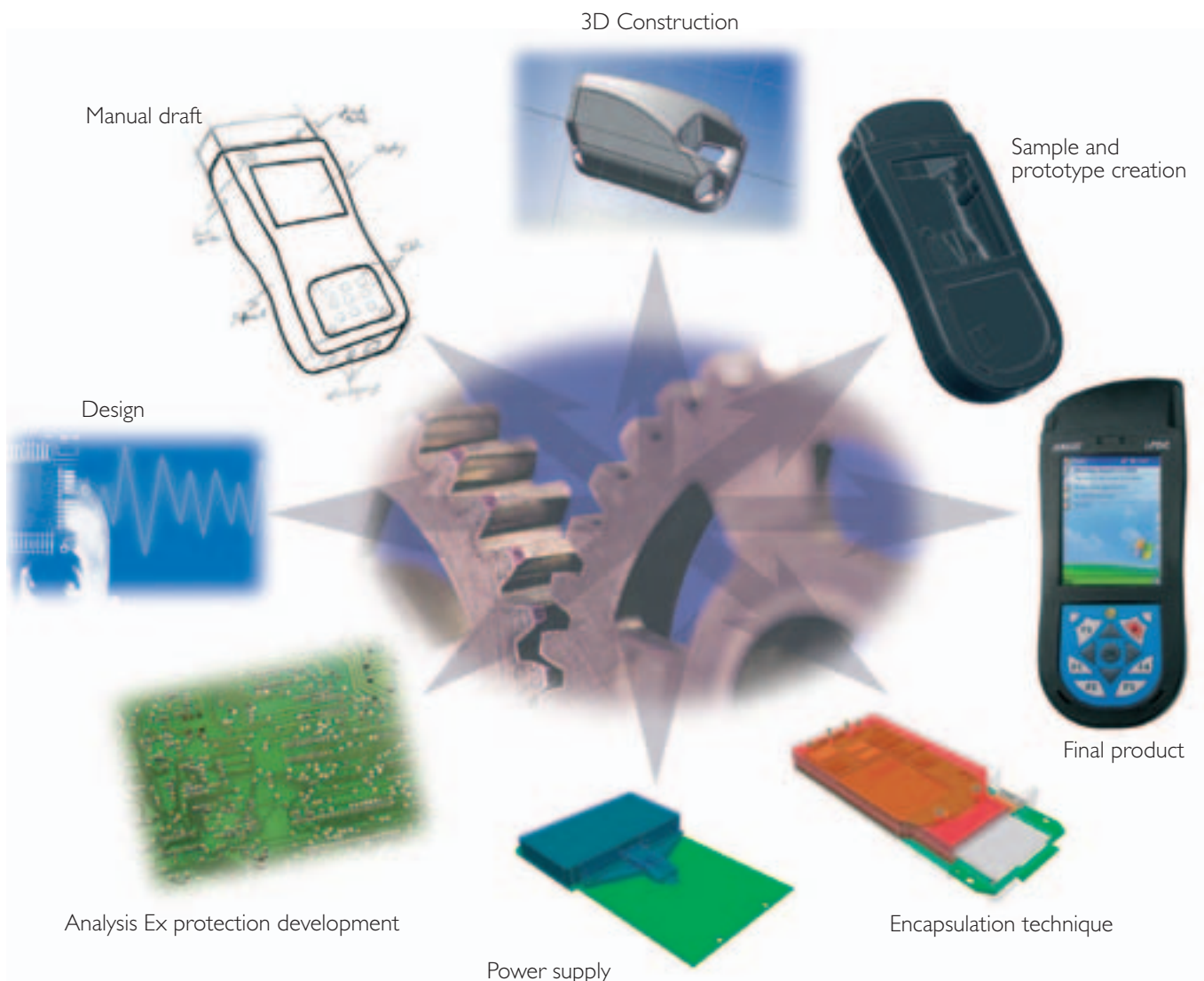
Services for product realisation

ecom engineering provides services for product realisation:

Engineering

Do you want to develop hardware? **ecom engineering** can assist you on all levels of development:

- Requirement specifications
- System design and technical specifications
- Development
- Test
- Introduction of production



Consulting

Do you have an idea for a product and want to check the technical possibilities for realising it?

Do you have an outline specification and want to develop a detailed specification? Do you need technical clarification?

We can help with this and other aspects. Please contact us.

Project management

Do you want us to take the whole responsibility for the project?

Do you want a contact partner who has the system overview over all technologies?

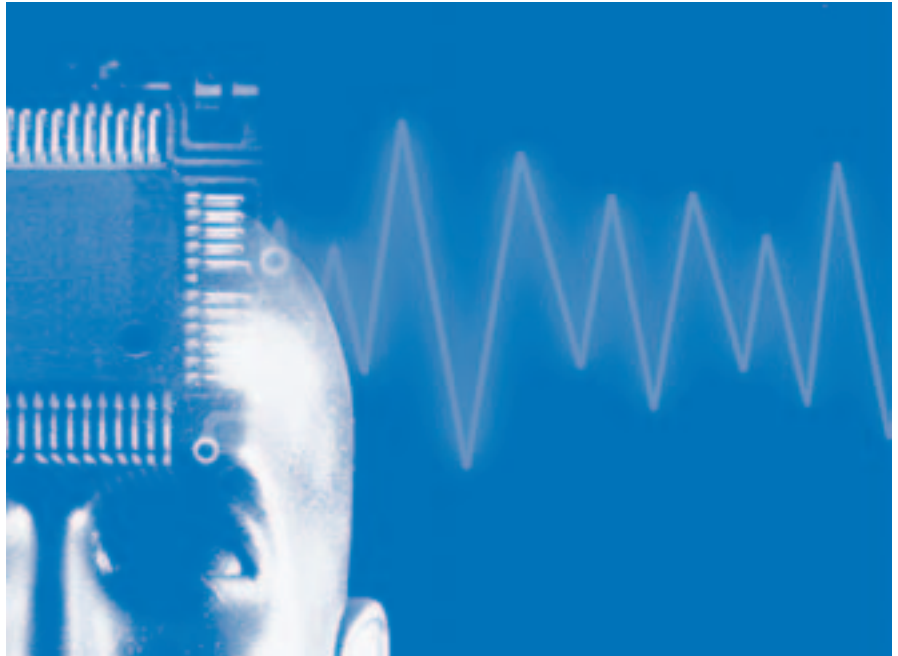
We have many years of experience and have the ability and determination to drive complex projects through in time - yet cost efficiently.

the objective of ecom engineering is to offer products and services of outstanding quality and with highest benefits for our customers.

We want satisfied customers with long-lasting trust in our products and services. Our range of services is an all-round package, including consulting, engineering, production and service. For us, the opinion of our clients is the crucial quality benchmark.

Essential factors for achieving optimum satisfaction of our customers are the identification and accomplishment of requirements for the product or the service. These requirements are defined by the customer's task and by effective laws and regulations.

Identifying and accomplishing these requirements are therefore an essential obligation for all members of our staff, and are a primary objective.

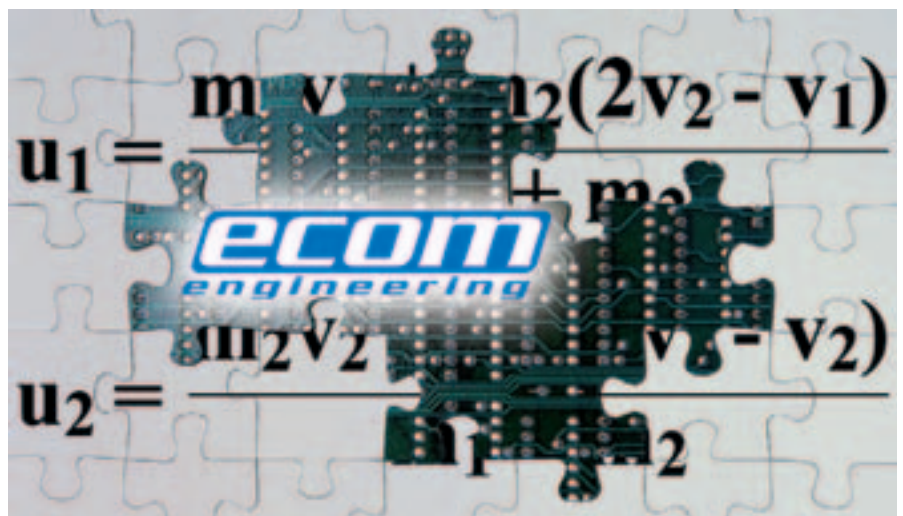


With high-tech and innovative technologies we are developing groundbreaking solutions for mobile computing, communication and measuring and calibrating technology. Our intelligent products have put us in a leading position all over the world. It is our aim to always have a head start of a few steps for the benefit of our partners.

During customised development **ecom engineering** covers all phases:

- Providing requirement specifications
- Development of hardware
 - Development of connections
 - Circuit board layout
 - Construction of apparatus
- Development of software
- Conducting EMC-checks in order to obtain CE label
- Documentation

The solution



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Location



Coming from direction Nürnberg / Ulm

Take motorway exit Crailsheim (46), follow B 290 to Bad Mergentheim, passing Rot am See. From there in direction of Stuppach to Assamstadt. Here take exit Industriegebiet Seewiesen/Assamstadt. Turn left into the industrial park just after the town sign.

Coming from direction Heilbronn / Würzburg

Take motorway exit Boxberg (5) and follow road signs towards Boxberg, B292. Then take the L513 towards Bad Mergentheim. Follow this road until exit Industriegebiet Seewiesen/Assamstadt. Turn left into the industrial park just after the town sign.



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Information Request Form

From:

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Name

Position / Dept.

Address

Post Code / City

Telephone / Fax

E-Mail

You can find the contact details for ecom world-wide on page 96.

I am interested in:

- A Quotation Please contact me by telephone
- Information about ecom WEBfactory Information about ecom engineering
- Brochures about
-

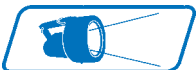
www.ecom-ex.com

I.S. Communication



- Ex- Mobile Phone (ME 45-Ex)
- I.S. Mobile Phone (Ex-Handy 04)
- I.S. Bluetooth Headset (Ex-BT 300)
- I.S. GSM Call Alert (VIB-Ex 1)
- I.S. Two-Way Radio (Ex-PMR 500)
- I.S. Digital dictating device (Voice-Ex 180)
- I.S. Pager (Ex-Pager A5)

I.S. Torches



- I.S. LED pocket torch (Lite-Ex LED 30)
- I.S. LED pocket torch (Lite-Ex HL 10&30 / 50 N)
- I.S. Torches (Lite-Ex 15; 20; 23; 25)
- I.S. Rubber Cased Torch (Lite-Ex HD 10)
- I.S. Handlamp (H-251 A / H-4 DCA)
- I.S. LED pocket torch (Lite-Ex LED 8)
- I.S. Mini pocket torch (Ex-Penlight)
- I.S. Flashing Indicator (Lite-Tracker-LT 103 E)
- I.S. Laser-Pointer (Ex-Point 02 A)

I.S. Measuring & Calibration



- I.S. Multimeter (Ex-DM 1000)
- I.S. Temperature Meter (Ex-MX 2)
- I.S. Temperature Meter (Ex-MP 4)
- I.S. Data logger (Ex-171, Ex-171-3)
- I.S. Temperature Meter (Ex-TP 20)
- I.S. Sensor-Temperature Meter (Ex-Pt 720)
- I.S. Ultrasonic Wall Thickness Gauge (1071-Ex)
- I.S. Laser-Tachometer (Ex-Tacho 10)
- I.S. Magnet Probe (Magnet-Ex 12)
- I.S. Continuity Tester (Ex-DT 12)
- I.S. Solar Pocket Calculator (TI-36 SOLAR)
- I.S. Wall Clocks (Ex-Time 40 / 50 & 35)
- I.S. Digital Camera (Ex-Cam 01)
- I.S. Pressure Calibrator (718Ex)
- I.S. Multifunction Process Calibrator (725Ex)
- I.S. Loop Calibrator (707Ex)
- I.S. Pressure module (700PEX)

Mobile Computing



- (I.S.)PDA (i.roc 41* / 51* -Ex / 61* -Ex)
- Accessories i.roc
- I.S. Barcode Handscanner (SC 900-Ex)

Measuring & Calibration



- Multifunction Calibrator (MCAL 4200)
- Multifunction Process Calibrator (725)
- Universal Temperature Calibrator (PTC 400)
- Loop Calibrator (MA 400)
- Loop Calibrator (707)
- Pressure Calibrator (CP 400 / 420)
- Pressure Calibrator (718)
- Digitale Pressure Test Gauge (CP 440)
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- Documenting Process Calibrator (Serie 740B)
- Infrared-Thermometer (63,66,68)

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