

# Circulators and Isolators

## DATA HANDBOOK

Philips Semiconductors



**PHILIPS**

B | 0 | 0 | K | P | C | 0 | 6 | 1 | 9 | 9 | 4



## **QUALITY ASSURED**

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## CIRCULATORS AND ISOLATORS

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## SELECTION GUIDE



## SELECTION BY FREQUENCY RANGE

frequency- MHz range	max. W power	type	page
54 to 60	130	2722 162 07271	30
66 to 72	130	2722 162 07281	30
68 to 150	40	2722 162 09002	24
72 to 73	20	2722 162 02913	26
73 to 74	20	2722 162 02732	26
74,5 to 75,5	25	2722 162 05151	26
83 to 84	20	2722 162 02723	26
86,5 to 87,5	20	2722 162 02862	26
88 to 108	50	2722 162 05991	30
88 to 108	300	2722 162 07021	30
96 to 146	50	2722 162 03332	30
96 to 146	50	2722 162 03342	30
100 to 101	20	2722 162 02943	26
100 to 163	75	2722 162 05881	30
100 to 163	300	2722 162 05891	30
132 to 178	40	2722 162 07141	30
138 to 141	25	2722 162 02903	26
138 to 141	110	2722 162 05002	26
140 to 260	40	2722 162 09012	24
144,5 to 147,5	20	2722 162 02953	26
146 to 174	110	2722 162 05755	26
146,5 + 2,5	110	2722 162 05142	26
153,5 + 2,6	110	2722 162 05202	26
153,5 to 156,5	20	2722 162 02963	26
156 to 157	20	2722 162 06003	26
159,5 + 2,6	110	2722 162 03832	26
160 to 178	500	2722 162 01871	36
160 to 178	500	2722 162 03641	36
160 to 178	1000	2722 162 01901	36
160 to 178	1000	2722 162 03681	36
160,5 + 2,6	110	2722 162 03842	26
161 to 162	15	2722 162 02993	26
166 + 2,6	110	2722 162 05282	26
168 + 2,6	110	2722 162 03852	26
170 to 230	100	2722 162 07005	36
173 to 204	500	2722 162 01861	36
173 to 204	500	2722 162 03631	36
173 to 204	1000	2722 162 03671	36
173 to 204	1000	2722 162 01891	36
173 to 204	1000	2722 162 05811	36
173 to 204	1500	2722 162 05971	36
176,5 to 183,5	20	2722 162 06893	26
190 to 220	100	2722 162 07012	36
195 to 205	1000	2722 162 05031	36
200 to 230	500	2722 162 01851	36
200 to 230	500	2722 162 03621	36
200 to 230	1000	2722 162 05821	36

# SELECTION GUIDE

frequency- MHz range	max. W power	type	page
200 to 230	1000	2722 162 05981	36
200 to 230	1000	2722 162 01881	36
200 to 230	1000	2722 162 03661	36
200,5 to 207,5	20	2722 162 06903	26
201 to 209	100	2722 162 06292	26
208,5 to 215,5	20	2722 162 06911	26
225 to 270	150	2722 162 01931	26
225 to 270	150	2722 162 01932	26
225 to 270	500	2722 162 03171	36
225 to 270	500	2722 162 03651	36
225 to 270	1000	2722 162 03691	36
225 to 270	1000	2722 162 03181	36
225 to 400	50	2722 162 03722	30
225 to 400	50	2722 162 03732	30
225 to 400	200	2722 162 05782	30
230 to 470	40	2722 162 09022	24
270 to 330	60	2722 162 03421	26
270 to 330	150	2722 162 01941	26
330 to 400	60	2722 162 05091	26
330 to 400	150	2722 162 01951	26
400 to 470	20	2722 162 02712	32
400 to 470	100	2722 162 03411	32
400 to 470	100	2722 162 05101	32
400 to 470	300	2722 162 01572	44
400 to 500	25	2722 162 09041	24
406 to 414	60	2722 162 02931	32
406 to 470	100	2722 162 06161	32
433 to 435	2000	2722 162 03991	48
450 to 458	60	2722 162 02981	32
455 to 459	100	2722 162 06931	32
460 to 468	60	2722 162 02857	32
462 to 468	100	2722 162 01555	32
470 to 600	10	2722 162 02691	40
470 to 600	10	2722 162 02671	40
470 to 600	50	2722 162 03871	40
470 to 600	100	2722 162 03961	40
470 to 600	100	2722 162 01551	40
470 to 600	300	2722 162 01582	44
470 to 600	400	2722 162 01632	44
470 to 600	500	2722 162 01121	46
470 to 600	500	2722 162 03221	46
470 to 600	500	2722 162 03141	46
470 to 600	700	2722 162 05371	46
470 to 600	2000	2722 162 01771	48
470 to 600	2000	2722 162 01261	48
470 to 600	2000	2722 162 03051	50
470 to 600	2000	2722 162 03001	50



frequency- MHz range	max. W power	type	page
470 to 610	200	2722 162 07651	40
470 to 610	150	2722 162 07411	40
510 to 514	60	2722 162 02921	32
550 to 650	100	2722 162 01563	40
590 to 720	300	2722 162 01592	44
590 to 720	400	2722 162 01642	44
590 to 720	500	2722 162 03241	46
590 to 720	500	2722 162 03201	46
590 to 720	500	2722 162 01131	46
590 to 720	700	2722 162 05381	46
590 to 720	2000	2722 162 01781	48
590 to 720	2000	2722 162 01281	48
590 to 720	2000	2722 162 03011	50
590 to 720	2000	2722 162 03061	50
600 to 800	10	2722 162 02701	40
600 to 800	10	2722 162 02681	40
600 to 800	10	2722 162 02751	40
600 to 800	50	2722 162 03821	40
600 to 800	100	2722 162 01561	40
600 to 800	100	2722 162 03971	40
600 to 800	500	2722 162 03151	46
600 to 800	500	2722 162 03231	46
600 to 800	500	2722 162 03191	46
600 to 800	2000	2722 162 01791	48
600 to 800	2000	2722 162 01331	48
600 to 960	10	2722 162 05321	30
600 to 960	10	2722 162 06111	30
610 to 810	150	2722 162 07421	40
610 to 860	200	2722 162 07661	40
710 to 860	300	2722 162 01612	44
710 to 860	400	2722 162 01662	44
710 to 860	500	2722 162 01141	46
710 to 860	500	2722 162 03211	46
710 to 860	500	2722 162 03251	46
710 to 860	700	2722 162 05391	46
710 to 860	2000	2722 162 01801	48
710 to 860	2000	2722 162 01271	48
710 to 860	2000	2722 162 01981	50
710 to 860	2000	2722 162 03071	50
790 to 1000	10	2722 162 02741	40
790 to 1000	10	2722 162 02401	40
790 to 1000	50	2722 162 03811	40
790 to 1000	100	2722 162 03261	40
790 to 1000	100	2722 162 03263	40
790 to 1000	100	2722 162 03981	40
806 to 960	100	2722 162 06671	32
880 to 950	10	2722 162 07361	32

# SELECTION GUIDE

frequency- MHz range	max. W power	type	page
930 to 965	60	2722 162 06841	32
935 to 960	35	2722 162 06962	32
935 to 960	60	2722 162 08801	32
960 to 1225	100	2722 162 03591	52
1200 to 1415	20	2722 162 08341	52
1215 to 1400	250	2722 162 07511	52
1230 to 1365	60	2722 162 08641	52
1350 to 1700	10	2722 162 05331	52
1350 to 2100	10	2722 162 06701	52
1350 to 2100	10	2722 162 05571	52
1427 to 1535	10	2722 162 02492	52
1427 to 1535	10	2722 162 03802	52
1470 to 1620	1	2722 162 02521	56
1470 to 1620	15	2722 162 02631	56
1590 to 1800	1	2722 162 02531	56
1590 to 1800	15	2722 162 02641	56
1626 to 1660	20	2722 162 07491	52
1630 to 1780	1	2722 162 06031	62
1680 to 1920	20	2722 162 03881	60
1680 to 1920	50	2722 162 03911	60
1700 to 2100	10	2722 162 05311	56
1700 to 2100	15	2722 162 02571	56
1700 to 2100	15	2722 162 02581	56
1700 to 2100	30	2722 162 05241	56
1700 to 2100	30	2722 162 05231	56
1700 to 2100	30	2722 162 05251	56
1700 to 2100	30	2722 162 04051	62
1700 to 2100	30	2722 162 04091	62
1700 to 2300	20	2722 162 02191	60
1700 to 2300	20	2722 162 02511	60
1700 to 2300	20	2722 162 03951	60
1700 to 2300	50	2722 162 03941	60
1700 to 2700	25	2722 162 07601	56
1760 to 1940	1	2722 162 02541	56
1760 to 1940	15	2722 162 02651	56
1805 to 1880	45	2722 162 07801	52
1815 to 1925	1	2722 162 06321	62
1880 to 2120	20	2722 162 03891	60
1880 to 2120	50	2722 162 03921	60
1890 to 1990	1	2722 162 06041	62
1890 to 2110	1	2722 162 02551	56
1890 to 2110	15	2722 162 02661	56
1900 to 2300	10	2722 162 05341	56
1900 to 2300	15	2722 162 02591	56
1900 to 2300	15	2722 162 02601	56
1900 to 2300	15	2722 162 05471	56
1900 to 2300	30	2722 162 05261	56

frequency- MHz range	max. W power	type	page
1900 to 2300	30	2722 162 05271	56
1900 to 2300	30	2722 162 04101	62
1900 to 2300	30	2722 162 04061	62
2000 to 2700	10	2722 162 05411	56
2000 to 4000	50	2722 162 01501	68
2000 to 4000	50	2722 162 02091	68
2000 to 4000	50	2722 162 02101	68
2000 to 4000	50	2722 162 01491	68
2038,5 to 2108	1	2722 162 06051	62
2074 to 2184	1	2722 162 06331	62
2080 to 2320	20	2722 162 03901	60
2080 to 2320	50	2722 162 03931	60
2100 to 2500	10	2722 162 05351	56
2297,5 to 2367	1	2722 162 06061	62
2300 to 2700	10	2722 162 05361	56
2350 to 2400	3000	2722 163 02091	76
2350 to 2400	3000	2722 163 02081	76
2350 to 2400	6500	2722 163 02024	78
2350 to 2400	6500	2722 163 02025	78
2425 to 2475	3000	2722 163 02061	76
2425 to 2475	3000	2722 163 02071	76
2425 to 2475	6500	2722 163 02005	78
2425 to 2475	6500	2722 163 02004	78
2425 to 2475	6500	2722 163 01021	80
2425 to 2475	2000	2722 163 02121	82
2450 to 2850	10	2722 162 05401	56
3000 to 6000	20	2722 162 02071	68
3000 to 6000	20	2722 162 01511	68
3800 to 4200	10	2722 162 04031	64
3800 to 4200	10	2722 162 03431	64
4000 to 8000	10	2722 162 01811	68
4000 to 8000	10	2722 162 02111	68
4200 to 4400	10	2722 162 02471	64
4400 to 5000	10	2722 162 04041	64
4400 to 5000	10	2722 162 03441	64
5925 to 6425	20	2722 162 08421	66
5925 to 6425	200	2722 161 04003	66
5925 to 6425	200	2722 161 02212	66
6400 to 7100	1	2722 162 08461	66
6425 to 7125	200	2722 161 02312	66
6425 to 7125	200	2722 161 04052	66
7000 to 12400	10	2722 162 02122	68
7000 to 12400	10	2722 162 01822	68
7125 to 7750	200	2722 161 04062	66
7125 to 7750	200	2722 161 02322	66
7900 to 10400	5	2722 162 02231	68
8200 to 11200	50	2722 161 02071	68

# SELECTION GUIDE

frequency- MHz range	max. W power	type	page
8500 to 9600	1	2722 161 01221	74
8500 to 9600	1	2722 161 01222	74
8500 to 9600	5	2722 161 01361	74
8500 to 9600	10	2722 161 01211	74
8500 to 9600	10	2722 161 01261	74
8900 to 9600	5	2722 162 02501	68
10025 to 10325	1	2722 161 01531	74
12000 to 18000	5	2722 162 02221	68
12000 to 18000	5	2722 162 03301	68

**GENERAL**





## CIRCULATORS AND ISOLATORS

### INTRODUCTION

*This Data Handbook gives only a selection of circulators and isolators from our production line which, we think, are of common interest and which shows our capability. Should you require other executions, different connectors, different frequencies or any other data, please contact us.*

Circulators and isolators are key elements in modern v.h.f., u.h.f. and microwave engineering. Their fundamental property of non-reciprocity is capable of simplifying the construction and improving the stability, efficiency and accuracy of radar, communication and testing systems, and industrial heating applications.

The devices contain a core of ferrite material biased by a static magnetic field. This field orients the electron spins within the ferrite to produce a gyromagnetic effect. The non-reciprocal behaviour occurs when a r.f. signal, applied perpendicular to the biasing field, interacts with the precessing electrons to set up a standing-wave pattern within the core.

### CIRCULATORS

A circulator is a passive non-reciprocal device with three or more ports. Energy introduced into one port is transferred to an adjacent port, the other ports being isolated. Although circulators can be made with any number of ports, the most commonly used are 3-port and 4-port ones, the symbols for which are given in Figs 1 and 2.

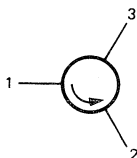


Fig. 1 Symbol for 3-port circulator.

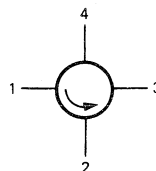


Fig. 2 Symbol for 4-port circulator.

Energy entering into port 1 emerges from port 2; energy entering into port 2 emerges from port 3, and so on in cyclic order.

### ISOLATORS

An isolator is a passive non-reciprocal 2-port device which permits r.f. energy to pass through it in one direction whilst absorbing energy in the reverse direction.



Fig. 3 Symbol for an isolator.

## TERMS AND DEFINITIONS

### Frequency range

This is the range within which the circulator or isolator meets the guaranteed specification.

### Isolation

In a circulator, isolation is the ratio, expressed in dB, of the power entering a port to the power scattered into the adjacent port on the side opposed to the normal circulation (matched source and the other ports correctly terminated).

In an isolator, isolation is the ratio, expressed in dB, of the input power to the output power for signal injection in the reverse direction (matched source and load).

### Insertion loss

The attenuation that results from including the device in the transmission system. It is given as a power ratio, expressed in dB, which compares the situation before and after the insertion of a circulator/ isolator (matched source and the other ports correctly terminated).

### Maximum power

In a circulator, the maximum power is the largest power it can handle at sea level and at maximum ambient temperature when one port is terminated with a mismatch giving a VSWR of 2, whilst the next port is matched with a VSWR of 1,2 or less, unless otherwise stated. This power value must not be exceeded. If the mismatch of the load is expected to exceed a VSWR of 2, a circulator of higher power handling capacity should be used.

The maximum power is the maximum continuous-wave power unless a maximum peak power is separately stated. If this value is exceeded the circulator can be damaged by arcing in its internal transmission structure. Power values are valid for one signal passage only. If more than one signal passes through the circulator, the peak power of the combined signal should not exceed the indicated maximum peak power.

In an isolator, the maximum power is the largest power that may be passed through it in the forward direction into a load with a VSWR of 2, unless otherwise stated. This power value must not be exceeded.

### Temperature range

The ambient temperature range within which circulators and isolators function to specification. (When necessary, special temperature compensation is built in for circulators.) Circulators still function outside the temperature range but their electrical behaviour may then be far outside the guaranteed specifications. However, no permanent damage can be expected unless a large temperature rise is caused by excessive power handling.

## CAUTIONARY NOTES

Circulators and isolators have internal fields that are carefully adjusted for optimum operation; they should not, therefore, be subjected to strong external magnetic fields. During storage and transport a minimum distance of 10 mm to other circulators/isolators and ferromagnetic material is recommended. During operation this distance should be at least 20 mm.

Care must be taken that condensation of humidity, especially in water-cooled items, does not occur.

## QUALITY GUARANTEE

Subject to the Conditions of Guarantee the Manufacturer guarantees that circulators and isolators supplied to the purchaser meet the specifications published in the Manufacturer's Data Handbook and are free from defects in material and workmanship.

## STANDARD TEST SPECIFICATIONS

### Initial measurements

These measurements have been carried out at room temperature and at the extreme temperatures, with a power level not exceeding 10 mW.

### Tropical test

This test has been carried out completely in accordance with IEC 68 test D, accelerated damp heat. This test begins with the temperature at  $55 \pm 2$  °C and R.H. at 95 to 100% for a period of 16 hours, followed by a period of 8 hours with the temperature at  $+ 25$  °C and R.H. 80 to 100% to complete the 24-hour cycle: the test consists of 6 uninterrupted cycles.

### Vibration test

This test has been carried out completely in accordance with MIL-STD-202D, method 201A: frequency range 10 to 55 to 10 Hz for 2 hours in each of the X, Y and Z directions, with a total excursion of 1,5 mm.

### Thermal shock test

This test has been carried out completely in accordance with MIL-STD-202D, method 107C under condition A: 5 cycles with extreme temperatures of  $-55$  °C and  $+ 85$  °C; each cycle of 1 hour's duration.

### Mechanical shock test

This test has been carried out in accordance with MIL-STD-202D, method 213A under condition G: peak value 100 g, duration 6 ms, and also with extreme peak values up to 800 g, duration approximately 1 ms for each device, referring to the results of the drop test.

### Drop test

This test has been carried out in accordance with ISO 2248, part IV: packaging complete, filled transport packages, vertical impact.

### R.F. power test

The devices have been tested in accordance with the definition of maximum power in the Data Handbook (VSWR = 2). The ambient temperature of 25 °C was increased to the maximum operating temperature and the duration of the test was 1 hour for each device.

### Final measurements

On completion of the above tests final measurements were carried out at a temperature of  $+ 25$  °C and with a power level not exceeding 10 mW. The results of these tests should be within the guaranteed values.

### Dimensions and visual appearance

These have been checked in accordance with the published data.

### Note

On request, different tests and/or additional tests to those above can be carried out.

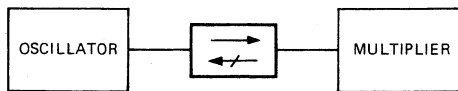
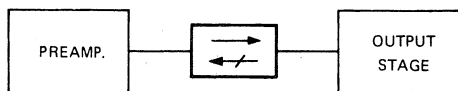
### 12-digit type number

Each device is uniquely identified by a 12-digit type number, the last three digits being specific device identifiers. The diagram below shows you how, from the first nine digits, to find the circulator, isolator or isoductor you need. Remember that devices with alternative connectors and operating at other frequencies may be available on request.

digits 1 - 4	digits 5 - 7	digits 8 and 9	
	161 (waveguide)	0 1 = field displacement or slimline isolator 0 2 = circulator 0 3 = X-configuration, 4-port circulator 0 4 = isolator	
2722	162 (coaxial)	0 1, 3, 5, 7 = circulator 0 2, 6, 8 = isolator 0 4 = 4-port circulator 0 9 = isoductor	
	163 (industrial)	0 1 = circulator 0 2 = isolator	

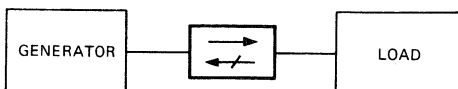
## APPLICATIONS

Decoupling of circuit stages



7Z88154

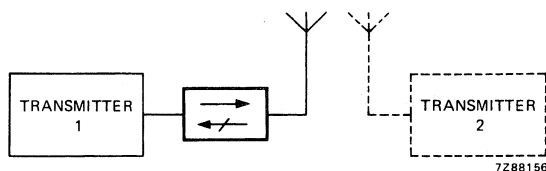
Reflection suppression



7Z88155

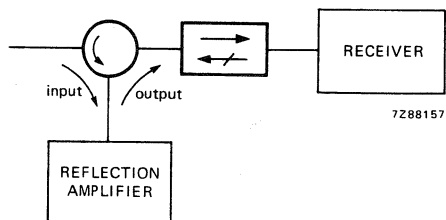
Suppression of reflections from

- long line to aerial
- mismatch by aerial damage
- feedback from nearby transmitters



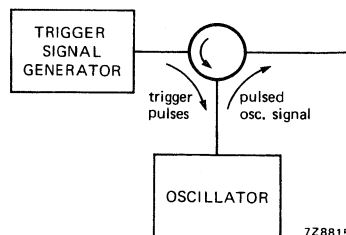
7Z88156

Separate input and output of a reflection amplifier, such as parametric amplifiers; tunnel, Gunn or Impatt diode amplifiers



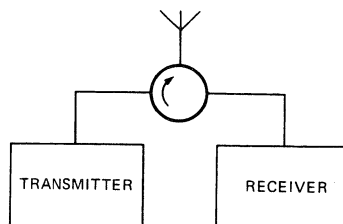
7Z88157

Feed trigger signals into an oscillator



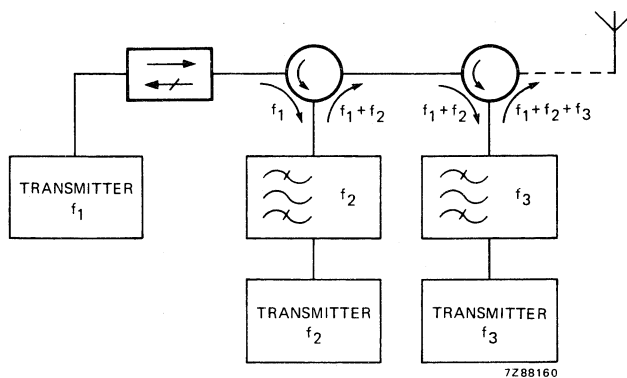
7Z88158

Avoid separate aerial for transmitter and receiver

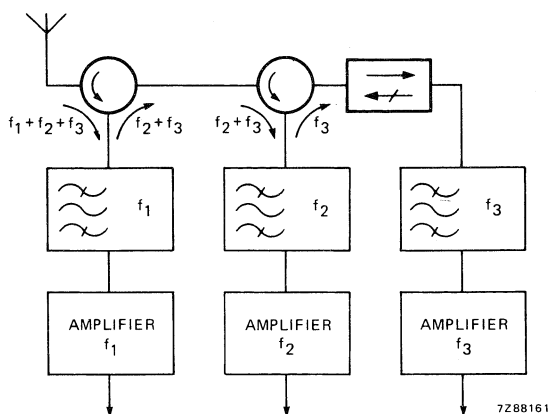


7Z88159

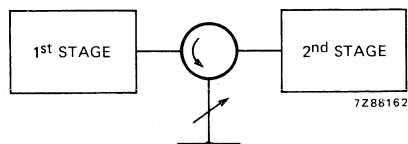
Connect different transmitters to a common aerial



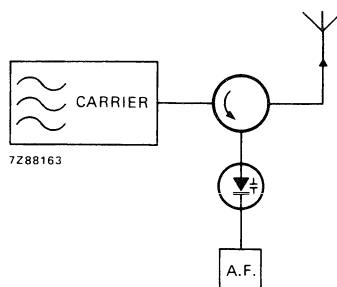
Separate a range of frequencies received by a common aerial



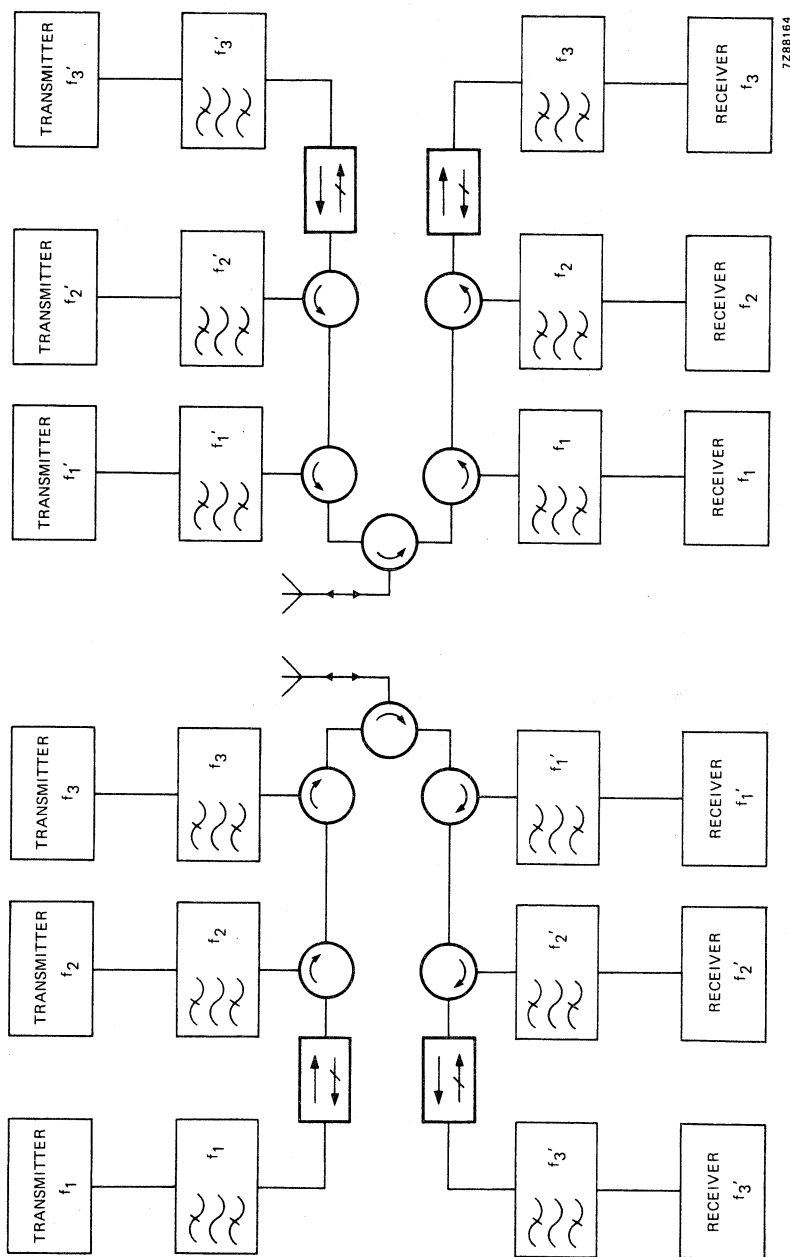
Variable phase shifters with a variable short-circuit



Phase modulation with a variable capacitance diode as a variable reactance







7288164

Signal combination and separation used together in a frequency-multiplexed, multichannel transceiver system



## **CIRCULATORS AND ISOLATORS**



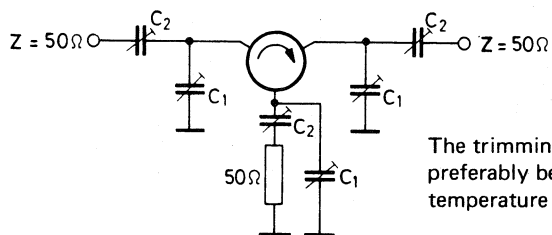


Preferred application: fixed and mobile communication.

type	dimensions Fig.	frequency range* MHz	maximum power	
			forward W	reflected W
2722 162 09002	1	68 to 150	40	total reflection permitted
2722 162 09012	1	140 to 260	40	
2722 162 09022	1	230 to 470	40	

\* For instantaneous bandwidth see diagram.

The technical characteristics have been measured in the following circuit:



The trimming capacitors should preferably be of a type with low temperature coefficient.

VX712212EA

type	C1 (pF)	C2 (pF)
2722 162 09002	25 to 200	20 to 150
2722 162 09012	5,5 to 65	5,5 to 65
2722 162 09022	2 to 16,5	2 to 16,5

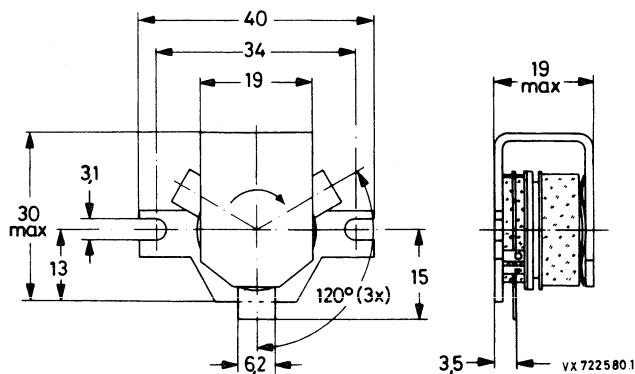
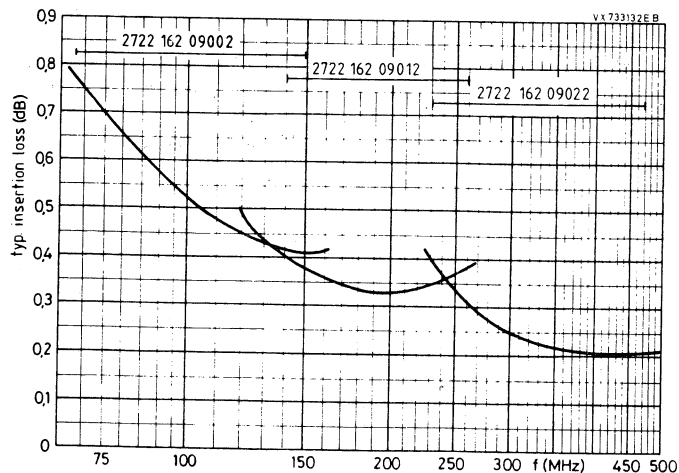
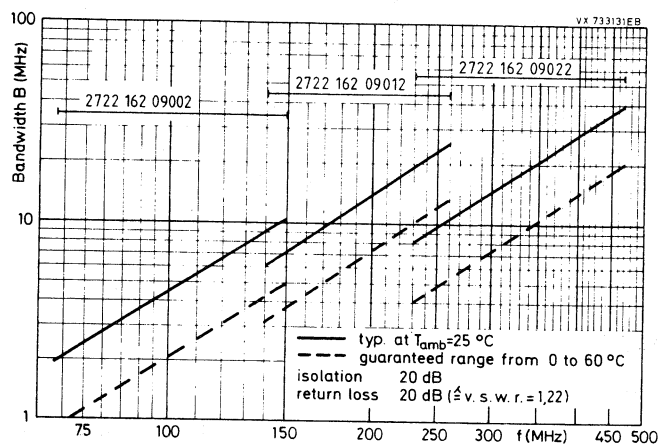


Fig. 1



insertion loss dB	isolation dB	VSWR	temp. range °C	connector	mass g
$\leq 0,9$ ( $\leq 100$ MHz)	$\geq 20$	$\leq 1,22$	0 to 60	solder pins	40
$\leq 0,7$ ( $> 100$ MHz)	$\geq 20$	$\leq 1,22$	0 to 60		40
$\leq 0,6$	$\geq 20$	$\leq 1,22$	0 to 60		40
$\leq 0,5$	$\geq 20$	$\leq 1,22$	0 to 60		40



Preferred application: fixed and mobile communication

type	dimensions Fig.	frequency range * MHz	maximum power	
			CW W	reflected W
2722 162 02913	2	72 to 73	20	20
02723		83 to 84	20	20
02943		100 to 101	20	20
02903		138 to 141	25	20
02953		144,5 to 147,5	20	20
02963		153,5 to 156,5	20	20
06003		156 to 157	20	20
02993		161 to 162	15	15
06893		176,5 to 183,5	20	20
06903		200,5 to 207,5	20	20
2722 162 05151	3a	74,5 to 75,5	25	20
05002	3b	138 to 141	110	110
05755	3b	146 to 174**	110	110
2722 162 01931	4	225 to 270	150	
01932		225 to 270		
01941		270 to 330		
01951		330 to 330		
2722 162 03421	5	270 to 330	60	
05091		330 to 400		

\* Other frequencies on request.

\*\* Tunable instantaneous  
bandwidth for isolation 20 dB min. 5 MHz.

isolation		insertion loss		VSWR		temp. range °C	connector	mass g
min. dB	typ. dB	max. dB	typ. dB	max.	typ			
20		0,7		1,25		0 to +50	N female	220
		0,7				0 to +55		
		0,7				0 to +50		
		0,4				0 to +55		
		0,6				0 to +50		
		0,6				0 to +50		
		0,6				0 to +50		
		0,6				0 to +50		
		0,6				0 to +55		
		0,6				0 to +55		
		0,8				0 to +55	N female	400
		0,5				0 to +55		
		0,5				0 to +60		
18	21	0,35 0,5 0,35 0,35	0,2 0,35 0,2 0,3	1,35	1,25	0 to +70	N female	725
18	21	0,35	0,2	1,35	1,25	0 to +70	SMA female	725

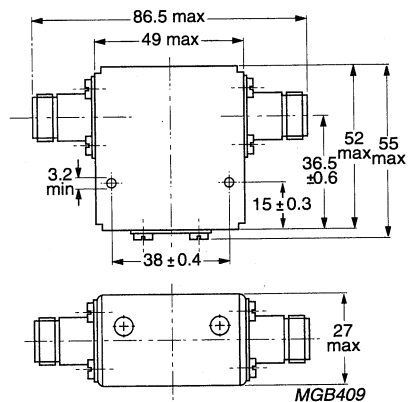


Fig. 2.

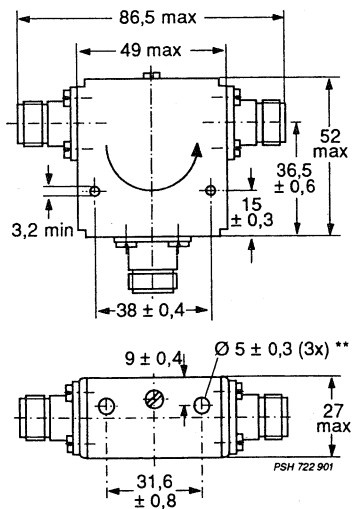


Fig. 3a.

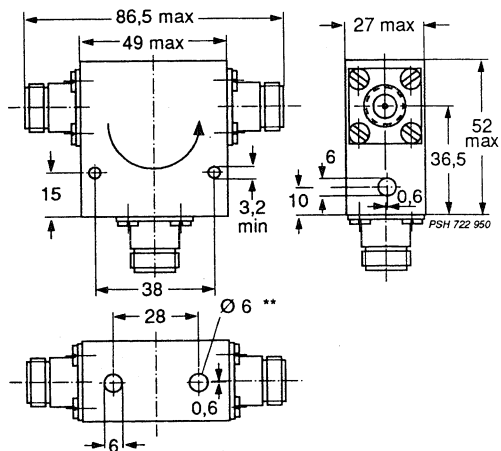


Fig. 3b.

\*\* note see page before

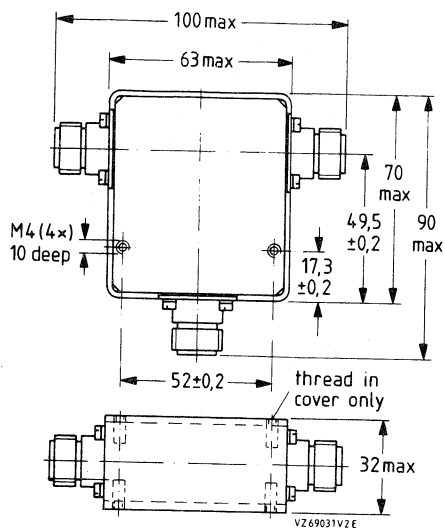


Fig. 4.

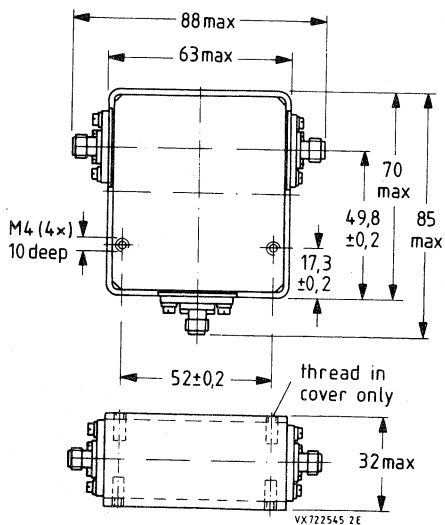


Fig. 5.

Preferred application: band I TV, fm radio, fixed and mobile communication

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 162 07271 07281	8	54 to 60 66 to 72	130	
2722 162 05991 07021	6 8	88 to 108	50 300	
2722 162 03342 03332	6 7	96 to 146	50	
2722 162 05881 05891	6 8	100 to 163	75 300	
2722 162 07141	6	132 to 178	40	
2722 162 03732 03722 05782	6 7 6	225 to 400	60 60 200	
2722 162 06111 05321	9 10	600 to 960	10	

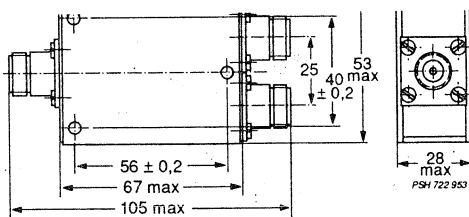


Fig. 6.

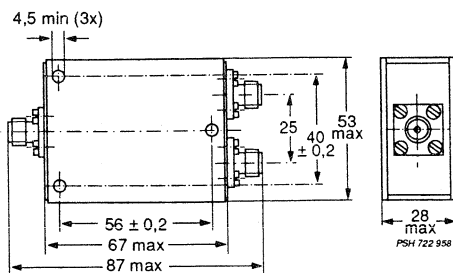


Fig. 7.

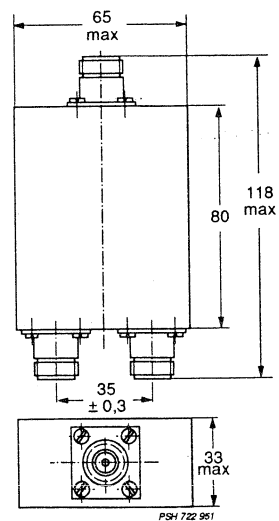


Fig. 8.



isolation		insertion loss		VSWR		temp. range °C	connector	mass g
min. dB	typ. dB	max. dB	typ. dB	max.	typ			
17		0,7		1,4		0 to +60	N female	700
18 16		0,8 0,8		1,3 1,4		-10 to +50 0 to +60	N female N female	420 700
18		1,3		1,3		-10 to +60	N female SMA female	420 380
14		1,5		1,5		-20 to +55	N female	420 700
17		0,5		1,35		-30 to +60	N female	420
15 15 17		1,4 1,4 0,7		1,6 1,6 1,4	1,4 1,4	-40 to +80 -40 to +80 0 to +60	N female SMA female N female	420 380 420
13	15	0,9	0,6	1,65	1,4	-25 to +65	SMA female	400

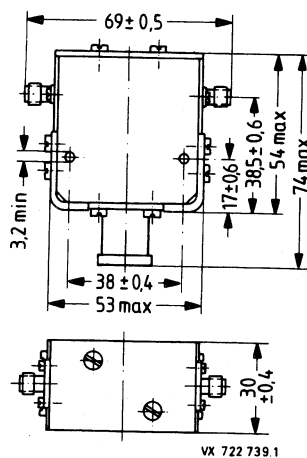


Fig. 9.

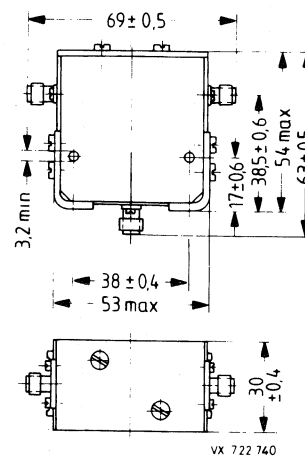


Fig. 10.

Preferred application: fixed and mobile communication, car telephone base stations

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 162 03411 05101	16 17	400 to 470	100	100
2722 162 02931 02981 02921	12	406 to 414 450 to 458 510 to 514	70	70
2722 162 06161 06931 02857	12	406 to 470 455 to 459 460 to 468	100	
2722 162 01555	16	462 to 468	100	
2722 162 06671	12	806 to 960	100	
2722 162 08801	15	935 to 960	60	
2722 162 07361	18	880 to 950	10	
2722 162 07596 08682 07781	11 13 14	935 to 960 930 to 965 925 to 960	70 60 50	

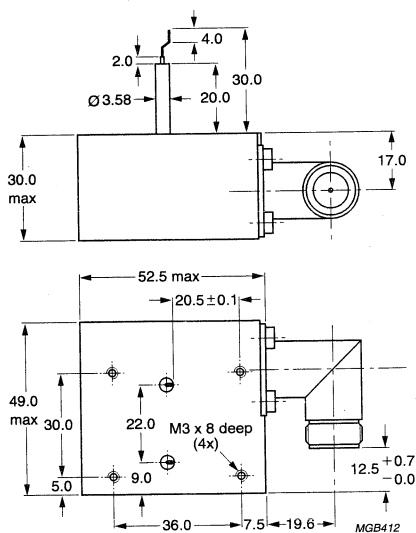


Fig. 11.

isolation		insertion loss		VSWR		temp. range °C	connector	mass g
min. dB	typ. dB	max. dB	typ. dB	max.	typ			
20	25	0,5	0,35	1,25	1,15	-10 to +60	N female SMA female	400
45	55	1,0 0,8 0,8	0,7 0,6 0,6	1,25	1,15	-10 to +60	N female	700
50	55 - -	0,8 0,6 0,6	0,7 - 0,4	1,25	1,15 - -	-20 to +60 -10 to +60 -10 to +60	N female	700
25		0,5		1,20		-10 to +60	N female	400
45	55	0,8	0,5	1,25	1,15	-10 to +60	N female	700
50		0,6		1,25		-10 to +55	N	340
22		0,4		1,20		-10 to +50	SMA female	120
20 45 20		0,3 0,7 0,5		1,20 1,20 1,25		-10 to +85 -10 to +85 -10 to +85	N female * SMA female solder pins	360 400 40

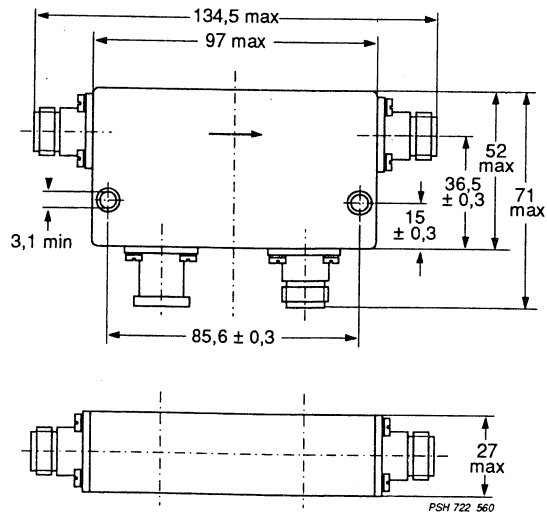


Fig. 12.

\* 2x semi-rigid cable

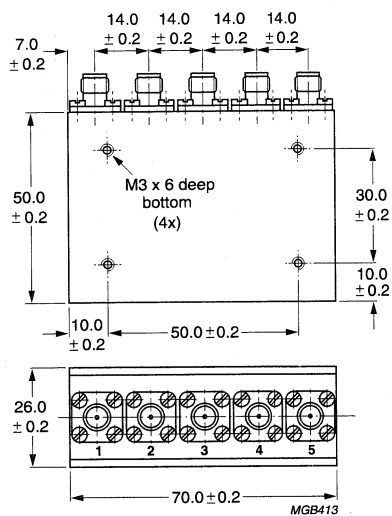


Fig. 13.

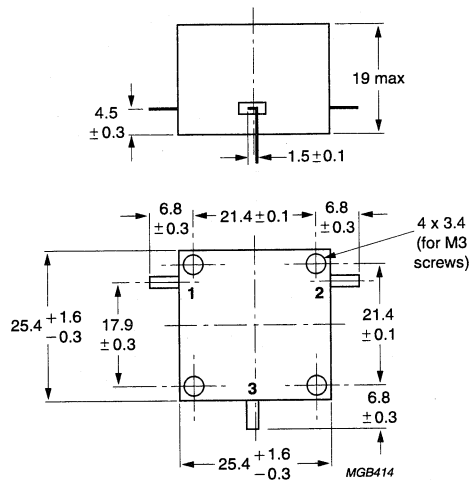


Fig. 14.

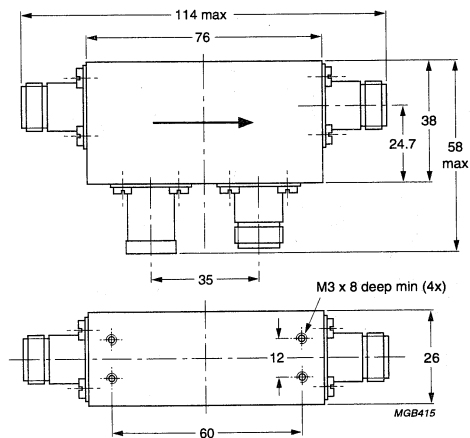


Fig. 15.

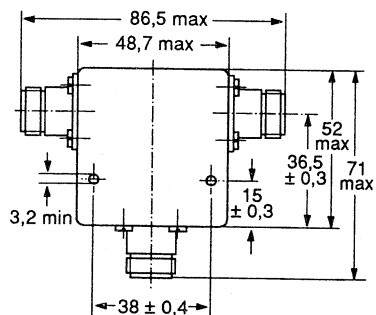


Fig. 16.

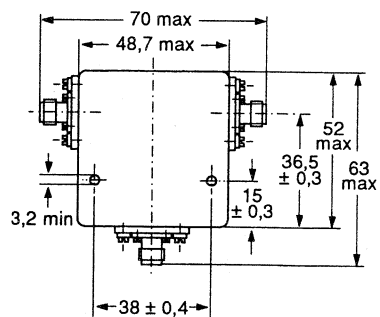


Fig. 17.

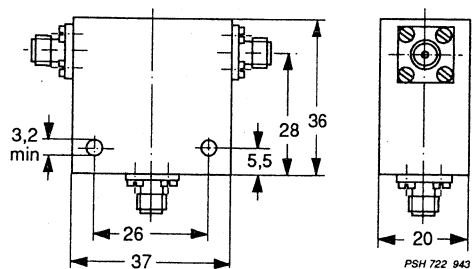


Fig. 18.

Preferred application: VHF television

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	peak W
2722 162 07005	20	170 to 230*	100	
2722 162 01871 01861 01851 03171	21	160 to 178 173 to 204 200 to 230 225 to 270	500	850
2722 162 03641 03631 03621 03651	22	160 to 178 173 to 204 200 to 230 225 to 270	500	850
2722 162 05031	24	195 to 205	1000	1800
2722 162 03681 03671 03661 03691	23	160 to 178 173 to 204 200 to 230 225 to 270	1000	1800
2722 162 01901 01891 01881 03181	24	160 to 178 173 to 204 200 to 230 225 to 270	1000	1800
2722 162 05971 05981	25	173 to 204 200 to 230	1500	1800
2722 162 05811 05821	19	173 to 204 200 to 230	1000	

\* Tunable, instantaneous bandwidth for isolation 18 dB min. 7 MHz.

\*\* With (filtered) air cooling at 250 Pa pressure drop; max. inlet temperature 40°C; max. permissible temperature of the connectors +55°C.

isolation		insertion loss		VSWR		temp. range °C	connector	mass g
min. dB	typ. dB	max. dB	typ. dB	max.	typ			
18		0,5		1,3		0 to +50	N female	
20	24	0,35	0,3	1,25	1,15	-10 to +60	N female	2100
20	24	0,35	0,3	1,25	1,15	-10 to +60	EIA 7/8"	2700
20		0,4		1,25		-10 to +40**	N female	2100
20	24	0,35	0,3	1,25	1,15	-10 to +40**	EIA 7/8"	2700
20	24	0,35	0,3	1,25	1,15	-10 to +40**	HF 7/16 female	2150
20		0,35		1,25		-10 to +40**	EIA 1 5/8"	
20		0,35		1,25		-10 to 40**	N female	

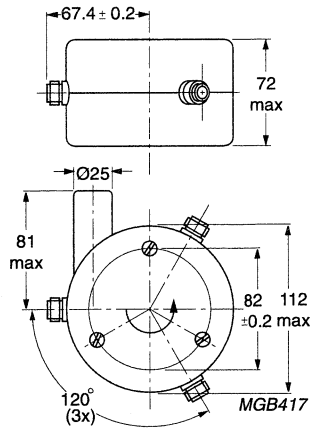


Fig. 19.

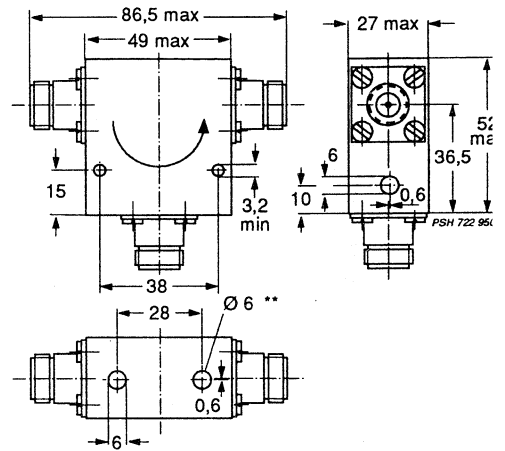


Fig. 20.

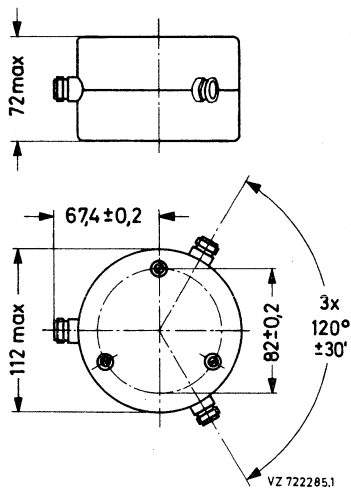


Fig. 21.

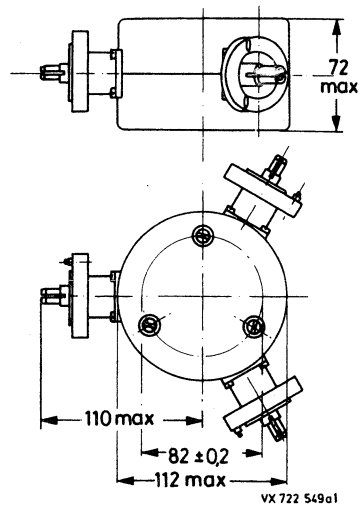


Fig. 22.

\*\* note see page before



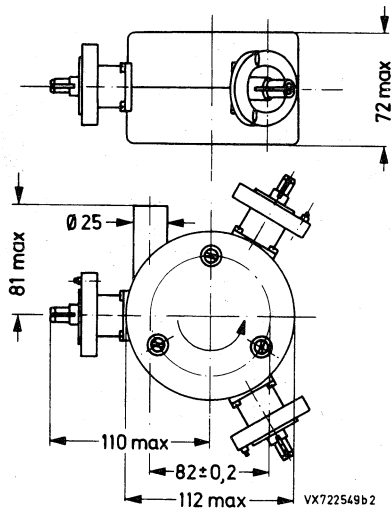


Fig. 23.

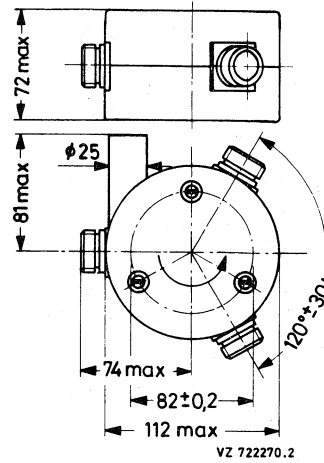


Fig. 24.

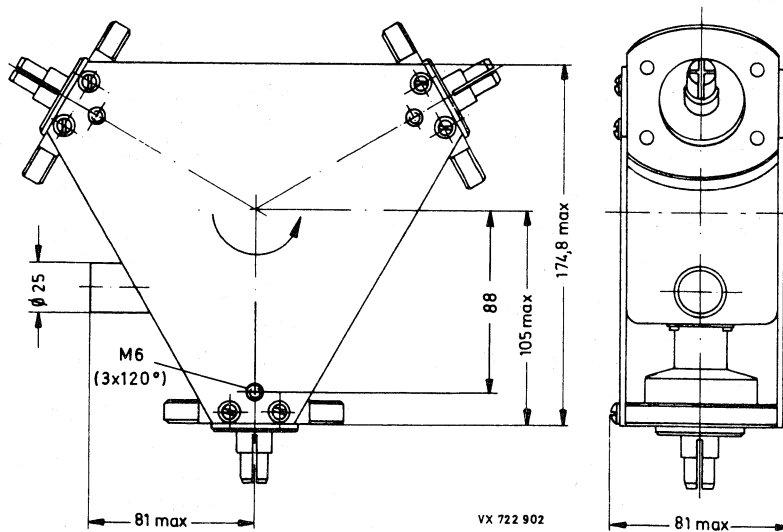


Fig. 25.

Preferred application: UHF television

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	peak W
2722 162 02691 02701 02401	26	470 to 600 600 to 800 790 to 1000	10	100
2722 162 02751 02741	27	600 to 800 790 to 1000	10	100
2722 162 02671 02681	28	470 to 600 600 to 800	10	100
2722 162 03871 03821 03811	29	470 to 600 600 to 800 790 to 1000	50	200
2722 162 01551 01563 01561 03261	30	470 to 600 550 to 650 600 to 800 790 to 1000	100	200
2722 162 03961 03971 03981	32	470 to 600 600 to 800 790 to 1000	100	200
2722 162 07411 07421	33	470 to 610 610 to 860	150	350
2722 162 07651 07661	31	470 to 610 610 to 860	200	

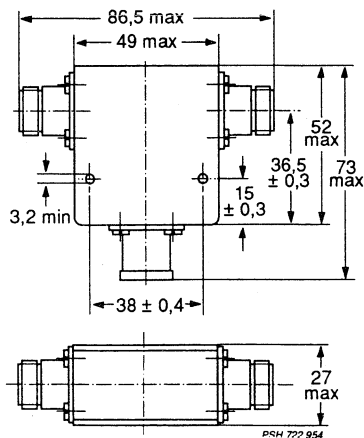


Fig. 26.

isolation		insertion loss		VSWR		temp. range °C	connector **	mass g
min. dB	typ. dB	max. dB	typ. dB	max.	typ			
20	25	0,5	0,35	1,25	1,15	-10 to +60	N female	400
20	25	0,5	0,35	1,25	1,15	-10 to +60	SMA female	400
20	25	0,5	0,35	1,25	1,15	-10 to +60	4, 1/9, 5 female	400
20	25	0,5	0,35 0,35 0,3	1,25	1,15 1,15 1,14	-10 to +60	SMA female	400
20	25	0,5	0,35 0,35 0,35 0,3	1,25	1,15 1,15 1,15 1,14	-10 to +60	N female	400
20	25	0,5	0,35 0,35 0,3	1,25	1,15 1,15 1,14	-10 to +60	N male	400
18		0,4		1,35		0 to +60	solder pins	240
18		0,4		1,35		0 to +60	N female	400

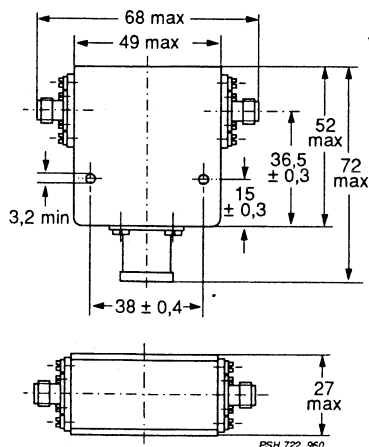


Fig. 27.

\*\* Other connectors on request.

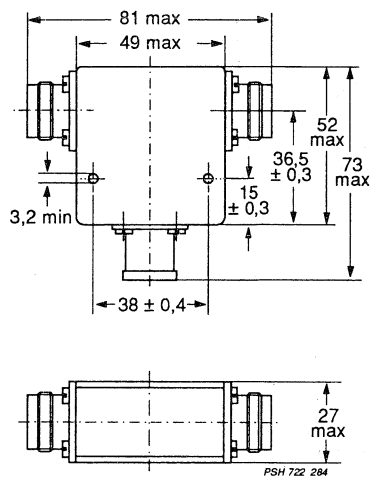


Fig. 28.

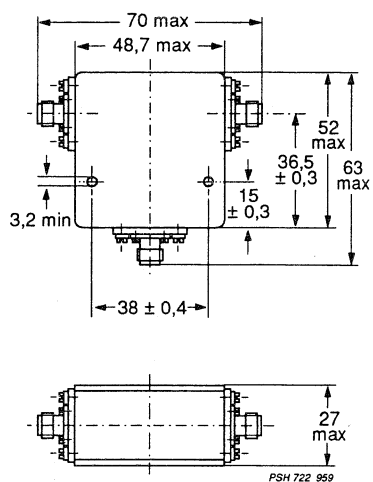


Fig. 29.

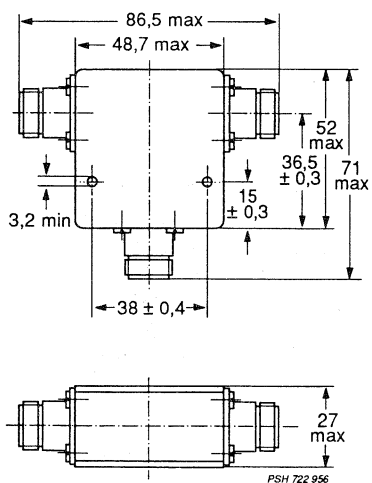


Fig. 30.

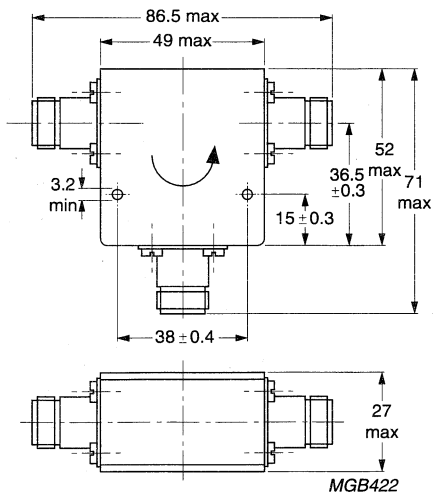


Fig. 31.

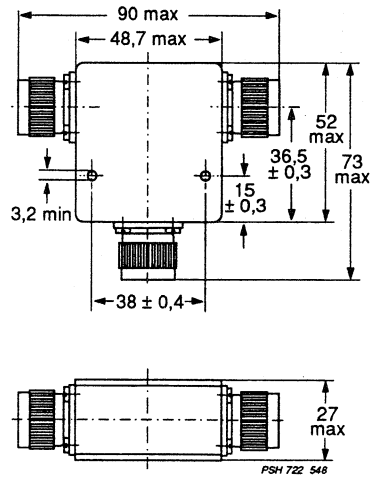


Fig. 32.

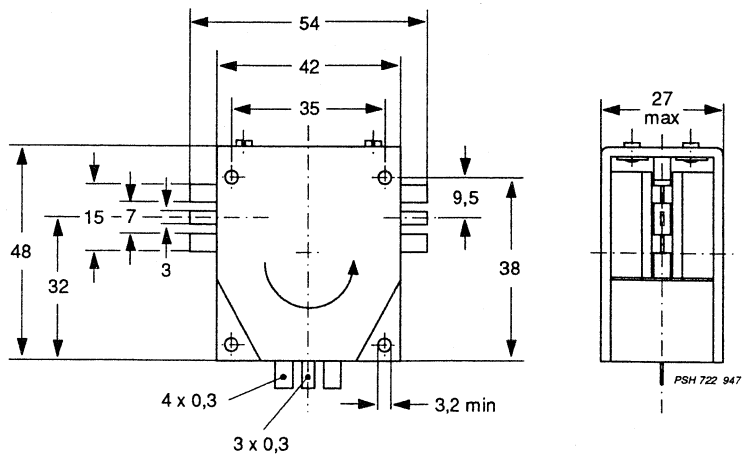


Fig. 33.

Preferred application: UHF television

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	peak W
2722 162 01572 01582 01592 01612	34	400 to 470 470 to 600 590 to 720 710 to 860	300	500
2722 162 01632 01642 01662	35	470 to 600 590 to 720 710 to 860	300	500

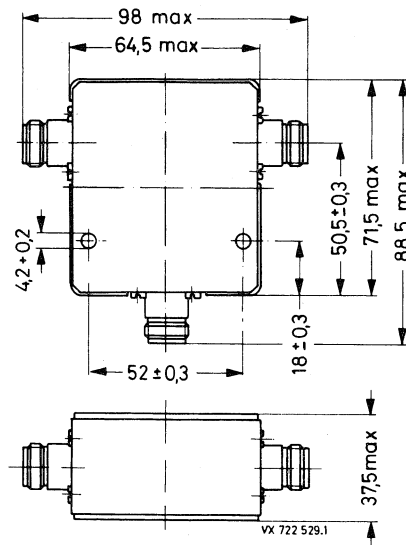


Fig. 34.

isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
20	25	0,35	0,20	1,25	1,15	-10 to + 60	N female	900
20	25	0,35	0,20	1,25	1,15	-10 to + 60	HF 7/16 female	1200

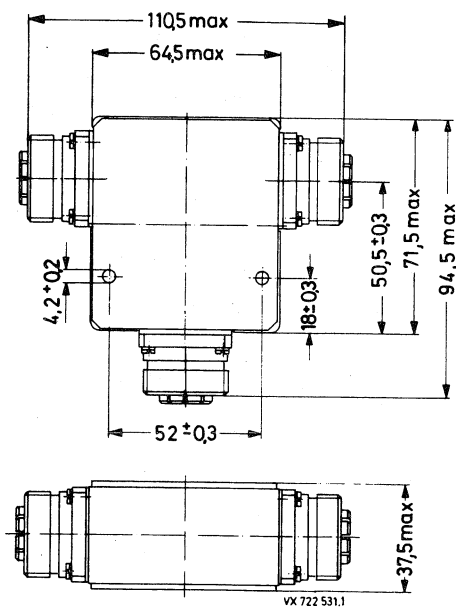


Fig. 35.

Preferred application: UHF television

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	peak W
2722 162 01121 03191 01131 01141	36	470 to 600 600 to 800 590 to 720 710 to 860	500	900
2722 162 03221 03231 03241 03251	37	470 to 600 600 to 800 590 to 720 710 to 860	500	900
2722 162 03141 03151 03201 03211	38	470 to 600 600 to 800 590 to 720 710 to 860	500	900
2722 162 05371 05381 05391	38	470 to 600 590 to 720 710 to 860	700	8000

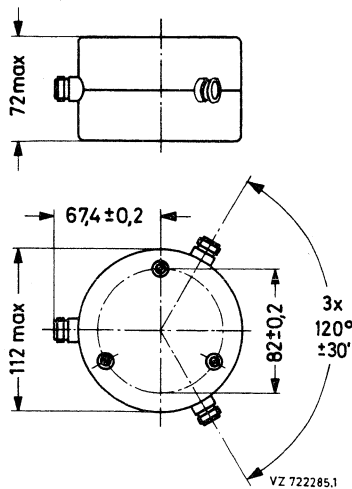


Fig. 36.

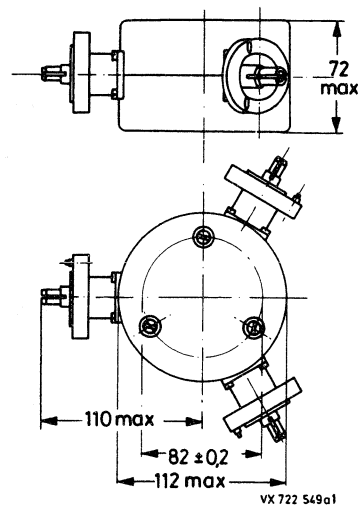


Fig. 37.



isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
20	24	0,35	0,25	1,2	1,15	-10 to + 70	N female	2080
20	24	0,35	0,25	1,25	1,15	-10 to + 70	EIA 7/8"	2700
20	24	0,35	0,25	1,25	1,15	-10 to + 70	HF 7/16 female	2200
20		0,4		1,25		+ 5 to + 65	HF 7/16 female	2200

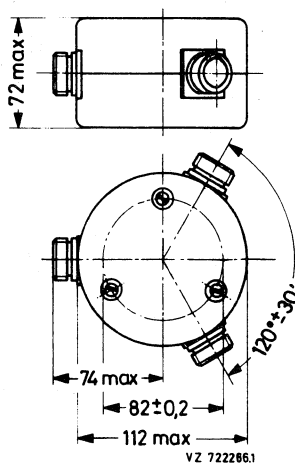


Fig. 38.

Preferred application: UHF television

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	peak W
2722 162 03991	39	433 to 435	2000	2000
2722 162 01771 01791 01781 01801	39	470 to 600 600 to 800 590 to 720 710 to 860	2000	2000
2722 162 01261 01331 01281 01271	40	470 to 600 600 to 800 590 to 720 710 to 860	2000	2000

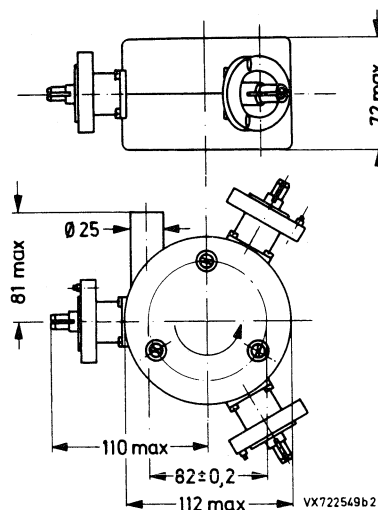


Fig. 39.

isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
20	24	0,4	0,3	1,25	1,15	0 to 40*	EIA 7/8"	2700
20	24	0,35	0,25	1,25	1,15	−10 to + 40*	EIA 7/8"	2700
20 20 22 22	24 24 26 26	0,35	0,75	1,25 1,25 1,2 1,2	1,15	−10 to + 40*	HF 7/16 female	2200

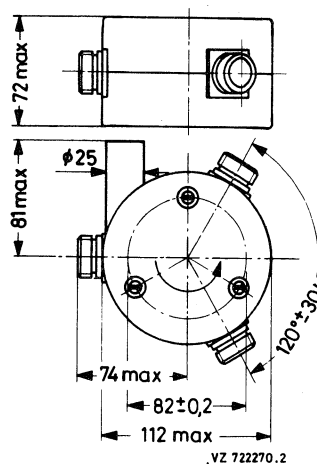


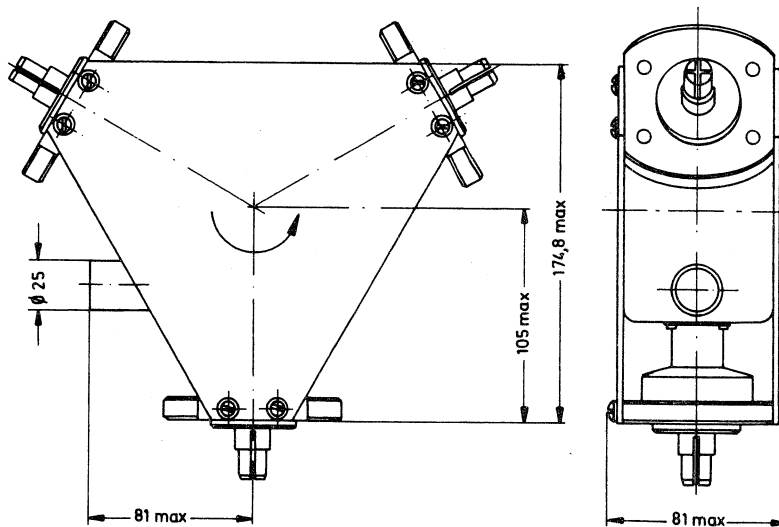
Fig. 40.

\* With (filtered) air cooling, at 250 Pa pressure drop; 40 °C inlet temperature, max. permissible temperature of the connectors + 55 °C.

Preferred application: UHF television

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	peak W
2722 162 03001 03011 01981	41	470 to 600 590 to 720 710 to 860	2000	8000

isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
20		0,4		1,25		+ 5 to + 40*	EIA 1 $\frac{5}{8}$ "	3900



VX 722 550.1

Fig. 41.

\* With (filtered) air cooling at 250 Pa pressure drop; 40 °C inlet temperature, max. permissible temperature of the connectors + 55 °C.

Preferred application: radio links and navigation, pcn

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 162 03591	42	960 to 1225	100	
2722 162 08341	43	1200 to 1415	20	
2722 162 07511	44	1215 to 1400	250	
2722 162 08641	45	1230 to 1365	60	
2722 162 05331	46	1350 to 1700	10	
2722 162 05571 06701	46 47	1350 to 2100		
2722 162 02492 03802	43 42	1427 to 1535	10	
2722 162 07801	48	1805 to 1880	45	

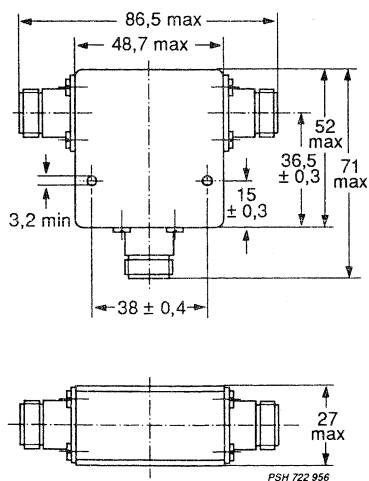


Fig. 42.

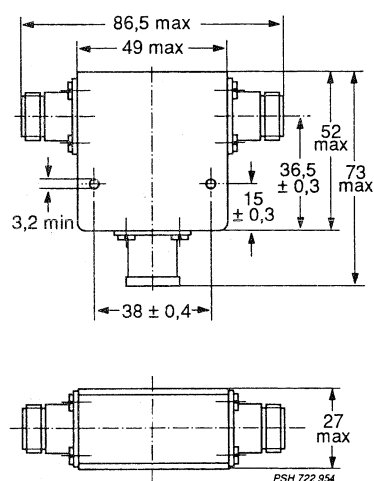


Fig. 43.

isolation		insertion loss		VSWR		temp. range °C	connector	mass g
min. dB	typ. dB	max. dB	typ. dB	max.	typ			
20	22	0,5	0,35	1,25	1,20	-10 to +60	N female	460
20		0,4		1,25		0 to +70	N female	400
19		0,3		1,25		0 to +50	HF 7/16 female	1200
20		0,4		1,25		0 to +55	SMA female, N female	180
20	23	0,4	0,3	1,2	1,15	0 to +45	SMA female	120
17		0,5		1,35		-15 to +65	SMA female	120
20	24	0,4	0,3	1,15	1,12	0 to +55	N female	400
22		0,35		1,15		-10 to +60	1 x N female*	360

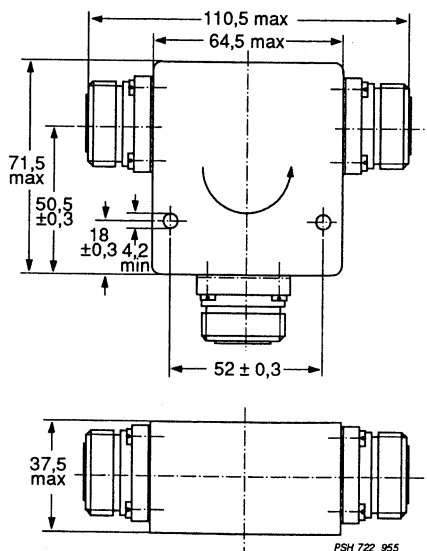


Fig. 44.

\* 2x semi-rigid cable

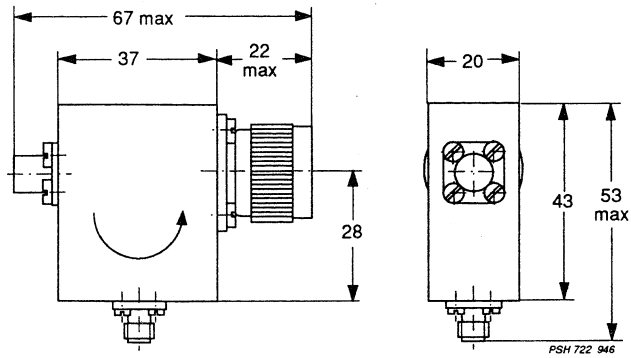


Fig. 45.

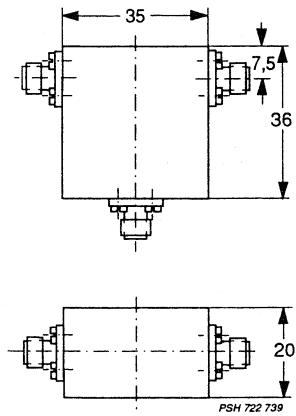


Fig. 46.



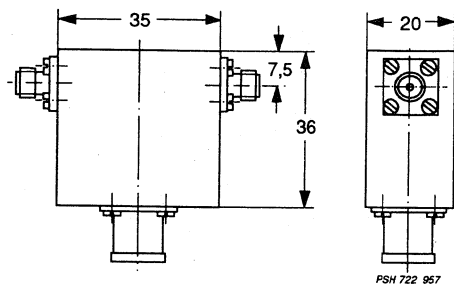


Fig. 47.

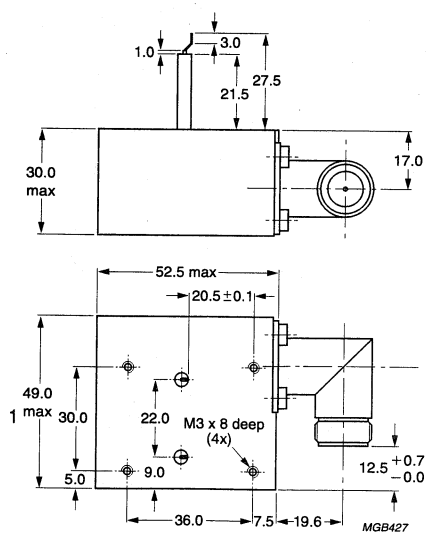


Fig. 48.

Preferred application: radio links

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 162 05241 05251 05231	49	1700 to 2100	30	
2722 162 05261 05271	49	1900 to 2300	30	
2722 162 02571 02581 02591 02601	50	1700 to 2100 1700 to 2100 1900 to 2300 1900 to 2300	15	15
2722 162 05311 05341 05351 05361 05401 05411	51	1700 to 2100 1900 to 2300 2100 to 2500 2300 to 2700 2450 to 2850 2000 to 2700	10	
2722 162 07601	51	1700 to 2700	25	
2722 162 05471	52	1900 to 2300	15	

isolation		insertion loss		VSWR		temp. range °C	connector	mass g
min. dB	typ. dB	max. dB	typ. dB	max.	typ			
26 26 20		0,3		1,11 1,11 1,25		0 to +55	SMA 2x female 1x male	120
26		0,3		1,11		0 to +55	SMA 2x female 1x male	120
26		0,25		1,11		0 to +55	SMA 1x female 1x male	140
20		0,4		1,2		-20 to +50	SMA female	120
20		0,45		1,25		0 to +50	SMA female	120
23		0,3		1,1		0 to +45	1x N female 2x SMA female	150

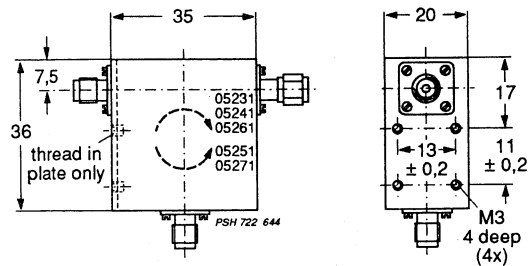


Fig. 49.

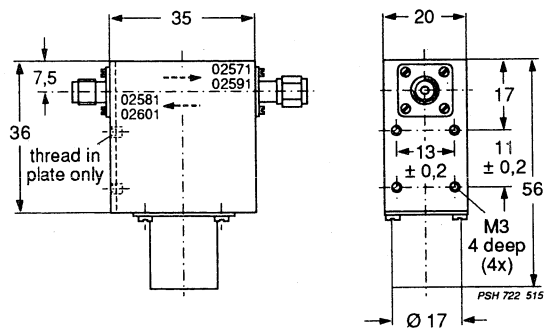


Fig. 50.

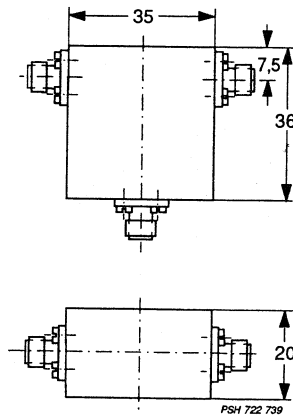


Fig. 51.

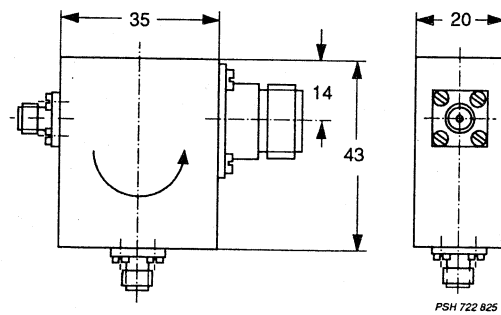


Fig. 52.

Preferred application: radio links

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 162 03881 03891 03901	53	1680 to 1920 1880 to 2120 2080 to 2320	20	
2722 162 03911 03921 03931	54	1680 to 1920 1880 to 2120 2080 to 2320	50	
2722 162 03951 03941	53 54	1700 to 2300	20 50	
2722 162 02191 02511	55 56	1700 to 2300	20	5

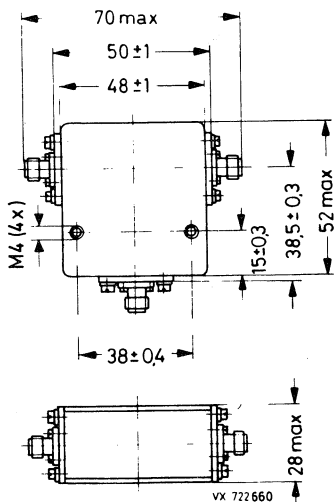


Fig. 53.

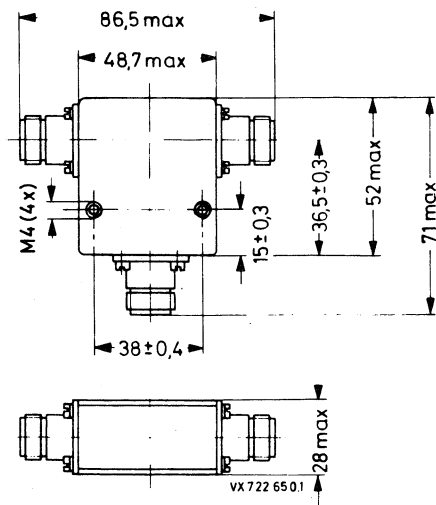


Fig. 54.

isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
25		0,35		1,12		0 to + 50	SMA female	400
23		0,40		1,15		-20 to + 60	N female	400
20		0,3		1,25		0 to + 55	SMA female N female	400
20		0,3		1,25		0 to + 55	N m + f SMA m + f	400

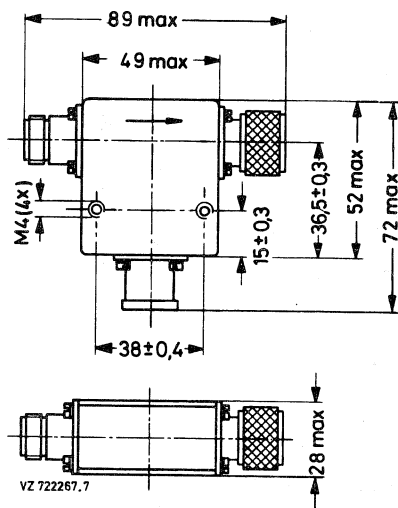


Fig. 55.

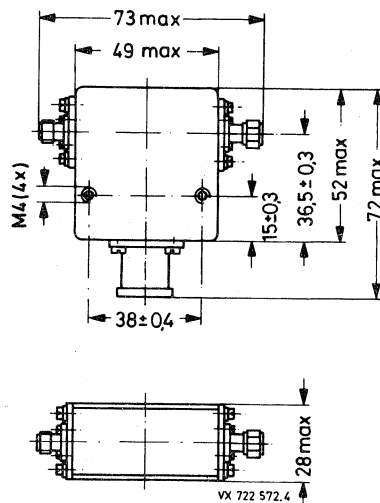


Fig. 56.

4-PORT  
CIRCULATORS  
2 GHz

Preferred application: radio links

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 162 04051 04061	57	1700 to 2100 1900 to 2300	30	15
2722 162 04091 04101	57	1700 to 2100 1900 to 2300	30	

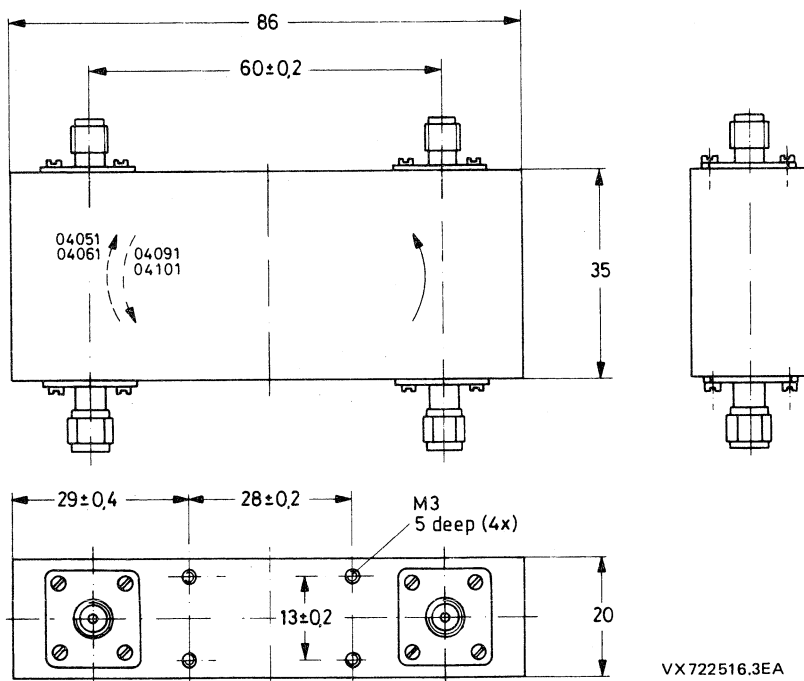


Fig. 57.



**4-PORT  
CIRCULATORS  
2 GHz**

isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
26		0,25		1,11		0 to + 55	SMA male 2 x female 2 x	220
26		0,25		1,11		0 to + 55	SMA male 2 x female 2 x	220

Preferred application: radio links and navigation

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 162 02471	58	4200 to 4400	10	1,5
2722 162 03431 03441	59	3800 to 4200 4400 to 5000	10	
2722 162 04031 04041	60	3800 to 4200 4400 to 5000	10	

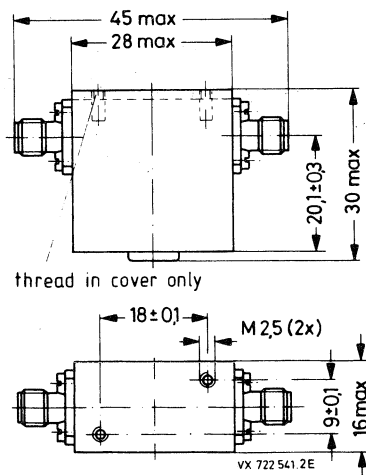


Fig. 58.

isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
23	25	0,3	0,25	1,2	1,12	-55 to + 90	SMA female	60
25	27	0,25	0,2	1,12	1,10	-10 to + 70	SMA female	110
25	27	0,25	0,2	1,12	1,10	-10 to + 70	SMA female	220

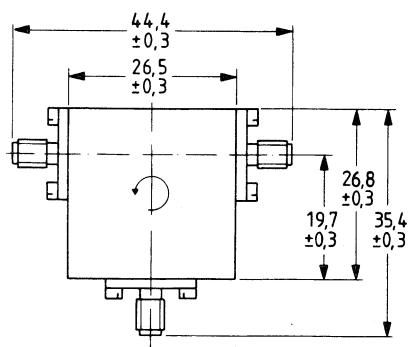


Fig. 59.

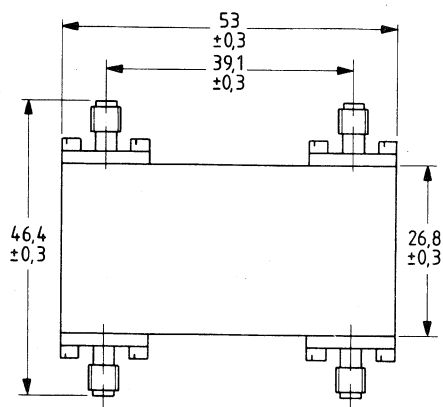


Fig. 60.

Preferred application: radio links

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 161 04003 04052 04062	61	5925 to 6425 6425 to 7125 7125 to 7750	200	3
2722 161 02212 02312 02322	62	5925 to 6425 6425 to 7125 7125 to 7750	200	
2722 162 08461	63	6400 to 7100	1	

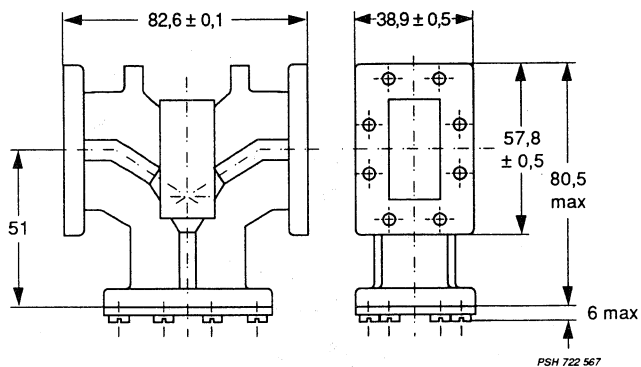


Fig. 61.

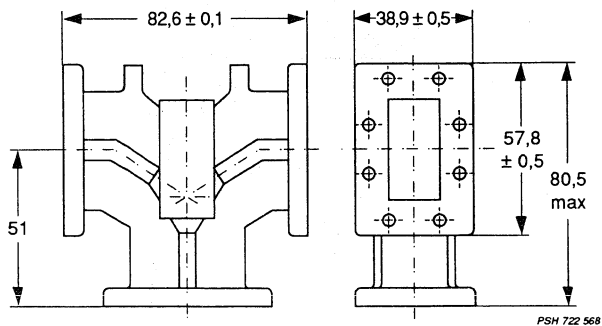


Fig. 62.

isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ			
28		0,2		1,08		0 to +50	IEC-UER 70	230
28		0,2		1,08		0 to +50	IEC-UER 70	230
23		0,4		1,15		0 to +50	SMA female	60

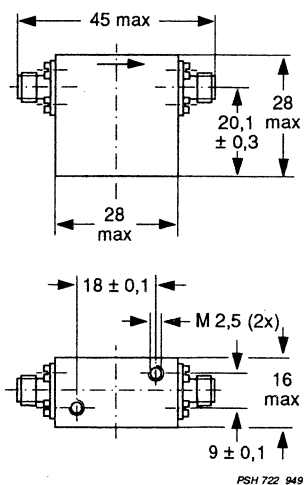


Fig. 63.

Preferred application: microwave measurements

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 162 02091 01491	64 65	2000 to 4000	50	
2722 162 02101 01501	66 67	2000 to 4000	50	
2722 162 02071 01511	68 69	3000 to 6000	20	
2722 162 02111 01811	70 71	4000 to 8000	10	
2722 162 02122 01822	72 73	7000 to 12400	10	
2722 162 02221 03301	74 75	12000 to 18000	5	
2722 162 02231 02501	76 77	7900 to 10400 8900 to 9600	5	
2722 161 02071	78	8200 to 11200	50	

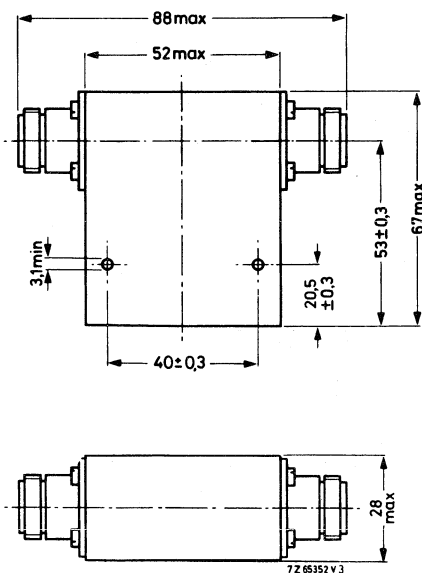


Fig. 64.

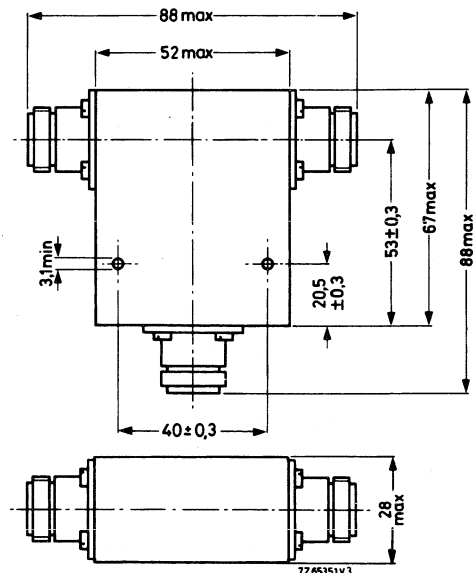


Fig. 65.

isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
20	24	0,5	0,35	1,25	1,15	-10 to + 70	N female	300
20	24	0,5	0,35	1,25	1,15	-10 to + 70	SMA female	300
20	24	0,5	0,3	1,25	1,15	-10 to + 70	SMA female	120
20	24	0,5	0,3	1,25	1,15	-10 to + 70	SMA female	100
20	24	0,6	0,35 0,4	1,25	1,15	-10 to + 70	SMA female	60
20 18	22	0,6	0,35	1,3	1,2	-10 to + 70	SMA female	20
20	22	0,4	0,35	1,25	1,23	-10 to + 70	SMA female	30
22	30	0,5	0,3	1,18	1,15	+10 to + 40	IEC-UBR 100	500

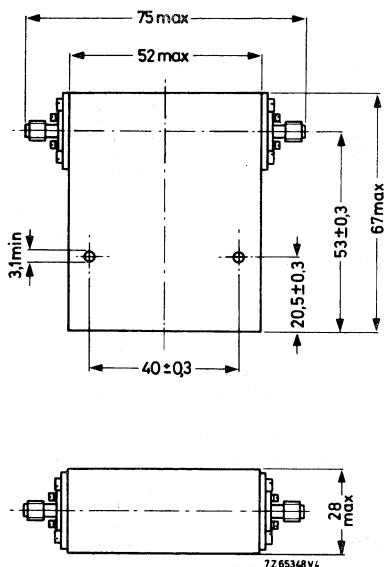


Fig. 66.

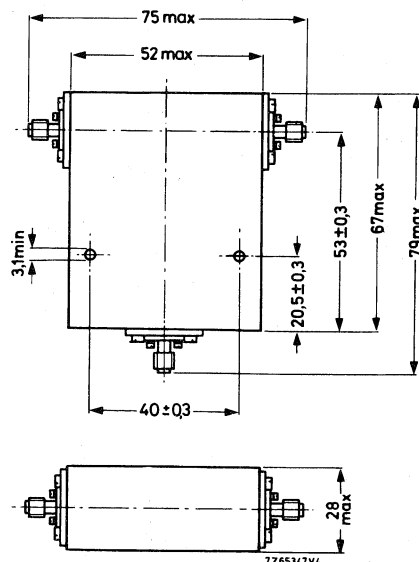


Fig. 67.

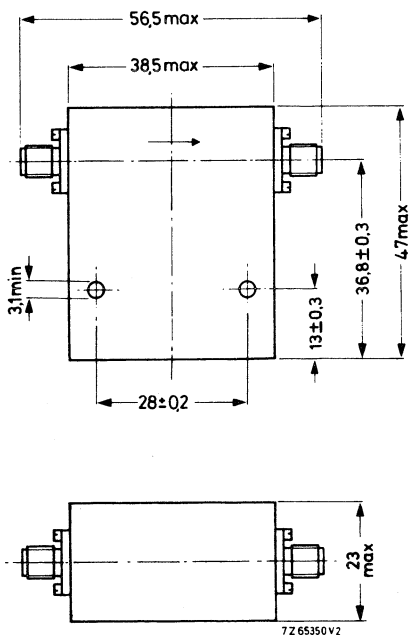


Fig. 68.

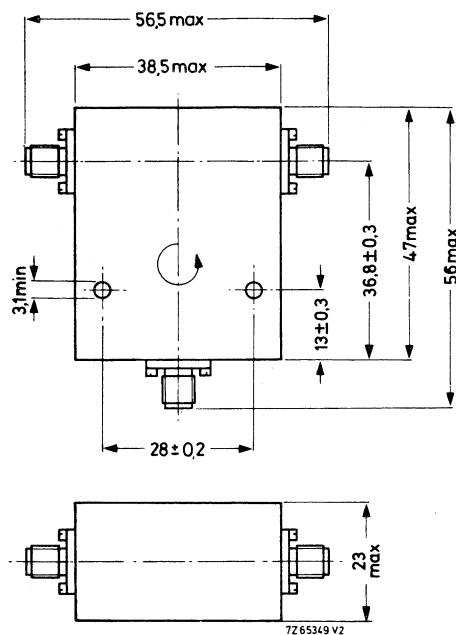


Fig. 69.

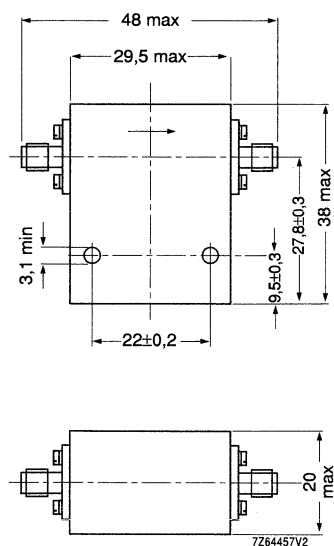


Fig. 70.

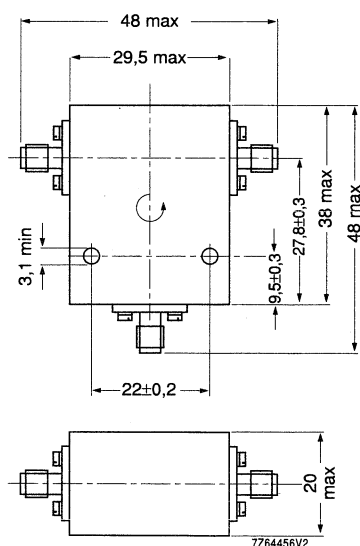


Fig. 71.



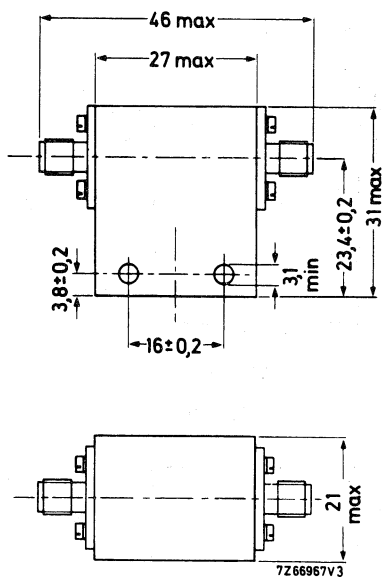


Fig. 72.

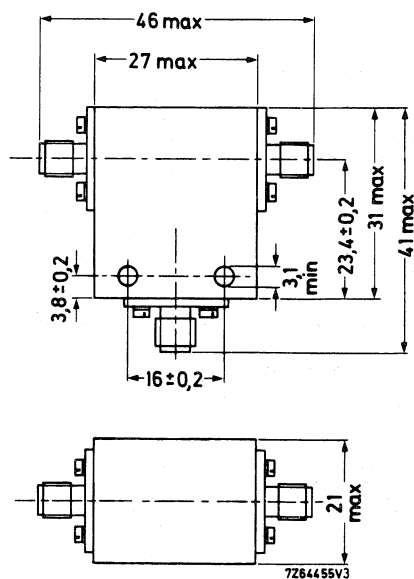


Fig. 73.

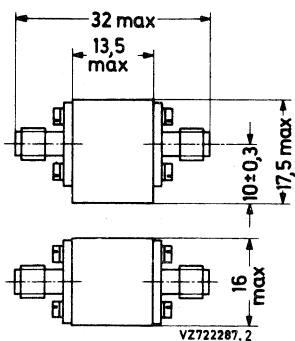


Fig. 74.

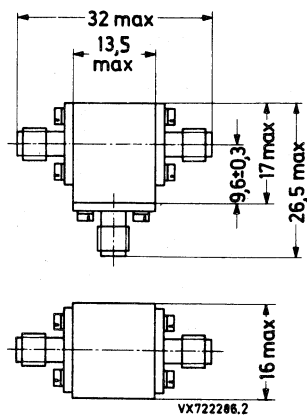


Fig. 75.



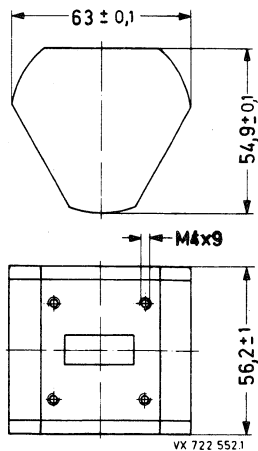


Fig. 78.

Preferred application: radar

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 161 01221 01222*	79	8500 to 9600	1	
2722 161 01361	80	8500 to 9600	5	
2722 161 01211 01261	81 82	8500 to 9600	10	

\* With M4-Helicoil.

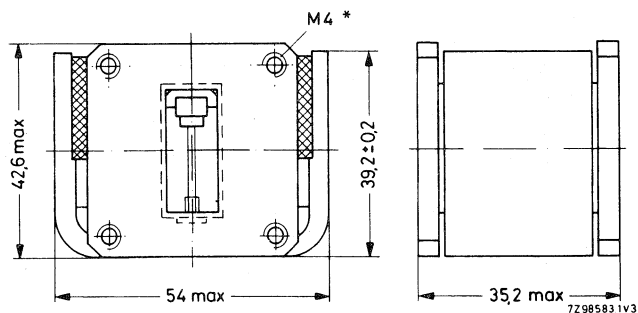


Fig. 79.

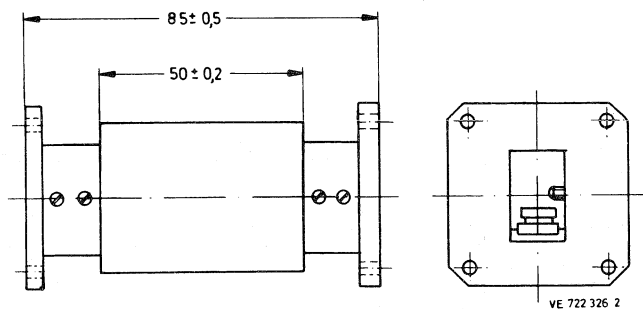


Fig. 80.

isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
15		0,6		1,15		+ 10 to + 70	IEC-UBR 100	400
30		0,5		1,05		-10 to + 70	IEC-UBR 100	600
30 55		0,5 1,2		1,05 1,20		-10 to + 70	IEC-UBR 100	420 600

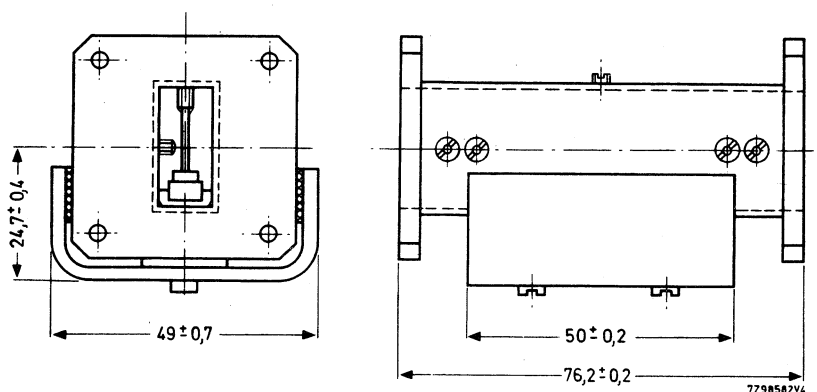


Fig. 81.

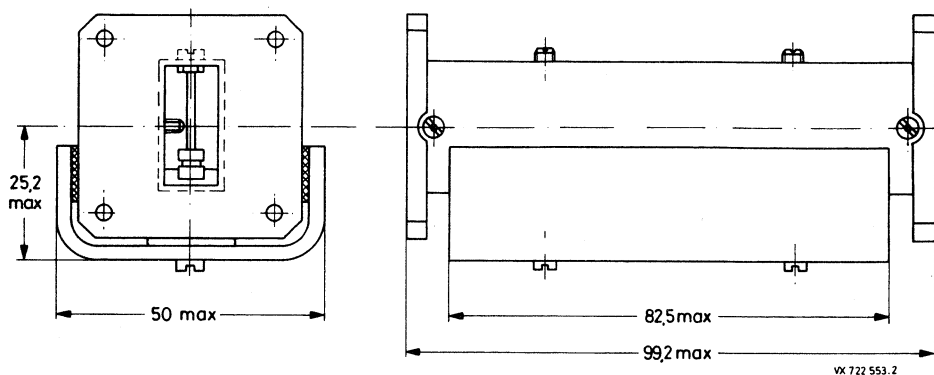


Fig. 82.

Preferred application: microwave heating

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 163 02071 02061	83 84	2425 to 2475	3000	3000

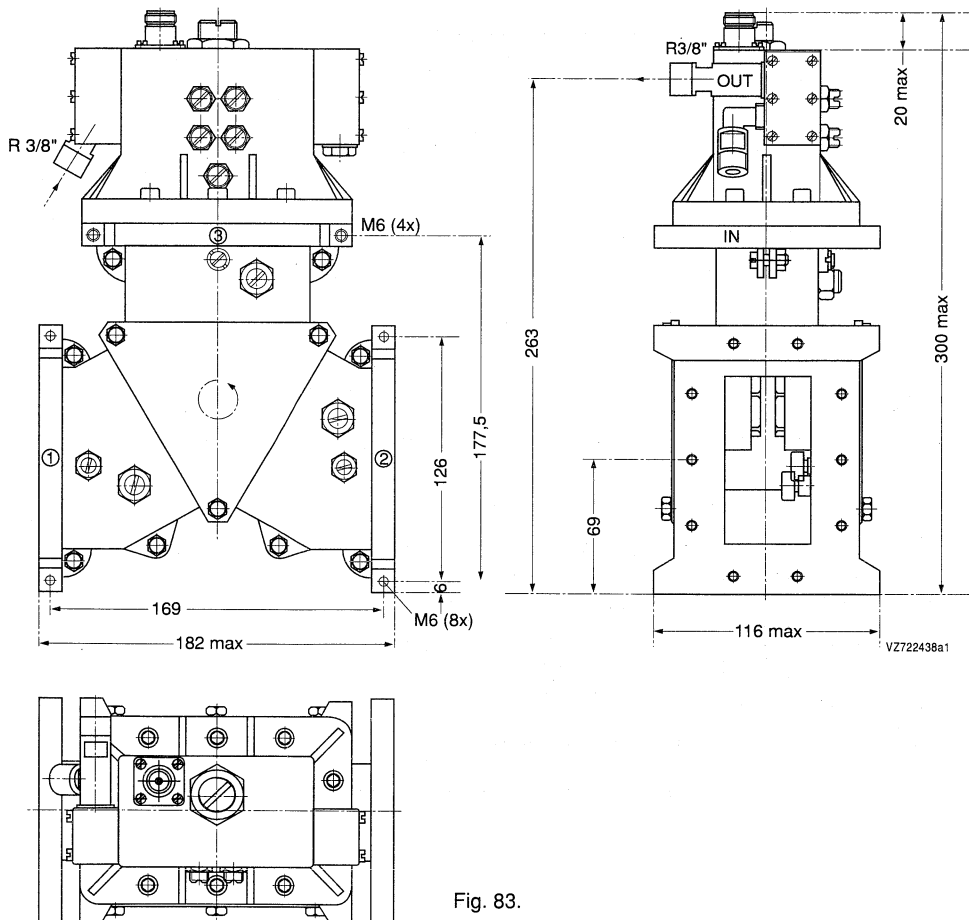


Fig. 83.

isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
20	26	0,3	0,2	1,25*		$\theta_1$ : max. + 40 $\theta_2$ : max. + 50	IEC-PDR 26, monitor- output: N female	4500

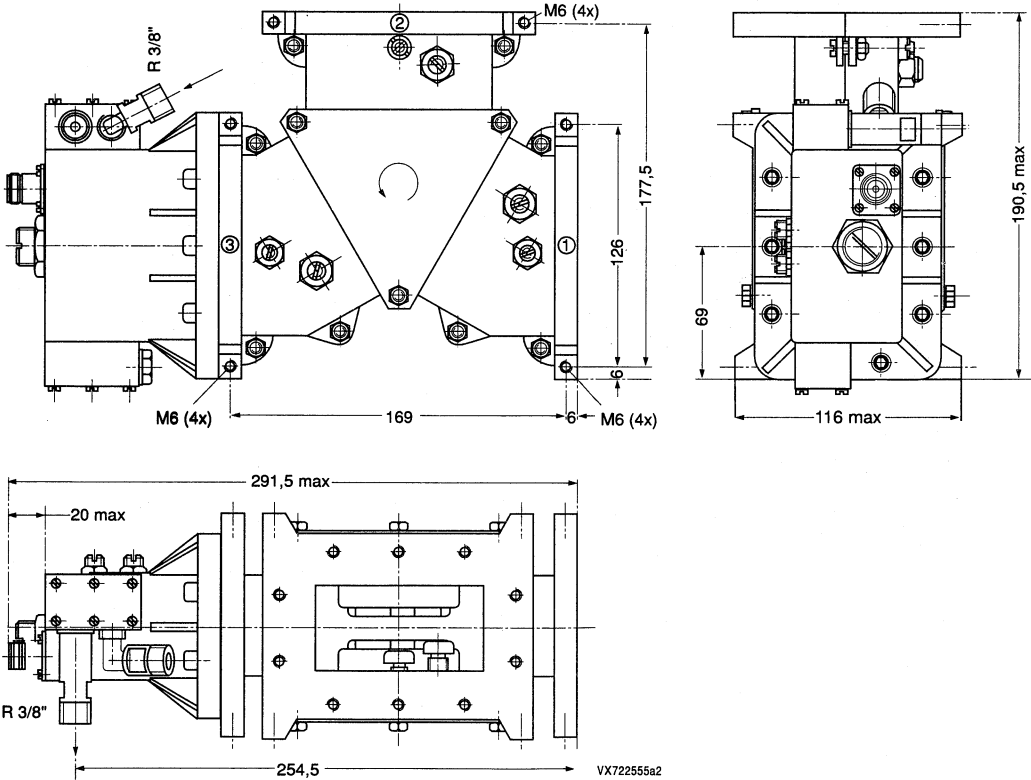


Fig. 84.

\* With output short-circuited:  $S \leq 1,5$ .

Preferred application: microwave heating

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 163 02004 02005	85 86	2425 to 2475	6500	6500

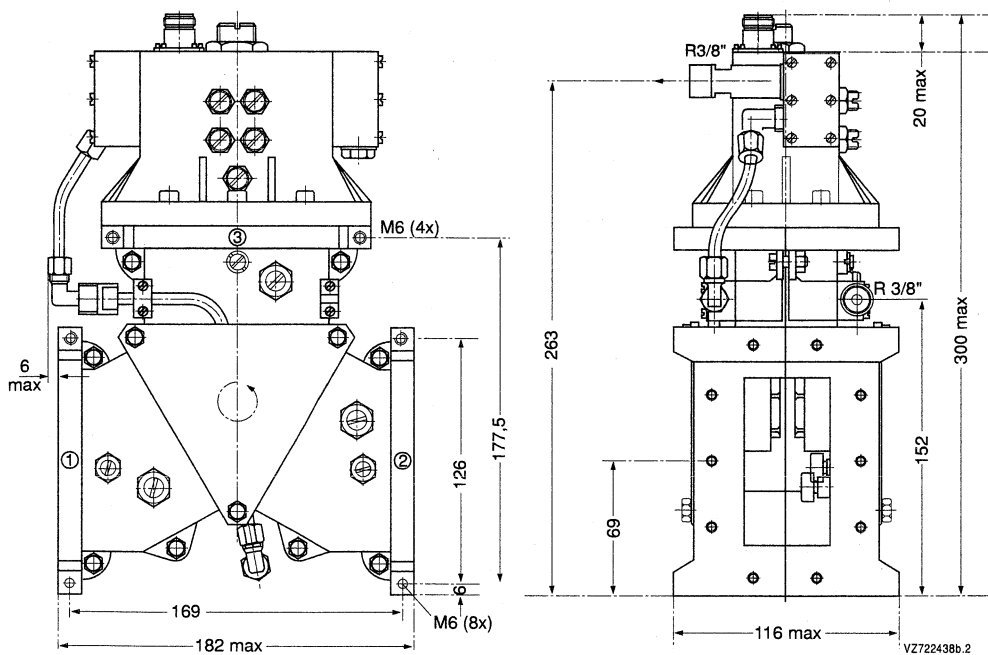


Fig. 85.



isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
20	26	0,3	0,2	1,25*	1,1	$\theta_1$ : max. + 40 $\theta_2$ : max. + 50	IEC-PDR 26, monitor- output: N female	4700

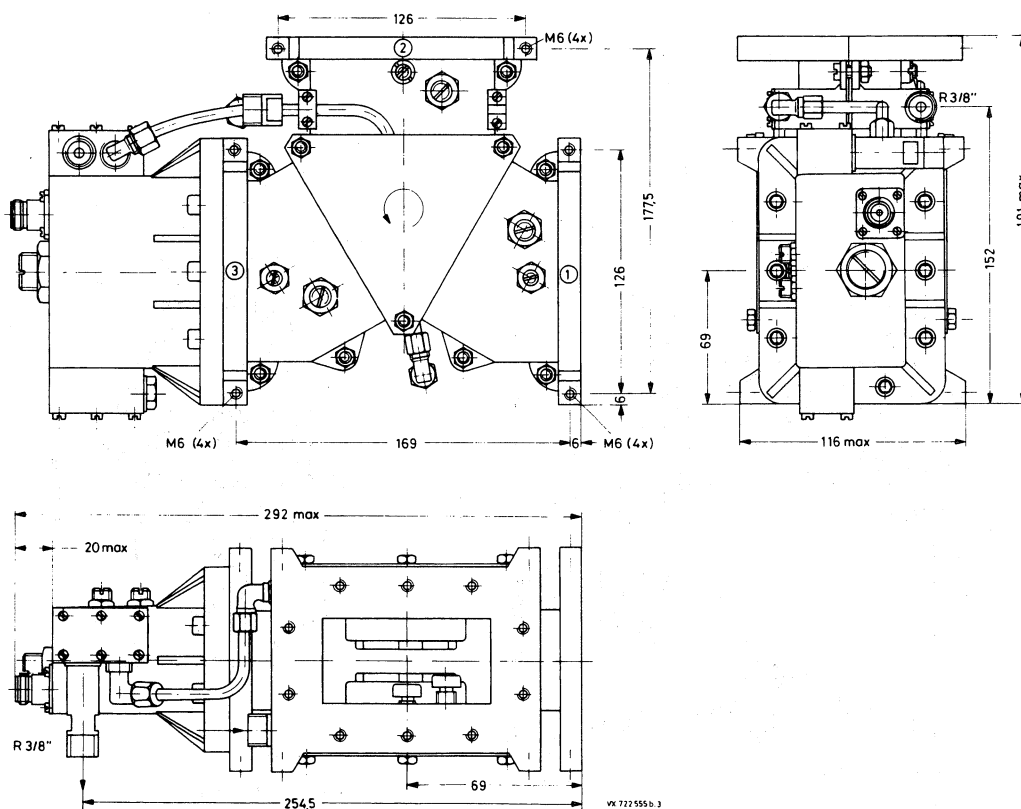


Fig. 86.

\* With output short-circuited:  $S \leq 1,5$ .

Preferred application: microwave heating

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	W
2722 163 01021	87	2425 to 2475	6500	

Water load; type 2722 163 02051; dimensions Fig. 88;  $\theta_1$ : max. + 40 °C;  $\theta_2$ : max. 50 °C;  
connector: IEC-PDR26, monitor output: N female.

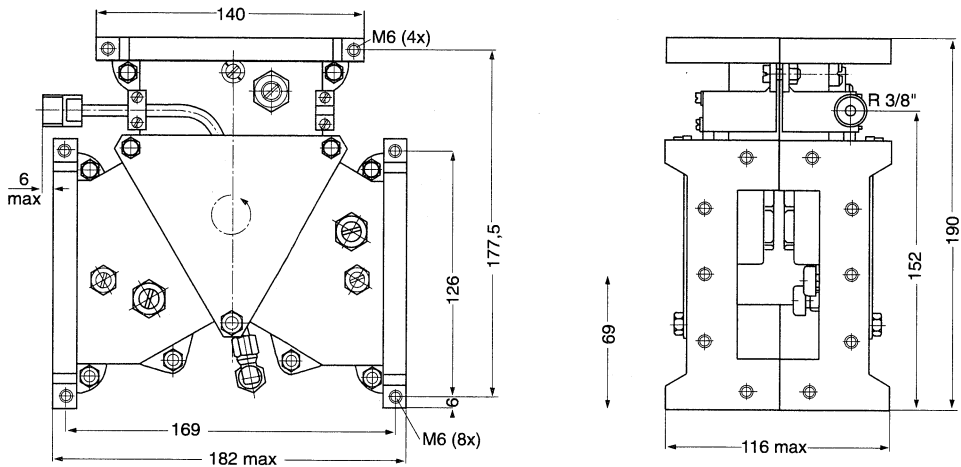


Fig. 87.

isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
20		0,3		1,25 *		$\theta_1$ : max. + 40 $\theta_2$ : max. + 50	IEC-PDR 26	

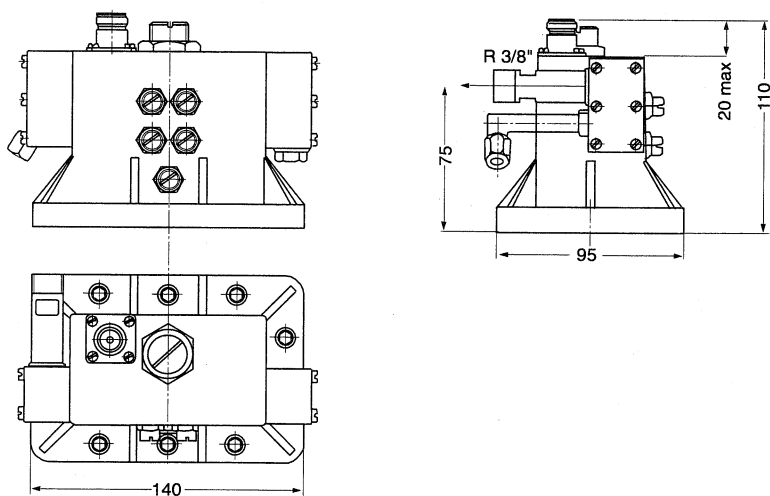


Fig. 88.

\* With output short-circuited:  $S \leq 1,5$ .

Preferred application: microwave heating

type	dimensions Fig.	frequency range MHz	maximum power	
			CW W	reflected W
2722 163 02102	89	2425 to 2475	2000	2000

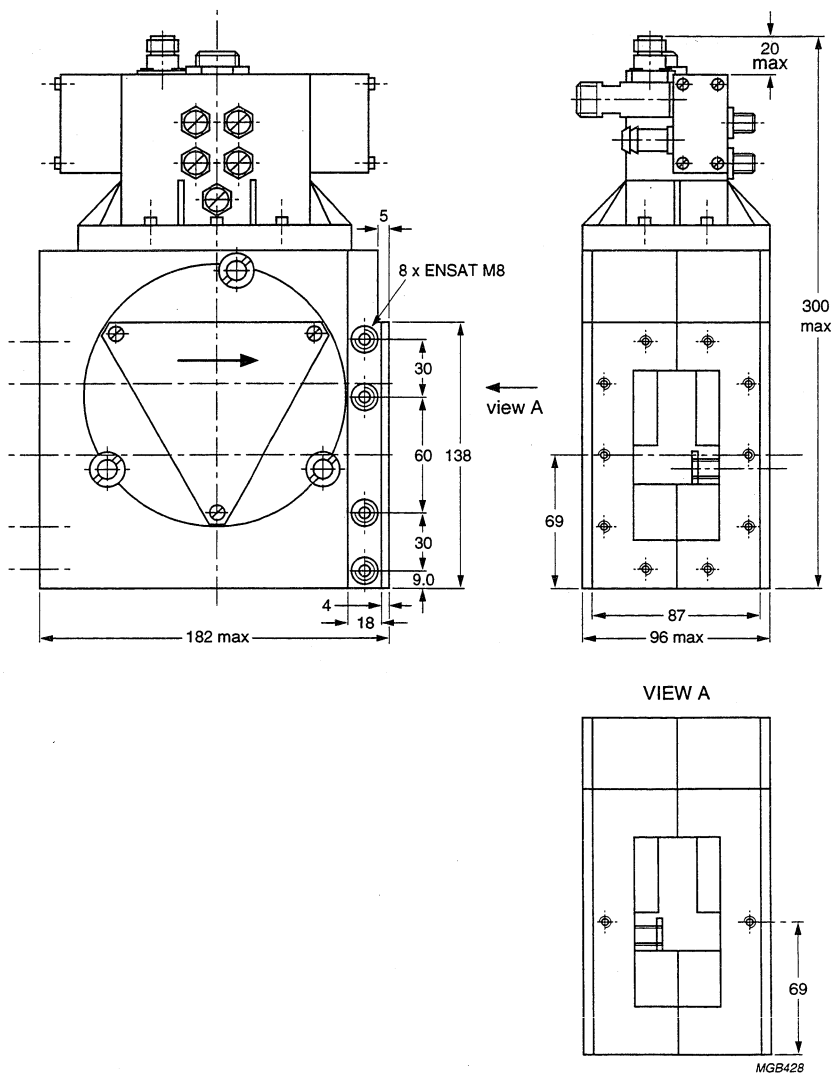


Fig. 89.

isolation		insertion loss		VSWR		temp. range °C	connector	mass
min. dB	typ. dB	max. dB	typ. dB	max.	typ.			
20	26	0,3	0,2	1,25*		$\theta_1$ : max. + 40 $\theta_2$ : max. + 50	IEC-PDR 26, monitor- output: N female	9000

\* With output short-circuited:  $S \leq 1,5$ .



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2722 162 0181	68	2722 162 0285	32	2722 162 0380	52
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## **DATA HANDBOOK SYSTEM**



**DATA HANDBOOK SYSTEM**

Philips Components data handbooks are available for selected product ranges and contain all relevant data available at the time of publication and each is revised and updated regularly.

Loose data sheets are sent to subscribers to keep them up-to-date on additions or alterations made during the lifetime of each edition.

Our data handbook titles are listed here.

**Display components**

*Book Title*

- |      |   |
|------|---|
| DC01 | Colour Display Components<br>Colour TV Picture Tubes and Assemblies<br>Colour Monitor Tube Assemblies |
| DC02 | Monochrome Monitor Tubes and Deflection Units   |
| DC03 | Television Tuners, Coaxial Aerial Input<br>Assemblies   |
| DC05 | Flyback Transformers, Mains Transformers<br>and General-purpose FXC Assemblies                        |

**Magnetic products**

- |      |   |
|------|---|
| MA01 | Soft Ferrites                                 |
| MA03 | Piezoelectric Ceramics and Specialty Ferrites |
| MA04 | Dry-reed Switches                             |

**Passive components**

- |      |   |
|------|---|
| PA01 | Electrolytic Capacitors                                     |
| PA02 | Varistors, Thermistors and Sensors                          |
| PA03 | Potentiometers  |
| PA04 | Variable Capacitors   |
| PA05 | Film Capacitors   |
| PA06 | Ceramic Capacitors  |
| PA07 | Quartz Crystals for Special and Industrial<br>Applications  |
| PA08 | Fixed Resistors   |
| PA10 | Quartz Crystals for Automotive and<br>Standard Applications |
| PA11 | Quartz Oscillators  |

**Professional components**

- |      |   |
|------|---|
| PC04 | Photo Multipliers   |
| PC05 | Plumbicon Camera Tubes and Accessories                    |
| PC07 | Vidicon and Newvicon Camera Tubes<br>and Deflection Units |
| PC08 | Image Intensifiers  |
| PC12 | Electron Multipliers                                      |

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Our sister product division, Philips Semiconductors, also has a comprehensive data handbook system to support their products. Their data handbook titles are listed here.

### Integrated circuits

<i>Book</i>	<i>Title</i>
IC01	Semiconductors for Radio and Audio Systems
IC02	Semiconductors for Television and Video Systems
IC03	Semiconductors for Telecom Systems
IC04	CMOS HE4000B Logic Family
IC05	Advanced Low-power Schottky (ALS) Logic Series
IC06	High-speed CMOS Logic Family
IC08	100K ECL Logic Family
IC10	Memories
IC11	General-purpose/Linear ICs
IC12	Display Drivers and Microcontroller Peripherals (planned)
IC13	Programmable Logic Devices (PLD)
IC14	8048-based 8-bit Microcontrollers
IC15	FAST TTL Logic Series
IC16	ICs for Clocks and Watches
IC17	RF/Wireless Communications
IC18	Semiconductors for In-car Electronics and General Industrial Applications (planned)
IC19	Semiconductors for Datacom: LANs, UARTs, Multi-protocol Controllers and Fibre Optics
IC20	8051-based 8-bit Microcontrollers
IC21	68000-based 16-bit Microcontrollers (planned)
IC22	ICs for Multi-Media Systems (planned)
IC23	QUBIC Advanced BiCMOS Interface Logic ABT, MULTIBYTE™
IC24	Low Voltage Logic

### Discrete semiconductors

SC01	Diodes
SC02	Power Diodes
SC03	Thyristors and Triacs
SC04	Small-signal Transistors
SC05	Low-frequency Power Transistors and Hybrid IC Power Modules
SC06	High-voltage and Switching NPN Power Transistors
SC07	Small-signal Field-effect Transistors
SC08a	RF Power Bipolar Transistors
SC08b	RF Power MOS Transistors

### Discrete semiconductors (continued)

SC09	RF Power Modules
SC10	Surface Mounted Semiconductors
SC13	PowerMOS Transistors including TOPFETs and IGBTs
SC14	RF Wideband Transistors, Video Transistors and Modules
SC15	Microwave Transistors
SC16	Wideband Hybrid IC Modules
SC17	Semiconductor Sensors

### Professional components

PC01	High-power Klystrons and Accessories
PC06	Circulators and Isolators

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