



Weidmüller 

Accessories and Technical Information Section M

The Weidmüller ranges of products includes many that compliment their range of signal products. This section contains information about switchmode power supplies, Surge Protection devices, CTs, DIN Rails and Terminal blocks that are suited to signal processing applications. This represents a small portion of our range so please contact you sales representative for more information if you do not find the product here.

We have also included some technical information that you may find useful.

Installation Accessories

Current Transformers (CTs)



Current Transformers

A range of general measurement current transformers, conforming to the class performance requirements of AS60044.1 and suitable for measurement of AC current in busbar or cables. Supplied with busbar mounting kits to aid installation, they are available in bar sizes up to 125mm.

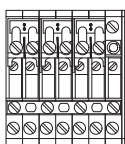
Ordering Data

	Part Number	Description	Busbar Size	Cable dia.	Ratio	Burden		Order Number
						Class 1	Class 2	
	WF000Z0040/5	CT 40A to 5A c/w Bar 8mm	na	na	40/5	5		7940009852
	WF000Z0060/5	CT 60A to 5A c/w Bar 8mm	na	na	60/5	10	10	7940009853
	WF000Z0080/5	CT 80A to 5A c/w Bar 8mm	na	na	80/5	5	10	7940009854
	WF030X0100/5	CT 100/5A /BUS 30x10 /OD 20mm	30 x 10	20mm	100/5	10		7940009855
	WF030X0150/5	CT 150/5A /BUS 30x10 /OD 20mm	30 x 10	20mm	150/5	5	10	7940009856
	WF030X0200/5	CT 200/5A /BUS 30x10 /OD 20mm	30 x 10	20mm	200/5	5	10	7940009857
	WF030X0250/5	CT 250/5A /BUS 30x10 /OD 20mm	30 x 10	20mm	250/5	5	10	7940009858
	WF040X0300/5	CT 300/5A /BUS 40x10 /OD 30mm	40 x 10	30mm	300/5	5	10	7940009859
	WF040X0400/5	CT 400/5A /BUS 40x10 /OD 30mm	40 x 10	30mm	400/5	5	10	7940009860
	WF040X0500/5	CT 500/5A /BUS 40x10 /OD 30mm	40 x 10	30mm	500/5	5	10	7940009861
	WF060X0600/5	CT 600/5A /BUS 40x10 /OD 40mm	60 x 20	40mm	600/5	10	15	7940009862
	WF060X0750/5	CT 750/5A /BUS 40x10 /OD 40mm	60 x 20	40mm	750/5	10	15	7940009863
	WF060X0800/5	CT 800/5A /BUS 40x10 /OD 40mm	60 x 20	40mm	800/5	10	15	7940009864
	WF060X1000/5	CT 1000/5A /BUS 40x10 /OD 40mm	60 x 20	40mm	1000/5	10	15	7940009865
	WF125X1500/5	CT 1500/5A /BUS 60x10 /OD 60mm	125 x 57mm	60mm	1500/5	15	30	7940009866
	WF125X2000/5	CT 2000/5A /BUS 60x10 /OD 60mm	125 x 57mm	60mm	2000/5	15	30	7940009867
	WF125X2500/5	CT 2500/5A /BUS 60x10 /OD 60mm	125 x 57mm	60mm	2500/5	15	30	7940009868
	WF125X3000/5	CT 3000/5A /BUS 60x10 /OD 60mm	125 x 57mm	60mm	3000/5	15	30	7940009869

CT Shorting Terminals



PLAN VIEW
SINGLE PHASE CT LINK SET
FULLY ASSEMBLED



PLAN VIEW
3 PHASE CT KIT
FULLY ASSEMBLED

CT Shorting Terminals

CT Shorting Terminals

CT Shorting Terminals allow you to place a shorting link across the CT output. This means that you can safely disconnect the current measuring device from the CT without danger from high voltages generated by breaking the CT output current path.

Ordering Data

Type	Description	Order No.
CTST 1-PHASE	Single phase CT Shorting Terminal	7940008492
CTST 2-PHASE	Three phase CT Shorting Terminal	7940008504

VSPC - Surge Protection

Surge Protection: VSPC

The Weidmüller VSPC family consist of a full range of plug-in surge protection devices for analogue and digital signals used in control and instrumentation systems. Units consist of a base and a plug-in arrester. Bases are as direct earth (signal GND connects directly to the DIN rail) or with floating ground (FG option) which connects the signal GND to the DIN rail via a spark gap. Bases also have terminal connections for wired earth connections if the DIN is isolated. Visual indicators show when the arrester has protected the system and needs to be replaced. Bases fitted with relay outputs (option R) allow remote monitoring of the arrester status. Modules are available in various DC or AC clamping voltages to suit your application.

Benefits

- Loop remains connected with the arrester removed. Helpful on remote sites if no spares are present.
- Monitoring of failure status with a relay output. Up to 10 relay outputs can be connected via a control unit.
- I_{max}=10kA (8-20µs)
- Operating Temperature -40°C to 70°C
- SIL3 Rating



VSPC Surge Protector Base Selection Table

	VSPC BASE 4SL	VSPC BASE 4SL R	VSPC BASE 4SL FG	VSPC BASE 4SL FG R	VSPC BASE 1CL PW	VSPC BASE 1CL PW FG	VSPC BASE 1CL PWR Ex	VSPC BASE 4SL FG Ex	VSPC BASE 2CL	VSPC BASE 2CL R	VSPC BASE 2CL FG	VSPC BASE 2CL FG R	VSPC BASE 2CL FG Ex	VSPC BASE 2SL	VSPC BASE 2SL R	VSPC BASE 2SL FG	VSPC BASE 2SL FG R	VSPC BASE 2SL FG Ex	VSPC BASE 1CL	VSPC BASE 1CL R	VSPC BASE 1CL FG	VSPC BASE 1CL FG R	VSPC BASE 1CL FG Ex	VSPC BASE 2/4CH	VSPC BASE 2/4CH FG	VSPC BASE 2/4CH FG R	VSPC BASE 2/4CH R	VSPC BASE
	8924700000	8951750000	8924260000	8951760000	1070230000	1105700000	1070470000	8951840000	8924710000	8951710000	8924270000	8951720000	8951820000	8924720000	8951770000	8924280000	8951780000	8951830000	8924730000	8951730000	8924290000	8951740000	8951810000	8924740000	8924300000	8951800000	8951790000	8951850000
VSPC 2CL xxV 0.5A									•		•																	
VSPC 2CL xxV 0.5A R										•		•																
VSPC 1CL xxV																			•		•							
VSPC 1CL xxV R																				•		•						
VSPC 1CL +Power 24V 0.5A					•	•																						
VSPC 2SL xxV 0.5A													•			•												
VSPC 2SL xxV 0.5A R															•		•											
VSPC 4SL xxV 0.5A	•		•																									
VSPC 4SL xxV 0.5A R		•		•																								
VSPC 3/4 wire xxV																									•	•		
VSPC MOV 2ch xxV8kA																									•	•		
VSPC MOV 2ch xxV8kA R																										•	•	
VSPC GDT 2ch 90V20kA																									•	•		
VSPC TAZ 2ch 24V 0.3kA																									•	•		
VSPC TAZ 4ch 24V 0.3kA																									•	•		
VSPC Test Connector	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
VSPC Ground	•	•	•	•				•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
VSPC TELE Uko 2wire									•		•																	
VSPC RS 485 2ch									•		•																	
VSPC RS 485 2ch R										•		•																
VSPC 2CL HF xxVdc									•		•																	
VSPC 2CL HF xxVdc R										•		•																
VSPC 1CL xxV Ex																												
VSPC 2CL xxV 0.5A Ex													•															•
VSPC 1CL/Power Ex							•																					
VSPC 2SL xxV Ex																												
VSPC 3/4 wire xxV Ex																												•

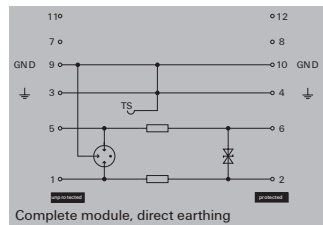
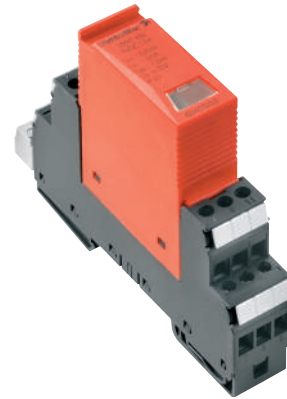
Product	VSPC 2CL 24Vdc 0.5A	VSPC 2CL 24Vdc 0.5A R	VSPC 1CL 24Vdc 0.5A	VSPC 1CL 12Vdc 0.5A R	VSPC 1CL 24Vdc 0.5A R	VSPC 2CL HF 5Vdc	VSPC 2CL HF 5Vdc R	VSPC 2CL HF 12Vdc	VSPC 2CL HF 12Vdc R	VSPC 3/4 Wire 24Vdc	VSPC R485 2ch	VSPC R485 2ch R	VSSC4 CL 24Vdc 0.5A	VSSC6 CL 24Vdc 0.5A	VSSC6 RS485
Interface	8924470000	8951480000	8924480000	8951540000	8951550000	8924430000	8951680000	8924460000	8951690000	8924550000	8924670000	8951670000	1063730000	1064170000	1064980000
0(4-20mA) / 0-10V	●	●	●	●	●								●	●	
Pt100									●	●					
Modbus (+plus)								●	●						
Profibus DP (FMS)						●	●	●	●						
RS485 / Profibus DP											●	●			●
HART		●			●								●	●	
Features: Dual Channel	●	●				●	●	●	●		●	●			
Features: Plug-in element only	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Features: Alarm Relay		●		●	●		●		●				●		
Features: Rated Voltage (Vdc)	24	24	24	12	24	5	5	12	12	24	5	5	24	34	12

Varitector SPC for Analogue Signals

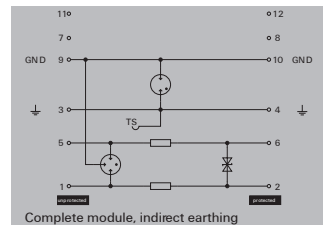
The Varitector VSPC

Features Include:

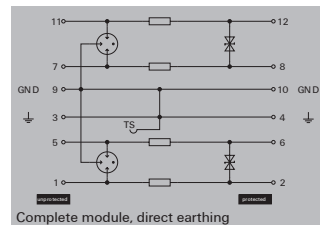
- I_{max} 10kA (8/10us) wire-wire / wire-PE / GND-PE (2x 10kA wire- PE 2 channel unit)
- Low Resistance per path 2.2Ω
- Version with floating-earth PE connection for avoiding potential differences
- Pluggable arrester (plug-in disconnect interruption - free and impedance neutral)
- Optional alarm function for status indication
- Space saving design 1 and 2 Channel (90 x 17.8x69mm) and (98 x 17.8 x 69mm)
- Large operating temperature range -40°C...+70°C
- IP20
- Can be tested with V-TEST testing device
- Tested in accordance with installations standard IEC62305



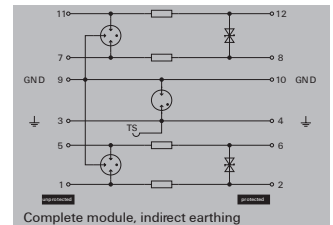
VSPC 1CL - Direct earthing



VSPC 1CL - (FG) Indirect earthing



VSPC 2CL - Direct earthing



VSPC 2CL - (FG) Indirect earthing

VSPC

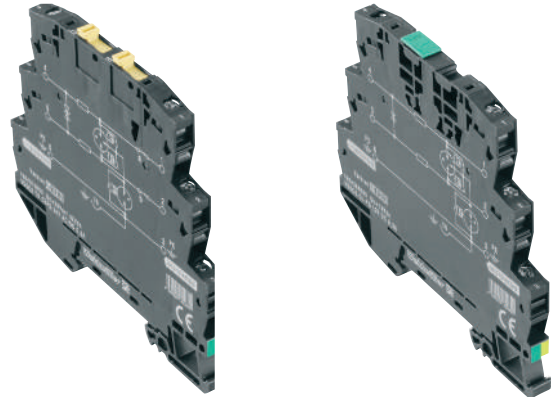
Single Channel Type	Max Cont Volts DC	Max Cont Volts AC	Max Load Current	Protection Level (wire-wire/wire-PE/GND-PE)	VSPC		No Alarm Contact		With Alarm Contact	
					VSPC	VSPC	Base (Direct Earth)	Base (Indirect Earth)	VSPC	Base (Direct Earth)
VSPC 1CL 12VDC 0.5A	15VDC	-	450mA	25V / 450 / 650V	8924450000				8951540000	
VSPC 1CL 24VDC 0.5A	28VDC	-	450mA	45V / 450V / 650V	8924480000				8951550000	
VSPC 1CL 24VAC 0.5A	39VDC	28VAC	450mA	60V / 450V / 650V	8924500000	8924730000	8924290000		8951560000	8951730000 8951740000
VSPC 1CL 48VAC 0.5A	85VDC	60VAC	350mA	85V / 450V / 650V	8924520000				-	

Dual Channel Type	Max Cont Volts DC	Max Cont Volts AC	Max Load Current	Protection Level (wire-wire/wire-PE/GND-PE)	VSPC		No Alarm Contact		With Alarm Contact	
					VSPC	VSPC	2 Channel Base (Direct Earth)	2 Channel Base (Indirect Earth)	VSPC	2 Channel Base (Direct Earth)
VSPC 2CL 12VDC 0.5A	15VDC	-	450mA	25V / 450 / 800V	8924440000				8951470000	
VSPC 2CL 24VDC 0.5A	28VDC	-	450mA	45V / 450V / 800V	8924470000				8951480000	
VSPC 2CL 24VAC 0.5A	39VDC	28VAC	450mA	60V / 450V / 800V	8924490000	8924710000	8924270000		1093400000	8951710000 8951720000
VSPC 2CL 48VAC 0.5A	85VDC	60VAC	350mA	85V / 450V / 650V	8951490000				-	

Varitector VSSC6 for Analogue Signals

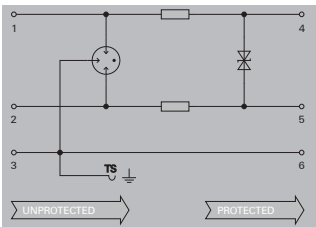
The Varitector VSSC6

Weidmüller's new VSSC6 range of surge diverters provide surge protection for control and instrumentation circuits coupled with a market leading range of features (test points, disconnection levers, indication and identification). The VSSC6 has six terminals which includes ground connections for the cable shield.

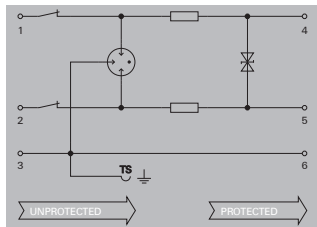


Features

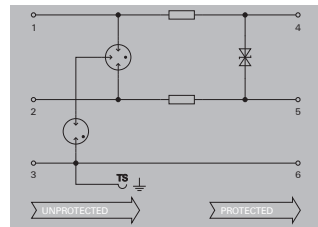
- Designed for protection of analogue signals
- I_{max} 5kA (8/20µs) wire-wire / wire-PE
- Version with floating-earth (FG) PE connection for avoiding potential differences
- Slimline Design with a width of 6.2mm
- PE Connection via DIN rail
- Optional disconnection feature for loop testing
- Integrated test socket
- Large operational temperature -40°C...+70°C
- IP20
- Tested in accordance with installations standard IEC62305 and IEC61643-1/-22



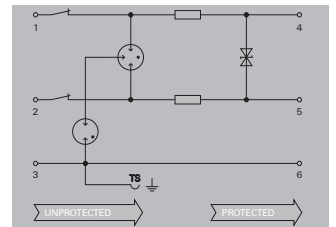
VSSC6 CL



VSSC6 CL with disconnect



VSSC6 CL FG



VSSC6 CL FG with disconnect

VSSC6 - CL

Type	Max Cont Volts DC	Max Cont Volts AC	Max Load Current	Protection Level (Output side sym wire-wire)	Order Number No Disconnect	Order Number With Disconnect
VSSC6 CL 12VDC	15VDC	-	500mA	30V	1064150000	1064220000
VSSC6 CL 24VUC	42VDC	30VAC	500mA	70V	1064170000	1064230000
VSSC6 CL 48VUC	85VDC	60VAC	500mA	150V	1064190000	1064240000

VSSC6 - CL with Floating Ground

Type	Max Cont Volts DC	Max Cont Volts AC	Max Load Current	Protection Level (wire-wire/wire-PE/GND-PE/ Output side sym wire-wire)	Order Number No Alarm Contact	Order Number With Alarm Contact
VSSC6 CL FG 12VDC	15VDC	-	500mA	30V	1064260000	1064300000
VSSC6 CL FG 24VUC	42VDC	30VAC	500mA	70V	1064270000	1064310000
VSSC6 CL FG 48VUC	85VDC	60VAC	500mA	150V	1106428000	1064232000

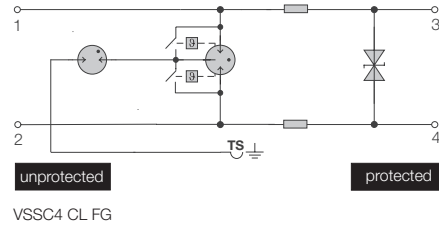
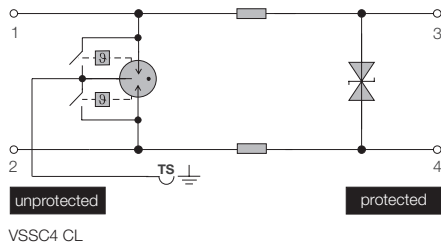
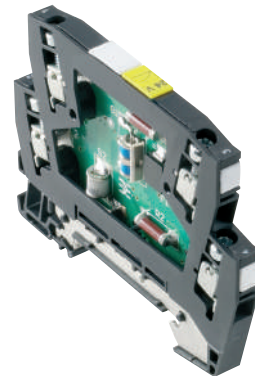
Varitector VSSC4 for Analogue Signals

The Varitector VSSC4

Weidmüller's new VSSC4 range of surge diverters provide two stage surge protection for control and instrumentation circuits. The VSSC4 has four terminals and any surge potentials are discharged directly to the DIN rail or via a spark gap (to the DIN rail) for floating ground systems.

Features

- Designed for protection of analogue signals
- I_{max} 5kA (8/20 μ s) wire-wire / wire-PE
- Version with floating-earth (FG) PE connection for avoiding potential differences
- Slimline Design with a width of 6.2mm
- PE Connection via DIN rail
- Integrated test socket
- Large operational temperature -40°C...+70°C
- IP20
- Tested in accordance with installations standard IEC62305 and IEC61643-1/-22



VSSC4 CL

Type	Max Cont Volts DC	Max Cont Volts AC	Max Load Current	Protection Level (I_n wire-wire/wire-PE)	Order Number With Floating Ground - FG
VSSC4 CL 12VDC	15VDC	N/A	500mA	30V/600V	1063720000
VSSC4 CL FG 12VDC	15VDC	N/A	500mA	30V/1500V	1063760000
VSSC4 CL 24VUC	42VDC	30VAC	500mA	70V/600V	1063730000
VSSC4 CL FG 24VUC	42VDC	30VAC	500mA	70V/1500V	1063770000
VSSC4 CL 48VUC	85VDC	60VAC	500mA	150V/600V	1063740000
VSSC4 CL FG 48VUC	85VDC	60VAC	500mA	150V/1500V	1063780000

DIN Rail Terminals

Installation Accessories General

Accessories for Signal Installations are available from our Power and Data product ranges. General items that may be of use are shown below.

Ordering Data

Type	Description	Order No.
2.5mm DIN Rail mount Terminals (5.1mm wide)		
WDU 2.5	Grey single deck terminal	1020000000
WDU 2.5BL	Blue single deck terminal	1020080000
WAP 2.5-10	Dark beige end plate	1050000000
WAP 2.5-10BL	Blue end plate	1050080000
WEW 35/2	End bracket	1061200000
WPE2.5	Earth terminal	1010000000
WDK 2.5	Dual deck terminal	1021500000
WDK 2.5V	Dual deck terminal all linked	1022300000
WAPD	Dual deck terminal end plate	1059100000
Disconnect Terminals		
WTR2.5	Single Deck disconnect terminal	1855610000
WTR2.5 STB2,3	Single Deck disconnect c/w test sockets	1855620000
WTR2.5/ZZ	Single Deck disconnect, dual connections	1039900000
WDTR2.5	Dual deck disconnect for each deck	9528070000
WDTR2.5/WE	1 input, 2 output each with disconnect, no end plate required	9528090000
Fuse terminals for 5x20mm fuses (8mm wide)		
WSI 6	Single deck fuse terminal	1011000000
WSI 6LD	Single deck fuse terminal 10-36Vac/dc with LED	1011300000
WSI 6LD	110Vdc/250Vac with LED	1012400000
KDSK1/35 DB	Dual deck terminal, one deck fused	9532440000
G20/0.25A/F	5 x 20mm, 0.25A fast blow fuse to suit KDSK1/35 DB	0430500000
G20/0.50A/F	5 x 20mm, 0.50A fast blow fuse to suit KDSK1/35 DB	0430600000
G20/1.00A/F	5 x 20mm, 1.00A fast blow fuse to suit KDSK1/35 DB	0430700000
G20/2.00A/F	5 x 20mm, 2.00A fast blow fuse to suit KDSK1/35 DB	0430900000
Thermocouple terminals (10.2mm wide)		
WDU 2.5/TC TYP K	2 parallel W series terminals	1024100000
WDU 2.5/TC TYP T	2 parallel W series terminals	1024200000
WDU 2.5/TC TYP J	2 parallel W series terminals	1024300000
WDU 2.5/TC TYP SR	2 parallel W series terminals	1024400000
WDU 2.5/TC TYP E	2 parallel W series terminals	1033300000
WDU 2.5/TC TYP B	2 parallel W series terminals	1033700000
WDU 2.5/TC TYP N	2 parallel W series terminals	1041500000
RTD terminals (6.1mm wide)		
DLD2.5DB	3 deck terminal	1784180000
AP DLD2.5DB	End plate to suit DLD2.5DB	1784210000
MAK2.5	3 deck terminal with earth connection	1615270000
APMAK2.5DB	End plate to suit MAK2.5	7917000000
Screwdriver to suit above terminals		
SDI 0.6 x 3.5 x 100	Screwdriver	9008390000
Shield connection terminals		
KLBU 3-8 SC	3-8mm cable diameter to suit FM4 foot	1692261001
KLBU 4-13.5 SC	4-13.5mm cable diameter to suit FM4 foot	1712311001
KLBU 10-20 SC	10-20mm cable diameter to suit FM4 foot	1712321001
FM4	Metal DIN rail feet with M4 thread	0687900000
Busbar system shield connections		
SSCH 10X3X1000 CU/SN	Tin plated copper busbar (1m length)	0348900000
SH 1 TS 15 complete	Busbar Holding Clip	0299860000
ZB 4G GN/GE	Busbar Clamping Yoke Green/Yellow for Instrument Earth	0322160000
ZB4 Blank	Bare Busbar Clamping Yoke	0316500000
WSH1	DIN Rail Holder	1068700000
DIN Rail		
TS35/F6	T35/F6 Slotted 7.5mm x 2m /ST/ZN	0676200000
TS35 7.5mm	TS35 7.5 mm x 2m /ST/ZN (Unslotted)	0383400000
Markers		
DEK5/5 Multi	Card of 200 markers - special print to order	1609810000

Please note that there are many other terminal sizes and accessories available. Please ask your distributor for details.

Pro-M Power Supplies



Pro-M Advanced Switchmode Power Supplies

PRO-M Advanced Switchmode Power Supplies

The new PRO-M range of switchmode power supplies have a space saving of up to 50% and no gap required between multiple units. PRO-M will squeeze into the tightest of switchboards or machines with overall efficiencies of up to 90%. Their extended operating temperature range of -25°C to +70°C increases the number application possibilities. Up to 5 modules can be connected without the need for external diode modules allowing for simple redundancy and increases in power output. A power boost up to 120% is provided for up to 2 minutes.

Ordering Data

Max. Output Power	Output Current	Output Voltage	Input Voltage	Dimensions LxWxH (mm)	Order No.
1-phase					
70 W	3 A	24 V (22.5 to 29.5 V)	85-264Vac / 80-370Vdc	125x33x130	8951330000
120 W	5 A	24 V (22.5 to 29.5 V)	85-264Vac / 80-370Vdc	125x40x130	8951340000
180 W	7.5 A	24 V (22.5 to 29.5 V)	85-264Vac / 80-370Vdc	125x50x130	8951350000
250 W	10 A	24 V (22.5 to 29.5 V)	85-264Vac / 80-370Vdc	150x60x130	8951360000

PRO-M Diode Modules



PRO-M Diode Modules

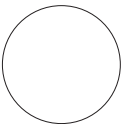
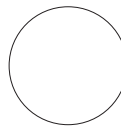

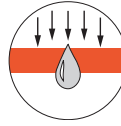

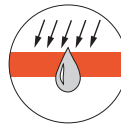







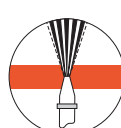
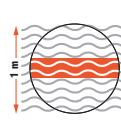
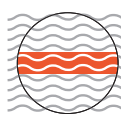
Redundant power supply systems increase the availability and consequently the operating times of machinery. The new diode modules, with 20 A or 40 A output current and integrated status relay, enable the installation of trouble-free systems.

Ordering data

Model	Input current	Input voltage	Rated output current @ U _{Nom}	Status Relay	Order No.
CP-M-DM20	2 x 10A (1 x 20A)	24V (18-30Vdc)	20A @ 60°C	Yes (Off < 20.4V / On > 21.6V)	1222210000
CP-M-DM40	2 x 20A (1 x 40A)	24V (18-30Vdc)	40A @ 60°C	Yes (Off < 20.4V / On > 21.6V)	1222220000

Technical Information

IP Class Descriptions - IP class of protection to EN 60529

<p>The ingress protection class or IP rating is indicated by a code consisting of the two letters IP and two digits representing the class of protection.</p>			<p>Example: I P 6 5</p> <p>2nd digit: protection from liquids 1st digit: protection from solid bodies</p>		
<p>Protection against intrusion of external particles (1st digit)</p>			<p>Protection against penetration of liquids (2nd digit)</p>		
Digit			Digit		
0		No protection	0		No protection
1		Protection against ingress of large solid bodies with diameter > 50 mm. Stops dangerous parts being touched with the back of the hand.	1		Protection against drops of condensed water falling vertically.
2		Protection against ingress of large solid bodies with diameter > 12.5 mm. Stops dangerous parts being touched with the fingers.	2		Protection against drops of liquid falling at an angle of 15° with respect to the vertical.
3		Protection against ingress of large solid bodies with diameter > 2.5 mm. Stops dangerous parts being touched with a tool.	3		Protection against drops of liquid falling at an angle of 60° with respect to the vertical.
4		Protection against ingress of large solid bodies with diameter > 1 mm. Stops dangerous parts being touched with a piece of wire.	4		Protection against liquids splashed from any direction.
5		Protection against harmful deposits of dust, which cannot enter in an amount sufficient to interfere with satisfactory operation.	5		Protection against low pressure water jets from any direction.
6		Complete protection against ingress of dust.	6		Protection against high pressure water jets from any direction or from heavy sea on ships' decks. Limited ingress allowed.
			7		Protection against immersion in water up to 1m depth for a defined time. Limited ingress allowed.
			8		Protection against indefinite immersion in water for defined pressure (which must be agreed between manufacturer and user and must be more adverse than number 7).

Classification of Hazardous Areas

Hazardous area classification

General

Installations in which flammable materials are manufactured, handled or stored should be designed, operated and maintained so that any releases of flammable material and the extent of hazardous areas are kept to a minimum. In situations where there may be an explosive gas atmosphere, the following steps should be taken:

- Eliminate the likelihood of an explosive gas atmosphere occurring around the source of ignition; or
- Eliminate the source of ignition

Where this is not possible, protective measures, process equipment, systems and procedures should be selected so the likelihood of both being present at the same time is acceptably small. In the first instance, it is preferable to eliminate the presence of a flammable atmosphere.

This is possible by:

- Substituting with a non-flammable substance; or
- Raising the flashpoint above the process temperature, e.g. by adding water
- Lowering the process temperature, e.g. cooling
- Limiting the concentration below the LEL, e.g. dilution/ventilation or inerting
- Explosion-proof design (containment)

In practice, however, it is very difficult to ensure that an explosive gas atmosphere will never occur. In this case, apparatus with special protective measures should be used.

Definitions of zones

Zone 0

A place in which an explosive atmosphere is present continuously, for long periods, or frequently.

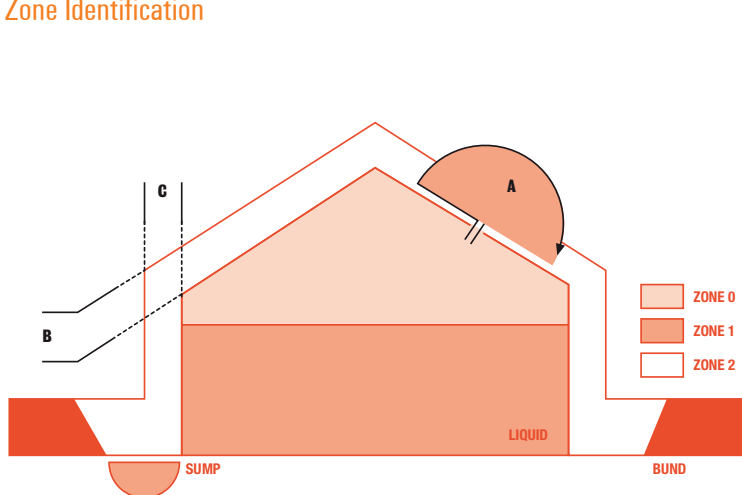
Zone 1

A place in which an explosive atmosphere is likely to occur occasionally in normal operation.

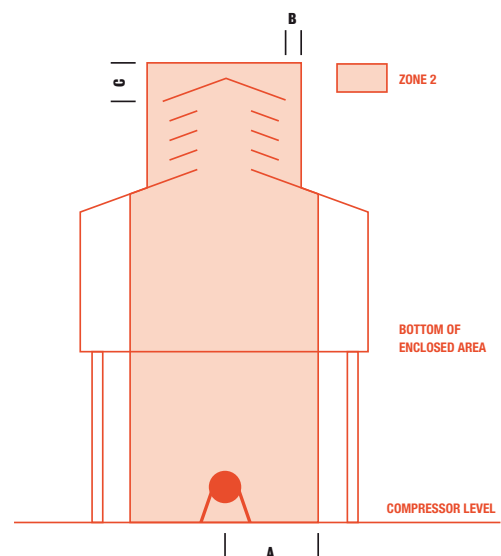
Zone 2

A place in which an explosive atmosphere is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

Zone Identification



VENTILATION	Type: Natural	Degree: Medium	Availability: Good
SOURCE OF RELEASE	Liquid surface within the vessel	Vent opening and other openings in the roof	Flanges etc. inside bund and over-filling of the tank
GRADE OF RELEASE	Continuous	Primary	Secondary
PRODUCT	Flashpoint: Below process and ambient temperature	Vapour density: Greater than air	Vapour density: Greater than air
EXTENT OF ZONE	A = 3 m from vent openings	B = 3 m above the roof	C = 1 m horizontally from the tank



VENTILATION	Type: Natural	Degree: Medium	Availability: Good
SOURCE OF RELEASE	Compressor seals, valves and flanges close to the compressor		
GRADE OF RELEASE	Secondary	Gas density: Lighter than air	Vapour density: Greater than air
PRODUCT	Gas: Hydrogen		
EXTENT OF ZONE	A = 3 m horizontally from source of release	B = 1 m horizontally from ventilation openings	C = 1 m above ventilation openings

Tables Thermocouple Extension Cables

Thermocouple Extension/Compensation Cable Colour Code Chart

Extension Cable	Compensating Cable	International (IEC 60684-3)	American Cable (ANSI/MC 96.1)	German (DIN 43714)	Japanese (JIS C 1610)	French (NFC 42324)	British (BS 1843)	Notes
K								The most commonly used thermocouple type with a wide measurement range. Nickel-Chromium (+) / Nickel-Aluminium (-)
K (V)								Compensation cable for Type 'K' thermocouples. Can also be used for extending type 'T' Thermocouples. Copper (+) / Copper-Nickel (-)
T								Used mostly for low temperature and cryogenic applications. Can be used as an unprotected sensor in mildly oxidising or reducing atmospheres. Copper (+) / Copper-Nickel (-)
J								Commonly used in the plastics molding industry. Can be used as an unprotected sensor in reducing atmospheres. Iron (+) / Copper-Nickel (-)
E								Has highest sensitivity (change in output per °C). Can be used as an unprotected sensor in a vacuum or in mildly oxidising or reducing atmospheres. Nickel-Chromium (+) / Copper-Nickel (-)
N								A good alternative to Type 'K' (more stable and longer lived). Nickel-Chromium-Silicon (+) / Nickel-Silicon-Magnesium (-)
N								Compensating cable for type 'N' thermocouples. Nickel-Chromium-Silicon (+) / Nickel-Silicon-Magnesium (-)
R								Used for high temperature applications. Has high resistance to oxidation and corrosion but is easily contaminated and normally requires protection. Platinum - 13% Rhodium (+) / Platinum (-)
S								Used for high temperature applications. Has high resistance to oxidation and corrosion but is easily contaminated and normally requires protection. Platinum - 10% Rhodium (+) / Platinum (-)
B								Commonly used in glass industry. Copper-Copper compensating cable can be used for temperature gradients less than 100°C. Platinum - 30% Rhodium (+) / Platinum - 6% Rhodium (-)

Extension Cable

Thermocouple extension cable is made of conductors with the same nominal composition as the relevant thermocouple type. The EMF of a thermocouple is developed along the entire temperature gradient between measurement point and cold junction (normally at the instrument terminals) so extension cable should be used anywhere there are high temperature gradients.

Compensation Cable

Thermocouple compensation cable is made of conductors with a different composition to the relevant thermocouple type. Compensation cable can be used anywhere that temperature gradients along the cable are small.

Resistance Temperature Detectors (RTDs)

Resistance Temperature Detectors (RTDs)

A Pt100 RTD (Resistance Temperature Detector) is a common industrial temperature sensor that changes resistance with temperature and can be connected to an RTD converter/indicator/controller with the knowledge that it meets industry standards with known accuracy. Since they are more accurate and stable than thermocouples, RTD's are commonly used to measure temperatures in the range -200°C to +500°C (unless you are prepared to trade accuracy and stability for a fast response or small element is essential). They can be used up to 850°C if the element is designed for higher temperatures.

The standard RTD has a resistance at 0°C of 100Ω (hence Pt100) and resistance change per °C (alpha value) of 0.00385Ω/Ω/°C. There are different accuracy classes available, the most commonly used is Class B with accuracy ±0.3°C (at 0°C). Class A has accuracy ±0.15°C (at 0°C).

Duplex RTDs contain 2 sensors in one element, this removes the need to remove the probe during a process as you can simply swap the wiring to the second sensor. RTD Extension cable is simply good quality, multi-stranded, shielded copper cable.

RTDs are manufactured with 2, 3 or 4 lead wires. As RTDs are resistance based any lead resistance can affect calibration and accuracy so the extra leads are used by the measuring equipment to compensate for lead resistance. 2-wire RTDs should only be used with short wiring lengths as lead resistance will affect calibration. 3-wire RTDs are the most common as they give good results when the lead resistances are equal and small. 4-wire RTDs are used for long wiring runs, or high accuracy, as the measuring device can use the two extra wires to eliminate the effects of lead resistance.

Type 'K' Thermocouple Tables (IEC 584-1)

Temp (°C)	EMF (µV)	Temp (°C)	EMF (µV)	Temp (°C)	EMF (µV)	Temp (°C)	EMF (µV)	Temp (°C)	EMF (µV)	Temp (°C)	EMF (µV)
		0	0	300	12209	600	24905	900	37326	1200	48838
		10	397	310	12624	610	25330	910	37765	1210	49202
		20	798	320	13040	620	25755	920	38164	1220	49565
-270	-6458	30	1203	330	13457	630	26179	930	38561	1230	49926
-260	-6441	40	1612	340	13874	640	26602	940	38958	1240	50286
-250	-6404	50	2023	350	14293	650	27025	950	39353	1250	50644
-240	-6344	60	2436	360	14713	660	27447	960	39747	1260	51000
-230	-6262	70	2851	370	15133	670	27869	970	40141	1270	51355
-220	-6158	80	3267	380	15554	680	28289	980	40533	1280	51708
-210	-6035	90	3682	390	15975	690	28710	990	40924	1290	52060
-200	-5891	100	4096	400	16397	700	29129	1000	41315	1300	52410
-190	-5730	110	4509	410	16820	710	29548	1010	41704	1310	52759
-180	-5550	120	4920	420	17243	720	29965	1020	42092	1320	53106
-170	-5354	130	5328	430	17667	730	30382	1030	42479	1330	53451
-160	-5141	140	5735	440	18091	740	30798	1040	42865	1340	53795
-150	-4913	150	6138	450	18516	750	31213	1050	43250	1350	54138
-140	-4669	160	6540	460	18941	760	31628	1060	43633	1360	54479
-130	-4411	170	6941	470	19366	770	32041	1070	44016	1370	54819
-120	-4138	180	7340	480	19792	780	32453	1080	44397		
-110	-3852	190	7739	490	20218	790	32865	1090	44778		
-100	-3554	200	8138	500	20644	800	33275	1100	45157		
-90	-3243	210	8539	510	21071	810	33685	1110	45534		
-80	-2920	220	8940	520	21497	820	34093	1120	45911		
-70	-2587	230	9343	530	21924	830	34501	1130	46286		
-60	-2243	240	9747	540	22350	840	34908	1140	46660		
-50	-1889	250	10153	550	22776	850	35313	1150	47033		
-40	-1527	260	10561	560	23203	860	35718	1160	47404		
-30	-1156	270	10971	570	23629	870	36121	1170	47774		
-20	-778	280	11382	580	24055	880	36524	1180	48142		
-10	-392	290	11795	590	24480	890	36925	1190	48509		

Pt100 RTD Tables (alpha=.00385)

Temp (°C)	Res (Ω)	Temp (°C)	Res (Ω)	Temp (°C)	Res (Ω)	Temp (°C)	Res (Ω)	Temp (°C)	Res (Ω)
		0	100.00	250	194.07	500	280.90	750	360.47
		10	103.90	260	197.69	510	284.22	760	363.50
		20	107.79	270	201.29	520	287.53	770	366.52
		30	111.67	280	204.88	530	290.83	780	369.53
		40	115.54	290	208.45	540	294.11	790	372.52
-200	18.49	50	119.40	300	212.02	550	297.39	800	375.51
-190	22.80	60	123.24	310	215.57	560	300.65	810	378.48
-180	27.08	70	127.07	320	219.12	570	303.91	820	381.45
-170	31.32	80	130.89	330	222.65	580	307.15	830	384.40
-160	35.53	90	134.70	340	226.17	590	310.38	840	387.34
-150	39.71	100	138.50	350	229.67	600	313.59	850	390.26
-140	43.87	110	142.29	360	233.17	610	316.80		
-130	48.00	120	146.06	370	236.65	620	319.99		
-120	52.11	130	149.82	380	240.13	630	323.18		
-110	56.19	140	153.58	390	243.59	640	326.35		
-100	60.25	150	157.31	400	247.04	650	329.51		
-90	64.30	160	161.04	410	250.48	660	332.66		
-80	68.33	170	164.76	420	253.90	670	335.79		
-70	72.33	180	168.46	430	257.32	680	338.92		
-60	76.33	190	172.16	440	260.72	690	342.03		
-50	80.31	200	175.84	450	264.11	700	345.13		
-40	84.27	210	179.51	460	267.49	710	348.22		
-30	88.22	220	183.17	470	270.86	720	351.30		
-20	92.16	230	186.82	480	274.22	730	354.37		
-10	96.09	240	190.45	490	277.56	740	357.42		