

OVERVOLTAGE PROTECTION FOR INSTRUMENTATION AND CONTROL

Overvoltage protectors class **DM** (for instrumentation and control) and **DN** (for power supply) are intended for protection of data input of devices in measuring and regulating systems, which in general are extremely sensitive to overvoltage damage.

KIWA SPDs for instrumentation and control are characterized by

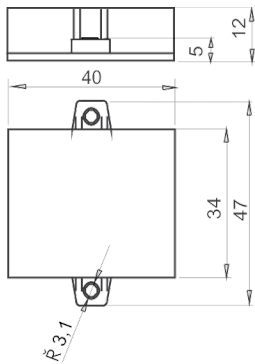
- a high diverting capacity up to 20 kA (8/20) according to the type,
- a high suppression efficiency of overvoltage events,
- simple installation,
- long operational life.

Three basic versions available:

- R - distributor panel
- M - modular
- P - integrated



DIMENSIONS



DM-xx-M



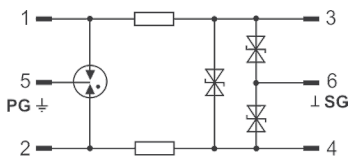
DM-xxx-R
DN-xxx-R

CONNECTION DIAGRAM

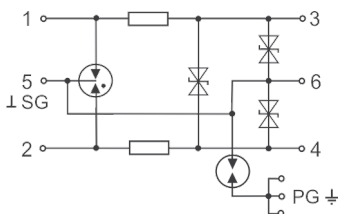
The 2-level

CS, CC protectors. The separation between levels is realized by inductance-free resistors. The application area is protection of analogue circuits operating at a frequency of up to 3 MHz and digital circuits with transfer rate up to 1.5 MBit/s. Diverting ability reaches a value of 10 kA (8/20).

CS



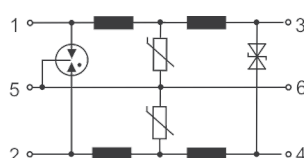
CC



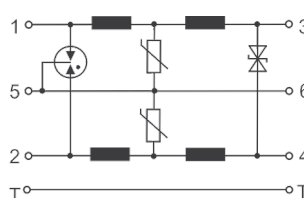
The 3-level

BS, BA.. protectors. The separation between levels is realized by chokes. The application area is protection of analogue signals with low frequency, circuits with current loops (0/4 - 20 mA) and two-state (ON/OFF) signals. With respect to the low transfer resistance, they are also suitable to protect AC, DC supply distributions.

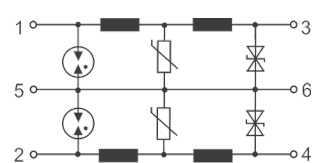
BS



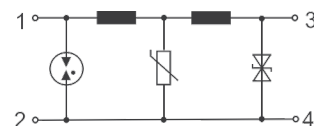
BST



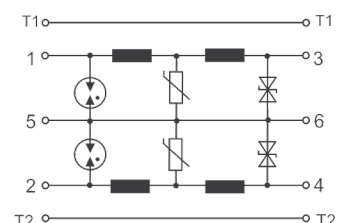
BA



BA1



BAT



TECHNICAL PARAMETERS

Connection diagram: **BS, BST**

Nominal voltage	U_n	8 V	12 V	16 V	24 V	48 V
Max. operating voltage	U_c	1,15 · U_n				
Rated loaded current	I_L	1 A				
	DN class	1 A				
	DM class	100 mA				
Nominal discharge current (8/20)	I_n	10 kA				
Max. discharge current (8/20)	I_{max}	20 kA				
Voltage protection level for I_{max}	U_p					
line / line		≤ 15 V	≤ 30 V	≤ 40 V	≤ 50 V	≤ 92 V
line / signal earth		≤ 80 V	≤ 110 V	≤ 120 V	≤ 260 V	≤ 480 V
Response time	t_A					
line / line		≤ 1 ns	≤ 1 ns	≤ 1 ns	≤ 1 ns	≤ 1 ns
line / signal earth		≤ 25 ns	≤ 25 ns	≤ 25 ns	≤ 25 ns	≤ 25 ns
Cut-off frequency	f_o					
	DN class	70 kHz				
	DM class	100 kHz				
Serial impedance / line	L, R					
	DN class	max. 250 μH / max. 2 Ω				
	DM class	max. 150 μH / max. 1 Ω				
Operating temperature range		-25°C ... +80°C				
Connection		input/output: terminal for 0,5 - 2,5 mm ² wire				

Connection diagram: **CS, CC**

Nominal voltage	U_n	8 V= / 5 V~	12 V= / 8 V~	16 V= / 11 V~	24 V= / 17 V~	48 V= / 34 V~
Max. operating voltage	U_c	1,15 · U_n				
Rated loaded current	I_L	100 mA				
Nominal discharge current (8/20)	I_n	5 kA				
Max. discharge current (8/20)	I_{max}	10 kA				
Voltage protection level for I_{max}	U_p					
line / line		15 V	≤ 23 V	≤ 45 V	≤ 36 V	≤ 72 V
line / signal earth		15 V	≤ 23 V	≤ 25 V	≤ 36 V	≤ 72 V
Voltage protection level for 1 kV/μs	U_{sp}					
line / protected earth		≤ 450 V				
Response time	t_A					
line / line		≤ 1 ns				
line / signal earth		≤ 1 ns				
line (sign.earth) / protected earth		≤ 100 ns				
Cut-off frequency/ baud rate	f_o	3 MHz / 1,5 MBit/s				
Longitudinal impedance / line	R_L	max. 10 Ω				
Operating temperature range		-25°C ... +80°C				
Connection		input/output: terminal for 0,5 - 2,5 mm ² wire				
	R version	input/output: terminal for 0,5 - 2,5 mm ² wire				
	M version	input: 0,5 mm ² cable, 100 mm long output: 0,2 mm ² wire, 100 mm long				

Connection diagram: **BA, BA1, BAT**

Nominal voltage	U_n	8 V	12 V	16 V	24 V	48 V
Max. operating voltage	U_c	1,15 · U_n				
Rated load current	I_L					
	DN class	1 A				
	DM class	100 mA				
Nominal discharge current (8/20)	I_n	10 kA				
Max. discharge current (8/20)	I_{max}	20 kA				
Voltage protection level for I_{max}	U_p					
	line / sign. earth	≤ 13 V	≤ 19 V	≤ 21 V	≤ 33 V	≤ 72 V
	line / line	≤ 26 V	≤ 38 V	≤ 42 V	≤ 66 V	≤ 144 V
Response time	t_A					
	line / sign. earth	≤ 1 ns				
Cut-off frequency	f_o					
	DN class	70 kHz				
	DM class	100 kHz				
Serial impedance / line	L, R					
	DN class	max. 250 μH / max. 2 Ω				
	DM class	max. 150 μH / max. 1 Ω				
Operating temperature range		-25°C ... +80°C				
Connection		input/output: terminal for 0,5 - 2,5 mm ² wire				

PRODUCT SPECIFICATION

D - - / - — Nominal voltage (V)
 — version: R - on a DIN35 (distributor) rail or M - modular
 — type of product - (**BS, BST, CS, CC, BA, BA1, BAT**) corresponding to connection diagram
 — class of overvoltage protection (**M** - instrumentation and control 0,1A, or **N** - supply 1A)

TYPE	Order number				
	8 V	12 V	16 V	24 V	48 V
DM-BS-R				94.038	
DN-BS-R			94.013	94.023	
DM-BST-R				94.031	
DN-BST-R				94.050	
DM-BSO-P				94.030	
DM-CS-M	94.001	94.016		94.018	94.040
DM-CS-R	94.002	94.017		94.019	94.034
DM-CC-R	94.022		94.035	94.057	
DM-BA-R		94.043	94.045	94.033	94.032
DN-BA-R		94.044		94.039	
DM-BA1-R	94.063	94.065		94.046	
DN-BA1-R		94.064	94.010	94.048	
DM-BAT-R				94.047	
DN-BAT-R				94.036	

OVERVOLTAGE PROTECTION FOR INSTRUMENTATION AND CONTROL

DM-CCT-R

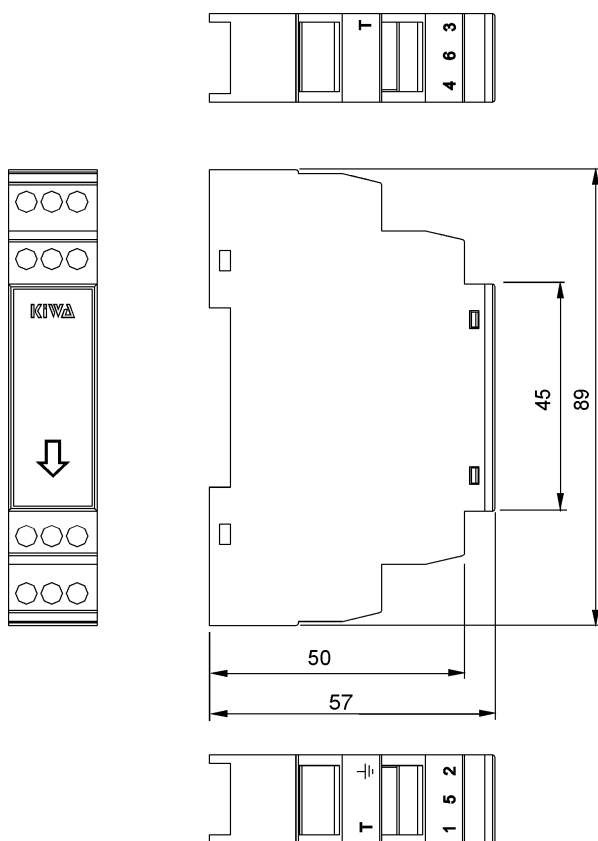
It is used as a protection of appliances against the overvoltage, which is propagating through data and communication lines. It enables the protection of two wires lines or of two one wire lines (symmetrical or asymmetrical systems). It is commonly used in the area of measuring, controlling, and the area of digital and analogue information transmission equipment.

The SPD has been created as the two-stage system with the stepwise overvoltage reduction down to allowable values. In the first stage are used the efficient spark plugs while fast suppressing diodes are used in the second stage. The correct operation requests the proper connection according to this recommendation, respecting connecting diagram as it is printed on the housing.

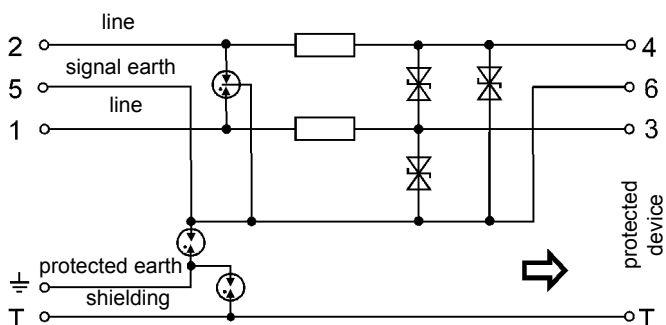
The SPD is encased in the plastic housing designed for mounting on DIN 35 rail.



DIMENSIONS



CONNECTION DIAGRAM



TECHNICAL PARAMETERS

Nominal voltage	U_n	8 V=	12 V=	16 V=	24 V=	48 V=
Max. operating voltage	U_c	1,15 · U_n				
Rated load current	I_L	100 mA				
Nominal discharge current (8/20)	I_n	5 kA				
Max. discharge current (8/20)	I_{max}	10 kA				
Max. discharge current (10/350)	I_{max}	2,5 kA				
Voltage protection level for I_{max}	U_p					
line / line		25 V	≤ 23 V	≤ 29 V	≤ 36 V	≤ 72 V
line / sign. earth		15 V	≤ 23 V	≤ 29 V	≤ 36 V	≤ 72 V
Voltage protection level for 1 kV/μs						
line / protection earth		≤ 450 V				
sign. earth / protection earth						
Response time	t_A					
line / line		≤ 1 ns				
line / sign. earth		≤ 1 ns				
line / protection earth		≤ 100 ns				
sign. earth / protection earth		≤ 100 ns				
shielding / protection earth		≤ 100 ns				
Limit frequency / baud rate	f_o	3 MHz / 1,5 MBit/s				
Input resistance (line / sig. earth)	R_V	≤ 1 MΩ				
Longitudinal impedance / line	R_L	max. 10 Ω				
Operating temperature range		-25 °C ... +80 °C				
Connection		input/output: terminal for cable 0,5 - 2,5 mm ² ; wire 0,2 - 4 mm ²				
Products comply with norms IEC 61643-21		C2; D1				

PRODUCT SPECIFICATION

D - [] - [] / [] — nominal voltage (V)
 — version: R - on a DIN35 (distributor) rail
 — type of product - (CCT) corresponding to connection diagram
 — class of overvoltage protection (M - instrumentation and control 0,1A)

TYPE	Order number				
	8 V	12 V	16 V	24 V	48 V
DM-CCT-R	94.058	94.059	94.060	94.061	94.062