

SP-112

6-lines Surge Arrestor, differential mode



Description

The SP-112 surge arrester is able to protect up to 6 lines against overvoltages caused by 8/20us surges (lightning) or 10/1000us surges (power switching).

Several levels of protection are available from 18V to 75V.

A thermal protection is added to the lines connected to power supplies.

General features

Dimensions	90 mm x 70 mm
Thickness	17,5 mm
Weight	110 g
Assembly	DIN rail
Connections	Screw

Climatic conditions

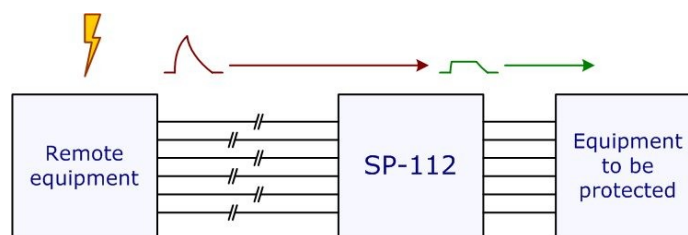
Storage temperature	-20°C to +70°C
Operating temperature	-20°C to +50°C

Lines protection

Nominal current (I_N)	20 kA
Maximum current (I_{MAX})	25 kA
Protection levels (U_C)	18 V _{DC} (12 V _{AC}) 24 V _{DC} (16,5 V _{AC}) 48 V _{DC} (33 V _{AC}) 75 V _{DC} (50 V _{AC})

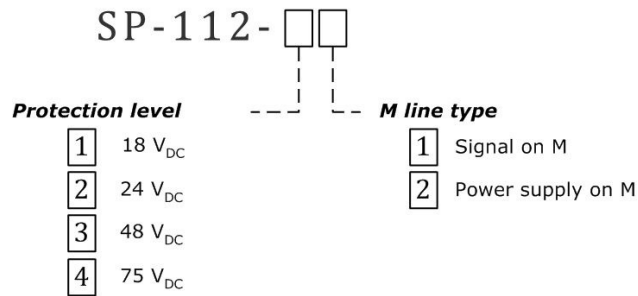
Lines features

DC serial resistance	0,4 Ω (Signal) 0,8 Ω (Supply)
Serial resistance at 1kHz	1,8 Ω (Signal) 2,2 Ω (Supply)
Maximum current per line	500 mA



Available references

The product reference is constructed as follows :



Available references are the following :

SP-112-11	SP-112-21	SP-112-31	SP-112-41
SP-112-12	SP-112-22		

Overview

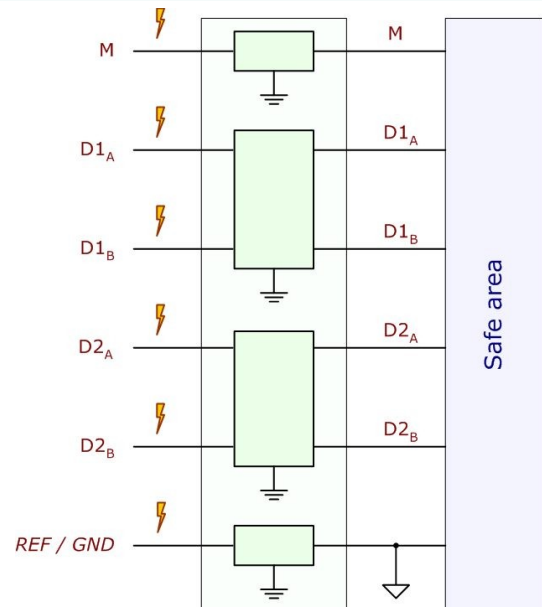
The SP-112 module protects up to 6 low-voltage lines against the effects of transients.

Two pairs are protected in differential mode while the two last lines are protected in common mode.

The lines get the following functions :

REF	Voltage reference/ Ground
D1, D2	'Signal' line (analog or digital)
M	'Mixed' line

A 'Mixed' line is considered either as a 'Signal' line, either as a 'Supply' line then requiring an additional thermal protection.



Lines definitions

'Reference' line (REF).

This line acts as a voltage reference. It can be an electronic ground or an other signal.

Protection levels implicitly use this line as a reference. For proper operation of the arrestor, it must be connected.

'Signal' line (D1, D2 or M).

A 'Signal' line is a general purpose line. It can be analog or digital.

'Supply' line (M).

This type of line is connected to a DC power supply.

In some cases, when the arrestor is triggered, the DC supply can maintain it in a state of protection and ultimately damage the arrestor.

An additional protection is added to this type of line.

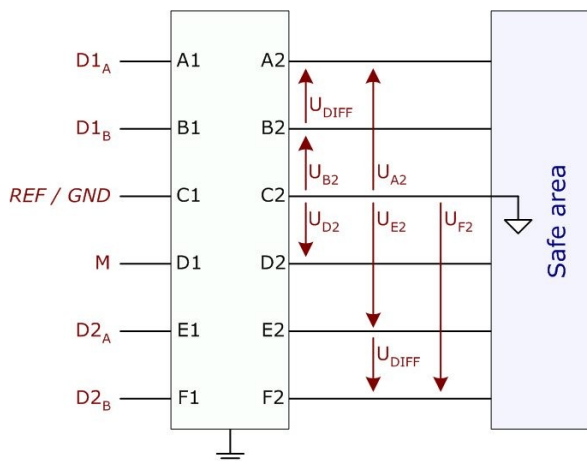
Protection levels

The arrestor protection level indicates its maximum operating voltage without tripping.

This voltage, called U_c , is the maximum steady state voltage.

For proper operation, the D1, D2 and M lines voltages (U_{A2} to U_{F2}) must remain within the limits of $\pm U_c$ (REF line used as the reference).

The voltage between the D1 and D2 lines (U_{DIFF}) must also remain within the limits of $\pm U_c$.



At the triggering of the arrestor, the voltage of D1, D2 and M lines rises above the voltage U_c . This voltage is called the clamping voltage U_R .

Reference SP-112-1x

U_c voltage	18 V _{DC} (12 V _{AC})
U_R clamping voltage	21,1 V min. 22,0 V typ. 29,2 V max.

Reference SP-112-2x

U_c voltage	24 V _{DC} (16,5 V _{AC})
U_R clamping voltage	28,1 V min. 29,4 V typ. 38,9 V max.

Reference SP-112-31

U_c voltage	48 V _{DC} (33 V _{AC})
U_R clamping voltage	56,1 V min. 60,1 V typ. 77,4 V max.

Reference SP-112-41

U_c voltage	75 V _{DC} (50 V _{AC})
U_R clamping voltage	92,1 V min. 99,0 V typ. 121,0 V max.

'Signal' lines protection (D1, D2)

The D1 and D2 lines can be connected to an analog or digital signal, as an input or an output.

Their operating voltage is between $+U_c$ and $-U_c$.

The arrester adds a serial resistance of 0.4Ω .

'Mixed' lines protection (M)

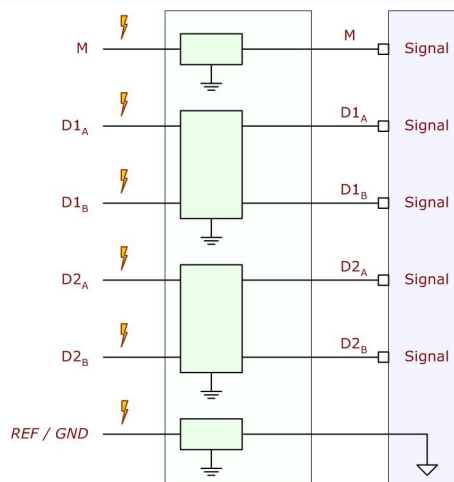
The M line is a signal.

References SP-112-x1

The M line can be connected to an analog or digital signal, as an input or an output.

Its operating voltage is between $+U_c$ and $-U_c$.

The arrester adds a serial resistance of 0.4Ω to this line.



The M line is a power supply.

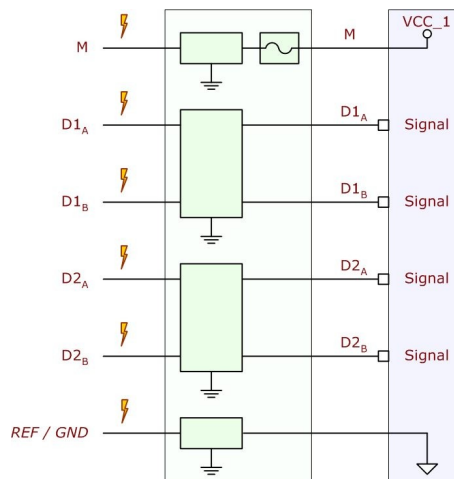
References SP-112-x2

The M line has an additional thermal protection.

In some cases, a power supply can prevent the SPD to return to its resting state after tripping due to overvoltage.

The supply voltage is between $+U_c$ and $-U_c$.

The arrester adds a serial resistance of 0.8Ω on a supply line.



Earth connection

The SP-112 is connected to the Earth via the DIN rail on which it is mounted.

The user will care to check that:

- DIN rail is in good condition
- The DIN rail is properly connected to the Earth.
- SP-112 module is well fixed on the DIN rail



Without connection to the Earth, the surge protection is ineffective.

Inserted impedance

SP-112 arrester is designed for low frequency equipment.

It shall be preferred for use with signals of frequency less than 10kHz.

The user will care to check the impact of the added impedance by the SPD on its application.

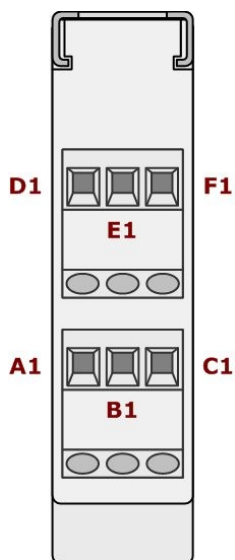
	« Reference » line « Signal » line	« Supply » line
DC	0,4 Ω	0,8 Ω
1 kHz	1,8 Ω	2,2 Ω
3 kHz	4,6 Ω	5,0 Ω
10 kHz	14,3 Ω	14,7 Ω

Connections

The connections A1 to F1 have to be connected to the equipment that may be exposed to electrical disturbances (lightning, power switching ...).

The connections A2 to F2 are connected to the protected equipment. These connections should be as short as possible.

Line	Non-protected pin	Protected pin
D1 _A	A1	A2
D1 _B	B1	B2
REF	C1	C2
M	D1	D2
D2 _A	E1	E2
D2 _B	F1	F2



Top view



Front view