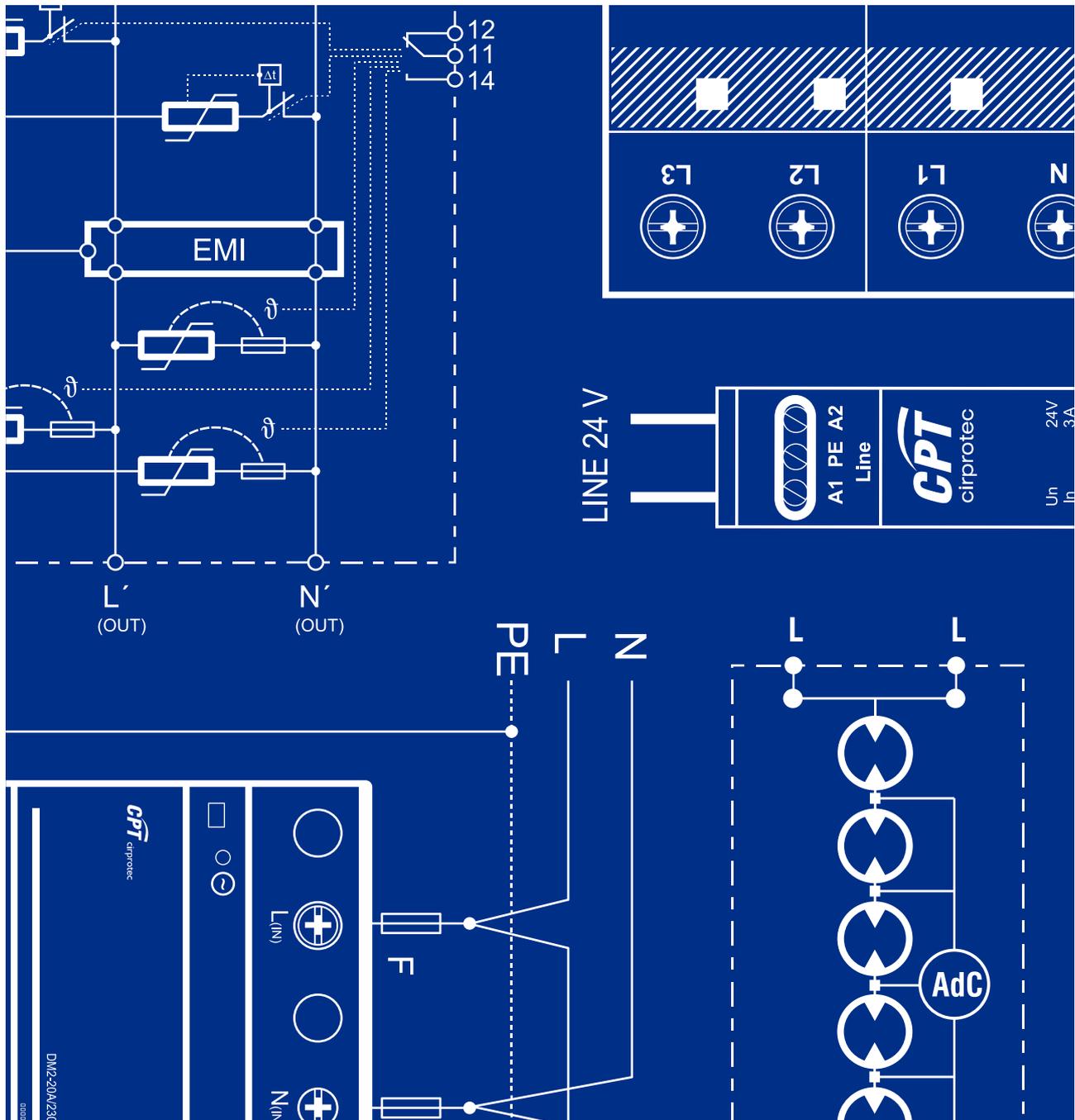
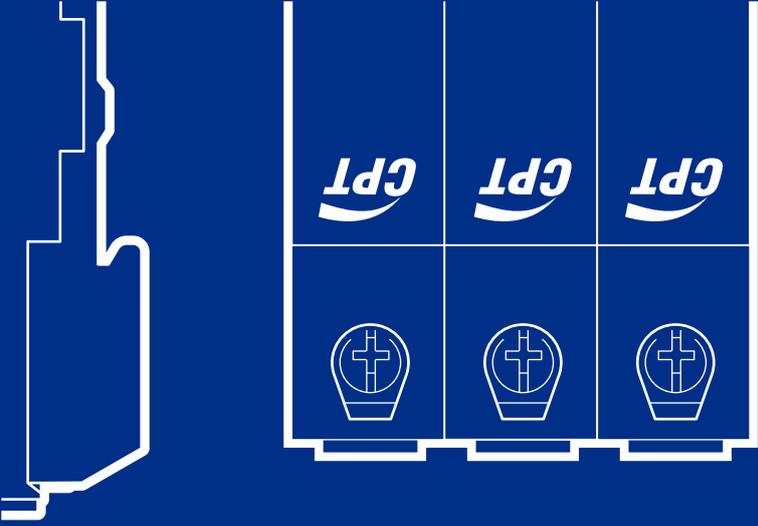


Power Distribution and Protection

Circuit Protection



Surge Protection

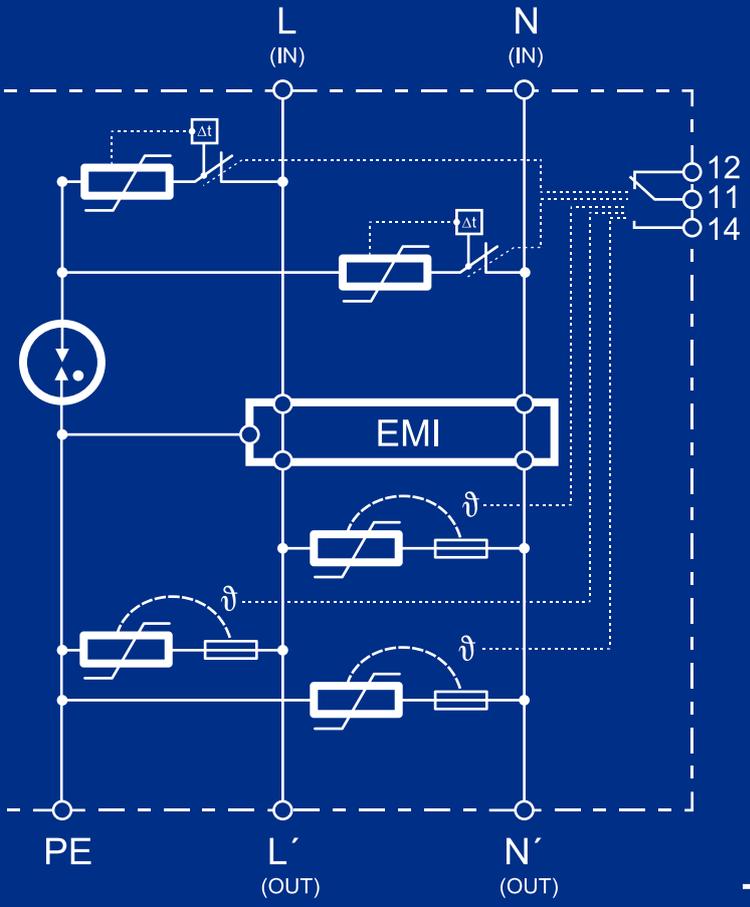


15 kA	x
275 V~	
5 kA	
≤1,2 kV	
1-20-230	



I_{max} 15 kA
 U_c 275/440 V~
 I_n 5 kA
 U_p ≤ 1,2/1,5 kV
 SDS4-20-400

CPT
 circuitec
 NHP
 MOD6
 Circuitec
 Inside

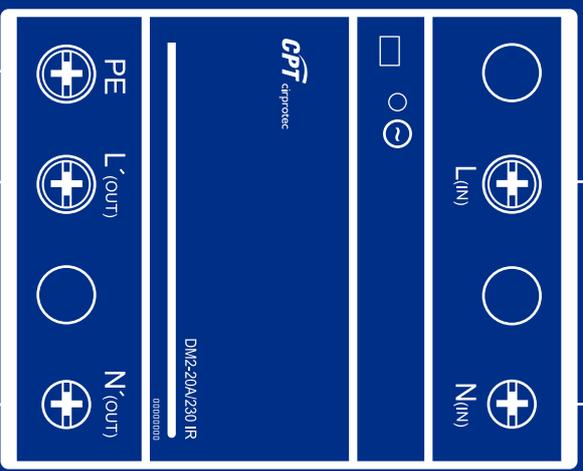
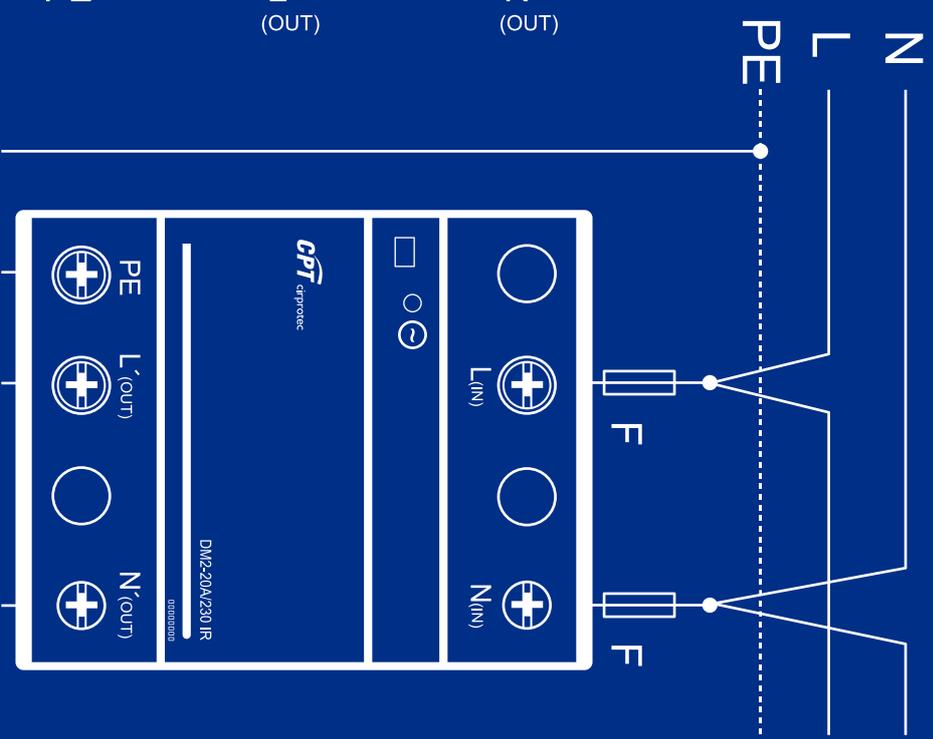


LINE 24 V

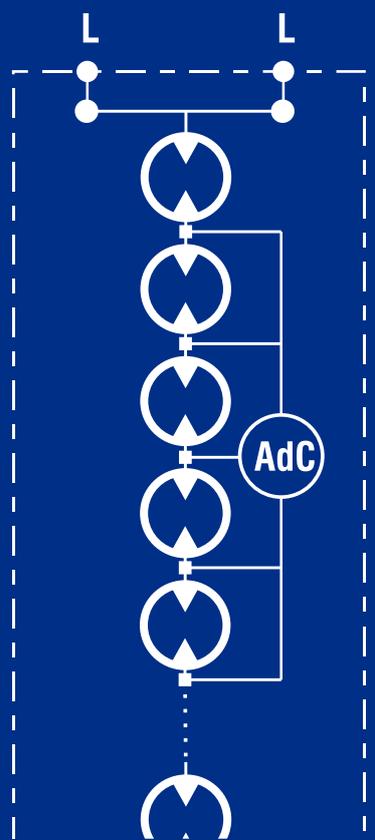


U_n 24V
 I_n 3A
 I_{max} 10kA
 U_p <45V

DIN 24V-3A
 77 840 927 CE



DM2-20A/230 IR



A1 PE Line

CPT
 circuitec

U_n
 I_n
 I_{max}
 U_p

DIN 24V
 77 840 927

Equipm
 A1 PE

4 Surge Protection

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Introduction to Surge Protection

What are surges?

Surges are transient over voltages that can reach tens of kilovolts with durations in the order of microseconds. Despite their short duration, the high energy content can cause serious problems to equipment connected to the line like premature aging of electronic components, equipment failure or disruptions to service and financial loss.

Origin of surges

Lightning: The most destructive source of surge. Based on the IEC 61643-12 standard, energy from lightning can reach up to 200 kA. However for reference, estimates indicate 65 % are less than 20 kA and 85% are less than 35 kA.

Induction: Sources include cloud to cloud lightning or nearby lightning impacts where the current flow induces an over voltage on supply lines or other metallic conductors.

There is no way of really knowing when, where, the size, or the duration/waveform of a surge. Therefore within the Standards some assumptions have been made and 2 main waveforms have been chosen to simulate different surge events:

Types of Surges

Conduction

Conduction or 10/350 μ s simulates energy from lightning direct impact

Induction

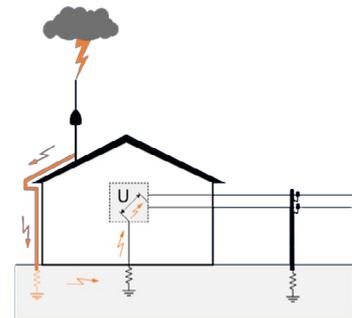
Induction or 8/20 μ s simulates energy from indirect lightning impact

Important

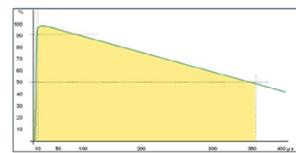
Don't confuse this kA rating with the fault levels of the installation. Fault ratings given by the transformer are kA for 1 second. Surge kA rates are for microseconds. Protection in front of surge will be based on this statement.



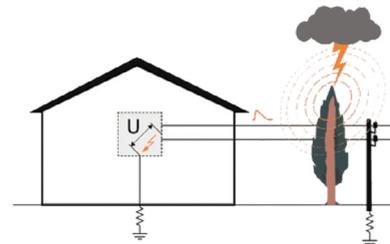
Conduction



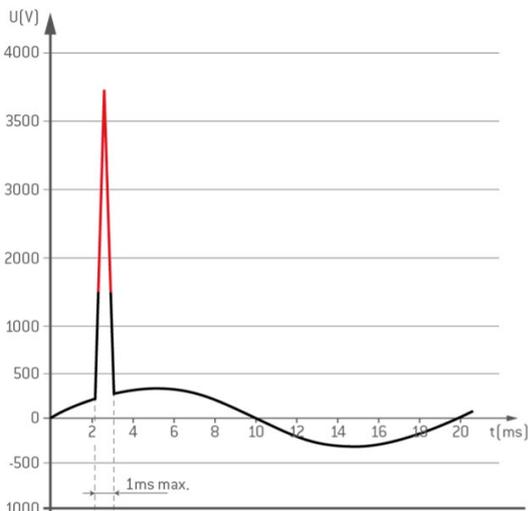
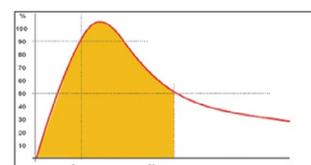
Current wave 10/350



Induction



Current wave 8/20





Internal sources: These are the main source of surge in real life

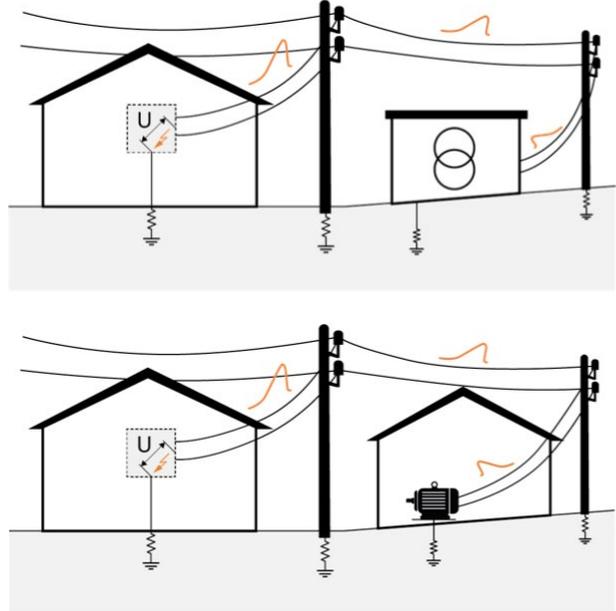
They come from utility grid switching, disconnection of motors or other inductive loads. Energy from these sources is also analysed with the 8/20 wave form.

Transient over voltages do not occur solely in power distribution lines, and are also common in any line formed by metal conductors, such as telephony, communications, measurement and data.

Protector in front of surges: SPD (Surge Protection Device)

A transient over voltage protection device acts as a voltage controlled switch and is installed between the active conductors and ground in parallel with the equipment to be protected. When the supply voltage is lower than its activation voltage, the protector acts as a high-impedance element so that no current flows through it. When the supply voltage is higher than the activation voltage, the protector acts as an element with impedance close to zero, diverting the over voltage to earth and preventing it from affecting equipment downstream.

Nevertheless, in the terminals of the SPD there will always be a residual voltage (U_{res}) which is not a fixed rate. Higher surge current leads to higher residual voltage. To protect your electrical equipment the residual voltage across the SPD, including the wires and connections, needs to be less than the over voltage withstand of the equipment.



Above
Electrical surge created by switching utility grid.

Bottom
Electrical surge created when discounting electrical motors.

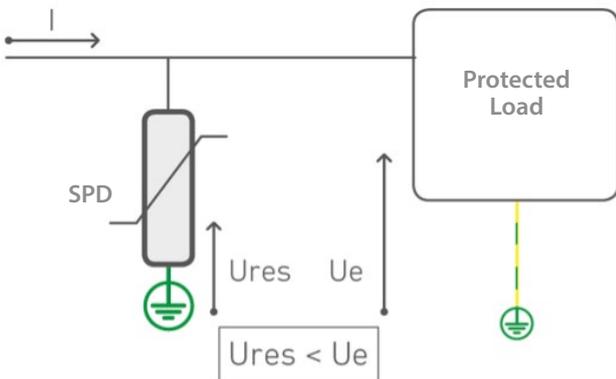
Surge Protection

3P or 4P? When is the N-PE pole required

Surge Protection Devices (SPDs) are installed in parallel upstream from electrical equipment in a position such that, during any excessive voltage event, the SPD will act as a low-impedance path to earth. This channels the high voltage energy away from the downstream equipment before its voltage withstand rating is exceeded thus avoiding damage.

A common enquiry regarding SPDs is the distinction between the application of 3 pole and 4 pole devices. In the case of TN-C-S wiring systems, the neutral conductor is directly connected to earth (MEN link). Should an SPD be installed within 10 metres of this MEN link, only a 3 pole device is required. The additional N-PE pole provided by 4 pole devices is made redundant in this situation as there is already a path to earth through the neutral via the MEN link. This has been further clarified and confirmed in AS/NZS1768. Reference 5.6.3.7

However, if an SPD is installed further than 10 metres from a MEN link, a 4 pole SPD is required. As the impedance to earth increases with cable length, a surge energy now has the potential to enter the network after the MEN link and damage the downstream equipment.



I: peak current.
 U_{res} : voltage protection level.
 Residual voltage at I_n .
 U_e : impulse voltage the equipment can withstand

Classification of protectors

Protection devices are classified into types according to discharge capacity:

Type 1:

- Tested with a 10/350 μ s waveform (Class I test), which simulates the current produced by a direct lightning strike.
- Ability to discharge very high currents to earth, providing a high U_p - voltage protection level.
- Must be accompanied by downstream Type 2 protectors. Designed for use in incoming power supply panels where the risk of lightning strike is high, for example in buildings with an external protection system.

Type 2:

- Tested with a 8/20 μ s waveform (Class II test), which simulates the current produced in the event of a switching or lightning strike on the distribution line or its vicinity.
- Ability to discharge high currents to earth, providing a medium U_p - voltage protection level. Designed for use in distribution panels located downstream of Type 1 protectors or in incoming power supply panels in areas with low exposure to lightning strikes.

Type 3:

- Tested with a combined 1.2/50 μ s - 8/20 μ s waveform (Class III test), which simulates the current and voltage that can reach the equipment to be protected.
- Ability to discharge medium currents to earth, providing a low U_p - voltage protection level. Always installed downstream of a Type 2 protection designed to protect sensitive equipment or equipment located more than 20m downstream of the Type 2 device.

The technology can provide protection solutions that combine different types of protection: Type 1+2 and Type 2+3.



Important Note

UL1449 uses similar parameter units, however the tests are different giving different results. When assessing SPDs ensure you are comparing IEC parameters with IEC parameters. Don't mix standards.

SPD features based on the IEC 61643 standard

Protector parameters

U_p Level of protection	Maximum residual voltage between the terminals of the protection device during the application of a peak current.
I_n Nominal current	Peak current in 8/20 μ s waveform the protection device can withstand 15 times without reaching end of life.
I_{max} Maximum discharge current	Peak current with 8/20 μ s waveform which the protection device can withstand.
U_c Maximum continuous operating voltage	Maximum effective voltage that can be applied permanently to the terminals of the protection device.
I_{imp} Impulse current	Peak current with 10/350 μ s waveform which the protection device can withstand without reaching end of life.



SPD placement in your design

Where to start the protection design?

As the origin of the installation, the main switchboard is the place to start the design of SPDs on the network.

How to start the protection design?

As previously stated, the SPD protection design does not depend on the fault ratings given by the transformer it only depends on the level of exposure in front of surge. So, what SPD do we have to install in the main switchboard?

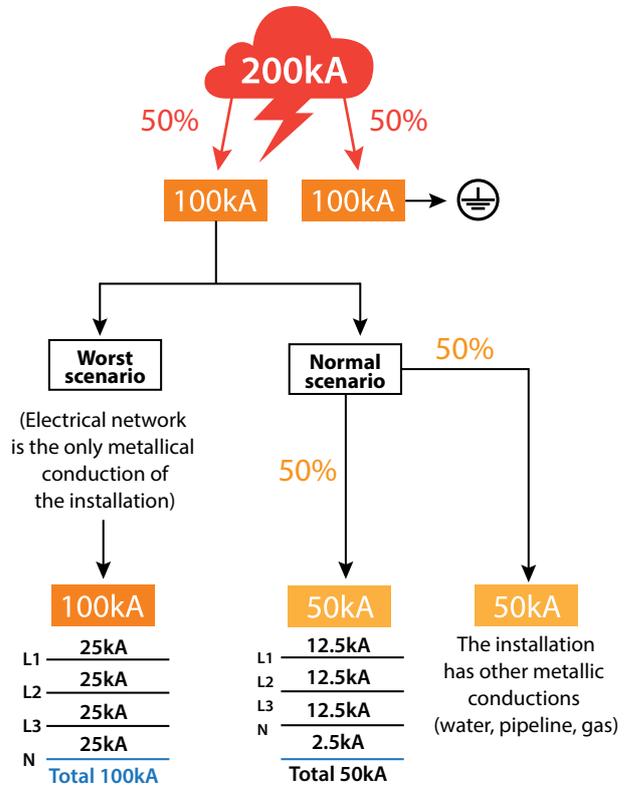
See the diagram, to the right, from IEC 63205-1 standard which displays the dispersion of the highest lightning considered: 200kA @ 10/350µs.

In the worst case scenario, 50% of this energy is conducted away to earth leaving 100kA potential across the networks 3 phase and neutral.

Here a 25kA @ 10/350µs (I_{imp}) Type 1 SPD is highly recommended for cases when a lightning strikes on or close to the building's earth connection – in particular when a building has a lightning rod.

In the "Normal Scenario" it is assumed any direct lightning strike to the network will be at such a distance from the installation that another 50% of the energy is dispersed to earth via other conductors before entering your point of connection. In this scenario a device with a 12.5kA @ 10/350µs (I_{imp}) Type 1 is recommended. Furthermore, based on the IEC 61643-12 standard, 12.5 kA is the minimum kA rating when a Type 1 is needed.

If the level of exposure of the installation is lower than above described scenarios Type 2 SPD (I_{max}) may be considered along with risk and cost of equipment and downtime.



Do we have to consider more SPDs in the distribution boards?

The IEC 60634-4-443 standard classifies electrical devices in categories, depending on how sensitive they are to the surge over voltage (U_e). Category 1 devices (electronic receivers) are the most sensitive, U_e has to be at least 1.5 kV. Whereas category 4 devices can withstand 6kV or more. Generally, components in main switchboards are category 4 devices ie ACB, MCCB etc.

Category	IV	III	II	I
230/400 lines	Counters / MCCB / ACB	MCBs and RCCDs	Electrical devices	Electronic receivers
Example				
Impulse voltage withstand	6kV	4kV	2.5kV	1.5kV



Then, let's consider an example below, where a Type 1+2 SPD is installed in the main distribution board of an installation. Following chart analysis, the status of the SPD, the status of the category 1 loads (the most sensitive U_e : 1.5 kV) in front of different surge scenarios:

$I_{imp} = 25 \text{ kA}$
 $I_{max} = 100 \text{ kA}$
 $I_n = 25 \text{ kA}$
 $U_p \leq 1.5 \text{ kV}$

$U_e = 1.5 \text{ kV}$

In accordance with the IEC 61643-11
 Robustness classification for electric and electronic devices according to IEC 60634-4-443



	$\leq 25\text{kA}$		
Surge Example	100kA		
	$>100\text{kA}$		

Statements

- For discharges over the maximum capacity (I_{max}) of the SPD, the loads and the SPD itself will be damaged.
- I_{imp} and I_{max} describe the maximum surge level the SPD itself can withstand but do not describe the protection.
- Only I_n describes the level of protection as at I_n the residual voltage, U_p , is seen.
- As surges may be induced in cable between the main switchboard and distribution board or by the final loads themselves, a SPD in the main switchboard may not be close enough to direct a surge in time to protect other final loads.

Conclusions

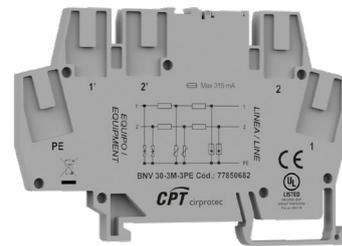
- With just one stage of protection only equipment close to the SPD is protected and only up to a surge of I_n .
- To improve the protection possibilities, at least, a second stage of protection in a distribution board is a must. This SPD design is called cascading protection.

Do I need to install a third stage of surge protection devices?

A third stage of surge protection installed at the final load may be considered depending on what loads it, how critical, expensive, cost of downtime and sensitive it is. If the cost of the equipment and/or downtime is high then installing a third stage Type 3 (1.5/50 μs) device will further reduce the risk of any last surge energy getting to your equipment.

Examples of applications that should include a 3rd stage of surge protection are:

- Hospitals
- Data Centres
- Airports
- Banking and Insurance
- Transportation

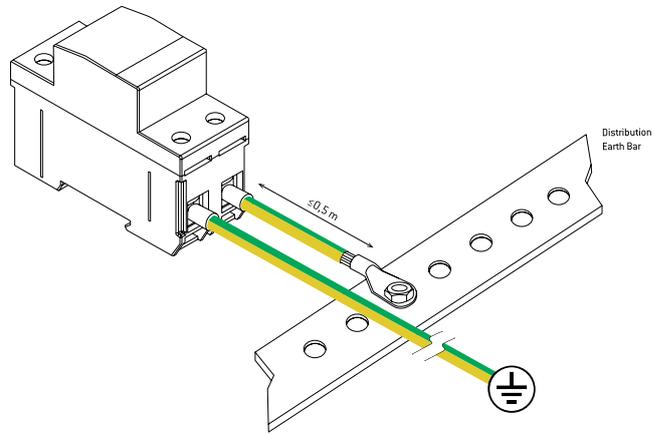




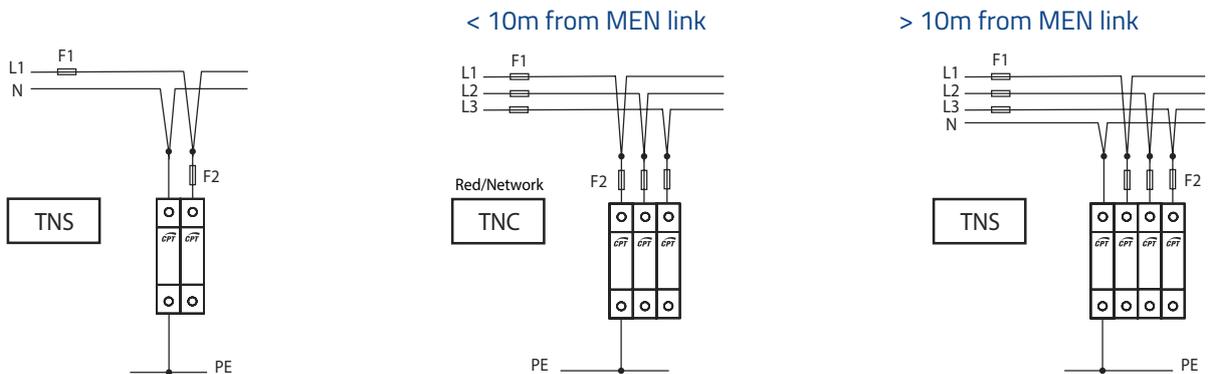
Recommended lengths and connection types according to 61643-12

In order to achieve optimum over voltage protection, connecting conductors of SPDs shall be as short as possible. Long lead lengths will degrade the protection offered by the SPD.

When connecting an SPD in parallel, the optimal connection is a "V-type" (see image to the below). Whenever this is not feasible, the maximum derivation cable length should be less than 0.5 m.



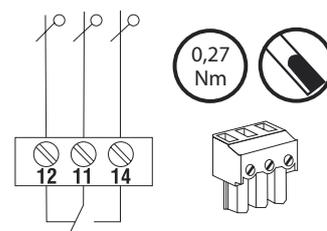
Wiring, general considerations (lengths and sections)



	STRANDED	RIGID
Type of wire		
\varnothing min. L,N,PE	6mm ²	
\varnothing max. L,N,PE	25 mm ²	35 mm ²

When do you have to install a back-up fuse or circuit breaker*

Range	Maximum back-up rating according to manufacturer		Recommend back up protection
PSC T12 25 I_{imp} 25 kA	If F1 > 315 A then ↓ F2 315 A	If F1 ≤ 315A then ↓ F2 not required*	250 A gG ¹⁾
PSC T12 12,5 I_{imp} 12,5 kA	F1 > 200 A ↓ F2 200 A	If F1 ≤ 200A then ↓ F2 not required*	160 A gG ¹⁾
PSM T2 40 I_{max} 40 kA	F1 > 125 A ↓ F2 125 A	If F1 ≤ 125A then ↓ F2 not required*	63 A MCB ²⁾
PSM T2 20 I_{max} 20 kA	F1 > 80 A ↓ F2 80 A	If F1 ≤ 80A then ↓ F2 not required*	32 A MCB ²⁾



	U_{max} / I_{max}
AC	250V / 1A
DC	125V / 0,2A



max 1,5 mm²
min 0,05 mm²

(1) Fuse rating recommended in IEC 61643 for Type 1 SPD

(2) Tested MCB ratings to I_n and I_{max}

* If the main circuit breaker has a rating less than the maximum required by the SPD, then additional protection is not required.



For further information on key SPD ratings to IEC 61643, as well as UL 1449 and AS 1768 please see the whitepaper: 'Exposing the confusion of key surge parameters'

Surge Protection

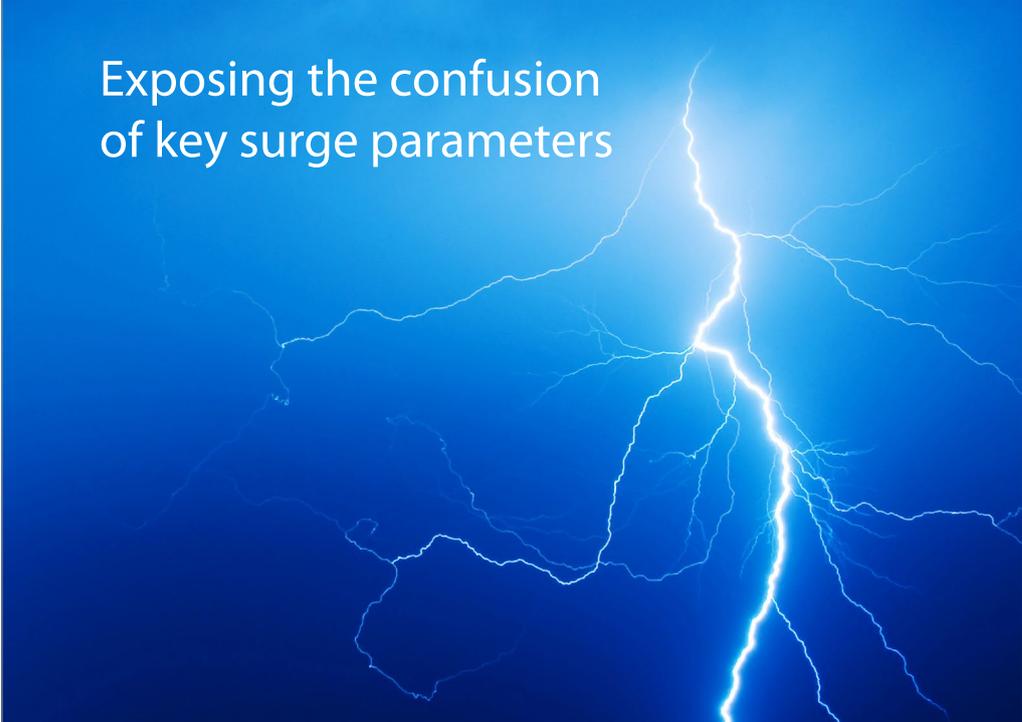
Issue #60 - May 2011



Technical News

INDUSTRIAL SWITCHGEAR & AUTOMATION SPECIALISTS

Exposing the confusion of key surge parameters



Written by Wes Stephenson
Product Manager - Power Quality

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Surge Protection Selection Guide

IEC 61439

**Type 1 + 2 -
PSC**
**Type 2 -
PSM**
**Type 2 + 3 -
DM with
EMI Filter**
**Final Stage
Surge
Protection**


Location	First step of protection	Second step of protection	Final stage of protection (very fine)	Final stage of protection (very fine)
SPD Type	Type 1 + 2 SPD to IEC / EN 61643	Type 2 SPD to IEC / EN 61643	Type 2 + 3 SPD to IEC / EN 61643	Type 3 SPD to IEC / EN 61643
IIMP (10 / 350 μS)	12.5kA 25kA	—	—	—
IMAX (8 / 20 μS)	65kA 100kA	40 kA	20 kA	20 kA 10 kA 6 kA
IN (8 / 20 MS)	20kA 25kA	20 kA	10 kA	10 kA 5 kA 3 kA
UOC (1,2 / 50 μS)	—	—	6 kV	10 kV 6 kV
Special Features	<ul style="list-style-type: none"> • ELV: Extra Low Voltage models available • Reversible and coded cartridges 	<ul style="list-style-type: none"> • ELV: Extra Low Voltage models available • Reversible and coded cartridges 	<ul style="list-style-type: none"> • Filter attenuation up to 82 dB (common mode) vs electromagnetic disturbances • Rated current load up to 20 A 	<ul style="list-style-type: none"> • Power Line communication friendly solutions (LCF)

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**Solar
PV-Rated
Surge
Protection**



**MOD6
Electrical
Network
Diverters**



**UL 1449 -
TVSS**

**CPS Block
Plus**



**CPS Nano
Plus**



For DC photovoltaic applications

Second step of protection

Type 2 DC to EN-50539-11 UTE C 61740-51 UL 1449 3rd Ed. Recognised

Type 2 SPD to IEC / EN 61643

–

–

40 kA

40 kA
20 kA

20 kA

20 kA
10 kA

–

–

- Iscpv = 10 kA (no back-up fuse needed)
- SCCR 100 kA and 50 kA
- Reversible and coded cartridges

- Monoblock construction

41

45

Location

First step of protection

Second step of protection

Class

1

2

IIMP (10 / 350 µS)

–

–

UL IMAX (8 / 20 µS)

120 kA
160 kA
200 kA
240 kA

UL IN (8 / 20 MS)

–

40 kA
60 kA
80 kA
120 kA
160 kA

UOC (1,2 / 50 µS)

–

–

Special Features

- Intelligent aging display
- Surge counter
- EMI / RFI filter (-40 dB)
- Wall or flush mounting

- EMI / RFI filter (≤40 dB)
- Wall or flush mounting

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Surge Protection Selection Process

Main Switchboard

First Stage of Surge Protection



Does the building have external lightning protection? (A lightning rod)

YES →

NO ↓

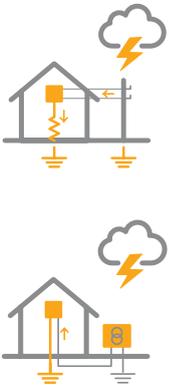
Type 1 + 2 PSC - 25 kA



Parameters per Range

I_{imp}	25 kA
I_{max}	100 kA
I_{msc}	200 kA
I_n	20 kA
U_p	< 1.3 kV

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Does your building have overhead supply or is in a region with great than 2.2 lightning flashers per km² per year*?

YES →

NO ↓

Type 1 + 2 PSC - 12.5 kA



Consider upgrading to I_{imp} 25 kA

Parameters per Range

I_{imp}	12.5 kA
I_{max}	65 kA
I_n	20 kA
U_p	< 1.3 kV

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Underground mains supply

YES →

Type 2 PSM - 40 kA



Parameters per Range

I_{max}	40 kA
I_n	20 kA
U_p	< 1.3 kV

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Distribution Switchboard

Second Stage of Surge Protection

Type 2 PSM - 40 kA



Parameters per Range

I_{max}	40 kA
I_n	20 kA
U_p	< 1.3 kV

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Type 2 PSM - 20 kA



Parameters per Range

I_{max}	20 kA
I_n	10 kA
U_p	< 1.3 kV

Page Number **25**

*Check the lightning density in your region here:

Australia:
http://www.bom.gov.au/jsp/ncc/climate_averages/thunder-lightning/index.jsp

New Zealand:
https://statisticsnz.shinyapps.io/lightning_strikes/

Based on Australia and New Zealand's Main Electrical supply of 230 / 400 V AC. For other voltages, please contact NHP.

Type 1 + 2 - PSC



- ✓ PSC is the range of combined devices for discharging lightning currents (Type 1 / Class I), and protecting against induced transient overvoltages (Type 2 / Class II), in accordance with IEC 61643-11
- ✓ DIN rail plug-in format
- ✓ Suitable as the first step of protection in incoming power supply panels and areas with greater exposure to the atmosphere, where installations are usually provided with an external lightning protection system
- ✓ Discharges impulse currents with a 10 / 350 μ s waveform. Iimp: 25 kA, 12.5 kA per phase
- ✓ Remote and visual indication of protection device life status
- ✓ Reversible chassis to allow cable entry from above or below. Mechanically polarised cartridges depending on the network voltage, to avoid possible cartridge replacement errors
- ✓ Biconnect - two types of terminal: for rigid or flexible cable and for fork type comb busbar



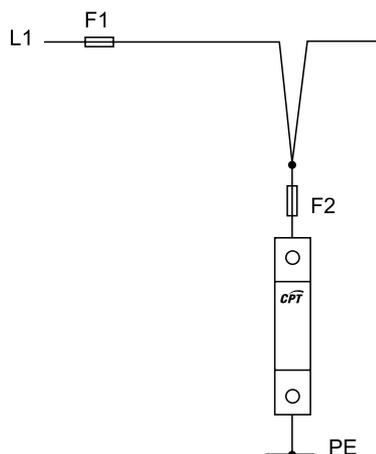
General

Protection Class	1 + 2	
Protection Classification Standard	IEC 61643-1 EN 61643-11	
Certifications	CE	
Visual End Of Life Indication	Yes	
Remote Contacts For End Of Life Monitoring	Yes	
Monitoring Contact Configuration	1 CO	
Frequency	50 / 60	Hz
tA, Response Time (L - N)	25	ns
tA, Response Time (N - PE)	100	ns
Maximum Operating Temperature	80	°C max
Minimum Operating Temperature	-40	°C min
Replaceable Modules	Yes	
Icc, Current, Short Circuit Withstand	25	kA
IEC Recommended Fuse Current Rating	315	A
Technology	L- N Metal Oxide Varistor (MOV) N-PE Gas Discharge	

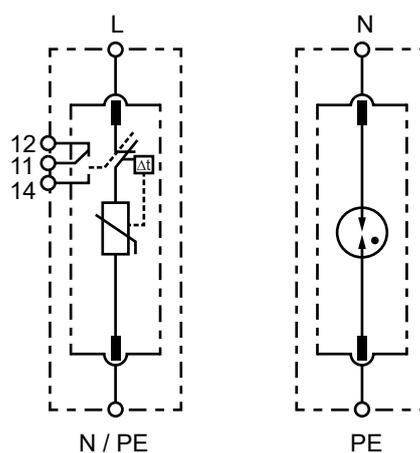
Note: Remote monitoring not applicable to Neutral SPD devices

Connection / Circuit Diagrams

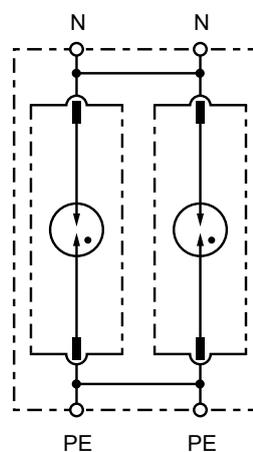
1 Pole PSC Connection



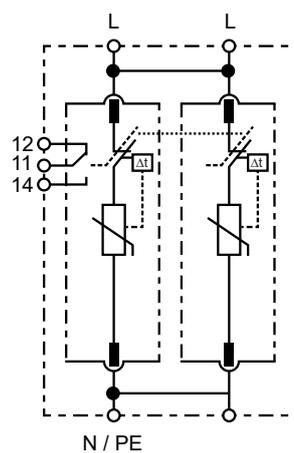
1 Pole PSC 12.5 Internal Configuration



1 Pole PSC 25 Internal Configuration

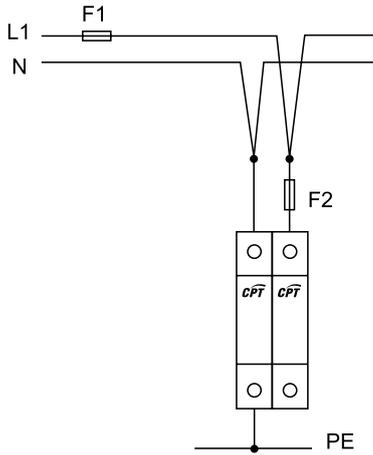


1 Pole PSC 25 Internal Configuration

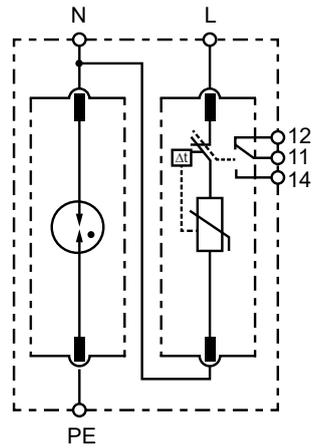




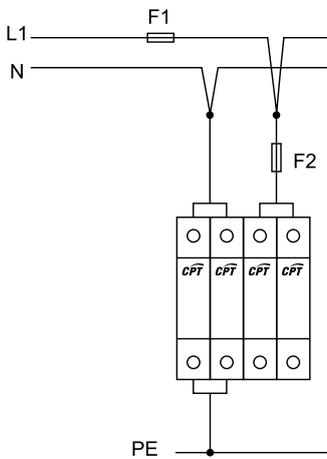
2 Pole PSC 12.5 Connection



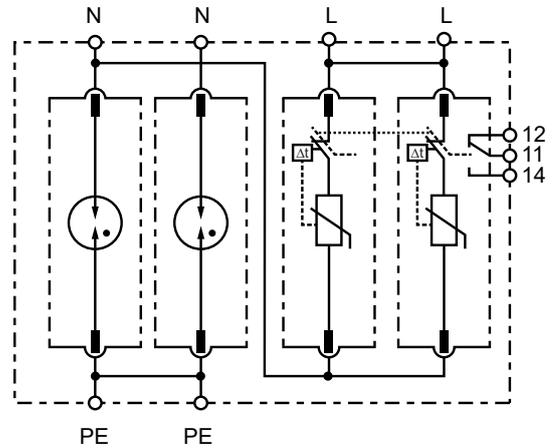
2 Pole PSC 12.5 Internal Configuration



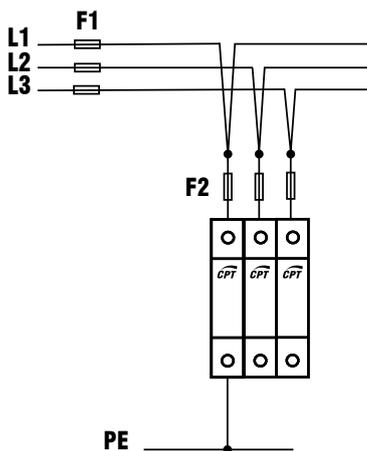
2 Pole PSC 25 Connection



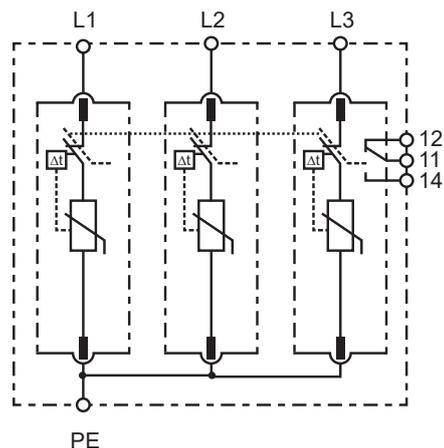
2 Pole PSC 25 Internal Configuration



3 Pole PSC 12.5 Connection

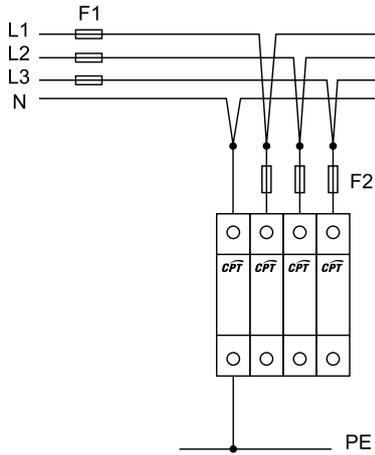


3 Pole PSC 12.5 Internal Configuration

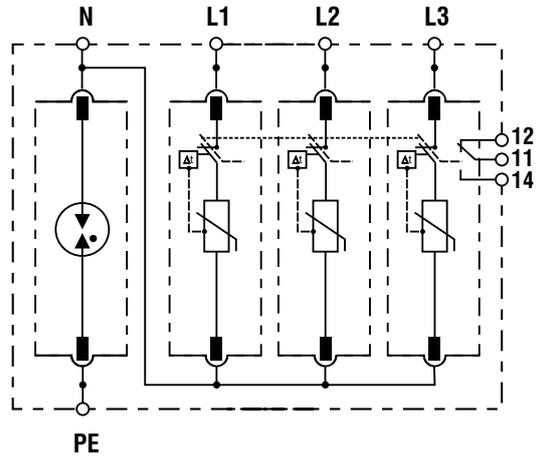




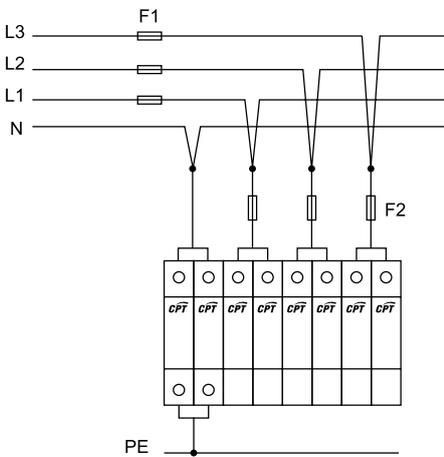
4 Pole PSC 12.5 Connection



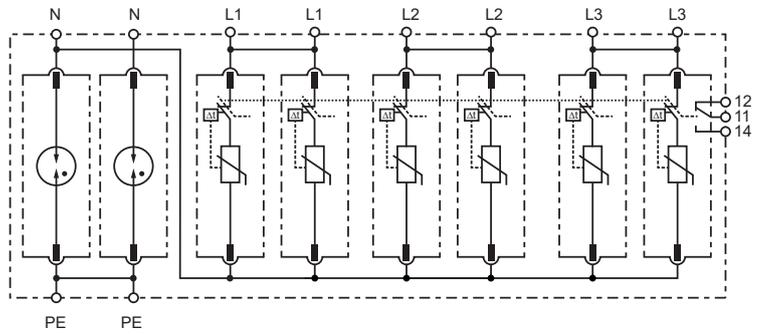
4 Pole PSC 12.5 Configuration



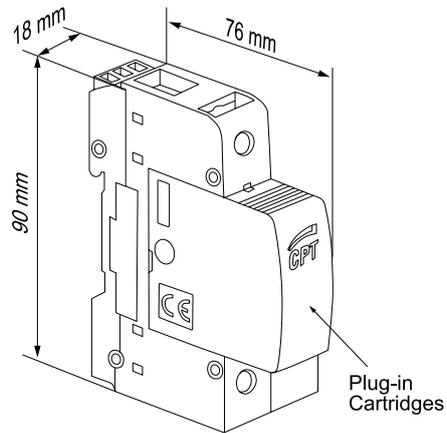
4 Pole PSC 25 Connection



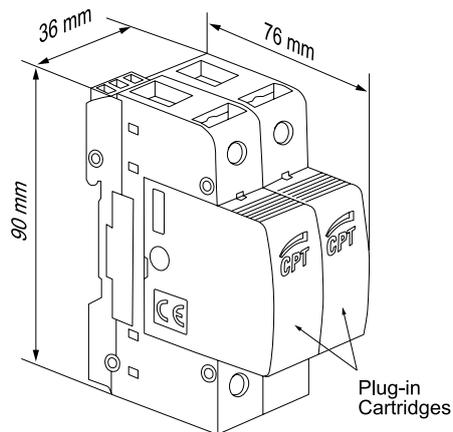
4 Pole PSC 25 Internal Configuration



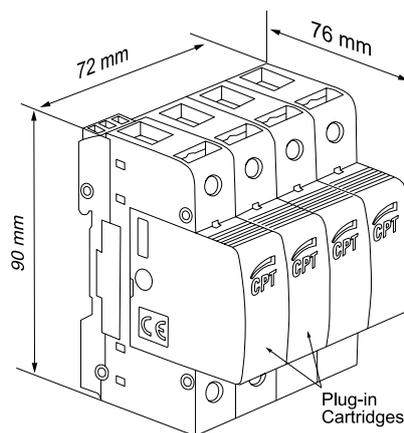
Dimensions for 1 Pole PSC 12.5 (mm)



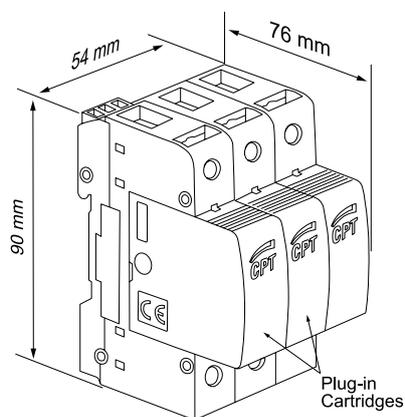
Dimensions for 1 Pole PSC 25 or 2 Pole PSC 12.5 (mm)



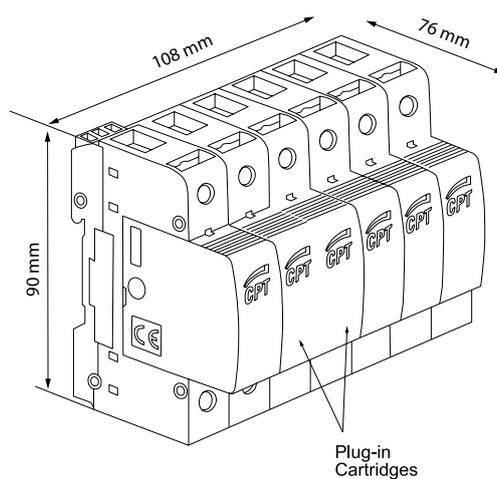
Dimensions for 2 Pole PSC 25 or 4 Pole PSC 12.5 (mm)



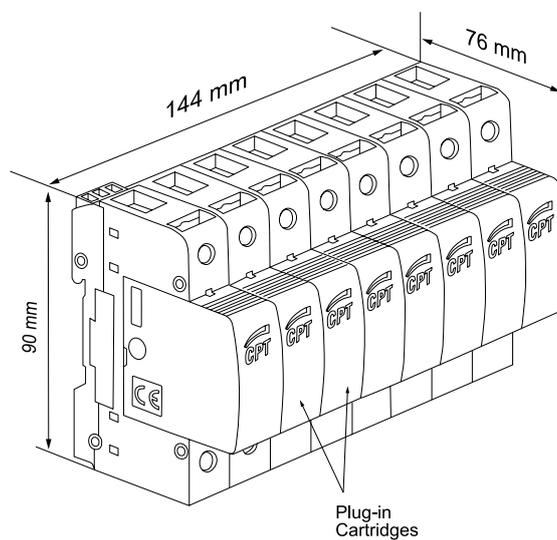
Dimensions for 3 Pole PSC 12.5 (mm)



Dimensions for 3 Pole PSC 25 (mm)



Dimensions for 4 Pole PSC 25 (mm)





Poles	No. of DIN Modules	Protection Modes	I_{imp} N - PE / L - N (kA)	I_{max} N - PE / L - N (kA)	I_n N - PE / L - N (kA)	U_n , L - L / L - N (V AC)	U_p (kV @ I_n)	Catalogue No.
1	1	N - PE	25	65	25	Neutral	≤1.5	CPTPSC125N
1	1	N - PE	50	65	50	Neutral	≤1.5	CPTPSC150N
1	2	N - PE	100	100	50	Neutral	≤1.5	CPTPSC1100N
1	1	L - N	12.5	65	20	230	≤1.3	CPTPSC112230IR
1	2	L - N	25	100	25	230	≤1.5	CPTPSC125230IR
2	2	L + N - PE	25 / 12.5	65 / 65	25 / 20	400 / 230	≤1.3 L-N ≤1.5 N-PE	CPTPSC212230IR
2	4	L + N - PE	50 / 25	100 / 100	50 / 25	400 / 230	≤1.5	CPTPSC225230IR
3	3	L + L + L + N	12	65	20	400 / 230	≤1.3	CPTPSC312400IR
3	6	L + L + L + N	25	100	25	400 / 230	1.5	CPTPSC325400IR
4	4	L + L + L + N - PE	50 / 12.5	65 / 65	50 / 20	400 / 230	≤1.3 L-N ≤1.5 N-PE	CPTPSC412400IR
4	8	L + L + L + N - PE	100 / 25	100 / 100	50 / 25	400 / 230	≤1.5	CPTPSC425400IR



Voltage Ratings

U_n, Nominal Voltage, AC, L - L	400	V AC
U_n, Nominal Voltage, AC, L - N / PE	230	V AC
U_c, Continuous Operating Voltage, AC, Max	255, 275	V AC
U_c, Continuous Operating Voltage, DC, Max	–	V DC

Environmental

Operating Temperature	-40 / 80	°C
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Physical

Colour	Light Grey	
IP Rating	IP20	
Mounting	DIN-35 Rail Mount	
Tightening Torque, Nominal	4	Nm
Flex Cable, Max	25 mm ²	max
Flex Cable, Min	6 mm ²	min
Rigid Cable, Max	35 mm ²	max
Rigid Cable, Min	6 mm ²	min

Dimensions

Depth (mm)	Height (mm)	Width (mm)	Weight (kg)	Catalogue No.
76	90	18	0.115	CPTPSC125N
76	90	18	0.148	CPTPSC150N
76	90	36	0.29	CPTPSC1100N
76	90	18	0.178	CPTPSC112230IR
76	90	36	0.341	CPTPSC125230IR
76	90	36	0.278	CPTPSC212230IR
76	90	72	0.7	CPTPSC225230IR
76	90	54	0.49	CPTPSC312400IR
76	90	72	0.49	CPTPSC325400IR
76	90	72	0.624	CPTPSC412400IR
76	90	144	1.263	CPTPSC425400IR

PSC Replacement Modules

1P

Replacement Modules for PSC Surge Protection Devices



Item Description	Catalogue No.
PSC Replacement Module L - N I_{imp} 12.5 kA I_{max} 65 kA 240 V AC	CPTPSC12230MOD
PSC Replacement Module L - N I_{imp} 25 kA I_{max} 100 kA 240 V AC	CPTPSC25230MOD

N - PE

Replacement Modules for PSC Surge Protection Devices



Item Description	Catalogue No.
PSC Replacement Module N - PE I_{imp} 100 kA I_{max} 100 kA	CPTPSC100NMOD
PSC Replacement Module N - PE I_{imp} 50 kA I_{max} 65 kA	CPTPSC50NMOD

Type 2- PSM



- ✓ PSM is the range of devices for discharging induced transient overvoltages (Type 2 / Class II), in accordance with IEC 61643-11
- ✓ DIN rail plug-in format
- ✓ Suitable for the second stage of protection in supply distribution panels in which Type 1 protection devices are installed, or for the first stage of protection in residential, commercial or other applications not exposed to direct strikes and with no external lightning protection system
- ✓ High discharge capacity with an 8 / 20 μ s waveform. Imax: 40 kA or 30 kA
- ✓ Remote and visual indication of life status of the protection device
- ✓ Reversible chassis to allow cable entry from above or below. Mechanically polarised cartridges depending on the network voltage, to avoid possible cartridge replacement errors
- ✓ Biconnect - two types of terminal: for rigid or flexible cable and for fork type comb busbar



General

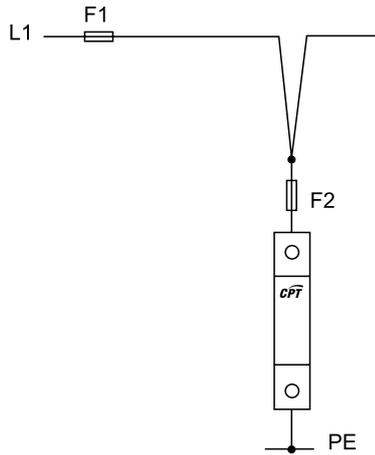
Protection Class	2	
Protection Classification Standard	IEC 61643-1 EN 61643-11	
Certifications	CE RCM	
Visual End Of Life Indication	Yes*	
Remote Contacts For End Of Life Monitoring	No	
Monitoring Contact Configuration	1 CO**	
Frequency	50 / 60	Hz
tA, Response Time (L - N)	25	ns
tA, Response Time (N - PE)	100	ns
Maximum Operating Temperature	80	°C max
Minimum Operating Temperature	-30	°C min
Replaceable Modules	Yes	
Icc, Current, Short Circuit Withstand	25	kA
Technology:	L - N Metal Oxide Varistor (MOV) N-PE Gas Discharge	

* Visual indication not applicable to Neutral SPD devices

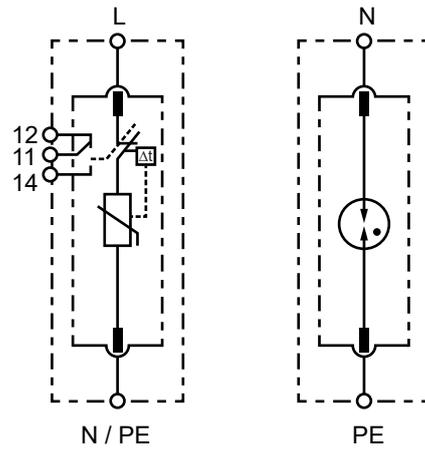
** Remote monitoring not applicable to Neutral and SG SPD devices

Connection / Circuit Diagrams

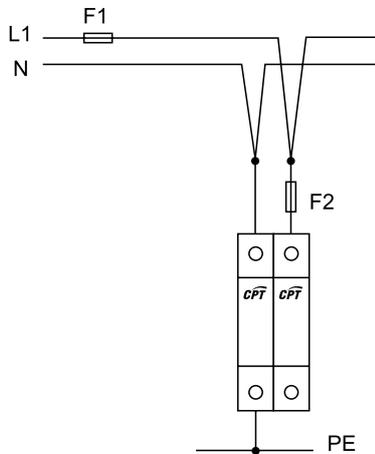
1 Pole PSM Connection



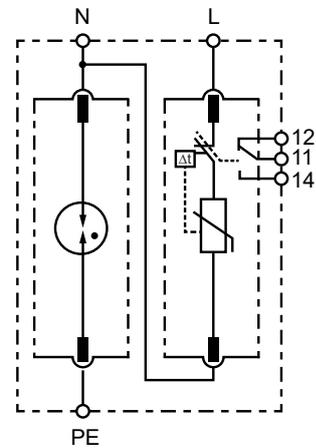
1 Pole PSM Internal Configuration



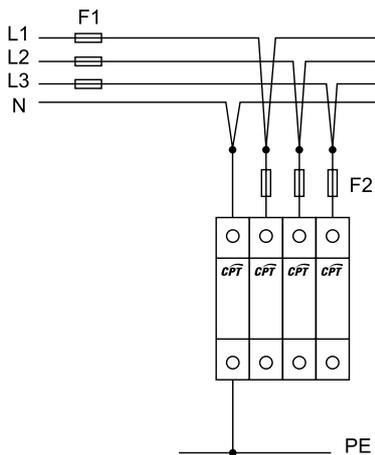
2 Pole PSM Connection



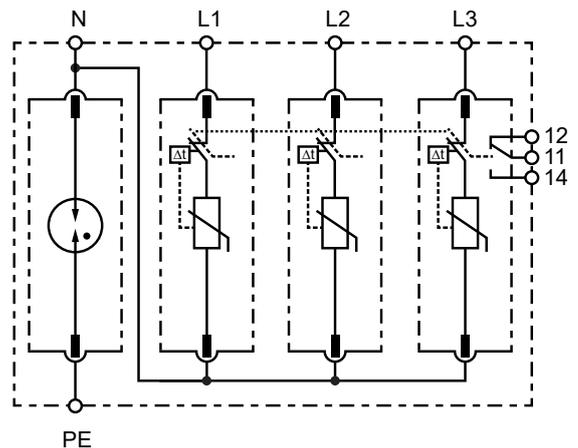
2 Pole PSM Internal Configuration



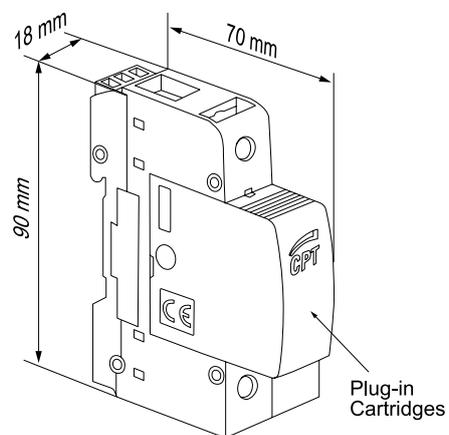
4 Pole PSM Connection



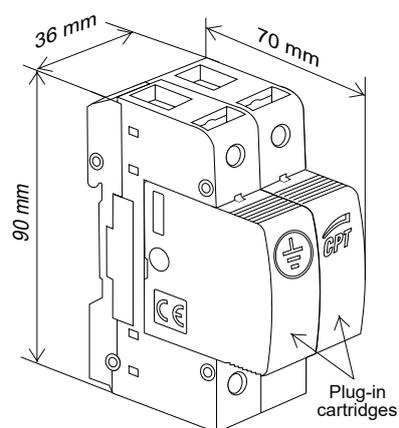
4 Pole PSM Internal Configuration



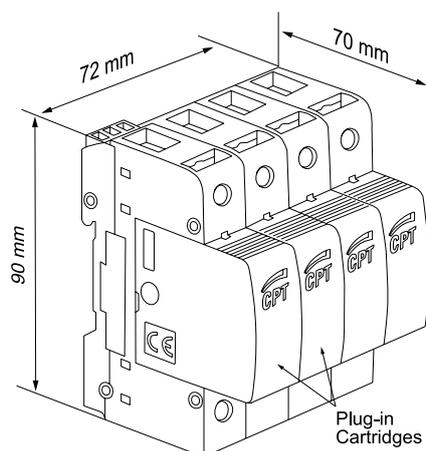
Dimensions for 1 Pole PSM (mm)



Dimensions for 2 Pole PSM (mm)



Dimensions for 4 Pole PSM (mm)





Poles	No. of DIN Modules	Protection Modes	I_{max} N - PE / L - N (kA)	I_n N - PE / L - N (kA)	U_n , L - L / L - N (V AC)	U_p (kV @ I_n)	Catalogue No.
1	1	N - PE	20	10	Neutral	≤1.5	CPTPSM120N
1	1	N - PE	40	20	Neutral	≤1.5	CPTPSM140N
1	1	L - N	20	10	230	≤1.4	CPTPSM120230IR
1	1	L - N	40	20	230	≤1.3	CPTPSM140230IR
2	2	L + N - PE	20 / 20	10 / 10	230	≤1.4 L-N ≤1.5 N-PE	CPTPSM220230IR
2	2	L + N - PE	40	20	400 / 230	≤1.3 L-N ≤1.5 N-PE	CPTPSM240230IR
4	4	L + L + L + N - PE	20	10	400 / 230	≤1.4 L-N ≤1.5 N-PE	CPTPSM420400IR
4	4	L + L + L + N - PE	40	20	400 / 230	≤1.3 L-N ≤1.5 N-PE	CPTPSM440400IR
4	2	L + N - PE	40	20	230	1.3	CPTPSM240230SG
4	4	L + L + L + N - PE	40	20	400	≤1.3 L-N ≤1.5 N-PE	CPTPSM440400SG



Voltage Ratings

U_n, Nominal Voltage, AC, L - L	230,400	V AC
U_n, Nominal Voltage, AC, L - N / PE	230, 400	V AC
U_c, Continuous Operating Voltage, AC, Max	255, 265, 275, 320	V AC
U_c, Continuous Operating Voltage, DC, Max	-	V DC

Environmental

Operating Temperature	-30 / 80	°C
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Physical

Colour	Light Grey (RAL 7035)	
IP Rating	IP20	
Mounting	DIN-35 Rail Mount	
Tightening Torque, Nominal	4	Nm
Flex Cable, Max	25 mm ²	max
Flex Cable, Min	6 mm ²	min
Rigid Cable, Max	35 mm ²	max
Rigid Cable, Min	6 mm ²	min

Dimensions

Depth (mm)	Height (mm)	Width (mm)	Weight (kg)	Catalogue No.
70	90	18	0.101	CPTPSM120N
70	90	18	0.104	CPTPSM140N
70	90	18	0.117	CPTPSM120230IR
70	90	18	0.126	CPTPSM140230IR
70	90	36	0.2	CPTPSM220230IR
70	90	36	0.215	CPTPSM240230IR
70	90	72	0.39	CPTPSM420400IR
70	90	72	0.42	CPTPSM440400IR
70	90	36	0.225	CPTPSM240230SG
70	90	72	0.388	CPTPSM440400SG

PSM Replacement Modules

1P

Replacement Modules for PSM Surge Protection Devices



Item Description	Catalogue No.
PSM Replacement Module L - N I_{max} 20 kA 240 V AC	CPTPSM20230MOD
PSM Replacement Module L - N I_{max} 40 kA 400 V AC	CPTPSM40230MOD

N - PE

Replacement Modules for PSM Surge Protection Devices



Item Description	Catalogue No.
PSM Replacement Module N - PE I_{max} 40 kA	CPTPSM40NMOD

Type 2 + 3 - DM with EMI Filter



- ✓ DM is a range of combined devices for discharging induced transient overvoltages (Type 2 / Class II) and provides fine protection for sensitive equipment (Type 3 / Class III) in accordance with IEC 61643-11
- ✓ The range also includes devices that are for very fine protection of sensitive equipment, in accordance with IEC61643-11. These devices are surge protection devices (Type 3 / Class III)
- ✓ Complete with a built-in EMI filter
- ✓ DIN rail mounting, with a monobloc format
- ✓ Suitable as the final stage of protection in installations with electromagnetic disturbances which might interrupt, degrade limit line performance
- ✓ Series connection for applications up to 8 / 20 A rated current (depending on model)
- ✓ With electromagnetic interference (EMI) filter
- ✓ Combined voltage pulse with 1.2 / 50 μ s waveform. Uoc: 6 kV
- ✓ Remote and local visual indication of life status of the protection device



General

Protection Class	2, 2 + 3	
Protection Classification Standard	IEC 61643-1 EN 61643-11	
Certifications	CE	
Visual End Of Life Indication	Yes*	
Remote Contacts For End Of Life Monitoring	Yes*	
Monitoring Contact Configuration	1 CO, Volt Free	
Frequency	50 / 60	Hz
tA, Response Time (L - N)	25	ns**
tA, Response Time (N - PE)	100	ns**
Maximum Operating Temperature	80	°C max
Minimum Operating Temperature	-40	°C min
Replaceable Modules	No	
IEC Recommended Fuse Current Rating	20	A
Technology	L- N Metal Oxide Varistor (MOV) N-PE Gas Discharge	

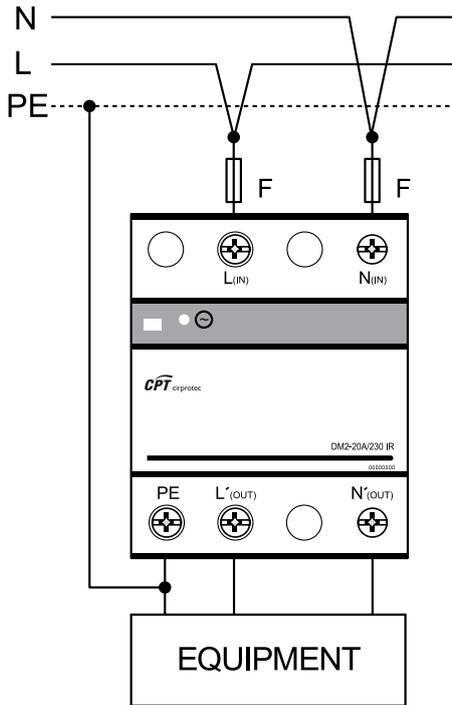
* Remote Monitoring and Visual Indication not applicable to CPTDM12308A

** Response Time (L - N) and (N - PE) not applicable to CPTDM22302A

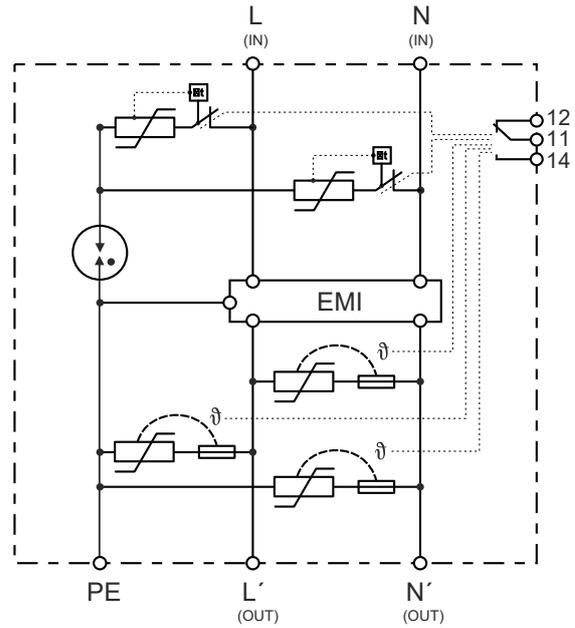


Connection / Circuit Diagrams

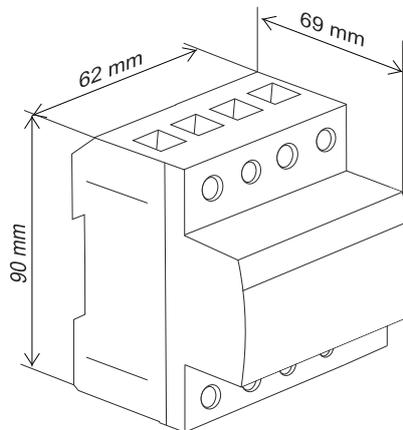
2 Pole DM2 Connection



2 Pole DM2 Internal Configuration



Dimensions for 2 Pole DM2



Poles	No. of DIN Modules	Protection Modes	I_{max} N - PE / L - N (kA)	I_n N - PE / L - N (kA)	U_n , L - N (V AC)	U_p (kV @ I_n)	Catalogue No.
2	4	L + N - PE	20 / 20	10	230	1.2	CPTDM223020A



Voltage Ratings

U_n , Nominal Voltage, AC, L - L	-	V AC
U_n , Nominal Voltage, AC, L - N / PE	230	V AC
U_c , Continuous Operating Voltage, AC, Max	275	V AC
U_c , Continuous Operating Voltage, DC, Max	-	V DC

Dimensions

Depth (mm)	Height (mm)	Width (mm)	Weight (kg)	Catalogue No.
69	90	62	0.337	CPTDM223020A

Environmental

Operating Temperature	-40 / 80	°C
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Physical

Colour	Grey Anthracite	
IP Rating	IP20	
Mounting	DIN-35 Rail Mount	
Tightening Torque, Nominal	4	Nm
Flex Cable, Max	25 mm ²	max
Flex Cable, Min	6 mm ²	min
Rigid Cable, Max	35 mm ²	max
Rigid Cable, Min	6 mm ²	min

Final Stage Surge Protection



- ✓ Compact size
- ✓ Status indication (or LED)
- ✓ DIN rail mounting
- ✓ Thermal disconnection
- ✓ Remote indication (via volt free contact)
- ✓ Integrated MOV and / or spark gap technology
- ✓ DIN 12 and 24 are the series of devices for discharging transient overvoltages networks and digital networks
- ✓ In accordance with IEC 61643-21
- ✓ DIN rail format or rail monobloc format (varies by part number)
- ✓ Suitable for the protection of instrumentation installed in RS 232 networks. By their nature, they are highly exposed to induced transient overvoltages (surges) associated with meteorological activity
- ✓ Suitable for the protection of instrumentation installed in binary networks. By their nature, they are highly exposed to induced transient overvoltages (surges) associated with meteorological activity
- ✓ Protection of a pair of wires / four – wire protection
- ✓ Provides models with protection of the following signal types Devicenet, RS 485 / 422, 4 - 20 mA, PROFIBUS PA, Binary signals, KNX bus, Modbus, PTC



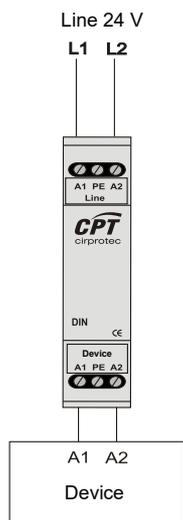
General

Protection class	-	
Protection Classification Standard	IEC 61643-21	
Certifications	CE	
Frequency	50 / 60	Hz
Maximum Operating Temperature	60	°C max
Minimum Operating Temperature	-40	°C min
Technology	Metal Oxide Varistor (MOV)	

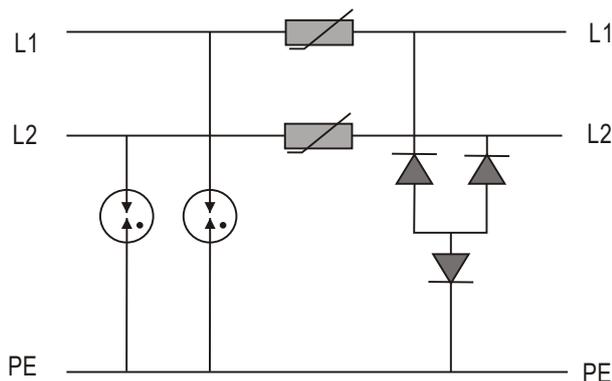


Connection / Circuit Diagrams

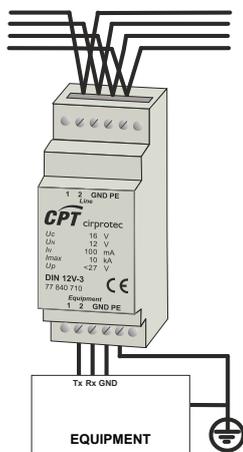
DIN_V2C Connection



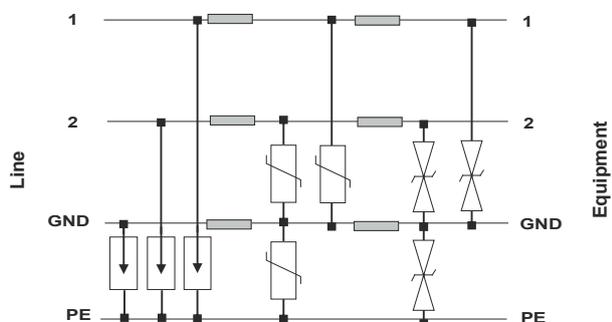
DIN_V2C Internal Configuration



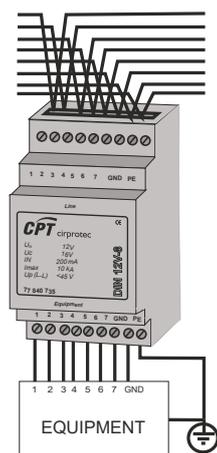
DIN_V3 Connection



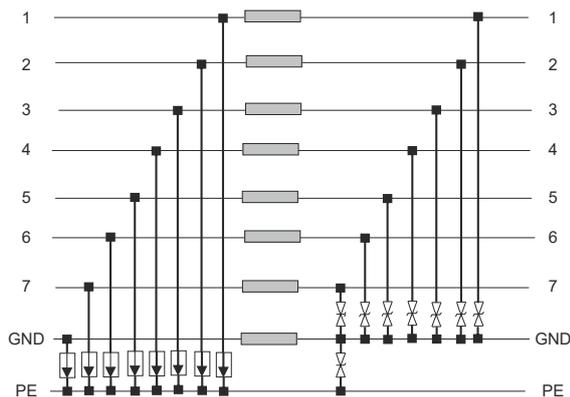
DIN_V3 Internal Configuration



DIN_V8 Connection

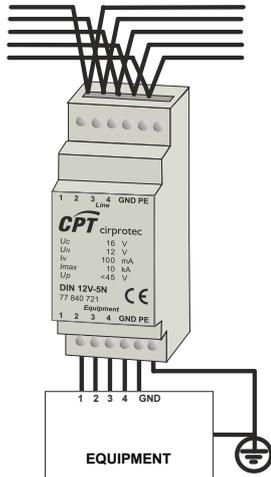


DIN_V8 Internal Configuration

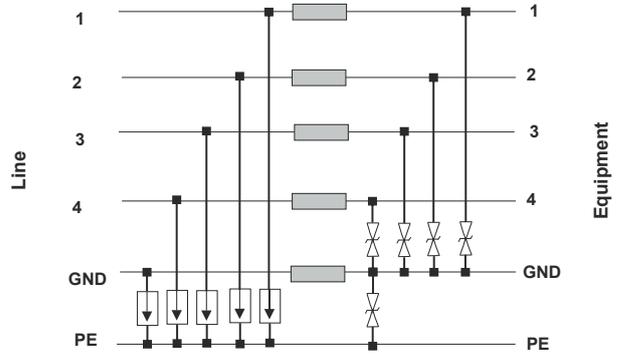




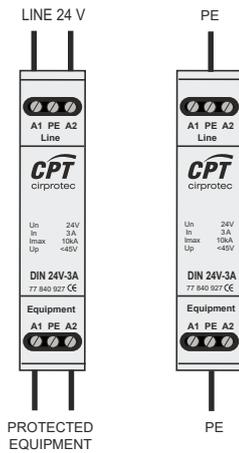
DIN_V5 Connection



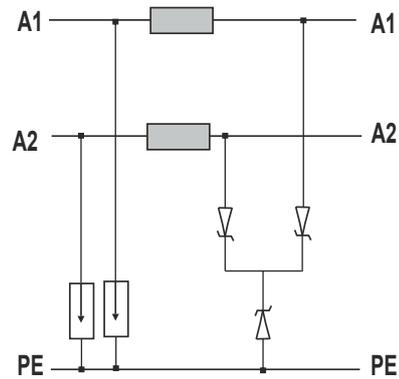
DIN_V5 Internal Configuration



DIN_V3A Connection

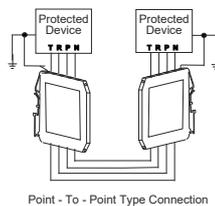
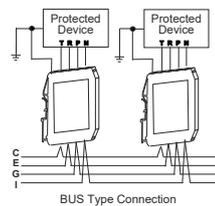


DIN_V3A Internal Configuration

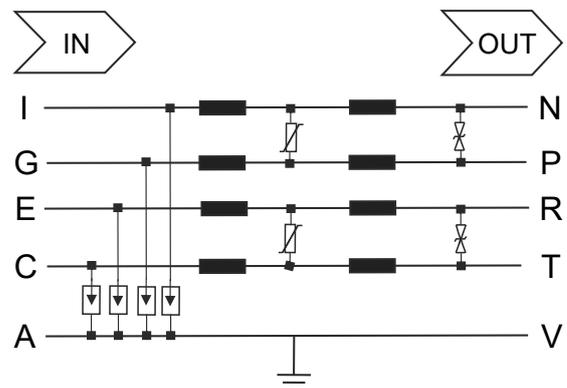


DIN24V_G_ Connection

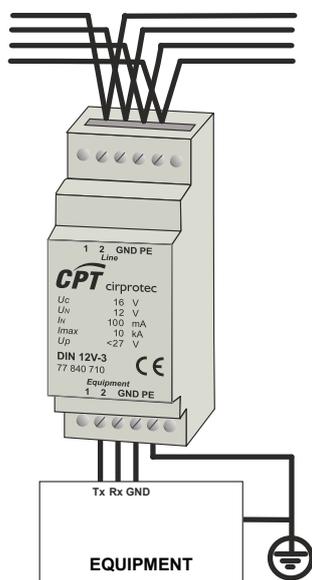
Connection Diagrams



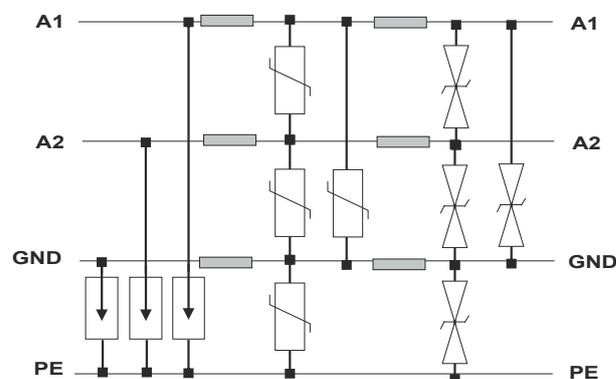
DIN24V_G_ Internal Configuration



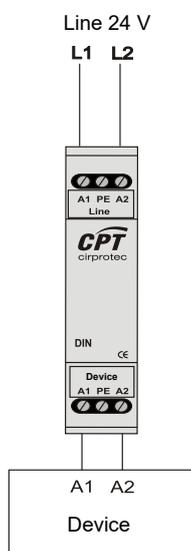
DIN_V3 Connection



DIN4853 Internal Configuration



CPTADSL Connection



DIN6

Poles	No. of DIN Modules	Protection Modes	$I_{max} L-L / L-PE$ (kA)	$I_n L-L / L-PE$ (kA)	$U_n, L-PE$ (V AC)	U_p (V @ I_n)	Catalogue No.
2	1	L + L + PE	10	5	6	≤ 10	CPTDIN6V2C

DIN12

Poles	No. of DIN Modules	Protection Modes	$I_{max} L-L / L-PE$ (kA)	$I_n L-L / L-PE$ (kA)	$U_n, L-PE$ (V AC)	U_p (V @ I_n)	Catalogue No.
2	1	L + L + PE	10	5	12	≤ 20	CPTDIN12V2C
3	2	L + L + L + N - PE	10	5	12	≤ 45 (L - PE) ≤ 27 (L - GND)	CPTDIN12V3
–	2	L + L + L + L + N - PE	10	5	12	≤ 45 (L - PE) ≤ 27 (L - GND)	CPTDIN12V5N

DIN24

Poles	No. of DIN Modules	Protection Modes	$I_{max} L-L / L-PE$ (kA)	$I_n L-L / L-PE$ (kA)	$U_n, L-PE$ (V AC)	U_p (V @ I_n)	Catalogue No.
3	1	L + L + PE	10	5	24	≤ 40	CPTDIN24V2C
3	1	L + L + N - PE	10	5	24	≤ 45	CPTDIN24V3A
5	0.5	L + L + L + N - PE	10	5	24	≤ 60 (L - PE) ≤ 120 (L - L)	CPTDIN24V4G1
5	2	L + L + L + N - PE	10	5	24	≤ 600 (L1/L2 - PE) ≤ 60 (L1-L2)	CPTDIN24V2G2

DIN150

Poles	No. of DIN Modules	Protection Modes	$I_{max} L-L / L-PE$ (kA)	$I_n L-L / L-PE$ (kA)	$U_n, L-PE$ (V AC)	U_p (V @ I_n)	Catalogue No.
3	1	L + L + PE	10	5	150	≤ 200	CPTDIN150V2C

RS4853

Poles	No. of DIN Modules	Protection Modes	$I_{max} L-L / L-PE$ (kA)	$I_n L-L / L-PE$ (kA)	$U_n, L-PE$ (V AC)	U_p (V @ I_n)	Catalogue No.
–	2	L + L + N - PE	10	5	12	≤ 45 (L - PE) ≤ 27 (L - L)	CPTDIN4853



NBN

Poles	No. of DIN Modules	Protection Modes	I_{max} L - L / L - PE (kA)	I_n L - L / L - PE (kA)	U_n , L - PE (V AC)	U_p (V @ I_n)	Catalogue No.
–	1	L + L + PE	10	5	50	≤ 200	CPTDINADSL

Communications

Device	No. of DIN Modules	Protection Modes	I_{max} L - L / L - PE (kA)	I_n L - L / L - PE (kA)	U_n , L - PE (V AC)	U_p (V @ I_n)	Catalogue No.
BNV	0.33	–	5	5	110	< 260	CPTBNV110
BNV	0.33	–	5	5	24	< 45	CPTBNV30
Ethernet	–	–	–	0.5	5	< 35	CPTNETPRO100BT

Voltage Ratings

U_n, Nominal Voltage, AC, L - L	24, 50	V AC
U_n, Nominal Voltage, AC, L - N / PE	5,6, 12, 24, 50, 110, 150	V AC
U_c, Continuous Operating Voltage, AC, Max	6,7, 16, 27, 30, 130, 180	V AC
U_c, Continuous Operating Voltage, DC, Max	-	V DC

Environmental

Operating Temperature	-40 / 60	°C
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Physical

IP Rating	IP20	
Mounting	DIN-35 Rail Mount	
Tightening Torque, Nominal	0.5	Nm
Flex Cable, Max	2.5 mm ²	max
Flex Cable, Min	1 mm ²	min

Dimensions

Depth (mm)	Height (mm)	Width (mm)	Weight (kg)	Catalogue No.
70	90	17.5	0.057	CPTDIN6V2C
70	90	17.5	0.056	CPTDIN12V2C
60	90	36	0.076	CPTDIN12V3
60	90	36	0.084	CPTDIN12V5N
70	90	17.5	0.058	CPTDIN24V2C
70	90	17.9	0.06	CPTDIN24V3A
90	90	7.5	0.71	CPTDIN24V4G1
90	90	7.75	0.069	CPTDIN24V2G2
70	90	17.5	0.056	CPTDIN150V2C
60	90	36	0.076	CPTDIN4853
69	90	17.5	0.057	CPTDINADSL
63.2	91.6	6	0.034	CPTBNV110
63.2	91.6	6	0.027	CPTBNV30
30	44	82	0.132	CPTNETPRO100BT

Solar PV-Rated Surge Protection



- ✓ PSC PV and PSM PV are ranges of combined devices for discharging lightning currents (Type 1 / Class I) and protecting against induced transient overvoltages (Type 2 / Class II), for Photovoltaic installations, in accordance with EN 50539-11
- ✓ DIN rail plug-in format
- ✓ PSM PV UL 1449 certified
- ✓ PSC PV is suitable as protection for combiner boxes in areas with greater exposure to the atmosphere, where installations are usually provided with an external lightning protection system
- ✓ PSM PV is suitable for all photovoltaic applications: large-scale, rooftop and self-consumption (off-grid) DC installations
- ✓ High current discharge capacity with a 8 / 20 μ s waveform. I_{max} : 40 kA
- ✓ Discharges impulse currents with a 10 / 350 μ s waveform. I_{limp} : 5 kA
- ✓ Exclusive devices for photovoltaic systems according to EN 50539-11. Maximum voltage rating 1500 V DC
- ✓ Remote and visual indication of protection device life status



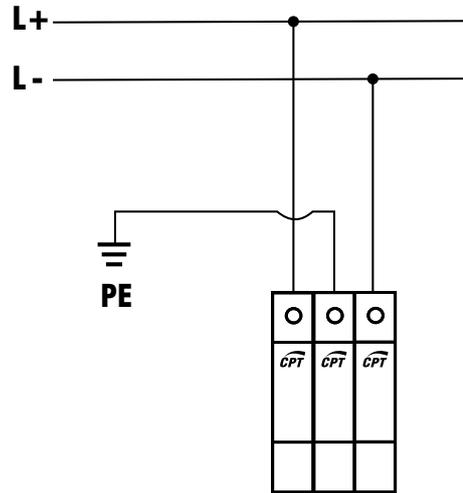
General

Protection Class	1 + 2, 2	
Protection Classification Standard	IEC 61643-11	
Certifications	CE	
Visual End Of Life Indication	Yes	
Remote Contacts For End Of Life Monitoring	Yes	
Monitoring Contact Configuration	1 CO	
Frequency	50 / 60	Hz
tA, Response Time (L - L)	25	ns
Maximum Operating Temperature	85	°C max
Minimum Operating Temperature	-40	°C min
Replaceable Modules	Yes	
ICC, Current, Short Circuit Withstand*	10, 25	kA
Technology: Metal Oxide Varistor (MOV)		

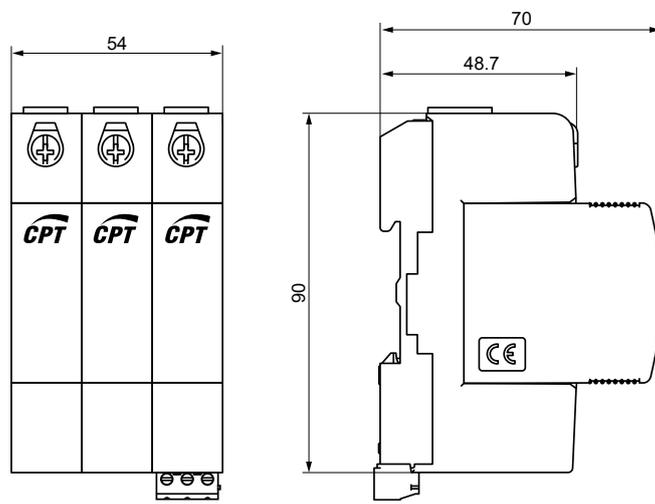
* ICC Current, Short Circuit Withstand Value for CPTPSC351000IR is 25 kA



Connection / Circuit Diagrams



Dimensions for 2 Pole + Earth SPD PV





Type 1 + 2 - PV

Poles	No. of DIN Modules	Protection Modes	I_{imp} L - L (kA)	I_{max} L - L (kA)	I_n L - L (kA)	U_C Max (V DC)	U_p (kV @ I_n)	Catalogue No.
2	3	L + L + PE	5	40	20	1060	4	CPTPSC351000IR

Type 2 - PV

Poles	No. of DIN Modules	Protection Modes	I_{imp} L - L (kA)	I_{max} L - L (kA)	I_n L - L (kA)	U_C Max (V DC)	U_p (kV @ I_n)	Catalogue No.
2	3	L + L + PE	-	40	20	600	2.6	CPTPSM340600IR
2	3	L + L + PE	-	40	20	1060	4	CPTPSM3401000IR
2	3	L + L + PE	-	40	15	1500	5	CPTPSM3401500IR

Environmental

Operating Temperature	-40 / 85	°C
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Physical

Colour	Grey Anthracite
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IP Rating	IP20
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Mounting	DIN-35 Rail Mount
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Tightening Torque, Nominal	4	Nm
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Flex Cable, Max	25 mm ²	max
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Flex Cable, Min	6 mm ²	min
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Rigid Cable, Max	35 mm ²	max
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Rigid Cable, Min	6 mm ²	min
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Dimensions

Depth (mm)	Height (mm)	Width (mm)	Weight (kg)	Catalogue No.
70	90	54	0.514	CPTPSC351000IR
70	90	54	0.349	CPTPSM3401000IR
70	90	54	0.36	CPTPSM3401500IR
70	90	54	0.322	CPTPSM340600IR

MOD6 Electrical Network Diverters



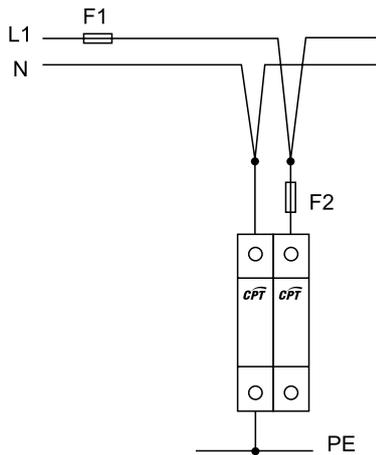
- ✓ MOD6 Electrical Network Diverters are a range of devices for discharging induced transient overvoltages (Type 2 / Class II), in accordance with IEC 61643-11
- ✓ DIN rail plug-in format
- ✓ Suitable for the second stage of protection in supply distribution panels in which Type 1 protection devices are installed, or for the first stage of protection in residential, commercial or other applications not exposed to direct strikes and with no external lightning protection system
- ✓ High discharge capacity with an 8 / 20 μ s waveform. Imax: 40 kA or 30 kA
- ✓ Remote and visual indication of life status of the protection device
- ✓ Biconnect - two types of terminal: for rigid or flexible cable and for fork type comb busbar

General

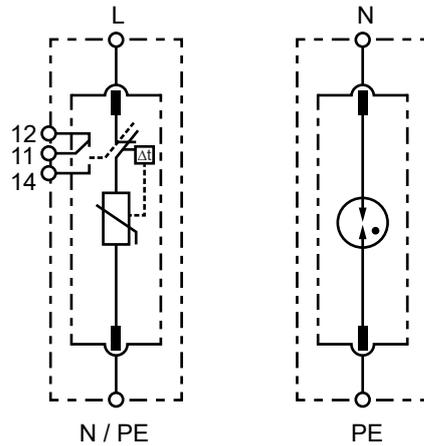
Protection Class	2	
Protection Classification Standard	IEC 61643-11	
Certifications	-	
Visual End Of Life Indication	Yes	
Remote Contacts For End Of Life Monitoring	Yes	
Monitoring Contact Configuration	1 CO	
Frequency	50 / 60	Hz
tA, Response Time (L - N)	25	ns
Maximum Operating Temperature	80	°C max
Minimum Operating Temperature	-40	°C min
Icc, Current, Short Circuit Withstand	25	kA
Technology	L- N Metal Oxide Varistor (MOV) N-PE Gas Discharge	

Connection / Circuit Diagrams

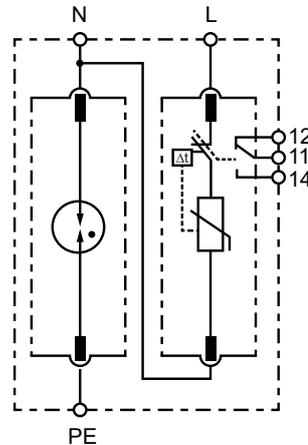
1 or 2 Pole MOD6 Connection



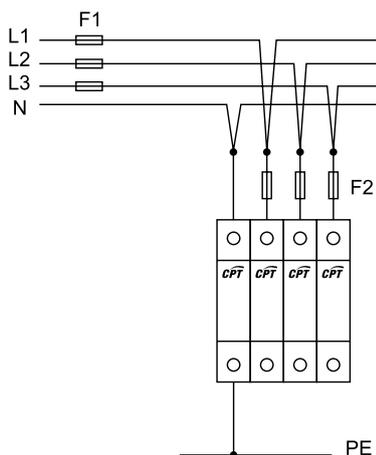
1 Pole MOD6 Internal Configuration



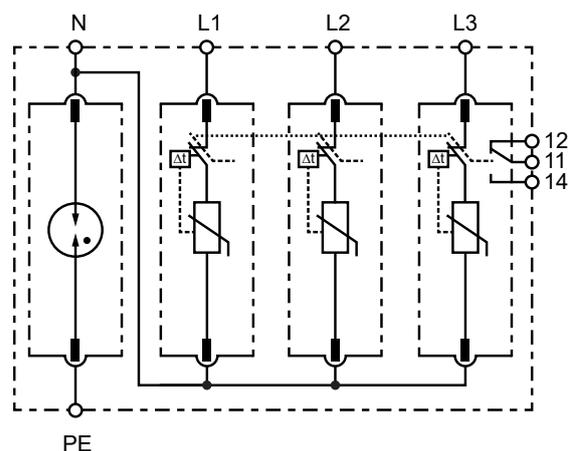
2 Pole MOD6 Internal Configuration



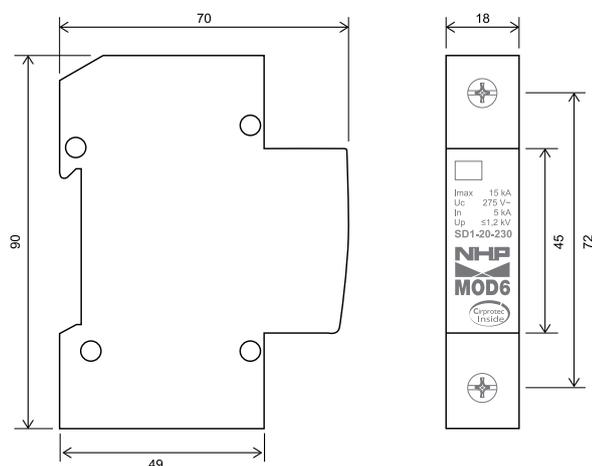
4 Pole MOD6 Connection



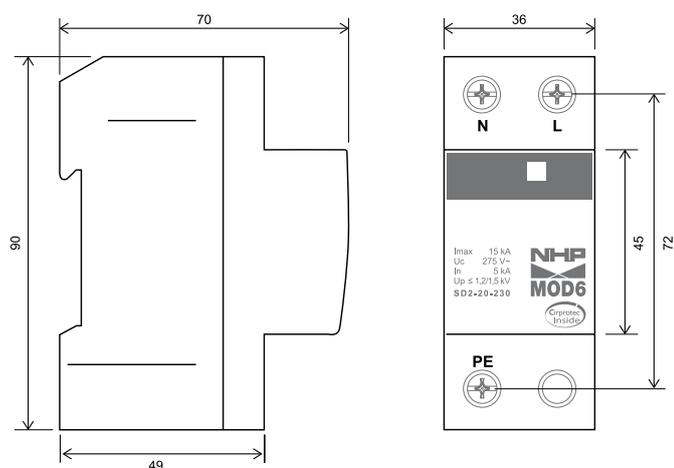
4 Pole MOD6 Internal Configuration



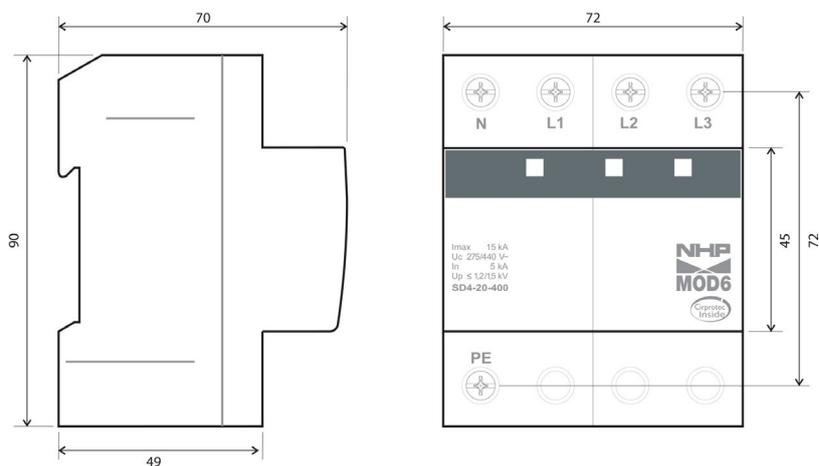
Dimensions for 1 Pole SPD (mm)



Dimensions for 2 Pole SPD (mm)



Dimensions for 4 Pole SPD (mm)





Poles	No. of DIN Modules	Protection Modes	I_{max} L - N (kA)	I_n L - N (kA)	U_n , L - L / L - N (V AC)	U_p (kV @ I_n)	Catalogue No.
1	1	L - N	20	10	230	1.4	MOD6SD120230
1	1	L - N	40	20	230	1.3	MOD6SD140230
2	2	L + N - PE	20	10	230	1.4	MOD6SD220230
2	2	L + N - PE	40	20	230	1.3	MOD6SD240230
4	4	L + L + L + N - PE	20	10	400	1.4	MOD6SD420400
4	4	L + L + L + N - PE	40	20	400	1.3	MOD6SD440400



Voltage Ratings

U_n, Nominal Voltage, AC, L - L	230, 400	V AC
U_c, Continuous Operating Voltage, AC, Max	275, 320	V AC
U_c, Continuous Operating Voltage, DC, Max	-	V DC

Environmental

Operating Temperature	-40 / 80	°C
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Physical

Colour	Grey Anthracite	
IP Rating	IP20	
Width	18, 36, 72 mm	
Mounting	DIN-35 Rail Mount	
Tightening Torque, Nominal	4	Nm
Flex Cable, Max	25 mm ²	max
Flex Cable, Min	6 mm ²	min
Rigid Cable, Max	35 mm ²	max
Rigid Cable, Min	6 mm ²	min

Dimensions

Depth (mm)	Height (mm)	Width (mm)	Weight (kg)	Catalogue No.
70	90	18	-	MOD6SD120230
70	90	18	-	MOD6SD140230
70	90	36	-	MOD6SD220230
70	90	36	-	MOD6SD240230
70	90	72	-	MOD6SD420400
70	90	72	-	MOD6SD440400

CPS Block Plus



- ✓ CPS Block Plus is the range of modular surge protection devices (SPD - TVSS) in accordance with UL 1449 3rd edition. NEMA type enclosure with replaceable surge protection modules, prewired
- ✓ Depending on the maximum discharge capacity of the suppressor and the exposure level of the installation, they are suitable either as the first stage of protection in outbuildings, service entrances and main panels, or as the second stage protection in main panels, distribution panels and short distance circuits. Location categories C and B respectively in accordance with IEEE C62.41.2-2002
- ✓ Maximum discharge capacity per phase with 8/20 μ s waveform. I_{max}: 240kA, 200kA, 160kA and 120kA, depending on the model
- ✓ Nominal discharge current per phase with an 8 / 20 μ s waveform. I_n: 10 to 20kA, depending on the model.
- ✓ Redundant Multi Discharge System (MDS) using varistor technology with individual disconnect of each MOV. All-mode-protection: common and differential mode protection (AMP)
- ✓ LED system for early end of life warning: Intelligent Aging Display (IAD ®) for monitoring the % protection available for each mode. Values: 0%, 33%, 66%, 100%. With remote indication (IR)
- ✓ Electromagnetic and radio frequency interference (EMI / RFI) filter



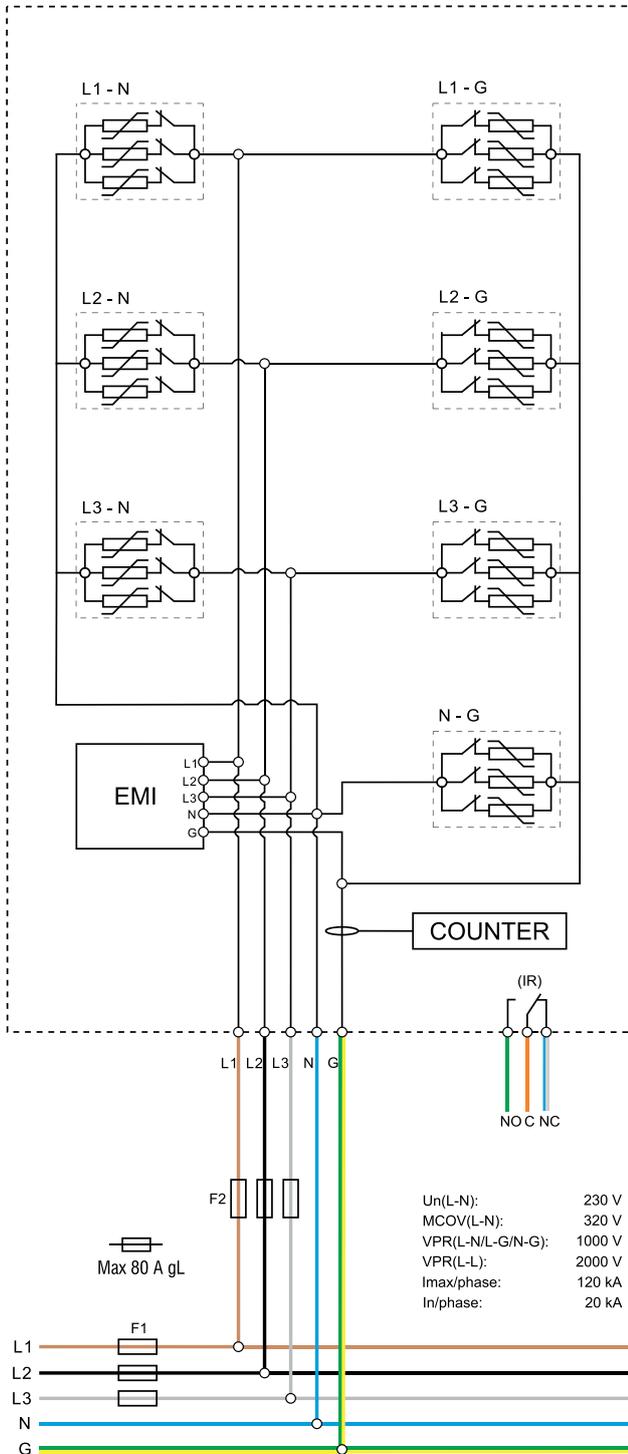
Specific equipment for neutral systems 1 Phase (2W+G), Split Phase (3W+G), 3 Phase WYE (4W+G), 3 Phase Delta (3W+G), High Leg Delta (4W+G). 120/208 V, 230/400 V, 277/480 V networks.

General

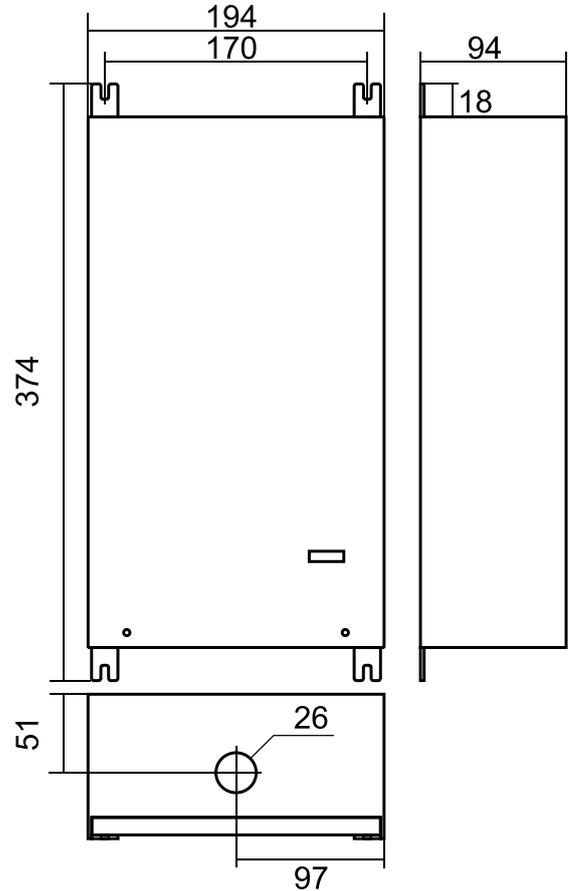
Protection Class	2	
Protection Classification Standard	UL 1449 3rd Edition IEEE 62.41.2-2002 IEEE 62.41.1-2002 IEC 61643-11	
Certifications	CE RCM	
Visual End Of Life Indication	Yes	
Remote Contacts For End Of Life Monitoring	Yes	
Monitoring Contact Configuration	1 CO	
Frequency	50 / 60	Hz
tA, Response Time (L - L)	1	ns
Maximum Operating Temperature	70	°C max
Minimum Operating Temperature	-40	°C min
Replaceable Modules	Yes	
Icc, Current, Short Circuit Withstand	200	kA
IEC Recommended Fuse Current Rating	80	A
Technology	Metal Oxide Varistor (MOV)	



Connection / Circuit Diagrams



Dimensions



Surge Protection



Poles	Protection Modes	I_{max} L - L (kA)	U_n , L - N / L - L (V AC)	V_{pr} L - N / L - L (V)	Catalogue No.
3	L - N, L - G, N - G, L - L	120	230 / 400	1000 / 2000	CPTCPSBLOCKPLUS120
3	L - N, L - G, N - G, L - L	160	230 / 400	1000 / 2000	CPTCPSBLOCKPLUS160
3	L - N, L - G, N - G, L - L	200	230 / 400	1000 / 2000	CPTCPSBLOCKPLUS200
3	L - N, L - G, N - G, L - L	240	230 / 400	1000 / 2000	CPTCPSBLOCKPLUS240

Specifications

Models	Split Phase	1 Phase	3 Phase WYE			3 Phase Delta			High leg Delta			
Classification according to UL 1449-3 rd Edition	Type 2											
Classification according to IEC 61643-11	Class II											
Protection modes	Common and differential mode protection											
Nominal voltage rating AC 50-60 Hz	U _n [V]	120	120	230	120/208	230/400	277/480	240	400	480	120/240	
Maximum continuous operating voltage AC 50-60 Hz	MCOV [V]	175	175	320	175	320	385	275	420	510	175/320	
Maximum discharge capacity per phase / Nominal discharge capacity per phase	I _{max} /phase [kA] / I _n /phase [kA]	120/20										
		160/20										
		200/20										
		240/20										
Voltage protection rating (L-N/L-G/N-G)	VPR [V]	600	600	1000	600	1000	1200	900	1500	1800	600	
Voltage protection rating (L-L)		1200	-	-	1200	2000	2400	900	1500	1800	1200	
Voltage protection rating (LHL-N/LH-G)		-	-	-	-	-	-	-	-	-	-	1000
Voltage protection rating (LHL-L)		-	-	-	-	-	-	-	-	-	-	1200
Maximum back-up fuse	[A gL]	80										
Short-circuit current rating	SCCR [kA]	200										
Response time	t _A [ns]	1										
Multi-Discharge System (MDS)	Yes											
Dynamic thermal disconnection	Yes											
Remote indication (RI)	Yes											
Status indicator LED	Yes											
Intelligent aging display (IAD®) LED	100% - 66% - 33% - 0% of each protection mode											
EMI Filter	≤ 40 dB											
Enclosure type	IP 55 /NEMA 12											
Material	Sheet steel											

Environmental

Operating Temperature -40 / 70 °C

Physical

Colour Dark Grey

IP Rating IP55

Width 194 mm

Height 374 mm

Depth 94 mm

Weight 4.32 kg

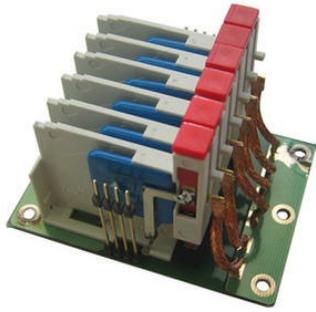
Mounting Panel Mount

Flex Cable, Max 2.5 mm² max

Flex Cable, Min 2.5 mm² min

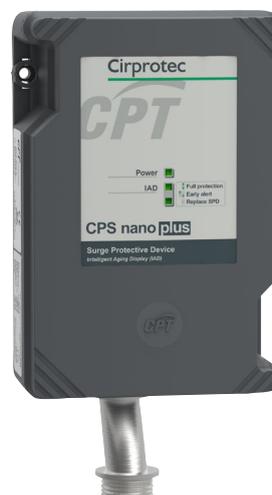
CPS Block Plus Replacement Modules

Replacement Modules for CPS Block Plus Surge Protection Devices



Item Description	Catalogue No.
Replacement Surge Block Module for CPS Block, 3-Phase WYE (4 W + G), 100 kA, VLN = 230 V (L - N)	CPTBLOCKMOD100
Replacement Surge Block Module for CPS Block, L - N I_{max} 160 kA 400 V AC	CPTBLOCKMOD160
Replacement Surge Block Module for CPS Block, L - N I_{max} 200 kA 400 V AC	CPTBLOCKMOD200
Replacement Surge Block Module for CPS Block, 240 kA	CPTBLOCKMOD240

CPS Nano Plus



- ✓ CPS Nano Plus is the range of non-modular surge protection devices (SPD - TVSS) in accordance with UL 1449 3rd edition. NEMA type enclosure, hardwired compact format
- ✓ Depending on the maximum discharge capacity of the suppressor and the exposure level of the installation, they are suitable either as the first stage of protection in outbuildings, service entrances and main panels, or as the second stage protection in main panels, distribution panels and short distance circuits, or also as the third stage next to individual equipment and subpanels in long distance circuits. Location categories C, B and A respectively in accordance with IEEE C62.41.2-2002
- ✓ Maximum discharge capacity per phase with 8 / 20 μ s waveform. I_{max}: 160 kA, 120 kA, 80 kA, 60 kA and 40 kA, depending on the model
- ✓ Nominal discharge current per phase with an 8 / 20 μ s waveform. I_n: 10 to 20 kA, depending on the model
- ✓ Redundant Multi Discharge System (MDS) using varistor technology with individual disconnect of each MOV. All-mode-protection: common and differential mode protection (AMP)
- ✓ LED system for early end of life warning: Intelligent Aging Display (IAD®) for monitoring the % protection available for the equipment. Values: 0%, 50%, 100%. With remote indication (IR)
- ✓ Electromagnetic and radio frequency interference (EMI / RFI) filter



General

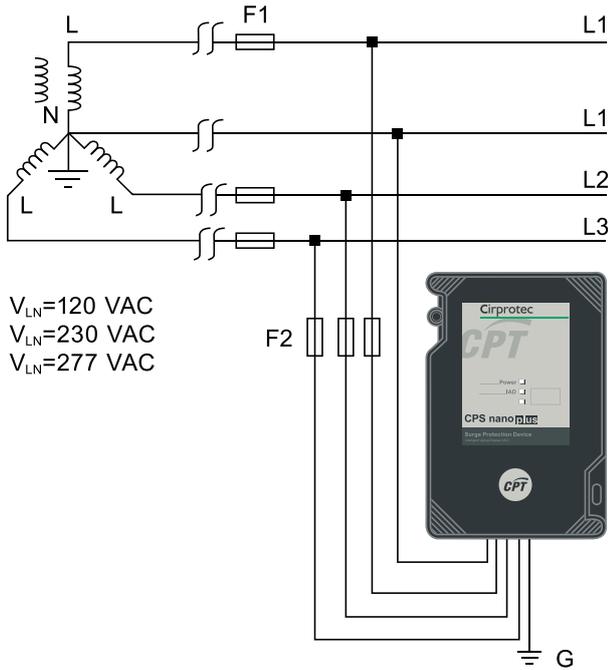
Protection Class	2	
Protection Classification Standard	UL 1449 3rd Edition IEEE 62.41.2-2002 IEEE 62.41.1-2002 IEC 61643-11	
Certifications	CE RCM	
Visual End Of Life Indication	Yes	
Remote Contacts For End Of Life Monitoring	Yes	
Monitoring Contact Configuration	1 CO	
Frequency	50 / 60	Hz
tA, Response Time (L - L)	1	ns
Maximum Operating Temperature	70	°C max
Minimum Operating Temperature	-40	°C min
Replaceable Modules	No	
Icc, Current, Short Circuit Withstand	100	kA
IEC Recommended Fuse Current Rating	63	A

Technology: Metal Oxide Varistor (MOV)

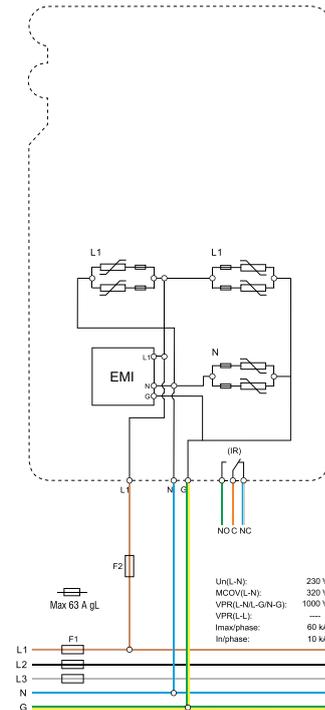


Connection / Circuit Diagrams

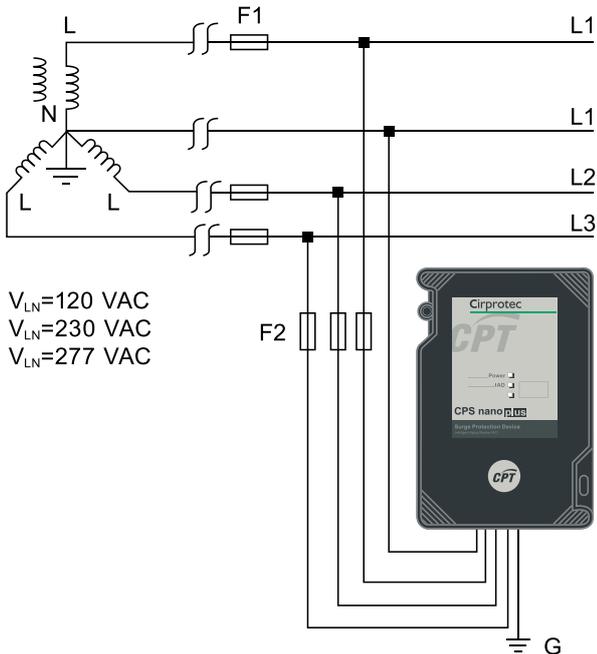
1 Pole Nano Plus Connection



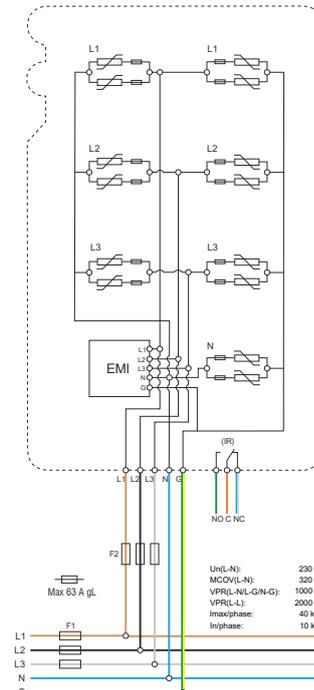
1 Pole Nano Plus Internal Configuration



3 Pole Nano Plus Connection

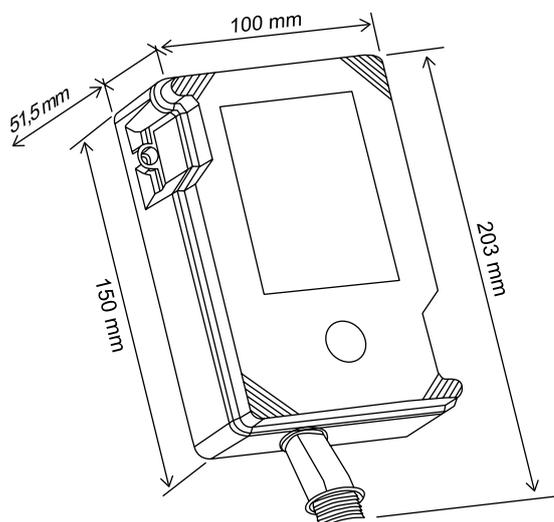


3 Pole Nano Plus Internal Configuration





Dimensions



Poles	Protection Modes	I_{\max} L - L (kA)	U_n , L - N / L - L (V AC)	V_{pr} L - N / L - L (V)	Catalogue No.
1	L - N, L - G, N - G, L - L	60	230	1000	CPTCPSNANOPLUS1P60
3	L - N, L - G, N - G, L - L	40	230 / 400	1000 / 2000	CPTCPSNANOPLUS3P40
3	L - N, L - G, N - G, L - L	60	230 / 400	1000 / 2000	CPTCPSNANOPLUS3P60
3	L - N, L - G, N - G, L - L	80	230 / 400	1000 / 2000	CPTCPSNANOPLUS3P80
3	L - N, L - G, N - G, L - L	120	230 / 400	1000 / 2000	CPTCPSNANOPLUS3P120
3	L - N, L - G, N - G, L - L	160	230 / 400	1000 / 2000	CPTCPSNANOPLUS3P160

Specifications

Models		Split Phase	1 Phase			3 Phase WYE			3 Phase Delta			High leg Delta
Classification according to UL 1449-3 rd Edition		Type 2										
Classification according to IEC 61643-11		Class II										
Protection modes		Common and differential mode protection										
Nominal voltage rating AC 50-60 Hz	U_n [V]	120	120	230	120/208	230/400	277/480	240	400	480	120/240	
Maximum continuous operating voltage AC 50-60 Hz	MCOV [V]	175	175	320	175	320	385	275	420	510	175/320	
Maximum discharge capacity per phase / Nominal discharge capacity per phase	I_{max} /phase [kA] / I_n /phase [kA]	40/10										
		60/10										
		80/10										
		120/20										
		160/20										
Voltage protection rating (L-N/L-G/N-G)	VPR [V]	600	600	1000	600	1000	1200	900	1500	1800	600	
Voltage protection rating (L-L)		1200	-	-	1200	2000	2400	900	1500	1800	1200	
Voltage protection rating (L _{HL} -N/L _H -G)		-	-	-	-	-	-	-	-	-	-	1000
Voltage protection rating (L _{HL} -L)		-	-	-	-	-	-	-	-	-	-	1200
Maximum back-up fuse	[A gL]	63										
Short-circuit current rating	SCCR [kA]	100										
Response time	t_A [ns]	1										
Multi-Discharge System (MDS)		Yes										
Dynamic thermal disconnection		Yes										
Remote indication (RI)		Yes										
Voltage LED		Yes										
Status indicator LED		Yes										
Intelligent aging display LED (IAD®)		Yes (full protection, early alert, replace)										
EMI Filter		≤ 40 dB										
Enclosure type		IP 66/NEMA 4										
Insulating material and class		PC; V-0										

Environmental

Operating Temperature -40 / 70 °C

Physical

Colour Dark Grey

IP Rating IP66

Width 100 mm

Height 203 mm

Depth 51.5 mm

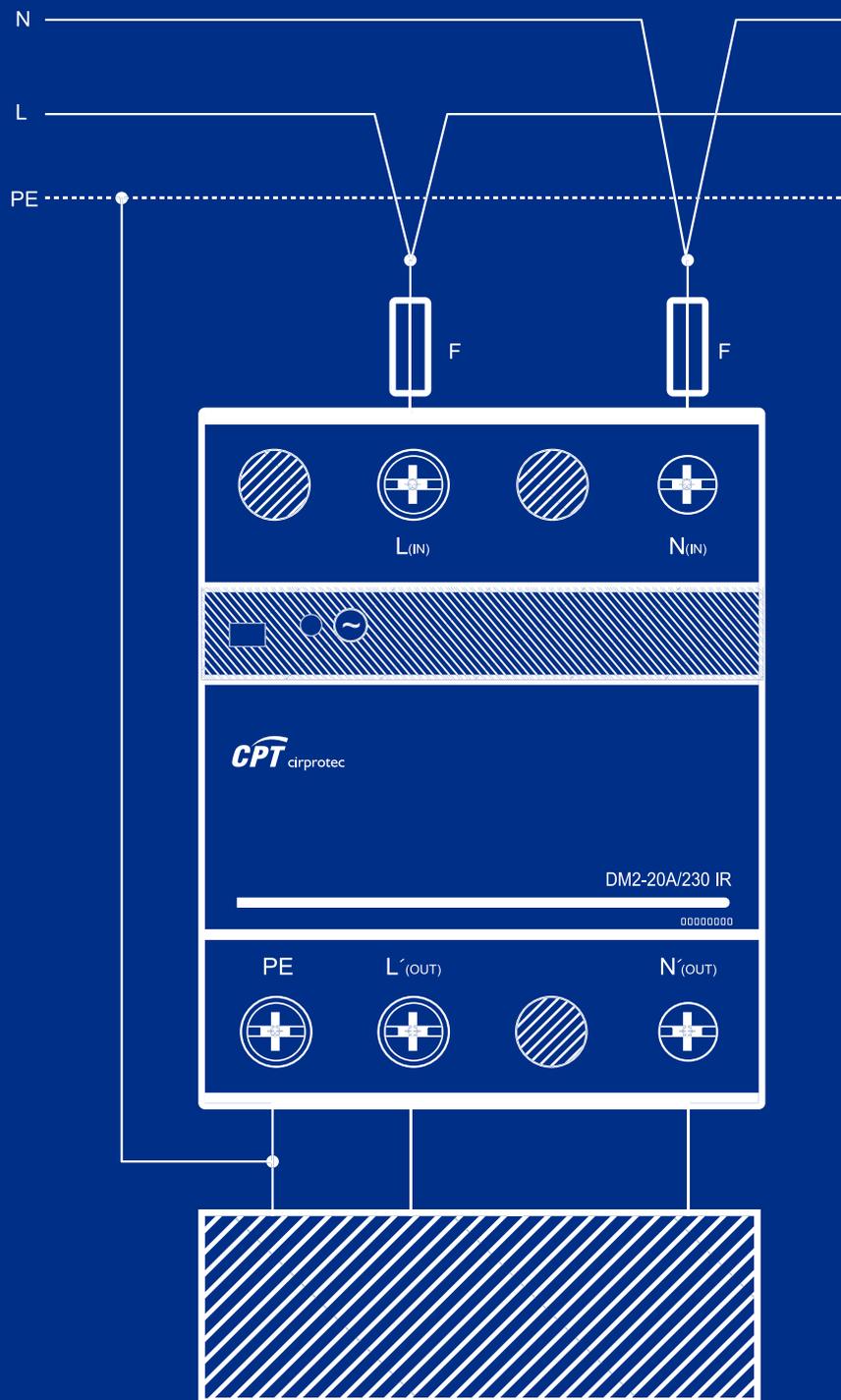
Weight 0.89 kg

Mounting Panel Mount

Flex Cable, Max 2.5 mm² max

Flex Cable, Min 2.5 mm² min

Catalogue Number	Page	Catalogue Number	Page
C			
CPTBLOCKMOD100	54	CPTPSM140N	28
CPTBLOCKMOD160	54	CPTPSM20230MOD	30
CPTBLOCKMOD200	54	CPTPSM220230IR	28
CPTBLOCKMOD240	54	CPTPSM240230IR	28
CPTBNV110	38	CPTPSM240230SG	28
CPTBNV30	38	CPTPSM3401000IR	43
CPTCPSBLOCKPLUS120	52	CPTPSM3401500IR	43
CPTCPSBLOCKPLUS160	52	CPTPSM340600IR	43
CPTCPSBLOCKPLUS200	52	CPTPSM40230MOD	30
CPTCPSBLOCKPLUS240	52	CPTPSM40NMOD	30
CPTCPSNANOPLUS1P60	57	CPTPSM420400IR	28
CPTCPSNANOPLUS3P120	57	CPTPSM440400IR	28
CPTCPSNANOPLUS3P160	57	CPTPSM440400SG	28
CPTCPSNANOPLUS3P40	57	M	
CPTCPSNANOPLUS3P60	57	MOD6SD120230	48
CPTCPSNANOPLUS3P80	57	MOD6SD140230	48
CPTDIN12V2C	38	MOD6SD220230	48
CPTDIN12V3	38	MOD6SD240230	48
CPTDIN12V5N	38	MOD6SD420400	48
CPTDIN150V2C	38	MOD6SD440400	48
CPTDIN24V2C	38		
CPTDIN24V2G2	38		
CPTDIN24V3A	38		
CPTDIN24V4G1	38		
CPTDIN4853	38		
CPTDIN6V2C	38		
CPTDINADSL	38		
CPTDM223020A	32		
CPTNETPRO100BT	38		
CPTPSC100NMOD	24		
CPTPSC1100N	22		
CPTPSC112230IR	22		
CPTPSC12230MOD	24		
CPTPSC125230IR	22		
CPTPSC125N	22		
CPTPSC150N	22		
CPTPSC212230IR	22		
CPTPSC225230IR	22		
CPTPSC25230MOD	24		
CPTPSC312400IR	22		
CPTPSC325400IR	22		
CPTPSC351000IR	43		
CPTPSC412400IR	22		
CPTPSC425400IR	22		
CPTPSC50NMOD	24		
CPTPSM120230IR	28		
CPTPSM120N	28		
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