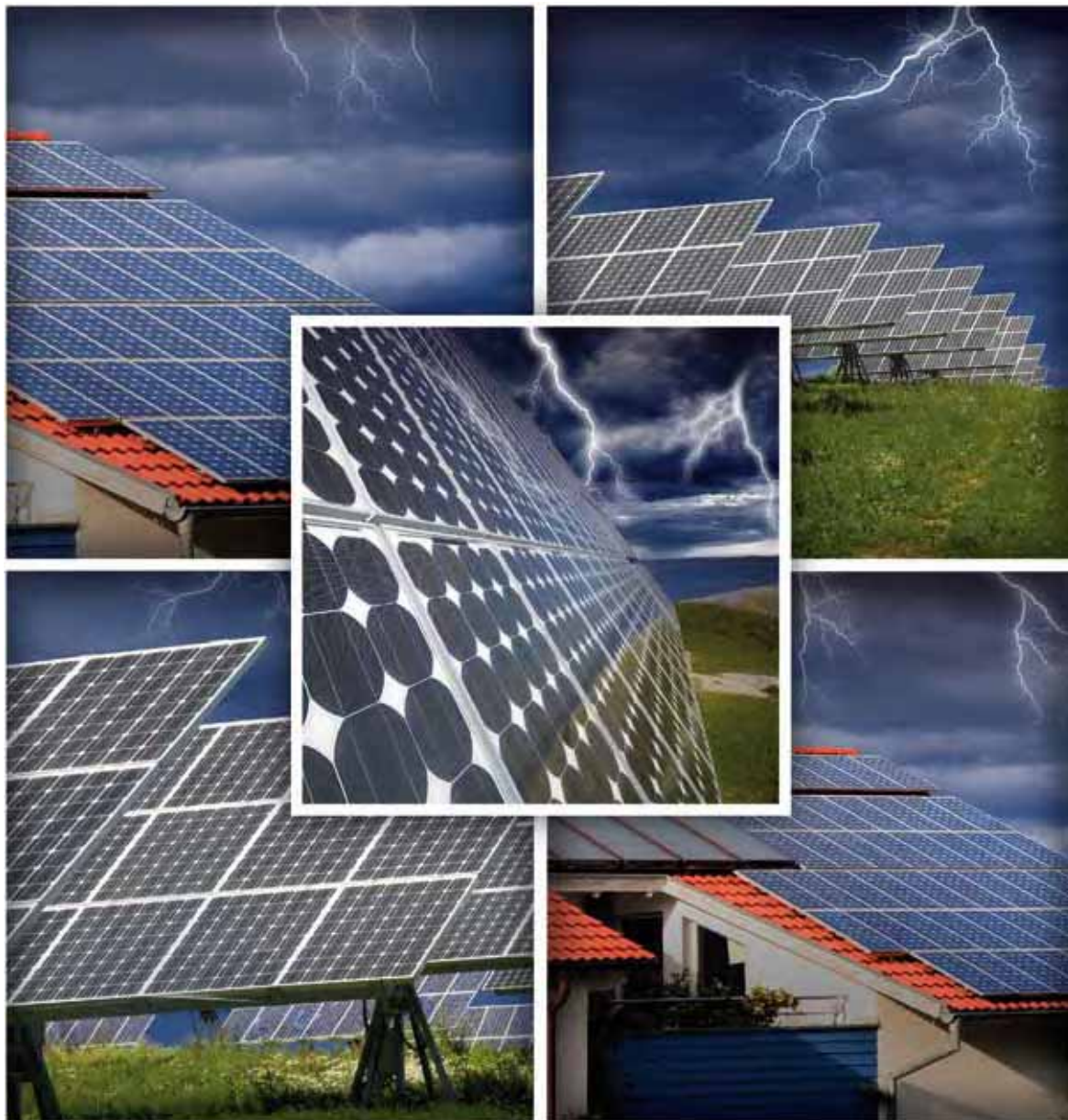


Lightning & Overvoltage Protection

Photovoltaic systems



COMPETENCE

ABB : Recognized competence in lightning protection



Lightning wave generator 10 / 350



ABB Laboratory at Bagnères-de-Bigorre, in France



200 kV generator

ABB Lightning Protection Group, established in the South West of France, benefiting from acquired experience during the last decades, makes the most of its masterly skills in lightning and overvoltage protection technology. In addition to its present expertise concerning the global supply for lightning protection (both external and internal protection), ABB henceforth proposes a range of lightning arresters against overvoltages, dedicated to photovoltaic installations, both standalone and connected facilities.

Moreover, ABB Lightning Protection Group benefits from a laboratory including various generators enabling arresters to be tested under real conditions with shock currents of different amplitudes, and this in order to optimize protection solutions specific to the customer as regards photovoltaic installations.

PROTECT

Why do photovoltaic systems need to be protected?



Providing power with photovoltaic solar panels is tremendously interesting in the context of renewable energy sources, as regards economical LV photovoltaic systems connected to the public electricity network.

Because of their exposition, frequently in isolated sites and of the extended surface of photovoltaic systems (PV), lightning strikes are a major component in the risk to be assumed, both for the direct effect of lightning on the structure, and of the surge overvoltages on the installation.

Risk analysis on photovoltaic installations leads us to the following criteria: the extent, structure and exposition of the photovoltaic system as well as lightning strike density at the relevant site.

The consequences of lightning on the photovoltaic generator have repercussions on the entire equipment, because of the interconnection between the photovoltaic system and the electrical installation of the building. Moreover, the risk of financial losses should be taken into account, when considering the investment in solar panels at a photovoltaic site.



Photovoltaic system at an industrial site



Photovoltaic system at Villeurbanne, France

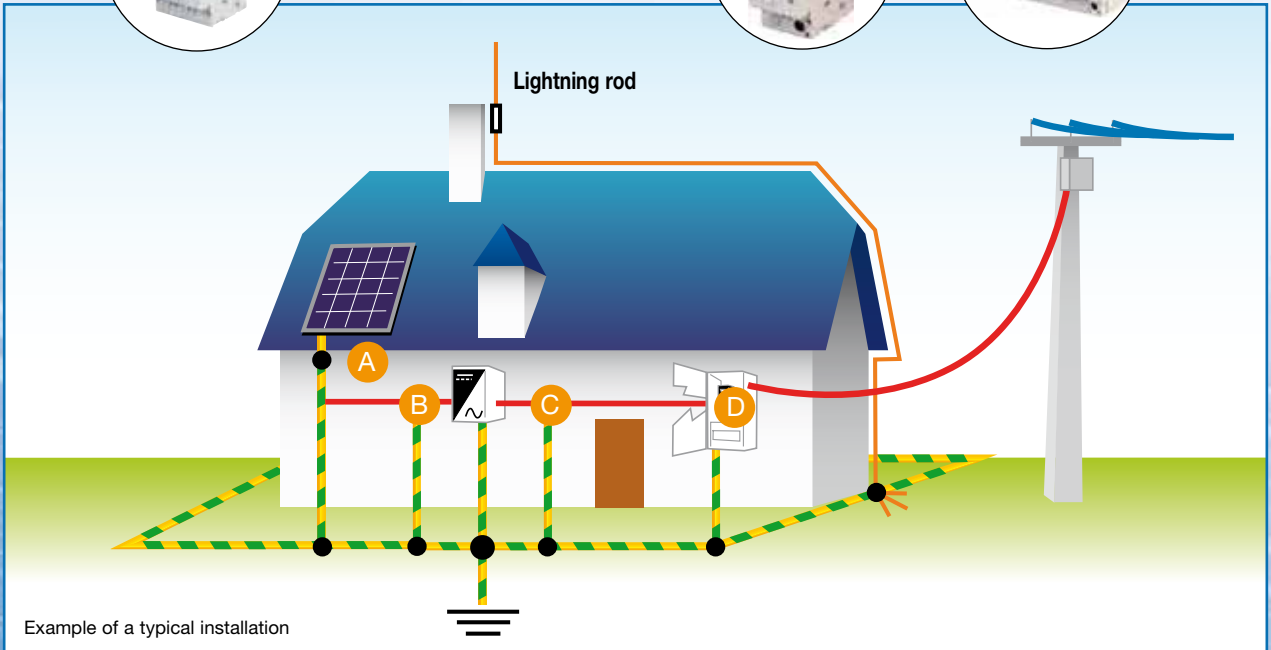


Photovoltaic system at the IUT of Tarbes, France

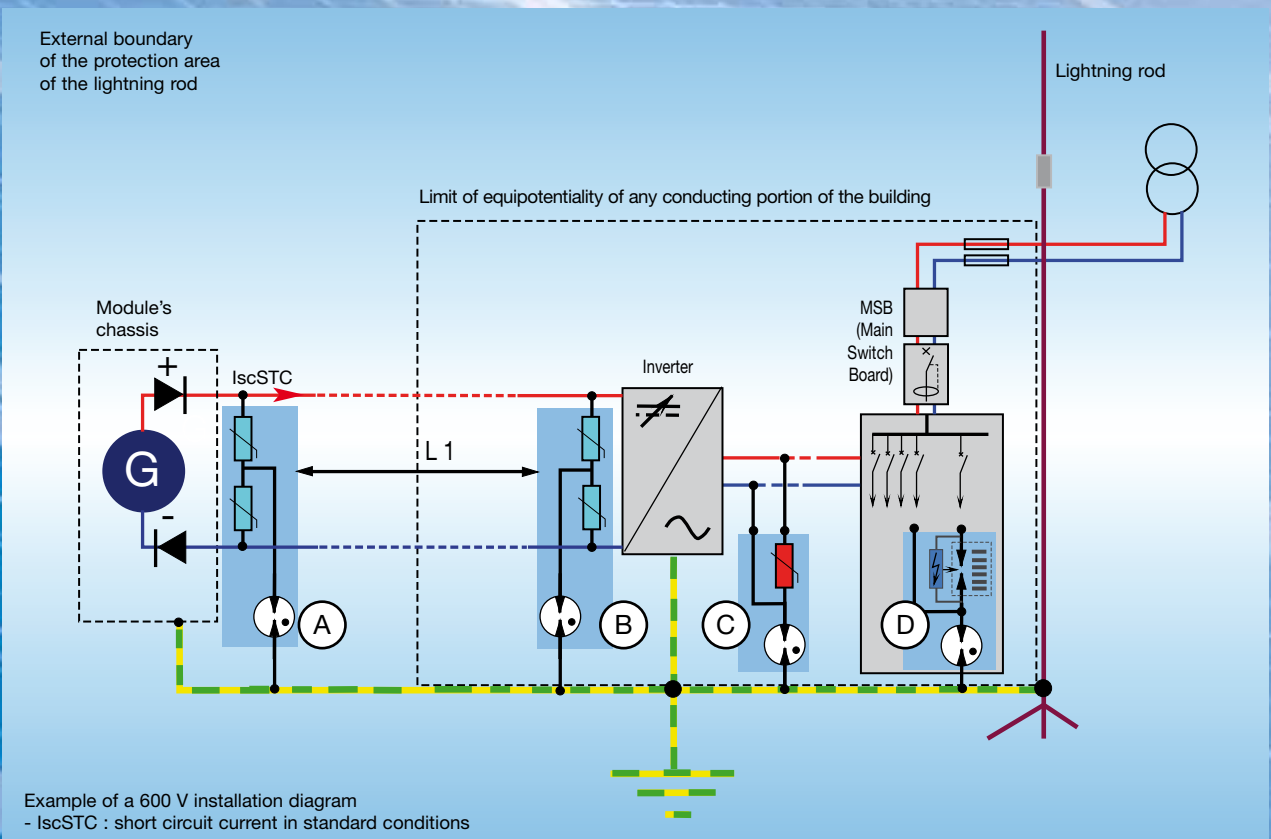
CONNECTED

Residential application

Protection of connected systems







*: OVR T1 mandatory in a presence of a lightning rod.



For more detail on our complete range of OVR surge arresters, please consult us.

Configuration of the surge arresters of the whole installation for residential application

Surge arrester location	Role	Options	Comment
	Protection of cells	If the distance L1 < 10 m, only OVR PV in A or B is recommended.	Connection to the chassis should be as short and rectilinear as possible. The lightning arrester depending on the environment should be installed in a leak-proof casing.
	Protection of the inverter input on the DC side	If the distance L1 < 10 m, only OVR PV in A or B is recommended.	Connection to the earthing bar and to the ground of the inverter on the DC side should be as short and rectilinear as possible.
	Protection of the inverter output on the AC side	Routine installation	Connection to the earthing bar and to the ground of the inverter on the AC side should be as short and rectilinear as possible.
	AC head protection at the entrance of the building	Routine installation	Connection to the earthing bar should be as short and rectilinear as possible.

OVR PV surge arresters for protecting photovoltaic systems are particularly suitable:

- Modular systems with pluggable cartridges for easy maintenance (without breaking the circuit),
- Fitted with remote auxiliary contacts for monitoring the operating status (TS),
- No follow current
- No risk of + and - inversion.



OVR PV surge arrester (A or B)

Selection of surge arresters, DC portion

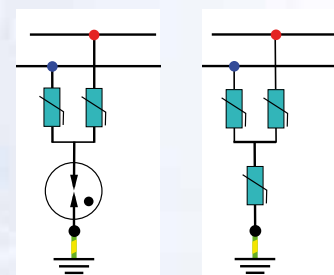
Surge arrester locations	Inverter U max.	Current flow capacity	Voltage protection level Up (L-L / L-PE)	Designation / Part number
A B	500 and 600 V	40 kA	2.8 / 1.4 kV	OVR PV 40 600 P 2CTB803953R5300
A B	500 and 600 V	40k A	2.8 / 1.4 kV	OVR PV 40 600 P TS* 2CTB803953R5400
A B	1000 V	40 kA	3.8 kV	OVR PV 40 1000 P 2CTB803953R6400
A B	1000 V	40 kA	3.8 kV	OVR PV 40 1000 P TS* 2CTB803953R6500

TS*: auxiliary contact

Selection of lightning arresters, AC portion (TT earthing system, Ph+N. Other surge arresters see OVR catalog)

Surge arrester location	Lightning rod presence	Designation / Part number
D	Yes	*OVR T1 3N 25 255 TS* / 2CTB815101R0700
C	Yes	OVR T2 1N 40 275 P / 2CTB803952R1100
D	No	*OVR T2 3N 70 275 s P / 2CTB803953R0100
C	No	OVR T2 1N 15 275 P / 2CTB803952R1200

*: also available in 1 pole + neutral (1N)



600 V OVR PV surge arrester block diagram (A or B)

1000 V OVR PV surge arrester block diagram (A or B)

Dimensions

L 42,5 mm X A. 85 mm X P. 63 mm

Cartridges for maintenance in 600 V

2 x OVR PV 40 600 C 2CTB803950R0000

Cartridges for maintenance in 600 V : neutral

OVR PV MC 2CTB803950R0300

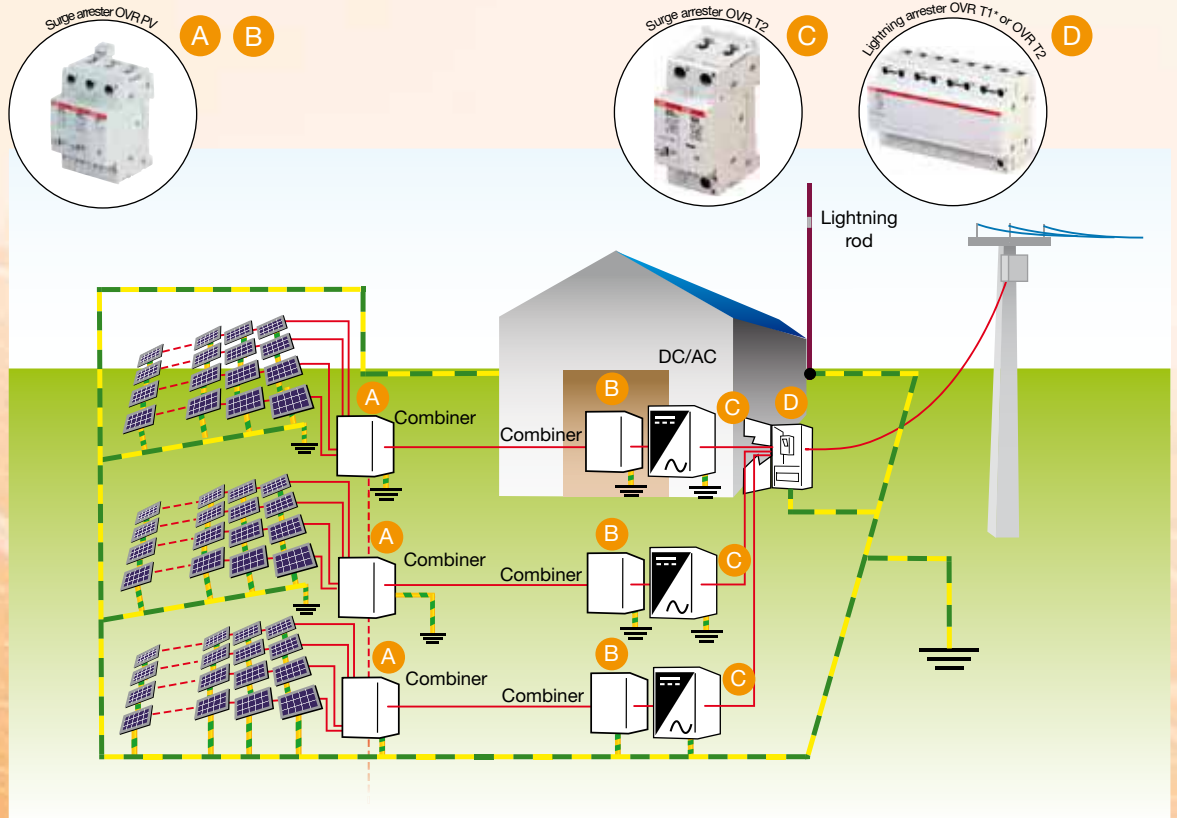
Cartridges for maintenance in 1000 V

3 x OVR PV 40-1000 C 2CTB803950R0100

CONNECTED

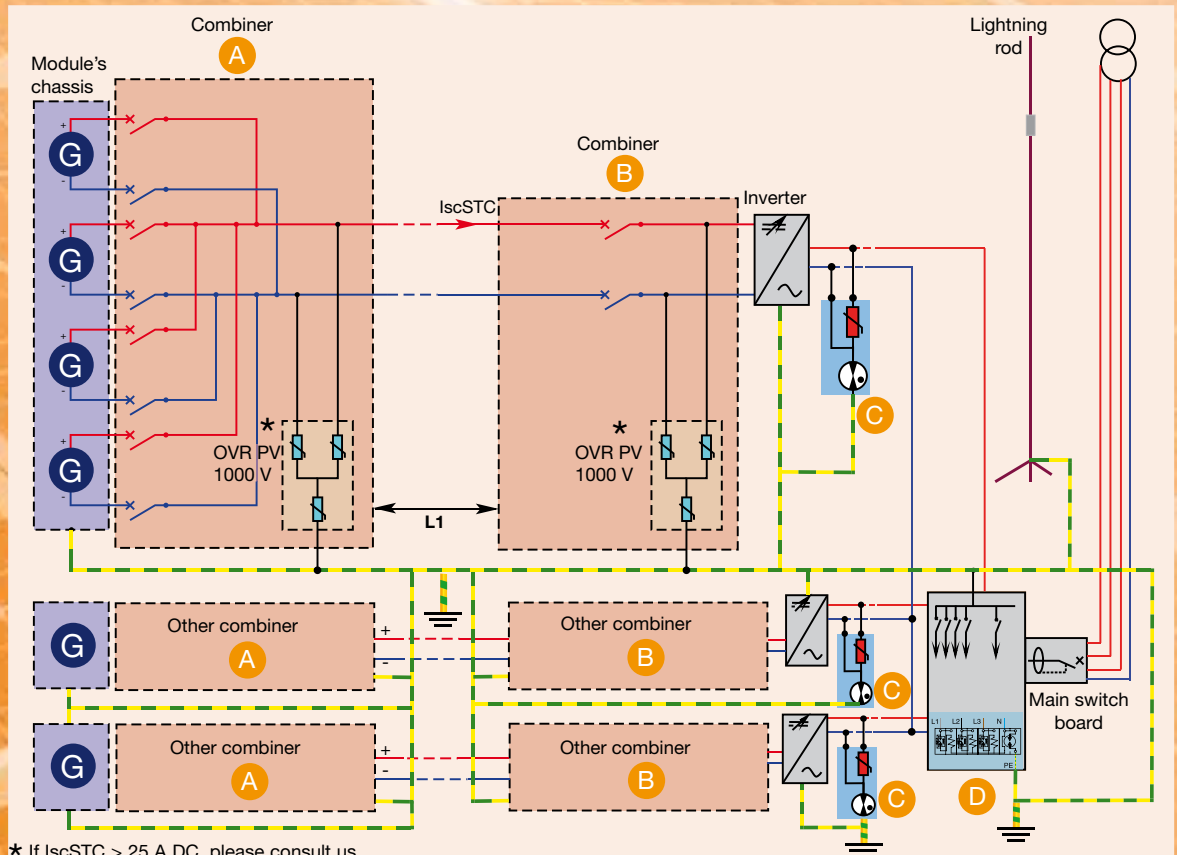
Power plant application

Protection
of connected systems
for power plant



Example of typical installation

*: OVR T1 mandatory in a presence of a lightning rod.



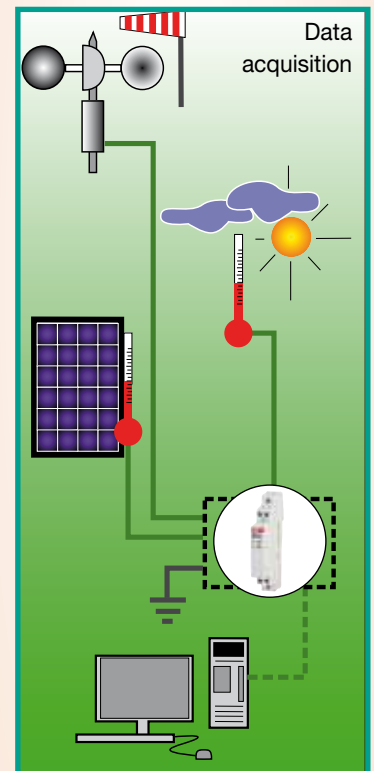
* If IscSTC > 25 A DC, please consult us.

For more detail on our complete range of OVR surge arresters, please consult us.

DATA

Protection of data lines

Selection guide according to use



Configuration of the surge arresters of the whole installation for power plant

Surge arrester location	Role	Options	Comment
	Protection of cells	If the distance $L1 < 10$ m, only OVR PV in A or B is recommended.	Connection to the chassis should be as short and rectilinear as possible. The lightning arrester depending on the environment should be installed in a leak-proof casing.
	Protection of the inverter input on the DC side	If the distance $L1 < 10$ m, only OVR PV in A or B is recommended.	Connection to the earthing bar and to the ground of the inverter on the DC side should be as short and rectilinear as possible.
	Protection of the inverter output on the AC side	Routine installation	Connection to the earthing bar and to the ground of the inverter on the AC side should be as short and rectilinear as possible.
	AC head protection at the entrance of the building	Routine installation	Connection to the earthing bar should be as short and rectilinear as possible.

Selection of surge arresters, DC portion

Surge arrester locations	Inverter U max.	Current flow capacity	Voltage protection level Up (L-L / L-PE)	Designation / Part number
A B	500 and 600 V	40 kA	2.8 / 1.4 kV	OVR PV 40 600 P 2CTB803953R5300
A B	500 and 600 V	40k A	2.8 / 1.4 kV	OVR PV 40 600 P TS* 2CTB803953R5400
A B	1000 V	40 kA	3.8 kV	OVR PV 40 1000 P 2CTB803953R6400
A B	1000 V	40 kA	3.8 kV	OVR PV 40 1000 P TS* 2CTB803953R6500

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Selection of lightning arresters, AC portion (TT earthing system, Ph+N. Other surge arresters see OVR catalog)

Surge arrester location	Lightning rod presence	Designation / Part number
D	Yes	OVR T1 3N 25 255 TS* / 2CTB815101R0700
C	Yes	OVR T2 1N 40 275 P / 2CTB803952R1100
D	No	OVR T2 3N 70 275 s P / 2CTB803953R0100
C	No	OVR T2 1N 15 275 P / 2CTB803952R1200

Surge arrester type	Signal voltage
OVR TC 06V P / 2CTB804820R0000	6 V
OVR TC 12V P / 2CTB804820R0100	12 V
OVR TC 24V P / 2CTB804820R0200	24 V
OVR TC 48V P / 2CTB804820R0300	48 V
OVR TC 200FR P / 2CTB804820R0500	220 V
OVR TC 200V P / 2CTB804820R0400	220 V



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