BREMAS

BETTER SWITCHES

DC DISCONNECT SWITCHES AND SURGE PROTECTIVE DEVICES

FOR PV APPLICATIONS

MADE IN ITALY

bremas.it


BREMAS
BETTER SWITCHES

BREMAS

BETTER SWITCHES

QUALITY MAKES OUR PRODUCTS GREAT

With over 50 years of experience we are specialist in the manufacturing of cam switches, disconnect switches, position and safety switches, power tools switches and relay sockets.

We design and build extremely realiable and efficient products: our company is managed in full accordance with UNI EN ISO 9001 and all our products are verified in our laboratory under the most stringent standards to guarantee performance, durability and safety.

We have a state of the art R&D department committed to develop new, better products. We have gained a wide experience in designing custom products for different industrial sectors: our technicians constantly interact with customers to develop solutions which can offer significant added value.

DP-DK-DM-DX-DU Series

Highest standards of quality

Bremas disconnect switches range is designed for safety operations even under load.
DP-DK-DM-DX-DU disconnect switches series has been specifically designed for DC applications in the solar industry.
Current ratings from 12A to 60A up to 1000Vdc, and from 10A to 30A up to 1500Vdc, are available just in one size. Thanks to its mechanical and electrical characteristics the **DP-DK-DM-DX-DU** achieves top performances and the highest standards of quality and operational reliability.

- Rated current: 60A
- Rated insulation voltage: 1500V
- PV1 and PV2 tested
- Terminal protection degree IP20
- Different mounting possibilities
- Padlockable handles and knobs
- IP66, NEMA 4X and IP67

Up to 60A at 1000Vdc

Up to 30A at 1500Vdc

With only 45 mm

Code structure

DX	150	30	1	2U	A	L	MVU5	E
Series	Rated Voltage	Rated Current	N° of inputs	Poles configuration	Handle position	Mounting type	Plate and/or knob	Suffixes (optional)

A complete range for DC applications

DC
Disconnect
Switches

Selected materials

The materials we employ have been carefully studied: the contacts are built with an exclusive alloy specifically made. The plastic components are made with V0 materials, the highest self-extinguishing degree. The handles are made with UV rays resistant materials.

Designed for the inverters of the next generation

Thanks to the modular construction, can manage up to 6 DC inputs/MPPT and up to 12 DC/AC poles.

Best powerful contact system

Reduced the time of the electric arc and better guarantees its fast extinction.

Worldwide installations

Certified according to the European standard IEC EN 60947 (TÜV), the Chinese regulations (CCC) and the American standard (UL).

Dimensions

The **DP-DK-DM-DX-DU** series has the most compact dimensions and the highest switching power on the market. Capable of breaking 60A and 1000Vdc with only 45 mm (1,77") of total depth or 30A at 1500Vdc, **DP-DK-DM-DX-DU** is the most complete and versatile range of disconnect switches for the solar industry.

Easy identification to positive (+) and negative (-) inputs

RED for Positive inputs/outputs. BLACK for Negative inputs/outputs.

Connection and easy wiring

The patented contacts solution permits to connect both the input and output cables in a linear way. The connecting terminals assure a trouble-free use of the screwdriver both in case of panel and base mounting. Designed for an optimal space exploitation: wires do not interfere with each other even in case of mounting adjacent to walls or other devices.

DP-DK-DM-DX-DU Series - Product range

DP10012 DC21B/PV1	DP10012 PV2	DK10016 DC21B/PV1	DK10016 PV2	DM10020 DC21B/PV1	DM10020 PV2	DX12030 DC21B/PV1	DX12030 PV2	DX12030..U DC21B/PV1	DX12030..U PV2
Poles 1+1		Poles 1+1		Poles 1+1		Poles 1+1		Poles 1+1	
1000Vdc 12A	**1000Vdc** 4A	**1200Vdc** 8A		**1100Vdc** 12A	**1100Vdc** 5A	**1500Vdc** 10A	**1500Vdc** 5A	**1500Vdc** 15A	**1500Vdc** 6A
750Vdc 25A	**750Vdc** 10A	**1000Vdc** 16A	**1000Vdc** 6A	**1000Vdc** 20A	**1000Vdc** 10A	**1250Vdc** 20A	**1250Vdc** 8A	**1250Vdc** 25A	**1250Vdc** 10A
600Vdc 32A	**600Vdc** 16A	**750Vdc** 32A	**750Vdc** 12A	**750Vdc** 32A	**750Vdc** 18A	**1000Vdc** 30A	**1000Vdc** 12A	**1100Vdc** 30A	**1100Vdc** 12A
			700Vdc 16A	**700Vdc** 40A	**700Vdc** 20A	**800Vdc** 45A	**800Vdc** 17A	**1000Vdc** 40A	**1000Vdc** 16A
		500Vdc 50A		**500Vdc** 50A			**700Vdc** 25A	**800Vdc** 50A	**800Vdc** 20A
									700Vdc 30A

DX15030..U DC21B/PV1	DX15030..U PV2	DX15030..P DC21B/PV1	DX15030..P PV2
Poles 1+1		Poles 1+1	
1500Vdc 20A	1500Vdc 8A	1500Vdc 30A	1500Vdc 12A
1300Vdc 25A	1300Vdc 10A	1000Vdc 60A	1000Vdc 25A
1250Vdc 30A	1250Vdc 12A		
1000Vdc 50A	1000Vdc 20A		
	800Vdc 30A		
	700Vdc 40A		

DU06020 UL	DU10020 UL	DU15020 UL	DU15030 UL
Poles 1+1	Poles 1+1	Poles 1+1	Poles 2+1
600Vdc 20A	1000Vdc 20A	1500Vdc 20A	1500Vdc 30A
	600Vdc 40A	1000Vdc 40A	1000Vdc 60A
		800Vdc 50A	

Technical data IEC EN 60947-3

			DP10012		DK10016		DM10020		DX12030	
Rated insulation voltage	Ui	V	1500		1500		1500		1500	
Rated impulse withstand voltage	Uimp	kV	8		8		8		8	
Rated thermal current	Ith	A	50		50		50		50	
Power loss per layer		W	0,2 / 1,25		0,2 / 1,25		0,2 / 1,25		0,2 / 1,25	
DC inputs										
Utilization category			PV1	PV2	PV1	PV2	PV1	PV2	PV1	PV2
Rated operational current at 1500 V	Ie	A	-	-	-	-	-	-	10	5
Rated operational current at 1300 V	Ie	A	-	-	-	-	-	-	-	-
Rated operational current at 1250 V	Ie	A	-	-	-	-	-	-	20	8
Rated operational current at 1200 V	Ie	A	-	-	8	-	-	-	-	-
Rated operational current at 1100 V	Ie	A	-	-	-	-	12	5	-	-
Rated operational current at 1000 V	Ie	A	12	4	16	6	20	10	30	12
Rated operational current at 800 V	Ie	A	-	-	-	-	-	-	45	17
Rated operational current at 750 V	Ie	A	25	10	32	12	32	18	-	-
Rated operational current at 700 V	Ie	A	-	-	-	16	40	20	-	25
Rated operational current at 600 V	Ie	A	32	16	-	-	-	-	-	-
Rated operational current at 500 V	Ie	A	-	-	50	-	50	-	-	-
Short circuit protection										
Rated conditional short-circuit current	gPV	kA	5		5		5		5	
Max fuse size for short circuit protection	Icw	A	50		50		50		50	
Rated short-time withstand current (1s)	Icm	A	780		780		780		780	
Rated short-circuit making capacity		kA	1,4		1,4		1,4		1,4	
AC inputs										
Rated insulation voltage	Ui	V	-		690		-		-	
Rated impulse withstand voltage	Uimp	kV	-		8		-		-	
Rated thermal current	Ith	A	-		63		-		-	
Utilization category			-		AC21-B		-		-	
Rated operational current	Ie	690V	-		63		-		-	
Mechanical characteristics										
Terminal capacity with solid wires	Max	mm^2	2x 6		2x 6		2x 6		2x 6	
		AWG	2x 10		2x 10		2x 10		2x 10	
Terminal capacity with fork terminals 10 mm^2	Max	mm^2	1x 16		1x 16		1x 16		1x 16	
		AWG	1x 4		1x 4		1x 4		1x 4	
Terminal screw			M4		M4		M4		M4	
Screw tightening torque	Nm		1,7 ±10%		1,7 ±10%		1,7 ±10%		1,7 ±10%	
	lb.in		12 ±10%		12 ±10%		12 ±10%		12 ±10%	
Protection degree IEC 529 EN 60529										
To the terminals			IP20		IP20		IP20		IP20	
Ambient conditions										
Pollution degree 2 2			2		2		2		2	
Operational ambient temperature		°C	-40 ÷ +70		-40 ÷ +70		-40 ÷ +70		-40 ÷ +70	
Storage ambient temperature		°C	-40 ÷ +85		-40 ÷ +85		-40 ÷ +85		-40 ÷ +85	
Damp heat test IEC60068-2-30			90-100% RH at +55 °C		90-100% RH at +55 °C		90-100% RH at +55 °C		90-100% RH at +55 °C	

UL 508i

Suitable as photovoltaic disconnect switch in accordance with Article 690 of NFPA 70 (NEC)

DX12030..U		DX15030..U		DX15030..P		DU06020	DU10020	DU15020	DU15030
1500		1500		1500		1500	1500	1500	1500
8		8		8		8	8	8	8
50		50		60		50	50	50	60
0,2 / 1,25		0,2 / 1,25		0,2 / 1,25		0,2 / 1,25	0,2 / 1,25	0,2 / 1,25	0,2 / 1,25
PV1	PV2	PV1	PV2	PV1	PV2	-	-	-	-
15	6	20	8	30	12	-	-	20	30
-	-	25	10	-	-	-	-	-	-
25	10	30	12	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
30	12	-	-	-	-	-	-	-	-
40	16	50	20	60	25	-	20	40	60
50	20	-	30	-	-	-	-	50	-
-	-	-	-	-	-	-	-	-	-
-	30	-	40	-	-	-	-	-	-
-	-	-	-	-	-	20	40	-	-
-	-	-	-	-	-	-	-	-	-
5		5		5		5	5	5	5
50		50		63		50	50	50	63
780		780		780		780	780	780	780
1,4		1,4		1,4		1,4	1,4	1,4	1,4
-		-		-		-	-	-	-
-		-		-		-	-	-	-
-		-		-		-	-	-	-
-		-		-		-	-	-	-
-		-		-		-	-	-	-
2x 6		2x 6		2x 6		2x 6	2x 6	2x 6	2x 6
2x 10		2x 10		2x 10		2x 10	2x 10	2x 10	2x 10
1x 16		1x 16		1x 16		1x 16	1x 16	1x 16	1x 16
1x 4		1x 4		1x 4		1x 4	1x 4	1x 4	1x 4
M4		M4		M4		M4	M4	M4	M4
1,7 ±10%		1,7 ±10%		1,7 ±10%		1,7 ±10%	1,7 ±10%	1,7 ±10%	1,7 ±10%
12 ±10%		12 ±10%		12 ±10%		12 ±10%	12 ±10%	12 ±10%	12 ±10%
IP20		IP20		IP20		IP20	IP20	IP20	IP20
2		2		2		2	2	2	2
-40 ÷ +70		-40 ÷ +70		-40 ÷ +70		-40 ÷ +70	-40 ÷ +70	-40 ÷ +70	-40 ÷ +70
-40 ÷ +85		-40 ÷ +85		-40 ÷ +85		-40 ÷ +85	-40 ÷ +85	-40 ÷ +85	-40 ÷ +85
90-100% RH at +55 °C		90-100% RH at +55 °C		90-100% RH at +55 °C		90-100% RH at +55 °C	90-100% RH at +55 °C	90-100% RH at +55 °C	90-100% RH at +55 °C

Applications

Inverter

String combiner boxes

Energy storage systems (ESS)

IP Protection

The highest level of waterproof and dustproof in photovoltaic industry certified by TUV.
IP66, NEMA 4X Standard / IP67 Optional.
Please contact us for more information.

IP66 - Water resistant against powerful jets

To pass IP66 testing, the fixture must be able to protect against powerful water jets.
Water projected in powerful jets (12.5 mm nozzle) against the enclosure from
any direction shall have no harmful effects.
Test duration: at least 3 minutes.
Water volume: 100 litres per minute.
Pressure: 100 kPa at distance of 3 m.

This protection is required for the main PV installation

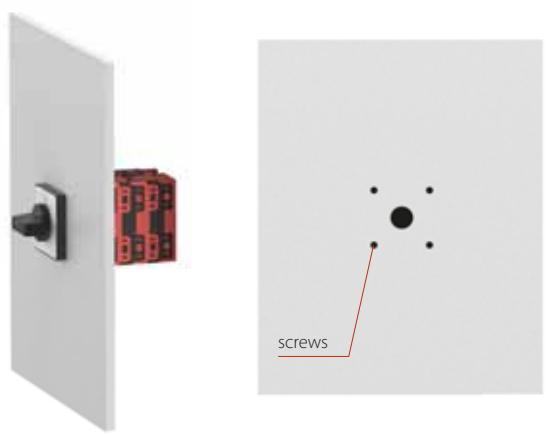
IP67 - Protected against complete temporary water submersion

To pass IP67 testing, ingress of water in harmful quantity shall not be possible
when the enclosure is immersed in water under defined conditions of pressure and time
(up to 1 m of submersion).
Test duration: 30 minutes.
Immersion at depth of at least 1 m measured at bottom of device,
and at least 15 cm measured at top of device.

This protection is required for floating PV installation

Fixing type

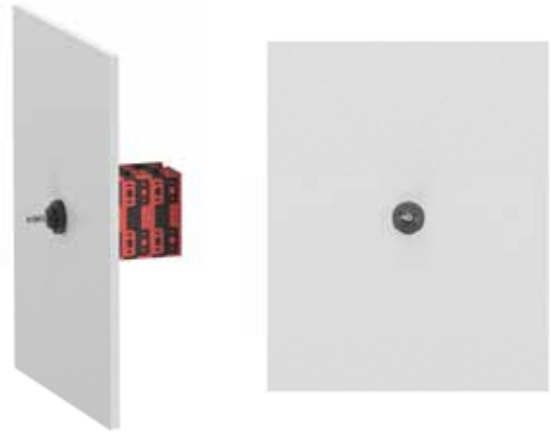
Panel mounting



Fixing by 4 screws

36x36mm hole spacing
48x48mm hole spacing

Main features
No bending of the switch
DIN rail not needed

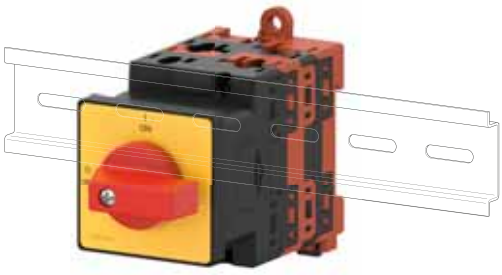


Fixing by M16 hole

Fixing with nut by M16x1,5mm single hole

Main features
Reduced assembly time.

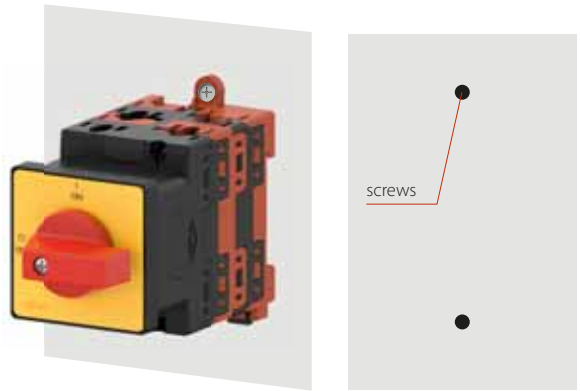
Base mounting



Fixing on DIN rail

Mechanical hooking on DIN rail

Main features
Reduced assembly time
Pre-mounted knob



Fixing by 2 screws

68mm hole spacing

Main features
Pre-mounted knob

Mounting type

Terminal screws orientation

Head up

Base mounting

Product image	Description	Mounting type
	Back-side for DIN rail or 2 screws fixing Direct operation With pre-mounted knob and/or plate	E
	Back-side for DIN rail or 2 screw fixing For standard distribution boards (45mm window) With pre-mounted knob	D

Panel mounting

Product image	Description	Mounting type
	Fixing M16 (L=12mm)	L
	Fixing 36x36mm with 4 tapping screws	T
	Fixing 48x48mm with 4 tapping screws	C

Double mounting

Product image	Description	Mounting type
	Back-side for DIN rail or 2 screws fixing Fixing M16 (L=12mm)	V
	Back-side for DIN rail or 2 screws fixing Fixing 36x36mm with 4 tapping screws	W
	Back-side for DIN rail or 2 screws fixing Fixing 48x48mm with 4 tapping screws	J

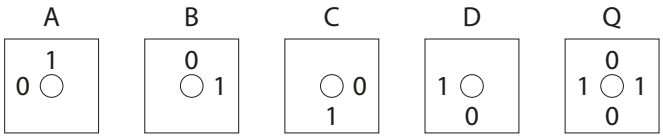
Other configurations available upon request.

Configuration

Handle position

Available for base mounting, panel mounting or double mounting

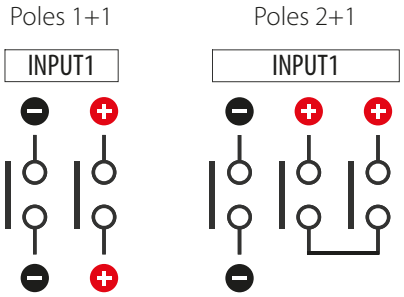
A = 9 (OFF) and 12 o'clock (ON)
B = 12 (OFF) and 3 o'clock (ON)
C = 3 (OFF) and 6 o'clock (ON)
D = 6 (OFF) and 9 o'clock (ON)
Q = 12 (OFF) and 3 o'clock (ON); 6 (OFF) and 9 o'clock (ON)



N° of inputs and poles configuration

N° of inputs
A single switch can manage up to 6 inputs/MPPT for DP-DK-DM-DX series, and up to 4 inputs/MPPT for DU series, with two poles each one (negative and positive polarity).

Poles configuration
It is possible to realize different poles configurations.
The standard configuration supplied is "Poles 1+1".



Other configurations available upon request

Handles and plates

DP-DM-DK-DX Series

Panel mounting – Fixing by 4 screws – IP66 handles

RV4

RW4

RV6

RW6

RKU6S

RL6S

Panel mounting / Double mounting – Fixing with nut by M16x1,5mm single hole

MVU5

MVU6

ML6

MKU6

ML5

MKU5

DU Series

Panel mounting - Fixing by 4 screws - NEMA 4X handles

RV4UL

RW4UL

RV6UL

RW6UL

Panel mounting / Double mounting – Fixing with nut by M16x1,5mm single hole

MKU5

MLU5

MKU6

MLU6

Enclosed disconnect switches

Enclosed DC disconnect switches IP65

- Nominal current from 12A up to 60A
- Nominal voltage up to 1500 Vdc
- Up to 4 DC Poles switching
- Compact dimensions
- Maximum terminal access
- IEC EN 60947 certified
- IP65 protection degree
- Double insulation ABS thermoplastic enclosure
- Handles padlockable in "OFF" position
- Cable entry knockout to simplify wiring

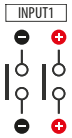
Standard and approvals

Country	Tecnischer Uberwachungs-Verein	USA	China	UK	Germany	Switzerland	Denmark	Norway	Sweden	Finland	Austria	Australia	Great Britain
Mark of standard	TÜV SÜD	UL Pending	CCC	UKCA	VDE 0660	+S	D	N	S	FI	OVE	RCM	BS EN 60947
DP 100 12	•	☐	•	+	+	+	+	+	+	+	+	+	+
DK 100 16	•	☐	•	+	+	+	+	+	+	+	+	+	+
DM 100 20	•	☐	•	+	+	+	+	+	+	+	+	+	+
DX 120 30	•	☐	•	+	+	+	+	+	+	+	+	•	+
DX 120 30 U	•	☐	•	+	+	+	+	+	+	+	+	•	+
DX 150 30 U	•	☐	•	+	+	+	+	+	+	+	+	•	+
DX 150 30 P	•	☐	•	+	+	+	+	+	+	+	+	•	+
DU 060 20	+	•	+	+	+	+	+	+	+	+	+	+	+
DU 100 20	+	•	+	+	+	+	+	+	+	+	+	+	+
DU 150 20	+	•	+	+	+	+	+	+	+	+	+	+	+
DU 150 30	+	•	+	+	+	+	+	+	+	+	+	+	+

• Approved
+ Conforms to requirements
☐ Not approved

DP - DK - DM - DX Series - For standard distribution boards (45mm window)

n° of poles 1x (1+1)



Base mounting

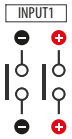
Pre-mounted knob

Fixing on DIN rail or by 2 screws

Series	PV1 cat. per input	PV1 cat. per input	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP100121E0ADRND	3*
DK	750V - 32A	1000V - 16A	DK100161E0ADRND	3*
DM	700V - 40A	1000V - 20A	DM100201E0ADRND	3*
DX	1000V - 30A	1500V - 10A	DX120301E0ADRND	3*
DX..U	1000V - 40A	1500V - 15A	DX120301EUADRND	3*
	1000V - 50A	1500V - 20A	DX150301EUADRND	3*
DX..P	1000V - 60A	1500V - 30A	DX150301EPADRND	3*

* One layer is empty.

n° of poles 1x (1+1)



Base mounting

Pre-mounted knob - Padlockable

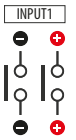
Fixing on DIN rail or by 2 screws

Series	PV1 cat. per input	PV1 cat. per input	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP100121E0ADRLE	3*
DK	750V - 32A	1000V - 16A	DK100161E0ADRLE	3*
DM	700V - 40A	1000V - 20A	DM100201E0ADRLE	3*
DX	1000V - 30A	1500V - 10A	DX120301E0ADRLE	3*
DX..U	1000V - 40A	1500V - 15A	DX120301EUADRLE	3*
	1000V - 50A	1500V - 20A	DX150301EUADRLE	3*
DX..P	1000V - 60A	1500V - 30A	DX150301EPADRLE	3*

* One layer is empty.

DP - DK - DM - DX Series - For direct operation

n° of poles 1x (1+1)



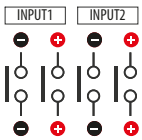
Base mounting - Pre-mounted knob

Fixing on DIN rail or by 2 screws

Series	PV1 cat. Per input	PV1 cat. Per input	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP10012120AERW4E	2
DK	750V - 32A	1000V - 16A	DK10016120AERW4E	2
DM	700V - 40A	1000V - 20A	DM10020120AERW4E	2
DX	1000V - 30A	1500V - 10A	DX120301E0AERW4E	3*
DX..U	1000V - 40A	1500V - 15A	DX120301EUAERW4E	3*
	1000V - 50A	1500V - 20A	DX150301EUAERW4E	3*
DX..P	1000V - 60A	1500V - 30A	DX150301EPAERW4E	3*

* One layer is empty.

n° of poles 2x (1+1)



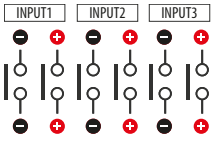
Base mounting - Pre-mounted knob

Fixing on DIN rail or by 2 screws

Series	PV1 cat. Per input	PV1 cat. Per input	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP10012220AERW4E	4
DK	750V - 32A	1000V - 16A	DK10016220AERW4E	4
DM	700V - 40A	1000V - 20A	DM10020220AERW4E	4
DX	1000V - 30A	1500V - 10A	DX120302E0AERW4E	5*
DX..U	1000V - 40A	1500V - 15A	DX120302EUAERW4E	5*
	1000V - 50A	1500V - 20A	DX150302EUAERW4E	5*
DX..P	1000V - 60A	1500V - 30A	DX150302EPAERW4E	5*

* One layer is empty.

n° of poles 3x (1+1)



Base mounting - Pre-mounted knob

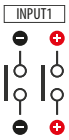
Fixing on DIN rail or by 2 screws

Series	PV1 cat. Per input	PV1 cat. Per input	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP10012320AERW4E	6
DK	750V - 32A	1000V - 16A	DK10016320AERW4E	6
DM	700V - 40A	1000V - 20A	DM10020320AERW4E	6
DX	1000V - 30A	1500V - 10A	DX120303E0AERW4E	7*
DX..U	1000V - 40A	1500V - 15A	DX120303EUAERW4E	7*
	1000V - 50A	1500V - 20A	DX150303EUAERW4E	7*
DX..P	1000V - 60A	1500V - 30A	DX150303EPAERW4E	7*

* One layer is empty.

DU Series - For direct operation

n° of poles 1x (1+1)



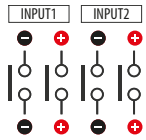
Base mounting - Pre-mounted knob

Fixing on DIN rail or by 2 screws

Series	UL Per input	UL Per input	Code	N° of layers
DU	600V-20A	-	**DU06020120AERW4UL**	2
DU	600V-40A	1000V-20A	**DU10020120AERW4UL**	2
DU	1000V-40A	1500V-20A	**DU15020120AERW4UL**	2
DU*	1000V-60A	1500V-30A	**DU15030130AERW4UL**	3

* n° of poles 1x (2+1)

n° of poles 2x (1+1)



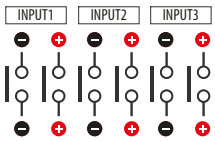
Base mounting - Pre-mounted knob

Fixing on DIN rail or by 2 screws

Series	UL Per input	UL Per input	Code	N° of layers
DU	600V-20A	-	**DU06020220AERW4UL**	4
DU	600V-40A	1000V-20A	**DU10020220AERW4UL**	4
DU	1000V-40A	1500V-20A	**DU15020220AERW4UL**	4
DU*	1000V-60A	1500V-30A	**DU15030230AERW4UL**	6

* n° of poles 2x (2+1)

n° of poles 3x (1+1)



Base mounting - Pre-mounted knob

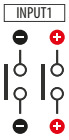
Fixing on DIN rail or by 2 screws

Series	UL Per input	UL Per input	Code	N° of layers
DU	600V-20A	-	**DU06020320AERW4UL**	6
DU	600V-40A	1000V-20A	**DU10020320AERW4UL**	6
DU	1000V-40A	1500V-20A	**DU15020320AERW4UL**	6
DU*	1000V-60A	1500V-30A	**DU15030330AERW4UL**	9

* n° of poles 3x (2+1)

DP - DK - DM - DX Series - 1 input / MPPT

n° of poles 1x (1+1)



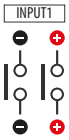
Panel mounting

4 screws 36x36mm

Single hole M16

Series	PV1 cat. Per input	PV1 cat. Per input	Code	Code	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP10012120ATRV4E	DP10012120ALMVU5E	DP10012120ALMVU6E	2
DK	750V - 32A	1000V - 16A	DK10016120ATRV4E	DK10016120ALMVU5E	DK10016120ALMVU6E	2
DM	700V - 40A	1000V - 20A	DM10020120ATRV4E	DM10020120ALMVU5E	DM10020120ALMVU6E	2
DX	1000V - 30A	1500V - 10A	DX12030120ATRV4E	DX12030120ALMVU5E	DX12030120ALMVU6E	2
DX..U	1000V - 40A	1500V - 15A	DX1203012UATRV4E	DX1203012UALMVU5E	DX1203012UALMVU6E	2
	1000V - 50A	1500V - 20A	DX1503012UATRV4E	DX1503012UALMVU5E	DX1503012UALMVU6E	2
DX..P	1000V - 60A	1500V - 30A	DX1503012PATRV4E	DX1503012PALMVU5E	DX1503012PALMVU6E	2

n° of poles 1x (1+1)



Panel mounting

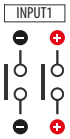
4 screws 36x36mm

Single hole M16

Series	PV1 cat. Per input	PV1 cat. Per input	Code	Code	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP10012120ATRKU6SE	DP10012120ALML5E	DP10012120ALMKU6E	2
DK	750V - 32A	1000V - 16A	DK10016120ATRKU6SE	DK10016120ALML5E	DK10016120ALMKU6E	2
DM	700V - 40A	1000V - 20A	DM10020120ATRKU6SE	DM10020120ALML5E	DM10020120ALMKU6E	2
DX	1000V - 30A	1500V - 10A	DX12030120ATRKU6SE	DX12030120ALML5E	DX12030120ALMKU6E	2
DX..U	1000V - 40A	1500V - 15A	DX1203012UATRKU6SE	DX1203012UALML5E	DX1203012UALMKU6E	2
	1000V - 50A	1500V - 20A	DX1503012UATRKU6SE	DX1503012UALML5E	DX1503012UALMKU6E	2
DX..P	1000V - 60A	1500V - 30A	DX1503012PATRKU6SE	DX1503012PALML5E	DX1503012PALMKU6E	2

DU Series - 1 input / MPPT

n° of poles 1x (1+1)



Panel mounting

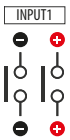
4 screws 36x36mm

Single hole M16

Series	UL per input	UL per input	Code	Code	Code	N° of layers
DU	600V-20A	-	DU06020120ATRV4UL	DU06020120ALMKU5	DU06020120ALMLU5	2
DU	600V-40A	1000V-20A	DU10020120ATRV4UL	DU10020120ALMKU5	DU10020120ALMLU5	2
DU	1000V-40A	1500V-20A	DU15020120ATRV4UL	DU15020120ALMKU5	DU15020120ALMLU5	2
DU*	1000V-60A	1500V-30A	DU15030130ATRV4UL	DU15030130ALMKU5	DU15030130ALMLU5	3

* n° of poles 1x (2+1)

n° of poles 1x (1+1)



Panel mounting

4 screws 36x36mm

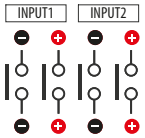
Single hole M16

Series	UL per input	UL per input	Code	Code	Code	N° of layers
DU	600V-20A	-	DU06020120ATRW4UL	DU06020120ALMKU6	DU06020120ALMLU6	2
DU	600V-40A	1000V-20A	DU10020120ATRW4UL	DU10020120ALMKU6	DU10020120ALMLU6	2
DU	1000V-40A	1500V-20A	DU15020120ATRW4UL	DU15020120ALMKU6	DU15020120ALMLU6	2
DU*	1000V-60A	1500V-30A	DU15030130ATRW4UL	DU15030130ALMKU6	DU15030130ALMLU6	3

* n° of poles 1x (2+1)

DP - DK - DM - DX Series - 2 inputs / MPPT

n° of poles 2x (1+1)



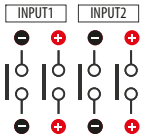
Panel mounting

4 screws 36x36mm

Single hole M16

Series	PV1 cat. per input	PV1 cat. per input	Code	Code	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP10012220ATRV4E	DP10012220ALMVU5E	DP10012220ALMVU6E	4
DK	750V - 32A	1000V - 16A	DK10016220ATRV4E	DK10016220ALMVU5E	DK10016220ALMVU6E	4
DM	700V - 40A	1000V - 20A	DM10020220ATRV4E	DM10020220ALMVU5E	DM10020220ALMVU6E	4
DX	1000V - 30A	1500V - 10A	DX12030220ATRV4E	DX12030220ALMVU5E	DX12030220ALMVU6E	4
DX..U	1000V - 40A	1500V - 15A	DX1203022UATRV4E	DX1203022UALMVU5E	DX1203022UALMVU6E	4
	1000V - 50A	1500V - 20A	DX1503022UATRV4E	DX1503022UALMVU5E	DX1503022UALMVU6E	4
DX..P	1000V - 60A	1500V - 30A	DX1503022PATRV4E	DX1503022PALMVU5E	DX1503022PALMVU6E	4

n° of poles 2x (1+1)



Panel mounting

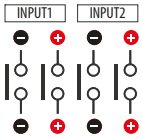
4 screws 36x36mm

Single hole M16

Series	PV1 cat. per input	PV1 cat. per input	Code	Code	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP10012220ATRKU6SE	DP10012220ALML5E	DP10012220ALMKU6E	4
DK	750V - 32A	1000V - 16A	DK10016220ATRKU6SE	DK10016220ALML5E	DK10016220ALMKU6E	4
DM	700V - 40A	1000V - 20A	DM10020220ATRKU6SE	DM10020220ALML5E	DM10020220ALMKU6E	4
DX	1000V - 30A	1500V - 10A	DX12030220ATRKU6SE	DX12030220ALML5E	DX12030220ALMKU6E	4
DX..U	1000V - 40A	1500V - 15A	DX1203022UATRKU6SE	DX1203022UALML5E	DX1203022UALMKU6E	4
	1000V - 50A	1500V - 20A	DX1503022UATRKU6SE	DX1503022UALML5E	DX1503022UALMKU6E	4
DX..P	1000V - 60A	1500V - 30A	DX1503022PATRKU6SE	DX1503022PALML5E	DX1503022PALMKU6E	4

DU Series - 2 inputs / MPPT

n° of poles 2x (1+1)



Panel mounting

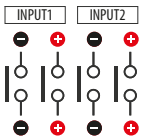
4 screws 36x36mm

Single hole M16

Series	UL per input	UL per input	Code	Code	Code	N° of layers
DU	600V-20A	-	DU06020220ATRV4UL	DU06020220ALMKU5	DU06020220ALMLU5	4
DU	600V-40A	1000V-20A	DU10020220ATRV4UL	DU10020220ALMKU5	DU10020220ALMLU5	4
DU	1000V-40A	1500V-20A	DU15020220ATRV4UL	DU15020220ALMKU5	DU15020220ALMLU5	4
DU*	1000V-60A	1500V-30A	DU15030230ATRV4UL	DU15030230ALMKU5	DU15030230ALMLU5	6

* n° of poles 2x (2+1)

n° of poles 2x (1+1)



Panel mounting

4 screws 36x36mm

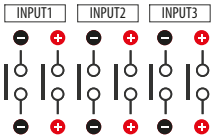
Single hole M16

Series	UL per input	UL per input	Code	Code	Code	N° of layers
DU	600V-20A	-	DU06020220ATRW4UL	DU06020220ALMKU6	DU06020220ALMLU6	4
DU	600V-40A	1000V-20A	DU10020220ATRW4UL	DU10020220ALMKU6	DU10020220ALMLU6	4
DU	1000V-40A	1500V-20A	DU15020220ATRW4UL	DU15020220ALMKU6	DU15020220ALMLU6	4
DU*	1000V-60A	1500V-30A	DU15030230ATRW4UL	DU15030230ALMKU6	DU15030230ALMLU6	6

* n° of poles 2x (2+1)

DP - DK - DM - DX Series - 3 inputs / MPPT

n° of poles 3x (1+1)



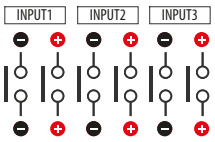
Panel mounting

4 screws 36x36mm

Single hole M16

Series	PV1 cat. Per input	PV1 cat. Per input	Code	Code	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP10012320ATRV4E	DP10012320ALMVU5E	DP10012320ALMVU6E	6
DK	750V - 32A	1000V - 16A	DK10016320ATRV4E	DK10016320ALMVU5E	DK10016320ALMVU6E	6
DM	700V - 40A	1000V - 20A	DM10020320ATRV4E	DM10020320ALMVU5E	DM10020320ALMVU6E	6
DX	1000V - 30A	1500V - 10A	DX12030320ATRV4E	DX12030320ALMVU5E	DX12030320ALMVU6E	6
DX..U	1000V - 40A	1500V - 15A	DX1203032UATRV4E	DX1203032UALMVU5E	DX1203032UALMVU6E	6
	1000V - 50A	1500V - 20A	DX1503032UATRV4E	DX1503032UALMVU5E	DX1503032UALMVU6E	6
DX..P	1000V - 60A	1500V - 30A	DX1503032PATRV4E	DX1503032PALMVU5E	DX1503032PALMVU6E	6

n° of poles 3x (1+1)



Panel mounting

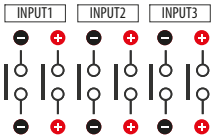
4 screws 36x36mm

Single hole M16

Series	PV1 cat. Per input	PV1 cat. Per input	Code	Code	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP10012320ATRKU6SE	DP10012320ALML5E	DP10012320ALMKU6E	6
DK	750V - 32A	1000V - 16A	DK10016320ATRKU6SE	DK10016320ALML5E	DK10016320ALMKU6E	6
DM	700V - 40A	1000V - 20A	DM10020320ATRKU6SE	DM10020320ALML5E	DM10020320ALMKU6E	6
DX	1000V - 30A	1500V - 10A	DX12030320ATRKU6SE	DX12030320ALML5E	DX12030320ALMKU6E	6
DX..U	1000V - 40A	1500V - 15A	DX1203032UATRKU6SE	DX1203032UALML5E	DX1203032UALMKU6E	6
	1000V - 50A	1500V - 20A	DX1503032UATRKU6SE	DX1503032UALML5E	DX1503032UALMKUE	6
DX..P	1000V - 60A	1500V - 30A	DX1503032PATRKU6SE	DX1503032PALML5E	DX1503032PALMKUE	6

DU Series - 3 inputs / MPPT

n° of poles 3x (1+1)



Panel mounting

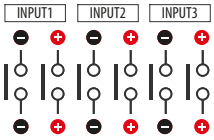
4 screws 36x36mm

Single hole M16

Series	UL per input	UL per input	Code	Code	Code	N° of layers
DU	600V-20A	-	DU06020320ATRV4UL	DU06020320ALMKU5	DU06020320ALMLU5	6
DU	600V-40A	1000V-20A	DU10020320ATRV4UL	DU10020320ALMKU5	DU10020320ALMLU5	6
DU	1000V-40A	1500V-20A	DU15020320ATRV4UL	DU15020320ALMKU5	DU15020320ALMLU5	6
DU*	1000V-60A	1500V-30A	DU15030330ATRV4UL	DU15030330ALMKU5	DU15030330ALMLU5	9

* n° of poles 3x (2+1)

n° of poles 3x (1+1)



Panel mounting

4 screws 36x36mm

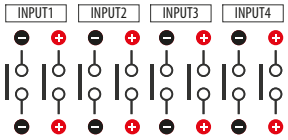
Single hole M16

Series	UL per input	UL per input	Code	Code	Code	N° of layers
DU	600V-20A	-	DU06020320ATRW4UL	DU06020320ALMKU6	DU06020320ALMLU6	6
DU	600V-40A	1000V-20A	DU10020320ATRW4UL	DU10020320ALMKU6	DU10020320ALMLU6	6
DU	1000V-40A	1500V-20A	DU15020320ATRW4UL	DU15020320ALMKU6	DU15020320ALMLU6	6
DU*	1000V-60A	1500V-30A	DU15030330ATRW4UL	DU15030330ALMKU6	DU15030330ALMLU6	9

* n° of poles 3x (2+1)

DP - DK - DM - DX Series - 4 inputs / MPPT

n° of poles 4x (1+1)



Panel mounting

4 screws 36x36mm

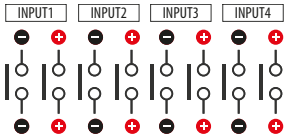
Double mounting

Single hole M16

Series	PV1 cat. per input	PV1 cat. per input	Code	Code	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP10012420ATRV4E	DP10012420AVMVU5E	DP10012420AVMVU6E	8
DK	750V - 32A	1000V - 16A	DK10016420ATRV4E	DK10016420AVMVU5E	DK10016420AVMVU6E	8
DM	700V - 40A	1000V - 20A	DM10020420ATRV4E	DM10020420AVMVU5E	DM10020420AVMVU6E	8
DX	1000V - 30A	1500V - 10A	DX12030420ATRV4E	DX120304E0AVMVU5E*	DX120304E0AVMVU6E*	8
DX..U	1000V - 40A	1500V - 15A	DX1203042UATRV4E	DX120304EUAVMVU5E*	DX120304EUAVMVU6E*	8
	1000V - 50A	1500V - 20A	DX1503042UATRV4E	DX150304EUAVMVU5E*	DX150304EUAVMVU6E*	8
DX..P	1000V - 60A	1500V - 30A	DX1503042PATRV4E	DX150304EPAVMVU5E*	DX150304EPAVMVU6E*	8

* N of layers 9, one is empty.

n° of poles 4x (1+1)



Panel mounting

4 screws 36x36mm

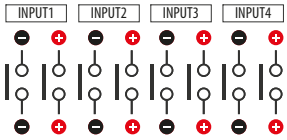
Double mounting

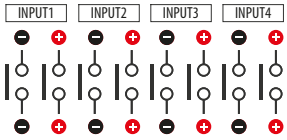
Single hole M16

Series	PV1 cat. per input	PV1 cat. per input	Code	Code	Code	N° of layers
DP	600V - 32A	1000V - 12A	DP10012420ATRKU6SE	DP10012420AVML5E	DP10012420AVMKU6E	8
DK	750V - 32A	1000V - 16A	DK10016420ATRKU6SE	DK10016420AVML5E	DK10016420AVMKU6E	8
DM	700V - 40A	1000V - 20A	DM10020420ATRKU6SE	DM10020420AVML5E	DM10020420AVMKU6E	8
DX	1000V - 30A	1500V - 10A	DX12030420ATRKU6SE	DX120304E0AVML5E*	DX120304E0AVMKU6E*	8
DX..U	1000V - 40A	1500V - 15A	DX1203042UATRKU6SE	DX120304EUAVML5E*	DX120304EUAVMKU6E*	8
	1000V - 50A	1500V - 20A	DX1503042UATRKU6SE	DX150304EUAVML5E*	DX150304EUAVMKU6E*	8
DX..P	1000V - 60A	1500V - 30A	DX1503042PATRKU6SE	DX150304EPAVML5E*	DX150304EPAVMKU6E*	8

* One layer is empty.

DU Series - 4 inputs / MPPT

n° of poles 4x (1+1)			Panel mounting	Double mounting		
			 4 screws 36x36mm	 Single hole M16		
Series	**UL per input**	**UL per input**	**Code**	**Code**	**Code**	**N° of layers**
DU	600V-20A	-	**DU06020420ATRV4UL**	**DU06020420AVMKU5**	**DU06020420AVMLU5**	8
DU	600V-40A	1000V-20A	**DU10020420ATRV4UL**	**DU10020420AVMKU5**	**DU10020420AVMLU5**	8
DU	1000V-40A	1500V-20A	**DU15020420ATRV4UL**	**DU15020420AVMKU5**	**DU15020420AVMLU5**	8

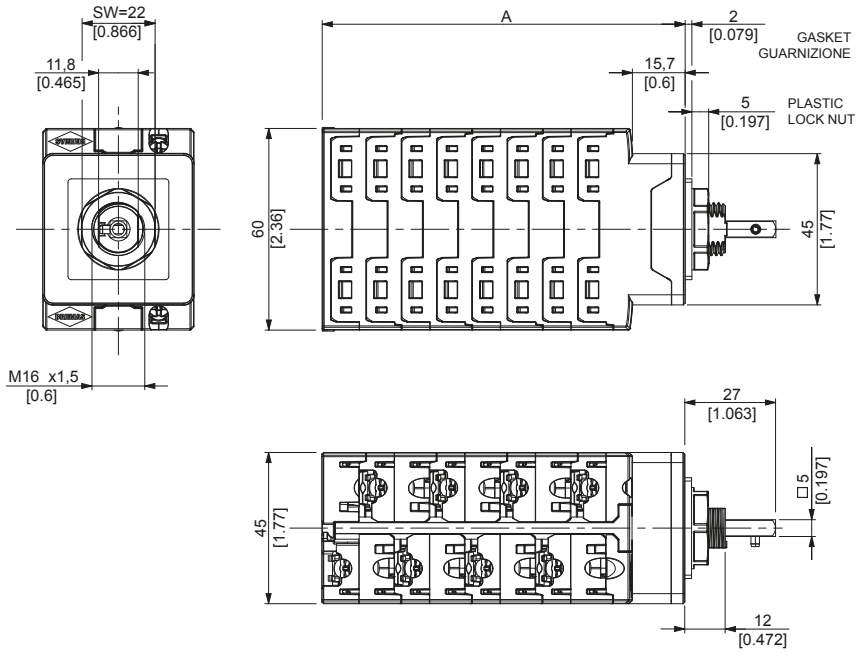
n° of poles 4x (1+1)			Panel mounting	Double mounting		
			 4 screws 36x36mm	 Single hole M16		
Series	**UL per input**	**UL per input**	**Code**	**Code**	**Code**	**N° of layers**
DU	600V-20A	-	**DU06020420ATRW4UL**	**DU06020420AVMKU6**	**DU06020420AVMLU6**	8
DU	600V-40A	1000V-20A	**DU10020420ATRW4UL**	**DU10020420AVMKU6**	**DU10020420AVMLU6**	8
DU	1000V-40A	1500V-20A	**DU15020420ATRW4UL**	**DU15020420AVMKU6**	**DU15020420AVMLU6**	8

DP - DK - DM - DX Series - Enclosed disconnect switches

				Enclousure B140 - IP65	
					
				Yellow/Red padlockable handle	Grey/Black padlockable handle
Series	**PV1 cat. per input**	**PV1 cat. per input**	**N° of poles**	**Code**	**Code**
DP	600V - 32A	1000V - 12A	1x (1+1)	**DP10012120AB140ML6**	**DP10012120AB140MKU6**
			2x (1+1)	**DP10012220AB140ML6**	**DP10012220AB140MKU6**
DK	750V - 32A	1000V - 16A	1x (1+1)	**DK10016120AB140ML6**	**DK10016120AB140MKU6**
			2x (1+1)	**DK10016220AB140ML6**	**DK10016220AB140MKU6**
DM	700V - 40A	1000V - 20A	1x (1+1)	**DM10020120AB140ML6**	**DM10020120AB140MKU6**
			2x (1+1)	**DM10020220AB140ML6**	**DM10020220AB140MKU6**
DX	1000V - 30A	1500V- 10A	1x (1+1)	**DX12030120AB140ML6**	**DX12030120AB140MKU6**
			2x (1+1)	**DX12030220AB140ML6**	**DX12030220AB140MKU6**
DX..U	1000V - 40A	1500V- 15A	1x (1+1)	**DX1203012UAB140ML6**	**DX1203012UAB140MKU6**
			2x (1+1)	**DX1203022UAB140ML6**	**DX1203022UAB140MKU6**
	1000V - 50A	1500V- 20A	1x (1+1)	**DX1503012UAB140ML6**	**DX1503012UAB140MKU6**
			2x (1+1)	**DX1503022UAB140ML6**	**DX1503022UAB140MKU6**
DX..P	1000V - 60A	1500V- 30A	1x (1+1)	**DX1503012PAB140ML6**	**DX1503012PAB140MKU6**
			2x (1+1)	**DX1503022PAB140ML6**	**DX1503022PAB140MKU6**

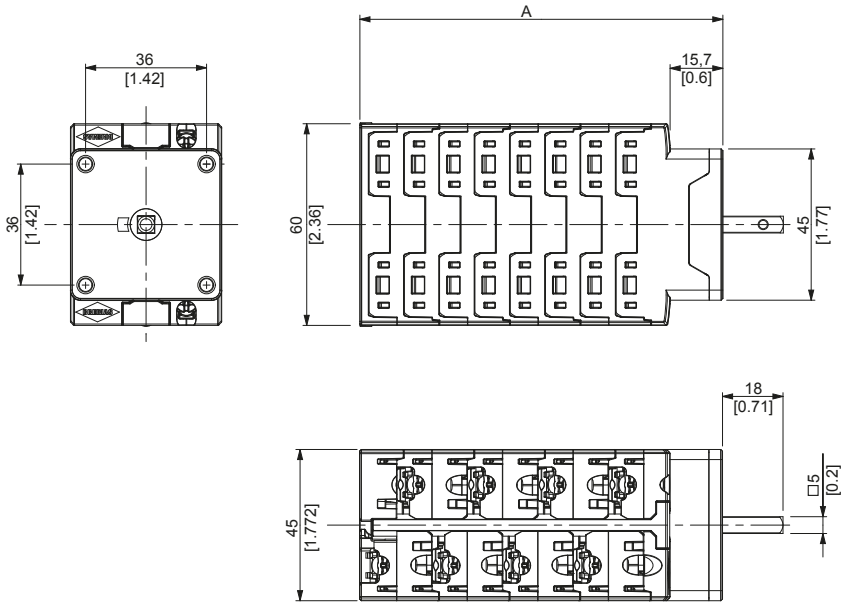
Dimensions

Panel mounting L - Fixing M16



	Panel mounting L					
Number of layers	2	3	4	6	8	9
A dimensions (mm)	45	55,5	66	90	108	118,5

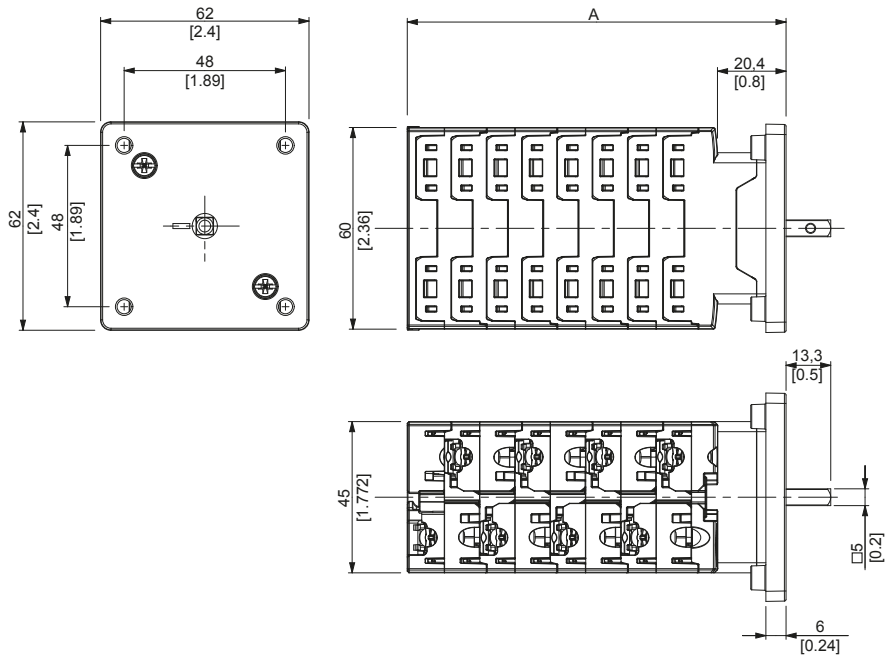
Panel mounting T - Fixing with 4 screws 36x36mm



	Panel mounting T					
Number of layers	2	3	4	6	8	9
A dimensions (mm)	45	55,5	66	90	108	118,5

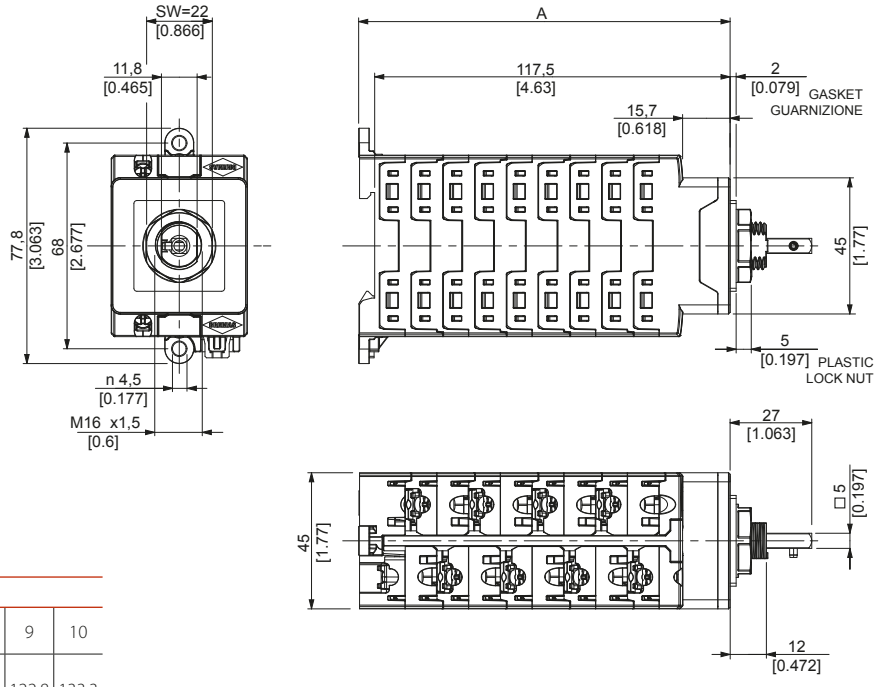
Dimensions

Panel mounting C - Fixing with 4 screws 48x48mm



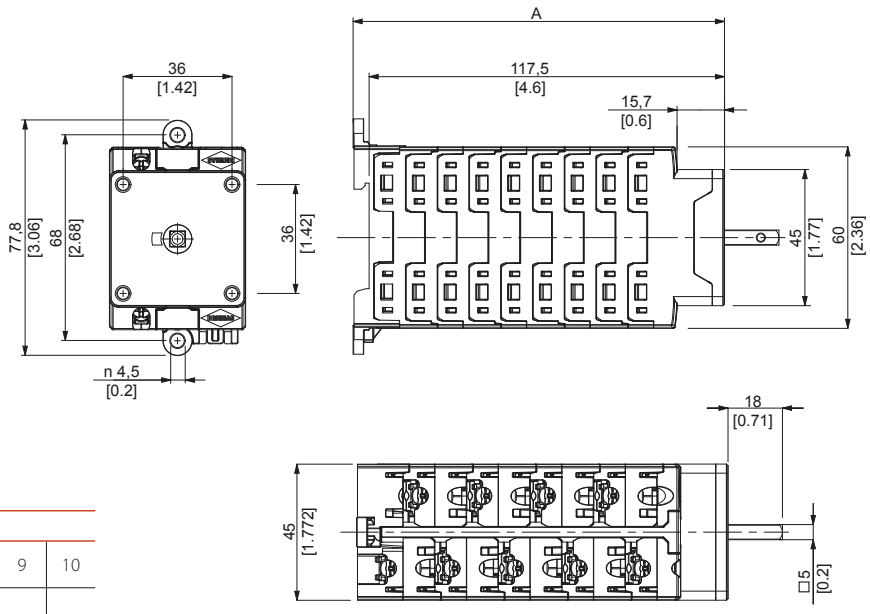
	Panel mounting C					
Number of layers	2	3	4	6	8	9
A dimensions (mm)	49,7	60,2	70,7	91,7	112,7	123,2

Double mounting V - Fixing M16



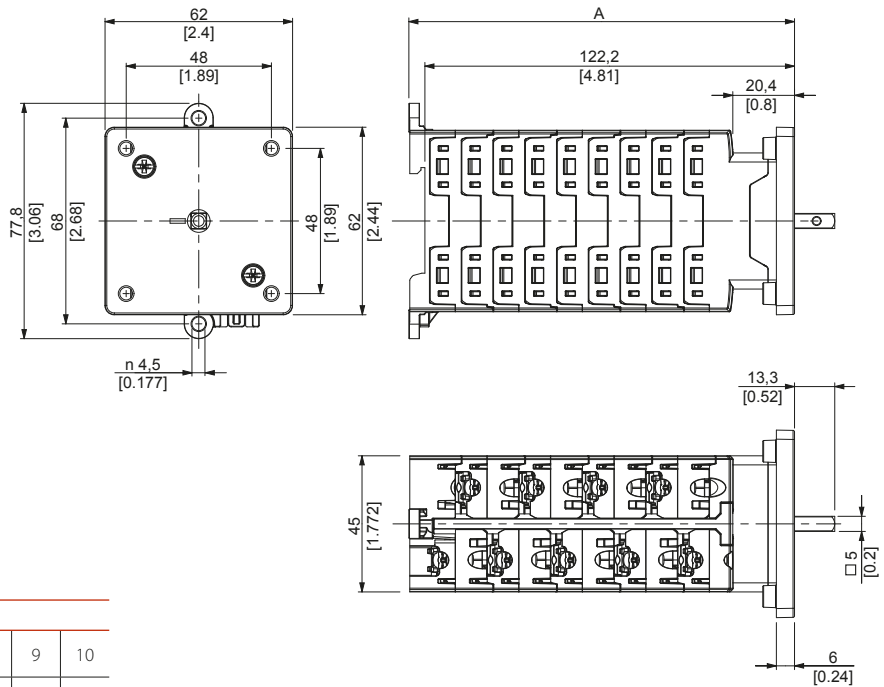
	Double mounting V								
Number of layers	2	3	4	5	6	7	8	9	10
A dimensions (mm)	49,3	59,8	70,3	80,8	91,3	101,8	112,3	122,8	133,3

Double mounting W - Fixing with 4 screws 36x36mm



	Double mounting W								
Number of layers	2	3	4	5	6	7	8	9	10
A dimensions (mm)	49,3	59,8	70,3	80,8	91,3	101,8	112,3	122,8	133,3

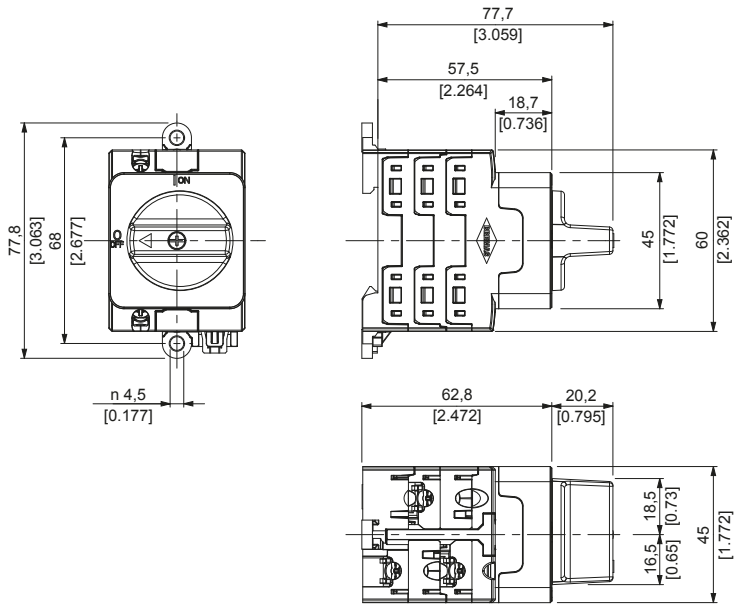
Double mounting J - Fixing with 4 screws 48x48mm



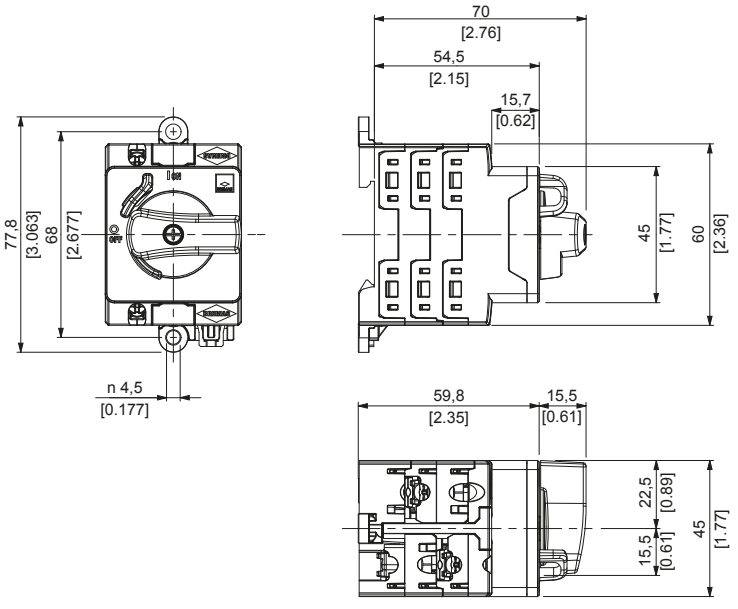
	Double mounting J								
Number of layers	2	3	4	5	6	7	8	9	10
A dimensions (mm)	54	64,5	75	85,5	96	106,5	117	127,5	138

Dimensions

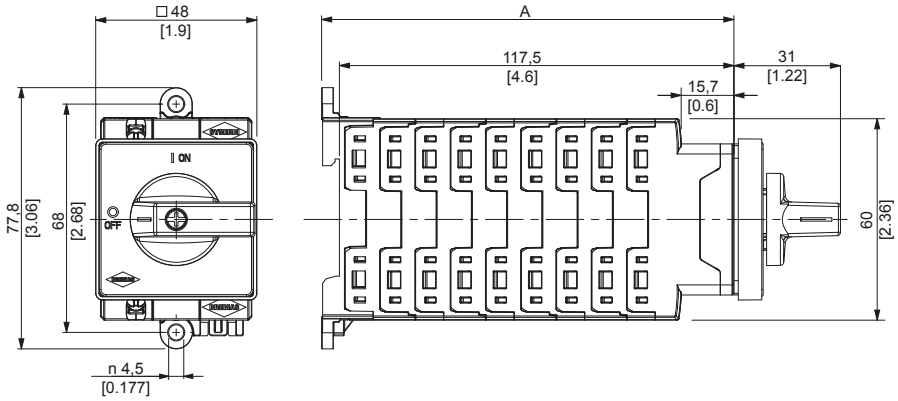
Base mounting D - Back-side for DIN rail or 2 screws fixing
For standard distribution boards (45mm window)
With pre-mounted knob



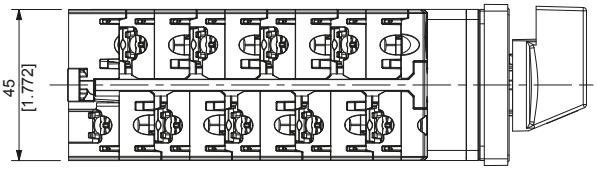
Base mounting D - Back-side for DIN rail or 2 screws fixing
For standard distribution boards (45mm window)
With pre-mounted padlockable knob



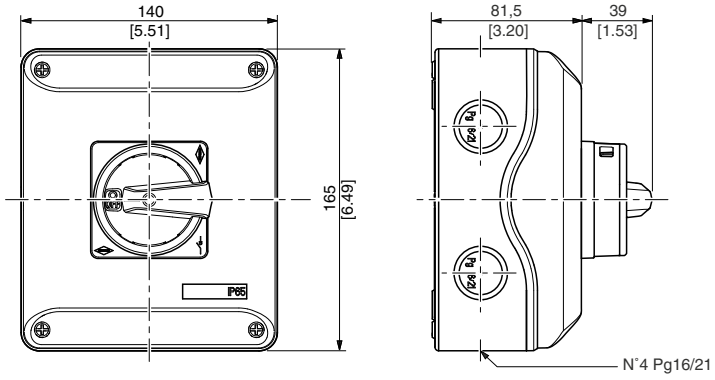
Base mounting E - Back-side for DIN rail or 2 screws fixing
For direct operation
With pre-mounted knob (RW4)



	Base mounting E								
Number of layers	2	3	4	5	6	7	8	9	10
A dimensions (mm)	49,3	59,8	70,3	80,8	91,3	101,8	112,3	122,8	133,3

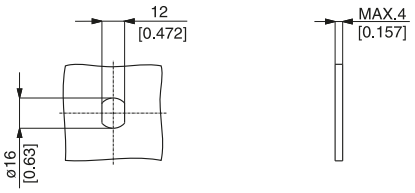


Enclosed disconnect switches

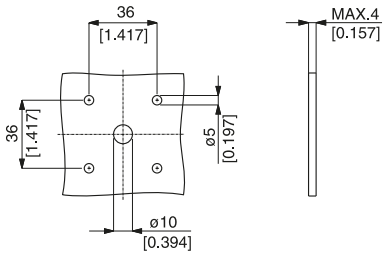


Drilling templates

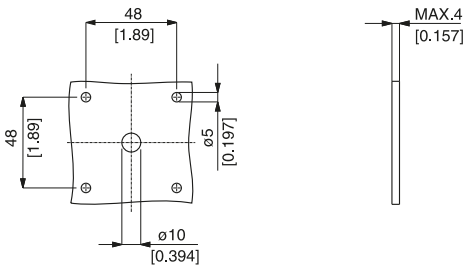
Mounting type L



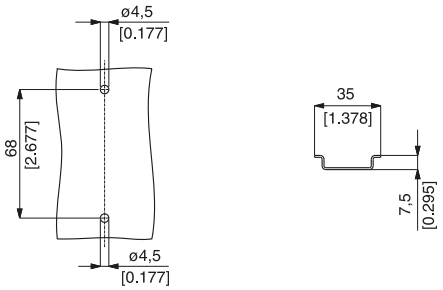
Mounting type T



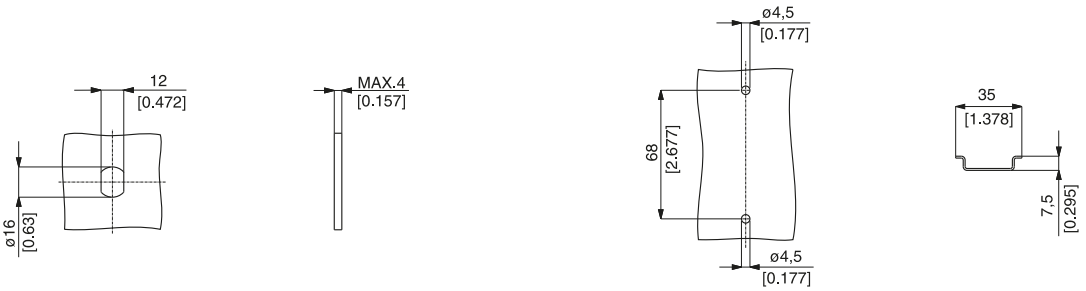
Mounting type C



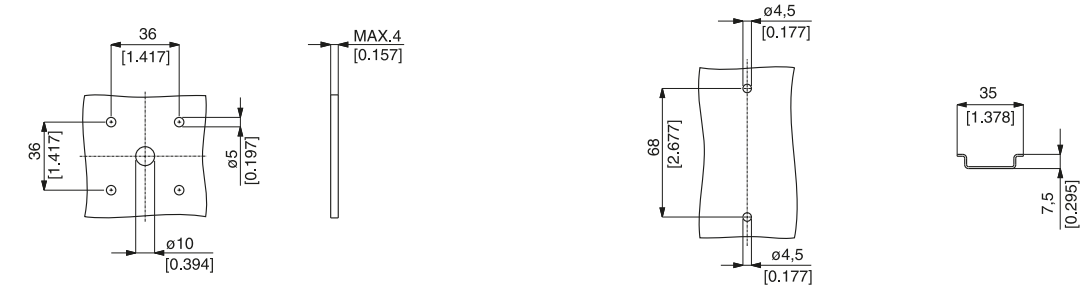
Mounting type D / E



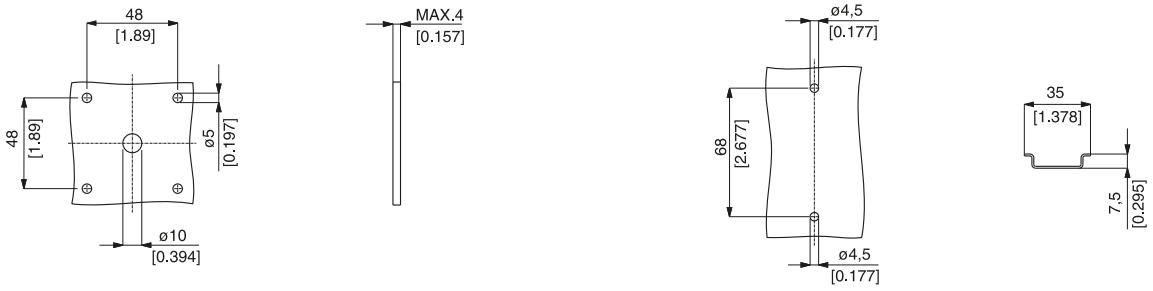
Mounting type V



Mounting type W



Mounting type J



Surge Protection

DC surge protective devices - SAPV Series

- Specifically designed for photovoltaic systems, DC application.
- According to standard EN 50539-11.
- Surge protective device Type 2 / Class II (IEC 61643-31).
- Suitable for protection against induced overvoltages (tested at 8/20µs).
- Discharger elements made with Metal Oxide Varistor technology (MOV).
- Pluggable solution, to facilitate maintenance. With mechanical coding system which identify the different plugs (cartridge), to avoid possible replacement errors.
- Integrated disconnection system capable of disconnecting the SPD at the end of its operating life time (OCFM).
- Local signaling of the operating status condition, available on the front side.
- Remote signaling of the operating status condition, with changeover relay.
- Without back-up fuse for short circuit current (I_{SCPV}) up to 1000A.
- IP20 degree, on terminals.
- Fixing on DIN rail.
- Indoor installation.

DC

Surge
Protective
Devices

Technical data

			SAPV060T2	SAPV060T2R	SAPV100T2	SAPV100T2R
Standards						
Applicable Standards			EN 50539-11 / IEC 61643-31		EN 50539-11 / IEC 61643-31	
Technical data						
Residual current	I_{PE}	µA	< 500 (Iac/dc)		< 500 (Iac/dc)	
Permanent current for PV application	I_{CPV}	µA	< 500 (Iac/dc)		< 500 (Iac/dc)	
Maximum continuous operating voltage	U_{CPV}	V (dc)	600		1040	
Nominal discharge current (8/20 µs)	I_n	kA	18		18	
Maximum discharge current (8/20 µs)	I_{max}	kA	40		40	
Total discharge current (8/20 µs)	I_{total}	kA	40		40	
Reference voltage (1 mA)	U_{REF}	V (dc)	860		1500	
Short-circuit current without back-up fuse	I_{SCPV}	kA	1		1	
Voltage protection level	U_p	kV	< 2,7		< 3,5	
Remote signaling relay - Electrical parameters			-	230 Vac - 1A 24 Vdc - 1A	-	230 Vac - 1A 24 Vdc - 1A
Functional data						
SPD typology			Type 2 / Class II		Type 2 / Class II	
Protection technology			Metal Oxide Varistor (MOV)		Metal Oxide Varistor (MOV)	
Protection mode			L+ / PE, L / PE (common mode) L+ / L- (differential mode)		L+ / PE, L / PE (common mode) L+ / L- (differential mode)	
Typical response time	t_A	ns	< 25		< 25	
Thermal protection			Yes		Yes	
SPD failure mode			Open circuit (OCFM)		Open circuit (OCFM)	
Operating status signaling			Local, through display indicator (GREEN - Service; RED - End of lifetime)		Local, through display indicator (GREEN - Service; RED - End of lifetime)	
Mechanical characteristics						
Protection degree			IP20		IP20	
Number of ports		Nr.	1		1	
Maximum dimensions (W-D-H)		mm	53 x 74 x 94,6	53 x 74 x 99	53 x 74 x 94,6	53 x 74 x 99
Fixing			DIN rail		DIN rail	
Enclosure material			UL-V0 (non-spread and self-extinguishing characteristics)		UL-V0 (non-spread and self-extinguishing characteristics)	
Weight		g	276	283	315	322
Connection terminals Cross-sectional area of conductors		mm^2	4 ÷ 25		4 ÷ 25	
		AWG	11 ÷ 4		11 ÷ 4	
Connection terminals - Tightening torque		Nm	3 (±10%)		3 (±10%)	
Remote signaling relay Cross-sectional area of conductors		mm^2		1,5		1,5
		AWG		15		15
Remote signaling relay - Tightening torque		Nm		0,4 (±10%)		0,4 (±10%)
Ambient conditions						
Humidity		%HR	5 ÷ 95		5 ÷ 95	
Operating temperature	T_U	°C	-40 ÷ +70		-40 ÷ +70	
Installation			Indoor		Indoor	
Accessories						
Replacement plug			SAXCPV060		SAXCPV100	

SAPV Series

TYPE 2

Maximum continuous operating voltage U_{cpv}: 600 Vdc

Bremas SPD T2 600V 40kA

Maximum continuous operating voltage	Nominal discharge current (8/20 µs)	Maximum discharge current (8/20 µs)	Voltage protection level	Code	Remote signaling
U_{CPV} (Vdc)	I_n (kA)	I_{max} (kA)	U_P (kV)		
600	18	40	< 2,7	**SAPV060T2**	No
600	18	40	< 2,7	**SAPV060T2R**	Yes

Maximum continuous operating voltage U_{cpv}: 1040 Vdc

Bremas SPD T2 1040V 40kA

Maximum continuous operating voltage	Nominal discharge current (8/20 µs)	Maximum discharge current (8/20 µs)	Voltage protection level	Code	Remote signaling
U_{CPV} (Vdc)	I_n (kA)	I_{max} (kA)	U_P (kV)		
1040	18	40	< 3,5	**SAPV100T2**	No
1040	18	40	< 3,5	**SAPV100T2R**	Yes

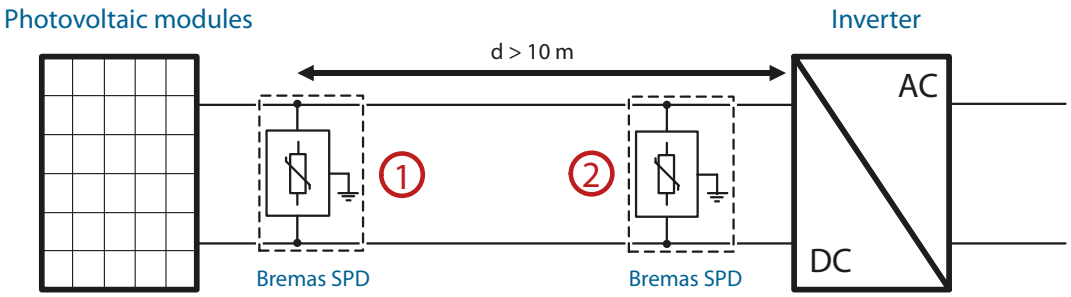
Accessories

Replacement plug

Maximum continuous operating voltage	Nominal discharge current (8/20 µs)	Maximum discharge current (8/20 µs)	Code	Description
U_{CPV} (Vdc)	I_n (kA)	I_{max} (kA)		
600	18	40	**SAXCPV060**	For Bremas SPD type SAPV060…
1040	18	40	**SAXCPV100**	For Bremas SPD type SAPV100…

Features

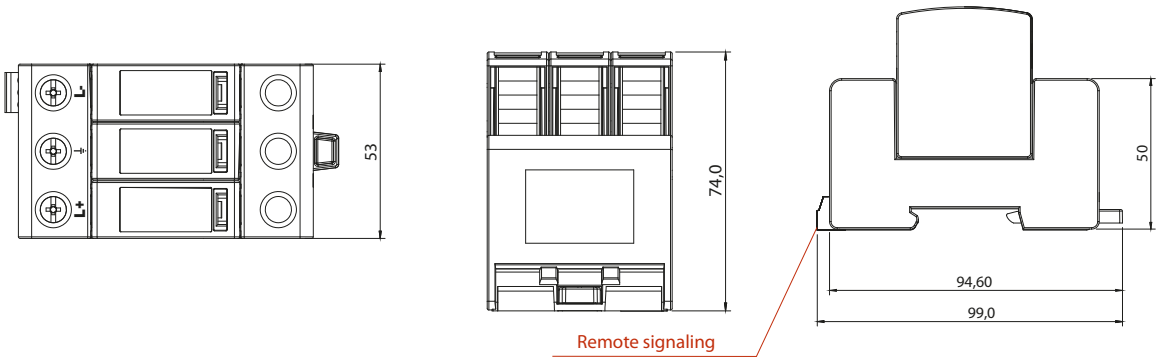
Distances



If d < 10 m, the Bremas SPD (2) is not required

Dimensions

Data in mm



SOL 0623 GB

BREMAS
BETTER SWITCHES

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ISO 9001 Certified Quality System

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