



K SQUARE ENERGY™

## Manufacturer Declaration Letter For DCDB, ACDB & Isolation Switch

We, M/s. Ksquare Energy Having registered office At A-331, Sahjanand Business Park, Opp Marigold restaurant, Sp Ring road odhav, Ahmedabad-382415, Gujarat & Works at E-37, Sahjanand Business Park, Opp Marigold restaurant, Sp Ring road odhav, Ahmedabad-382415 Here by agrees to Supply DCDB, ACDB & Isolation Switch As per Need Of Empanelled Agency Who Are Working in the Under Suryagujarat Scheme.

We, M/s Ksquare Energy are Manufacturer & Distributor Of DCDB, ACDB, & Isolation Switch As Per The terms & Specifications Of PGVCL EOI Reference: PGVCL/DSM/EOI/SRT/2019-20/01 Dated : 20/07/2019

As per The EOI Specifications Material Should be a per the the Below Standards.

Sr. No	Particulars	Brand	Standards
1	Enclosure	Kenclozer	IP67 & IEC 60598
2	DC MCB 500V/800V/1000V	Schneider	IEC 60947:2019
3	DC Fuse	Mersen	IEC 60947 & EN50521
4	AC MCB 16A-40A ( 2P&4P)	Schneider	IEC 60947:2019
5	DC SPD (600V & 1000V)	Phoenix	IEC 61643-1
6	AC SPD (240V & 440V)	Phoenix	IEC 61643-1
7	DC-AC Cables	Polycab/RR	En 50618 ,IS/IES 694
8	Terminals	Elmax/Connecwell	IEC 60947-1,7(1),Ed-3
9	Glands, Lugs	Jigo	NA
10	Printed Ferrule Marker , Stickers	NA	PC , Tube Ferrule

All The Make Wise Datasheet For Enclosure, MCB & SPD Are attached with this letter.

FOR, Ksquare Energy  
  
Authorised Signatory  
(Kuldip Sorathiya)

# Certificate of Compliance

RoHS Directive (2011/65/EU) as Amended (EU) 2015/863 of the European Parliament and of the Council on the restriction of use of certain Hazardous Substances in Electrical and Electronic Equipments

**Certificate No.: UQ-12906**

## Manufacturer

Name : **KSQUARE ENERGY**

Address : **331, Sahjanand Business Park, Opp. Marigold Restaurant,  
S.P. Ring Road, Odhav-382415, Ahmedabad, Gujarat, India**

Product : **ABS & PC Enclosure, Solar DCDB ACDB & Electrical  
Control Panels**

This is to state that the above mentioned product is in compliance with RoHS Directive (2011/65/EU) as Amended (EU) 2015/863 of the European Parliament and Commission Decision 2005/618/EC on the restriction of use of certain Hazardous Substances [Lead (Pb): < 1000 ppm, Mercury (Hg): < 100 ppm, Cadmium (Cd): < 100 ppm, Hexavalent Chromium (Cr VI) < 1000 ppm, Polybrominated Biphenyls (PBB): 1000 ppm, Polybrominated Diphenyl Ethers (PBDE): < 1000 ppm, Bis(2-Ethylhexyl) phthalate (DEHP): < 1000 ppm, Benzyl butyl phthalate (BBP): < 1000 ppm, Dibutyl phthalate (DBP): < 1000 ppm, Diisobutyl phthalate (DIBP): < 1000 ppm in Electrical and Electronic Equipments.

## STATEMENT:

This certificate declares that the product type / model described above complies with the mentioned above European Standard(s).

## REMARKS:

This certificate of complies is based on the evaluation of a sample of the above mentioned products. It does not imply and assessment of the mass-production of the product. This certificate holder may use this certificate in connection with the test report. The certification body should be informed (revision of technical file) for any modification or alterations made to the aforementioned product type(s), including design and manufacture and /or extension to the existing scope of application.

The certificate is valid for three years if the company applies the technical construction file which has been stored in UKCert office. This certificate includes declaration of manufacturer. Certificate remains property of UKCert (UK Certification and Inspection Ltd.) to whom it must be returned upon request. The certificate validity is conditioned by positive results or surveillance audits.

**Validity of this certificate can be verified at [www.ukcertifications.org.uk/verify](http://www.ukcertifications.org.uk/verify)**

Date of this Certificate	17 <sup>th</sup> June 2019
1 <sup>st</sup> Surveillance Audit Due	16 <sup>th</sup> June 2020
2 <sup>nd</sup> Surveillance Audit Due	16 <sup>th</sup> June 2021
Certificate Expiry (subject to the company maintaining its system to the required standard)	16 <sup>th</sup> June 2022



Authorised Signatory



# Certificate of Compliance

## CE

We hereby declare that the technical file of product complied with the requirement of directives 2014/35/EU Low Voltage Directive.

**Certificate No.: CE-4016**

### Manufacturer

**Name : KSQUARE ENERGY**

**Address : 331, Sahjanand Business Park, Opp. Marigold Restaurant,  
S.P.Ring Road, Odhav-382415, Ahmedabad, Gujarat, India**

**Products : ABS & PC Enclosure, Solar DCDB ACDB & Electrical  
Control Panels**

The Certification body has performed an audit of the above product quality system covering the design, manufacture and final inspection of the certified product. The quality system has been assessed, approved and is subject to continuous surveillance according to Directive 2014/35/EU Low Voltage Directive & 2014/30/EU Electromagnetic Compatibility Directive.

### This certificate is issued under the following conditions:

1. It applies only to the quality system maintained in the manufacture of above referenced models and it does not substitute the design or type-examination procedures, if requested.
2. The certificate remains valid until the manufacturing conditions or the quality systems are changed.
3. The certificate validity is conditioned by positive results or surveillance audits.

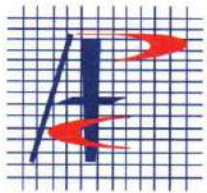
The CE mark as shown above can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of conformity and compliance with all relevant EC Directives. The statement is based on a single evaluation of one sample of above mentioned product. It does not imply an assessment of the whole production.

**Validity of this certificate can be verified at [www.ukcertifications.org.uk/verify](http://www.ukcertifications.org.uk/verify)**

<b>Date of Certificate</b>	<b>17<sup>th</sup> June 2019</b>
<b>1<sup>st</sup> Surveillance Audit Due</b>	<b>16<sup>th</sup> June 2020</b>
<b>2<sup>nd</sup> Surveillance Audit Due</b>	<b>16<sup>th</sup> June 2021</b>
<b>Certificate Expiry</b> (subject to the company maintaining its system to the required standard)	<b>16<sup>th</sup> June 2022</b>



**Authorised Signatory**



# AlekH

## PLASTICS TESTING CENTRE

F-94-95, RUDRAKSHA-II, JASHODANAGAR MEHAMDABAD HIGHWAY,  
VATVA, AHMEDABAD: 382445. TEL-FAX : 79-25830445,  
E-Mail: alekh\_plastics@yahoo.com; alekhplastics@gmail.com www.alekhtestingcentre.com

Doc.No: F/RPT/01

Page no: 1 of 1

### TEST REPORT

URL no: TC620919000000366P

No: TR/19-20/0313-R

Issued to: M/s. KSquare Energy  
Odhav,  
Ahmedabad

Date: 02/09/2019

Date of receipt: 29/08/19

Date of completion: 02/09/19

Sampling by: Customer

Sample details: Plastics Kenclousure SRT Series having size 180mm X 130mm X 100mm (as stated by the party)

Sample Packing: Loose

Mode of delivery: By hand

Your reference: Personal visit on 29/08/19.

#### Test result

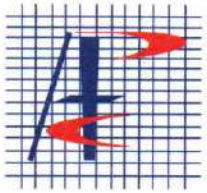
Sample	Test Property	Unit	Test method	Test value
Box as above	Material identification (cover)	---	By FTIR spectroscopy	Polycarbonate -No Halogen presence
	Material identification (box)	---	By FTIR spectroscopy	ABS copolymer -No Halogen present
	Ingress protection*	IP rating	IEC: 62208	
	a) against solid objects			IP-6X
	b) against water			IP-X7
	Flammability (top cover)	UL rating	ISO: 1210	UL 94-V2
	Flammability (base cover)	UL rating	ISO: 1210	UL 94-HB
	Protection to external mechanical impact*	IK rating	IEC:60598-1	IK-08
	Thermal resistance*	---	At 85°C/4hrs	No effect
	Dielectric strength*	---	At 25KV/mm/60 seconds	No effect



ACCREDITED  
Certificate no: TC-6209

Authorised Signatory  
B. R. Phadnis  
Chief Executive

N.B.: No liabilities are accepted, whatsoever, for this test report. Valid only for the sample tested. Not for publication. Not for legal purpose. The tests marked with an\* are not accredited by NABL. # marked tests are outsourced from NABL accredited lab. ~~~~~ END OF REPORT ~~~~~



# Alekh

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F-94-95, RUDRAKSHA-II, JASHODANAGAR MEHAMDABAD HIGHWAY,  
VATVA, AHMEDABAD: 382445. TEL-FAX : 79-25830445,  
E-Mail: alekh\_plastics@yahoo.com; alekhplastics@gmail.com www.alekhtestingcentre.com

Doc.No: F/RPT/01

Page no: 1 of 1

### TEST REPORT

URL no: TC620919000000366P

No: TR/19-20/0313A-R

Issued to: M/s. KSquare Energy  
Odhav,  
Ahmedabad

Date: 02/09/2019

Date of receipt: 29/08/19

Date of completion: 02/09/19

Sampling by: Customer

Sample details: Plastics Kenclousure SRT series having size 180mm X 180mm X100mm (as stated by the party)

Sample Packing: Loose

Mode of delivery: By hand

Your reference: Personal visit on 29/08/19.

#### Test result

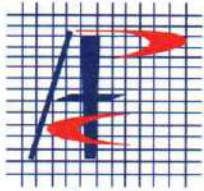
Sample	Test Property	Unit	Test method	Test value
Box as above	Material identification (cover)	---	By FTIR spectroscopy	Polycarbonate -No Halogen presence
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VATVA, AHMEDABAD: 382445. TEL-FAX : 79-25830445,  
E-Mail: alekh\_plastics@yahoo.com; alekhplastics@gmail.com www.alekhtestingcentre.com

Doc.No: F/RPT/01

Page no: 1 of 1

### TEST REPORT

URL no: TC620919000000366P

No: TR/19-20/0313B

Issued to: M/s. KSquare Energy  
Odhav,  
Ahmedabad

Date: 02/09/2019

Date of receipt: 29/08/19

Date of completion: 02/09/19

Sampling by: Customer

Sample details: Plastics Kenclosure SRT Series having size 20" X 29" X 100mm (as stated by the party)

Sample Packing: Loose

Mode of delivery: By hand

Your reference: Personal visit on 29/08/19.

#### Test result

Sample	Test Property	Unit	Test method	Test value
Box as above	Material identification (cover)	---	By FTIR spectroscopy	Polycarbonate -No Halogen presence
	Material identification (box)	---	By FTIR spectroscopy	ABS copolymer -No Halogen present
	Ingress protection*	IP rating	IEC: 62208	
	a) against solid objects			IP-6X
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	Thermal resistance*	---	At 85°C/4hrs	No effect
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### Main

Range	Acti 9
Product name	Acti 9 C60H-DC
Product or component type	Miniature circuit-breaker
Device short name	C60H-DC
Device application	Distribution
Poles description	2P
Number of protected poles	2
[In] rated current	16 A at 25 °C
Network type	DC
Trip unit technology	Thermal-magnetic
Curve code	C
Breaking capacity	Icu 20 kA at 220 V DC conforming to GB 14048.2 Icu 10 kA at 440 V DC conforming to EN 60947-2 Icu 10 kA at 440 V DC conforming to IEC 60947-2 Icu 6 kA at 500 V DC conforming to EN 60947-2 Icu 6 kA at 500 V DC conforming to IEC 60947-2 Icu 20 kA at 220 V DC conforming to IEC 60947-2 Icu 20 kA at 250 V DC conforming to GB 14048.2 Icu 20 kA at 250 V DC conforming to IEC 60947-2
Utilisation category	Category A conforming to EN 60947-2 Category A conforming to IEC 60947-2
Suitability for isolation	Yes conforming to EN 60947-2 Yes conforming to IEC 60947-2

### Complementary

Network frequency	50/60 Hz
[Ue] rated operational voltage	500 V DC
[Ics] rated service breaking capacity	15 kA 75 % x Icu at 220 V DC conforming to EN 60947-2 15 kA 75 % x Icu at 220 V DC conforming to IEC 60947-2 15 kA 75 % x Icu at 250 V DC conforming to EN 60947-2 15 kA 75 % x Icu at 250 V DC conforming to IEC 60947-2

4.5 kA 75 % x Icu at 500 V DC conforming to EN 60947-2  
 4.5 kA 75 % x Icu at 500 V DC conforming to IEC 60947-2  
 7.5 kA 75 % x Icu at 440 V DC conforming to EN 60947-2  
 7.5 kA 75 % x Icu at 440 V DC conforming to IEC 60947-2

[Ui] rated insulation voltage	500 V DC conforming to IEC 60947-2 500 V DC conforming to EN 60947-2
[Uimp] rated impulse withstand voltage	6 kV conforming to EN 60947-2 6 kV conforming to IEC 60947-2
Contact position indicator	Yes
Control type	Toggle
Local signalling	ON/OFF indication
Mounting mode	Fixed
Mounting support	35 mm symmetrical DIN rail
Comb busbar and distribution block compatibility	Standard top or bottom
9 mm pitches	4
Product weight	0.256 kg
Colour	White
Mechanical durability	20000 cycles
Electrical durability	6000 cycles - 500 V DC
Provision for padlocking	Padlockable
Locking options description	In position O
Tightening torque	2.5 N.m top or bottom power circuit
Earth-leakage protection	Without

## Environment

Standards	IEC 60947-2 EN 60947-2
Pollution degree	3 conforming to EN 60947-2 3 conforming to IEC 60947-2
Overvoltage category	IV
Tropicalisation	2 conforming to IEC 60068-2
Operating altitude	2000 m
Ambient air temperature for operation	-25...70 °C
Ambient air temperature for storage	-40...85 °C

## Offer Sustainability

Sustainable offer status	Green Premium product
RoHS (date code: YYWW)	Compliant - since 0844 - Schneider Electric declaration of conformity <a href="#">Schneider Electric declaration of conformity</a>
REACH	Reference not containing SVHC above the threshold <a href="#">Reference not containing SVHC above the threshold</a>
Product environmental profile	Available
Product end of life instructions	Need no specific recycling operations

## Contractual warranty

Warranty period	18 months
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# FPV-63

CCC CE CB   RoHS

## Solar DC Mini Circuit Breaker (DC MCB)



**FEED**  
ELECTRIC

## FPV-63

### Solar DC Mini Circuit Breaker (DC MCB)



#### Application

FPV-63 DC MCB supplementary protectors are designed to provide overcurrent protection within appliances or electrical equipment, where a branch circuit protection is already provided or not required. Devices are designed for direct current (DC) control circuit applications.

#### Specifications

FPV-63 Series Circuit Breaker		FPV-63			
Frame Degree Rated Current (A)		63			
Pole		1P	2P	3P	4P
Rated Operating Voltage (V DC)		250VDC	800VDC	750VDC	1000VDC
Rated Current In (A)		3,6,10,16,20,25,32,40,50,63A			
Rated Insulation Voltage Ui (V DC)		1200VDC			
Rated Impact Voltage Uimp (kV)		4			
Ultimate Breaking Capacity Icu (kA)		10			
Run Breaking Capacity Ics (75% Icu)		7.5			
Curve Type		C			
Trip Type		Thermal-magnetic			
Mechanical	Actual average value	20000			
	Standard value	8500			
Electric	Actual average value	2500			
	Standard value	1500			

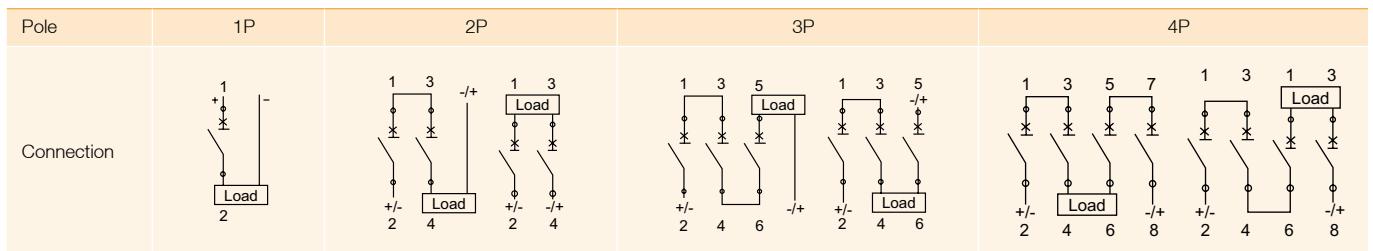
#### Control and Indication

Shunt release (SHT)	Option
Undervoltage release (UNT)	
Auxiliary contact (AX)	
Alarm contact (AL)	

#### Condition and Installation

Wiring capacity (mm <sup>2</sup> )	In ≤ 32A, 1~25 mm <sup>2</sup> , I ≥ 40A, 10~35mm <sup>2</sup>				
Ambient temperature (°C)	-20~+70				
Altitude	≤ 2000				
Relative humidity	≤ 95%				
Pollution Level	3				
Installation Environment	No obvious shock and vibration				
Installation category	Class III				
Installation	DIN Standard rail				
Dimensions(W)x(H)x(Deep)	W	18	36	54	72
	H	80	80	80	80
	Deep	71	71	71	71
Weight (kg)		0.12	0.24	0.36	0.48

#### Connection



## SOLAR DC MINI CIRCUIT BREAKER (DC MCB)

### Over current tripping characteristic

Item	Test Current	Initial State	Limited Time	Prospective Result	Starting State
a	1.05I <sub>n</sub>	Cold state a	t≤1h	Non-tripping	
b	1.3I <sub>n</sub>	Followed by test a	t<1h	Tripping	The current rise steadily to a fixed value within 5s
c	7I <sub>n</sub>	Cold state a	t≤0.2s	Non-tripping	
d	10I <sub>n</sub>	Cold state a	t<0.2s	Tripping	

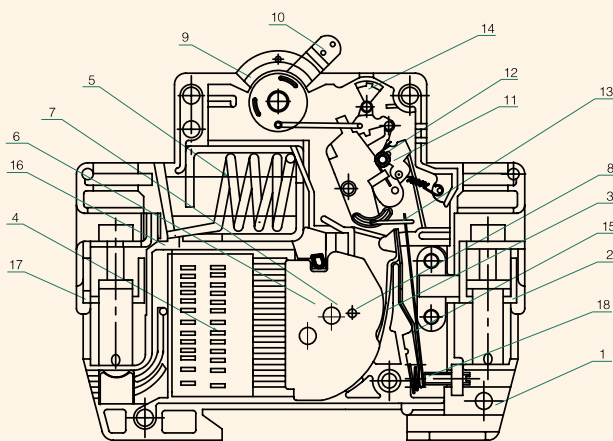
### Current correction values used at different ambient temperatures

Rated Current(A)	Temperature												
	-35	-30	-20	-10	0	10	20	30	40	50	60	70	
3A	3.9	3.78	3.69	3.57	3.42	3.3	3.12	3	2.88	2.79	2.64	2.49	
6A	7.8	7.56	7.38	7.14	6.84	6.6	6.24	6	5.76	5.64	5.28	4.98	
10A	13.2	12.7	12.5	12	11.5	11.1	10.6	10	9.6	9.3	8.9	8.4	
16A	21.12	20.48	20	19.2	18.4	17.76	16.96	16	15.36	14.88	14.24	13.44	
20A	26.4	25.6	25	24	23	22.2	21.2	20	19.2	18.6	17.8	16.8	
25A	33	32	31.25	30	28.75	27.75	26.5	25	24	23.25	22.25	21	
32A	42.56	41.28	40	38.72	37.12	35.52	33.93	32	30.72	29.76	28.16	26.88	
40A	53.2	51.2	50	48	46.4	44.8	42.4	40	38.4	37.2	35.6	33.6	
50A	67	65.5	63	60.5	58	56	53	50	48	46.5	44	41.5	
63A	83.79	81.9	80.01	76.86	73.71	70.56	66.78	63	60.48	58.9	55.44	52.29	

### Current correction factor used at different altitudes

Rated Current(A)	Different altitude correction factors		
	≤2000m	2000~3000m	≥3000m
3,6,10,16,20,25,32,40,50,63A	1.0	0.9	0.8

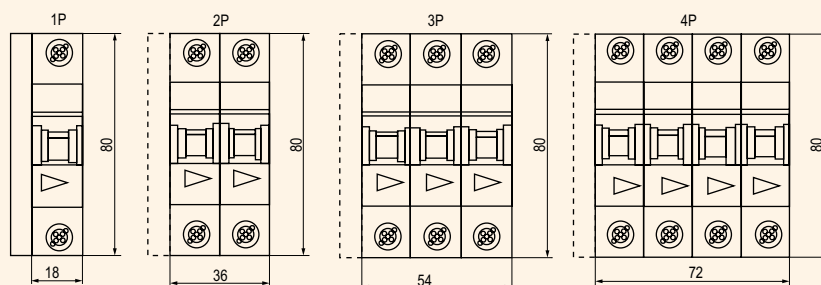
### Details



- |                     |                        |
|---------------------|------------------------|
| 1. Shell            | 10. Handle             |
| 2. Wiring board     | 11. Lock catch knuckle |
| 3. Static contact   | 12. Tripping chain     |
| 4. Arc chamber      | 13. Jump pin           |
| 5. Copper coil      | 14. Indicator          |
| 6. Insulation plate | 15. Bimetal            |
| 7. Moving contact   | 16. Soft linking       |
| 8. Fixed contact    | 17. Wiring board       |
| 9. Spring           | 18. Adjusting screw    |

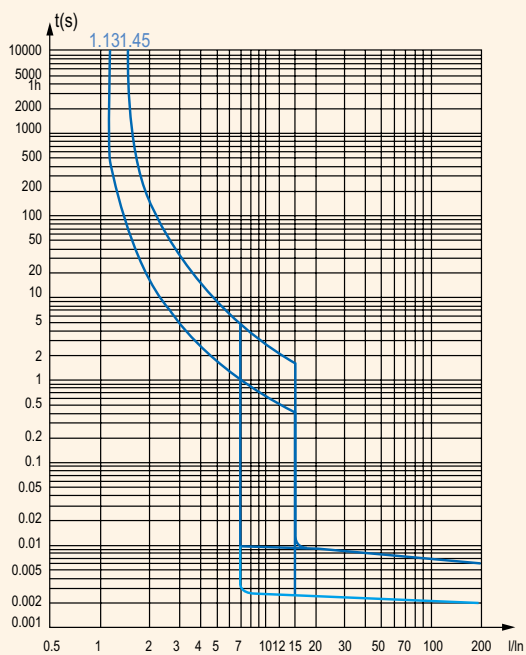
# SOLAR DC MINI CIRCUIT BREAKER (DC MCB)

## Dimension



## Characteristic Curve

FPV-63 Characteristic curve



## VAL-MS BE

Order No.: 2817741

The illustration shows the base element with remote indication contact

<http://eshop.phoenixcontact.de/phoenix/treeViewClick.do?UID=2817741>

Base element for type 2 arresters of the VALVETRAB MS series of products. Design: 1-channel

### Commercial data

GTIN (EAN)	4017918148164
sales group	J022
Pack	10 pcs.
Customs tariff	85363010
Weight/Piece	0.07255 KG
Catalog page information	Page 199 (NTK-2010)

### Product notes

WEEE/RoHS-compliant since:  
01/31/2006

<http://www.download.phoenixcontact.com>  
Please note that the data given here has been taken from the online catalog. For comprehensive information and data, please refer to the user documentation. The General Terms and Conditions of Use apply to Internet downloads.

### Technical data

#### Standards

Housing material	PA
Inflammability class acc. to UL 94	V0
Color	black
Degree of protection	IP20
Mounting type	DIN rail 35 mm

Design	DIN rail module, two-section, divisible
Number of positions	1
Ambient temperature (operation)	-40 °C ... 80 °C
Width	17.70 mm
Height	50.00 mm
Length	90.00 mm
Pitch unit	1 Div.

**Protective circuit**

Max. required backup fuse with branch wiring	125 A (gL/gG)
Short-circuit resistance $I_{CC}$ with max. backup fuse (effective)	25 kA

**Connection, protective circuit**

Type of connection	Biconnect terminal blocks
Screw thread	M5
Tightening torque	4.5 Nm
Stripping length	14.5 mm
Conductor cross section stranded min.	0.5 mm <sup>2</sup>
Conductor cross section stranded max.	25 mm <sup>2</sup>
Conductor cross section solid min.	0.5 mm <sup>2</sup>
Conductor cross section solid max.	35 mm <sup>2</sup>
Conductor cross section AWG/kcmil min.	20
Conductor cross section AWG/kcmil max	2

**Environmental conditions**

Standards/regulations	IEC 61643-1
	DIN EN 61643-11
	DIN EN 61643-11/A11

**Certificates / Approvals**

Certification

CB, CCA, CSA, GOST, KEMA, OEVE, UL

**Accessories**

Item	Designation	Description
<b>Bridges</b>		
2809209	MPB 18/1- 2	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 2-pos.
2809209	MPB 18/1- 2	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 2-pos.
2809212	MPB 18/1- 3	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 3-pos.
2809212	MPB 18/1- 3	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 3-pos.
2809225	MPB 18/1- 4	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 4-pos.
2809225	MPB 18/1- 4	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 4-pos.
2748564	MPB 18/1- 6	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 6-pos.
2748564	MPB 18/1- 6	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 6-pos.
2856278	MPB 18/1- 7 BU	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 7-pos., color: Blue
2748577	MPB 18/1- 8	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 8-pos.
2748577	MPB 18/1- 8	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 8-pos.
2858470	MPB 18/1- 8 BU	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 8-pos., color: Blue
2748580	MPB 18/1- 9	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 9-pos.
2748580	MPB 18/1- 9	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 9-pos.
2748593	MPB 18/1-12	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 12-pos.
2748593	MPB 18/1-12	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 12-pos.
2830168	MPB 18/1-20/1.2.5	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 20 pitches with contact sequence 1-2-0-0-5
2809238	MPB 18/1-57	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 57-pos.
2809238	MPB 18/1-57	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 57-pos.

2809241	MPB 18/3- 6	Wiring bridge for modules with connecting pitch 17.5 mm, 3-phase, 6-pos.
2809241	MPB 18/3- 6	Wiring bridge for modules with connecting pitch 17.5 mm, 3-phase, 6-pos.
2809254	MPB 18/3- 9	Wiring bridge for modules with connecting pitch 17.5 mm, 3-phase, 9-pos.
2809283	MPB 18/4- 8	Wiring bridge for modules with connecting pitch 17.5 mm, 4-phase, 8-pos.
2809283	MPB 18/4- 8	Wiring bridge for modules with connecting pitch 17.5 mm, 4-phase, 8-pos.
2809296	MPB 18/4-12	Wiring bridge for modules with connecting pitch 17.5 mm, 4-phase, 12-pos.
2809296	MPB 18/4-12	Wiring bridge for modules with connecting pitch 17.5 mm, 4-phase, 12-pos.
2818339	MPB F200X16/ 1GS	Wiring bridge flexible, diameter 16 mm <sup>2</sup> , with a fork-type cable lug on one side, length: 200 mm
2818339	MPB F200X16/ 1GS	Wiring bridge flexible, diameter 16 mm <sup>2</sup> , with a fork-type cable lug on one side, length: 200 mm
2818342	MPB F400X16/ 1GS	Wiring bridge flexible, diameter 16 mm <sup>2</sup> , with a fork-type cable lug on one side, length: 400 mm
2818342	MPB F400X16/ 1GS	Wiring bridge flexible, diameter 16 mm <sup>2</sup> , with a fork-type cable lug on one side, length: 400 mm
2818355	MPB F600X16/ 1GS	Wiring bridge flexible, diameter: 16 mm <sup>2</sup> , with a fork-type cable lug on one side, length: 600 mm
2818355	MPB F600X16/ 1GS	Wiring bridge flexible, diameter: 16 mm <sup>2</sup> , with a fork-type cable lug on one side, length: 600 mm

**General**

2749880	DK-BIC-35	Feed-through terminal block for VAL and FLT applications
2830443	MPB 18/1-10/1.0.0	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 10 pitches with contact sequence 1-0-0

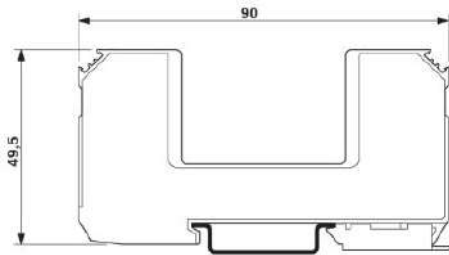
**Marking**

1051993	B-STIFT	Marker pen, for manual labeling of unprinted Zack strips, smear-proof and waterproof, line thickness 0.5 mm
2749589	ZBN 18,LGS:ERDE	Marking labels, printed horizontally, strips with 5 labels, GND (grounding symbol), color: White
2749576	ZBN 18,LGS:L1-N,ERDE	Marker labels, printed horizontally, strips with 5 labels, L1, L2, L3, N, GND, color: white
0800763	ZBN 18:SO/CMS	Marker labels, 5-section, special printing, labeled according to customer requirements (Please specify the required marking with order), for terminal width: 17.5 mm, color: White
2809128	ZBN 18:UNBEDRUCKT	Unprinted marker labels, strips with 5 labels for individual labeling with M-PEN or CMS system, for terminal block width: 17.5 mm, color: White

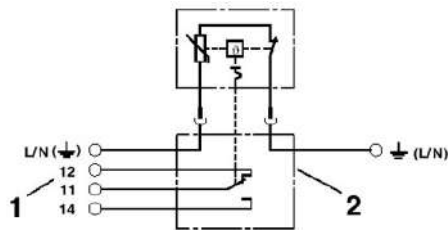


## Diagrams/Drawings

### Dimensioned drawing



### Circuit diagram



**Address**

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# 1156900

## VAL-MS 600DC-PV/2+0-ST

Data sheet  
83215908

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### 1 Change note

Rev.	Date	Project No.	Name	Comments
00	19.09.2019	MCL190021	Jungermann	First release

Vorläufig

Vorläufig

Vorläufig

Vorläufig

## 2 Technical data

General data	
Standards/regulations	EN 50539-11 2013
IEC test classification	PV $\overline{\text{T2}}$
Installation location	Interior
Accessibility	Accessible
Installation location of the disconnect device	Internal
SPD failure behavior	OCM (Open-circuit mode)
SPD design	Voltage-limiting type
Mounting type	on base element
Surge protection fault message	optical
Color	jet black RAL 9005
Insulating material	PA 6.6-FR
Housing material	PA 6.6-FR
Air clearances and creepage distances (according to EN 60664-1 and EN 50539-11)	
Degree of pollution	2
Overvoltage category	III
Material group	I
CTI value of material	$\geq 600$
U <sub>max</sub>	< 2.5 kV
Flammability rating according to UL 94	V-0
Degree of protection	IP20
Shock (operation)	60g (Half-sine / 11 ms / 3x $\pm X$ , $\pm Y$ , $\pm Z$ )
Vibration (operation)	7.5g (5-500 Hz/2.5 h/XYZ)
Ambient temperature (operation)	-40 °C ... 80 °C
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Permissible humidity (operation)	5 % ... 95 %
Altitude	$\leq 2000$ m (amsl (above mean sea level))
Width	17.5 mm
Height	52.4 mm
Depth	55.3 mm
Horizontal pitch	1 Div.
Electrical data	
Maximum continuous operating voltage U <sub>CPV</sub>	585 V DC
Open circuit voltage U <sub>OCSTC</sub>	$\leq 485$ V DC
Short-circuit current rating I <sub>SCPV</sub>	2000 A
Continuous operating current I <sub>CPV</sub>	< 20 $\mu$ A
Standby power consumption P <sub>C</sub>	$\leq 25$ mVA
Nominal discharge current I <sub>n</sub> (8/20) $\mu$ s	15 kA
Maximum discharge current I <sub>max</sub> (8/20) $\mu$ s	40 kA
Voltage protection level U <sub>p</sub>	$\leq 1.9$ kV

**Electrical data**

Residual voltage $U_{res}$	$\leq 1.9$ kV (at $I_n$ ) $\leq 1.5$ kV (at 5 kA) $\leq 1.7$ kV (at 10 kA) $\leq 2$ kV (at 20 kA) $\leq 2.3$ kV (at 30 kA) $\leq 2.5$ kV (at 40 kA)
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Response time $t_A$	$\leq 25$ ns
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Insulation resistance $R_{iso}$	$> 5$ G $\Omega$ (at 500 V DC)
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**Connection data**

Connection method	pluggable
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Vorläufig

Vorläufig

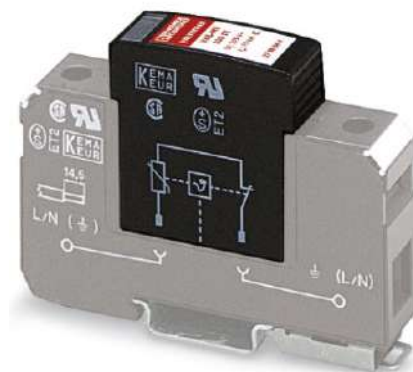
Vorläufig

Vorläufig

# VAL-MS 400 ST

Order No.: 2816399

The illustration shows the version VAL-MS 230 ST



<http://eshop.phoenixcontact.de/phoenix/treeViewClick.do?UID=2816399>

Surge protection connector type 2 with high-capacity varistor for VAL-MS base element, thermal monitoring, visual fault warning. Design: 400 V AC



## Commercial data

EAN	4017918131593
Pack	10 Pcs.
Customs tariff	85363010
Weight/Piece	0.04948 KG
Catalog page information	Page 35 (TT-2007)

## Product notes

WEEE/RoHS-compliant since:  
05/12/2006



<http://www.download.phoenixcontact.com>  
Please note that the data given here has been taken from the online catalog. For comprehensive information and data, please refer to the user documentation. The General Terms and Conditions of Use apply to Internet downloads.

## Technical data

### Standards

Housing material	PA
Inflammability class acc. to UL 94	V0
Color	black

Degree of protection	IP20
Mounting type	On base element
Design	DIN rail module, two-section, divisible
Ambient temperature (operation)	-40 °C ... 80 °C
Arrester can be tested with CHECKMASTER from software version:	From SW rev. 1.10
Message surge protection faulty	Optical
Direction of action	1L-N/PE
Width	17.70 mm
Height	54.50 mm
Length	52.40 mm
Pitch unit	1 Div.

**Protective circuit**

IEC category	II
EN type	T2
Nominal voltage $U_N$	400 V AC
Arrester rated voltage $U_c$	440 V AC 585 V DC
Nominal frequency $f_N$	50 Hz (60 Hz)
Discharge current to PE at $U_c$	$\leq 0.3$ mA
Max. discharge surge current $I_{max}$ (8/20) $\mu$ s	40 kA
Nominal discharge surge current $I_n$ (8/20) $\mu$ s	20 kA
Lightning test current (10/350) $\mu$ s, peak value $I_{imp}$	3 kA
Protection level $U_p$	$\leq 2.2$ kV
Residual voltage	$\leq 1.5$ kV (at 5 kA)
Response time	$\leq 25$ ns
Required maximum backup fuse with branch wiring	125 A (gL)
Short circuit resistance $I_{CC}$ with max. backup fuse (effective)	25 kA

**Connection, protective circuit**

Connection type IN	FLASHTRAB/VALVETRAB plug-in system
Connection type OUT	FLASHTRAB/VALVETRAB plug-in system
Connection system	Biconnect terminal block
Conductor cross section stranded min.	0.5 mm <sup>2</sup>

Conductor cross section stranded max.	25 mm <sup>2</sup>
Conductor cross section solid min.	35 mm <sup>2</sup>
Conductor cross section solid max.	0.5 mm <sup>2</sup>
Conductor cross section AWG/kcmil min.	20
Conductor cross section AWG/kcmil max	2

#### Environmental conditions

Standards/regulations	IEC 61643-1
	E DIN VDE 0675-6/A1
	E DIN VDE 0675-6/A2

#### Certificates / Approvals



#### CUL

Nominal voltage U <sub>N</sub>	400 V
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#### UL

Nominal voltage U <sub>N</sub>	400 V
Certification	CB, CUL, GOST, KEMA, OEVE, UL

#### Accessories

Item	Designation	Description
<b>Bridges</b>		
2809209	MPB 18/1- 2	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 2-pos.
2809212	MPB 18/1- 3	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 3-pos.
2809225	MPB 18/1- 4	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 4-pos.
2830142	MPB 18/1- 4/1.4	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 4 pitches with contact sequence 1-0-0-4
2748564	MPB 18/1- 6	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 6-pos.
2748577	MPB 18/1- 8	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 8-pos.



2748580	MPB 18/1- 9	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 9-pos.
2830155	MPB 18/1-16/1.4	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 12 pitches with contact sequence 1-0-0-4
2830168	MPB 18/1-20/1.2.5	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 20 pitches with contact sequence 1-2-0-0-5
2809241	MPB 18/3- 6	Wiring bridge for modules with connecting pitch 17.5 mm, 3-phase, 6-pos.
2809283	MPB 18/4- 8	Wiring bridge for modules with connecting pitch 17.5 mm, 4-phase, 8-pos.
2809296	MPB 18/4-12	Wiring bridge for modules with connecting pitch 17.5 mm, 4-phase, 12-pos.
2818339	MPB F200X16/ 1GS	Wiring bridge flexible, diameter 16 mm <sup>2</sup> , with a fork-type cable lug on one side, length: 200 mm
2818342	MPB F400X16/ 1GS	Wiring bridge flexible, diameter 16 mm <sup>2</sup> , with a fork-type cable lug on one side, length: 400 mm
2818355	MPB F600X16/ 1GS	Wiring bridge flexible, diameter: 16 mm <sup>2</sup> , with a fork-type cable lug on one side, length: 600 mm

**General**

2830443	MPB 18/1-10/1.0.0	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 10 pitches with contact sequence 1-0-0
2748593	MPB 18/1-12	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 12-pos.
2838063	MPB 18/1-12/1.6	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 12 pitches with contact sequence 1-0-0-0-0-6
2809238	MPB 18/1-57	Wiring bridge for modules with connecting pitch 17.5 mm, 1-phase, 57-pos.

**Marking**

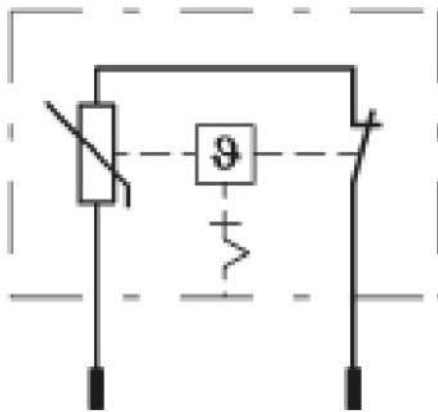
1051993	B-STIFT	Marker pen, for manual labeling of unprinted Zack strips, smear-proof and waterproof, line thickness 0.5 mm
2749589	ZBN 18,LGS:ERDE	
2749576	ZBN 18,LGS:L1-N,ERDE	Marker labels, printed horizontally, strips with 5 labels, L1, L2, L3, N, GND, color: white
0800763	ZBN 18:SO/CMS	Marker labels, 5-section, special printing, labeled according to customer requirements (Please specify the required marking with order), for terminal width: 17.5 mm, color: White
2809128	ZBN 18:UNBEDRUCKT	Unprinted marker labels, strips with 5 labels for individual labeling with M-PEN or CMS system, for terminal block width: 17.5 mm, color: White

### Additional products

Item	Designation	Description
<b>General</b>		
2817741	VAL-MS BE	Base element for type 2 arresters of the VALVETRAB MS series of products. Design: 1-channel
2817738	VAL-MS BE/FM	Base element for type 2 arresters of the VALVETRAB MS series of products, with remote indication contact. Design: 1-channel

### Drawings

Circuit diagram



1 = Remote indicator contact  
2 = base element

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## TEST REPORT

Date of issue-10.12.2019

**Item** : VAL-MS 600DC-PV/2+0

**Article No.** : 1156902

Specification	Specified Values / Standard	Observation
Width	35.6 mm	O.K./NOT O.K.
Height	98.7 mm	O.K./NOT O.K.
Color	Jet Black	O.K./NOT O.K.
Degree of Protection	IP20	O.K./NOT O.K.
Mounting type	DIN rail mounting	O.K./NOT O.K.
Maximum Continuous operating voltage	585 V DC (DC+/DC-) - PE) 1170 V DC (DC+ - DC-)	O.K./NOT O.K.
Open Circuit Voltage	485 V DC	O.K./NOT O.K.
Rated Load Current	80 A	O.K./NOT O.K.
Total Discharge current ( 8/20) $\mu$ s	40 KA	O.K./NOT O.K.
Continuous Operating current	< 20 $\mu$ A	O.K./NOT O.K.
Flammability rating according to UL 94	V-0	O.K./NOT O.K.
Ambient Temperature (Operation)	-40 °C ... 80 °C	O.K./NOT O.K.
Response time	$\leq$ 25 ns	O.K./NOT O.K.
Degree of pollution	2	O.K./NOT O.K.
Shock ( Operation )	60 g (Half – sine/11ms/3x $\pm$ X, $\pm$ Y, $\pm$ Z)	O.K./NOT O.K.
Vibration ( Operation )	7.5 g ( 5-500 Hz/2,5h/XYZ)	O.K./NOT O.K.
Standards	EN 50539-11 2013	O.K./NOT O.K.
CTI Value of Material	$\geq$ 600	O.K./NOT O.K.

For **PHOENIX CONTACT INDIA PVT. LTD.**



(Quality Assurance)

## Type 2 surge arrester - VAL-MS 1000DC-PV/2+V - 2800628

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Surge arrester for 2-pos. isolated 1000 V DC voltage systems, for DIN rail mounting, 3-pos. base element, three plug-in temperature-monitored protective elements, status message on each plug.

### Why buy this product

- ✓ Increased safety, thanks to compliance with standard EN 50539-11
- ✓ Reliable contact, thanks to integrated rotating latch
- ✓ Easy replacement, thanks to plug-in arresters
- ✓ Optimum inverter protection, thanks to low protection level
- ✓ Efficient replacement of defective plugs, thanks to visual status indicator
- ✓ Protection against mismatching, thanks to keyed plugs and base elements
- ✓ Always the right arrester, thanks to universal type 1/type 2 protective components



### Key Commercial Data

Packing unit	1 STK
GTIN	 4 046356 615082
GTIN	4046356615082
Weight per Piece (excluding packing)	327.150 g
Custom tariff number	85363030
Country of origin	Germany

### Technical data

#### Dimensions

Height	90 mm
Width	53.4 mm
Depth	65.5 mm
Horizontal pitch	3 Div.

#### Ambient conditions

Degree of protection	IP20 (only when all terminal points are used)
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# Type 2 surge arrester - VAL-MS 1000DC-PV/2+V - 2800628

## Technical data

### Ambient conditions

Ambient temperature (operation)	-40 °C ... 80 °C
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Altitude	≤ 2000 m (amsl (above mean sea level))
Permissible humidity (operation)	5 % ... 95 %
Shock (operation)	60g (Half sine/11 ms/3x #X#Y#Z)
Vibration (operation)	7.5g (5-500 Hz/2.5 h/XYZ)

### General

IEC test classification	PV II
	PV T2
EN type	T2
SPD failure behavior	OCM (Open-circuit mode)
Connection configuration	Y configuration
Installation location	Inside
Accessibility	Accessible
Installation location of the disconnect device	Internal
Mode of protection	(L+) - (L-)
	(L+) - PE
	(L-) - PE
Mounting type	DIN rail: 35 mm
Color	jet black RAL 9005
Housing material	PA 6.6-FR
	PBT-FR
Degree of pollution	2
Distance between live and grounded parts	8 mm
Flammability rating according to UL 94	V-0
Design	DIN rail module, two-section, divisible
Surge protection fault message	optical

### Additional descriptions

Note	The device is intended for touch proof installation in a housing. Ensure that there is a gap of at least 8 mm between the active and grounded parts in the connection area.
------	---

### Protective circuit DC voltage side (DC)

Maximum continuous operating voltage $U_{CPV}$	1170 V DC
Open circuit voltage $U_{OCSTC}$	≤ 970 V DC
Short-circuit current rating $I_{SCPV}$	1000 A
Continuous operating current $I_{CPV}$	< 20 μA
Rated load current $I_L$	80 A
Residual current $I_{PE}$	≤ 20 μA DC
	≤ 250 μA AC
Standby power consumption $P_C$	≤ 25 mVA

# Type 2 surge arrester - VAL-MS 1000DC-PV/2+V - 2800628

## Technical data

### Protective circuit DC voltage side (DC)

Nominal discharge current (8/20) $\mu\text{s}$	15 kA
Maximum discharge current $I_{\text{max}}$ (8/20) $\mu\text{s}$	40 kA
Total discharge current $I_{\text{total}}$ (8/20) $\mu\text{s}$	40 kA
Voltage protection level $U_p$	$\leq 3.7$ kV
Residual voltage $U_{\text{res}}$	$\leq 3.7$ kV (at $I_n$ )
	$\leq 3.1$ kV (at 5 kA)
	$\leq 3.5$ kV (at 10 kA)
	$\leq 4$ kV (at 20 kA)
	$\leq 4.6$ kV (at 30 kA)
	$\leq 5$ kV (at 40 kA)
Response time $t_A$	$\leq 25$ ns
Insulation resistance $R_{\text{iso}}$	$> 5$ G $\Omega$ (at 500 V DC)

### Connection data

Connection method	Screw connection
Screw thread	M5
Tightening torque	4.5 Nm
Stripping length	16 mm
Conductor cross section flexible	1.5 mm <sup>2</sup> ... 25 mm <sup>2</sup>
Conductor cross section solid	1.5 mm <sup>2</sup> ... 35 mm <sup>2</sup>
Conductor cross section AWG	15 ... 2
Connection method	Biconnect terminal blocks
Screw thread	M5
Conductor cross section flexible	1.5 mm <sup>2</sup> ... 16 mm <sup>2</sup>

### UL specifications

SPD Type	4CA
Maximum continuous operating voltage MCOV (L+) - (L-)	1170 V DC
Maximum continuous operating voltage MCOV (L+) - G	1170 V DC
Maximum continuous operating voltage MCOV (L-) - G	1170 V DC
Nominal voltage	970 V DC
Mode of protection	(L+) - (L-)
	(L+) - G
	(L-) - G
Power distribution system	1
Measured limiting voltage MLV (L+) - (L-)	3960 V
Measured limiting voltage MLV (L+) - G	3960 V
Measured limiting voltage MLV (L-) - G	3980 V
Nominal discharge current $I_n$ (L+) - (L-)	10 kA
Nominal discharge current $I_n$ (L+) - G	10 kA
Nominal discharge current $I_n$ (L-) - G	10 kA

# Type 2 surge arrester - VAL-MS 1000DC-PV/2+V - 2800628

## Technical data

### UL connection data

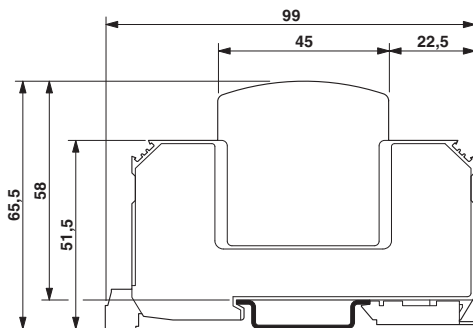
Conductor cross section AWG	10 ... 2
Tightening torque	30 lb <sub>r</sub> -in.

### Standards and Regulations

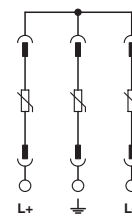
Standards/regulations	EN 50539-11 2013
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## Drawings

Dimensional drawing



Circuit diagram



The illustration shows the dimensional drawing for a version with remote indicator contact

## Classifications

### eCl@ss

eCl@ss 4.0	27140201
eCl@ss 4.1	27130801
eCl@ss 5.0	27130801
eCl@ss 5.1	27130801
eCl@ss 6.0	27130805
eCl@ss 7.0	27130805
eCl@ss 8.0	27130805
eCl@ss 9.0	27130805

### ETIM

ETIM 3.0	EC000941
ETIM 4.0	EC000941
ETIM 5.0	EC000941
ETIM 6.0	EC000941

### UNSPSC

UNSPSC 6.01	30212010
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# Type 2 surge arrester - VAL-MS 1000DC-PV/2+V - 2800628

## Classifications

### UNSPSC

UNSPSC 7.0901	39121610
UNSPSC 11	39121610
UNSPSC 12.01	39121610
UNSPSC 13.2	39121620

## Approvals

### Approvals

#### Approvals

UL Recognized / KEMA-KEUR / cUL Recognized / EAC / cULus Recognized

#### Ex Approvals

### Approval details

UL Recognized		<a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a>	FILE E 330181
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KEMA-KEUR		<a href="http://www.dekra-certification.com">http://www.dekra-certification.com</a>	2171492.01
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cUL Recognized		<a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a>	FILE E 330181
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EAC			RU C- DE.A*30.B01561
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cULus Recognized		<a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a>	
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## Accessories

### Accessories

#### Bridge

## Type 2 surge arrester - VAL-MS 1000DC-PV/2+V - 2800628

### Accessories

Wiring bridge - MPB F200X16/ 1GS - 2818339



Wiring bridge flexible, diameter 16 mm<sup>2</sup>, with a fork-type cable lug on one side, length: 200 mm

---

Wiring bridge - MPB F400X16/ 1GS - 2818342



Wiring bridge flexible, diameter 16 mm<sup>2</sup>, with a fork-type cable lug on one side, length: 400 mm

---

Wiring bridge - MPB F600X16/ 1GS - 2818355



Wiring bridge flexible, diameter: 16 mm<sup>2</sup>, with a fork-type cable lug on one side, length: 600 mm

---

### Device marking

Zack marker strip - ZBN 18:UNBEDRUCKT - 2809128



Zack marker strip, Strip, white, unlabeled, can be labeled with: CMS-P1-PLOTTER, PLOTMARK, Mounting type: Snap into tall marker groove, for terminal block width: 18 mm, Lettering field: 18 x 5 mm

---

### Labeled device marker

Marker for terminal blocks - ZBN 18,LGS:ERDE - 2749589



Marker for terminal blocks, Strip, white, labeled, Horizontal: Grounding symbol, Mounting type: Snap into tall marker groove, for terminal block width: 18 mm, Lettering field: 18 x 5 mm

---

## Type 2 surge arrester - VAL-MS 1000DC-PV/2+V - 2800628

### Accessories

Marker for terminal blocks - ZBN 18,LGS:L1-N,ERDE - 2749576



Marker for terminal blocks, Strip, white, labeled, Horizontal: L1, L2, L3, N, GND, Mounting type: Snap into tall marker groove, for terminal block width: 18 mm, Lettering field: 18 x 5 mm

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### Marker pen

Marker pen - B-STIFT - 1051993



Marker pen, for manual labeling of unprinted Zack strips, smear-proof and waterproof, line thickness 0.5 mm

---

### Spare parts

Type 2 surge protection plug - VAL-MS 1000DC-PV-ST - 2800624



Replacement plug for PV arrester combinations from the VAL-MS 1000DC-PV-... product range



K SQUARE ENERGY™

## Manufacturer Declaration Letter For DCDB, ACDB & Isolation Switch

We, M/s. Ksquare Energy Having registered office At A-331, Sahjanand Business Park, Opp Marigold restaurant, Sp Ring road odhav, Ahmedabad-382415, Gujarat & Works at E-37, Sahjanand Business Park, Opp Marigold restaurant, Sp Ring road odhav, Ahmedabad-382415 Here by agrees to Supply DCDB, ACDB & Isolation Switch As per Need Of Empanelled Agency Who Are Working in the Under Suryagujarat Scheme.

We, M/s Ksquare Energy are Manufacturer & Distributor Of DCDB, ACDB, & Isolation Switch As Per The terms & Specifications Of PGVCL EOI Reference: PGVCL/DSM/EOI/SRT/2019-20/01 Dated : 20/07/2019

As per The EOI Specifications Material Should be a per the the Below Standards.

Sr. No	Particulars	Brand	Standards
1	Enclosure	Kenclozer	IP67 & IEC 60598
2	DC MCB 500V/800V/1000V	Schneider	IEC 60947:2019
3	DC Fuse	Mersen	IEC 60947 & EN50521
4	AC MCB 16A-40A ( 2P&4P)	Schneider	IEC 60947:2019
5	DC SPD (600V & 1000V)	Phoenix	IEC 61643-1
6	AC SPD (240V & 440V)	Phoenix	IEC 61643-1
7	DC-AC Cables	Polycab/RR	En 50618 ,IS/IES 694
8	Terminals	Elmax/Connecwell	IEC 60947-1,7(1),Ed-3
9	Glands, Lugs	Jigo	NA
10	Printed Ferrule Marker , Stickers	NA	PC , Tube Ferrule

All The Make Wise Datasheet For Enclosure, MCB & SPD Are attached with this letter.

FOR, Ksquare Energy  
  
Authorised Signatory  
(Kuldip Sorathiya)

# Certificate of Compliance

RoHS Directive (2011/65/EU) as Amended (EU) 2015/863 of the European Parliament and of the Council on the restriction of use of certain Hazardous Substances in Electrical and Electronic Equipments

**Certificate No.: UQ-12906**

## Manufacturer

Name : **KSQUARE ENERGY**

Address : **331, Sahjanand Business Park, Opp. Marigold Restaurant,  
S.P. Ring Road, Odhav-382415, Ahmedabad, Gujarat, India**

Product : **ABS & PC Enclosure, Solar DCDB ACDB & Electrical  
Control Panels**

This is to state that the above mentioned product is in compliance with RoHS Directive (2011/65/EU) as Amended (EU) 2015/863 of the European Parliament and Commission Decision 2005/618/EC on the restriction of use of certain Hazardous Substances [Lead (Pb): < 1000 ppm, Mercury (Hg): < 100 ppm, Cadmium (Cd): < 100 ppm, Hexavalent Chromium (Cr VI) < 1000 ppm, Polybrominated Biphenyls (PBB): 1000 ppm, Polybrominated Diphenyl Ethers (PBDE): < 1000 ppm, Bis(2-Ethylhexyl) phthalate (DEHP): < 1000 ppm, Benzyl butyl phthalate (BBP): < 1000 ppm, Dibutyl phthalate (DBP): < 1000 ppm, Diisobutyl phthalate (DIBP): < 1000 ppm in Electrical and Electronic Equipments.

## STATEMENT:

This certificate declares that the product type / model described above complies with the mentioned above European Standard(s).

## REMARKS:

This certificate of complies is based on the evaluation of a sample of the above mentioned products. It does not imply and assessment of the mass-production of the product. This certificate holder may use this certificate in connection with the test report. The certification body should be informed (revision of technical file) for any modification or alterations made to the aforementioned product type(s), including design and manufacture and /or extension to the existing scope of application.

The certificate is valid for three years if the company applies the technical construction file which has been stored in UKCert office. This certificate includes declaration of manufacturer. Certificate remains property of UKCert (UK Certification and Inspection Ltd.) to whom it must be returned upon request. The certificate validity is conditioned by positive results or surveillance audits.

**Validity of this certificate can be verified at [www.ukcertifications.org.uk/verify](http://www.ukcertifications.org.uk/verify)**

Date of this Certificate	17 <sup>th</sup> June 2019
1 <sup>st</sup> Surveillance Audit Due	16 <sup>th</sup> June 2020
2 <sup>nd</sup> Surveillance Audit Due	16 <sup>th</sup> June 2021
Certificate Expiry (subject to the company maintaining its system to the required standard)	16 <sup>th</sup> June 2022



Authorised Signatory



# Certificate of Compliance

## CE

We hereby declare that the technical file of product complied with the requirement of directives 2014/35/EU Low Voltage Directive.

**Certificate No.: CE-4016**

### Manufacturer

**Name : KSQUARE ENERGY**

**Address : 331, Sahjanand Business Park, Opp. Marigold Restaurant,  
S.P.Ring Road, Odhav-382415, Ahmedabad, Gujarat, India**

**Products : ABS & PC Enclosure, Solar DCDB ACDB & Electrical  
Control Panels**

The Certification body has performed an audit of the above product quality system covering the design, manufacture and final inspection of the certified product. The quality system has been assessed, approved and is subject to continuous surveillance according to Directive 2014/35/EU Low Voltage Directive & 2014/30/EU Electromagnetic Compatibility Directive.

### This certificate is issued under the following conditions:

1. It applies only to the quality system maintained in the manufacture of above referenced models and it does not substitute the design or type-examination procedures, if requested.
2. The certificate remains valid until the manufacturing conditions or the quality systems are changed.
3. The certificate validity is conditioned by positive results or surveillance audits.

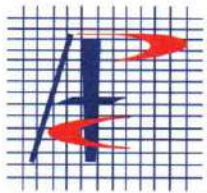
The CE mark as shown above can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of conformity and compliance with all relevant EC Directives. The statement is based on a single evaluation of one sample of above mentioned product. It does not imply an assessment of the whole production.

**Validity of this certificate can be verified at [www.ukcertifications.org.uk/verify](http://www.ukcertifications.org.uk/verify)**

<b>Date of Certificate</b>	<b>17<sup>th</sup> June 2019</b>
<b>1<sup>st</sup> Surveillance Audit Due</b>	<b>16<sup>th</sup> June 2020</b>
<b>2<sup>nd</sup> Surveillance Audit Due</b>	<b>16<sup>th</sup> June 2021</b>
<b>Certificate Expiry</b> (subject to the company maintaining its system to the required standard)	<b>16<sup>th</sup> June 2022</b>



**Authorised Signatory**



# AlekH

## PLASTICS TESTING CENTRE

F-94-95, RUDRAKSHA-II, JASHODANAGAR MEHAMDABAD HIGHWAY,  
VATVA, AHMEDABAD: 382445. TEL-FAX : 79-25830445,  
E-Mail: alekh\_plastics@yahoo.com; alekhplastics@gmail.com www.alekhtestingcentre.com

Doc.No: F/RPT/01

Page no: 1 of 1

### TEST REPORT

URL no: TC620919000000366P

No: TR/19-20/0313-R

Issued to: M/s. KSquare Energy  
Odhav,  
Ahmedabad

Date: 02/09/2019

Date of receipt: 29/08/19

Date of completion: 02/09/19

Sampling by: Customer

Sample details: Plastics Kenclousure SRT Series having size 180mm X 130mmX 100mm (as stated by the party)

Sample Packing: Loose

Mode of delivery: By hand

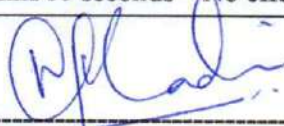
Your reference: Personal visit on 29/08/19.

#### Test result

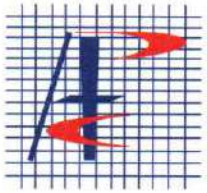
Sample	Test Property	Unit	Test method	Test value
Box as above	Material identification (cover)	---	By FTIR spectroscopy	Polycarbonate -No Halogen presence
	Material identification (box)	---	By FTIR spectroscopy	ABS copolymer -No Halogen present
	Ingress protection*	IP rating	IEC: 62208	
	a) against solid objects			IP-6X
	b) against water			IP-X7
	Flammability (top cover)	UL rating	ISO: 1210	UL 94-V2
	Flammability (base cover)	UL rating	ISO: 1210	UL 94-HB
	Protection to external mechanical impact*	IK rating	IEC:60598-1	IK-08
	Thermal resistance*	---	At 85°C/4hrs	No effect
	Dielectric strength*	---	At 25KV/mm/60 seconds	No effect



ACCREDITED  
Certificate no: TC-6209

  
-----  
Authorised Signatory  
B. R. Phadnis  
Chief Executive

N.B.: No liabilities are accepted, whatsoever, for this test report. Valid only for the sample tested. Not for publication. Not for legal purpose. The tests marked with an\* are not accredited by NABL. # marked tests are outsourced from NABL accredited lab. ~~~~~ END OF REPORT ~~~~~



# Alekh

## PLASTICS TESTING CENTRE

F-94-95, RUDRAKSHA-II, JASHODANAGAR MEHAMDABAD HIGHWAY,  
VATVA, AHMEDABAD: 382445. TEL-FAX : 79-25830445,  
E-Mail: alekh\_plastics@yahoo.com; alekhplastics@gmail.com www.alekhtestingcentre.com

Doc.No: F/RPT/01

Page no: 1 of 1

### TEST REPORT

URL no: TC620919000000366P

No: TR/19-20/0313A-R

Issued to: M/s. KSquare Energy  
Odhav,  
Ahmedabad

Date: 02/09/2019

Date of receipt: 29/08/19

Date of completion: 02/09/19

Sampling by: Customer

Sample details: Plastics Kenclousure SRT series having size 180mm X 180mm X100mm (as stated by the party)

Sample Packing: Loose

Mode of delivery: By hand

Your reference: Personal visit on 29/08/19.

#### Test result

Sample	Test Property	Unit	Test method	Test value
Box as above	Material identification (cover)	---	By FTIR spectroscopy	Polycarbonate -No Halogen presence
	Material identification (box)	---	By FTIR spectroscopy	ABS copolymer -No Halogen present
	Ingress protection*	IP rating	IEC: 62208	
	a) against solid objects			IP-6X
	b) against water			IP-X7
	Flammability (top cover)	UL rating	ISO: 1210	UL 94-V2
	Flammability (base cover)	UL rating	ISO: 1210	UL 94-HB
	Protection to external mechanical impact*	IK rating	IEC:60598-1	IK-08
	Thermal resistance*	---	At 85°C/4hrs	No effect
	Dielectric strength*	---	At 25KV/mm/60 seconds	No effect

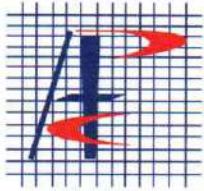


ACCREDITED  
Certificate no: TC-6209

Authorised Signatory  
B. R. Phadnis  
Chief Executive

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# ALEKH

## PLASTICS TESTING CENTRE

F-94-95, RUDRAKSHA-II, JASHODANAGAR MEHAMDABAD HIGHWAY,  
VATVA, AHMEDABAD: 382445. TEL-FAX : 79-25830445,  
E-Mail: alekh\_plastics@yahoo.com; alekhplastics@gmail.com www.alekhtestingcentre.com

Doc.No: F/RPT/01

Page no: 1 of 1

### TEST REPORT

URL no: TC620919000000366P

No: TR/19-20/0313B

Issued to: M/s. KSquare Energy  
Odhav,  
Ahmedabad

Date: 02/09/2019

Date of receipt: 29/08/19

Date of completion: 02/09/19

Sampling by: Customer

Sample details: Plastics Kenclosure SRT Series having size 20" X 29" X 100mm (as stated by the party)

Sample Packing: Loose

Mode of delivery: By hand

Your reference: Personal visit on 29/08/19.

#### Test result

Sample	Test Property	Unit	Test method	Test value
Box as above	Material identification (cover)	---	By FTIR spectroscopy	Polycarbonate -No Halogen presence
	Material identification (box)	---	By FTIR spectroscopy	ABS copolymer -No Halogen present
	Ingress protection*	IP rating	IEC: 62208	
	a) against solid objects			IP-6X
	b) against water			IP-X7
	Flammability (top cover)	UL rating	ISO: 1210	UL 94-V2
	Flammability (base cover)	UL rating	ISO: 1210	UL 94-HB
	Protection to external mechanical impact*	IK rating	IEC:60598-1	IK-08
	Thermal resistance*	---	At 85°C/4hrs	No effect
	Dielectric strength*	---	At 25KV/mm/60 seconds	No effect



ACCREDITED  
Certificate no: TC-6209

Authorised Signatory  
B. R. Phadnis  
Chief Executive

N.B.: No liabilities are accepted, whatsoever, for this test report. Valid only for the sample tested. Not for publication. Not for legal purpose. The tests marked with an\* are not accredited by NABL. # marked tests are outsourced from NABL accredited lab. ~~~~~ END OF REPORT ~~~~~



### Main

Device application	Distribution
Range of product	Acti 9
Range	Acti 9
Product name	XC60
Product or component type	Miniature circuit-breaker
Device short name	XC60
Poles description	2P
Number of protected poles	2
[In] rated current	25 A
Network type	DC AC
Trip unit technology	Thermal-magnetic
Curve code	C
Utilisation category	Category A conforming to EN/IEC 60947-2
Suitability for isolation	Yes conforming to EN/IEC 60947-2

### Complementary

Network frequency	50/60 Hz
[Ue] rated operational voltage	240 V AC 50/60 Hz 380...415 V AC 50/60 Hz 100...125 V DC
Magnetic tripping limit	8 x In +/- 20 %
Breaking capacity	10000 A Icn at 240 V AC 50/60 Hz conforming to EN/IEC 60898-1 10000 A Icn at 415 V AC 50/60 Hz conforming to EN/IEC 60898-1 15 kA Icu at 380...415 V AC 50/60 Hz conforming to EN/IEC 60947-2 6 kA Icu at 100...125 V DC conforming to EN/IEC 60947-2
[Ics] rated service breaking capacity	6 kA conforming to EN/IEC 60947-2 - 100...125 V DC 7.5 kA conforming to EN/IEC 60947-2 - 380...415 V AC 50/60 Hz
Limitation class	3 conforming to EN/IEC 60898-1 3 conforming to EN/IEC 60947-2

[Ui] rated insulation voltage	AC 50/60 Hz conforming to EN/IEC 60947-2
[Uimp] rated impulse withstand voltage	6 kV conforming to EN/IEC 60947-2
Contact position indicator	Yes
Control type	Toggle
Local signalling	ON/OFF indication
Mounting mode	Clip-on
Mounting support	35 mm DIN rail
Comb busbar and distribution block compatibility	Top: YES
9 mm pitches	4
Height	85 mm
Width	36 mm
Depth	77.5 mm
Product weight	0.215 kg
Colour	White
Mechanical durability	20000 cycles
Electrical durability	10000 cycles
Connections - terminals	Tunnel type terminals (bottom) 16 mm <sup>2</sup> flexible Tunnel type terminals (bottom) 25 mm <sup>2</sup> rigid Biconnect (top)
Wire stripping length	13 mm for top or bottom connection
Tightening torque	2 N.m
Earth-leakage protection	Separate block
Product compatibility	C60 auxiliary C60 accessories

## Environment

Standards	EN/IEC 60898-1 EN/IEC 60947-2
IP degree of protection	IP20 conforming to IEC 60529
Pollution degree	3
Tropicalisation	2 conforming to IEC 60068-1
Relative humidity	95 % at 55 °C
Ambient air temperature for operation	-30...70 °C
Ambient air temperature for storage	-40...85 °C

## Offer Sustainability

Sustainable offer status	Green Premium product
REACH Regulation	<a href="#">REACH Declaration</a>
EU RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope) <a href="#">EU RoHS Declaration</a>
Mercury free	Yes
RoHS exemption information	<a href="#">Yes</a>
China RoHS Regulation	<a href="#">Download RoHS China Declaration</a> Product out of China RoHS scope. Substance declaration for your information
Environmental Disclosure	<a href="#">Product Environmental Profile</a>
Circularity Profile	No need of specific recycling operations



### Main

Device application	Distribution
Range of product	Acti 9
Range	Acti 9
Product name	XC60
Product or component type	Miniature circuit-breaker
Device short name	XC60
Poles description	4P
Number of protected poles	4
[In] rated current	32 A
Network type	DC AC
Trip unit technology	Thermal-magnetic
Curve code	C
Utilisation category	Category A conforming to EN/IEC 60947-2
Suitability for isolation	Yes conforming to EN/IEC 60947-2

### Complementary

Network frequency	50/60 Hz
[Ue] rated operational voltage	240 V AC 50/60 Hz 380...415 V AC 50/60 Hz 220...250 V DC
Magnetic tripping limit	8 x In +/- 20 %
Breaking capacity	10000 A Icn at 240 V AC 50/60 Hz conforming to EN/IEC 60898-1 10000 A Icn at 415 V AC 50/60 Hz conforming to EN/IEC 60898-1 15 kA Icu at 380...415 V AC 50/60 Hz conforming to EN/IEC 60947-2 6 kA Icu at 220...250 V DC conforming to EN/IEC 60947-2
[Ics] rated service breaking capacity	7.5 kA conforming to EN/IEC 60947-2 - 380...415 V AC 50/60 Hz 6 kA conforming to EN/IEC 60947-2 - 220...250 V DC
Limitation class	3 conforming to EN/IEC 60898-1 3 conforming to EN/IEC 60947-2

Disclaimer: This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications

[Ui] rated insulation voltage	500 V AC 50/60 Hz conforming to EN/IEC 60947-2
[Uimp] rated impulse withstand voltage	6 kV conforming to EN/IEC 60947-2
Contact position indicator	Yes
Control type	Toggle
Local signalling	ON/OFF indication
Mounting mode	Clip-on
Mounting support	35 mm DIN rail
Comb busbar and distribution block compatibility	Top: YES
9 mm pitches	8
Height	85 mm
Width	72 mm
Depth	77.5 mm
Net weight	0.415 kg
Colour	White
Mechanical durability	20000 cycles
Electrical durability	10000 cycles
Connections - terminals	Biconnect (top) Tunnel type terminals (bottom) 25 mm <sup>2</sup> flexible Tunnel type terminals (bottom) 35 mm <sup>2</sup> rigid
Wire stripping length	13 mm for top or bottom connection
Tightening torque	3.5 N.m
Earth-leakage protection	Separate block
Product compatibility	C60 auxiliary C60 accessories

## Environment

Standards	EN/IEC 60898-1 EN/IEC 60947-2
IP degree of protection	IP20 conforming to IEC 60529
Pollution degree	3
Tropicalisation	2 conforming to IEC 60068-1
Relative humidity	95 % at 55 °C
Ambient air temperature for operation	-30...70 °C
Ambient air temperature for storage	-40...85 °C

## Offer Sustainability

Sustainable offer status	Green Premium product
REACH Regulation	<a href="#">REACH Declaration</a>
EU RoHS Directive	Compliant <a href="#">EU RoHS Declaration</a>
Mercury free	Yes
RoHS exemption information	<a href="#">Yes</a>
China RoHS Regulation	<a href="#">China RoHS declaration</a> Product out of China RoHS scope. Substance declaration for your information
Environmental Disclosure	<a href="#">Product Environmental Profile</a>
Circularity Profile	No need of specific recycling operations



### Main

Device application	Distribution
Range of product	Acti 9
Range	Acti 9
Product name	XC60
Product or component type	Miniature circuit-breaker
Device short name	XC60
Poles description	4P
Number of protected poles	4
[In] rated current	63 A
Network type	AC DC
Trip unit technology	Thermal-magnetic
Curve code	C
Utilisation category	Category A conforming to EN/IEC 60947-2
Suitability for isolation	Yes conforming to EN/IEC 60947-2

### Complementary

Network frequency	50/60 Hz
[Ue] rated operational voltage	240 V AC 50/60 Hz 380...415 V AC 50/60 Hz 220...250 V DC
Magnetic tripping limit	8 x In +/- 20 %
Breaking capacity	10000 A Icn at 240 V AC 50/60 Hz conforming to EN/IEC 60898-1 10000 A Icn at 415 V AC 50/60 Hz conforming to EN/IEC 60898-1 10 kA Icu at 380...415 V AC 50/60 Hz conforming to EN/IEC 60947-2 6 kA Icu at 220...250 V DC conforming to EN/IEC 60947-2
[Ics] rated service breaking capacity	7.5 kA conforming to EN/IEC 60947-2 - 380...415 V AC 50/60 Hz 6 kA conforming to EN/IEC 60947-2 - 220...250 V DC
Limitation class	3 conforming to EN/IEC 60898-1 3 conforming to EN/IEC 60947-2

[Ui] rated insulation voltage	500 V AC 50/60 Hz conforming to EN/IEC 60947-2
[Uimp] rated impulse withstand voltage	6 kV conforming to EN/IEC 60947-2
Contact position indicator	Yes
Control type	Toggle
Local signalling	ON/OFF indication
Mounting mode	Clip-on
Mounting support	35 mm DIN rail
Comb busbar and distribution block compatibility	Top: YES
9 mm pitches	8
Height	85 mm
Width	72 mm
Depth	77.5 mm
Net weight	0.415 kg
Colour	White
Mechanical durability	20000 cycles
Electrical durability	10000 cycles
Connections - terminals	Biconnect (top) Tunnel type terminals (bottom) 25 mm <sup>2</sup> flexible Tunnel type terminals (bottom) 35 mm <sup>2</sup> rigid
Wire stripping length	13 mm for top or bottom connection
Tightening torque	3.5 N.m
Earth-leakage protection	Separate block
Product compatibility	C60 auxiliary C60 accessories

## Environment

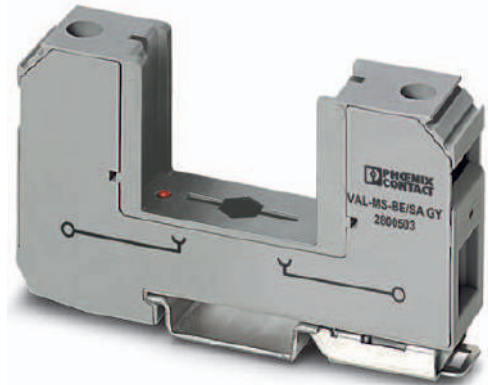
Standards	EN/IEC 60898-1 EN/IEC 60947-2
IP degree of protection	IP20 conforming to IEC 60529
Pollution degree	3
Tropicalisation	2 conforming to IEC 60068-1
Relative humidity	95 % at 55 °C
Ambient air temperature for operation	-30...70 °C
Ambient air temperature for storage	-40...85 °C

## Offer Sustainability

Sustainable offer status	Green Premium product
REACH Regulation	<a href="#">REACH Declaration</a>
EU RoHS Directive	Compliant <a href="#">EU RoHS Declaration</a>
Mercury free	Yes
RoHS exemption information	<a href="#">Yes</a>
China RoHS Regulation	<a href="#">China RoHS declaration</a> Product out of China RoHS scope. Substance declaration for your information
Environmental Disclosure	<a href="#">Product Environmental Profile</a>
Circularity Profile	No need of specific recycling operations

# 2800503 VAL-MS BE/SA GY

Base element for type 2 arresters of the VALVETRAB  
MS series of products. Design: 1-channel



Data sheet  
83163835

© PHOENIX CONTACT 2014-11-03

## 1 Product information

Type	VAL-MS BE/SA GY
Order No.	2800503
Project number	ACL140076
Document number	83163835

## 2 Change note

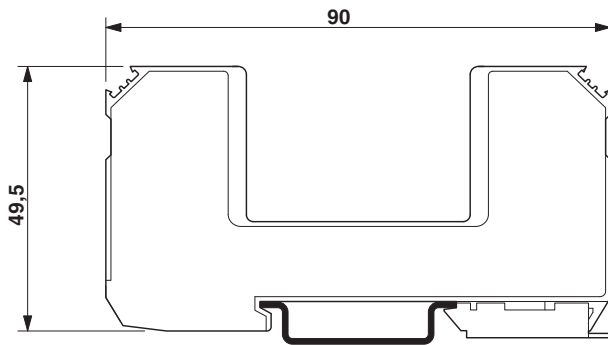
Comments	Name	Date	Revision
-	Chen	08.04.2011	00
Revision IEC 61643-11:2011-03	Dittert	30.10.2014	01



### 3 Technical data

General data	
Standards/regulations	IEC 61643-11 2011 EN 61643-11 2012
IEC test classification	<b>T2</b>
EN type	T2
Mounting type	DIN rail: 35 mm
Color	traffic grey A RAL 7042
Insulating material	PA 6.6
Housing material	PA 6.6
Air and creepage distances (according to EN 60664-1 and EN 61643-11)	
Pollution degree	2
Surge voltage category	III
Material group	I
CTI value of material	≥ 600
Inflammability class according to UL 94	V-0
Degree of protection	IP20 (only when all terminal points are used)
Shock (operation)	25g
Vibration (operation)	5g
Ambient temperature (operation)	-40 °C ... 80 °C
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Permissible humidity (operation)	5 % ... 95 %
Altitude	≤ 2000 m (amsl (above mean sea level))
Width	17.6 mm
Height	90 mm
Depth	44 mm
Electrical data	
Maximum continuous operating voltage $U_C$	600 V AC
Rated load current $I_L$	80 A
Short-circuit current rating $I_{SCCR}$	25 kA
Current tripping factor k	1.6
Max. backup fuse with branch wiring	125 A AC (gG)
Max. backup fuse with V-type through wiring	80 A AC (gG)
Connection data	
Connection method	Screw connection
Conductor cross section stranded min.	1.5 mm <sup>2</sup>
Conductor cross section stranded max.	25 mm <sup>2</sup>
Conductor cross section solid min.	1.5 mm <sup>2</sup>
Conductor cross section solid max.	35 mm <sup>2</sup>
Cross section AWG	15 ... 2
Screw thread	M5
Tightening torque	4.5 Nm
Stripping length	16 mm
Additional descriptions	
Note	For installation into a touch protected cabinet. For applications with $U_C > 500$ V distances at the side and distances at the connection area must be minimum of 5 mm between different active parts including earthed parts.

#### 4 Dimensional drawing



#### 5 Circuit diagram



# 2800688

## F-MS 12 ST GY

Surge protection plug type 2, with N-PE total current spark gap for base element.



Data sheet  
00581298

© PHOENIX CONTACT 2014-08-12

### 1 Product information

Type	F-MS 12 ST GY
Order No.	2800688
Project number	ACL140076
Document number	00581298

### 2 Change note

Comments	Name	Date	Revision
-	Chen	14.03.2011	01
Revision IEC 61643-11:2011-03	Jungermann	04.08.2014	02

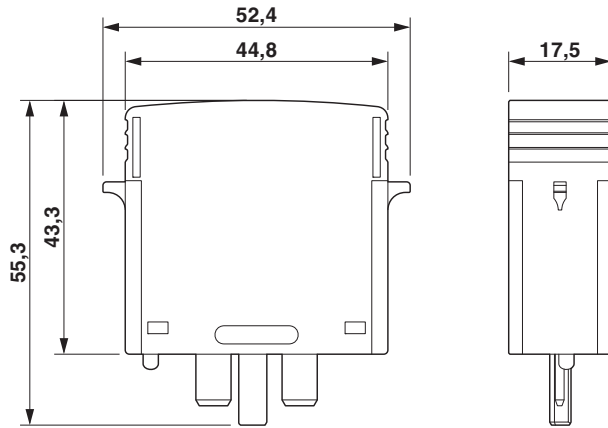
### 3 Technical data

General data	
Standards/regulations	IEC 61643-11 2011 EN 61643-11 2012
IEC test classification	<b>T2</b>
EN type	T2
SPD design	Voltage-switching type
Mode of protection	N-PE
Mounting type	On base element
Color	gray
Insulating material	PA 6.6
Housing material	PA 6.6
Air and creepage distances (according to EN 60664-1 and EN 61643-11)	
Pollution degree	2
Surge voltage category	III
Material group	I
CTI value of material	≥ 600
Inflammability class according to UL 94	V-0
Degree of protection	IP20
Shock (operation)	25g
Vibration (operation)	5g
Ambient temperature (operation)	-40 °C ... 80 °C
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Permissible humidity (operation)	5 % ... 95 %
Altitude	≤ 2000 m (amsl (above mean sea level))
Width	17.5 mm
Height	52.4 mm
Depth	55.3 mm
Electrical data	
Nominal voltage $U_N$	240/415 V AC (TN - only N-PE) 240/415 V AC (TT - only N-PE)
Nominal frequency $f_N$	50 Hz (60 Hz)
Maximum continuous operating voltage $U_C$	260 V AC
Reference test voltage $U_{REF}$	255 V AC
Residual current $I_{PE}$	≤ 5 μA
Standby power consumption $P_C$	≤ 1.5 mVA
Nominal discharge current $I_n$ (8/20) μs	20 kA
Maximum discharge current $I_{max}$ (8/20) μs	40 kA
Follow current interrupt rating $I_{fi}$	100 A (260 V)
Voltage protection level $U_p$	≤ 1.5 kV
Residual voltage $U_{res}$	≤ 0.4 kV (at $I_n$ ) ≤ 0.25 kV (at 10 kA) ≤ 0.15 kV (at 5 kA) ≤ 0.1 kV (at 3 kA)
Front of wave sparkover voltage at 6 kV (1.2/50) μs	≤ 1.5 kV
TOV behavior at $U_T$	1200 V AC (200 ms / withstand mode)
Response time $t_A$	≤ 100 ns
Insulation resistance $R_{iso}$	> 1 GΩ (100 V DC)

**Connection data**

Connection method

VALVETRAB plug-in system

**4 Dimensional drawing****5 Circuit diagram**

# 2800681 VAL-MS 320/40 ST GY

Surge protection connector type 2 with high-capacity varistor for VAL-MS base element, thermal monitoring, visual fault warning. Design: 320 V AC



Data sheet  
00582044

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## 1 Product information

Type	VAL-MS 320/40 ST GY
Order No.	2800681
Project number	ACL140076
Document number	00582044

## 2 Change note

Comments	Name	Date	Revision
-	PxC-India	14.03.2011	01
Revision IEC 61643-11:2011-03	Jungermann	04.08.2014	02

### 3 Technical data

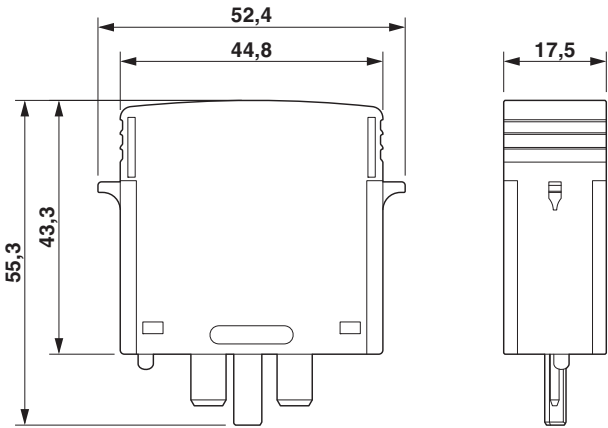
General data	
Standards/regulations	IEC 61643-11 2011 EN 61643-11 2012
IEC test classification	<b>T2</b>
EN type	T2
SPD design	Voltage-limiting type
Mode of protection	L-PEN L-N
Mounting type	On base element
Color	gray
Insulating material	PA 6.6
Housing material	PA 6.6
Air and creepage distances (according to EN 60664-1 and EN 61643-11)	
Pollution degree	2
Surge voltage category	III
Material group	I
CTI value of material	≥ 600
Inflammability class according to UL 94	V-0
Degree of protection	IP20
Shock (operation)	25g
Vibration (operation)	5g
Ambient temperature (operation)	-40 °C ... 80 °C
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Permissible humidity (operation)	5 % ... 95 %
Altitude	≤ 2000 m (amsl (above mean sea level))
Width	17.5 mm
Height	52.4 mm
Depth	55.3 mm
Electrical data	
Nominal voltage $U_N$	240/415 V AC (TN) 240/415 V AC (TT)
Nominal frequency $f_N$	50 Hz (60 Hz)
Maximum continuous operating voltage $U_C$	335 V AC
Reference test voltage $U_{REF}$	255 V AC
Residual current $I_{PE}$	≤ 0.45 mA
Standby power consumption $P_C$	≤ 150 mVA
Nominal discharge current $I_n$ (8/20) $\mu$ s	20 kA
Maximum discharge current $I_{max}$ (8/20) $\mu$ s	40 kA
Short-circuit current rating $I_{SCCR}$	25 kA
Voltage protection level $U_p$	≤ 1.5 kV
Residual voltage $U_{res}$	≤ 1.5 kV (at $I_n$ ) ≤ 1.3 kV (at 10 kA) ≤ 1.2 kV (at 5 kA) ≤ 1.1 kV (at 3 kA)
TOV behavior at $U_T$	415 V AC (5 s / withstand mode) 440 V AC (120 min / safe failure mode)
Response time $t_A$	≤ 25 ns
Max. required backup fuse with branch wiring	125 A AC (gG)

**Connection data**

Connection method

VALVETRAB plug-in system

**4 Dimensional drawing**



**5 Circuit diagram**





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## TEST REPORT

Date of issue-03.12.2019

**Item** : VAL-MS 320/1+1-GY  
**Article No.** : 1086590

Specification	Specified Values	Observation
Color	Gray	O.K./ <del>NOT O.K.</del>
Ambient Temperature (Operation)	-40 °C ... 80 °C	O.K./ <del>NOT O.K.</del>
Ambient Temperature (Storage /Transport)	-40 °C ... 80 °C	O.K./ <del>NOT O.K.</del>
Degree of Protection	IP 20	O.K./ <del>NOT O.K.</del>
Degree of pollution	2	O.K./ <del>NOT O.K.</del>
Mode of Protection	L-N / L-PE /N-PE	O.K./ <del>NOT O.K.</del>
Flammability Rating	V0	O.K./ <del>NOT O.K.</del>
Number of Positions	2	O.K./ <del>NOT O.K.</del>
Nominal Voltage UN	240 /415 V AC (TN-S) , 240/415 V AC (TT)	O.K./ <del>NOT O.K.</del>
Nominal Frequency	50 /60 HZ	O.K./ <del>NOT O.K.</del>
Maximum Continuous Voltage Uc (L-N) /L-PE	335 V AC	O.K./ <del>NOT O.K.</del>
Maximum Continuous Voltage Uc (N-PE)	260 V AC	O.K./ <del>NOT O.K.</del>
Rated Load current IL	80 A	O.K./ <del>NOT O.K.</del>
Response Time tA (L-N)	≤ 25 ns	O.K./ <del>NOT O.K.</del>
Response Time tA (L-PE)	≤ 100 ns	O.K./ <del>NOT O.K.</del>
Response Time tA (N-PE)	≤ 100 ns	O.K./ <del>NOT O.K.</del>
Short-circuit current rating I <sub>SCCR</sub>	25 KA	O.K./ <del>NOT O.K.</del>
Maximum discharge current I <sub>max</sub> (8/20) μs	40 KA	O.K./ <del>NOT O.K.</del>

Specification	Specified Values	Observation
Nominal discharge current $I_n$ (8/20) $\mu$ s	20 KA	O.K./ <del>NOT O.K.</del>
Voltage protection level $U_p$ (L-N)	$\leq 1.5$ kV	O.K./ <del>NOT O.K.</del>
Voltage protection level $U_p$ (L-PE)	$\leq 1.8$ kV	O.K./ <del>NOT O.K.</del>
Voltage protection level $U_p$ (N-PE)	$\leq 1.5$ kV	O.K./ <del>NOT O.K.</del>
Standards/regulations	IEC 61643-11 2011	O.K./ <del>NOT O.K.</del>

For **PHOENIX CONTACT INDIA PVT. LTD.**

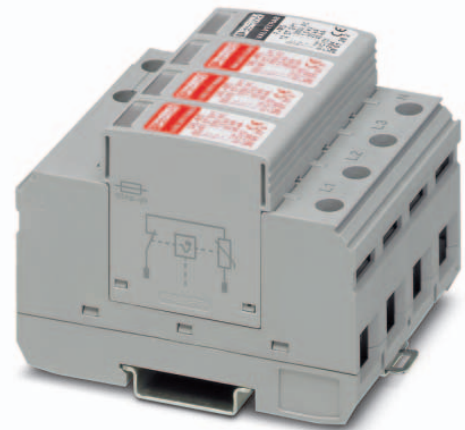


(DOMESTIC SERVICES)

# 2800685

## VAL-MS 320/40/3+1 GY

Type 2 surge arrester for 5-conductor power supply systems (L1, L2, L3, N, PE), consisting of a base element and protective plugs.



Data sheet  
00582836

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### 1 Product information

Type	VAL-MS 320/40/3+1 GY
Order No.	2800685
Project number	ACL140076
Document number	00582836

### 2 Change note

Comments	Name	Date	Revision
-	PxC-India	15.03.2011	01
Residual current $I_{PE}$ adjusted	Dittert	18.07.2013	02
Revision IEC 61643-11:2011-03	Jungermann	04.08.2014	03

### 3 Technical data

General data	
Standards/regulations	IEC 61643-11 2011 EN 61643-11 2012
IEC test classification	<b>T2</b>
EN type	T2
Number of ports	One
SPD design	Combination type
Mode of protection	L-N L-PE N-PE
Mounting type	DIN rail: 35 mm
Color	gray
Insulating material	PA 6.6/PBT
Housing material	PA 6.6 PBT
Air and creepage distances (according to EN 60664-1 and EN 61643-11)	
Pollution degree	2
Surge voltage category	III
Material group	I
CTI value of material	≥ 600
Inflammability class according to UL 94	V-0
Degree of protection	IP20 (only when all terminal points are used)
Shock (operation)	25g
Vibration (operation)	5g
Ambient temperature (operation)	-40 °C ... 80 °C
Ambient temperature (storage/transport)	-40 °C ... 80 °C
Permissible humidity (operation)	5 % ... 95 %
Altitude	≤ 2000 m (amsl (above mean sea level))
Width	71 mm
Height	90 mm
Depth	58 mm
Electrical data	
Nominal voltage $U_N$	240/415 V AC (TN-S) 240/415 V AC (TT)
Nominal frequency $f_N$	50 Hz (60 Hz)
Maximum continuous operating voltage $U_C$ (L-N)	335 V AC
Maximum continuous operating voltage $U_C$ (N-PE)	260 V AC
Reference test voltage $U_{REF}$	255 V AC
Rated load current $I_L$	80 A
Residual current $I_{PE}$	≤ 5 μA
Standby power consumption $P_C$	≤ 450 mVA
Nominal discharge current $I_n$ (8/20) μs (L-N)	20 kA
Nominal discharge current $I_n$ (8/20) μs (L-PE)	20 kA
Nominal discharge current $I_n$ (8/20) μs (N-PE)	20 kA
Maximum discharge current $I_{max}$ (8/20) μs (L-N)	40 kA
Maximum discharge current $I_{max}$ (8/20) μs (L-PE)	40 kA
Maximum discharge current $I_{max}$ (8/20) μs (N-PE)	40 kA
Follow current interrupt rating $I_{fi}$ (N-PE)	100 A (260 V)
Short-circuit current rating $I_{SCCR}$	25 kA

**Electrical data**

Voltage protection level $U_p$ (L-N)	$\leq 1.6$ kV
Voltage protection level $U_p$ (L-PE)	$\leq 1.9$ kV
Voltage protection level $U_p$ (N-PE)	$\leq 1.5$ kV
Residual voltage $U_{res}$ (L-N)	$\leq 1.6$ kV (at $I_n$ ) $\leq 1.5$ kV (at 10 kA) $\leq 1.3$ kV (at 5 kA) $\leq 1.1$ kV (at 3 kA)
Residual voltage $U_{res}$ (L-PE)	$\leq 1.9$ kV (at $I_n$ ) $\leq 1.5$ kV (at 10 kA) $\leq 1.3$ kV (at 5 kA) $\leq 1.2$ kV (at 3 kA)
Residual voltage $U_{res}$ (N-PE)	$\leq 0.4$ kV (at $I_n$ ) $\leq 0.25$ kV (at 10 kA) $\leq 0.15$ kV (at 5 kA) $\leq 0.1$ kV (at 3 kA)
Front of wave sparkover voltage at 6 kV (1.2/50) $\mu$ s (N-PE)	$\leq 1.5$ kV
TOV behavior at $U_T$ (L-N)	415 V AC (5 s / withstand mode) 440 V AC (120 min / safe failure mode)
TOV behavior at $U_T$ (N-PE)	1200 V AC (200 ms / withstand mode)
Response time $t_A$ (L-N)	$\leq 25$ ns
Response time $t_A$ (N-PE)	$\leq 100$ ns
Insulation resistance $R_{iso}$	$> 1$ G $\Omega$ (100 V DC)
Current tripping factor k	1.6
Max. backup fuse with branch wiring	125 A AC (gG)
Max. backup fuse with V-type through wiring	80 A AC (gG)

**Connection data**

Connection method	Screw connection
Conductor cross section stranded min.	1.5 mm <sup>2</sup>
Conductor cross section stranded max.	25 mm <sup>2</sup>
Conductor cross section solid min.	1.5 mm <sup>2</sup>
Conductor cross section solid max.	35 mm <sup>2</sup>
Cross section AWG	15 ... 2
Screw thread	M5
Tightening torque	4.5 Nm
Stripping length	16 mm

## 4 Dimensional drawing

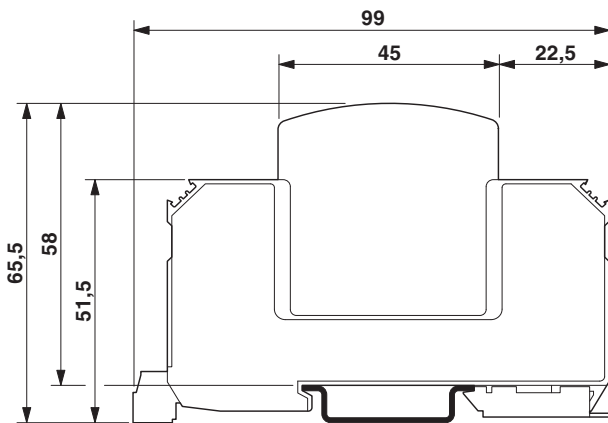


Figure 1 The illustration shows the dimensional drawing for a version with remote indicator contact

## 5 Circuit diagram

