

## HLSA6,5 PV 200/2 M S

- Lightning impulse current and surge arresters type T1+T2 intended for photovoltaic systems (PV) at U or Y connection.
- The advantage of the Y connection versus the U connection is the resistance to the earth connection of the working conductors and zero residual (leakage) current through the PE conductor.
- Particular varistor sectors, connected between the terminals L+, Land PE are equipped with internal disconnectors, which are activated when the varistors fail (overheat) and they are able to interrupt the DC current.
- Special construction of the internal disconnector allows installation without a back-up fuse.

- They are installed on the DC side in PV applications with external LPS, where a sufficient distance "s" is not observed.
- Suitable for level LPL III or IV.
- Ensure the equipotential bonding of plus and minus busbars of PV systems and the elimination of transient overvoltage resulting from the atmospheric discharges (including direct lightning strike to the PV system) or switching processes.
- M indication specifies a type of construction with removable module.
- **S** indication specifies a version with remote monitoring.

Test class according to EN 61643-11:2012 and EN 61643-31:2019   DC   PV system type	Туре		HLSA6,5 PV 200/2 M S
PV system type	Test class according to EN 61643-11:2012 and EN 61643-31:2019		T1, T2
SPD connection type $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	System		DC
Maximum continuous operating voltage (+/-) $U_{CPV} \qquad 200  V  DC$ Maximum continuous operating voltage ( $\pm$ /PE) $U_{CPV} \qquad 100  V  DC$ Max. voltage of PV generator $U_{OCSTC} \leq U_{CPV} / 1.2$ $U_{OCSTC} \qquad 160  V$ Short-circuit current rating $I_{SCPV} \qquad 10  kA$ Impulse discharge current for class I test (10/350) $I_{imp} \qquad 6.5  kA$ Charge $Q \qquad 3.25  As$ Specific energy for class I test $W/R \qquad 10.56  kJ/\Omega$ Total discharge current (10/350) $\pm$ ->PE $I_{rotal} \qquad 12.5  kA$ Total discharge current (8/20) $\pm$ ->PE $I_{rotal} \qquad 140  kA$ Maximum discharge current (8/20) $I_{max} \qquad 40  kA$ Nominal discharge current for class II test (8/20) $I_{max} \qquad 40  kA$ Voltage protection level at $I_n (\pm /-)$ $U_p \qquad < 1.1  kV$ Voltage protection level at $I_n (\pm /PE)$ $I_A \qquad < 25  ns$ Response time $(\pm /-)$ $I_A \qquad < 25  ns$ Response time $(\pm /-)$ $I_A \qquad < 25  ns$ Response time $(\pm /-)$ $I_{PE} \qquad I_{PE} $	PV system type		Ungrounded
Maximum continuous operating voltage $(\pm/PE)$ $U_{CPV}$ 100 V DC Max. voltage of PV generator $U_{OCSTC} \le U_{CPV}$ / 1.2 $U_{OCSTC}$ 160 V Short-circuit current rating $I_{SCPV}$ 10 kA Impulse discharge current for class I test (10/350) $I_{Imp}$ 6.5 kA Charge $Q$ 3.25 As Specific energy for class I test $V_{II}$ 10.56 kJ/ $V_{II}$ 1	SPD connection type		U
Max. voltage of PV generator $U_{OCSTC} \le U_{CPV} / 1.2$ $U_{OCSTC}$ $160 \text{ V}$ Short-circuit current rating $I_{SCPV}$ $10 \text{ kA}$ Impulse discharge current for class I test $(10/350)$ $I_{Imp}$ $6.5 \text{ kA}$ Charge $Q$ $3.25 \text{ As}$ Specific energy for class I test $W/R$ $10.56 \text{ kJ}/\Omega$ Total discharge current $(10/350) \pm ->PE$ $I_{Total}$ $12.5 \text{ kA}$ Total discharge current $(8/20) \pm ->PE$ $I_{Total}$ $40 \text{ kA}$ Maximum discharge current $(8/20) \pm ->PE$ $I_{Total}$ $40 \text{ kA}$ Maximum discharge current for class II test $(8/20)$ $I_{Imax}$ $40 \text{ kA}$ Nominal discharge current for class II test $(8/20)$ $I_{Imax}$ $40 \text{ kA}$ Voltage protection level at $I_{I_{I_{I_{I_{I_{I_{I_{I_{I_{I_{I_{I_{I$	Maximum continuous operating voltage (+/-)	$U_{\text{CPV}}$	200 V DC
Short-circuit current rating $I_{SCPV}$ 10 kA Impulse discharge current for class I test (10/350) $I_{Imp}$ 6.5 kA Charge $I_{Imp}$ 6.5 kA Charge $I_{Imp}$ 6.5 kA Charge $I_{Imp}$ 6.5 kA Charge $I_{Imp}$ 6.5 kA $I_{Imp}$ 6.5 kA Charge Specific energy for class I test $I_{Imp}$ 8.25 kA Total discharge current (10/350) $\pm$ ->PE $I_{Iotal}$ 12.5 kA Total discharge current (8/20) $\pm$ ->PE $I_{Iotal}$ 40 kA Maximum discharge current (8/20) $I_{Imposed}$ 40 kA Nominal discharge current for class II test (8/20) $I_{Imposed}$ 40 kA Nominal discharge current for class II test (8/20) $I_{Imposed}$ 40 kA Notinal discharge current for class II test (8/20) $I_{Imposed}$ 40 kA Notinal discharge current for class II test (8/20) $I_{Imposed}$ 40 kA Notinal discharge current for class II test (8/20) $I_{Imposedd}$ 40 kA Notinal discharge current for class II test (8/20) $I_{Imposedd}$ 40 kA Notinal discharge current for class II test (8/20) $I_{Imposeddd}$ 40 kA Notinal discharge current for class II test (8/20) $I_{Imposedddddddddddddddddddddddddddddddddddd$	Maximum continuous operating voltage (±/PE)	$U_{CPV}$	100 V DC
Impulse discharge current for class I test (10/350)  Ilimp  6.5 kA  Charge  Q  3.25 As  Specific energy for class I test  W/R  10.56 kJ/ $\Omega$ Total discharge current (10/350) ±->PE  ITotal discharge current (8/20) ±->PE  ITotal discharge current (8/20)  Ilimax  40 kA  Maximum discharge current (8/20)  In  20 kA  Voltage protection level at In (+/-)  Voltage protection level at In (±/PE)  Response time (±/-)  Response time (±/-)  Response time (±/PE)  Housing material  Degree of protection  Operating temperature $\theta$ 40 kA  Nominal discharge current for class II test (8/20)  In  20 kA  Voltage protection level at In (±/PE)  Up  <0.55 kV  <25 ns  Polyamid PA6, UL94 V-0  IP20  Operating temperature $\theta$ 40 ÷ 70 ° C  Humidity range  RH  5 ÷ 95 %  Minimum cross-section of connected Cu conductors according to IEC 61643-32:2017  S  6 mm² (L+, L-)	Max. voltage of PV generator U <sub>OCSTC</sub> ≤ U <sub>CPV</sub> / 1.2	$U_{\text{ocstc}}$	160 V
Charge Q $3.25 \text{ As}$ Specific energy for class I test $W/R$ $10.56 \text{ kJ}/\Omega$ Total discharge current $(10/350) \pm -> PE$ $I_{Total}$ $12.5 \text{ kA}$ Total discharge current $(8/20) \pm -> PE$ $I_{Total}$ $40 \text{ kA}$ Maximum discharge current $(8/20)$ $I_{max}$ $40 \text{ kA}$ Nominal discharge current for class II test $(8/20)$ $I_{n}$ $20 \text{ kA}$ Voltage protection level at $I_n$ $(+/-)$ $U_p$ $< 1.1 \text{ kV}$ Voltage protection level at $I_n$ $(\pm/PE)$ $U_p$ $< 0.55 \text{ kV}$ Response time $(\pm/-)$ $t_A$ $< 25 \text{ ns}$ Response time $(\pm/PE)$ $t_A$ $< 25 \text{ ns}$ Housing material Polyamid PA6, UL94 V-0  Degree of protection  Operating temperature $\theta$ $\theta$ $-40 \div 70 \degree C$ Humidity range $\theta$ Minimum cross-section of connected Cu conductors according to IEC 61643-32:2017 $\theta$	Short-circuit current rating	I <sub>SCPV</sub>	10 kA
Charge Q 3.25 As Specific energy for class I test W/R 10.56 kJ/ $\Omega$ Total discharge current (10/350) ±->PE $I_{Total}$ 12.5 kA Total discharge current (8/20) ±->PE $I_{Total}$ 40 kA Maximum discharge current (8/20) $I_{max}$ 40 kA Nominal discharge current for class II test (8/20) $I_{n}$ 20 kA Voltage protection level at $I_{n}$ (±/-) $I_{n}$ 20 kA Voltage protection level at $I_{n}$ (±/PE) $I_{n}$ 40 kA Response time (±/-) $I_{n}$ 40 kA Response time (±/PE) $I_{n}$ 40 kA Response time (±/PE) $I_{n}$ 40 kA Response time (±/-) $I_{n}$ 50 kA Response time (±/-) $I_{n}$ 50 kB Response time (±/-) $I_{n}$ 60 kB Res	Impulse discharge current for class I test (10/350)	l <sub>imp</sub>	6.5 kA
Total discharge current $(10/350) \pm ->$ PE	Charge		3.25 As
Total discharge current (8/20) $\pm$ ->PE	Specific energy for class I test	W/R	10.56 kJ/ $\Omega$
Maximum discharge current (8/20) $I_{max} \qquad 40 \text{ kA}$ Nominal discharge current for class II test (8/20) $I_{n} \qquad 20 \text{ kA}$ Voltage protection level at $I_{n}$ (+/-) $U_{p} \qquad < 1.1 \text{ kV}$ Voltage protection level at $I_{n}$ (±/PE) $U_{p} \qquad < 0.55 \text{ kV}$ Response time (+/-) $t_{A} \qquad < 25 \text{ ns}$ Response time (±/PE) $t_{A} \qquad < 25 \text{ ns}$ Housing material $Polyamid PA6, UL94 V-0$ Degree of protection $IP20$ Operating temperature $\theta \qquad -40 \div 70 \text{ °C}$ Humidity range $RH \qquad 5 \div 95 \text{ %}$ Minimum cross-section of connected Cu conductors according to IEC 61643-32:2017 $S \qquad 6 \text{ mm}^{2} \text{ (L+, L-)}$	Total discharge current (10/350) ±->PE	I <sub>Total</sub>	12.5 kA
Nominal discharge current for class II test (8/20)  Voltage protection level at $I_n$ (+/-)  Voltage protection level at $I_n$ (±/PE)  Response time (+/-)  Response time (±/PE)  Housing material  Degree of protection  Operating temperature  Humidity range  Main 20 kA  Voltage protection level at $I_n$ (±/PE) $I_n$ < 0.55 kV $I_n$ < 25 ns $I_n$ < 25 ns  Polyamid PA6, UL94 V-0  IP20  RH $I_n$ 5 ÷ 95 %  Minimum cross-section of connected Cu conductors according to IEC 61643-32:2017  S 6 mm² (L+, L-)	Total discharge current (8/20) ±->PE	I <sub>Total</sub>	40 kA
Voltage protection level at $I_n$ (+/-)  Voltage protection level at $I_n$ (±/PE) $U_p$ $< 0.55  \text{kV}$ Response time (+/-)  Response time (±/PE) $t_A$ $< 25  \text{ns}$ Response time (±/PE) $t_A$ $< 25  \text{ns}$ Housing material  Polyamid PA6, UL94 V-0  Degree of protection  Operating temperature $\theta$ $\theta$ $\theta$ $\theta$ $\theta$ Minimum cross-section of connected Cu conductors according to IEC 61643-32:2017  S $\theta$ $\theta$ $\theta$ $\theta$ $\theta$ $\theta$ $\theta$	Maximum discharge current (8/20)	I <sub>max</sub>	40 kA
Voltage protection level at $I_n$ ( $\pm$ /PE) $U_p$ < 0.55 kV  Response time ( $\pm$ /-) $t_A$ < 25 ns  Response time ( $\pm$ /PE) $t_A$ < 25 ns  Housing material Polyamid PA6, UL94 V-0  Degree of protection IP20  Operating temperature $\theta$ -40 $\div$ 70 °C  Humidity range RH $\theta$ 5 $\div$ 95 %  Minimum cross-section of connected Cu conductors according to IEC 61643-32:2017 S $\theta$ 6 mm² (L+, L-)	Nominal discharge current for class II test (8/20)	I <sub>n</sub>	20 kA
Response time (+/-) $t_{A} < 25 \text{ ns}$ Response time (±/PE) $t_{A} < 25 \text{ ns}$ Housing material	Voltage protection level at I <sub>n</sub> (+/-)	$U_p$	< 1.1 kV
Response time ( $\pm$ /PE)	Voltage protection level at In (±/PE)	$U_p$	< 0.55 kV
Housing material  Polyamid PA6, UL94 V-0  IP20  Operating temperature  9 -40 ÷ 70 °C  Humidity range  RH  5 ÷ 95 %  Minimum cross-section of connected Cu conductors according to IEC 61643-32:2017  S 6 mm² (L+, L-)	Response time (+/-)	t <sub>A</sub>	< 25 ns
Degree of protection IP20  Operating temperature $9$ $-40 \div 70$ °C  Humidity range RH $5 \div 95$ %  Minimum cross-section of connected Cu conductors according to IEC 61643-32:2017 S $6 \text{ mm}^2 \text{ (L+, L-)}$	Response time (±/PE)	t <sub>A</sub>	< 25 ns
Operating temperature $9$ -40 ÷ 70 °C Humidity range RH $5 \div 95 \%$ Minimum cross-section of connected Cu conductors according to IEC 61643-32:2017 S $6 \text{ mm}^2 \text{ (L+, L-)}$	Housing material		Polyamid PA6, UL94 V-0
Humidity range RH $5 \div 95\%$ Minimum cross-section of connected Cu conductors according to IEC 61643-32:2017 S $6 \text{ mm}^2 \text{ (L+, L-)}$	Degree of protection		IP20
Minimum cross-section of connected Cu conductors according to IEC 61643-32:2017 S 6 mm² (L+, L-)	Operating temperature	Э	-40 ÷ 70 °C
	Humidity range	RH	5 ÷ 95 %
	•	S	

## **Lightning and surge arresters T1+T2 for photovoltaic systems**



Туре		HLSA6,5 PV 200/2 M S
Minimum cross-section of connected Cu conductors according to IEC 61643-32:2017 (doesn't apply to "V" connection) for T2	S	2.5 mm <sup>2</sup> (L+, L-) 6 mm <sup>2</sup> (PE)
Clamp fastening range (solid conductor)		$2.5 \div 35 \text{ mm}^2$
Clamp fastening range (stranded conductor)		$2.5 \div 25 \text{ mm}^2$
Tightening moment		4 Nm
Installation		On DIN rail 35 mm
Modular width		2 TE
Operating position		Any
Product placement environment		Internal
SPD failure mode		OCFM
Signalling at the device		Optic
Importance of local signaling		OK – green target FAULT – red target
Remote signalling		Yes
Potential free signal contact (S) (recommended cross-section of remote monitoring max. 1 mm²)		AC: 250 V / 1.5 A, DC: 250 V / 0.1 A
Modular design		Yes
Article number of the varistor spare module		16 389
Lifetime		> 100 000 h
Designed according to standards		
Requirements and test methods for SPDs for photovoltaic installations		IEC 61643-31:2018
Safety of Flammability of Plastic Materials		UL 94
Application standards		
Protection against lightning		IEC 62305:2010
Selection and application principles for SPDs connected to photovoltaic installations		IEC 61643-32:2017
Selection and application principles for SPDs connected to photovoltaic installations		CLC/TS 51643-32:2020
Low-voltage electrical installations – Photovoltaic (PV) systems		HD 60364-7-712:2016
Ordering, packaging and additional data		
Mass	m	234 g
Mass (including the packaging)	m	249 g
Packaging dimensions (H x W x D)		43 x 112 x 87 mm
Packaging value	V	0.42 dm <sup>3</sup>
ETIM group		EG000021
ETIM class		EC001457
Customs tariff no.		85363010
EAN code		8590681187432
Art. number		16 383

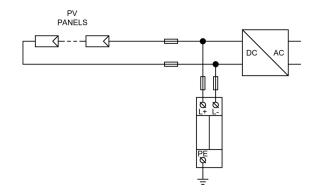


**The link in the QR code** leads to the online presentation of the **HLSA6,5 PV 200/2 M S**. There, in addition to the always up-to-date data sheet, you will also find all diagrams and drawings, declarations of conformity, or 2D or 3D models and other necessary materials. For more information, visit **www.hakel.com** 





## Application wiring diagram (installation)



## Internal diagram

