

## **HSAF160 S**

- Two-port surge arresters type T3 with high-frequency filters for serial connection.
- Intended for protection of electronic appliances against the effects of switching, induced and residual overvoltage in LV power supply systems.
- Contains an improved thermal fuse, which ensures timely disconnection of HSAF\* S and HSAF3\*S from the power grid during the MOV's overheating and thus prevents damage to the HSAF\* S and HSAF3\*S.
- Installed at the boundaries of LPZ 2 LPZ 3, as close to the device to be protected as possible (no further than 5 m).
- In front of HSAF\* S and HSAF3\*S must be installed a lightning current and surge arrester T1 and T2 from HAKEL company.
- Mounted on the main board of a switchboard using four screws.
- **S** indication specifies a version with remote monitoring.

Туре		HSAF160 S
Test class according to EN 61643-11:2012 (IEC 61643-11:2011)		Т3
System		TN-C-S, TN-S
Number of poles		2
Rated operating AC voltage	$U_N$	230 V
Maximum continuous operating voltage AC	U <sub>c</sub>	275 V
Rated load current	ار	160 A
Open circuit voltage of the combination wave generator (L/N, L/PE)	U <sub>oc</sub>	6 kV
Open circuit voltage of the combination wave generator (N/PE)	U <sub>oc</sub>	10 kV
Voltage protection level at U <sub>OC</sub> (L/N)	$U_p$	< 0.85 kV
Voltage protection level at U <sub>OC</sub> (L/PE)	$U_p$	< 1.5 kV
Voltage protection level at U <sub>OC</sub> (N/PE)	U <sub>p</sub>	< 1.2 kV
Nominal discharge current for class II test (8/20) L/N, L/PE	I <sub>n</sub>	3 kA
Nominal discharge current for class II test (8/20) N/PE	I <sub>n</sub>	5 kA
Total discharge current (8/20) L+N->PE	I <sub>Total</sub>	6 kA
Asymmetrical attenuation of filter at f = 4 MHz		> 80 dB
Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz		> 35 dB
Temporary overvoltage test (TOV) for $t_T = 5 \text{ s (L/N)}$	U <sub>T</sub>	337 V
Temporary overvoltage test (TOV) for $t_T = 120 \text{ min (L/N)}$	U <sub>T</sub>	440 V
Temporary overvoltage test (TOV) for $t_T = 0.2 \text{ s}$ (N/PE)	U <sub>T</sub>	1 200 V
Response time (L/N)	t <sub>A</sub>	< 25 ns
Response time (L/PE, N/PE)	t <sub>A</sub>	< 100 ns
Power dissipation	Pz	< 20 W
Maximal back-up fuse		160 A gL/gG
Residual current	I <sub>PE</sub>	≤ 5 µA
Lightning protection zone		LPZ 2-3
Housing material		Steel plate 1 mm
Degree of protection		IP20
Operating temperature	Э	-40 ÷ 55 °C

## Surge arresters T3 with EMI/RFI filter for AC systems



Humidity range   RH	Туре		HSAF160 S
Clamp fastening range (solid conductor)         1.5 ÷ 50 mm²           Clamp fastening range (stranded conductor)         1.5 ÷ 35 mm²           Tightening moment         10 Nm           Installation         Using the M4 screws on the chassis           Operating position         Any           Product placement environment         Internal           Signalling at the device         Optic           Importance of local signaling         OK - red light of FAULT - red light on Paux 1 mm²           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           Includes EMI / EMC filter         Yes           Modular design         No           Lifetime         > 100 0000 h           Designed according to standards         IEC 61643-11:2011           Requirements and test methods for SPDs connected to low-voltage power systems         IEC 61643-11:2011           Methods of measurement of the suppression characteristics of passive EMC filtering evices         EN 55017:2011 / CISPR 17:2011           Application standards         IEC 62305:2010           Protection against lightning         IEC 62305:2010           Selection and erection of electrical equipment – Switchgear and controlgear         HD 60364-5-53:2022           Selection and application principles for SPDs connected to low-voltage po	Humidity range	RH	5 ÷ 95 %
Clamp fastening range (stranded conductor)	Recommended cross-section of connected conductors	S	50 mm <sup>2</sup>
Tightening moment         10 Nm           Installation         Using the M4 screws on the chassis           Operating position         Any           Product placement environment         Internal           Signalling at the device         Optic           Importance of local signaling         OK - red light off FAULT - red light on FAULT - red li	Clamp fastening range (solid conductor)		1.5 ÷ 50 mm <sup>2</sup>
Installation	Clamp fastening range (stranded conductor)		1.5 ÷ 35 mm²
Operating position         Any           Product placement environment         Internal           Signalling at the device         Optic           Importance of local signaling         OK - red light off FAULT - red light on           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           Includes EMI / EMC filter         Yes           Modular design         No           Lifetime         > 100 000 h           Designed according to standards         IEC 61643-11:2011           Requirements and test methods for SPDs connected to low-voltage power systems         IEC 61643-11:2011           Methods of measurement of the suppression characteristics of passive EMC filtering devices         EN 55017:2011 / CISPR 17:2011           Application standards         IEC 62305:2010           Protection against lightning         IEC 62305:2010           Selection and erection of electrical equipment – Switchgear and controlgear         HD 60364-5-53:2022           Selection and application principles for SPDs connected to low-voltage power systems         CLC/TS 61643-12:2009           Ordering, packaging and additional data         m         1.83 kg           Mass (including the packaging)         m         1.912 kg           Packaging	Tightening moment		10 Nm
Product placement environment Signalling at the device Importance of local signaling Optic Importance of local signaling OK - red light off FAULT - red li	Installation		Using the M4 screws on the chassis
Signalling at the device       Optic         Importance of local signaling       OK - red light off FAULT - red light on FAULT - red light on 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         Includes EMI / EMC filter       Yes         Modular design       No         Lifetime       > 100 000 h         Designed according to standards       IEC 61643-11:2011         Requirements and test methods for SPDs connected to low-voltage power systems       IEC 61643-11:2011         Methods of measurement of the suppression characteristics of passive EMC filtering devices       EN 55017:2011 / CISPR 17:2011         Application standards       IEC 62305:2010         Selection and erection of electrical equipment - Switchgear and controlgear       HD 60364-5-53:2022         Selection and application principles for SPDs connected to low-voltage power systems       CLC/TS 61643-12:2009         Ordering, packaging and additional data       m         Mass (including the packaging)       m         Mass (including the packaging)       m         Packaging value       V         V       3.48 dm³         ETIM group       EG0000021         ETIM class       EC000942         Customs tariff no.       859681116968 </td <td>Operating position</td> <td></td> <td>Any</td>	Operating position		Any
Importance of local signaling  Remote signalling  Potential free signal contact (S) (recommended cross-section of remote monitoring max. 1 mm²)  Includes EMI / EMC filter  Yes  Modular design  Lifetime  Posigned according to standards  Requirements and test methods for SPDs connected to low-voltage power systems  Methods of measurement of the suppression characteristics of passive EMC filtering devices  Application standards  Protection against lightning  Selection and application principles for SPDs connected to low-voltage power systems  Cordering, packaging and additional data  Mass	Product placement environment		Internal
Remote signalling Potential free signal contact (S) (recommended cross-section of remote monitoring max. 1 mm²) Includes EMI / EMC filter  Modular design Lifetime Posigned according to standards Requirements and test methods for SPDs connected to low-voltage power systems Methods of measurement of the suppression characteristics of passive EMC filtering devices  Application standards Protection against lightning Selection and erection of electrical equipment – Switchgear and controlgear Selection and application principles for SPDs connected to low-voltage power systems CLC/TS 61643-11:2011 Selection and application principles for SPDs connected to low-voltage power systems CLC/TS 61643-12:2009  Ordering, packaging and additional data Mass m 1.83 kg Mass (including the packaging) m 1.912 kg Packaging dimensions (H x W x D) 87 x 260 x 154 mm Packaging value V 3.48 dm³ ETIM group EG000021 ETIM class EC000942 Customs tariff no. 85363090 EAN code  FAULT - red light on Yes AC: 250 V / 1.5 A, DC: 250 V / 0.1 A mox	Signalling at the device		Optic
Potential free signal contact (S) (recommended cross-section of remote monitoring max. 1 mm²) Includes EMI / EMC filter  Modular design  Lifetime  Possigned according to standards Requirements and test methods for SPDs connected to low-voltage power systems  Methods of measurement of the suppression characteristics of passive EMC filtering devices  Application standards  Protection against lightning  Selection and erection of electrical equipment – Switchgear and controlgear  Selection and application principles for SPDs connected to low-voltage power systems  Ordering, packaging and additional data  Mass  m  1.83 kg  Mass (including the packaging)  Mass (including the packaging)  Packaging dimensions (H x W x D)  87 x 260 x 154 mm  Packaging value  V  3.48 dm³  ETIM group  EG000021  ETIM class  Customs tariff no.  85363090  EAN code	Importance of local signaling		S S
max. 1 mm²) Includes EMI / EMC filter  Modular design Lifetime  Pesigned according to standards Requirements and test methods for SPDs connected to low-voltage power systems Methods of measurement of the suppression characteristics of passive EMC filtering devices  Application standards Protection against lightning Selection and erection of electrical equipment – Switchgear and controlgear Selection and application principles for SPDs connected to low-voltage power systems  CLC/TS 61643-12:2009  Ordering, packaging and additional data  Mass  m 1.83 kg Mass (including the packaging) m 1.912 kg Packaging dimensions (H x W x D) 87 x 260 x 154 mm Packaging value V 3.48 dm³  ETIM group EG000021 ETIM class EC000942 Customs tariff no. 859681116968	Remote signalling		Yes
Modular design       No         Lifetime       > 100 000 h         Designed according to standards         Requirements and test methods for SPDs connected to low-voltage power systems       IEC 61643-11:2011         Methods of measurement of the suppression characteristics of passive EMC filtering devices       EN 55017:2011 / CISPR 17:2011         Application standards       IEC 62305:2010         Protection against lightning       IEC 62305:2010         Selection and erection of electrical equipment – Switchgear and controlgear       HD 60364-5-53:2022         Selection and application principles for SPDs connected to low-voltage power systems       CLC/TS 61643-12:2009         Ordering, packaging and additional data       m       1.83 kg         Mass (including the packaging)       m       1.912 kg         Packaging dimensions (H x W x D)       87 x 260 x 154 mm         Packaging value       V       3.48 dm³         ETIM group       EG000021         ETIM class       EC000942         Customs tariff no.       85363090         EAN code       8590681116968			AC: 250 V / 1.5 A, DC: 250 V / 0.1 A
Lifetime > 100 000 h  Designed according to standards  Requirements and test methods for SPDs connected to low-voltage power systems  Methods of measurement of the suppression characteristics of passive EMC filtering devices  Application standards  Protection against lightning  Selection and erection of electrical equipment – Switchgear and controlgear  Selection and application principles for SPDs connected to low-voltage power systems  Ordering, packaging and additional data  Mass  m  1.83 kg  Mass (including the packaging)  Packaging dimensions (H x W x D)  Packaging value  V  3.48 dm³  ETIM group  EG000021  ETIM class  EC000942  Customs tariff no.  85363090  EAN code	Includes EMI / EMC filter		Yes
Requirements and test methods for SPDs connected to low-voltage power systems  Methods of measurement of the suppression characteristics of passive EMC filtering devices  Application standards  Protection against lightning  Selection and erection of electrical equipment – Switchgear and controlgear  Selection and application principles for SPDs connected to low-voltage power systems  Ordering, packaging and additional data  Mass  Mass (including the packaging)  Packaging dimensions (H x W x D)  Packaging value  FIM group  EG000021  ETIM class  EC000942  Customs tariff no.  85363090  EAN code	Modular design		No
Requirements and test methods for SPDs connected to low-voltage power systems  Methods of measurement of the suppression characteristics of passive EMC filtering devices  Application standards  Protection against lightning  Selection and erection of electrical equipment – Switchgear and controlgear  Selection and application principles for SPDs connected to low-voltage power systems  Ordering, packaging and additional data  Mass  m  1.83 kg  Mass (including the packaging)  Packaging dimensions (H x W x D)  Packaging value  TIM group  ETIM group  EG000021  ETIM class  EAN code  IEC 61643-11:2011  EN 55017:2011 / CISPR 17:2011	Lifetime		> 100 000 h
Methods of measurement of the suppression characteristics of passive EMC filtering devices  Application standards  Protection against lightning  Selection and erection of electrical equipment – Switchgear and controlgear  Selection and application principles for SPDs connected to low-voltage power systems  Ordering, packaging and additional data  Mass  m  1.83 kg  Mass (including the packaging)  Packaging dimensions (H x W x D)  Packaging value  V  3.48 dm³  ETIM group  EG000021  ETIM class  EC000942  Customs tariff no.  8590681116968	Designed according to standards		
Application standards Protection against lightning Selection and erection of electrical equipment – Switchgear and controlgear Selection and application principles for SPDs connected to low-voltage power systems  CLC/TS 61643-12:2009  Ordering, packaging and additional data  Mass m 1.83 kg Mass (including the packaging) m 1.912 kg Packaging dimensions (H x W x D) Packaging value  ETIM group  ETIM group  ETIM class  CLC/TS 61643-12:2009  V 3.48 dm³  ECO000942  Customs tariff no. 85363090  EAN code	Requirements and test methods for SPDs connected to low-voltage power systems		IEC 61643-11:2011
Protection against lightning  Selection and erection of electrical equipment – Switchgear and controlgear  Selection and application principles for SPDs connected to low-voltage power systems  CLC/TS 61643-12:2009  Ordering, packaging and additional data  Mass  Mass (including the packaging)  Packaging dimensions (H x W x D)  Packaging value  V  3.48 dm³  ETIM group  ETIM group  ETIM class  Customs tariff no.  85363090  EAN code			EN 55017:2011 / CISPR 17:2011
Selection and erection of electrical equipment – Switchgear and controlgear  Selection and application principles for SPDs connected to low-voltage power systems  CLC/TS 61643-12:2009  Ordering, packaging and additional data  Mass  m  1.83 kg  Mass (including the packaging)  Packaging dimensions (H x W x D)  Packaging value  V  3.48 dm³  ETIM group  ETIM class  Customs tariff no.  EAN code  B590681116968	Application standards		
Selection and application principles for SPDs connected to low-voltage power systems  Ordering, packaging and additional data  Mass  Mass (including the packaging)  Packaging dimensions (H x W x D)  Packaging value  ETIM group  ETIM class  CLC/TS 61643-12:2009  M 1.83 kg  M 1.912 kg  87 x 260 x 154 mm  V 3.48 dm³  EC000021  ETIM class  Customs tariff no.  85363090  EAN code  8590681116968	Protection against lightning		IEC 62305:2010
Ordering, packaging and additional data           Mass         m         1.83 kg           Mass (including the packaging)         m         1.912 kg           Packaging dimensions (H x W x D)         87 x 260 x 154 mm           Packaging value         V         3.48 dm³           ETIM group         EG000021           ETIM class         EC000942           Customs tariff no.         85363090           EAN code         8590681116968	Selection and erection of electrical equipment - Switchgear and controlgear		HD 60364-5-53:2022
Mass         m         1.83 kg           Mass (including the packaging)         m         1.912 kg           Packaging dimensions (H x W x D)         87 x 260 x 154 mm           Packaging value         V         3.48 dm³           ETIM group         EG000021           ETIM class         EC000942           Customs tariff no.         85363090           EAN code         8590681116968	Selection and application principles for SPDs connected to low-voltage power systems		CLC/TS 61643-12:2009
Mass (including the packaging)       m       1.912 kg         Packaging dimensions (H x W x D)       87 x 260 x 154 mm         Packaging value       V       3.48 dm³         ETIM group       EG000021         ETIM class       EC000942         Customs tariff no.       85363090         EAN code       8590681116968	Ordering, packaging and additional data		
Packaging dimensions (H x W x D)       87 x 260 x 154 mm         Packaging value       V       3.48 dm³         ETIM group       EG000021         ETIM class       EC000942         Customs tariff no.       85363090         EAN code       8590681116968	Mass	m	1.83 kg
Packaging value         V         3.48 dm³           ETIM group         EG000021           ETIM class         EC000942           Customs tariff no.         85363090           EAN code         8590681116968	Mass (including the packaging)	m	1.912 kg
ETIM group         EG000021           ETIM class         EC000942           Customs tariff no.         85363090           EAN code         8590681116968	Packaging dimensions (H x W x D)		87 x 260 x 154 mm
ETIM class EC000942 Customs tariff no. 85363090 EAN code 8590681116968	Packaging value	V	3.48 dm <sup>3</sup>
Customs tariff no.       85363090         EAN code       8590681116968	ETIM group		EG000021
EAN code 8590681116968	ETIM class		EC000942
	Customs tariff no.		85363090
Art. number 30 177	EAN code		8590681116968
	Art. number		30 177

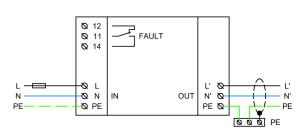


**The link in the QR code** leads to the online presentation of the **HSAF160 S**. There, in addition to the always up-to-date data sheet, you will also find all diagrams and drawings, declarations of conformity, or 2D or 3D models and other necessary materials. For more information, visit **www.hakel.com** 





## Application wiring diagram (installation)



## Internal diagram

