

## **HSAF16 S**

- Two-stage 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 generated in LV power supply systems.
- Contain an improved thermal fuse, which ensures timely disconnection of HSAF\* S from the power grid during the MOV's overheating and thus prevents damage to the HSAF\* 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 must be installed a lightning current and surge arrester T1 and T2 from HAKEL company.
- **S** indication specifies a version with remote monitoring.

Туре		HSAF16 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	IL	16 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)	$U_p$	< 0.75 kV
Voltage protection level at U <sub>oc</sub> (L/PE)	$U_p$	< 1 kV
Voltage protection level at U <sub>oc</sub> (N/PE)	$U_p$	< 1.5 kV
Nominal discharge current for class II test (8/20) L/N, L/PE	In	3 kA
Nominal discharge current for class II test (8/20) N/PE	In	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 $f = 0.15 \div 30 \text{ MHz}$		> 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	< 3.5 W
Maximal back-up fuse		16 A gL/gG
Residual current	I <sub>PE</sub>	≤ 1 800 μA
Short-circuit current rating at maximum back-up fuse	I <sub>SCCR</sub>	6 kA <sub>rms</sub>
Lightning protection zone		LPZ 2-3
Housing material		Polyamid PA6, UL94 V-0
Degree of protection		IP20

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



Operating temperature         9         440 + 55 °C           Humidity range         RH         5 + 95 %           Recommended cross-section of connected conductors         S         2.5 mm²           Clamp fastening range (solid conductor)         0.2 + 6 mm²           Clamp fastening range (stranded conductor)         0.2 + 4 mm²           Clamp fastening range (stranded conductor)         0.2 + 4 mm²           Clamp fastening range (stranded conductor)         0.2 + 4 mm²           Clamp fastening range (stranded conductor)         0.2 + 4 mm²           Clamp fastening range (stranded conductor)         0.2 + 4 mm²           Up the fastening range (stranded conductor)         0.5 Mm           Installation         On Din rail 35 mm           Modular width         3 TE           Operating position         Any           Internal         Optic           Importance of local signaling         OP C- real light off           Remote signalling         Yes           Obtained resign         Yes           Modular resignal contact (S) (recommended cross-section of remote monitoring max. 1 mm²)         A C: 250 V/ 1.5 A, DC: 250 V/ 0.1 A           Includes EMI / EMC filter         Yes           Modular design         No           Lifetime         > 100 000 th	Туре		HSAF16 S
Recommended cross-section of connected conductors   0.2 ÷ 6 mm²   0.5 Nm   0.5	Operating temperature	9	-40 ÷ 55 °C
Clamp fastening range (solid conductor)         0.2 ÷ 6 mm²           Clamp fastening range (stranded conductor)         0.2 ÷ 4 mm²           Tightening moment         0,5 Nm           Installation         On DIM rail 35 mm           Modular width         3 TE           Operating position         Any           Product placement environment         Internal           Signalling at the device         Optic           Importance of local signaling         K. Feet 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         Yes           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         UL 94           Safety of Flammability of Plastic Materials         UL 94           Potection against lightning         IEC 62035-2010           Selection and application principles for SPDs connected to low-voltage power systems         CLC/TS 61643-1:2009<	Humidity range	RH	5 ÷ 95 %
Clamp fastering range (stranded conductor)         0.2 ÷ 4 mm²           Tightening moment         0.5 Nm           Installation         On DIN rail 35 mm           Modular width         3 TE           Operating position         Any           Product placement environment         Internal           Signalling at the device         Optic           Importance of local signaling         OK - red light off FAULT - red light on Pass, 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         > 100 000 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           Safety of Flammability of Plastic Materials         UL 94           Protection against lightning         IEC 62305:2010           Selection and erection of electrical equipment - Switchgear and controlgear         HD 60364-5-53:2022	Recommended cross-section of connected conductors	S	2.5 mm <sup>2</sup>
Tightening moment   0,5 Nm   Nm   Installation   On DIN rail 25 mm   On DIN rail 25	Clamp fastening range (solid conductor)		0.2 ÷ 6 mm <sup>2</sup>
Installation         On DIN rail 35 mm           Modular width         3 TE           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 ligh	Clamp fastening range (stranded conductor)		0.2 ÷ 4 mm <sup>2</sup>
Modular width         3 TE           Operating position         Any           Product placement environment         Internal           Signalling at the device         Optic           Importance of local signaling         K- red light off           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           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           Safety of Flammability of Plastic Materials         UL 94           Application standards           Protection against lightning         IEC 62305:2010           Selection and erection of electrical equipment - Switchgear and controlgear         H0 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         208 g           Mass (including	Tightening moment		0,5 Nm
Operating position         Any           Product placement environment         Internal           Signalling at the device         Optic           Importance of local signaling         NK - red light off FAULT - red light on PAULT - red light on FAULT - red light on FAULT - red light on PAULT - red light on PAUL	Installation		On DIN rail 35 mm
Product placement environment Signalling at the device Optic Importance of local signaling OK - red light off FAULT - red light on Yes Potential free signal contact (S) (recommended cross-section of remote monitoring max. i mm²) Includes EMI / EMC filter Yes Modular design No Lifetime Yes Modular design No Lifetime Solono tandards Requirements and test methods for SPDs connected to low-voltage power systems Methods of measurement of the suppression characteristics of passive EMC filtering devices Safety of Flammability of Plastic Materials UL 94  Application standards Protection against lightning Selection and erection of electrical equipment - Switchgear and controlgear Selection and error of lectrical equipment and testical to low-voltage power systems CIC-(TS 61643-11:2011 Selection and polication principles for SPDs connected to low-voltage power systems CIC-(TS 61643-12:2009  Ordering, packaging and additional data Mass (including the packaging) m 184 g Mass (including the packaging) m 208 g Packaging dimensions (H x W x D) 60 x 113 x 73 mm Packaging value V 0.5 dm³ ETIM group EXPORTING BESSEG010	Modular width		3 TE
Signalling at the device       Optic         Importance of local signaling       OK - red light off FAULT - red light on FA	Operating position		Any
Importance of local signalling       OK - red light off FAULT - red light on Potential free signal contact (S) (recommended cross-section of remote monitoring max. 1 mm²)       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         Requirements and test methods for SPDs connected to low-voltage power systems         Methods of measurement of the suppression characteristics of passive EMC filtering devices       EN 55017:2011 / CISPR 17:2011         Safety of Flammability of Plastic Materials       UL 94         Application standards       UL 94         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         Mass (including the packaging)       m       184 g         Mass (including the packaging)       m       208 g         Packaging value       V       0.5 dm³         E	Product placement environment		Internal
Remote signalling Yes Potential free signal contact (S) (recommended cross-section of remote monitoring max. 1 mm²) Includes EMI / EMC filter Modular design Lifetime Sequirements and test methods for SPDs connected to low-voltage power systems Requirements and test methods for SPDs connected to low-voltage power systems Methods of measurement of the suppression characteristics of passive EMC filtering devices Safety of Flammability of Plastic Materials LIEC 62305:2010 Selection and arection of electrical equipment – Switchgear and controlgear Selection and application principles for SPDs connected to low-voltage power systems CLC/TS 61643-11:2011 Mass Mass (including the packaging) Mass (including the packaging) Packaging value Mass Mass Mass Mass Mass Mass Mass Mas	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  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  Safety of Flammability of Plastic Materials  LUL 94  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  Mass (including the packaging)  Mass (including the packaging)  Packaging dimensions (H x W x D)  Packaging value  V  0.5 dm³  ETIM group  EG000021  ETIM class  EC000942  Customs tariff no.  85363010  EAN code	Importance of local signaling		
max. 1 mm²)         Yes           Includes EMI / EMC filter         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           Safety of Flammability of Plastic Materials         UL 94           Application standards         UL 94           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         184 g           Mass (including the packaging)         m         208 g           Packaging dimensions (H x W x D)         60 x 113 x 73 mm           Packaging value         V         0.5 dm³           ETIM group         EG000021           ETIM class         EC000942           Customs tariff no.         85363010           EAN code         8590681116906	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         Safety of Flammability of Plastic Materials       UL 94         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       184 g         Mass (including the packaging)       m       208 g         Packaging dimensions (H x W x D)       60 x 113 x 73 mm         Packaging value       V       0.5 dm³         ETIM group       EG000021         ETIM class       EC000942         Customs tariff no.       85363010         EAN code       859681116906			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 IEC 61643-11:2011  Methods of measurement of the suppression characteristics of passive EMC filtering devices  Safety of Flammability of Plastic Materials UL 94  Application standards  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  Mass m 184 g  Mass (including the packaging) m 208 g  Packaging dimensions (H x W x D) 60 x 113 x 73 mm  Packaging value V 0.5 dm³  ETIM group EG000021  ETIM class EC000942  Customs tariff no. 85363010  EAN code 8590681116906	Includes EMI / EMC filter		Yes
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  Safety of Flammability of Plastic Materials  UL 94  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 184 g  Mass (including the packaging)  Packaging dimensions (H x W x D)  Packaging value  V 0.5 dm³  ETIM group  EG000021  ETIM class  EC000942  Customs tariff no.  85363010  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  Safety of Flammability of Plastic Materials  UL 94  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  184 g  Mass (including the packaging)  Packaging dimensions (H x W x D)  Packaging value  V  0.5 dm³  ETIM group  EG000021  ETIM class  EC000942  Customs tariff no.  8590681116906	Lifetime		> 100 000 h
Methods of measurement of the suppression characteristics of passive EMC filtering devices  Safety of Flammability of Plastic Materials  UL 94  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  184 g  Mass (including the packaging)  Packaging dimensions (H x W x D)  Packaging value  V  0.5 dm³  ETIM group  EG000021  ETIM class  EC000942  Customs tariff no.  85363010  EAN code	Designed according to standards		
devices  Safety of Flammability of Plastic Materials  UL 94  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  184 g  Mass (including the packaging)  m  208 g  Packaging dimensions (H x W x D)  Packaging value  V  0.5 dm³  ETIM group  EG0000021  ETIM class  EC000942  Customs tariff no.  8590681116906	Requirements and test methods for SPDs connected to low-voltage power systems		IEC 61643-11:2011
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 184 g Mass (including the packaging) m 208 g Packaging dimensions (H x W x D) Packaging value  V 0.5 dm³  ETIM group  ETIM group  ETIM class Customs tariff no.  85363010  EAN code			EN 55017:2011 / CISPR 17:2011
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  m 184 g Mass (including the packaging) m 208 g  Packaging dimensions (H x W x D)  Packaging value  V 0.5 dm³  ETIM group  ETIM group  EG000021  ETIM class  Customs tariff no.  85363010  EAN code	Safety of Flammability of Plastic Materials		UL 94
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 184 g  Mass (including the packaging)  Packaging dimensions (H x W x D)  Packaging value  V 0.5 dm³  ETIM group  ETIM class  Customs tariff no.  EAN code  HD 60364-5-53:2022  CLC/TS 61643-12:2009	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  V  0.5 dm³  ETIM group  ETIM class  CLC/TS 61643-12:2009  M  184 g  M  208 g  FOUR TO SET TO S	Protection against lightning		IEC 62305:2010
Ordering, packaging and additional data           Mass         m         184 g           Mass (including the packaging)         m         208 g           Packaging dimensions (H x W x D)         60 x 113 x 73 mm           Packaging value         V         0.5 dm³           ETIM group         EG000021           ETIM class         EC000942           Customs tariff no.         85363010           EAN code         8590681116906	Selection and erection of electrical equipment – Switchgear and controlgear		HD 60364-5-53:2022
Mass         m         184 g           Mass (including the packaging)         m         208 g           Packaging dimensions (H x W x D)         60 x 113 x 73 mm           Packaging value         V         0.5 dm³           ETIM group         EG000021           ETIM class         EC000942           Customs tariff no.         85363010           EAN code         8590681116906	Selection and application principles for SPDs connected to low-voltage power systems		CLC/TS 61643-12:2009
Mass         m         184 g           Mass (including the packaging)         m         208 g           Packaging dimensions (H x W x D)         60 x 113 x 73 mm           Packaging value         V         0.5 dm³           ETIM group         EG000021           ETIM class         EC000942           Customs tariff no.         85363010           EAN code         8590681116906	Ordering, packaging and additional data		
Packaging dimensions (H x W x D)         60 x 113 x 73 mm           Packaging value         V         0.5 dm³           ETIM group         EG000021           ETIM class         EC000942           Customs tariff no.         85363010           EAN code         8590681116906		m	184 g
Packaging value         V         0.5 dm³           ETIM group         EG000021           ETIM class         EC000942           Customs tariff no.         85363010           EAN code         8590681116906	Mass (including the packaging)	m	-
ETIM group         EG000021           ETIM class         EC000942           Customs tariff no.         85363010           EAN code         8590681116906	Packaging dimensions (H x W x D)		60 x 113 x 73 mm
ETIM class         EC000942           Customs tariff no.         85363010           EAN code         8590681116906	Packaging value	V	0.5 dm <sup>3</sup>
Customs tariff no.         85363010           EAN code         8590681116906	ETIM group		EG000021
EAN code 8590681116906	ETIM class		EC000942
	Customs tariff no.		85363010
Art. number 30 171	EAN code		8590681116906
	Art. number		30 171

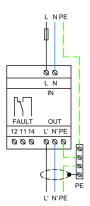


**The link in the QR code** leads to the online presentation of the **HSAF16 S**. There, in addition to the always up-to-date data sheet, you will also find all diagrams and drawings, declarations of conformity, or 2D or 3D models and other necessary materials. For more information, visit **www.hakel.com** 





## Application wiring diagram (installation)



## Internal diagram

