

## **HSAF10/125VDC 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 DC power supply systems.
- Contain an improved thermal fuse, which ensures timely disconnection of HSAF\*VDC S from the power grid during the MOV's overheating and thus prevents damage to the HSAF\*VDC 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\*VDC S must be installed a lightning current and surge arrester T1 and T2 from HAKEL company.
- **S** indication specifies a version with remote monitoring.

Test class according to EN 61643-11:2012 (IEC 61643-11:2011)   System   DC   Rated operating DC voltage   UN	Туре		HSAF10/125VDC S
Rated operating DC voltage $U_N$ 125 V Maximum continuous operating voltage DC $U_C$ 150 V Rated load current $I_L$ 10 A Open circuit voltage of the combination wave generator (+/-, $\pm$ /PE) $U_{OC}$ 6 kV Voltage protection level at $U_{OC}$ (+/-) $U_p$ < 0.9 kV Voltage protection level at $U_{OC}$ ( $\pm$ /PE) $U_p$ < 0.9 kV Voltage protection level at $U_{OC}$ ( $\pm$ /PE) $U_p$ < 0.6 kV Nominal discharge current for class II test (8/20) +/-, $\pm$ /PE $I_n$ 3 kA Total discharge current (8/20) $\pm$ ->PE $I_n$ 3 kA Symmetrical attenuation of filter at $f = 4$ MHz $\pm 80$ dB Asymmetrical attenuation of filter at $f = 4$ MHz $\pm 80$ dB Response time ( $\pm$ /-) $\pm 80$ dB Response time ( $\pm$ /-) $\pm 80$ dB Response time ( $\pm$ /PE) $\pm 80$ dB R	Test class according to EN 61643-11:2012 (IEC 61643-11:2011)		Т3
Maximum continuous operating voltage DC $U_{C}$ 150 V         Rated load current $I_{L}$ 10 A         Open circuit voltage of the combination wave generator (+/-, ±/PE) $U_{OC}$ 6 kV         Voltage protection level at $U_{OC}$ (±/PE) $U_{p}$ < 0.9 kV	System		DC
Rated load current $I_{L}$ 10 A Open circuit voltage of the combination wave generator (+/-, ±/PE) $I_{L}$ 6 kV Voltage protection level at $I_{L}$ 0.9 kV Voltage protection level at $I_{L}$ 10 C (±/PE) $I_{L}$ 2.0 kV Voltage protection level at $I_{L}$ 10 C (±/PE) $I_{L}$ 2.0 kV Voltage protection level at $I_{L}$ 2.1 kes (8/20) +/-, ±/PE $I_{L}$ 3 kA Total discharge current for class II test (8/20) +/-, ±/PE $I_{L}$ 6 kA Asymmetrical attenuation of filter at f = 4 MHz 8.0 dB Asymmetrical attenuation of filter at f = 4 MHz 8.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 8.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 8.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 8.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 8.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 8.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 8.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 8.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 9.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 9.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 9.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 9.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 9.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 9.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 9.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 9.0 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz 9.0 dB Asymmetrical attenuation of filter at f = 4 MHz 9.0 dB Asymmetrical attenuation of filter at f = 4 MHz 9.0 dB Asymmetrical attenuation of filter at f = 4 MHz 9.0 dB Asymmetrical attenuation of filter at f = 4 MHz 9.0 dB Asymmetrical attenuation of filter at f = 4 MHz 9.0 dB Asymmetrical attenuation of filter at f = 4 MHz 9.0 dB Asymmetrical attenuation of filter at f = 4 MHz 9.0 dB Asymmetrical attenuation of filter at f = 4 MHz 9.0 dB Asymmetrical attenuation of filter at f = 4 MHz 9.0 dB Asymm	Rated operating DC voltage	$U_N$	125 V
Open circuit voltage of the combination wave generator (+/-, ±/PE) $ \begin{array}{c} U_{OC} \\ 6 \text{ kV} \\ \\ \text{Voltage protection level at } U_{OC} (\pm/PE) \\ \text{In} \\ \text{3 kA} \\ \text{Total discharge current } (8/20) \pm -> PE \\ \text{Il} \\ \text{Total} \\ \text{4 kA} \\ \text{Asymmetrical attenuation of filter at } f = 4 \text{ MHz} \\ \text{Asymmetrical attenuation of filter at } f = 4 \text{ MHz} \\ \text{Asymmetrical attenuation of filter at } f = 0.15 \pm 30 \text{ MHz} \\ \text{Response time } (\pm/P) \\ \text{Response time } (\pm/PE) \\ \text{4 k} \\ \text{4 consists at } 100 \text{ ns} \\ \text{Power dissipation} \\ \text{Power dissipation} \\ \text{P2} \\ \text{4 consists at } 2.2 \text{ W} \\ \text{Maximal back-up fuse} \\ \text{4 log } 10 \text{ ns} \\ $	Maximum continuous operating voltage DC	U <sub>c</sub>	150 V
Voltage protection level at $U_{oc}$ (+/-) $U_{p}$ < 0.9 kV Voltage protection level at $U_{oc}$ (±/PE) $U_{p}$ < 0.6 kV Nominal discharge current for class II test (8/20) +/-, ±/PE $I_{n}$ 3 kA Total discharge current (8/20) ±->PE $I_{Total}$ 6 kA Asymmetrical attenuation of filter at f = 4 MHz > 80 dB Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz > 35 dB Response time (+/-) $I_{A}$ < 25 ns Response time (±/PE) $I_{A}$ < 100 ns Power dissipation Pz < 2.2 W Maximal back-up fuse $I_{B}$ = $I$	Rated load current	IL	10 A
Voltage protection level at $U_{oc}$ ( $\pm$ /PE) $U_{p}$ < 0.6 kV Nominal discharge current for class II test (8/20) +/-, $\pm$ /PE $I_{n}$ 3 kA Total discharge current (8/20) $\pm$ ->PE $I_{rotal}$ 6 kA Asymmetrical attenuation of filter at f = 4 MHz > 80 dB Asymmetrical attenuation of filter at f = 0.15 $\div$ 30 MHz > 35 dB Response time ( $\pm$ /P) $t_{A}$ < 25 ns Response time ( $\pm$ /PE) $t_{A}$ < 100 ns Power dissipation Pz < 2.2 W Maximal back-up fuse 10 A gL/gG Residual current rating at maximum back-up fuse $I_{PE}$ ≤ 1 800 $\mu$ A Short-circuit current rating at maximum back-up fuse $I_{PE}$ ≤ 1 800 $\mu$ A Short-circuit current rating at maximum back-up fuse $I_{PE}$ 6 kA $_{rms}$ Lightning protection zone $I_{PZ}$ 2-3 Housing material Polyamid PA6, UL94 V-0 Degree of protection $I_{PZ}$ 0 Polyamid PA6, UL94 V-0 Degree of protection $I_{PZ}$ 0 Recommended cross-section of connected conductors $I_{PZ}$ 1.5 mm² Clamp fastening range (solid conductor) $I_{PZ}$ 0.2 $\div$ 6 mm² Clamp fastening range (stranded conductor) 1,2 Nm	Open circuit voltage of the combination wave generator (+/-, ±/PE)	U <sub>oc</sub>	6 kV
Nominal discharge current for class II test (8/20) +/-, ±/PE         In total         3 kA           Total discharge current (8/20) ±->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           Response time (±/-)         t <sub>A</sub> < 25 ns	Voltage protection level at U <sub>OC</sub> (+/-)	Up	< 0.9 kV
Total discharge current (8/20) ±->PE	Voltage protection level at U <sub>oc</sub> (±/PE)	$U_p$	< 0.6 kV
Asymmetrical attenuation of filter at f = 4 MHz $> 80 \text{ dB}$ Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz $> 35 \text{ dB}$ Response time (+/-) $t_A < 25 \text{ ns}$ Response time (±/PE) $t_A < 100 \text{ ns}$ Power dissipation $P_C < 2.2 \text{ W}$ Maximal back-up fuse $P_C < 100 \text{ ms}$ Residual current $P_C < 100 \text{ ms}$ Residual current rating at maximum back-up fuse $P_C < 100 \text{ ms}$ Short-circuit current rating at maximum back-up fuse $P_C < 100 \text{ ms}$ Lightning protection zone $P_C < 100 \text{ ms}$ Housing material $P_C < 100 \text{ ms}$ Degree of protection $P_C < 100 \text{ ms}$ Polyamid PA6, UL94 V-0  Degree of protection $P_C < 100 \text{ ms}$ Recommended cross-section of connected conductors $P_C < 100 \text{ ms}$ Recommended cross-section of connected conductors $P_C < 100 \text{ ms}$ Clamp fastening range (solid conductor) $P_C < 100 \text{ ms}$ Tightening moment $P_C < 100 \text{ ms}$ 1,2 Nm	Nominal discharge current for class II test (8/20) +/-, ±/PE	In	3 kA
Asymmetrical attenuation of filter at f = 4 MHz $> 80 \text{ dB}$ Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz $> 35 \text{ dB}$ Response time (+/-) $t_A < 25 \text{ ns}$ Response time (±/PE) $t_A < 100 \text{ ns}$ Power dissipation $P_C < 2.2 \text{ W}$ Maximal back-up fuse $P_C < 100 \text{ ns}$ Residual current $P_C < 100 \text{ ns}$ Residual current rating at maximum back-up fuse $P_C < 100 \text{ ns}$ Short-circuit current rating at maximum back-up fuse $P_C < 100 \text{ ns}$ Short-circuit current rating at maximum back-up fuse $P_C < 100 \text{ ns}$ Tightning protection zone $P_C < 100 \text{ ns}$ Housing material $P_C < 100 \text{ ns}$ Polyamid PA6, UL94 V-0  Degree of protection $P_C < 100 \text{ ns}$ Tightning range (solid conductor) $P_C < 100 \text{ ns}$ Clamp fastening range (solid conductor) $P_C < 100 \text{ ns}$ Tightening moment $P_C <$	Total discharge current (8/20) ±->PE	I <sub>Total</sub>	6 kA
Response time (+/-) $ \begin{array}{ccccccccccccccccccccccccccccccccccc$	Asymmetrical attenuation of filter at f = 4 MHz		> 80 dB
Response time ( $\pm$ /PE)	Asymmetrical attenuation of filter at f = 0.15 ÷ 30 MHz		> 35 dB
Power dissipationPz<2.2.2 WMaximal back-up fuse10 A gL/gGResidual current $I_{PE}$ ≤1 800 μAShort-circuit current rating at maximum back-up fuse $I_{SCCR}$ 6 kA <sub>rms</sub> Lightning protection zoneLPZ 2-3Housing materialPolyamid PA6, UL94 V-0Degree of protectionIP20Operating temperature $9$ -40 ÷ 55 °CHumidity rangeRH $5$ ÷ 95 %Recommended cross-section of connected conductorsS $1.5$ mm²Clamp fastening range (solid conductor) $0.2$ ÷ 6 mm²Clamp fastening range (stranded conductor) $0.2$ ÷ 4 mm²Tightening moment $1,2$ Nm	Response time (+/-)	t <sub>A</sub>	< 25 ns
Maximal back-up fuse10 A gL/gGResidual current $I_{PE}$ ≤ 1 800 μAShort-circuit current rating at maximum back-up fuse $I_{SCCR}$ 6 kA <sub>rms</sub> Lightning protection zoneLPZ 2-3Housing materialPolyamid PA6, UL94 V-0Degree of protectionIP20Operating temperature $\theta$ -40 ÷ 55 °CHumidity rangeRH $5 \div 95$ %Recommended cross-section of connected conductorsS $1.5$ mm²Clamp fastening range (solid conductor) $0.2 \div 6$ mm²Clamp fastening range (stranded conductor) $0.2 \div 4$ mm²Tightening moment $1,2$ Nm	Response time (±/PE)	t <sub>A</sub>	< 100 ns
Residual currentIPE≤ 1 800 μAShort-circuit current rating at maximum back-up fuseISCCR6 kArmsLightning protection zoneLPZ 2-3Housing materialPolyamid PA6, UL94 V-0Degree of protectionIP20Operating temperature $\theta$ -40 ÷ 55 °CHumidity rangeRH $5 \div 95$ %Recommended cross-section of connected conductorsS1.5 mm²Clamp fastening range (solid conductor)0.2 ÷ 6 mm²Clamp fastening range (stranded conductor)0.2 ÷ 4 mm²Tightening moment1,2 Nm	Power dissipation	Pz	< 2.2 W
Short-circuit current rating at maximum back-up fuse  Lightning protection zone  LPZ 2-3  Housing material  Polyamid PA6, UL94 V-0  Degree of protection  IP20  Operating temperature  Humidity range  RH  S÷95 %  Recommended cross-section of connected conductors  Clamp fastening range (solid conductor)  Clamp fastening range (stranded conductor)  Tightening moment  Clamp moment  RH  S+05 %  1.5 mm²  0.2 ÷ 4 mm²  1,2 Nm	Maximal back-up fuse		10 A gL/gG
Lightning protection zone  LPZ 2-3  Housing material  Polyamid PA6, UL94 V-0  Degree of protection  IP20  Operating temperature  \$\text{9}\$ -40 \div 55 \circ\$C  Humidity range  RH  \$5 \div 95 \%  Recommended cross-section of connected conductors  \$S\$  \$1.5 \text{ mm}^2\$  Clamp fastening range (solid conductor)  Clamp fastening range (stranded conductor)  Tightening moment  \$\text{1,2 Nm}\$	Residual current	I <sub>PE</sub>	≤ 1 800 μA
Housing material  Polyamid PA6, UL94 V-0  Degree of protection  Operating temperature  Humidity range  RH  S÷95 °C  Humidity range  RH  S÷95 %  Recommended cross-section of connected conductors  S  1.5 mm²  Clamp fastening range (solid conductor)  Clamp fastening range (stranded conductor)  Tightening moment  Operating PA6, UL94 V-0  IP20  0 0.2 ÷ 0 m²  0.2 ÷ 0 m²  0.2 ÷ 4 mm²  1,2 Nm	Short-circuit current rating at maximum back-up fuse	I <sub>SCCR</sub>	6 kA <sub>rms</sub>
Degree of protection IP20 Operating temperature $\theta$ -40 ÷ 55 °C Humidity range RH $\theta$ 5 ÷ 95 % Recommended cross-section of connected conductors S 1.5 mm² Clamp fastening range (solid conductor) 0.2 ÷ 6 mm² Clamp fastening range (stranded conductor) 0.2 ÷ 4 mm² Tightening moment 1,2 Nm	Lightning protection zone		LPZ 2-3
Operating temperature $9$ $-40 \div 55$ °C Humidity range RH $5 \div 95$ % Recommended cross-section of connected conductors S $1.5 \text{ mm}^2$ Clamp fastening range (solid conductor) $0.2 \div 6 \text{ mm}^2$ Clamp fastening range (stranded conductor) $0.2 \div 4 \text{ mm}^2$ Tightening moment $1,2 \text{ Nm}$	Housing material		Polyamid PA6, UL94 V-0
Humidity range RH $5 \div 95\%$ Recommended cross-section of connected conductors S $1.5 \text{ mm}^2$ Clamp fastening range (solid conductor) $0.2 \div 6 \text{ mm}^2$ Clamp fastening range (stranded conductor) $0.2 \div 4 \text{ mm}^2$ Tightening moment $1,2 \text{ Nm}$	Degree of protection		IP20
Recommended cross-section of connected conductors S $1.5 \text{ mm}^2$ Clamp fastening range (solid conductor) $0.2 \div 6 \text{ mm}^2$ Clamp fastening range (stranded conductor) $0.2 \div 4 \text{ mm}^2$ Tightening moment $1,2 \text{ Nm}$	Operating temperature	Э	-40 ÷ 55 °C
Clamp fastening range (solid conductor)  Clamp fastening range (stranded conductor)  Clamp fastening range (stranded conductor)  Tightening moment  1,2 Nm	Humidity range	RH	5 ÷ 95 %
Clamp fastening range (stranded conductor)  Tightening moment  0.2 ÷ 4 mm²  1,2 Nm	Recommended cross-section of connected conductors	S	1.5 mm²
Tightening moment 1,2 Nm	Clamp fastening range (solid conductor)		0.2 ÷ 6 mm <sup>2</sup>
	Clamp fastening range (stranded conductor)		0.2 ÷ 4 mm <sup>2</sup>
Installation On DIN rail 35 mm	Tightening moment		1,2 Nm
	Installation		On DIN rail 35 mm

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



Туре		HSAF10/125VDC S
Modular width		4 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
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 devices		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		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	180 g
Mass (including the packaging)	m	204 g
Packaging dimensions (H x W x D)		60 x 113 x 73 mm
Packaging value	V	0.5 dm <sup>3</sup>
ETIM group		EG000021
ETIM class		EC000942
Customs tariff no.		85363010
EAN code		8590681161494
Art. number		30 352

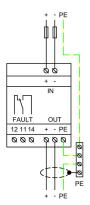


**The link in the QR code** leads to the online presentation of the **HSAF10/125VDC S**. There, in addition to the always up-to-date data sheet, you will also find all diagrams and drawings, declarations of conformity, or 2D or 3D models and other necessary materials. For more information, visit **www.hakel.com** 





## Application wiring diagram (installation)



## Internal diagram

