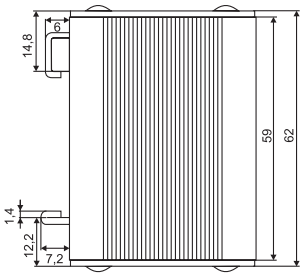
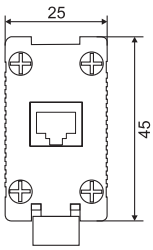
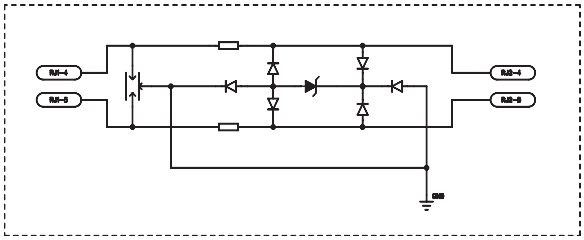
Surge protection devices for information technology systems

LPZ 1-2 / IP20 / CE







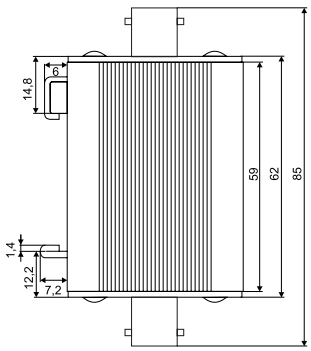
HT-ISDN *X*series

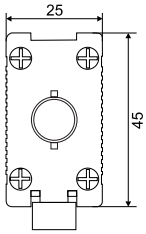
Hakel Transmition-ISDN is designed to protect telecommunication lines, which transmit the ISDN technology. The casing of this protector is made out of light alloy, which ensures high mechanical and thermal resistance. I_{max} = 2 kA. It is recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 according to EN 62305.

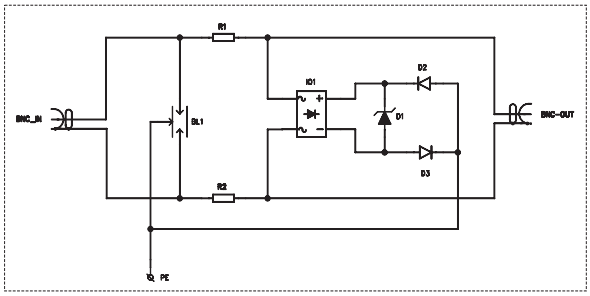
Type		HT-ISDN
Number of protected pairs		1
Connector type		RJ45
Nominal voltage	U_N	120 V
Max. continuous operating voltage	U_C	144 V
Rated load current	I_L	100 mA
C2 Max. discharge current (8/20)	I_{max}	2 kA
C2 Nominal discharge current (8/20)	I_n	1 kA
C2 Voltage protection level at I_n	U_P	200 V
C3 Voltage protection level at 1kV/μs	U_P	150 V
Response time	t_A	< 30 ns
Data rate		10 MBit/s
Series impedance per line		1,5 -10 Ω
Parasitic capacitance	C	1,5 nF
LPZ		1-2
Protection type		IP20
Operating temperatue range	ϑ	-40°C ÷ + 80°C
Recommended cable cross-section		0,3 mm^2
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1
Article number		57 000

Surge protection devices for information technology systems

LPZ 1-2-3 / IP20 / CE







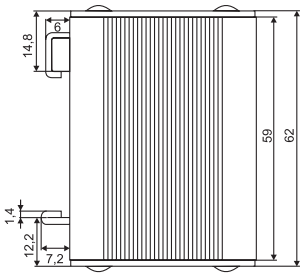
HT-CCTV 6 Xseries
HT-CCTV 12 Xseries

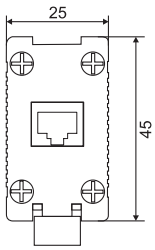
Hakel Transmition-CCTV is designed to protect video transmission equipment, which process the transferred video signal. The casing of this protector is made out of light alloy, which ensures high mechanical and thermal resistance. I_{max} = 5 kA. It is recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2-3 according to EN 62305.

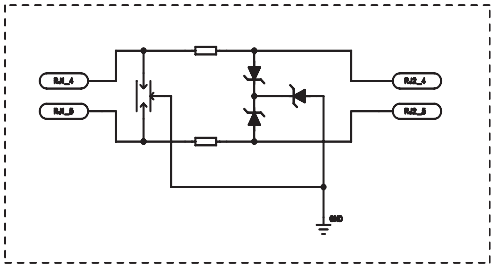
Type		HT-CCTV 6	HT-CCTV 12
Number of protected pairs		1	
Connector type		BNC (F/F, F/M)	
Nominal voltage	U_N	6 V	12 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V
Rated load current	I_L	300 mA	
C2 Max. discharge current (8/20)	I_{max}	5 kA	
C2 Nominal discharge current I_n (8/20)	I_n	1 kA	
C2 Voltage protection level at I_n	U_P	22 V	44 V
C3 Voltage protection level at 1kV/μs	U_P	10 V	20 V
Response time	t_A	< 30 ns	
Data rate		10 MBit/s	
Parasitic capacitance	C	< 27 pF	
Series impedance per line	R	10 Ω	
LPZ		2-3	
Protection type		IP20	
Operating temperatue range	ϑ	-40°C - +80°C	
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	
Article number		57 001	57 002

Surge protection devices for information technology systems

LPZ 1-2-3 / IP20 / CE







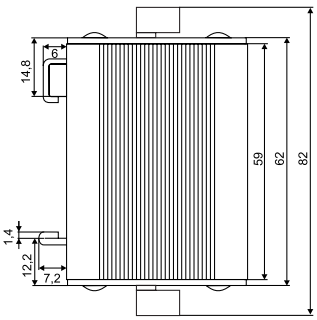
HT-TEL Xseries

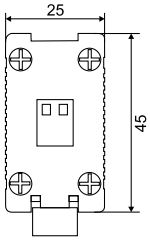
Hakel Transmition-TEL is designed to protect telecommunications equipment. The casing of this protector is made out of light alloy, which ensures high mechanical and thermal resistance. I_{max} = 2 kA. It is recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2-3 according to EN 62305.

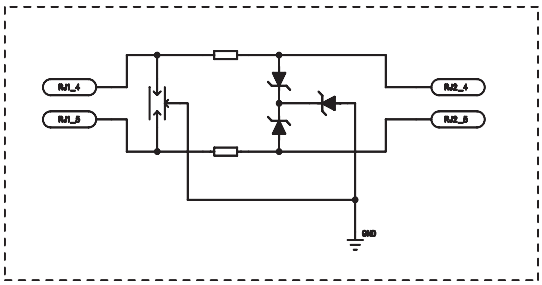
Type		HT-TEL
Number of protected pairs		1
Connector type		RJ45
Nominal voltage	U_N	170 V
Max. continuous operating voltage	U_C	204 V
Rated load current	I_L	100 mA
C2 Max. discharge current (8/20)	I_{max}	2 kA
C2 Nominal discharge current (8/20)	I_n	1 kA
C2 Voltage protection level at I_n (8/20)	U_P	500 V
C3 Voltage protection level at 1kV/μs	U_P	290 V
Response time	t_A	< 30 ns
Data rate		1 MBit/s
Series impedance per line		2,2 Ω
Parasitic capacitance	C	1,5 nF
LPZ		3
Protection type		IP20
Operating temperatue range	ϑ	-40°C ÷ + 80°C
Recommended cable cross-section		0,25 - 1,5 mm^2
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1
Article number		57 003

Surge protection devices for information technology systems

LPZ 1-2 / IP20 / CE







HT-DATA 1/* Xseries
HT-NV 1/*/0,5 Xseries

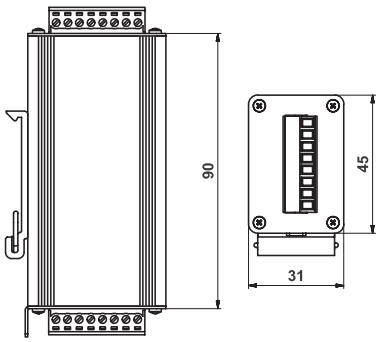
Hakel Transmition - Data is designed to protect transmission of information signals and Hakel Transmition-NV to protect links of power supply lines. The casing of this protector is made out of light alloy, which ensures high mechanical and thermal resistance. I_{max}=10kA. It is recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 according to EN 62305.

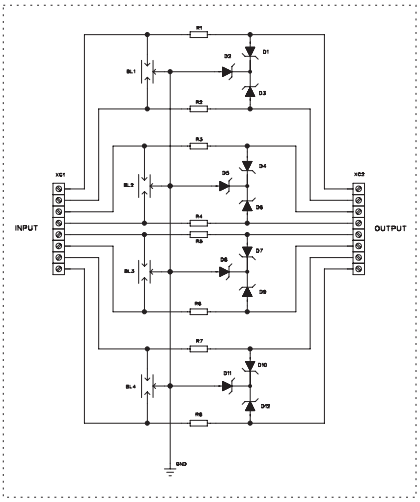
Type		HT-DATA 1/6	HT-DATA 1/12	HT-DATA 1/24	HT-DATA 1/48	HT-DATA 1/T
Number of protected pairs				1		
Connector type		Two-pole, screw type, slip-on terminal block DEGSON 2EDGK- 5.08				
Nominal voltage	U_N	6 V	12 V	24 V	48 V	170 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V	204 V
Rated load current	I_L	100 mA				
C2 Max. discharge current (8/20)	I_{max}	10 kA				
C2 Nominal discharge current (8/20)	I_n	1 kA				
C2 Voltage protection level at I_n(8/20)	U_P	15 V	28 V	64 V	160 V	500 V
C3 Voltage protection level at 1kV/μs	U_P	9 V	18 V	34 V	66 V	290 V
Response time	t_A	< 30 ns				
Data rate		1 MBit/s				
Series impedance per line		2,2 Ω				
Parasitic capacitance	C	1,5 nF				
LPZ		1-2				
Protection type		IP20				
Operating temperatue range	ϑ	-40°C ÷ + 80°C				
Recommended cable cross-section		0,25 - 1,5 mm²				
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1				
Article number		57 005	57 006	57 007	57 008	57 009

Type		HT-NV 1/6/0,5	HT-NV 1/12/0,5	HT-NV 1/24/0,5	HT-NV 1/48/0,5
Number of protected pairs			1		
Connector type		Two-pole, screw type, slip-on terminal block DEGSON 2EDGK- 5.08			
Nominal voltage	U_N	6 V	12 V	24 V	48 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V
Rated load current	I_L	0,5 A			
D1 Lightning impulse current (10/350)	I_{imp}	5 kA			
D1 Lightning impulse current (10/350) line/PE	I_{imp}	2,5 kA			
C2 Max. discharge current (8/20)	I_{max}	10 kA			
C2 Nominal discharge current (8/20)	I_n	1 kA			
C2 Voltage protection level at I_n (8/20)	U_P	15 V	28 V	64 V	85 V
C3 Voltage protection level at 1kV/μs	U_P	9 V	18 V	34 V	66 V
Response time	t_A	< 30 ns			
Data rate		1 MBit/s			
Insert inductance		4,7 μH			
LPZ		1-2			
Protection type		IP20			
Operating temperatue range	ϑ	-40°C ÷ + 80°C			
Parasitic capacitance	C	1,5 nF			
Recommended cable cross-section		0,25 - 1,5 mm²			
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1			
Article number		57 010	57 011	57 012	57 013

Surge protection devices for information technology systems

LPZ 1-2 / IP20 / CE





HT-4/* Xseries
HT-4/*/0,5 Xseries

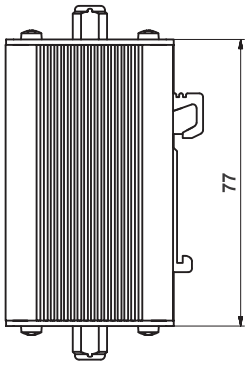
Hakel Transmition - is designed to protect transmission of information signals and Hakel Transmition-NV for protection of supply lines. The casing of this protector is made out of light alloy, which ensures high mechanical and thermal resistance. I_{max} = 10kA. It is recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 according to EN 62305 ed.2

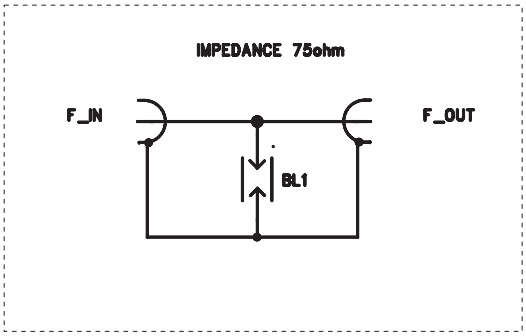
Type		HT-4/6	HT-4/12	HT-4/24	HT-4/48
Number of protected pairs		4			
Connector type		Eight-pole, screw / screwless type, slip-on terminal block DEGSON 2EDGK- 5.08			
Nominal voltage	U_N	6 V	12 V	24 V	48 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V
Rated load current	I_L	100 mA			
C2 Max. discharge current (8/20)	I_{max}	10 kA			
C2 Nominal discharge current (8/20)	I_n	1 kA			
C2 Voltage protection level at I_n(8/20)	U_P	15 V	28 V	64 V	160 V
C3 Voltage protection level at 1kV/μs	U_P	9 V	18 V	34 V	66 V
Response time	t_A	< 30 ns			
Data rate		1 MBit/s			
Series impedance per line		2,2 Ω			
Parasitic capacitance	C	1,5 nF			
LPZ		1-2			
Protection type		IP20			
Operating temperatue range	ϑ	-40°C ÷ + 80°C			
Recommended cable cross-section		0,25 - 1,5 mm^2			
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1			
Article number		35 003	35 004	35 005	35 006

Type		HT-NV 4/6/0,5	HT-NV 4/12/0,5	HT-NV 4/24/0,5	HT-NV 4/48/0,5
Number of protected pairs		4			
Connector type		Eight-pole, screw type, slip-on terminal block DEGSON 2EDGK- 5.08			
Nominal voltage	U_N	6 V	12 V	24 V	48 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V
Rated load current	I_L	0,5 A			
D1 Lightning impulse current (10/350)	I_{imp}	5 kA			
D1 Lightning impulse current (10/350) line/PE	I_{imp}	2,5 kA			
C2 Max. discharge current (8/20)	I_{max}	10 kA			
C2 Nominal discharge current (8/20)	I_n	1 kA			
C2 Voltage protection level at I_n (8/20)	U_P	15 V	28 V	64 V	85 V
C3 Voltage protection level at 1kV/μs	U_P	9 V	18 V	34 V	66 V
Response time	t_A	< 30 ns			
Data rate		1 MBit/s			
Insert inductance		4,7 μH			
LPZ		1-2			
Protection type		IP20			
Operating temperatue range	ϑ	-40°C ÷ + 80°C			
Parasitic capacitance	C	1,5 nF			
Recommended cable cross-section		0,25 - 1,5 mm^2			
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1			
Article number		35 007	35 008	35 009	35 010

Surge protection devices for information technology systems

LPZ 1-2 / IP20 / CE





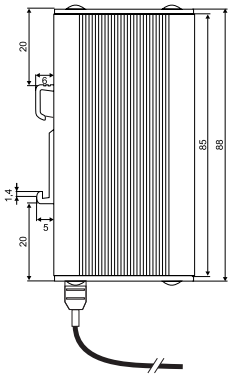
HT-SAT Xseries

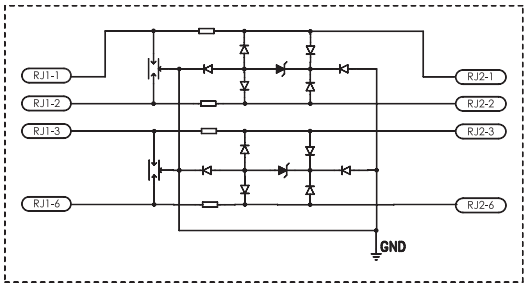
Hakel Transmition-SAT is designed to protect satellite equipment. Casing of this protector is made out of light alloy, which ensures high mechanical and thermal resistance.

Technical data		HT-SAT
Connector type		F
Max. continous operating voltage	U_C	72 V
Rated load current	I_N	0,5 A
D1 Max. lightning impulse current (10/350)	I_{imp}	2 kA
C2 Max. discharge current (8/20)	I_{max}	10 kA
C2 Nominal discharge current (8/20)	I_n	5 kA
Voltage protection level at 1kV/ms	U_P	500 V
Frequency range		0-2 GHz
Max. transmission power capacity		50 W
Insertion loss		< 0,5 dB
Return loss		> 20 dB
Characteristic impedance		75 W
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1
Article number		57 004

Surge protection devices for information technology systems

LPZ 1-2 / IP20 / CE





HT-NET 2/100 5cat *X*series

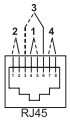
These surge protection devices intended for computer networks are specially designed for securing a faultless data transfer within computer networks category 5. They protect input electronic circuits of network cards against damage caused by surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 according to EN 62305. It is recommended to use these protection devices at the input of protected equipment.

Type		**HT-NET 2/100 5cat**
Number of protected pairs		2
Connector type input/output		RJ45/RJ45
Nominal voltage	U_N	6 V
Max. continuous operating voltage	U_C	7,2 V
Rated load current	I_L	300 mA
C2 Max. discharge current (8/20)	I_{max}	2 kA
C2 Nominal discharge current (8/20)	I_n	1 kA
C3 Voltage protection level at 1kV/μs	U_P	< 10 V
Data rate		max. 100 Mbit/s
Max. attenuation		< 0,4 dB (at 100 MHz)
Near-end crosstalk		> 40 dB (at 100 MHz)
Return loss		< 14 dB (at 100 MHz)
Series impedance per line		2,2 Ω
Response time	t_A	< 25 ns
Parasitic capacitance	C	<42 pF
LPZ		1-2
Protection type		IP20
Operating temperatue range	ϑ	-40°C ÷ + 80°C
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1
Article number		57 015

Connection of RJ45 pins
acc.to EIA/TIA 568, type B

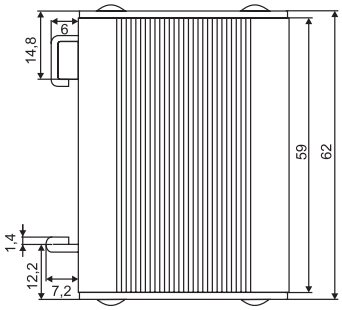
- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

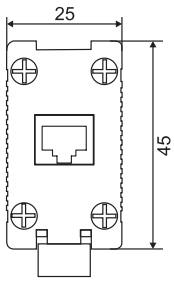
1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair

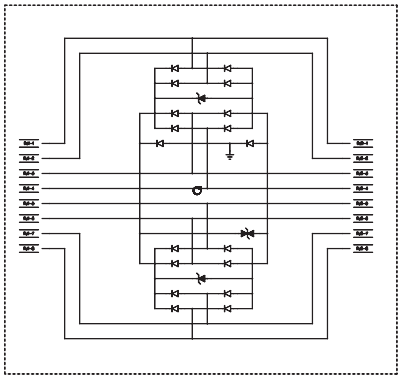


Surge protection devices for information technology systems

LPZ 2-3 / IP20 / CE







HT-NET 4/100M 5cat X series

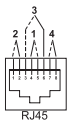
These surge protection devices intended for computer networks are specially designed for securing a faultless data transfer within computer networks category 5. The casing of this protector is made out of light alloy, which ensures high mechanical and thermal resistance. It is recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ 2-3 according to EN 62305.

Type		HT-NET 4/100M 5cat
Number of protected pairs		4
Connector type		RJ45/RJ45
Nominal voltage	U_N	6 V
Max. continuous operating voltage	U_C	7,2 V
Rated load current	I_L	300 mA
C2 Nominal discharge current (8/20)	I_n	20 A
C3 Voltage protection level at 1kV/μs	U_p	10 V
Response time	t_A	< 25 ns
Data rate		max. 100 MBit/s
Parasitic capacitance	C	47 pF
LPZ		2-3
Protection type		IP20
Operating temperatue range	ϑ	-40°C ÷ + 80°C
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1
Article number		57 014

Connection of RJ45 pins
acc.to EIA/TIA 568, type B

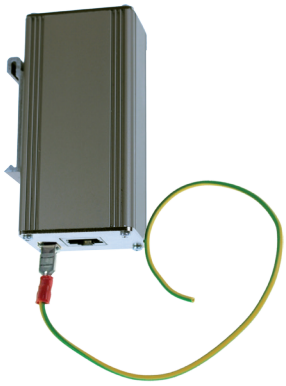
- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

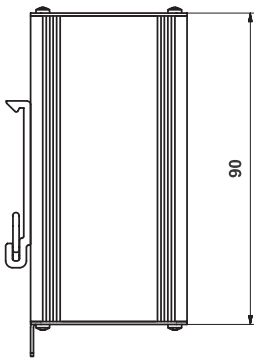
1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair

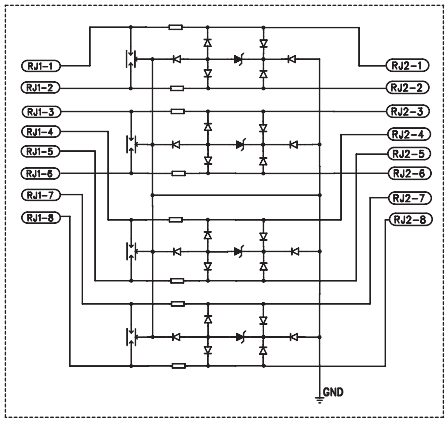


Surge protection devices for information technology systems

LPZ 1-2 / IP20 / CE







HT-NET 5Ecat/RJ *X*series

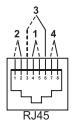
These surge protection devices intended for computer networks are specially designed for securing a faultless data transfer within computer networks category 5. They protect input electronic circuits of network cards against damage caused by surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 according to EN 62305. It is recommended to use these protection devices at the input of protected equipment.

Type		**HT-NET 5Ecat/RJ**
Number of protected pairs		4
Connector type input/output		RJ45/RJ45
Nominal voltage	U_N	48 V
Max. continuous operating voltage	U_C	57,6 V
Rated load current	I_L	300 mA
C2 Max. discharge current (8/20)	I_{max}	2 kA
C2 Nominal discharge current (8/20)	I_n	1 kA
C3 Voltage protection level at 1kV/μs	U_P	< 80 V
Data rate		max. 250 Mbit/s
Series impedance per line		2,2 Ω
Response time	t_A	< 25 ns
Parasitic capacitance	C	< 42 pF
LPZ		1-2
Protection type		IP20
Operating temperatue range	ϑ	-40°C ÷ + 80°C
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1
Article number		57 017

Connection of RJ45 pins
acc.to EIA/TIA 568, type B

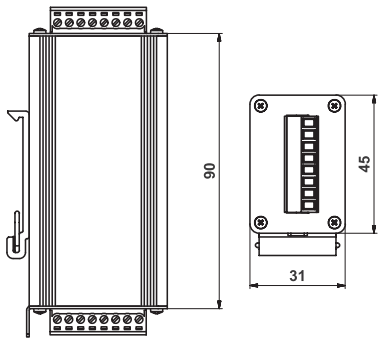
- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

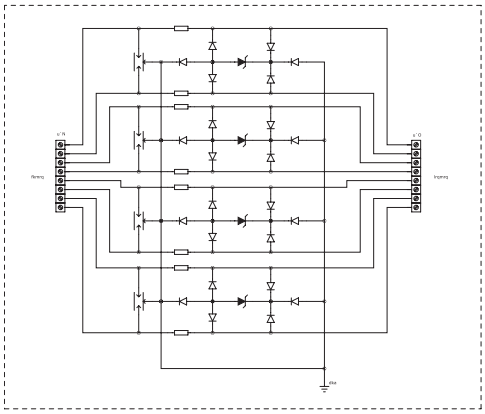
1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair



Surge protection devices for information technology systems

LPZ 1-2 / IP20 / CE





HT-NET 5Ecat/D *X*series

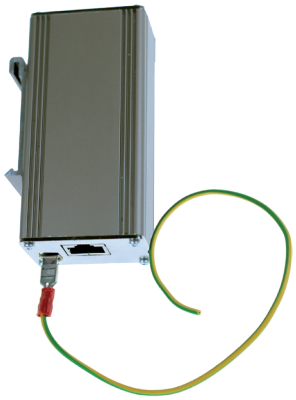
These surge protection devices intended for computer networks are specially designed for protection and faultless data transmission within the 5th category computer networks. They protect the input circuit network cards against damage caused by overvoltage effects within the LPZ concept at the boundaries of LPZ 1-2 according to EN 62305 ed.2. It is recommended to use these protective devices at the input of the protected equipment.

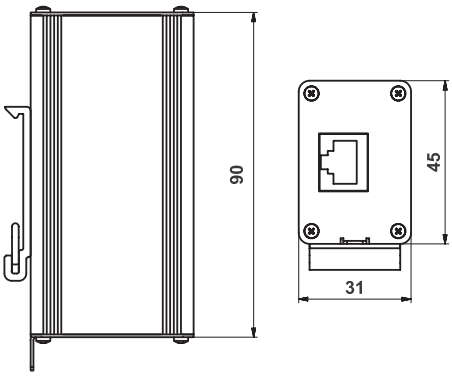
HT-NET 5Ecat/D are available in a version with screw terminals or screwless terminal block.

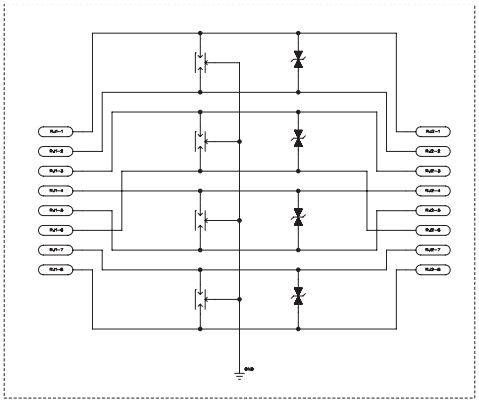
Type		**HT-NET 5Ecat/D**
Number of protected pairs		4
Connector type input/output		Screw / screwless terminal (DEGSON)
Nominal voltage	U_N	48 V
Max. continuous operating voltage	U_C	57,6 V
Rated load current	I_L	300 mA
C2 Max. discharge current (8/20)	I_{max}	2 kA
C2 Nominal discharge current (8/20)	I_n	1 kA
C3 Voltage protection level at 1kV/μs	U_P	< 80 V
Data rate		max. 250 Mbit/s
Series impedance per line		2,2 Ω
Response time	t_A	< 25 ns
Parasitic capacitance	C	< 42 pF
LPZ		1-2
Protection type		IP20
Operating temperatue range	ϑ	-40°C ÷ + 80°C
Category tested acc. to EN 61643-21+A1,A2		A2, B2, C2, C3, D1
Article number		57 018

Surge protection devices for information technology systems

LPZ 1-2 / IP20 / CE







HT-NET PoE 6cat *X*series

These surge protection devices intended for computer networks are specially designed for securing a faultless data transfer within computer networks category 6. They protect input electronic circuits of network cards against damage caused by surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ 1-2 according to EN 62305. It is recommended to use these protection devices at the input of protected equipment.

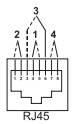
Models:
HT-NET PoE 6cat can be produced in the version with RJ connectors or with screw terminal blocks and screwless terminal blocks.

TYPE		HT-NET PoE 6cat
Connector type		RJ45/RJ45
Max. continous operating voltage(DC)	U_C	58 V
Max. continous operating voltage(AC)	U_C	41 V
Rated load current	I_L	1 A
C2 Max. discharge current line/PE	I_{max}	2 kV/ 1 kA
C1 Nominal discharge current line/line	I_n	300 V/ 150 A
C3 Voltage protection level at 1kV/μs	U_P	< 120 V
Voltage protection level line/line	U_P	< 150 V
Voltage protection level line/PE	U_P	< 700 V
Max. frequency		max. 500 MHz
Protection type		IP20
Operating temperature	ϑ	-40°C ÷ + 70°C
LPZ		1-2-3
Tested acc. to EN 61643-21+A1,A2		B2, C1, C2, C3
Approvals and certifications		Kat. 6A/EA, ISO/IEC 11801
PoE		IEEE 802.3af
Article number		57 101

Connection of RJ45 pins
acc.to EIA/TIA 568, type B

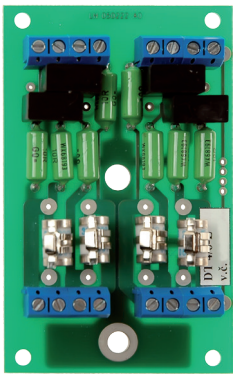
- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

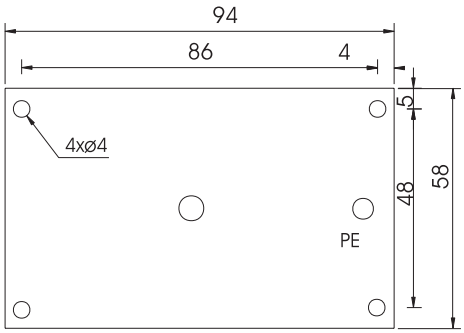
1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair

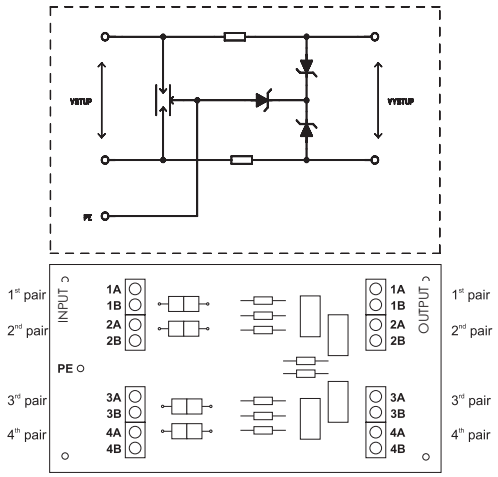


Surge protection devices for information technology systems

LPZ 1-2 / IP00 / CE







DT */*
DT */*-L

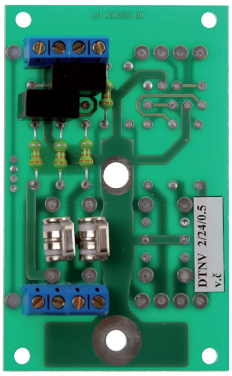
DT is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ -1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The rated load current of individual protected lines I_L < 0,1A.

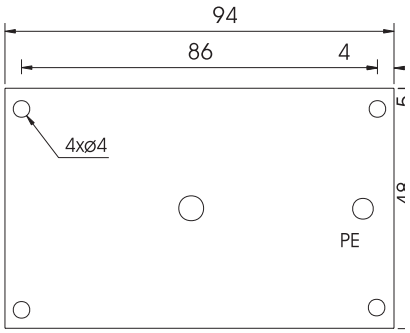
These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 6V-170V. Maximum discharge current is 10kA (8/20), in case of "L" design the maximum discharge current is 20kA (8/20). For the protection of telephone lines it is recommended to use DT type with nominal voltage U_N=170V (with code mark "T").

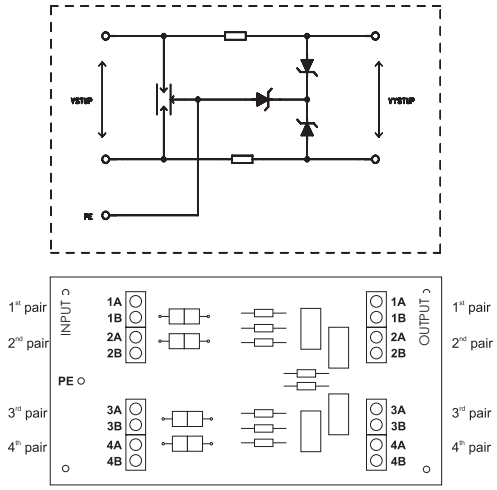
Type Number of protected pairs	1 2 3 4	**DT 1/6** **DT 2/6** **DT 3/6** **DT 4/6**	**DT 1/12** **DT 2/12** **DT 3/12** **DT 4/12**	**DT 1/24** **DT 2/24** **DT 3/24** **DT 4/24**	**DT 1/48** **DT 2/48** **DT 3/48** **DT 4/48**	**DT 1/T** **DT 2/T** **DT 3/T** **DT 4/T**
Nominal voltage	U_N	6 V	12 V	24 V	48 V	170 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V	204 V
Rated load current	I_L			100 mA		
C2 Max. discharge current (8/20)	I_{max}			10 kA		
C2 Nominal discharge current (8/20)	I_n			1 kA		
C2 Voltage protection level at I_n	U_P	15 V	28 V	64 V	160 V	500 V
C3 Voltage protection level at 1kV/μs	U_P	9 V	18 V	34 V	66 V	290 V
Response time	t_A			< 30 ns		
Data rate				1 MBit/s		
Series impedance per line				1,5 -10 Ω		
Parasitic capacitance	C			1,5 nF		
Recommended cable cross-section				0,25 - 1,5 mm^2		
Category tested acc. to IEC 61643:21-2000				A2, B2, C2, C3, D1		
Article number		48 101 48 201 48 301 48 401	48 102 48 202 48 302 48 402	48 103 48 203 48 303 48 403	48 104 48 204 48 304 48 404	48 105 48 205 48 305 48 405

Surge protection devices for information technology systems

LPZ 1-2 / IP00 / CE







DTNV */*/0,5
DTNV */*/0,5-L

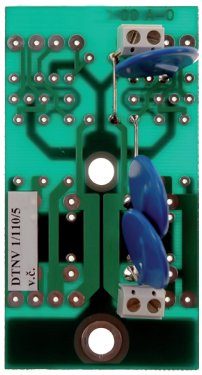
DTNV 0,5 is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The rated load current of individual protected lines I_L < 0,5A.

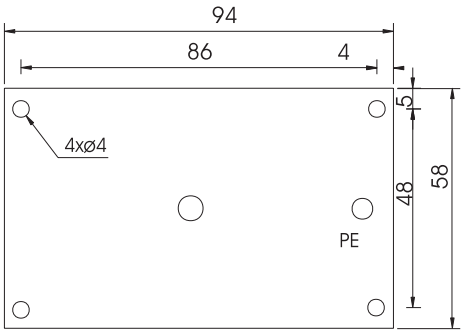
These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 6V-48V. Maximum discharge current is 10kA (8/20), in case of "L" design the maximum discharge current is 20kA (8/20).

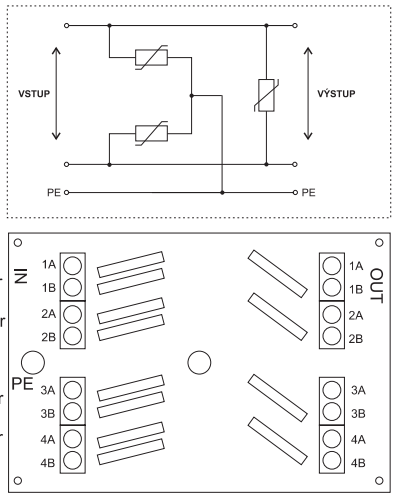
Type Number of protected pairs	1 2 3 4	**DTNV 1/6/0,5** **DTNV 2/6/0,5** **DTNV 3/6/0,5** **DTNV 4/6/0,5**	**DTNV 1/12/0,5** **DTNV 2/12/0,5** **DTNV 3/12/0,5** **DTNV 4/12/0,5**	**DTNV 1/24/0,5** **DTNV 2/24/0,5** **DTNV 3/24/0,5** **DTNV 4/24/0,5**	**DTNV 1/48/0,5** **DTNV 2/48/0,5** **DTNV 3/48/0,5** **DTNV 4/48/0,5**
Nominal voltage	U_N	6 V	12 V	24 V	48 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V
Rated load current	I_L	0,5 A			
C2 Max. discharge current (8/20)	I_{max}	10 kA			
C2 Nominal discharge current (8/20)	I_n	1 kA			
C2 Voltage protection level at I_n	U_P	15 V	28 V	64 V	160 V
C3 Voltage protection level at 1kV/μs	U_P	9 V	18 V	34 V	66 V
Response time	t_A	< 30 ns			
Data rate		1 MBit/s			
Series impedance per line		4,7 μH			
Parasitic capacitance	C	1,5 nF			
Recommended cable cross-section		0,25 - 1,5 mm^2			
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1			
Article number		50 101 50 201 50 301 50 401	50 102 50 202 50 302 50 402	50 104 50 204 50 304 50 404	50 106 50 206 50 306 50 406

Surge protection devices for information technology systems

LPZ 2-3 / IP00 / CE







DTNV */*/5

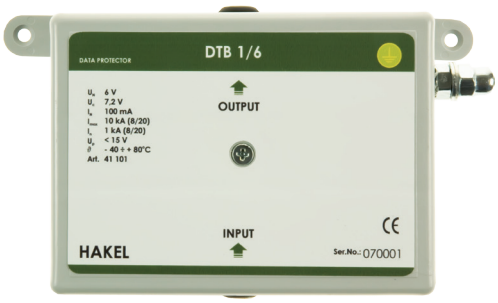
DTNV 5 is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The rated load current of individual protected lines I_L < 5A.

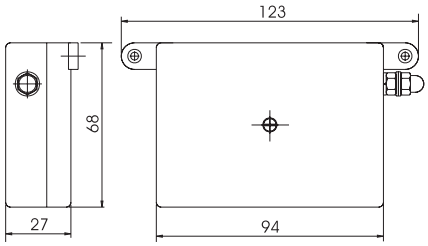
These devices consist of MOVs only. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 12V-110V. Maximum discharge current is different according to various types from 2kA (8/20) to 8kA (8/20).

Type Number of protected pairs	1 2 3 4	**DTNV 1/12/5** **DTNV 2/12/5** **DTNV 3/12/5** **DTNV 4/12/5**	**DTNV 1/24/5** **DTNV 2/24/5** **DTNV 3/24/5** **DTNV 4/24/5**	**DTNV 1/48/5** **DTNV 2/48/5** **DTNV 3/48/5** **DTNV 4/48/5**	**DTNV 1/80/5** **DTNV 2/80/5** **DTNV 3/80/5** **DTNV 4/80/5**	**DTNV 1/110/5** **DTNV 2/110/5** **DTNV 3/110/5** **DTNV 4/110/5**
Nominal voltage	U_N	12 V	24 V	48 V	80 V	110 V
Max. continuous operating voltage	U_C	14,4 V	28,6 V	57,6 V	96 V	132 V
Rated load current	I_L			5 A		
C2 Max. discharge current (8/20)	I_{max}		2 kA		6,5 kA	8 kA
C2 Nominal discharge current (8/20)	I_n			1 kA		
C2 Voltage protection level at I_n	U_P	56 V	90 V	170 V	280 V	400 V
C3 Voltage protection level at 1kV/μs	U_P	27 V	51 V	118 V	200 V	310 V
Response time	t_A			< 30 ns		
Parasitic capacitance	C			10 nF		
Recommended cable cross-section				0,25 - 1,5 mm^2		
Category tested acc. to IEC 61643:21-2000				A2, B2, C2, C3, D1		
Article number		50 103 50 203 50 303 50 403	50 105 50 205 50 305 50 405	50 107 50 207 50 307 50 407	50 108 50 208 50 308 50 408	50 109 50 209 50 309 50 409

Surge protection devices for information technology systems

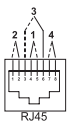
LPZ 1-2 / IP20 / CE

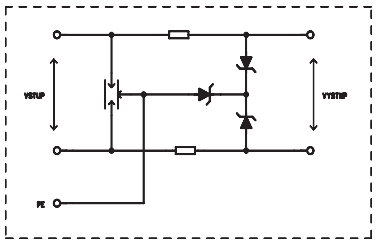


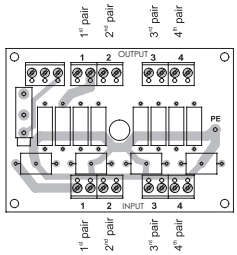


Connection of RJ45 pins
acc.to EIA/TIA 568, type B

- 1 whiteorange 1 - blue pair
- 2 orange 2 - orange pair
- 3 whitegreen 3 - green pair
- 4 blue 4 - brown pair
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown







DTB */*/*

DTB, DTB-R is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The rated load current of individual protected lines I_L < 0,1A.

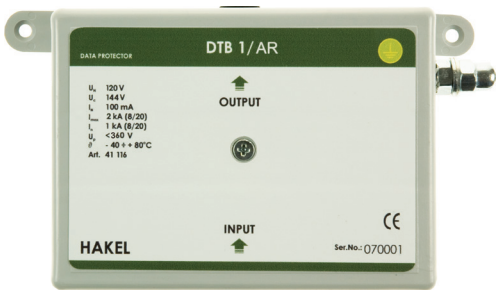
These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 6V-170V. Maximum discharge current is 10kA (8/20) for type DTB and 2kA (8/20) for DTB-R type. For the protection of telephone lines it is recommended to use DTB type with nominal voltage U_N = 170V (with code mark "T"). The connection of protected lines is carried out by screw terminals for type DTB and by RJ45 connectors for type DTB-R.

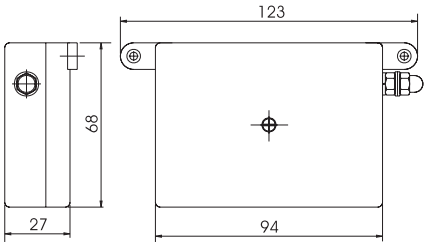
Type Number of protected pairs	1 2 3 4	**DTB 1/6** **DTB 2/6** **DTB 3/6** **DTB 4/6**	**DTB 1/12** **DTB 2/12** **DTB 3/12** **DTB 4/12**	**DTB 1/24** **DTB 2/24** **DTB 3/24** **DTB 4/24**	**DTB 1/48** **DTB 2/48** **DTB 3/48** **DTB 4/48**	**DTB 1/T** **DTB 2/T** **DTB 3/T** **DTB 4/T**
Nominal voltage	U_N	6 V	12 V	24 V	48 V	170 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V	204 V
Rated load current	I_L			100 mA		
C2 Max. discharge current (8/20)	I_{max}			10 kA		
C2 Nominal discharge current (8/20)	I_n			1 kA		
C2 Voltage protection level at I_n	U_P	15 V	28 V	64 V	160 V	500 V
C3 Voltage protection level at 1kV/μs	U_P	9 V	18 V	34 V	66 V	290 V
Response time	t_A			< 30 ns		
Data rate				1 MBit/s		
Series impedance per line				1,5 -10 Ω		
Parasitic capacitance	C			1,5 nF		
Recommended cable cross-section				0,25 - 1,5 mm^2		
Category tested acc. to IEC 61643:21-2000				A2, B2, C2, C3, D1		
Article number		41 101 42 101 43 101 44 101	41 102 42 102 43 102 44 102	41 103 42 103 43 103 44 103	41 104 42 104 43 104 44 104	41 105 42 105 43 105 44 105

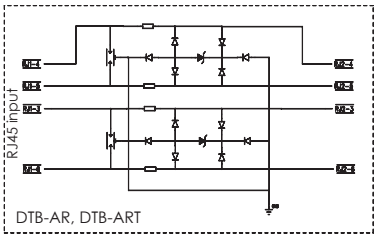
Type Number of protected pairs	1 2 3 4	**DTB 1/6 R** **DTB 2/6 R** **DTB 3/6 R** **DTB 4/6 R**	**DTB 1/12 R** **DTB 2/12 R** **DTB 3/12 R** **DTB 4/12 R**	**DTB 1/24 R** **DTB 2/24 R** **DTB 3/24 R** **DTB 4/24 R**	**DTB 1/48 R** **DTB 2/48 R** **DTB 3/48 R** **DTB 4/48 R**	**DTB 1/T R** **DTB 2/T R** **DTB 3/T R** **DTB 4/T R**
Nominal voltage	U_N	6 V	12 V	24 V	48 V	170 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V	204 V
Rated load current	I_L			100 mA		
C2 Max. discharge current (8/20)	I_{max}			2 kA		
C2 Nominal discharge current (8/20)	I_n			1 kA		
C2 Voltage protection level at I_n	U_P	15 V	28 V	64 V	160 V	500 V
C3 Voltage protection level at 1kV/μs	U_P	9 V	18 V	34 V	66 V	290 V
Response time	t_A			< 30 ns		
Data rate				1 MBit/s		
Series impedance per line				1,5 -10 Ω		
Parasitic capacitance	C			1,5 nF		
Recommended cable cross-section				0,25 - 1,5 mm^2		
Category tested acc. to IEC 61643:21-2000				A2, B2, C2, C3, D1		
Article number		41 111 42 111 43 111 44 111	41 112 42 112 43 112 44 112	41 113 42 113 43 113 44 113	41 114 42 114 43 114 44 114	41 115 42 115 43 115 44 115

Surge protection devices for information technology systems

LPZ 1-2-3 / IP20 / CE



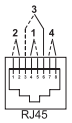




Connection of RJ45 pins
acc.to EIA/TIA 568, type B

- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair



DTB */*

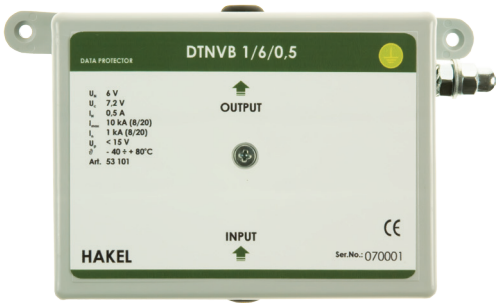
DTB-L, DTB-AR and DTB-ART is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The rated load current of individual protected lines I_L < 0,1A.

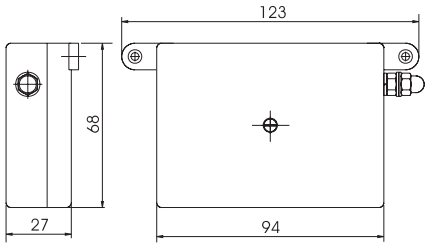
These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 6V-170V. DTB-AR and DTB-ART types are designed for the protection of equipment using DSL technology. Maximum discharge current of DTB-L is 20kA (8/20) and 2kA (8/20) for DTB-AR and DTB-ART types. For the protection of telephone lines it is recommended to use a type with nominal voltage U_N=170V (with code mark "T"). The connection of protected lines is carried out by screw terminals for type DTB-L and by RJ45 connectors for types DTB-AR and DTB-ART.

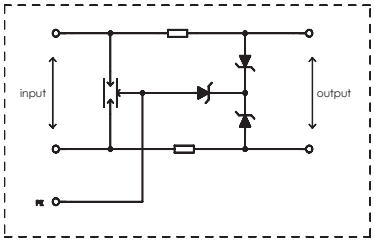
Type Number of protected pairs	1 2	**DTB 1/AR** **DTB 2/AR**	**DTB 1/ART** **DTB 2/ART**
Nominal voltage	U_N	120 V	170 V
Max. continuous operating voltage	U_C	144 V	204 V
Rated load current	I_L	100 mA	
C2 Max. discharge current (8/20)	I_{max}	2 kA	
C2 Nominal discharge current (8/20)	I_n	1 kA	
C2 Voltage protection level at I_n	U_P	360 V	520 V
C3 Voltage protection level at 1kV/μs	t_A	< 30 ns	
Response time		10 MBit/s	
Data rate		1,5 -10 Ω	
Series impedance per line	C	1,5 nF	
Parasitic capacitance	ϑ	-40°C ÷ + 80°C	
Recommended cable cross-section		0,3 mm^2	
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	
Article number		41 116 42 116	41 117 42 117

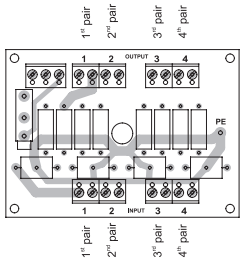
Surge protection devices for information technology systems

LPZ 1-2 / IP20 / CE









DTNVB */*/0,5

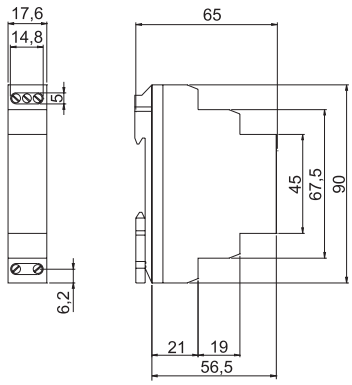
DTNVB 0,5 is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The rated load current of individual protected lines I_L < 0,5A.

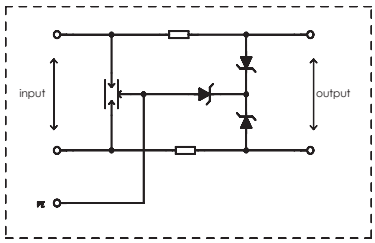
These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-4). These devices are produced for nominal voltage within the range of 6V-48V. Maximum discharge current is 10kA (8/20).

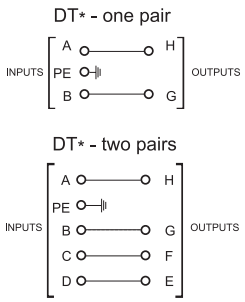
Type Number of protected pairs	1 2 3 4	**DTNVB 1/6/0,5** **DTNVB 2/6/0,5** **DTNVB 3/6/0,5** **DTNVB 4/6/0,5**	**DTNVB 1/12/0,5** **DTNVB 2/12/0,5** **DTNVB 3/12/0,5** **DTNVB 4/12/0,5**	**DTNVB 1/24/0,5** **DTNVB 2/24/0,5** **DTNVB 3/24/0,5** **DTNVB 4/24/0,5**	**DTNVB 1/48/0,5** **DTNVB 2/48/0,5** **DTNVB 3/48/0,5** **DTNVB 4/48/0,5**
Nominal voltage	U_N	6 V	12 V	24 V	48 V
Max. continuous operating voltage	C_U	7,2 V	14,4 V	28,6 V	57,6 V
Rated load current	I_L	0,5 A			
C2 Max. discharge current (8/20)	I_{max}	10 kA			
C2 Nominal discharge current (8/20)	I_n	1 kA			
C2 Voltage protection level at I_n	U_P	15 V	28 V	64 V	160 V
C3 Voltage protection level at 1kV/μs	U_P	9 V	18 V	34 V	66 V
Response time	t_A	< 30 ns			
Data rate		1 MBit/s			
Series impedance per line		4,7 μH			
Parasitic capacitance	C	1,5 nF			
Recommended cable cross-section		0,25 - 1,5 mm^2			
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1			
Article number		53 101 53 201 53 301 53 401	53 102 53 202 53 302 53 402	53 104 53 204 53 304 53 404	53 106 53 206 53 306 53 406

Surge protection devices for information technology systems

LPZ 1-2-3 / IP20 / CE







DTE */*

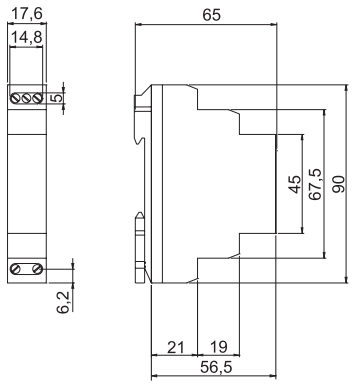
DTE is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The rated load current of individual protected lines I_L < 0,1A.

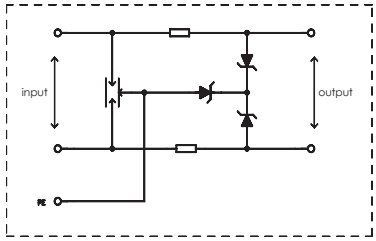
These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-2). These devices are produced for nominal voltage within the range of 6V-170V. Maximum discharge current is 10kA (8/20). For the protection of telephone lines it is recommended to use a type with nominal voltage U_N=170V (with code mark "T").

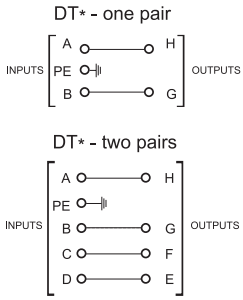
Type Number of protected pairs	1 2	**DTE 1/6** **DTE 2/6**	**DTE 1/12** **DTE 2/12**	**DTE 1/24** **DTE 2/24**	**DTE 1/48** **DTE 2/48**	**DTE 1/T** **DTE 2/T**
Nominal voltage	U_N	6 V	12 V	24 V	48 V	170 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V	28,6 V	57,6 V	204 V
Rated load current	I_L			100 mA		
C2 Max. discharge current (8/20)	I_{max}			10 kA		
C2 Nominal discharge current (8/20)	I_n			1 kA		
C2 Voltage protection level at I_n	U_P	15 V	28 V	64 V	160 V	500 V
C3 Voltage protection level at 1kV/μs	U_P	9 V	18 V	34 V	66 V	290 V
Response time	t_A			< 30 ns		
Data rate				1 MBit/s		
Series impedance per line				1,5 -10 Ω		
Parasitic capacitance	C			1,5 nF		
Recommended cable cross-section				0,25 - 1,5 mm^2		
Category tested acc. to IEC 61643:21-2000				A2, B2, C2, C3, D1		
Article number		41 301 42 301	41 302 42 302	41 303 42 303	41 304 42 304	41 306 42 306

Surge protection devices for information technology systems

LPZ 1-2-3 / IP20 / CE







DTNVE */*/0,5

DTNVE 0,5 is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The rated load current of individual protected lines I_L < 0,5A.

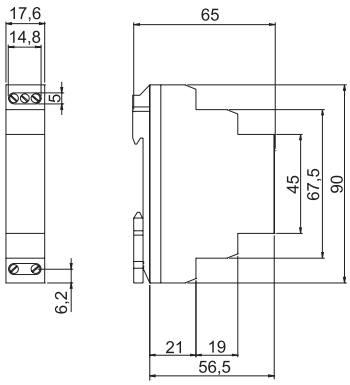
These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-2). These devices are produced for nominal voltage within the range of 6V-115V. Maximum discharge current is 10kA (8/20).

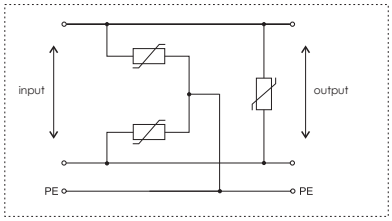
Type Number of protected pairs	1 2	**DTNVE 1/6/0,5** **DTNVE 2/6/0,5**	**DTNVE 1/12/0,5** **DTNVE 2/12/0,5**	**DTNVE 1/24/0,5** **DTNVE 2/24/0,5**	**DTNVE 1/30/0,5** **DTNVE 2/30/0,5**
Nominal voltage	U_N	6 V	12 V	24 V	30 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V	28,6 V	36 V
Rated load current	I_L	0,5 A			
D1 Lightning impulse current (10/350)	I_{imp}	5 kA			
D1 Lightning impulse current (10/350) line/PE	I_{imp}	2,5 kA			
C2 Max. discharge current (8/20)	I_{max}	10 kA			
C2 Nominal discharge current (8/20)	I_n	1 kA			
C2 Voltage protection level at I_n	U_P	15 V	28 V	64 V	75 V
C3 Voltage protection level at 1kV/μs	U_P	9 V	18 V	34 V	54 V
Response time	t_A	< 30 ns			
Data rate		1 MBit/s			
Series impedance per line		4,7 μH			
Parasitic capacitance	C	1,5 nF			
Recommended cable cross-section		0,25 - 1,5 mm^2			
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1			
Article number		41 313 42 323	41 324 42 316	41 308 42 308	41 309 42 309

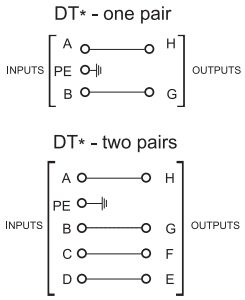
Type Number of protected pairs	1 2	**DTNVE 1/48/0,5** **DTNVE 2/48/0,5**	**DTNVE 1/80/0,5** **DTNVE 2/80/0,5**
Nominal voltage	U_N	48 V	80 V
Max. continuous operating voltage	U_C	57,6 V	96 V
Rated load current	I_L	0,5 A	
D1 Lightning impulse current (10/350)	I_{imp}	5 kA	
D1 Lightning impulse current (10/350) line/PE	I_{imp}	2,5 kA	
C2 Max. discharge current (8/20)	I_{max}	10 kA	
C2 Nominal discharge current (8/20)	I_n	1 kA	
C2 Voltage protection level at I_n	U_P	85 V	500 V
C3 Voltage protection level at 1kV/μs	U_P	66 V	120 V
Response time	t_A	< 30 ns	
Data rate		1 MBit/s	
Series impedance per line		4,7 μH	
Parasitic capacitance	C	1,5 nF	
Recommended cable cross-section		0,25 - 1,5 mm^2	
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	
Article number		41 310 42 311	41 338 42 322

Surge protection devices for information technology systems

LPZ 2-3 / IP20 / CE







DTNVE */*/5

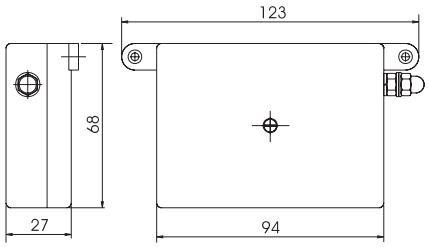
DTNVE 5 is a complex range of surge protection devices designed for protection of data, communication, measuring and control lines against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The rated load current of individual protected lines I_L < 5A.

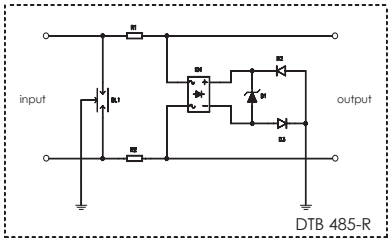
These devices consist of MOVs only. The number of protected pairs is optional (1-2). These devices are produced for nominal voltage within the range of 12V-230V. Maximum discharge current is different according to various types from 2kA (8/20) to 10kA (8/20).

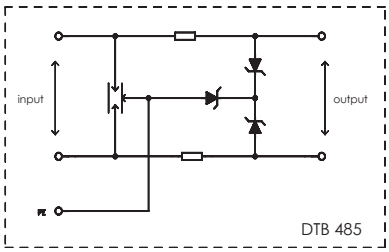
Type Number of protected pairs	1 2	**DTNVE 1/12/5** **DTNVE 2/12/5**	**DTNVE 1/24/5** **DTNVE 2/24/5**	**DTNVE 1/30/5** **DTNVE 2/30/5**	**DTNVE 1/48/5** **DTNVE 2/48/5**	**DTNVE 1/80/5** **DTNVE 2/80/5**
Nominal voltage	U_N	12 V	24 V	30 V	48 V	80 V
Max. continuous operating voltage	U_C	14,4 V	28,6 V	36 V	57,6 V	96 V
Rated load current	I_L			5 A		
C2 Max. discharge current (8/20)	I_{max}			6,5 kA		
C2 Nominal discharge current (8/20)	I_n			1 kA		
C2 Voltage protection level at I_n	U_P	56 V	90 V	140V	170 V	280 V
C3 Voltage protection level at 1kV/μs	U_P	27 V	51 V	100 V	118 V	200 V
Response time	t_A			< 30 ns		
Parasitic capacitance	C			10 nF		
Recommended cable cross-section				0,25 - 1,5 mm²		
Category tested acc. to IEC 61643:21-2000				A2, B2, C2, C3, D1		
Article number		41 312 42 317	41 307 42 307	41 311 42 312	41 318 42 321	41 334 42 328

Surge protection devices for information technology systems

LPZ 1-2-3 / IP20 / CE







DTB 485*
DTB 2/485*

DTB 485 is a complex range of surge protection devices designed for protection of lines interface RS485 against surge effects. These surge protection devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305. All types provide effective protection of connected equipment against common mode and differential mode surge effects according to IEC 61643-21. The rated load current of individual protected lines I_L < 0,1A.

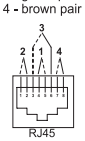
These devices consist of gas discharge tubes, series impedance and transils. The number of protected pairs is optional (1-2). These devices are produced for nominal voltage of 6V. Maximum discharge current is 10kA (8/20) for type DTB, 20kA (8/20) for type DTB-L and 2kA (8/20) for type DTB-R. The connection of protected lines is carried out by screw terminals for type DTB and by RJ45 connectors for type DTB-R.

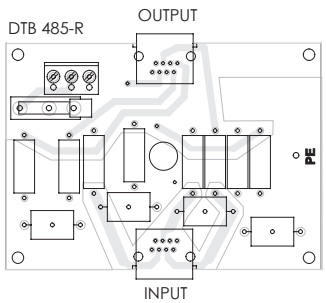
Type Number of protected pairs	1 2	**DTB 485** **DTB 2/485**	**DTB 485 R** **DTB 2/485 R**
Nominal voltage	U_N	6 V	6 V
Max. continuous operating voltage	U_C	7,2 V	7,2 V
Rated load current	I_L	100 mA	
D1 Lightning impulse current (10/350)	I_{imp}	5 kA	-
D1 Lightning impulse current (10/350) line/PE	I_{imp}	-	-
C2 Max. discharge current (8/20)	I_{max}	10 kA	2 kA
C2 Voltage protection level at I_n	U_P	15 V	
C3 Voltage protection level at 1kV/μs	U_P	9 V	
Response time	t_A	< 30 ns	
Data rate		1 MBit/s	10 MBit/s
Series impedance per line		1,5 Ω	
Recommended cable cross-section		0,25 - 1,5 mm²	
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	
Article number		41 585 41 586	41 785 41 786

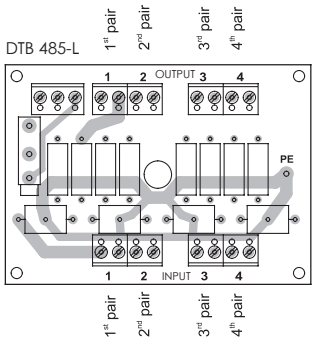
Connection of RJ45 pins
acc.to EIA/TIA 568, type B

- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair

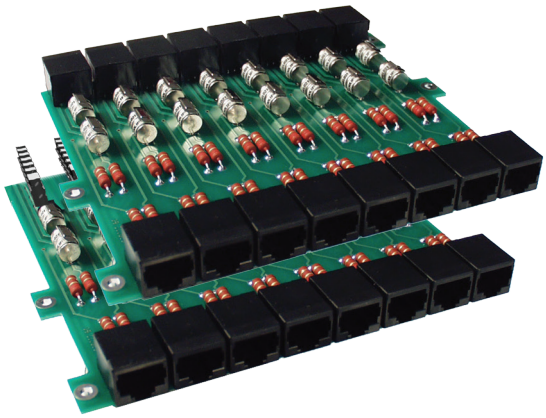


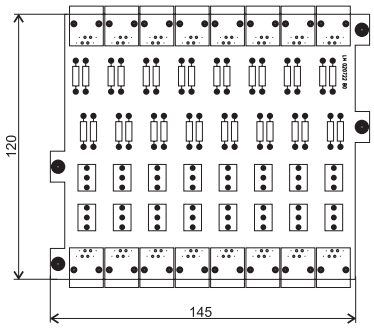




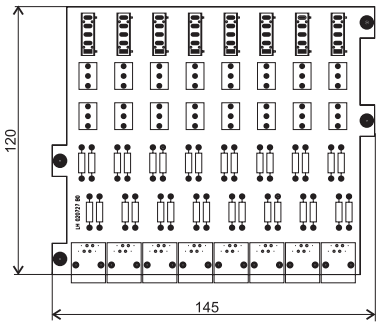
Surge protection devices for information technology systems

LPZ 3 / IP00 / CE





HAKELTEL 8 (RJ/RJ)



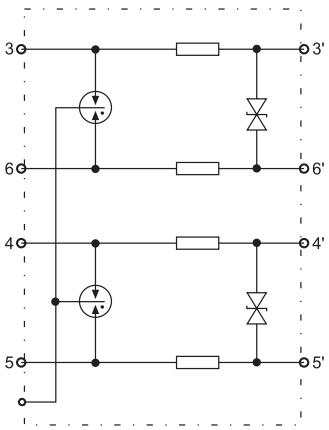
HAKELTEL 8 (LSA/RJ)

HAKELTEL 8.*RJ/RJ
HAKELTEL 8.*LSA/RJ

Hakeltel is a complex range of protection devices specially designed for the protection of analog telecommunication appliances against surges. These devices are recommended for use in the Lightning Protection Zones Concept at the boundaries of protection zones LPZ $0_{A(B)}$ - 1 according to EN 62305.

HAKELTEL is produced in two basic versions intended in preference for mounting to metal panel PSK 24 which is appropriate for installation into 19" rackmounts. For variant RJ/RJ is fitted to use the PSK24-19" type and for variant LSA/RJ is fitted to use the PSK 24/LSA-19" type. These types provide effective protection against surge for 8 telephone lines. The number of protected pairs of each telephone line is optional (1 or 2 pairs).

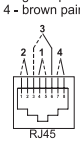
Type No. of telephone lines		**HAKELTEL 8.1 RJ/RJ** 8	**HAKELTEL 8.2 RJ/RJ** 8	**HAKELTEL 8.1 LSA/RJ** 8	**HAKELTEL 8.2 LSA/RJ** 8
No. of protected pairs per line		1	2	1	2
Nominal voltage	U_N	170 V DC			
Max. continuous operating voltage	U_C	204 V DC			
Rated load current	I_L	150 mA			
C2 Nominal discharge current	I_n	2,5 kA		5 kA	
C2 Voltage protection level I_n					
line/line line/PE	U_P	< 250 V < 600 V		< 275 V < 600 V	
C3 Voltage protection level 1 kV/µs					
line/line line/PE	U_P	< 230 V < 600 V			
Response time					
line/line line/PE	t_A	< 25 ns < 100 ns			
Data rate		1 MBit/s			
Series impedance per line	R	2,2 Ω			
Parasitic capacitance					
line/line line/PE	C	300 pF 15 pF			
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1			
Connector type input/output		RJ45/RJ45		LSA-PLUS/RJ45	
Pinning		4/5	3/6, 4/5	4/5	3/6, 4/5
Article number		45 024	45 026	45 025	45 027



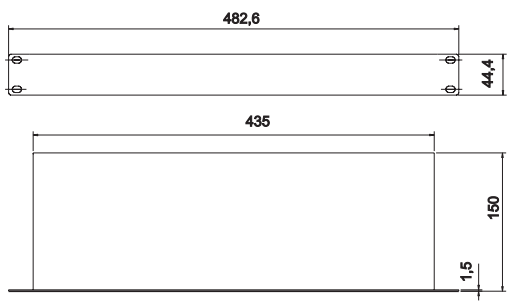
Connection of RJ45 pins
acc.to EIA/TIA 568, type B

- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair

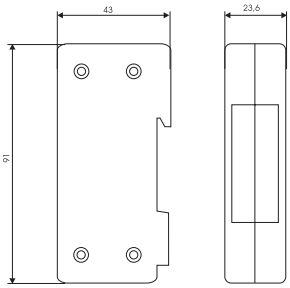


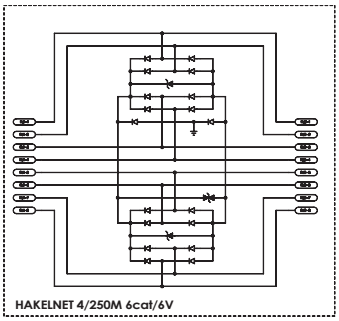
PSK24 is a metal suitable for fitting in 19" rackmounts. It is possible to mount up to 3 pieces of HAKELTEL 8.* into this panel.

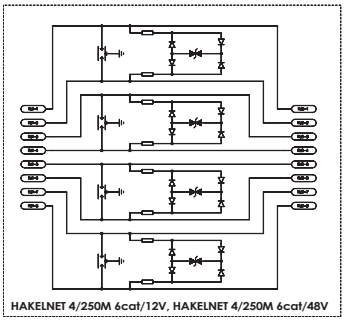


Surge protection devices for information technology systems

LPZ 3 / IP20 / CE







HAKELNET 4/250M 6cat/*

Hakelnet 4/250M 6 cat is designed to protect 5E/6 data and communications lines. All protected lines are equipped with Transient Voltage Suppressor Diode which eliminates common mode and differential mode surge effects during computer networks operation.

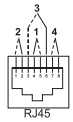
Hakelnet 4/250M 6cat consists of a plastic box and patch cords which are terminated with RJ45 connectors. Required length of patch cords (a, b) is to be specified by customer.

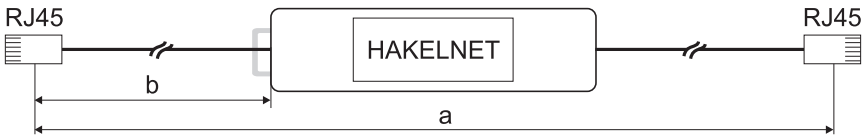
Type Number of protected pairs		**HAKELNET 4/250M 6cat** 4	**HAKELNET 4/250M 6cat/12V** 4	**HAKELNET 4/250M 6cat/48V** 4
Nominal voltage	U_N	6 V	12 V	48 V
Max. continuous operating voltage	U_C	7,2	14,4 V	57,6 V
Rated load current	I_L		200 mA	
Mode of protection			line-line, line-G(PE)	
Frequency handling line-line	f_g		250 MHz	
C2 Nominal discharge current I_n (8/20) line/line	I_n	20 A	150 A	150 A
C3 Voltage protection level line/line at 1 kV/μs (line/line)	U_p	< 15 V	< 40 V	< 150 V
Insertion loss for 250 MHz			< 3 dB	
Parasitic capacitance line/line	c	max. 5 pF	max. 160 pF	max. 160 pF
Mounting on			DIN rail 35 mm	
Input/output, pinning			RJ45/RJ45, 1/2, 3/6, 4/5, 7/8	
Length of patch cords				
Total length **a**			1,5 m or 3 m	
Supply length **b**			acc. to customer's specification	
Grounding method			trough DIN rail 35 mm by special metal clip on the back side of box	
Housing material			Polyamid PA6, UL94 V-0	
Colours			grey	
Category tested acc. to			EN 61643-21+A1,A2	
Approvals and certifications			cat. 6, ISO/IEC 11801	
Article number		45 034	45 038	45 037

Connection of RJ45 pins
acc.to EIA/TIA 568, type B

- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

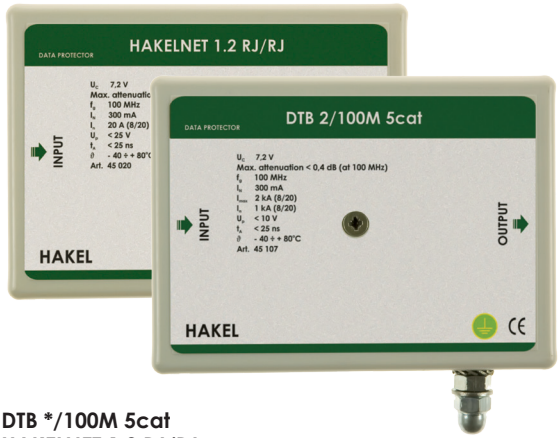
1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair

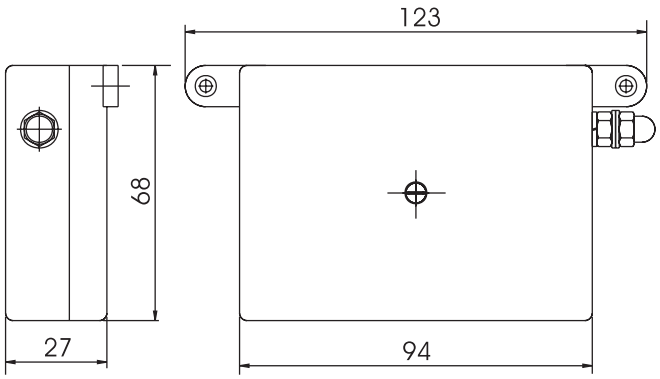




Surge protection devices for information technology systems

LPZ 2-3 / IP20 / CE



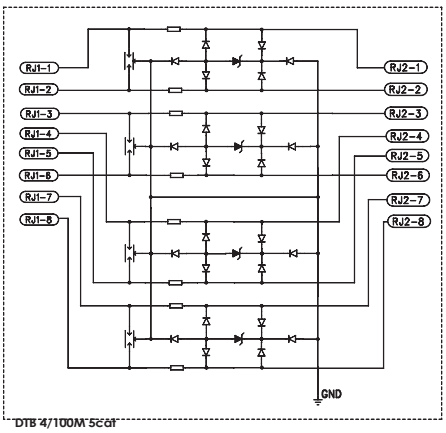


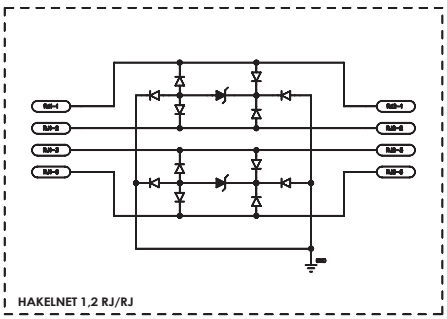
DTB */100M 5cat
HAKELNET 1,2 RJ/RJ

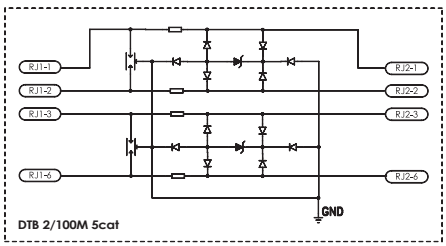
These surge protection devices intended for computer networks are specially designed for securing a faultless data transfer within computer networks category 5. They protect input electronic circuits of network cards against damage caused by surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ -1 and higher according to EN 62305. It is recommended to use these protection devices at the input of protected equipment.

Models:
DTB*/100M 5cat is suitable for mounting on a wall. DTB 2/100M 5cat protects two pairs and DTB 4/100M 5cat protects four pairs of conductors.
Hakelnet 1.2RJ/RJ protects one line with two protected pairs. It is supplyed in a plastic housing enabling bolt fastening on a wall. Alternatively, it can be attached to the protected appliance with a double-sided tape. Connectors RJ45 are at the input and output side of the device.

Type Number of protected pairs		**DTB 2/100M 5cat** 2	**DTB 4/100M 5cat** 4	**HAKELNET 1,2 RJ/RJ** 2
Connector type input/output		RJ45/RJ45	RJ45/RJ45	RJ45/RJ45
Nominal voltage	U_N	6 V		
Max. continuous operating voltage	U_C	7,2 V		
Rated load current	I_L	300 mA		
C2 Max. discharge current (8/20)	I_{max}	2 kA		-
C2 Nominal discharge current I_n (8/20)	I_n	1 kA		20 A
C3 Voltage protection level at 1kV/µs	U_P	< 10 V		< 25 V
Frequency handling line-line	f_g	100 MHz		
Max. attenuation		< 0,4 dB (at 100 MHz)		
Near-end crosstalk		> 40 dB (at 100 MHz)		
Return loss		< 14 dB (at 100 MHz)		
Series impedance per line		1,5 Ω	1,5 Ω	-
Characteristic impedance		100 Ω		
Response time	t_A	< 25 ns		
Parasitic capacitance	C	< 42 pF		< 47 pF
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1		
Article number		45 107	45 109	45 020



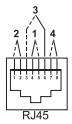




Connection of RJ45 pins
acc.to EIA/TIA 568, type B

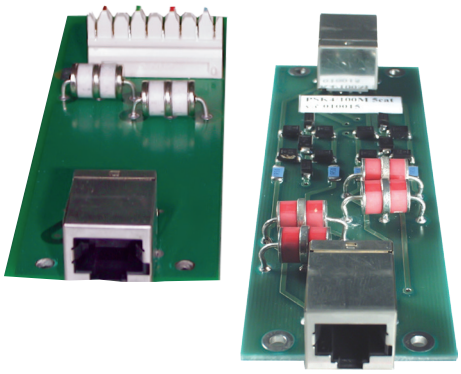
- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

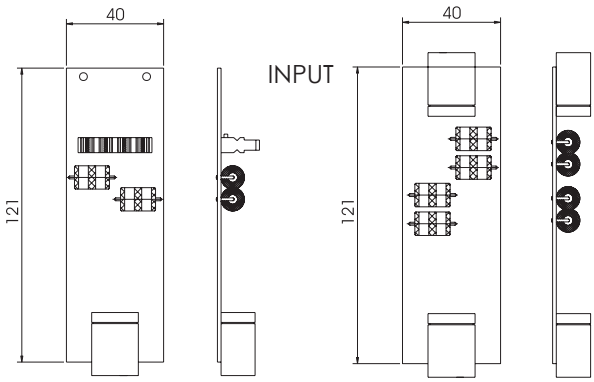
1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair



Surge protection devices for information technology systems

LPZ 1-2 / IP00 / CE



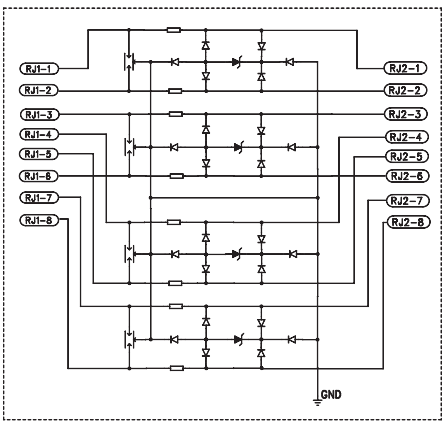


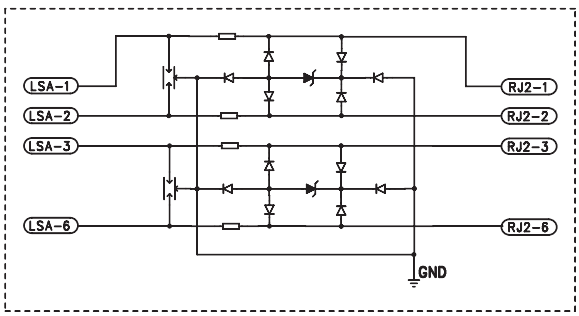
PSK */100M 5cat

These surge protection devices intended for computer networks are specially designed for securing a faultless data transfer within computer networks category 5. They protect input electronic circuits of network cards against damage caused by surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 and higher according to EN 62305. It is recommended to use these protection devices at the input of protected equipment.

Models:
PSK*/100M 5cat is a printed circuit board intended for mounting into PSK 10 which is appropriate for installation into 19" rackmounts.
PSK 2/100M 5cat designed for protection of two pairs has LSA-PLUS connector at the input side and RJ45 connector at the output side.
PSK 4/100M 5cat designed for protection of four pairs has RJ45 connector at the input and output sides.

Type Number of protected pairs		**PSK 2/100M 5cat** 2	**PSK 4/100M 5cat** 4
Connector type input/output		LSA-PLUS/RJ45	RJ45/RJ45
Nominal voltage	U_N	6 V	
Max. continuous operating voltage	U_C	7,2 V	
Rated load current	I_L	300 mA	
C2 Max. discharge current (8/20)	I_{max}	10 kA	2 kA
C2 Nominal discharge current I_n (8/20)	I_n	1 kA	
C2 Voltage protection level at I_n	U_P	10 V	
C3 Voltage protection level at 1kV/µs	U_P	< 10 V	
Response time	t_A	< 25 ns	
Parasitic capacitance	C	< 42 pF	
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	
Article number		45 011	45 012

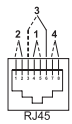




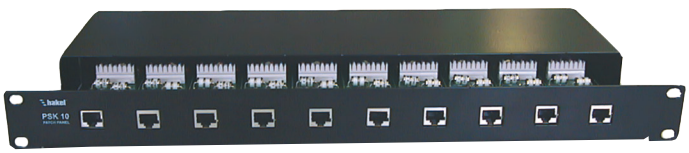
Connection of RJ45 pins
acc.to EIA/TIA 568, type B

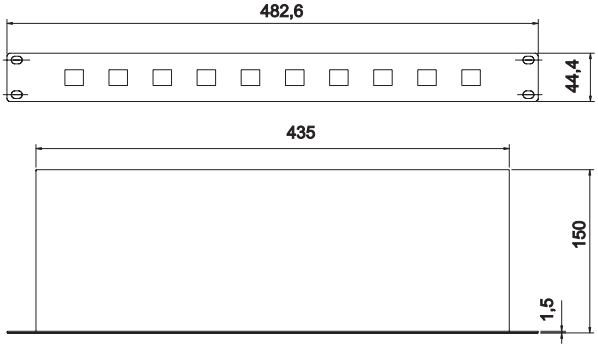
- 1 whiteorange
- 2 orange
- 3 whitegreen
- 4 blue
- 5 whiteblue
- 6 green
- 7 whitebrown
- 8 brown

1 - blue pair
2 - orange pair
3 - green pair
4 - brown pair



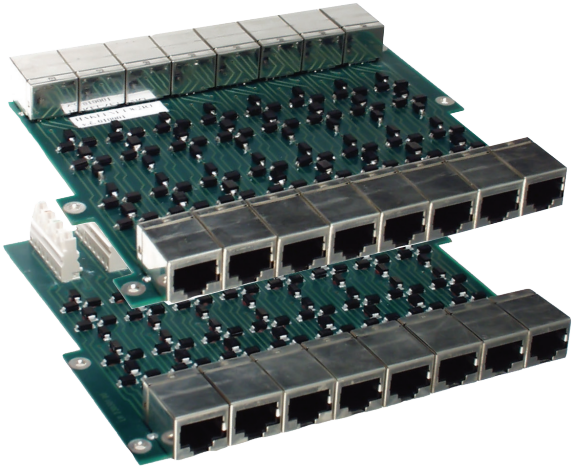
PSK 10 is a metal panel suitable for fitting in 19" rackmounts. It is possible to mount up to 3 pieces of HAKELNET 8.4 into this panel.

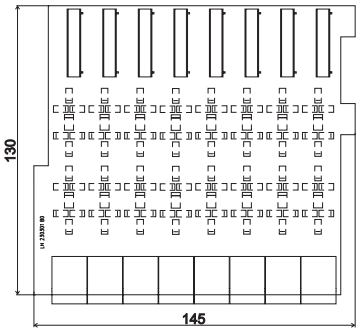




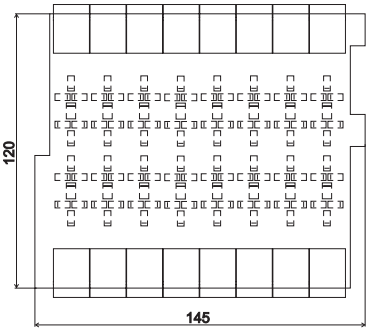
Surge protection devices for information technology systems

LPZ 3 / IP00 / CE





HAKELNET (LSA/RJ)



HAKELNET (RJ/RJ)

HAKELNET 8.4 RJ/RJ
HAKELNET 8.4 LSA/RJ

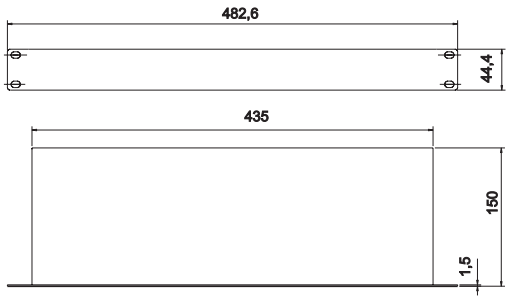
Hakelnet is a complex range of protection devices specially designed for faultless data transfers within computer networks category 5. They protect the input electronic circuits of network cards against a damage caused by surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ -1 and higher according to EN 62305. It is recommended to use these protection devices at the input of protected equipment.

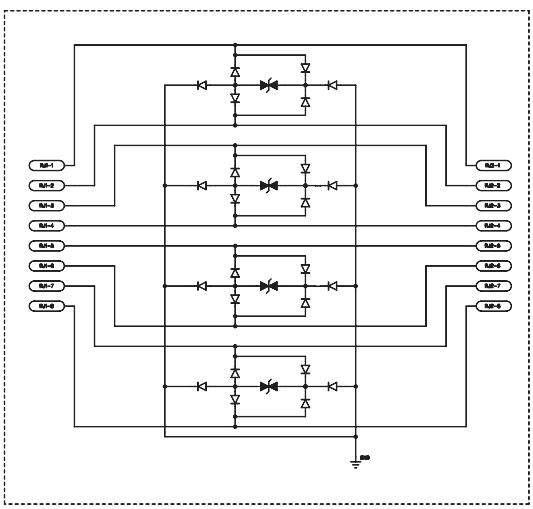
Models:
HAKELNET 8.4 RJ/RJ designed for protection of eight lines with four protected pairs has RJ45 connectors at the input and output sides of the device.
HAKELNET 8.4 LSA/RJ designed for protection of eight lines with four protected pairs has LSA-PLUS connectors at the input side and RJ45 connectors at the output side of the device.

For the option with RJ/RJ is intended a metal plate type 19" PSK 24. For the option with LSA/RJ is intended a metal plate type PSK24/LSA.

Type Number of protected pairs		**HAKELNET 8.4 RJ/RJ** 8	**HAKELNET 8.4 LSA/RJ** 8
No. of protected pairs per line		4	4
Connector type input/output		RJ45/RJ45	LSA-PLUS/RJ45
Nominal voltage	U_N	6 V	
Max. continuous operating voltage	U_C	7,2 V	
Rated load current	I_L	300 mA	
C2 Nominal discharge current I_n (8/20)	I_n	20 A	
C2 Voltage protection level at I_n	U_P	25 V	
C3 Voltage protection level at 1kV/μs	U_P	< 10 V	
Frequency handling line-line	f_g	100 MHz	
Max. attenuation		< 0,4 dB (at 100 MHz)	
Near-end crosstalk		> 40 dB (at 100 MHz)	
Return loss		< 14 dB (at 100 MHz)	
Characteristic impedance		100 Ω	
Response time	t_A	< 25 ns	
Parasitic capacitance	C	< 47 pF	
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1	
Article number		45 021	45 022

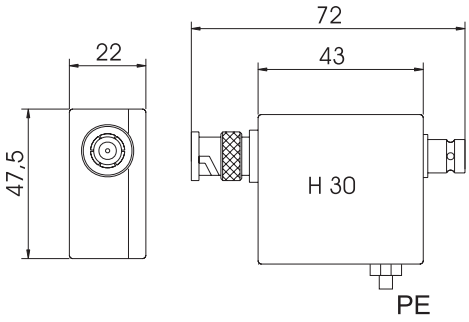
PSK 24 is a metal panel suitable for fitting in 19" rackmounts. It is possible to mount up to 3 pieces of HAKELNET 8.4 into this panel.





Surge protection devices for information technology systems

LPZ 1-2 / IP20 / CE

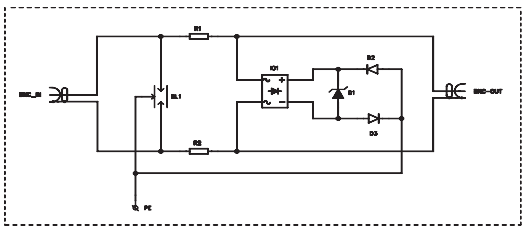


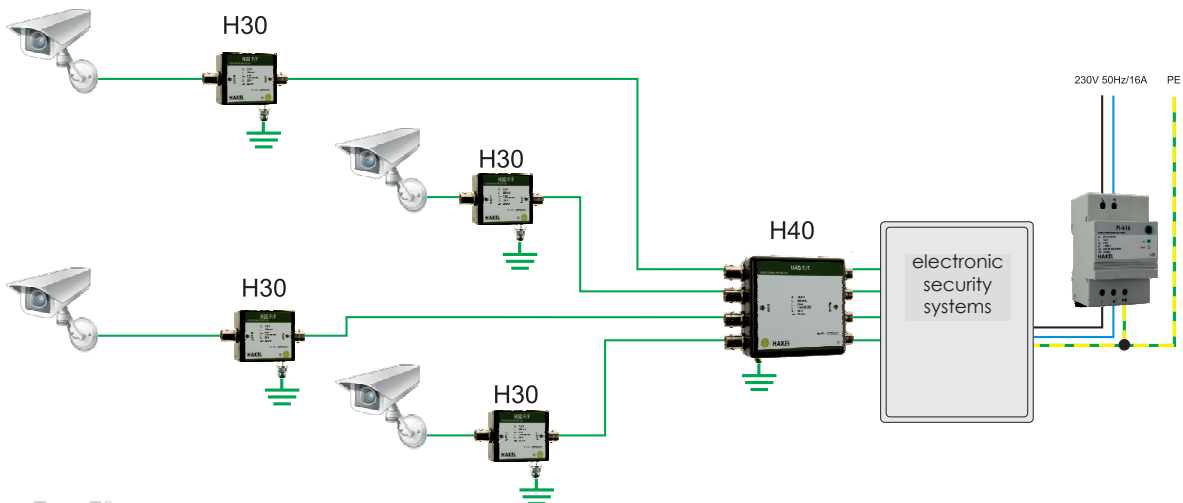
H30/*
H30-L/*

H30 and H30-L are designed for coaxial lines protection of 50Ω or 75Ω against induced surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305.

These devices are mainly used for protection of cameras and video signal concentrators. They are applicable to security and fire systems. H30-L version is equipped with more efficient nonlinear elements to reach higher discharge current up to 6,5kA (8/20).

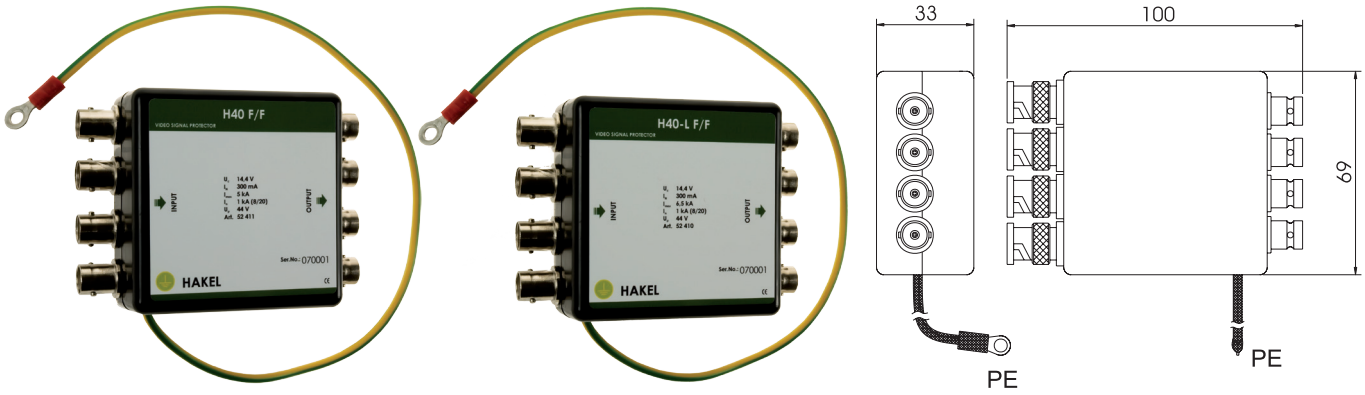
Type Number of protected pairs		**H30/6** 1	**H30/12** 1	**H30-L/6** 1	**H30-L/12** 1
Connector type		BNC (F/F, F/M)			
Nominal voltage	U_N	6 V	12 V	6 V	12 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V	7,2 V	14,4 V
Rated load current	I_L	300 mA			
C2 Max. discharge current (8/20)	I_{max}	5 kA		6,5 kA	
C2 Nominal discharge current I_n (8/20)	I_n	1 kA			
C2 Voltage protection level at I_n	U_P	22 V	44 V	22 V	44 V
C3 Voltage protection level at 1kV/μs	U_P	10 V	20 V	10 V	20 V
Response time	t_A	< 30 ns			
Parasitic capacitance	C	< 27 pF			
Series impedance per line	R	10 Ω			
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1			
Article number		52 310	52 312	52 300	52 313





Surge protection devices for information technology systems

LPZ 1-2 / IP20 / CE



H40/*
H40-L/*

H40 and H40-L are designed for coaxial lines protection of 50Ω or 75Ω against induced surge effects in the Lightning Protection Zones Concept at the boundaries of LPZ $0_{A(B)}$ - 1 according to EN 62305.

These devices are especially used for protection of cameras and video signal concentrators. They are applicable to security and fire systems. H40-L version is equipped with more efficient nonlinear elements to reach higher discharge current up to 6,5kA (8/20).

Type Number of protected pairs		**H40/6** 4	**H40/12** 4	**H40-L/6** 4	**H40-L/12** 4
Connector type		BNC (F/F, F/M)			
Nominal voltage	U_N	6 V	12 V	6 V	12 V
Max. continuous operating voltage	U_C	7,2 V	14,4 V	7,2 V	14,4 V
Rated load current	I_L	300 mA			
C2 Max. discharge current (8/20)	I_{max}	5 kA		6,5 kA	
C2 Nominal discharge current I_n (8/20)	I_n	1 kA			
C2 Voltage protection level at I_n	U_P	22 V	44 V	22 V	44 V
C3 Voltage protection level at 1kV/μs	U_P	10 V	20 V	10 V	20 V
Response time	t_A	< 30 ns			
Parasitic capacitance	C	< 47 pF			
Series impedance per line	R	10 Ω			
Category tested acc. to IEC 61643:21-2000		A2, B2, C2, C3, D1			
Article number		52 410	52 412	52 400	52 413