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## SURGE PROTECTION FOR EVERY APPLICATION

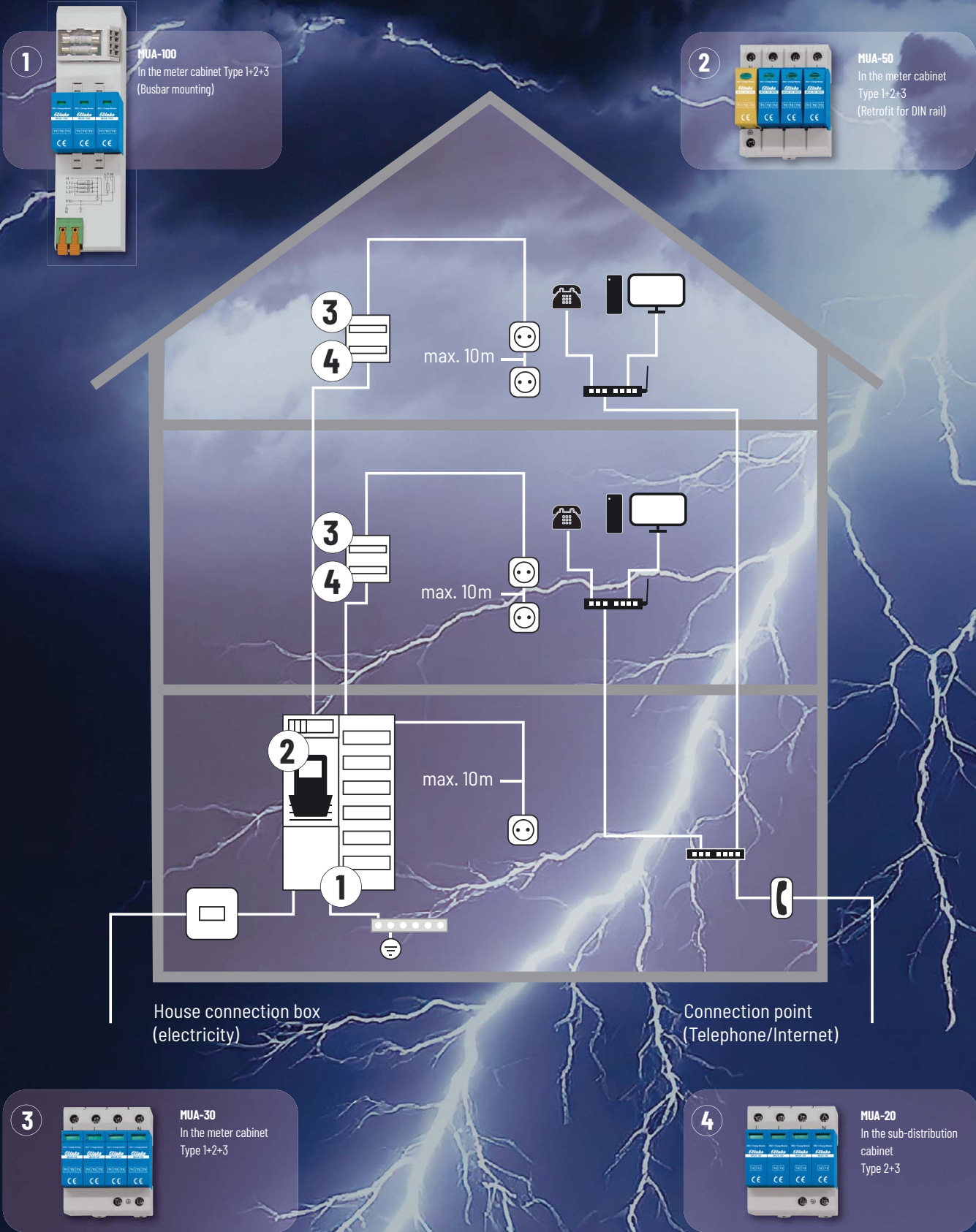
Whether residential buildings, commercial units, or industrial facilities: ELTAKO surge arrestors keep sensitive devices, high-performance consumers, and modern power generation systems safely protected – compliant with standards, flexible and powerful.

## CONTENT

# Overvoltages often occur in the network itself – we protect against them.

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# OVERVIEW OF DISTRIBUTIONS AND DEVICES





## MANDATORY SINCE 2016: SURGE PROTECTION IN RESIDENTIAL BUILDINGS

### **DIN VDE 0100-443**

(VDE 0100 part 443): 2016-10;

Low-voltage installations

Part 4-44: Protective measures - Protection against interference voltages and electromagnetic disturbances

Section 443: Protection against overvoltages due to atmospheric influences or switching operations

### **DIN VDE 0100-534**

(VDE 0100 part 534): 2016-10;

Low-voltage installations

Part 5-53: Selection and installation of electrical equipment - Switchgear and controlgear - Surge protective devices

The DIN VDE 0100 series of standards specifies the requirements for the planning and installation of safe electrical systems. VDE 0100-443 defines the need for protective measures against overvoltages that can occur due to atmospheric influences or switching operations. VDE 0100-534 describes the selection and installation of surge protective devices (SPDs) for protection against transient overvoltages in accordance with VDE 0100-443, VDE 0185-305, or other applicable regulations.

## PROTECTION CLASSES EXPLAINED

### Type 1 – Coarse Protection (Protection against direct lightning strikes)

#### Function:

- The Type 1 surge arrester protects electrical systems **from direct lightning strikes** that can enter a building via the power grid.
- It safely diverts **extremely high lightning currents** to the **grounding system** before they cause damage to the system.
- **ELTAKO Type 1+2 combined surge arrester products: MUA-30, MUA-50, MUA-100**

### Type 2 – Medium Protection (Protection against grid disturbances and distant lightning strikes)

#### Function:

- The Type 2 surge arrester protects electrical systems from transient (short-term) overvoltages caused by switching operations in the grid or indirect lightning strikes.
- It reduces dangerous voltage spikes that could damage sensitive electronic devices.
- Type 2 is used in sub-distribution boards to protect the entire building installation from surge damage.
- **Type 2 surge arrestors** are also referred to as **medium protection** because, in terms of their order, they are installed mid-way between a coarse protection device (Type 1) and a fine protection device (Type 3).  
If the building or its immediate annex is equipped with external lightning protection, a more efficient Type 1+2 surge arrester must be used instead of a Type 2.
- **ELTAKO products combination arrester**  
- Type 1+2: MUA-30, MUA-50, MUA-100  
- Type 2: MUA-20

### Type 3 – Fine Protection (Terminal Equipment Protection against Residual Surges)

#### Function:

- The Type 3 surge arrester protects sensitive terminal equipment from residual surges that have not been fully reduced by Type 1 or Type 2 protective devices.
- It ensures that even small voltage spikes that could damage computers, televisions, or control systems are eliminated.
- **Type 3** is always used **in addition to Type 1 or Type 2—never alone.**

#### Conclusion:

**Type 1:** Mandatory for buildings with lightning protection systems or in exposed locations

**Type 2:** Standard protection for all buildings (mandatory according to VDE 0100-443)

**Type 3:** Supplementary protection for terminal devices with particularly sensitive electronics

## INFORMATION

### 1. Why are surge protectors so important?

- **90% of all surges** are caused by **switching operations in the power system, not by lightning strikes.**
- **Lightning currents** can exceed **100,000 A** and cause damage within microseconds.
- Surge protection **prevents fires, data loss, and the failure of electronic devices.**
- Since 2016, surge protection according to **DIN VDE 0100-443 has been mandatory** for many buildings.

### 2. Common mistakes when installing surge arrestors

Incorrect placement:

- **SPD must be installed as close as possible** to the feeder (main distribution board).
- Maximum cable length between **SPD and mains connection: 0.5 m.** (DIN VDE 0100-534)

### 3. Incorrect cable cross-sections

Minimum cross-sections for connection:

- Type 1 coarse protection → **mind. 10 mm<sup>2</sup>**
- Type 2 medium protection → **mind. 6 mm<sup>2</sup>**

### 4. Incorrect coordination between SPDs:

- **Minimum distance of 10 m** between Type 1 and Type 2.

### 5. Missing protective earth (PE) connection:

- SPDs **without a correct PE connection cannot dissipate surges.**
- The grounding resistance should be **less than 10 ohms.**

## PRODUCT COMPARISON MUA SURGE ARRESTORS



Feature / Function	MUA-100	MUA-50	MUA-30	MUA-20
Type 1 - Lightning current	✓	✓	✓	-
Type 2 - Switching surge / remote lightning	✓	✓	✓	✓
Type 3 - Fine protection	✓	✓	✓	✓
Surge current resistance ( $I_{imp} \geq 12,5 \text{ kA}$ )	✓	✓	-	-
Max. discharge current ( $I_{max} \geq 50 \text{ kA}$ )	✓	✓	✓	-
Nominal discharge current ( $I_n \geq 20 \text{ kA}$ )	✓	✓	✓	✓
Protection level $\leq 1,5 \text{ kV}$	✓	✓	✓	✓
Response time $\leq 25 \text{ ns}$	✓	✓	✓	✓
Required for large consumers (Examples: PV systems, EV chargers, heat pumps)	✓	✓	✓	-
Location: Main distribution board	✓	✓	✓	-
Location: Sub-distribution board	-	✓	✓	✓
Can be used with external lightning protection	✓	✓	✓	-
Mounting: Busbar (5/10 mm)	✓	-	-	-
Mounting: DIN rail (TH35)	-	✓	✓	✓
Width (modules)	3 modules	4 modules	4 modules	4 modules
Replaceable SPD modules	✓	✓	✓	✓
Status indicator (visual)	✓	✓	✓	✓
TÜV certification available	✓	✓	-	-
Use in TN-S systems	✓	✓	✓	✓
Use in TN-C systems	✓	✓	-	-
Use in TT systems	✓	✓	✓	✓
Optional fuse module available	✓	-	-	-
WITH and WITHOUT external lightning protection	✓	✓	-	-

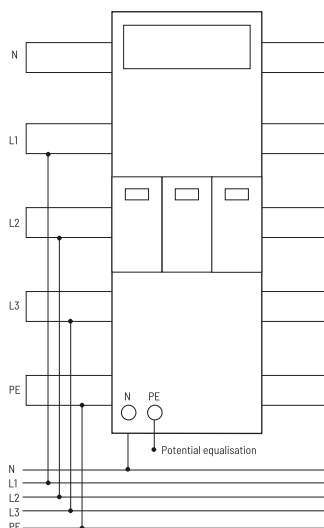
Type	MUA-100	MUA-50	MUA-30	MUA-20	SM/MUA-100
Art. No.	28380000	28380001	28380002	28380003	28380004
Price	215,00 €	150,00 €	133,33 €	108,33 €	25,00 €

## MODULAR SURGE ARRESTOR TYPE 1+2+3 BUSBAR MOUNTING MUA-100

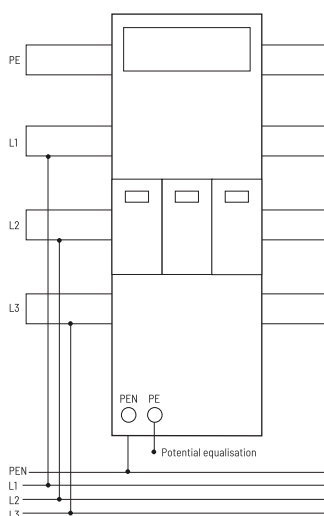


### Typical connection

5-wire networks (TN-S and TT)



4-wire networks (TN-C network)



Further connection information in the operating instructions.



Manuals and documents in further languages:  
<https://eltako.com/redirect/MUA-100>

# MUA-100

NEW

Mounted on 5 mm and 10 mm busbars.

**TÜV-certified according to IEC 61643-11, certificate number: AN 50567910 0001.**

**The modular combined surge arrester reliably protects electrical systems against transient overvoltages with and without external lightning protection.**

Offers high protection against direct lightning strikes in **TT, TN-C, and TN-S systems. 12.5 kA surge current withstand capacity per pole. Simple busbar mounting and modular design enable quick installation and maintenance.**

A fuse cover and a terminal lever are included in delivery.

Can optionally be equipped with the SM/MUA-100 fuse module, which enables a protected outgoing circuit from the MUA-100 to an APZ or RfZ panel.

**Combines protection classes Types 1, 2, and 3 in one device**, thus enabling comprehensive surge protection from the building entrance to the terminal device.

**According to DIN VDE 0100 443/534**, the use of a MUA-100 combined surge arrester **is mandatory for new buildings and extensions with high-power consumers** (e.g., wallboxes, heat pumps, PV systems).

If external lightning protection is present, a protection level is required:

Type 1 in the main distribution board (e.g., MUA-100, MUA-50)

Type 2 in the sub-distribution board (e.g., MUA-30, MUA-20)

A Type 2 surge arrester in the sub-distribution board is only required if the cable length to the main distribution board with Type 1+2+3 installed is more than 10 meters.

### TECHNICAL DATA

Nominal AC voltage (50/60 Hz)	$U_o / U_n$	240 V
Maximum continuous operating voltage (AC)	(L1-N) $U_c$ (N-PE) $U_c$	300 V 305 V
Nominal discharge current (8/20 $\mu$ s)	(L-N)(N-PE) $I_n$	20 kA/80 kA
Maximum discharge current (8/20 $\mu$ s)	(L-N)(N-PE) $I_{max}$	50 kA/100 kA
Impulse discharge current (10/350 $\mu$ s)	(L-N)(N-PE) $I_{imp}$	12.5 kA/50 kA
Specific energy	(L-N)(N-PE) W/R	39 kJ/ $\Omega$ / 225 kJ/ $\Omega$
Charge	(L-N)(N-PE) Q	3.75 As/15 As
Open circuit voltage of combination	$U_{oc}$	6 kV
Wave generation voltage protection level	(L-N)(N-PE) $U_p$	1500 V/1500 V
Follow current interrupt rating	(N-PE) $I_n$	100 ARMS
Response time	(L-N)(N-PE) $t_A$	<100 ns/<100 ns
Overcurrent protection (max.)		160 A gG
Short circuit current rating (AC)	$I_{scrr}$	25 kA
TOV withstand 120 min	$U_T$	442 V
TOV withstand 200 ms	$U_T$	1200 V
EN 61643-11 Performance characteristics	Typ 1+2+3	

Standards: IEC 61643-11; VDE 0100-534; VDE AR-N-4100

<b>MUA-100</b>	Modular surge arrester type 1+2+3 busbar mounting	<b>Art. No. 28380000</b>	<b>215,00 €/pc.</b>
<b>Optional: SM/MUA-100</b>	Fuse module for MUA-100	<b>Art. No. 28380004</b>	<b>25,00 €/pc.</b>
<b>Repl.: EM/MUA-100</b>	Replacement module for MUA-100	<b>Art. No. 28380005</b>	<b>35,00 €/pc.</b>

### Selection Guide

Application scenario	Recommended arrester
Sub-distribution without external lightning protection, cable <10 m	MUA-20
Sub-distribution with sensitive electronics, cable >10 m	MUA-30 or MUA-50
Main distribution without external lightning protection	MUA-30
Main distribution with and without external lightning protection	MUA-50
Busbar system with and without external lightning protection	MUA-100



# MUA-50

NEW

Modular device for DIN-EN 60715 TH35 rail mounting.  
**TÜV certified according to IEC 61643-11, certificate number: AN 50567910 0001.**  
 4 modules = 72 mm wide.

**The modular combined surge arrester reliably protects electrical systems against transient over voltages with and without external lightning protection.**

Offers high protection against direct lightning strikes in **TT, TN-C, and TN-S systems. 12.5 kA surge current withstand capacity per pole. Simple DIN rail mounting and modular design enable quick installation and maintenance.**

**Combines protection classes Type 1, 2, and 3 in one device**, thus enabling comprehensive surge protection from the building entrance to the terminal device.

The use of an MUA-50 combined surge arrester **is mandatory according to DIN VDE 0100 443/534 for new buildings and for expansions with high-power consumers (e.g., wall boxes, heat pumps, PV systems).**

If external lightning protection is present, a protection level is required:

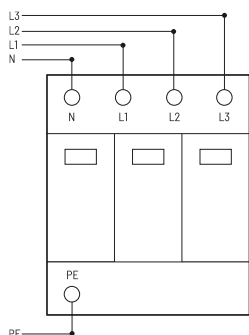
Type 1 in the main distribution board (e.g., MUA-100, MUA-50)

Type 2 in the sub-distribution board (e.g., MUA-30, MUA-20)

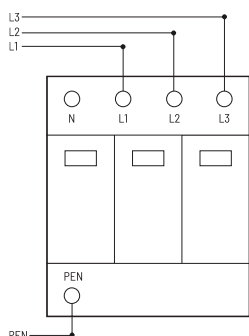
A Type 2 arrester in the sub-distribution board is only required if the cable length to the main distribution board with Type 1+2+3 installed is more than 10 meters.

### Typical connection

5-wire networks (TN-S and TT)



4-wire networks (TN-C network)



Manuals and documents in further languages:  
<https://eltako.com/redirect/MUA-50>

TECHNICAL DATA		
Nominal AC voltage (50/60 Hz)	$U_o / U_n$	240 V
Maximum continuous operating voltage (AC)	(L1-N) $U_c$ (N-PE) $U_c$	300 V 305 V
Nominal discharge current (8/20 $\mu$ s)	(L-N)(N-PE) $I_n$	20 kA/80 kA
Maximum discharge current (8/20 $\mu$ s)	(L-N)(N-PE) $I_{max}$	50 kA/100 kA
Impulse discharge current (10/350 $\mu$ s)	(L-N)(N-PE) $I_{imp}$	12,5 kA/50 kA
Specific energy	(L-N)(N-PE) W/R	39 kJ/ $\Omega$ / 225 kJ/ $\Omega$
Charge	(L-N)(N-PE) Q	3.75 As/15 As
Open circuit voltage of combination	$U_{oc}$	6 kV
Wave generation voltage protection level	(L-N)(N-PE) $U_p$	1500 V/1500 V
Follow current interrupt rating	(N-PE) $I_n$	100 ARMS
Response time	(L-N)(N-PE) $t_A$	< 100 ns / < 100 ns
Overcurrent protection (max.)		160 A gG
Short circuit current rating (AC)	$I_{scrr}$	25 kA
TOV withstand 120 min	$U_T$	442 V
TOV withstand 200 ms	$U_T$	1200 V
EN 61643-11 Performance characteristics	Type 1+2+3	

Standards: IEC 61643-11; VDE 0100-534, VDE AR-N-4100

<b>MUA-50</b>	Modular surge arrester type 1+2+3 DIN rail mounting	<b>Art. No. 28380001</b>	<b>150,00 €/pc.</b>
<b>Repl.: EM/MUA-50MOD</b>	Replacement module MOD for MUA-50	<b>Art. No. 28380007</b>	<b>25,00 €/pc.</b>
<b>Repl.: EM/MUA-50GTD</b>	Replacement module GTD for MUA-50	<b>Art. No. 28380006</b>	<b>30,00 €/pc.</b>

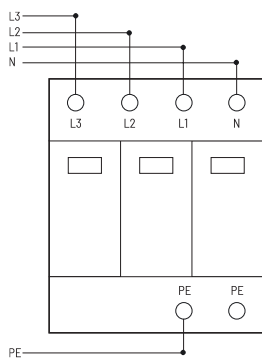
### Selection Guide

Application scenario	Recommended arrester
Sub-distribution without external lightning protection, cable < 10 m	MUA-20
Sub-distribution with sensitive electronics, cable > 10 m	MUA-30 or MUA-50
Main distribution without external lightning protection	MUA-30
Main distribution with and without external lightning protection	MUA-50
Busbar system with and without external lightning protection	MUA-100

## MODULAR SURGE ARRESTOR TYPE 1+2+3 DIN RAIL MOUNTING MUA-30



### Typical connection



Manuals and documents in further languages:  
<https://eltako.com/redirect/MUA-30>

# MUA-30

NEW

Modular device for DIN-EN 60715 TH35 rail mounting.

4 modules = 72 mm wide.

**The modular combined arrester reliably protects electrical systems against transient overvoltages.**

Combines lightning current and overvoltage protection in one device. Ideal for TN/TT networks with increased protection requirements. Design, simple DIN rail mounting, and modular construction enable quick installation and maintenance.

**Combines protection classes Type 1+2+3 in one device**, providing reliable protection against the effects of direct lightning strikes as well as transient overvoltages throughout the building.

**According to DIN VDE 0100-443/534**, the use of an MUA-30 is mandatory if, for example, the cable length between the main and sub-distribution exceeds 10 meters.

If external lightning protection is present, a protection staging is required:

Type 1 in the main distribution (e.g., MUA-100, MUA-50)

Type 2 in the sub-distribution (e.g., MUA-30, MUA-20)

A Type 2 arrester in the sub-distribution is only required if the cable length to the main distribution with installed Type 1+2+3 exceeds 10 meters.

TECHNICAL DATA	
Earthing system	TN/TT
Nominal voltage $U_n$	230/400 V
Maximum operating voltage $U_c$	275 V
Nominal discharge current $I_n$	30 kA
Nominal discharge current $I_{max}$	60 kA
Impulse discharge current $I_{imp}$	7.5 kA/pol
Protection level at $I_n$ $U_p$	≤ 1.5 kV
Response time $T_A$	≤ 25 ns
Overcurrent protection (max.)	160 A gL/gG
Short circuit strength at max. overcurrent $I_p$	25 kA
Insulation resistance $R_{isol}$	> 10 <sup>3</sup> MΩ
Degree of protection	IP20
EN 61643-11 Performance characteristics	Type 1+2+3
IEC 61643-1	Class 1+2+3
VDE 06756	B+C
according to DIN 43880	4 modules
Terminals	35 mm <sup>2</sup>

MUA-30	Modular surge arrester Type 1+2+3 DIN rail mounting	Art. No. 28380002	133,33 €/pc.
Repl.: EM/MUA-30	Replacement module for MUA-30	Art. No. 28380008	20,00 €/pc.

### Selection Guide

Application scenario	Recommended arrester
Sub-distribution without external lightning protection, cable < 10 m	MUA-20
Sub-distribution with sensitive electronics, cable > 10 m	MUA-30 or MUA-50
Main distribution without external lightning protection	MUA-30
Main distribution with and without external lightning protection	MUA-50
Busbar system with and without external lightning protection	MUA-100



# MUA-20

NEW

Modular device for DIN-EN 60715 TH35 rail mounting.  
4 modules = 72 mm wide.

**The modular surge arrester reliably protects electrical systems against transient overvoltages.**

Protects **TN and TT systems** from switching overvoltages and indirect lightning effects. Compact design, simple DIN rail mounting, and modular construction enable quick installation and maintenance. Provides **Type 2+3 protection** and reliably safeguards against transient overvoltages caused by switching operations or distant lightning strikes.

**According to DIN VDE 0100-443/534, the use of an MUA-20 is mandatory if, for example, the cable length between the main and sub-distribution exceeds 10 meters.**

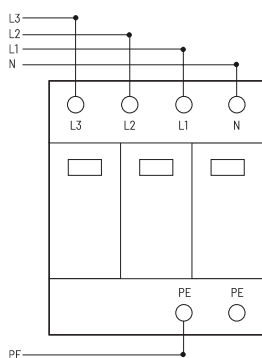
If external lightning protection is present, a protection grading is required:

Type 1 in the main distribution (e.g., MUA-100, MUA-50)

Type 2 in the sub-distribution (e.g., MUA-30, MUA-20)

A Type 2 arrester in the sub-distribution is only necessary if the cable length to the main distribution with installed Type 1+2+3 exceeds 10 meters.

### Typical connection



Manuals and documents in further languages:  
<https://eltako.com/redirect/MUA-20>

TECHNICAL DATA	
Earthing system	TN/TT
Nominal voltage $U_n$	230/400 V
Maximum operating voltage $U_c$	275 V
Nominal discharge current $I_n$	20 kA
Maximum discharge current $I_{max}$	40 kA
Protection level at $I_n$ $U_p$	$\leq 1.2$ kV
Response time $T_A$	$\leq 25$ ns
Overcurrent protection (max.)	125 A gL/gG
Short circuit strength at max. overcurrent $I_p$	25 kA
Insulation resistance $R_{isol}$	$> 10^3$ M $\Omega$
Degree of protection	IP20
EN 61643-11 Performance characteristics	Type 2+3
IEC 61643-1	Class 2+3
VDE 06756	C
according to DIN 43880	4 modules
Terminals	35 mm <sup>2</sup>

<b>MUA-20</b>	Modular surge arrester Type 2+3 DIN rail mounting	<b>Art. No. 28380003</b>	<b>108,33 €/pc.</b>
<b>Repl.: EM/MUA-20</b>	Replacement module for MUA-20	<b>Art. No. 28380009</b>	<b>15,00 €/pc.</b>

### Selection Guide

Application scenario	Recommended arrester
Sub-distribution without external lightning protection, cable < 10 m	MUA-20
Sub-distribution with sensitive electronics, cable > 10 m	MUA-30 or MUA-50
Main distribution without external lightning protection	MUA-30
Main distribution with and without external lightning protection	MUA-50
Busbar system with and without external lightning protection	MUA-100



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