

Load monitoring with integrated potential distribution

maxGUARD

Manual

Let's connect.



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1 About this documentation

1.1 Symbols and notes

The safety notices in this documentation are designed according to the severity of the danger.

	DANGER
	Imminent danger to life! Notes with the signal word "Danger" warn you of situations that will result in serious injury or death if you do not follow the instructions given in this manual.

	WARNING
	Possible danger to life! Notes with the signal word "Warning" warn you of situations that may result in serious injury or death if you do not follow the instructions given in this manual.





	CAUTION
	Risk of injury! Notes with the signal word "Caution" warn you of situations that may result in injury if you do not follow the instructions given in this manual.

	ATTENTION
	Material damage! Notes with the signal word "Attention" warn you of hazards that may result in material damage.



Text next to this arrow are notes that are not relevant to safety, but provide important information about proper and effective work procedures.

The situation-dependent safety notices may contain the following warning symbols:

Symbol	Bedeutung
	Warning against hazardous electrical voltage
	Warning against explosive atmospheres
	Warning against electrostatically charged components
	Instruction: Observe the documentation

- All instructions can be identified by the black triangles next to the text.
- Lists are marked with a tick.

1.2 Complete documentation



Observe the documentation delivered with the maxGUARD products.



All documents are available to download from the [Weidmüller website](#).

2 Safety

This section includes general safety notes on handling products belonging to the maxGUARD family. Specific warnings for specific tasks and situations are given at the appropriate places in the documentation. Failure to observe the safety notes and warnings may lead to personal injury and damage to property.



All work may only be carried out by trained electricians who are familiar with the safety standards that apply to electrical engineering.

2.1 General safety notes

Work on the maxGUARD products may only be performed by qualified electricians with the support of trained persons. As a result of their professional training and experience, an electrician is qualified to perform the necessary work and identify any potential risks.

Before any work is carried out on the products (installation, maintenance, retrofitting) the power supply must be switched off and secured against being switched on again.

maxGUARD products do not contain any modules or components that can be serviced by the user. If faults connected to a maxGUARD product cannot be rectified using the recommended measures (see chapter 11), the product in question must be sent to Weidmüller. Weidmüller assumes no liability if the product is tampered with!

Electrostatic discharge

maxGUARD products can be damaged or destroyed by electrostatic discharge. When handling the products, the necessary safety measures against electrostatic discharge (ESD) according to IEC 61340-5-1 and IEC 61340-5-2 must be observed. The packing and unpacking as well as the assembly and disassembly of a device may only be carried out by qualified personnel.

Open equipment

maxGUARD products are open equipment that may only be installed and operated in lockable housings, cabinets or electrical operations rooms. Only trained and authorised personnel may access the equipment.

The standards and guidelines applicable for the assembly of control cabinets and the arrangement of data and supply lines must be complied with.

Fusing

The operator must set up the equipment so that it is protected against overloading. The upstream fuse must be designed such that it does not exceed the maximum load current. The maximum permissible load current of the maxGUARD products can be found in the technical data. The operator must decide whether additional surge protection is required according to IEC 62305. Voltages that exceed ± 30 V may cause the destruction of the modules.

Earthing

Products belonging to the maxGUARD family may be used for earthed and non-earthed control voltage distributors. Products belonging to the maxGUARD family do not have a designated earth connection. Further information can be found in section 4.5.

2.2 Intended use

maxGUARD is an electronic load monitoring system with integrated potential distribution. It is used for the selective overload and short-circuit monitoring of 24 V DC control circuits in the field of programmable controllers or similar control systems. Electronic load monitoring devices are used for line protection. In case of a fault, the affected circuit is switched off. The wire cross-section has to be dimensioned according to the internal fuse (see section 3.5).

The system must be operated with 24 V DC safety extra-low voltage (SELV, 18–30 V DC) or protective extra-low voltage (PELV).

An AMG ELM electronic load monitoring device can only be operated in conjunction with a power-feed unit (AMG FIM-0..., AMG FIM-C...). The potential distributors of the maxGUARD family can be used for contact replication of the load monitor output. Only Weidmüller ZQV 4N cross-connectors may be used for connections within a station.

All products belonging to the maxGUARD family are intended for use in equipment or machinery installed in enclosed areas.

Installation in a suitable enclosure provides adequate protection against contact with live parts and also against the ingress of dust and water (e.g. control cabinet, panel, console or similar). Mounting is only permissible on a profile rail made of steel or galvanised steel in accordance with EN 60715 (TH 35-7.5, e.g. Weidmüller TS 35X7.5).

The products described in this manual may only be used for the intended applications. If used for any other purpose, the protective measures of the product may be rendered ineffective.

Any intervention in the products' hardware or software other than described in this manual may only be performed by Weidmüller.

Observance of the documentation is also part of the intended use.

2.3 Use in explosive risk zones

A list of all maxGUARD products that may be used in explosive atmospheres, zone 2, can be found in section 3.9. If maxGUARD products are used in explosive risk zones, the following **additional** notes apply:

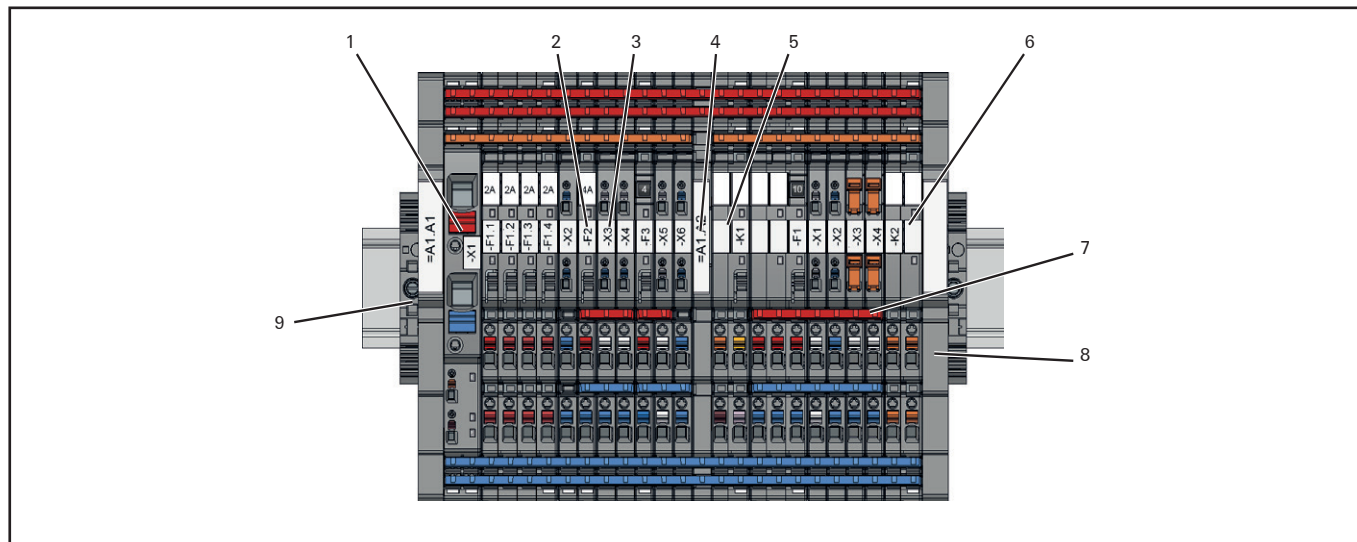
- Staff involved in assembly, installation and operation must be qualified to perform safe work on electrical systems protected against potentially explosive atmospheres.
- The provisions of IEC 60079-14 must be observed.
- The products must be installed in a tool-secured enclosure with a degree of protection of at least IP54 according to IEC 60079-7.
- The housing enclosing the products must meet the requirements of explosion protection type Ex na, Ex eb or Ex ec.
- Prior to starting installation, ensure that no potentially explosive atmosphere exists.
- If cut cross-connectors are used, AMG PP separation plates must be inserted wherever there are bare cut edges next to one another.
- If the temperature of a conductor or conductor entry exceeds 70 °C during rated operation, or 80 °C at the contact point, a conductor must be used that complies with the temperature specifications as per the actually measured temperature values.
- The products may only be operated in an environment with pollution severity level 2 or lower in accordance with IEC 60664-1.
- A stabilised power supply (24 V DC) with double or reinforced isolation must be used (SELV/PELV).
- A visual inspection of the maxGUARD station is to be performed once per year.
- If a potentially explosive atmosphere exists, the following applies:
 - Live electrical connections may not be disconnected.
 - DIP switches, binary switches and potentiometers may not be operated.

2.4 Legal notice

The products belonging to the maxGUARD family are CE-compliant according to EU Directive 2014/30/EU (EMC Directive).

Selected products belonging to the maxGUARD family meet the requirements of the ATEX Directive 2014/34/EU.

3 System overview



Example arrangement of a maxGUARD station

- 1 (Active) feed-in module
- 2 Electronic load monitor
- 3 Potential distribution terminal
- 4 Separation plate
- 5 Control module
- 6 Alarm module
- 7 Cross-connector
- 8 End plate
- 9 End bracket

maxGUARD is a modular system for building customised 24 V control voltage distributors. It consists of electronic load monitors, potential distribution terminals, and feed-in, control and alarm modules.

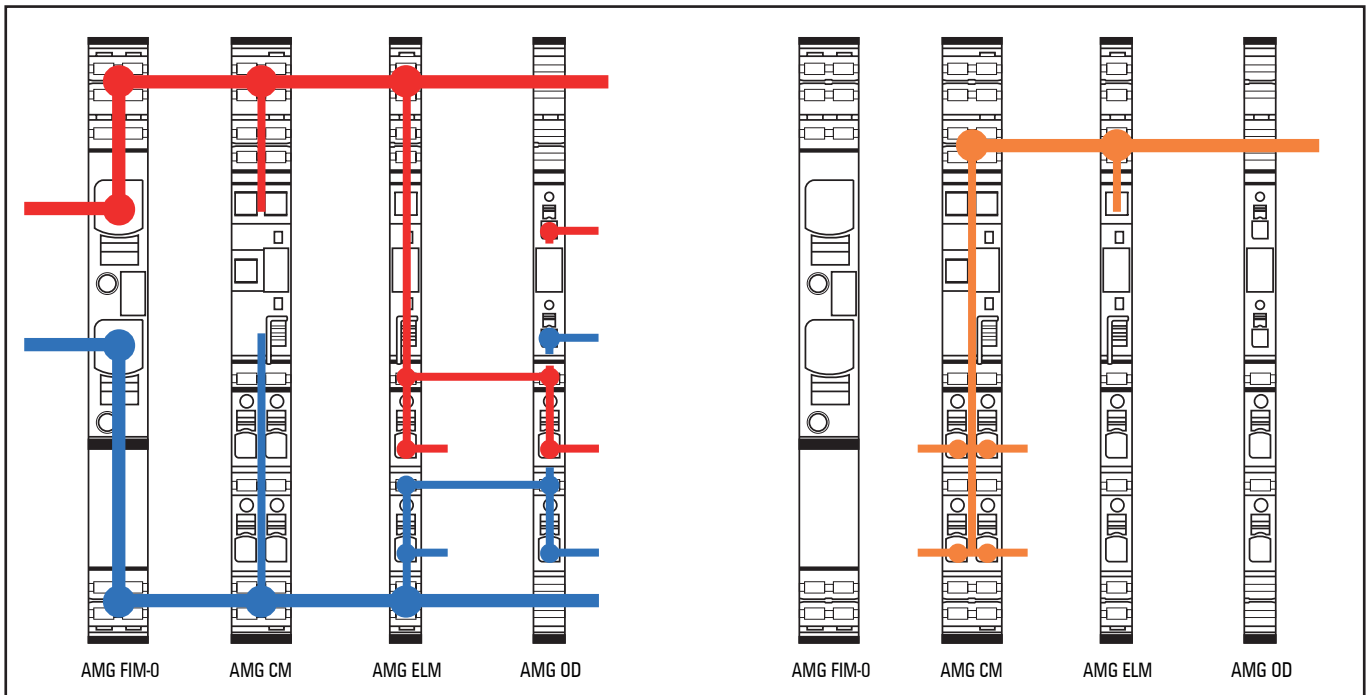
The electronic load monitors selectively protect individual load circuits against overload and short circuit. They are available as fixed-value variants or with an adjustable tripping characteristic, as well as with a 2-pole output relay. Active feed-in modules, control modules and alarm modules are used to control and monitor the electronic load monitors. Multiple control modules can be used to segment the control voltage distributor into separate load groups. Alarm modules can be used to transmit signals potential-free to external control boards.

All connections between the modules of a maxGUARD station are established using cross-connectors. All connection terminals are PUSH IN connections, are colour-coded and have an additional 2 mm test socket.

A large number of the modules are available in two performance classes:

- standard version with uncoated PCBs
- enhanced version with coated PCBs and enhanced certification for maritime applications and applications in explosive risk zones.

3.1 Mode of operation and connection concept



Left: Main strands and load outputs (red: +24 V, blue: 0 V)

Right: Communication via the internal signal line (orange)

A maxGUARD station has three main internal connection channels:

- +24V main strand for +24 V potential
- GND main strand for 0 V potential
- Internal signal line for communication

The two main strands are connected to the power supply via a feed-in module and distribute the respective potentials for the entire maxGUARD station.

The electronic load monitors form parallel junctions originating from the main strands.

Potential distribution terminals may be used to replicate the outputs of the load monitors as required.

The internal signal line enables communication within the maxGUARD station. Active feed-in modules, control modules and alarm modules connect the internal signal line to an external control board.

All connections between the modules of a maxGUARD station are established using cross-connectors.

The main connection channels are designed as double channels. For high currents, the main strands must each be equipped with two cross-connectors (see section 4.4). If necessary, the maxGUARD station can be extended by interleaving the placement of the cross-connectors.

If a module cannot be connected to a specific main connection channel, the corresponding cross-connection contacts will not be available. Installed cross-connectors will subsequently not be connected to the module and the individual contact elements of the cross-connectors do not have to be removed. White markings on the plastic tabs of the modules indicate the active cross-connection sockets.

Internal signal line

The individual modules communicate via a shared signal line. The signals are processed according to priority (1= high, 5= low).

Signal	Priority	Encoder
Reset	1	AMG FIM-C, AMG CM
ON/OFF	2	AMG CM
Alarm	3	AMG ELM
Overload advance warning (>90%)	4	AMG ELM
IDLE	5	AMG FIM-C, AMG CM

3.2 Functions

Overload advance warning

The adjustable load monitors are equipped with an overload advance warning function.

If the output current of an adjustable load monitor exceeds 90% of the designated tripping current, this load monitor couples an overload advance warning into the internal signal line. The load monitor LED will flash green.

The overload advance warning can be transmitted to a control board via control modules or potential-free via alarm modules.

Low voltage detection

Active feed-in modules, control and alarm modules as well as all load monitors are equipped with low voltage detection. If the input voltage of a load monitor falls below 18 V, the module LED will quickly flash red.

If the input voltage of a load monitor falls below 18 V, the load monitor will also disconnect the output.

If the input voltage falls below 15 V, the module will power down completely. The module LED will be off.

After power is restored, the module will automatically switch to its last operational state prior to the undervoltage.

Surge detection

Active feed-in modules, control and alarm modules as well as all load monitors are equipped with surge detection.

If the input voltage of these modules exceeds 31.2 V, the module LED will quickly flash red.

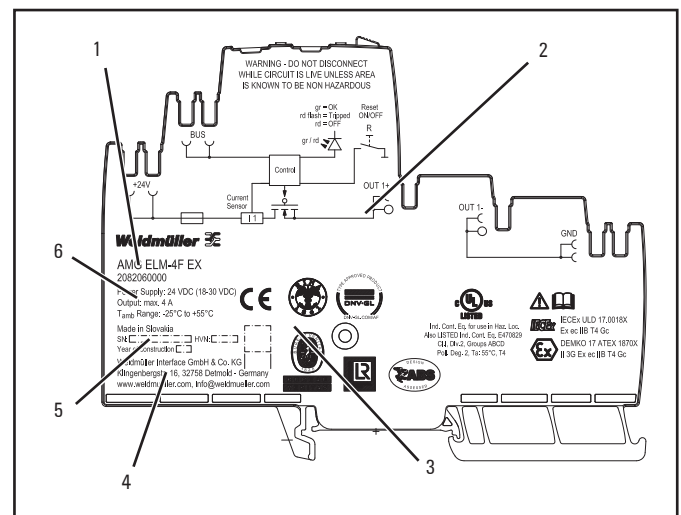
Overtemperature detection

The adjustable load monitors and the 4-channel load monitors are equipped with overtemperature detection.

If an overtemperature is detected on a channel, the load monitor will disconnect the output and couple an alarm signal into the internal signal line. The load monitor LED will illuminate orange (red and green simultaneously).

3.3 Type plate

Each module features a type plate, which includes identification information, the key technical specifications and a block diagram.



Type plate (example)

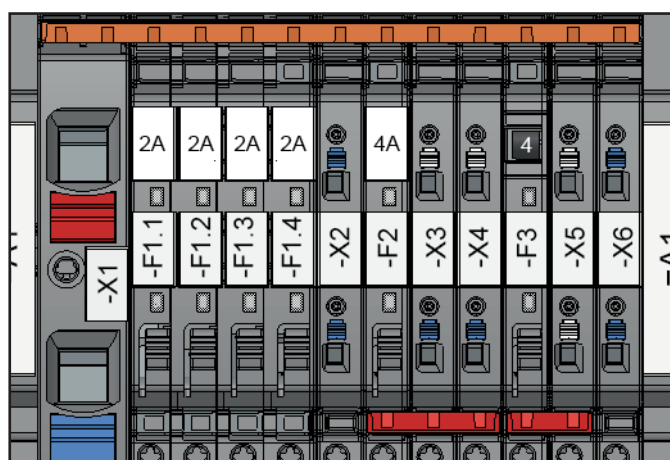
- 1 Product identification
- 2 Block diagram
- 3 Certification
- 4 Manufacturer
- 5 Serial number
- 6 Technical data

3.4 Markers

A wide range of markers are available as accessories for labelling equipment.

Module markers

The individual modules can be fitted with WS-series terminal markers (pitch dimension of 6 mm).



Modules with WS 10/6 terminal markers

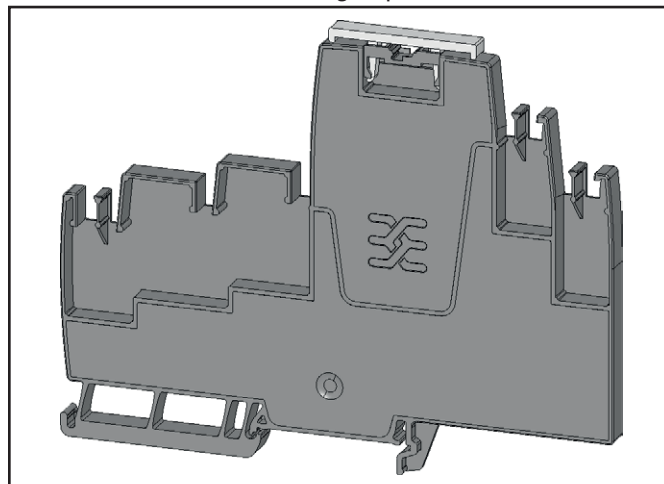
The following markers are available for the labelling:

- Markers for printing with Weidmüller PrintJet ADVANCED (Order No. 1324380000)
 - Order No. 1818400000, WS 10/6, white, PA 66
- Markers for printing with Weidmüller THM MMP (Order No. 2430820000)
 - Order No. 2007160000, WS 8/6 MM, white, PC-ABS/TPU

WAD group marker

The AMG PP separation plate can be fitted with the WAD 5 group marker.

The WEW 35/2 end bracket and the AMG EP end bracket can be fitted with the WAD 8 group marker.



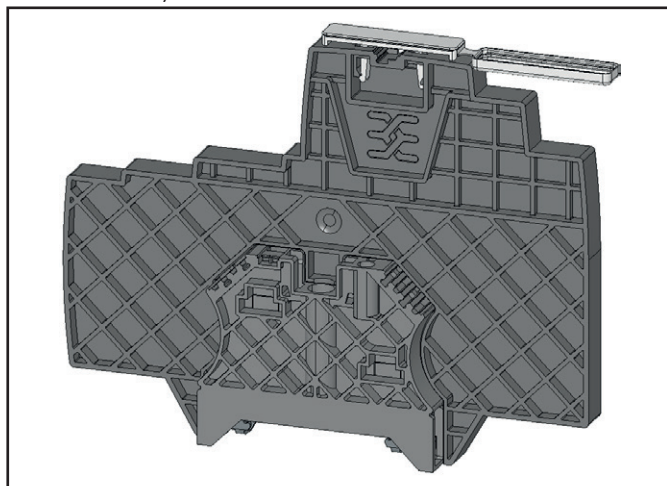
Separation plate with WAD 5 group marker

The following markers are available for the labelling:

- Markers for printing with Weidmüller PrintJet ADVANCED (Order No. 1324380000)
 - Order No. 1112910000, WAD 5, white, PA 66
 - Order No. 1112920000, WAD 5, yellow, PA 66
 - Order No. 1112940000, WAD 8, white, PA 66
 - Order No. 1112950000, WAD 8, yellow, PA 66

EM 8/30 end bracket marker

The WEW 35/2 end bracket and AMG EP end bracket can be fitted with the EM 8/30 end bracket marker (Order No. 1806120000).



End bracket with EM 8/30 end bracket marker

The following markers are available for the labelling:

- Markers for printing with Weidmüller PrintJet ADVANCED (Order No. 1324380000)
 - Order No. 1045570000, ELS 6/30, white, PA 66
 - Order No. 1045580000, ELS 6/30, yellow, PA 66
- Markers for printing with Weidmüller THM MMP (Order No. 2430820000)
 - Order No. 2009980000, ELS 6/30 MM, white, polyester
 - Order No. 2010620000, ELS 6/30 MM, yellow, polyester
- Labels for printing with office laser printers
 - Order No. 1607720000, ESO 7 white, paper
 - Order No. 1634780000, ESO 7 yellow, paper
 - Order No. 1670390000, ESO 7 P white, polyester
 - Order No. 1670400000, ESO 7 P yellow, polyester

3.5 Internal fuse

All load monitors are equipped with an internal fuse on the PCB. If the electronic switch-off fails, the fuse will protect the electronics and the external conductors against overload. If the electronics are intact, the electronic switch-off will always be tripped first.



The wire cross-sections must be measured according to the internal fuse value, not the tripping current of the electronic load monitor.

The wire cross-sections are to be measured according to DIN VDE 0298-4. National regulations must be observed.

Load monitor	Internal fuse
AMG ELM 6...	2x 6.3 A
AMG ELM 12...	2x 10 A
AMG ELM-6D CO	2x 6.3 A
AMG ELM-10D CO	2x 8 A
AMG ELM-1F...	2x 6.3 A
AMG ELM-2F...	2x 6.3 A
AMG ELM-4F...	2x 6.3 A
AMG ELM-6F...	2x 6.3 A
AMG ELM-8F...	2x 8 A
AMG ELM-10F...	2x 8 A
AMG ELM-1F CL2	1x 6,3 A
AMG ELM-2F CL2	1x 6,3 A
AMG ELM-4F CL2	1x 6,3 A
AMG ELM Q2222	4x (2x 6.3 A)
AMG ELM Q4444	4x (2x 6.3 A)
AMG ELM Q6666	4x (2x 6.3 A)
AMG ELM Q2244	4x (2x 6.3 A)
AMG ELM Q2266	4x (2x 6.3 A)

3.6 Product overview

maxGUARD components – standard version

The following maxGUARD products have uncoated PCBs and standard certification (see section 3.9).

Product designation	Function	Order No.
Feed-in modules, control module, alarm module		
AMG FIM-0	Feed-in module, passive	2081870000
AMG FIM-C	Feed-in module, active (reset, alarm)	2081880000
AMG CM	Control module (reset, alarm, overload advance warning, ON/OFF)	2081900000
AMG AM	Alarm module (alarm, overload advance warning), potential-free output contacts	2081890000
Electronic load monitors		
AMG ELM-6	1-channel, adjustable: 1–6 A	2080360000
AMG ELM-12	1-channel, adjustable: 4–12 A	2080410000
AMG ELM-1F	1-channel, fixed-value: 1 A	2080420000
AMG ELM-2F	1-channel, fixed-value: 2 A	2080480000
AMG ELM-4F	1-channel, fixed-value: 4 A	2080490000
AMG ELM-6F	1-channel, fixed-value: 6 A	2080500000
AMG ELM-8F	1-channel, fixed-value: 8 A	2080600000
AMG ELM-10F	1-channel, fixed-value: 10 A	2080650000
AMG ELM-1F CL2	1-channel, fixed-value: 1 A, Class 2 (UL 1310)	2491270000
AMG ELM-2F CL2	1-channel, fixed-value: 2 A, Class 2 (UL 1310)	2491280000
AMG ELM-4F CL2	1-channel, fixed-value: 4 A, Class 2 (UL 1310)	2491290000
AMG ELM-Q2222	4-channel, fixed-value: 2-2-2-2 A	2080750000
AMG ELM-Q4444	4-channel, fixed-value: 4-4-4-4 A	2080880000
AMG ELM-Q6666	4-channel, fixed-value: 6-6-6-6 A	2080920000
AMG ELM-Q2244	4-channel, fixed-value: 2-2-4-4 A	2081650000
AMG ELM-Q2266	4-channel, fixed-value: 2-2-6-6 A	2081820000
Potential distribution terminals		
AMG PD	4 x plus (grouped)	2122920000
AMG OD	2 x plus, 2 x minus (alternating)	2122910000
AMG MD	4 x minus (grouped)	2122930000
AMG XMD	4 x minus, electrical connection to GND main strand	2122940000
AMG DIS	Disconnecting lever for all-pole load separation	2123050000

maxGUARD components – enhanced version

The following maxGUARD products have coated PCBs and enhanced certification (see section 3.9).

Product designation	Function	Order No.
Feed-in modules, control module, alarm module		
AMG FIM-0 EX	Feed-in module, passive	2082530000
AMG FIM-C EX	Feed-in module, active (reset, alarm)	2082540000
AMG CM EX	Control module (reset, alarm, overload advance warning, ON/OFF)	2083360000
AMG AM EX	Alarm module (alarm, overload advance warning), potential-free output contacts	2082770000
Electronic load monitors		
AMG ELM-6 EX	1-channel, adjustable: 1–6 A	2082000000
AMG ELM-12 EX	1-channel, adjustable: 4–12 A	2082010000
AMG ELM-6D CO	1-channel, adjustable: 1–6 A, 2-pole output relay	2082440000
AMG ELM-10D CO	1-channel, adjustable: 4–10 A, 2-pole output relay	2082470000
AMG ELM-1F EX	1-channel, fixed-value: 1 A	2082040000
AMG ELM-2F EX	1-channel, fixed-value: 2 A	2082050000
AMG ELM-4F EX	1-channel, fixed-value: 4 A	2082060000
AMG ELM-6F EX	1-channel, fixed-value: 6 A	2082310000
AMG ELM-8F EX	1-channel, fixed-value: 8 A	2082320000
AMG ELM-10F EX	1-channel, fixed-value: 10 A	2082430000
Potential distribution terminals		
AMG PD EX	4 x plus (grouped)	2495070000
AMG OD EX	2 x plus, 2 x minus (alternating)	2495090000
AMG MD EX	4 x minus (grouped)	2495040000
AMG XMD EX	4 x minus, electrical connection to GND main strand	2495080000
AMG DIS EX	Disconnecting lever for all-pole load separation	2495100000

Fixing and disconnection elements

Product designation	Function	Order No.
Fixing and disconnection elements		
AMG PP	Separation plate	2123000000
AMG EP KIT	Termination kit (2x AMG EP end plates, 2x WEW 35/2 V0 GF SW end brackets)	2500760000
AMG EP	End plate, single	2495380000
WEW 35/2 SW	End bracket, flammability rating HB (UL94), single	1061210000
WEW 35/2 V0 GF SW	End bracket, flammability rating V-0 (UL94), single	1479000000

Cross-connectors

Orange cross-connectors			Blue cross-connectors		Red cross-connectors	
Number of poles	Type	Order No.	Type	Order No.	Type	Order No.
2-pole	ZQV 4N/2	1527930000	ZQV 4N/2 BL	1528040000	ZQV 4N/2 RD	2460450000
3-pole	ZQV 4N/3	1527940000	ZQV 4N/3 BL	1528080000	ZQV 4N/3 RD	2460810000
4-pole	ZQV 4N/4	1527970000	ZQV 4N/4 BL	1528120000	ZQV 4N/4 RD	2460800000
5-pole	ZQV 4N/5	1527980000	ZQV 4N/5 BL	1528140000	ZQV 4N/5 RD	2460790000
6-pole	ZQV 4N/6	1527990000	ZQV 4N/6 BL	1528170000	ZQV 4N/6 RD	2460780000
7-pole	ZQV 4N/7	1528020000	ZQV 4N/7 BL	1528180000	ZQV 4N/7 RD	2460770000
8-pole	ZQV 4N/8	1528030000	ZQV 4N/8 BL	1528190000	ZQV 4N/8 RD	2460760000
9-pole	ZQV 4N/9	1528070000	ZQV 4N/9 BL	1528220000	ZQV 4N/9 RD	2460750000
10-pole	ZQV 4N/10	1528090000	ZQV 4N/10 BL	1528230000	ZQV 4N/10 RD	2460740000
50-pole	ZQV 4N/50	1528130000	ZQV 4N/50 BL	1528240000	ZQV 4N/50 RD	2460730000

3.7 General technical data

General		
Total length of a maxGUARD station	max. 300 mm (with 50-pole cross-connector), max. 900 mm (with extension)	
Dimensions	Height: 125 mm Width: 6.1/12.2/18.3/24.4 mm Depth 96.5 mm	
Number of bus participants	max. 25 (incl. control or active feed-in module)	
Cross-connectors (type)	ZQV 4N, max. 50-pole (see section 3.6)	
Installation position	any	
maxGUARD station mounting distance	20 mm all round	
Type of protection	IP20 (if end plates are used)	
Electrical values		
Rated input voltage	24 V DC	
Input voltage range	18 – 30 V	
Operating voltage of potential distribution terminals	max. 50 V	
Voltage ripple of input voltage	max. 8.5 V _{pp} (peak-to-peak)	
Rated current of feed-in module	40 A	
Current-carrying capacity of main strands	max. 40 A (if equipped with twin cross-connectors)	
Pollution severity	2	
Overvoltage category	III	
Rated current of cross-connectors	32 A (2 contacts for 40 A feed-in required)	
Current-carrying capacity of load connections	max. 12 A total current (load monitors, potential distribution terminals)	
Connections		
Connection type (all line connections)	PUSH IN	
16 mm² connections (feed-in module)	Clamping range	rigid: 0.75 – 10 mm² flexible with or without wire-end ferrule: 0.75 – 16 mm² AWG 18 – AWG 6
	Stripping length	18 mm ¹⁾
	Contact surface length	Contact surface length: 18 mm
1.5 mm² connections	Clamping range	rigid: 0.14 – 1.5 mm² flexible with or without wire-end ferrule: 0.14 – 1.5 mm² flexible with twin wire-end ferrule: 0.5 – 1 mm² AWG 26 – AWG 14
	Stripping length	10 mm ¹⁾
	Contact surface length	10 mm (for twin wire-end ferrule: 12 mm from 0.75 mm² and 14 mm for 1 mm²)
2.5 mm² connections	Clamping range	rigid: 0.14 – 2.5 mm² flexible with or without wire-end ferrule: 0.14 – 2.5 mm² flexible with twin wire-end ferrule: 0.5 – 1.5 mm² AWG 26 – AWG 13
	Stripping length	10 mm ¹⁾
	Contact surface length	10 mm (for twin wire-end ferrule: 12 mm from 0.75 mm²)
Test sockets	2 mm test adapter	

1) If wire-end ferrules with plastic collars are used, the connector must be stripped 2 mm further than the contact surface length of the wire-end ferrule used (min. 3 mm longer for twin wire-end ferrules). Observe the information on the wire-end ferrule's data sheet.

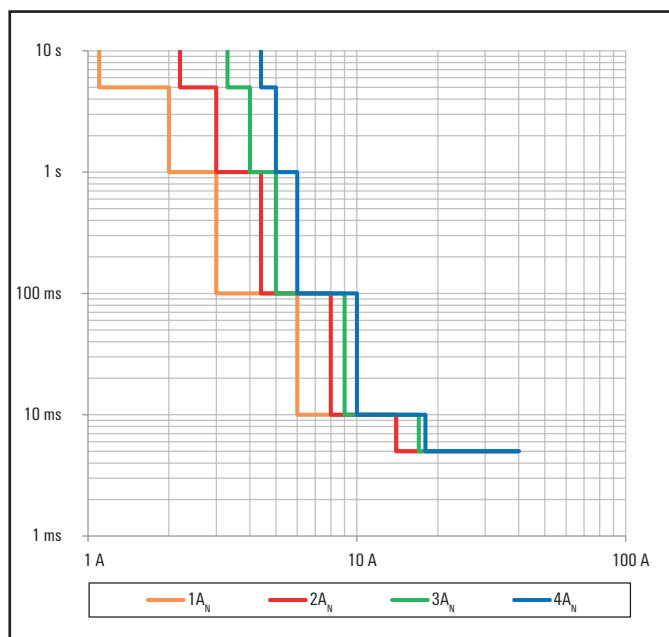
Environment			
Ambient temperature	Operation	-25 °C - +55 °C (no derating)	
	Storage, transport	-40 °C - +85 °C	
Permissible humidity		5% - 95% RH	
EMC, shock, vibration			
Emitted interference according to EN 61000-6-3, EN 61000-6-4	EN 55022	Class B	
Interference resistance according to EN 61000-6-2	Burst EN 61000-4-4	DC input/output:	± 2 kV
		Signal connection:	± 1 kV
	Surge EN 61000-4-5	DC input/output:	± 0.5 kV cable-to-cable ± 0.5 kV cable-to-earth
		Signal connection:	± 1 kV cable-to-earth
	ESD EN 61000-4-2	Contact discharge:	± 6 kV
		Air discharge:	± 8 kV
	HF voltage (CDN) EN 61000-4-6	DC input/output:	10 V; 0.15 - 80 MHz; 80% AM
		Signal connection:	10 V; 0.15 - 80 MHz; 80% AM
		Functional earth:	10 V; 0.15 - 80 MHz; 80% AM
	HF field EN 61000-4-3	Enclosure:	10 V/m; 80 - 1000 MHz 3 V/m; 1.4 GHz - 2 GHz 1 V/m; 2 GHz - 2.7 GHz
Shock resistance according to EN 60068-2-27 Test Ea	15 g/11 ms		
Vibration resistance according to EN 50178, EN 60068-2-6	1 g/0.075 mm (10 Hz - 150 Hz)		
Standards applied	DIN EN 50178, EN 55022, EN 60529, EN 60950-1, EN 61000-6-2, EN 61000-6-3, EN 61000-6-4 IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-6, IEC 60068-2-30, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6		
1) If wire-end ferrules with plastic collars are used, the connector must be stripped 2 mm further than the contact surface length of the wire-end ferrule used (min. 3 mm longer for twin wire-end ferrules). Observe the information on the wire-end ferrule's data sheet.			

All product-specific technical data can be found in the corresponding product description in chapters 5 to 7.

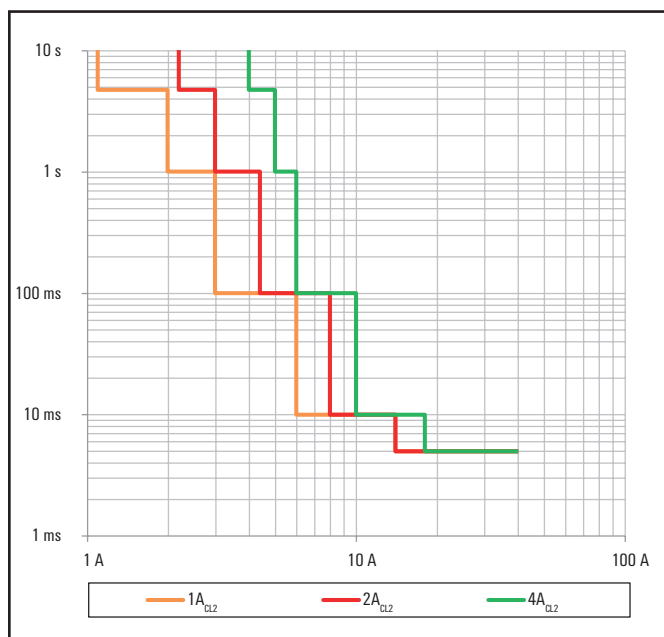
3.8 Tripping characteristics



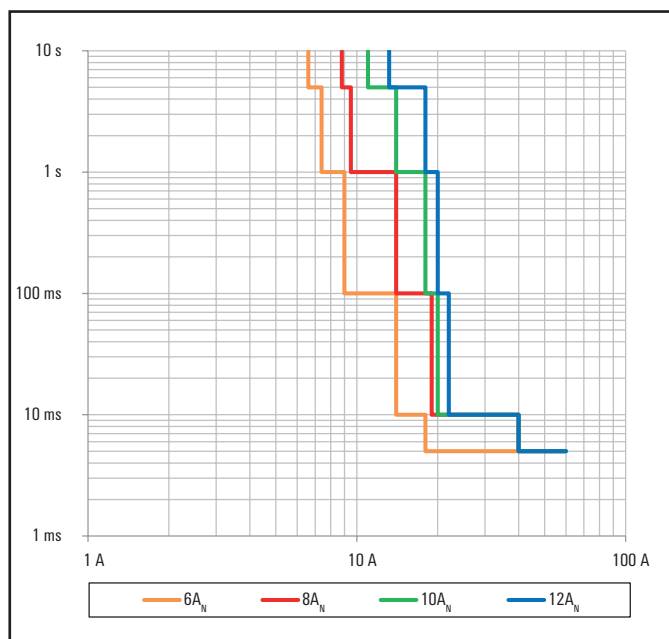
Enlarged representations and numerical values for the individual characteristics can be found in the annex



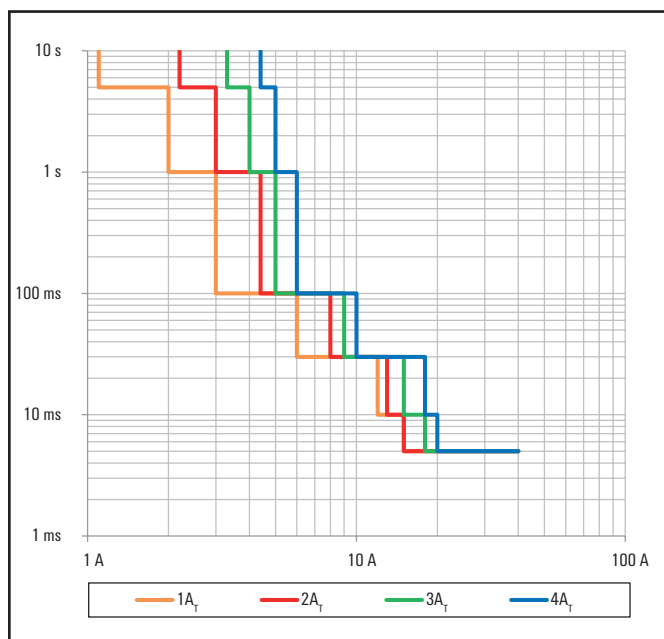
Tripping characteristics, normal: 1A_N – 4A_N



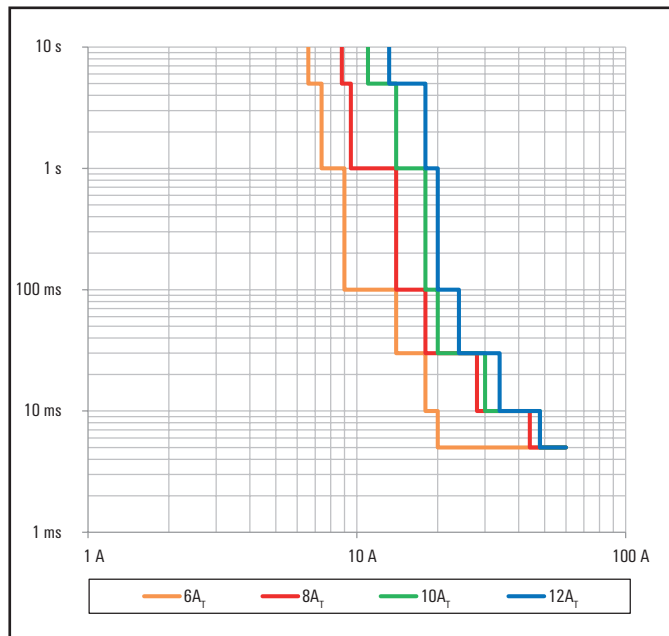
Tripping characteristics, normal, Class 2: 1A_{CL2} – 4A_{CL2}



Tripping characteristics, normal: 6A_N – 12A_N



Tripping characteristics, lag: 1A_T – 4A_T



Tripping characteristics, lag: $6A_T$ – $12A_T$

The filled cells in the following table show which tripping characteristics are available for the individual electronic load monitors.

Electronic load monitor		Normal tripping characteristic										Lagged tripping characteristic									
Designation	Order No.	1A _N	2A _N	3A _N	4A _N	6A _N	8A _N	10A _N	12A _N	1A _{CL2}	2A _{CL2}	4A _{CL2}	1A _T	2A _T	3A _T	4A _T	6A _T	8A _T	10A _T	12A _T	
AMG ELM-6	2080360000																				
AMG ELM-12	2080410000																				
AMG ELM-1F	2080420000																				
AMG ELM-1F CL2	2491270000																				
AMG ELM-2F	2080480000																				
AMG ELM-2F CL2	2491280000																				
AMG ELM-4F	2080490000																				
AMG ELM-4F CL2	2491290000																				
AMG ELM-6F	2080500000																				
AMG ELM-8F	2080600000																				
AMG ELM-10F	2080650000																				
AMG ELM-Q2222	2080750000																				
AMG ELM-Q4444	2080880000																				
AMG ELM-Q6666	2080920000																				
AMG ELM-Q2244	2081650000																				
AMG ELM-Q2266	2081820000																				
AMG ELM-6 EX	2082000000																				
AMG ELM-12 EX	2082010000																				
AMG ELM-6D CO	2082440000																				
AMG ELM-10D CO	2082470000																				
AMG ELM-1F EX	2082040000																				
AMG ELM-2F EX	2082050000																				
AMG ELM-4F EX	2082060000																				
AMG ELM-6F EX	2082310000																				
AMG ELM-8F EX	2082320000																				
AMG ELM-10F EX	2082430000																				

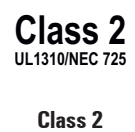
3.9 Conformity and approvals

The filled cells in the following tables show the scope of approvals for the individual maxGUARD products.

Standard version

Conformity and approvals

Designation	Order No.	CE	TÜV Süd	cUL _{US}	cUR _{US}	Class 2
AMG FIM-0	2082530000					
AMG FIM-C	2082540000					
AMG CM	2083360000					
AMG AM	2082770000					
AMG ELM-6	2080360000					
AMG ELM-12	2080410000					
AMG ELM-1F	2080420000					
AMG ELM-1F CL2	2491270000					
AMG ELM-2F	2080480000					
AMG ELM-2F CL2	2491280000					
AMG ELM-4F	2080490000					
AMG ELM-4F CL2	2491290000					
AMG ELM-6F	2080500000					
AMG ELM-8F	2080600000					
AMG ELM-10F	2080650000					
AMG ELM-Q2222	2080750000					
AMG ELM-Q4444	2080880000					
AMG ELM-Q6666	2080920000					
AMG ELM-Q2244	2081650000					
AMG ELM-Q2266	2081820000					
AMG PD	2122920000					
AMG OD	2122910000					
AMG MD	2122930000					
AMG XMD	2122940000					
AMG DIS	2123050000					



Enhanced version

Conformity and approvals

Designation	Order No.	CE	TÜV Süd	ATEX	IECEX	cUL _{US}	Cl. 1, Div. 2	DNV-GL	BV	RINA	LR	ABS
AMG FIM-0 EX	2082530000											
AMG FIM-C EX	2082540000											
AMG CM EX	2083360000											
AMG AM CO	2082770000											
AMG ELM-6 EX	2082000000											
AMG ELM-12 EX	2082010000											
AMG ELM-6D CO	2082440000											
AMG ELM-10D CO	2082470000											
AMG ELM-1F EX	2082040000											
AMG ELM-2F EX	2082050000											
AMG ELM-4F EX	2082060000											
AMG ELM-6F EX	2082310000											
AMG ELM-8F EX	2082320000											
AMG ELM-10F EX	2082430000											
AMG PD EX	2495070000											
AMG OD EX	2495090000											
AMG MD EX	2495040000											
AMG XMD EX	2495080000											
AMG DIS EX	2495100000											



CE



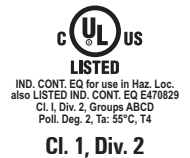
TÜV Süd



ATEX



IECEX

cUL_{US}

Cl. 1, Div. 2



DNV-GL



BV



RINA



LR



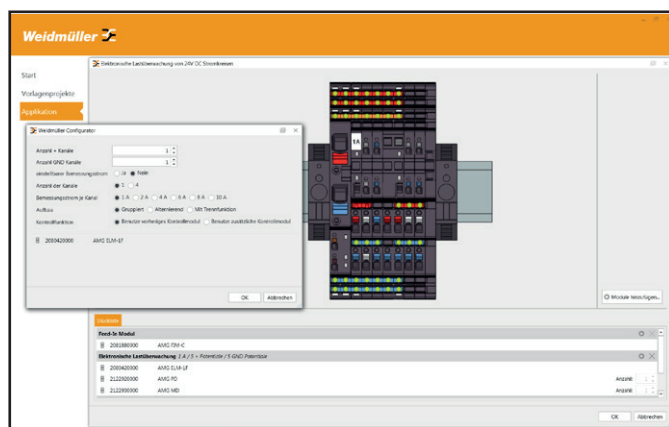
ABS

ATEX	<p>Certificate number: DEMKO 17 ATEX 1870X</p> <p>Markings: Ⓔ II 3G Ex ec IIB T4 Gc</p> <p>Standards: EN 60079-0:2012 + A11 2013, EN 60079-7:2015</p>
IECEX	<p>Certificate number: IECEX ULD 17.0018X</p> <p>Markings: Ex ec IIB T4 Gc</p> <p>Standards: IEC 60079-0 (Ed. 6) and IEC 60079-7 (Ed. 5)</p>

4 Configuration

4.1 Configuration in the Weidmüller Configurator

The Weidmüller Configurator helps you configure maxGUARD stations and offers numerous import and export functions for ECAD programs.



Configuration in the Weidmüller Configurator



You can download the Weidmüller Configurator from the Weidmüller website.

4.2 Arrangement and combination of the modules

A maxGUARD station always begins with a feed-in module, followed by one or more separately selectable segments.



- Machine functions and load groups should be grouped together as segments (see section 4.7).

We recommend arranging each segment of a maxGUARD station from left to right in the following order:

- control module, if required
- load monitors and potential distribution terminals
- alarm module, if required

Feed-in modules

It is preferable to use passive feed-in modules in combination with control modules. It is preferable to use active feed-in modules for simple maxGUARD stations.

Feed-in modules should be positioned at the beginning of a maxGUARD station and at the point where a station is extended (see section 4.8).

All feed-in modules must be connected to both main strands. Active feed-in modules must be connected to the internal signal line. Control modules must not be connected to active feed-in modules via the internal signal line.

Control modules

It is preferable to use control modules in conjunction with passive feed-in modules.

Control modules should be positioned next to a passive feed-in module or at the beginning of a segment.

Control modules must be connected to the internal signal line and both main strands. Control modules must not be connected to active feed-in modules via the internal signal line.

Alarm modules

Alarm modules may only be used in conjunction with active feed-in modules or with control modules.

Alarm modules may be positioned anywhere within a segment.

Alarm modules must be connected to the internal signal line and both main strands.

Electronic load monitors

Electronic load monitors may only be used in conjunction with feed-in modules.

Electronic load monitors may be positioned anywhere within a segment.

Electronic load monitors must be connected to both main strands.

If the electronic load monitors are to be controlled and monitored by a control unit, they must be connected to an active feed-in module or a control module via the internal signal line.

Potential distribution terminals

Potential distribution terminals should be positioned directly adjacent to the load monitor whose contacts are to be replicated.

AMG PD, AMG OD, AMG MD, AMG DIS:

It is preferable to use these potential distribution terminals with one-channel load monitors.

These potential distribution terminals must be connected to the PLUS output or the MINUS output of the assigned electronic load monitors.

AMG XMD:

It is preferable to use this potential distribution terminal with 4-channel load monitors. Under no circumstances may it be used with load monitors with a 2-pole output relay, as the functional isolation at the MINUS output will be rendered ineffective.

The AMG XMD must be connected to the GND main strand.

End bracket, end plate, separation plates

The station is fixed in the installation position by an end bracket at either side.

If a maxGUARD station ends with a potential distribution terminal, the station must be completed with an end plate on this side in order to ensure IP20 protection.

If cut cross-connectors are used for the main strands, the maxGUARD station must be completed with end plates on both sides in order to ensure IP20 protection.



End plates can improve the mechanical stability of a maxGUARD station.

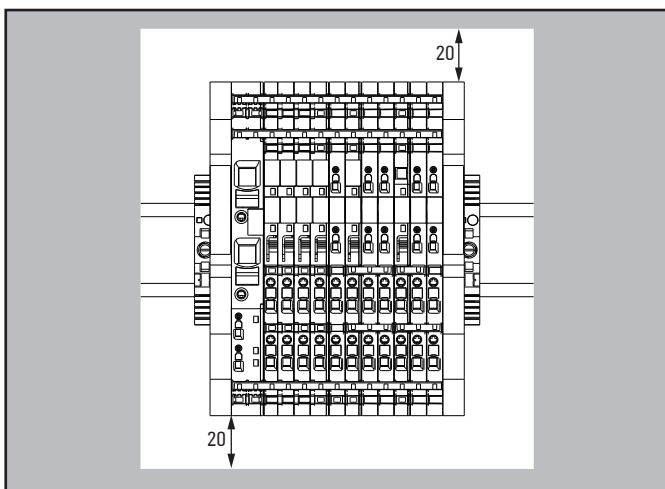
If cut cross-connectors are used for the load outputs or the internal signal line, the bare cut edges must be insulated against short circuits with separation plates.



Separation plates with labelled markers help to arrange the maxGUARD station more clearly.

4.3 Installation position and mounting distances

A maxGUARD station can be operated in any installation position without derating. The mounting distance must be at least 20 mm on all sides. The minimum permissible conductor bending radii must be observed.



Minimum distances for installation

4.4 Configuring cross-connections

All connections between the modules of a maxGUARD station are established via cross-connectors. To this end, only the ZQV 4N/x cross-connectors specified in section 3.6 shall be used. Whenever possible, use uncut cross-connectors insulated on both sides.

The use of different-coloured cross-connectors simplifies assembly and enhances the clarity of the maxGUARD station.

Main strand cross-connections

ATTENTION

The product can be destroyed!

If the total current is over 20 A, all main strands must each be equipped with two cross-connectors.



If the total current is below or equal to 20 A, the main strands are adequately equipped with one cross-connector per main strand.

The main strand connectors of all modules are connected to the corresponding main strand connectors of a feed-in module via cross-connectors.



The cross-connectors for the +24 V main strand and the GND main strand must always use at least two contacts of the feed-in module.

The main strands must be equipped with continuous cross-connectors along the entire length of the station. To this end, 50-pole cross-connectors may be cut to the required length. For maxGUARD stations with a length of up to 60 mm, cross-connectors with a suitable number of poles may be used. For maxGUARD stations with a length of over 300 mm, see section 4.8.



If cut cross-connectors are used for the main strands, the maxGUARD station must be completed with end plates on both sides in order to ensure IP20 protection.



Use red cross-connectors for the +24 V main strand. Use blue cross-connectors for the GND main strand.

Internal signal line cross-connections


ATTENTION

Risk of short circuit due to non-insulated cross-connectors!
► Insert an AMG PP separation plate wherever there are bare cut edges next to one another.

The connectors for the internal signal line of all modules within a segment are connected to an active feed-in module or a control module via cross-connectors.

For internal signal lines with a length of less than 60 mm, cross-connectors with a suitable number of poles may be used. For longer signal lines, 50-pole cross-connectors may be cut to the required length. For maxGUARD stations with a length of over 300 mm, see section 4.8.

The internal signal line connections are designed as double channels. The internal signal line can be extended by interleaving two cross-connectors at an active contact. One cross-connector only is required to adequately equip an internal signal line.



Use orange cross-connectors for the internal signal line.

Load output cross-connections

ATTENTION

Risk of short circuit due to non-insulated cross-connectors!
► Insert an AMG PP separation plate wherever there are bare cut edges next to one another.


ATTENTION

Risk of malfunction!
► Do not connect multiple load monitors in parallel or in series.
► Never connect the signal contacts of the control modules and alarm modules to the outputs of the load monitors.

The outputs of the load monitors may be connected to potential distribution terminals via cross-connectors.

To this end, only uncut cross-connectors insulated on both sides shall be used (ZQV 4N/2 – ZQV 4N/10). Cut cross-connectors may only be used if cross-connectors with more than 10 poles are required. If cut cross-connectors are used

for the load outputs, the bare cut edges must be insulated against short circuits with separation plates.



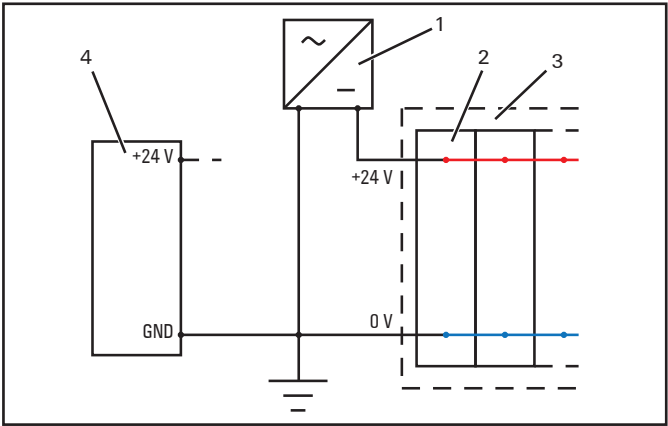
Use red cross-connectors for the PLUS output.
Use blue cross-connectors for the MINUS output.

4.5 Earthed and non-earthed control voltage distributors

Earthed control voltage distributors

For earthed control voltage distributors, the earth potential is the reference point for all signals between the maxGUARD station and the control board.

To this end, the minus output of the power supply is connected to a protective earth conductor terminal via a PE conductor. The GND output of the maxGUARD station and the ground connector of the control board are also connected to the earth potential.



Example of an earthed control voltage distributor

- 1 Power supply unit
- 2 Feed-in module
- 3 maxGUARD station
- 4 Control board

Non-earthed control voltage distributor

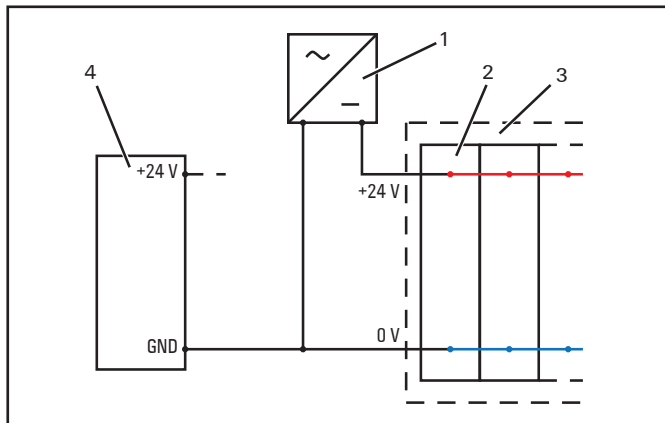
For non-earthed control voltage distributors, the shared minus potential is the reference point for all signals between the maxGUARD station and the control board.

In non-earthed systems, it is preferable to use load monitors with a two-pole output relay. In the event of an overload or short circuit, all poles of the affected load circuit are disconnected and it no longer has any influence on the rest of the system.

AMG PD, AMG OD, AMG MD and AMG DIS potential distributors may be used in conjunction with load monitors with a 2-pole output relay. These potential distributors draw their potential exclusively from the outputs of the load monitors.



The AMG XMD potential distribution terminal may not be used for contact replication in the case of load monitors with a 2-pole output relay. This would render the functional isolation at the MINUS output ineffective.



Example of a non-earthed control voltage distributor

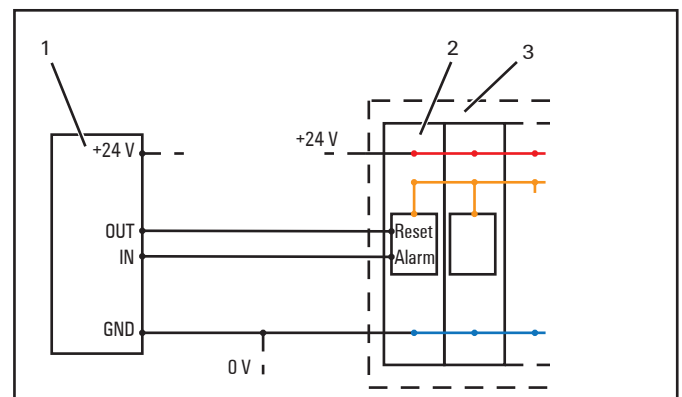
- 1 Power supply unit
- 2 Feed-in module
- 3 maxGUARD station
- 4 Control board

4.6 Connection to the control unit

The connection to a control board (PLC, remote I/O system) may be non-isolated or isolated (potential-free).

Non-isolated connection

A non-isolated connection can be established either via an active feed-in module or via control modules.

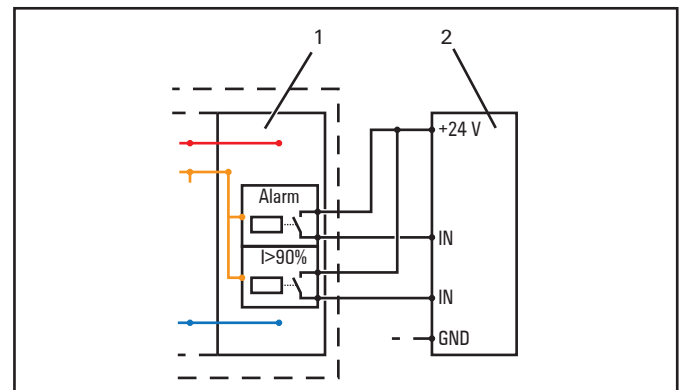


Example of a non-isolated connection

- 1 Control board
- 2 Active feed-in module
- 3 maxGUARD station

Isolated (potential-free) connection

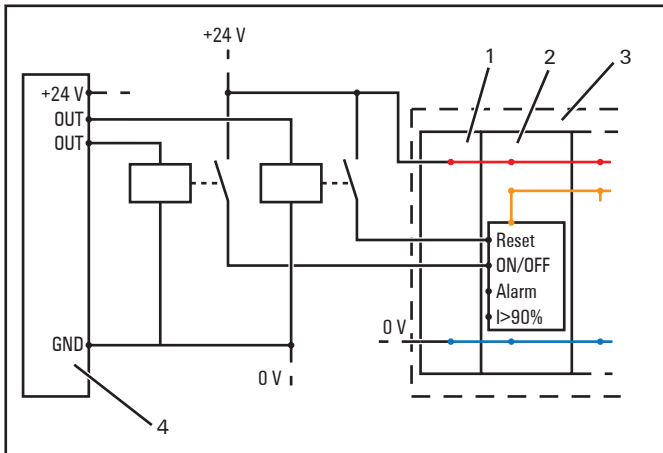
The potential-free decoupling of alarm and overload advance warning ($I > 90\%$) signals to a control board can be achieved using alarm modules.



Example of potential-free signal decoupling

- 1 Alarm module
- 2 Control board

The potential-free coupling of reset and ON/OFF signals can be achieved, for example, using Weidmüller relay modules and solid-state relays.



Example of potential-free signal coupling

- 1 Feed-in module
- 2 Control module
- 3 maxGUARD station
- 4 Control board

4.7 Segmentation of control voltage distributors

Within a maxGUARD station, load groups can be combined to form individually controlled and monitored segments. A segment always consists of a control module and at least one electronic load monitor.

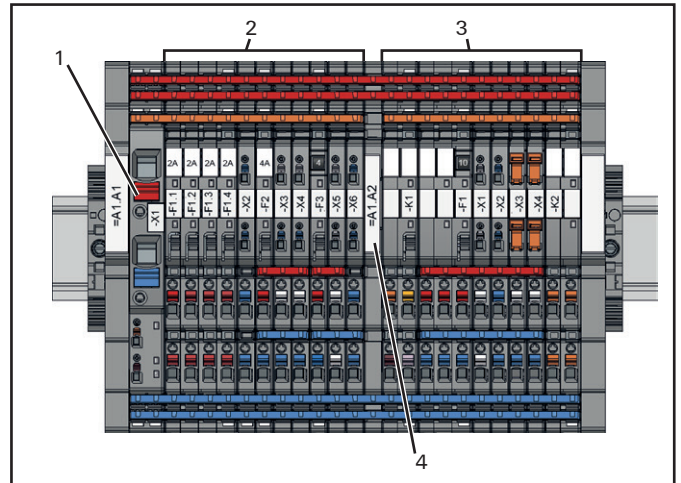
A separate internal signal line must be provided for each segment, and may not be connected to the internal signal lines of other segments. A segment may contain a maximum of 25 bus participants.

A feed-in module connects the power supply to the entire maxGUARD station. All segments are connected to a shared plus potential and a shared minus potential via the main strands (for maxGUARD stations longer than 300 mm, see section 4.8).

The reference potential for the control module signals is the shared minus potential of the GND main strand. This applies to non-earthed as well as earthed systems (see section 4.5).



In order to arrange the maxGUARD station as clearly as possible, individual segments should be separated from one another with AMG PP separation plates. Markers on the separation plates can also improve clarity.



Segmentation of a control voltage distributor

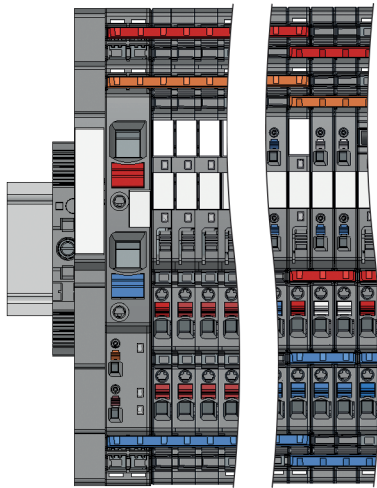
- 1 Feed-in module for entire maxGUARD station
- 2 Segment 1
- 3 Segment 2
- 4 AMG PP separation plate with WAD 5 marker

4.8 Extending control voltage distributors

50-pole cross-connectors can be used to build maxGUARD stations with a maximum length of 50 grid units (approx. 305 mm). By using additional cross-connectors and passive feed-in modules, a maxGUARD station can be extended to a length of 150 grid units (approx. 915 mm). Existing maxGUARD stations can be extended in the same way. Please note that extending the maxGUARD station will increase its total current. Always select the type of extension based on the expected total current in the main strands of the extended station.

Extensions for total currents of up to 20 A

The main strands and the internal signal line are each equipped with one cross-connector only. To extend a main connection channel, place a second cross-connector in the free shaft of the main connection channel so that the new and the original cross-connectors are electrically connected. In this way, the new cross-connector will begin at an active cross-connection socket that is already connected to the original cross-connector. White markings on the plastic tabs of the modules indicate the active cross-connection sockets.

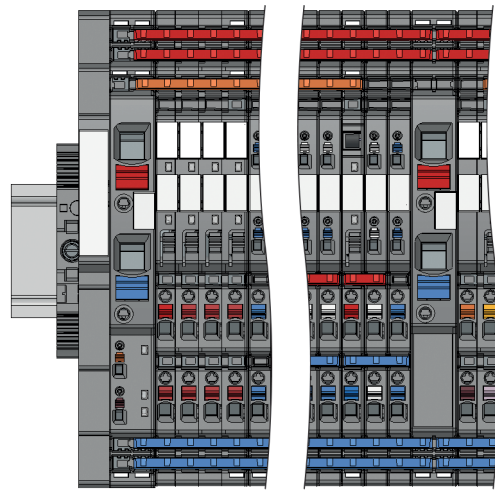


Extension to an active cross-connection socket

Extensions for total currents of over 20 A

The mains strands are each equipped with two cross-connectors. The internal signal line is equipped with only one cross-connector.

The main strands are extended to an additional passive feed-in module. This feed-in module should be placed after 50 grid units or at the end of the maxGUARD station.



Extension to a passive feed-in module

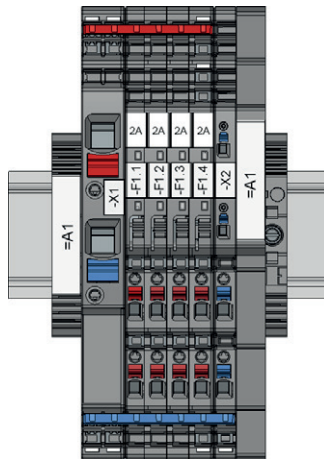
The cross-connectors of the main strands should be arranged in such a way that they connect the first feed-in module to the additional feed-in module. Subsequently, the next cross-connectors at the additional feed-in module can be inserted as an extension of the main strands.



The cross-connectors for the +24 V main strand and the GND main strand must always use two contacts of the feed-in module.

4.9 Example configurations

Example: One segment without connection to a control unit



Example: maxGUARD station without connection to a control unit

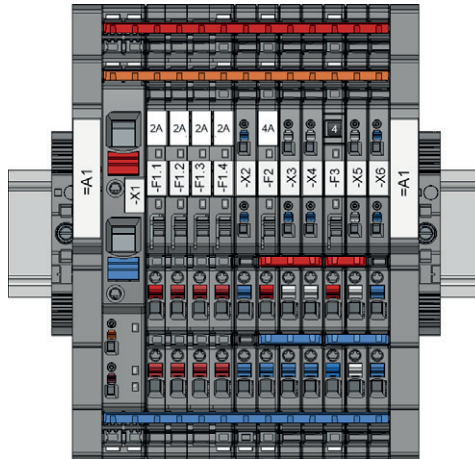
This example shows a control voltage distributor for four selectively fused load circuits without connection to a control unit.

The following maxGUARD products are used:

- 1x AMG FIM-0
- 1x AMG ELM-Q2222
- 1x AMG XMD
- 1x AMG EP
- 2x WEW 35/2
- 1x ZQV 4N/6 RD
- 1x ZQV 4N/7 BL

The passive feed-in module feeds in the supply voltage. The potentials are distributed to individual modules via uncut cross-connectors (white markings). As the total current flowing through the station is less than 20 A, the main strands are each equipped with only one cross-connector.

The station must be equipped with an end plate at the right end. Only then will the exposed side of the last potential distribution terminal be covered.

Example: One segment with connection to a control unit**Example: maxGUARD station with connection to a control unit**

This example shows a control voltage distributor for six selectively fused load circuits with connection to a control unit.

The following maxGUARD products are used:

- 1x AMG FIM-C
- 1x AMG ELM-6
- 1x AMG ELM-4F
- 1x AMG ELM-Q2222
- 1x AMG PD
- 2x AMG OD
- 1x AMG MD
- 1x AMG XMD
- 2x AMG EP
- 2x WEW 35/2
- 1x ZQV 4N/50 RD, 1x ZQV 4N/3 RD, 1x ZQV 4N/2 RD
- 1x ZQV 4N/50
- 1x ZQV 4N/50 BL, 2x ZQV 4N/3 BL

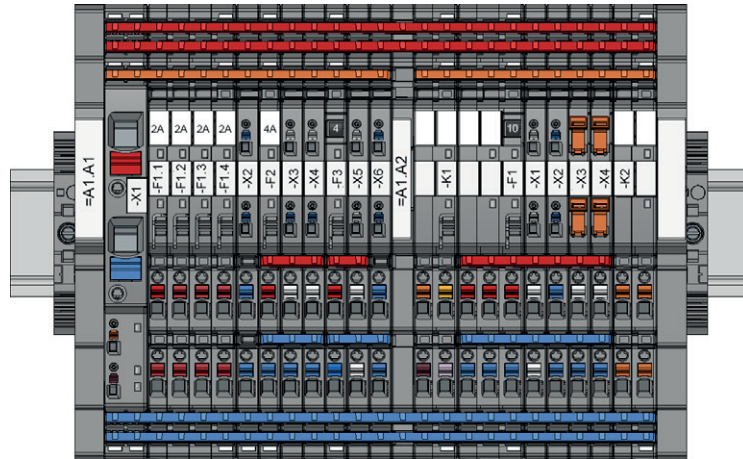
The active feed-in module feeds in the supply voltage and connects the station to the control unit.

The potentials are distributed to the individual modules via cut cross-connectors. As the total current flowing through the station is less than 20 A, the main strands are each equipped with only one cross-connector. The internal signal line is established via a cut cross-connector.

The outputs of the load monitors are replicated using potential distribution terminals. The potential distribution terminals are connected to the outputs of the load monitors via uncut cross-connectors.

The station must be equipped with end plates at both ends. Only then will the exposed cut edges of the cut cross-connector be insulated and the exposed side of the last potential distribution terminal covered.

Example: Two segments with connection to a control unit



Example: maxGUARD station with two segments and connection to a control unit

This example shows a control voltage distributor with two segments for seven selectively fused load circuits with connection to a control unit.

The following maxGUARD products are used:

- 1x AMG FIM-C
- 1x AMG CM
- 1x AMG AM
- 1x AMG ELM-6
- 1x AMG ELM-4F
- 1x AMG ELM-Q2222
- 1x AMG ELM-10D-C0
- 2x AMG PD
- 2x AMG OD
- 2x AMG MD
- 1x AMG XMD
- 2x AMG DIS
- 1x AMG PP
- 2x AMG EP
- 2x WEW 35/2
- 1x ZQV 4N/50 RD, 1x ZQV 4N/3 RD, 1x ZQV 4N/2 RD, 1x ZQV 4N/7 RD
- 1x ZQV 4N/50
- 1x ZQV 4N/50 BL, 2x ZQV 4N/3 BL, 1x ZQV 4N/7 BL

The active feed-in module feeds in the supply voltage and connects the first segment to the control unit. The second segment is connected to the control unit via the control module and the alarm module.

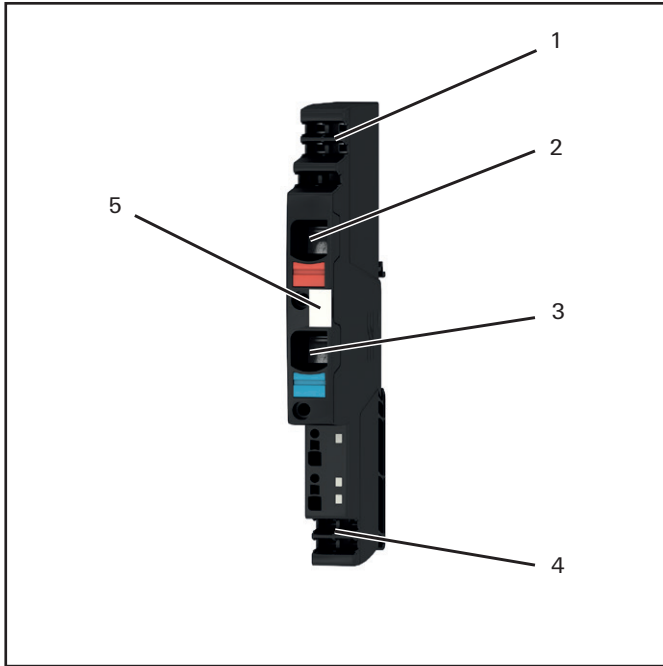
The potentials are distributed to the individual modules via cut cross-connectors. Since the total current flowing through the station is greater than 20 A, the main strands are each equipped with two cross-connectors. The internal signal line is established via two cut cross-connectors which connect the modules within the segments.

The outputs of the load monitors are replicated using potential distribution terminals. The potential distribution terminals are connected to the outputs of the load monitors via uncut cross-connectors.

The station must be equipped with end plates at both ends. Only then will the exposed cut edges of the cut cross-connectors be insulated. The separation plate divides the segments and prevents short circuits at the non-insulated cut edges of the cross-connectors for the internal signal lines.

5 Feed-in modules, control modules, alarm modules

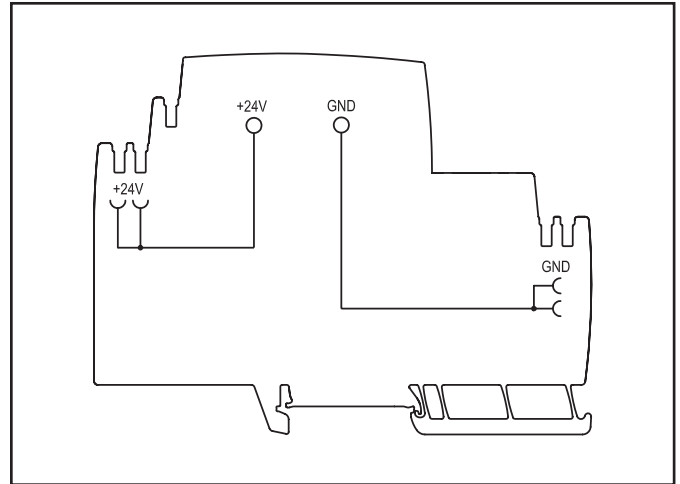
5.1 Passive feed-in modules AMG FIM-0...



AMG FIM-0...

- 1 +24 V main strand connection (+24 V)
- 2 +24 V feed-in connection (16 mm²)
- 3 GND feed-in connection (16 mm²)
- 4 GND main strand connection (0 V)
- 5 Marker

The passive feed-in modules are used to connect the feed-in conductors from the power supply. They connect the power supply to the main strands of the maxGUARD station.



AMG FIM-0... block diagram

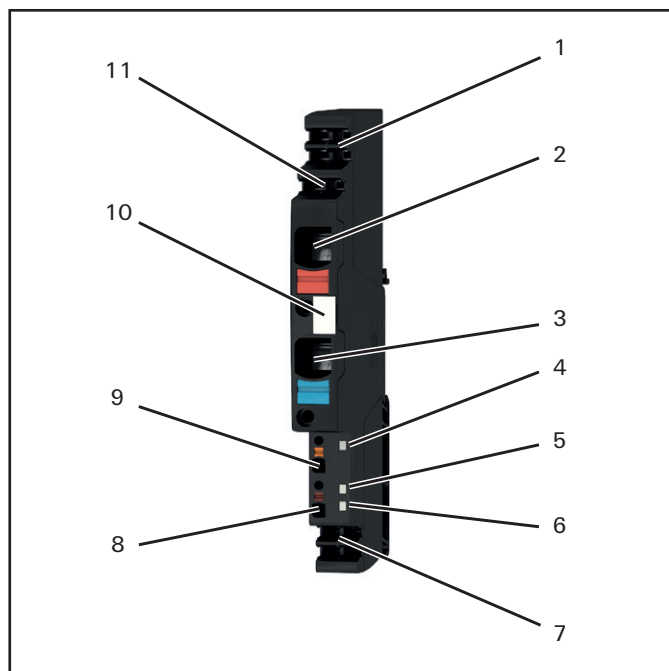
Technical data

AMG FIM-0...

General

Rated voltage	24 V DC
Operational voltage range	18 - 30 V DC
Width	12.2 mm

5.2 Active feed-in modules AMG FIM-C...

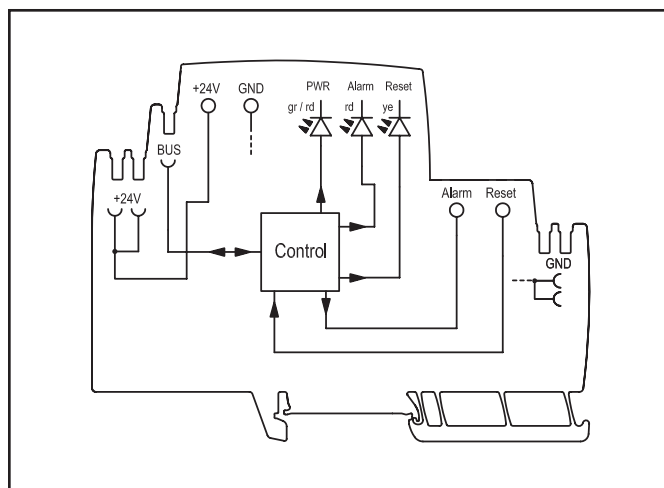


AMG FIM-C...

- 1 +24 V main strand connection (+24 V)
- 2 +24 V feed-in connection (16 mm²)
- 3 GND feed-in connection (16 mm²)
- 4 PWR LED (green/red)
- 5 Alarm LED (red)
- 6 Reset LED (yellow)
- 7 GND main strand connection (0 V)
- 8 Reset connection (1.5 mm²)
- 9 Alarm connection (1.5 mm²)
- 10 Marker
- 11 Internal signal line connection

Feed-in modules are used to connect the feed-in conductors. They connect the power supply to the main strands of the maxGUARD station. The AMG ELM electronic load monitors can be controlled and monitored using active feed-in modules. Active feed-in modules drive the internal bus and connect the internal signal line to an external control unit. An active feed-in module and the connected load monitors form unit concerning the control.

LED	Colour	Meaning
PWR	Green	Fault-free operation
	Red, flashing (5 Hz)	Supply voltage error
Alarm	Red	Alarm tripped
Reset	Yellow	Reset tripped



AMG FIM-C... block diagram

Signal	Function	Type	Level
Reset	Resets electronic load monitors	Input	LOW: no reset HIGH: reset
Alarm	Load monitor tripped	Output	LOW: alarm HIGH: no alarm

The reference point for the signals is the potential of the GND main strand.

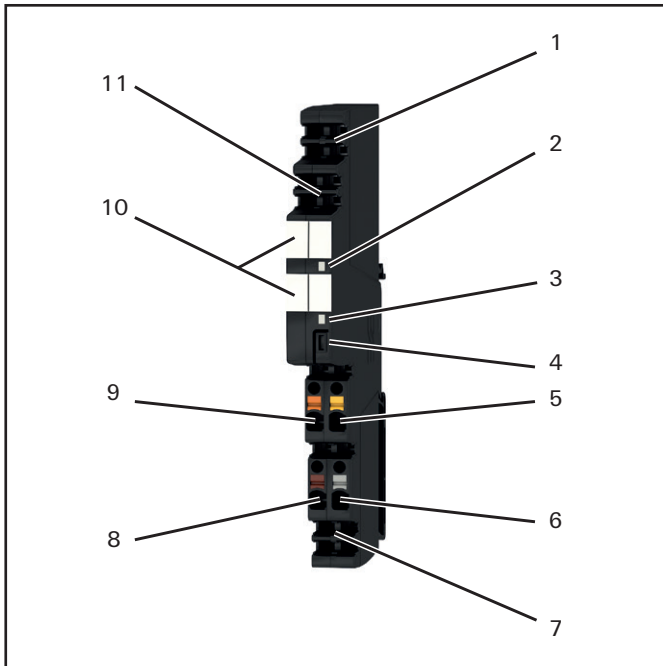
Technical data

AMG FIM-C...

General

Rated voltage	24 V DC
Operational voltage range	18 – 30 V DC
Low voltage detection	Yes (supply voltage < 18 V DC)
Surge detection	Yes (supply voltage > 31.2 V DC)
Operating current consumption (typical)	100 mA
Width	12.2 mm
Digital inputs	
Input resistance	10 kΩ
Input voltage hysteresis	LOW→HIGH: 15 V HIGH→LOW: 5 V
Digital outputs	
Active transistor output	24 V/ 20 mA
Short-circuit-proof	Yes

5.3 Control modules AMG CM...

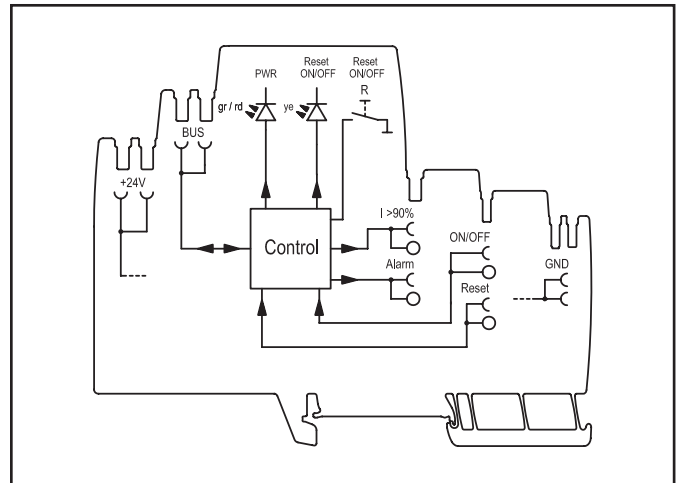


AMG CM...

- 1 +24 V main strand connection (+24 V)
- 2 PWR LED
- 3 ON/OFF LED
- 4 Reset key
- 5 I>90% connection (2.5 mm²)
- 6 ON/OFF connection (2.5 mm²)
- 7 GND main strand connection (0 V)
- 8 Reset connection (2.5 mm²)
- 9 Alarm connection (2.5 mm²)
- 10 Markers
- 11 Internal signal line connection

The AMG ELM electronic load monitors can be controlled and monitored using control modules. Control modules drive the internal bus and connect the internal signal line to an external control unit. A control module and the connected load monitors form a unit concerning the control.

LED	Colour	Meaning
PWR	Green	Fault-free operation
	Red, flashing	Supply voltage error
	Red	Alarm tripped or internal fault
ON	Yellow	Reset tripped or ON/OFF tripped



AMG CM... block diagram

Signal	Function	Type	Level
Reset	Resets electronic load monitors	Input	LOW: no reset HIGH: reset
ON/OFF	Switches load monitors on/off	Input	LOW: ON HIGH: OFF
Alarm	Load monitor tripped	Output	LOW: alarm HIGH: no alarm
I>90%	Overload advance warning	Output	LOW: I < 90% I _T HIGH: I > 90% I _T

The reference point for the signals is the potential of the GND main strand.

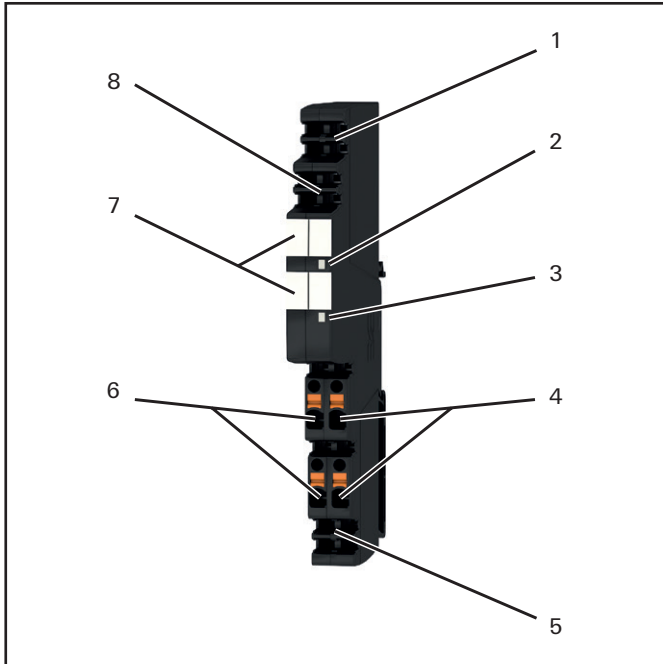
The reset key "R" can be used to manually reset and switch on/off the connected load monitors.

Technical data

AMG CM...

General	
Rated voltage	24 V DC
Operational voltage range	18 - 30 V DC
Low voltage detection	Yes (supply voltage < 18 V DC)
Surge detection	Yes (supply voltage > 31.2 V DC)
Operating current consumption (typical)	100 mA
Width	12.2 mm
Digital inputs	
Input resistance	10 kΩ
Input voltage hysteresis	LOW→HIGH: 15 V HIGH→LOW: 5 V
Digital outputs	
Active transistor output	24 V/ 20 mA
Short-circuit-proof	Yes

5.4 Alarm modules AMG AM...

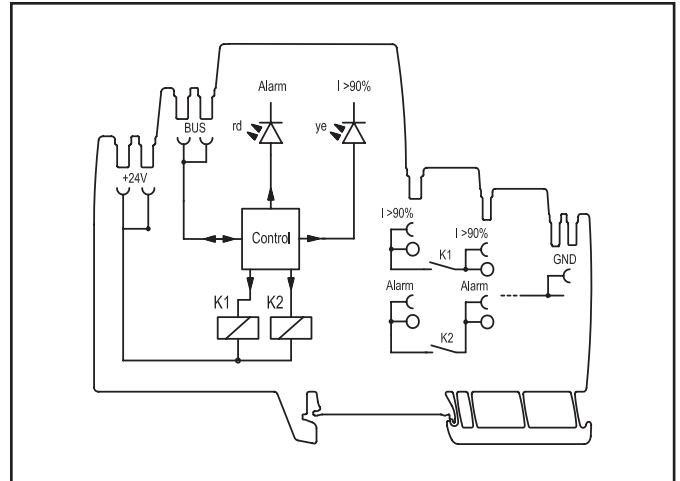


AMG AM...

- 1 +24 V main strand connection (+24 V)
- 2 LED alarm
- 3 LED overload advance warning
- 4 I>90% connections (2.5 mm²)
- 5 GND main strand connection (0 V)
- 6 Alarm connections (2.5 mm²)
- 7 Markers
- 8 Internal signal line connection

Alarm signals and overload advance warnings can be transmitted potential-free to control boards using alarm modules.

LED	Colour	Meaning
AL	Red	Alarm tripped
I>	Yellow	Overload advance warning (I > 90%)



AMG AM... block diagram

Signal	Function	Relay NO contact
I>90%	Overload advance warning	K1 closed: I < 90% I _T K1 open: I > 90% I _T
Alarm	Load monitor tripped	K2 closed: no alarm K2 open: alarm

Technical data

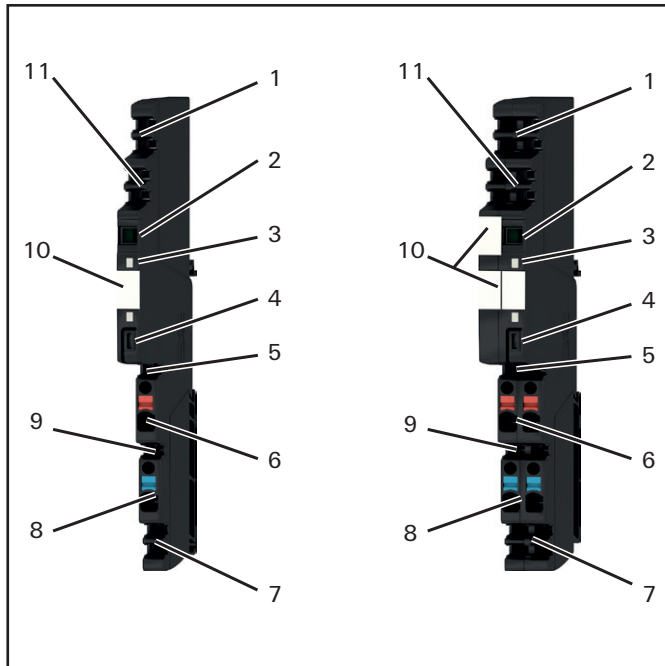
AMG AM...

General

Rated voltage	24 V DC
Operational voltage range	18 - 30 V DC
Low voltage detection	Yes (supply voltage < 18 V DC)
Surge detection	Yes (supply voltage > 31.2 V DC)
Operating current consumption	100 mA
Width	12.2 mm
Relay outputs	
Contact type	NO contact
Permissible contact load	30 V/100 mA

6 Electronic load monitors

6.1 AMG ELM-x...



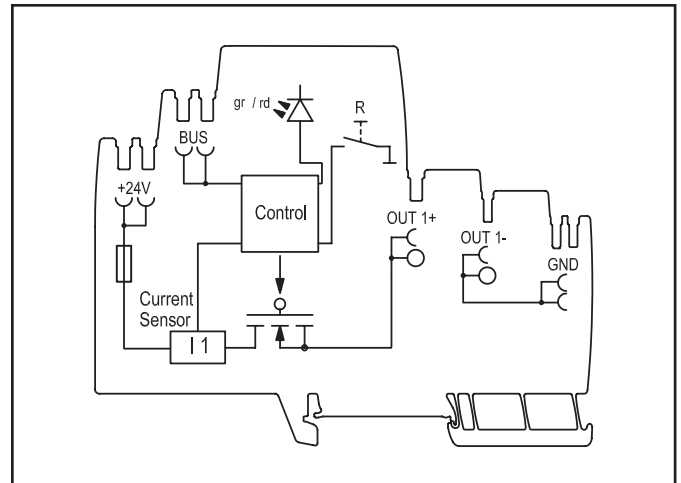
Left: AMG ELM-6...

Right: AMG ELM-12...

- 1 +24 V main strand connection (+24 V)
- 2 Thumbwheel switch
- 3 LED
- 4 Reset button "R"
- 5 PLUS output connection (cross-connector)
- 6 PLUS output connections (2.5mm²)
- 7 GND main strand connection (0 V)
- 8 MINUS output connections (2.5 mm²)
- 9 MINUS output connection (cross-connector)
- 10 Markers
- 11 Internal signal line connection

The AMG ELM-6 and AMG ELM-12 electronic load monitors monitor individual load circuits and disconnect them in the event of a short circuit or overload. The tripping current and the tripping characteristic are selected using the thumbwheel switch.

LED	Colour	Meaning
LED	Green	Fault-free operation
	Red	Load monitor is switched off
	Red, flashing	Load monitor tripped
	Red, flashing fast	Internal error
	Orange (red and green)	Overtemperature detected
	Red, green, alternating	Reset button deactivated for 30 seconds



AMG ELM-6..., AMG ELM-12... block diagram

The reset button "R" can be used to individually reset and switch on/off the load monitors.

The thumbwheel switch has ten settings. The current values of the standard tripping characteristic are shown with white numbers on a black background. The current values of the delayed tripping characteristic are shown with black numbers on a white background.

AMG ELM-6...

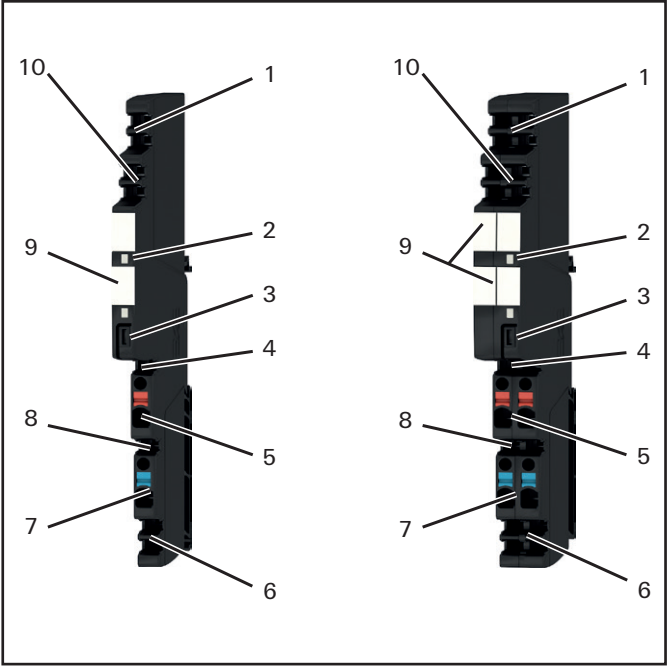
Thumbwheel switch	Characteristic
1	1A _N
2	2A _N
3	3A _N
4	4A _N
6	6A _N
1	1A _T
2	2A _T
3	3A _T
4	4A _T
6	6A _T

AMG ELM-12...

Thumbwheel switch	Characteristic
4	4A _N
6	6A _N
8	8A _N
10	10A _N
12	12A _N
4	4A _T
6	6A _T
8	8A _T
10	10A _T
12	12A _T

Technical data	AMG ELM 6...	AMG ELM 12...
General		
Rated voltage	24 V DC	
Operational voltage range	18 – 30 V DC	
Low voltage detection	Yes (supply voltage < 18 V DC)	
Surge detection	Yes (supply voltage > 31.2 V DC)	
Rated output current I _{OUT, rated}	6 A	12 A
Current consumption	I _{OUT} + 30 mA	
Voltage drop at I _{OUT, rated}	200 mV	250 mV
Capacitive load	15,000 µF	20,000 µF
Overtemperature protection	Yes	
Width	6.1 mm	12.2 mm
Tripping characteristic		
Adjustable	Yes	
Tripping current I _T	1 A, 2 A, 3 A, 4 A, 6 A	4 A, 6 A, 8 A, 10 A, 12 A
Characteristics (normal)	1A _N , 2A _N , 3A _N , 4A _N , 6A _N	4A _N , 6A _N , 8A _N , 10A _N , 12A _N
Characteristics (delayed)	1A _T , 2A _T , 3A _T , 4A _T , 6A _T	4A _T , 6A _T , 8A _T , 10A _T , 12A _T
Bus decoupling, bus coupling		
Alarm (tripped, fault)	Yes	
Overload advance warning	Yes	
Reset	Yes	
ON/OFF	Yes	
Button function		
Reset	Yes	
ON/OFF	Yes	

6.2 AMG ELM-xF...

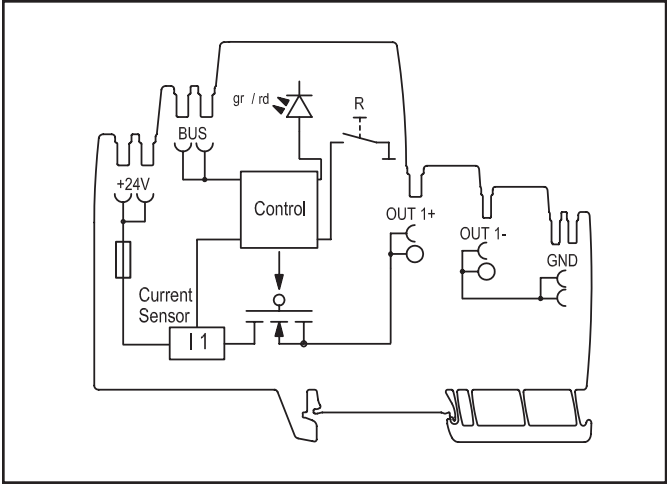


Left: AMG ELM-1F..., AMG ELM-2F..., AMG ELM-4F..., AMG ELM-6F...
Right: AMG ELM-8F..., AMG ELM-10F...

- 1 +24 V main strand connection (+24 V)
- 2 LED
- 3 Reset button "R"
- 4 PLUS output connection (cross-connector)
- 5 PLUS output connections (2.5 mm²)
- 6 GND main strand connection (0 V)
- 7 MINUS output connections (2.5 mm²)
- 8 MINUS output connection (cross-connector)
- 9 Markers
- 10 Internal signal line connection

The AMG ELM-1F to AMG ELM-10F 1-channel electronic load monitors monitor individual load circuits and disconnect them in the event of a short circuit or overload. The tripping current and the tripping characteristic are fixed.

LED	Colour	Meaning
LED	Green	Fault-free operation
	Red	Load monitor switched off
	Red, flashing	Load monitor tripped
	Red, flashing fast	Internal error
	Red, green, alternating	Reset button deactivated for 30 seconds

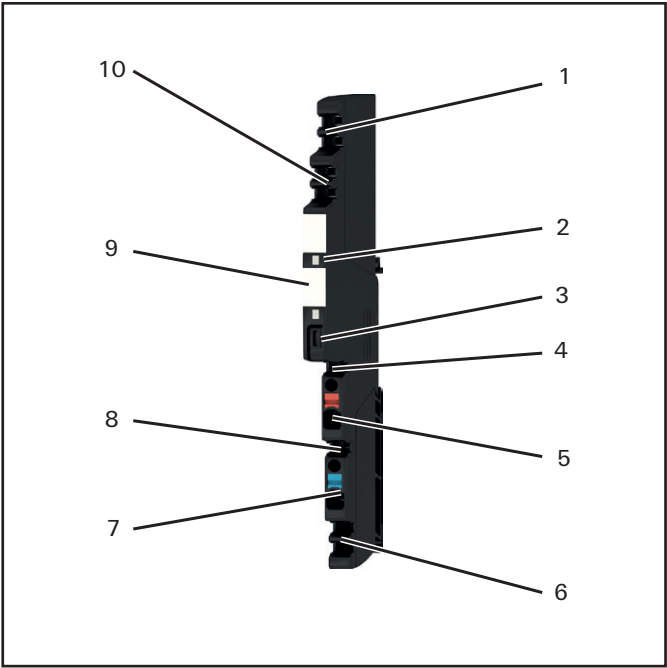


AMG ELM-xF... block diagram

The reset button "R" can be used to individually reset and switch on/off the load monitors.

Technical data	AMG ELM-1F...	AMG ELM-2F...	AMG ELM-4F...	AMG ELM-6F...	AMG ELM-8F...	AMG ELM-10F...
General						
Rated voltage	24 V DC					
Operational voltage range	18 – 30 V DC					
Low voltage detection	Yes (supply voltage < 18 V DC)					
Surge detection	Yes (supply voltage > 31.2 V DC)					
Rated output current I _{OUT, rated}	1 A	2 A	4 A	6 A	8 A	10 A
Current consumption	I _{OUT} + 30 mA					
Voltage drop at I _{OUT, rated}	200 mV					
Capacitive load	10,000 µF			15,000 µF		20,000 µF
Overtemperature protection	No					
Width	6.1 mm				12.2 mm	
Tripping behaviour						
Adjustable	No					
Tripping current I _T	1 A	2 A	4 A	6 A	8 A	10 A
Characteristics (normal)	1A _N	2A _N	4A _N	6A _N	8A _N	10A _N
Characteristics (delayed)	No					
Bus decoupling, bus coupling						
Alarm (tripped, fault)	Yes					
Overload advance warning (I>90%)	No					
Reset	Yes					
ON/OFF	Yes					
Button function						
Reset	Yes					
ON/OFF	Yes					

6.3 AMG ELM-xF CL2

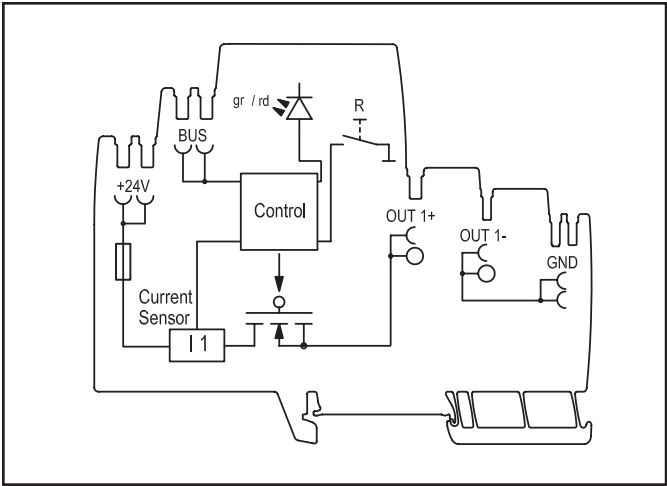


AMG ELM-1F CL2, AMG ELM-2F CL2, AMG ELM-4F CL2

- 1 +24 V main strand connection (+24 V)
- 2 LED
- 3 Reset button "R"
- 4 PLUS output connection (cross-connector)
- 5 PLUS output connections (2.5 mm²)
- 6 GND main strand connection (0 V)
- 7 MINUS output connections (2.5 mm²)
- 8 MINUS output connection (cross-connector)
- 9 Markers
- 10 Internal signal line connection

The AMG ELM-1F CL2, AMG ELM-2F CL2 and AMG ELM-4F CL2 1-channel electronic load monitors monitor individual load circuits and disconnect them in the event of a short circuit or overload. They are suited for use in Class 2 circuits according to National Electric Code (NEC). The tripping current and the tripping characteristic are fixed.

LED	Colour	Meaning
LED	Green	Fault-free operation
	Red	Load monitor switched off
	Red, flashing	Load monitor tripped
	Red, flashing fast	Internal error
	Red, green, alternating	Reset button deactivated for 30 seconds

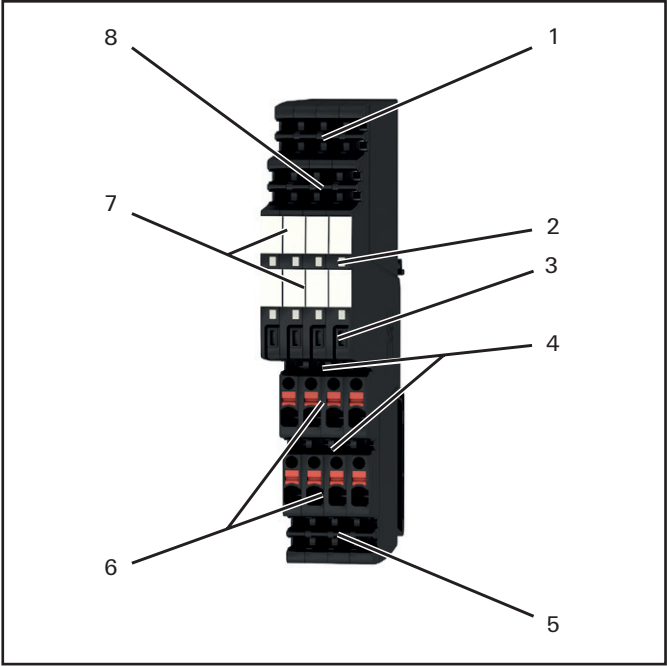


AMG ELM-xF CL2 block diagram

The reset button "R" can be used to individually reset and switch on/off the load monitors.

Technical data	AMG ELM-1F CL2		AMG ELM-2F CL2	AMG ELM-4F CL2
General				
Rated voltage	24 V DC			
Operational voltage range	18 ... 30 V DC			
Low voltage detection	Yes (supply voltage < 18 V DC)			
Surge detection	Yes (supply voltage > 31,2 V DC)			
Rated output current I _{OUT, rated}	1 A	2 A	4 A	
Current consumption	I _{OUT} + 30 mA			
Voltage drop at I _{OUT, rated}	200 mV			
Capacitive load	4 700 µF			
Overtemperature protection	No			
Width	6,1 mm			
Tripping behaviour				
Adjustable	No			
Tripping current I _T	1 A	2 A	4 A	
Characteristics (normal)	1A _{CL2}	2A _{CL2}	4A _{CL2}	
Characteristics (delayed)	No			
Bus decoupling, bus coupling				
Alarm (tripped, fault)	Yes			
Overload advance warning (I>90%)	No			
Reset	Yes			
ON/OFF	Yes			
Button function				
Reset	Yes			
ON/OFF	Yes			

6.4 AMG ELM-Qxxxx

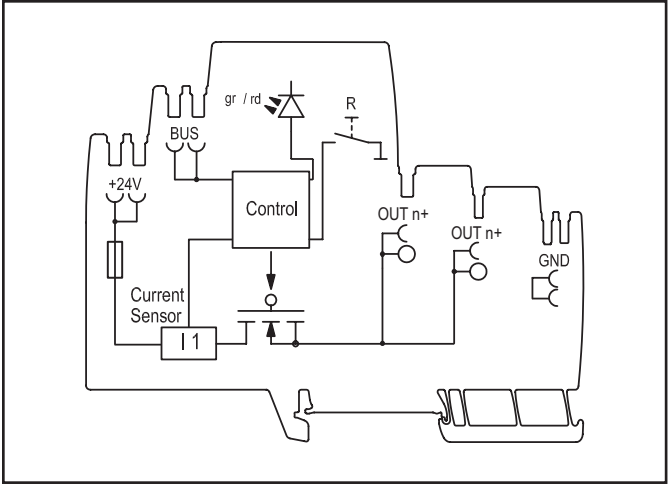


AMG ELM-Qxxxx

- 1 +24 V main strand connection (+24 V)
- 2 LED
- 3 Reset button "R"
- 4 PLUS output connection (cross-connector)
- 5 GND main strand connection (0 V)
- 6 PLUS output connections (2.5 mm²)
- 7 Markers
- 8 Internal signal line connection

The AMG ELM-Qxxx 4-channel electronic load monitors monitor individual load circuits and disconnect them in the event of a short circuit or overload. The tripping current and the tripping characteristic are fixed.

LED	Colour	Meaning
LED	Green	Fault-free operation
	Red	Load monitor switched off
	Red, flashing	Load monitor tripped
	Red, flashing fast	Internal error
	Orange (red and green)	Overtemperature detected
	Red, green, alternating	Reset button deactivated for 30 seconds



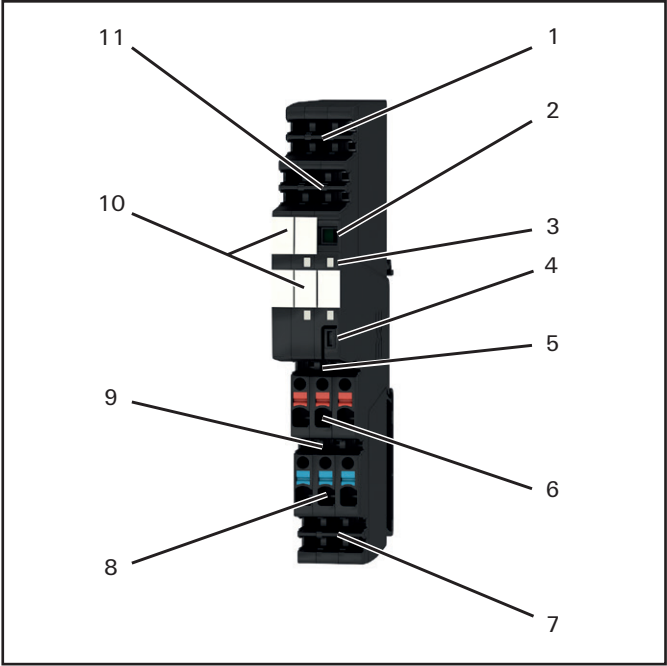
AMG ELM-Qxxxx block diagram (illustration of individual channel)

The reset button "R" can be used to individually reset and switch on/off the load monitors.

The 4-channel load monitors have two plus outputs per channel. The minus potential for the connected load circuits must be provided via potential distribution terminals.

Technical data	AMG ELM Q2222	AMG ELM Q4444	AMG ELM Q6666	AMG ELM Q2244	AMG ELM Q2266
General					
Rated voltage	24 V DC				
Operational voltage range	18 – 30 V DC				
Low voltage detection	Yes (supply voltage < 18 V DC)				
Surge detection	Yes (supply voltage > 31.2 V DC)				
Rated output current I _{OUT, rated}	4x 2 A	4x 4 A	4x 6 A	2x 2 A + 2x 4 A	2x 2 A + 2x 6 A
Current consumption	I _{OUT} + 4 x 30 mA				
Voltage drop at I _{OUT, rated}	200 mV				
Capacitive load	10,000 µF per channel		15,000 µF per channel	10,000 µF per channel	10,000 µF per 2 A channel 15,000 µF per 6 A channel
Overtemperature protection	Yes, per channel				
Width	24.4 mm				
Tripping behaviour					
Adjustable	No				
Tripping current I _T	2 A	4 A	6 A	2 A, 4 A	2 A, 6 A
Characteristics (normal)	2A _N	4A _N	6A _N	2A _N , 4A _N	2A _N , 6A _N
Characteristics (delayed)	No				
Bus decoupling, bus coupling					
Alarm (tripped, fault)	Yes				
Overload advance warning	No				
Reset	Yes				
ON/OFF	Yes				
Button function					
Reset	Yes, per channel				
ON/OFF	Yes, per channel				

6.5 AMG ELM-xD C0

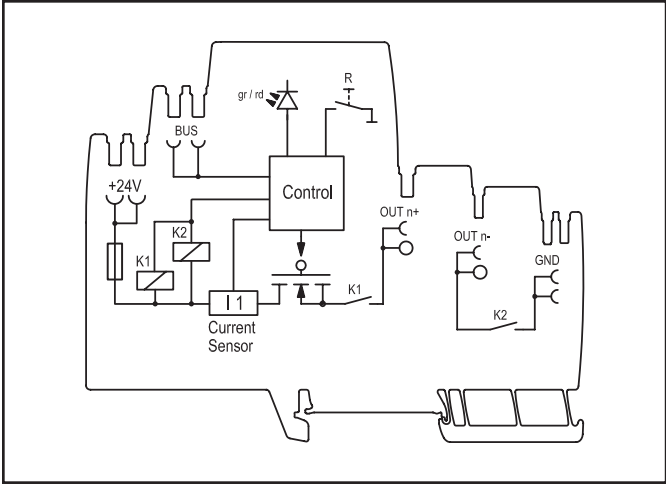


AMG ELM-6D C0, AMG ELM-10D C0

- 1 +24 V main strand connection (+24 V)
- 2 Thumbwheel switch
- 3 LED
- 4 Reset button "R"
- 5 PLUS output connection (cross-connector)
- 6 PLUS output connection (2.5 mm²)
- 7 GND main strand connection (0 V)
- 8 MINUS output connection (2.5 mm²)
- 9 MINUS output connection (cross-connector)
- 10 Markers
- 11 Internal signal line connection

The AMG ELM-6D C0 and AMG ELM-10D C0 electronic load monitors monitor individual load circuits and disconnect them in the event of a short circuit or overload. Two 1-pole relays ensure all-pole functional load separation in the event of switch-off. The current value and the tripping characteristic are selected using the thumbwheel switch.

LED	Colour	Meaning
LED	Green	Fault-free operation
	Red	Load monitor switched off
	Red, flashing	Load monitor tripped
	Red, flashing fast	Internal error
	Orange (red and green)	Overtemperature detected
	Red, green, alternating	Reset button deactivated for 30 seconds



AMG ELM-6D C0, AMG ELM-10D C0 block diagram

The reset button "R" can be used to individually reset and switch on/off the load monitors.

The thumbwheel switch has ten settings. The current values of the standard tripping characteristic are shown with white numbers on a black background. The current values of the delayed tripping characteristic are shown with black numbers on a white background.

AMG ELM-6D C0

Thumbwheel switch	Characteristic
1	1A _N
2	2A _N
3	3A _N
4	4A _N
6	6A _N
1	1A _T
2	2A _T
3	3A _T
4	4A _T
6	6A _T

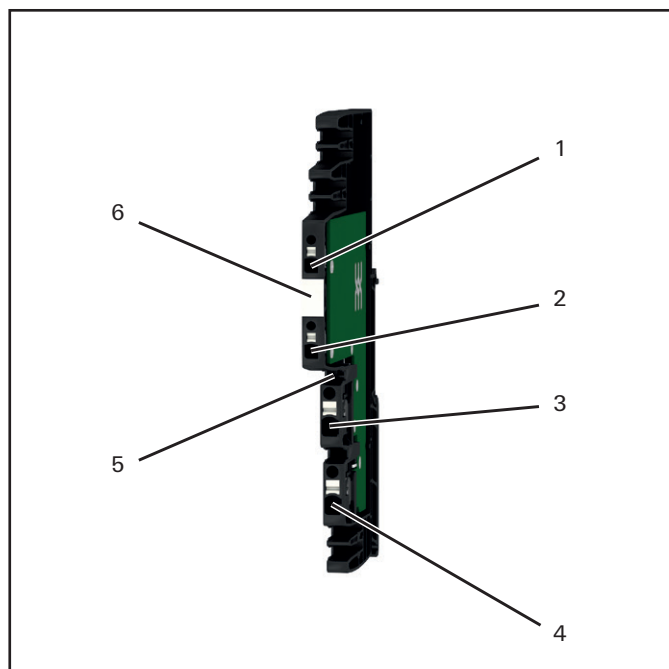
AMG ELM-10D C0

Thumbwheel switch	Characteristic
4	4A _N
6	6A _N
8	8A _N
10	10A _N
4	4A _T
6	6A _T
8	8A _T
10	10A _T
10	10A _T
10	10A _T

Technical data	AMG ELM-6D C0	AMG ELM-10D C0
General		
Rated voltage	24 V DC	
Operational voltage range	18 – 30 V DC	
Low voltage detection	Yes (supply voltage < 18 V DC)	
Surge detection	Yes (supply voltage > 31.2 V DC)	
Rated output current I _{OUT, rated}	6 A	10 A
Current consumption	I _{OUT} + 50 mA	
Voltage drop at I _{OUT, rated}	200 mV	250 mV
Capacitive load	15,000 µF	20,000 µF
Overtemperature protection	Yes	
Width	18.3 mm	
Tripping characteristic		
Adjustable	Yes	
Tripping current I _T	1 A, 2 A, 3 A, 4 A, 6 A	4 A, 6 A, 8 A, 10 A
Characteristics (normal)	1A _N , 2A _N , 3A _N , 4A _N , 6A _N	4A _N , 6A _N , 8A _N , 10A _N
Characteristics (delayed)	1A _T , 2A _T , 3A _T , 4A _T , 6A _T	4A _T , 6A _T , 8A _T , 10A _T
Bus decoupling, bus coupling		
Alarm (tripped, fault)	Yes	
Overload advance warning	Yes	
Reset	Yes	
ON/OFF	Yes	
Button function		
Reset	Yes	
ON/OFF	Yes	
Relay outputs		
Contact type	NO contact	
Galvanic isolation	All poles, functional	

7 Potential distribution terminals

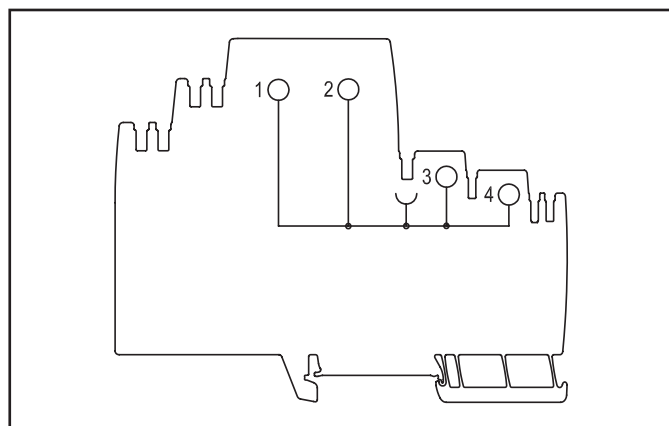
7.1 AMG PD... potential distribution terminal



AMG PD...

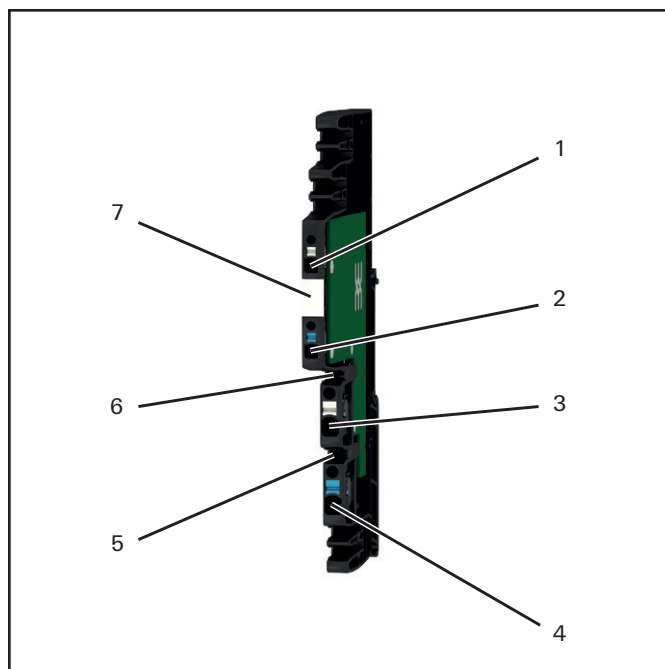
- 1 Connection 1 (1.5 mm²)
- 2 Connection 2 (1.5 mm²)
- 3 Connection 3 (2.5 mm²)
- 4 Connection 4 (2.5 mm²)
- 5 PLUS output connection (cross-connector)
- 6 Marker

The AMG PD potential distribution terminal is used to replicate the PLUS output of the AMG ELM load monitors. The potential is fed in exclusively from the PLUS output of the load monitor via a cross-connector..



AMG PD... block diagram

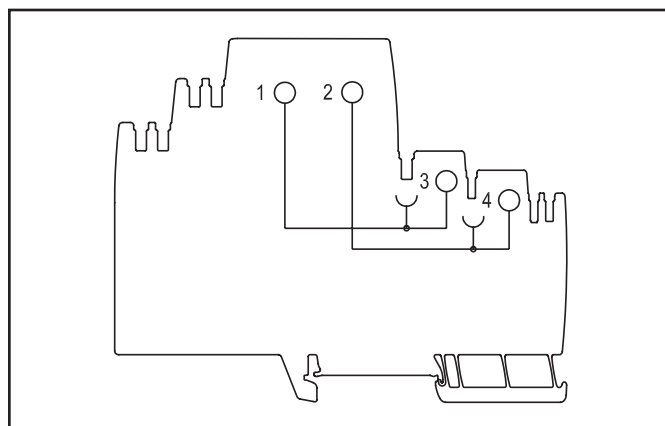
7.2 AMG OD... potential distribution terminal



AMG OD...

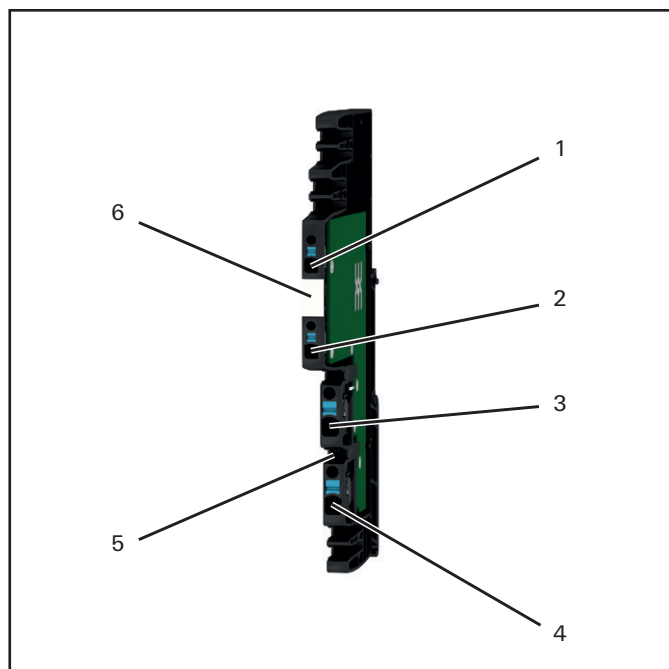
- 1 Connection 1 (1.5 mm²)
- 2 Connection 2 (1.5 mm²)
- 3 Connection 3 (2.5 mm²)
- 4 Connection 4 (2.5 mm²)
- 5 MINUS output connection (cross-connector)
- 6 PLUS output connection (cross-connector)
- 7 Marker

The AMG OD potential distribution terminal is used to replicate the outputs of the AMG ELM load monitors. The potential is fed in exclusively from the outputs of the load monitor via cross-connectors.



AMG OD... block diagram

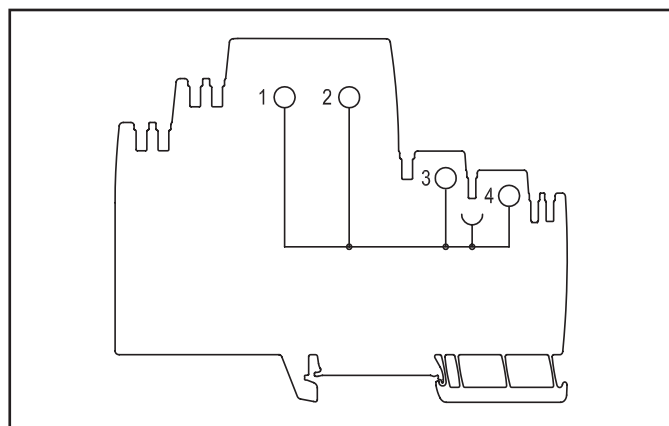
7.3 AMG MD... potential distribution terminal



AMG MD...

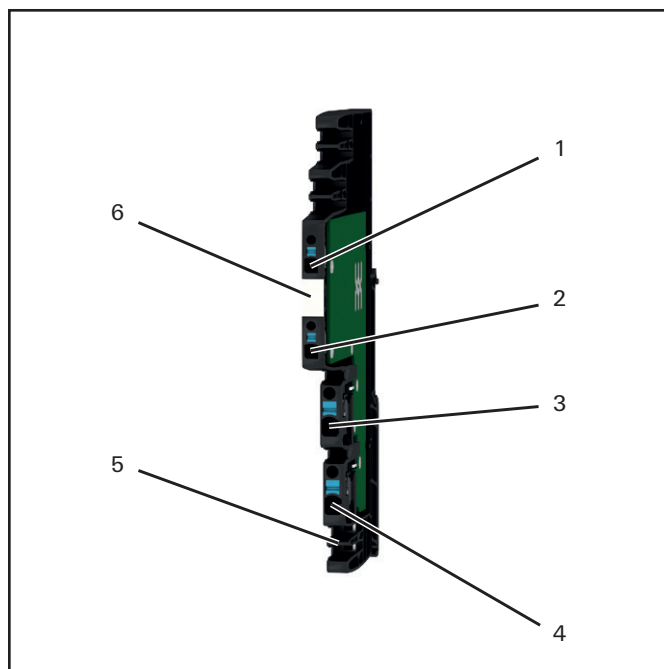
- 1 Connection 1 (1.5 mm²)
- 2 Connection 2 (1.5 mm²)
- 3 Connection 3 (2.5 mm²)
- 4 Connection 4 (2.5 mm²)
- 5 MINUS output connection (cross-connector)
- 6 Marker

The AMG MD potential distribution terminal is used to replicate the MINUS output of the AMG ELM load monitors. The potential is fed in exclusively from the MINUS output of the load monitor via a cross-connector.



AMG MD... block diagram

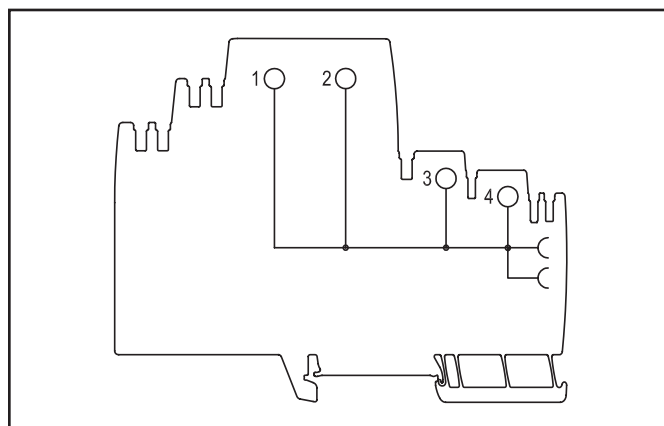
7.4 AMG XMD... potential distribution terminal



AMG XMD...

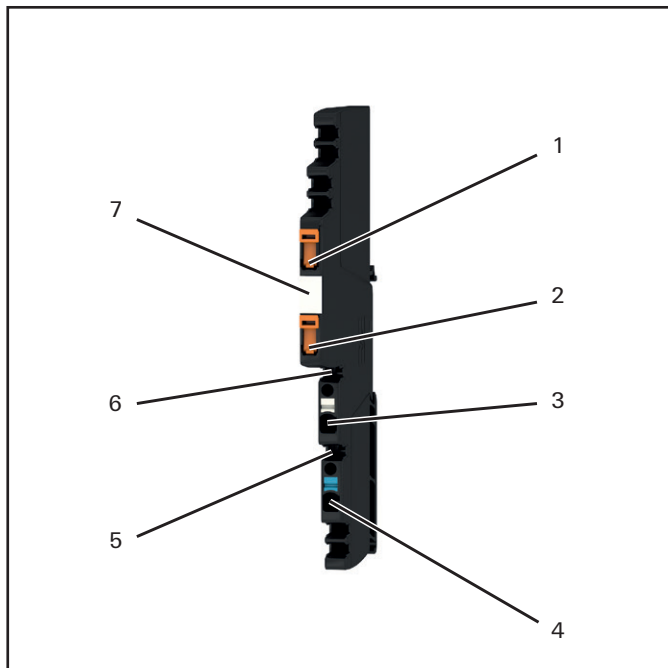
- 1 Connection 1 (1.5 mm²)
- 2 Connection 2 (1.5 mm²)
- 3 Connection 3 (2.5 mm²)
- 4 Connection 4 (2.5 mm²)
- 5 GND main strand connection (0 V)
- 6 Marker

The AMG XMD potential distribution terminal is used to replicate the connections to the GND main strand. The potential is fed in exclusively from the GND main strand via an internal connection.



AMG XMD... block diagram

7.5 AMG DIS... potential distribution terminal

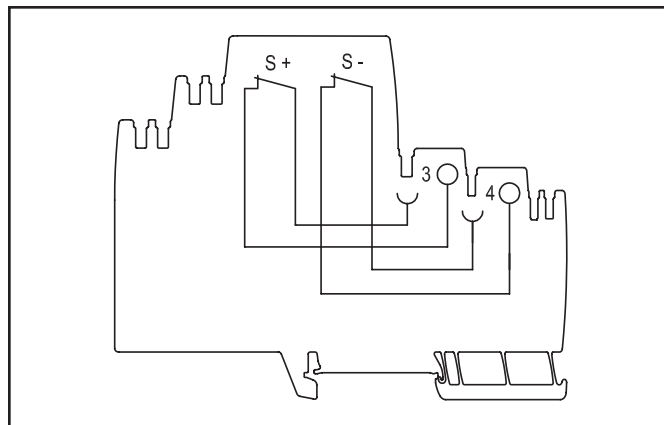


AMG DIS...

- 1 Disconnecting lever S+
- 2 Disconnecting lever S-
- 3 Connection 3 (2.5 mm²)
- 4 Connection 4 (2.5 mm²)
- 5 MINUS output connection (cross-connector)
- 6 PLUS output connection (cross-connector)
- 7 Marker


The AMG DIS potential distribution terminal is used to replicate the outputs of the AMG ELM load monitors. The potential is fed in exclusively from the outputs of the load monitor via cross-connectors.

The disconnecting levers can be used for testing purposes to electrically isolate the connections to the outputs of the load monitors.



AMG DIS... block diagram

8 Installation and wiring


	WARNING
	<p>Explosion risk!</p> <p>During installation work, sparks can form and surfaces may become excessively hot.</p> <ul style="list-style-type: none"> ▶ Before installation, make sure that there is not a potentially explosive atmosphere! ▶ For applications in explosive risk zones, observe the installation and construction requirements of EN 60079-15 and/or country-specific regulations.

terminal rail must be fitted before the maxGUARD station is installed.

The terminal rail must be attached to the substrate at intervals of at least 20 cm to protect it from vibration and impact. If the terminal rail is mounted on earthed mounting plates, it does not have to be separately earthed.


Stripping lengths

The required stripping length for every Weidmüller product is specified in mm (6 mm ± 0.5 mm, ≥ 10 mm ± 1 mm). The specified value must be complied with. If wire-end ferrules are used, the stripping length for the respective wire-end ferrule applies. The outside dimensions of crimped wire-end ferrules must conform with IEC-60947-1, table 7. For further information, see the general technical data in section 3.7.


	WARNING
	<p>Dangerous contact voltage!</p> <ul style="list-style-type: none"> ▶ Carry out installation and wiring work on the maxGUARD station only when the power supply is disconnected. ▶ Make sure that the place of installation (panel etc.) has been disconnected from the power supply!

Unpacking the delivery

- ▶ Please check the delivery for completeness and transport damage.
- ▶ Please report any transport damage immediately to the respective transport company.

 This section describes the installation and wiring of a fully configured maxGUARD station in accordance with installation drawings and wiring diagrams.

For planning-related tasks, see the notes in chapter 4.

	ATTENTION
	<p>The product can be destroyed by electrostatic discharge!</p> <p>The components in the maxGUARD series can be destroyed by electrostatic discharge.</p> <ul style="list-style-type: none"> ▶ Please make sure that persons and work equipment are sufficiently earthed!

8.1 Preparations for installation

The u-remote station is designed for installation in control cabinets, terminals or switch boxes. When fully assembled, a maxGUARD station meets the requirements of protection class IP20.

Environmental conditions

Make sure that the permitted environmental conditions for installation and operation are observed (see general technical data in section 3.7).

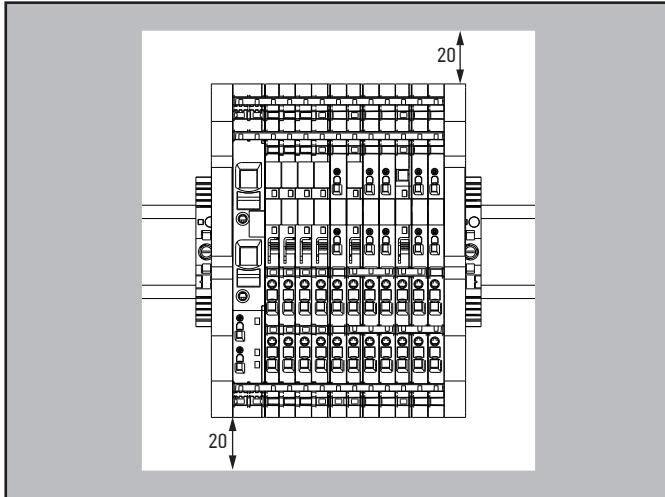
Terminal rail

The maxGUARD station is designed for installation on a terminal rail made from steel or galvanised steel in accordance with EN 60715 (TH 35-7.5, e.g. Weidmüller TS 35X7.5). The

- ▶ Unpack all parts and sort the modules into the installation sequence as per the instructions.
- ▶ Dispose of all packaging in accordance with the local disposal guidelines. The cardboard packaging from the maxGUARD components can be sent for paper recycling.

Installation position and mounting distances

A maxGUARD station can be operated in any installation position without derating. The mounting distance must be at least 20 mm on all sides. The minimum permissible conductor bending radii must be observed.



Minimum distances for installation

Preparation and required tools

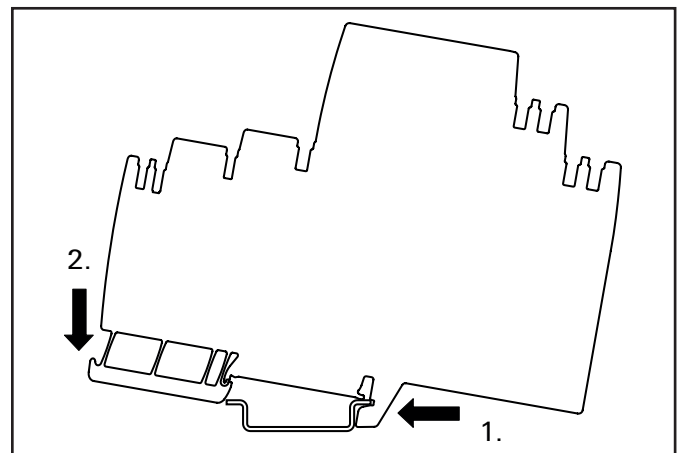
To install the maxGUARD station, you will need:

- slotted screwdriver:
 - blade 2 mm, e.g. Weidmüller SDS 0.4X2.0X60 (Order No. 9037160000)
 - blade 3.5 mm, e.g. Weidmüller SDS 0.6X3.5X100 (Order No. 9008330000)
 - blade 6.5 mm, e.g. Weidmüller SDS 1.2X6.5X150 (Order No. 9009010000)
 - cutting tool for cross-connectors, e.g. Weidmüller KT 14 (Order No. 1157820000)
- Lay out the modules in the intended sequence.
 - Lay out the required cross-connectors according to colour and length.
 - Lay out the printed markers.
 - Check whether the terminal rail feet can be moved on both end brackets. If necessary, loosen the mounting screw until the terminal rail feet can be moved freely.

8.2 Installing the maxGUARD station

	WARNING
	Explosion risk! <ul style="list-style-type: none"> ► Before starting any work, make sure that there is not a potentially explosive atmosphere!
	WARNING
	Dangerous contact voltage! <ul style="list-style-type: none"> ► Carry out installation and wiring work on the maxGUARD station only when the power supply is disconnected. ► Make sure that the place of installation (panel etc.) has been disconnected from the power supply!
	ATTENTION
	The product can be destroyed by electrostatic discharge! <p>The components in the maxGUARD series can be destroyed by electrostatic discharge.</p> <ul style="list-style-type: none"> ► Please make sure that persons and work equipment are sufficiently earthed!

Installing a module



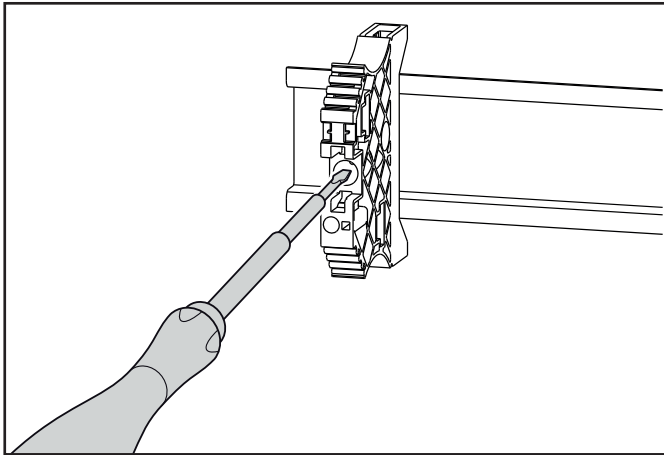
Installing a module

- Place the module on the terminal rail as shown.
- Push down the module in the direction of the terminal rail to engage the clip-in foot on the terminal rail.

Installing an end bracket



End brackets must be installed in order to fix the maxGUARD station in place and ensure fault-free operation.



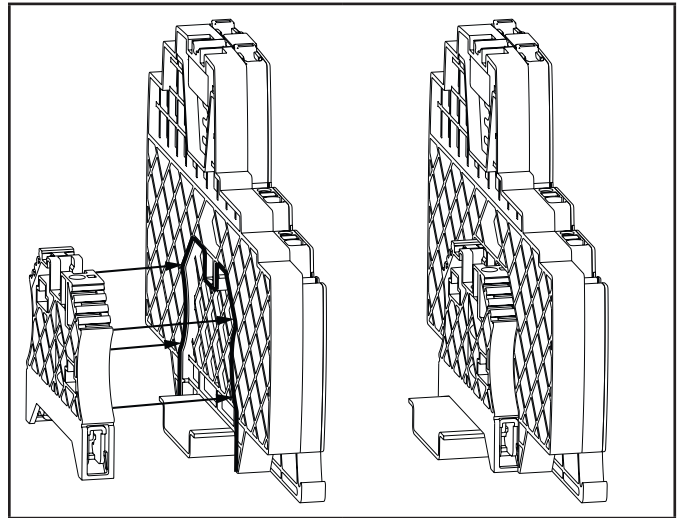
Installing an end bracket

- Place the WEW 35/2 end bracket on the terminal rail and screw down tightly (3.5 mm screwdriver).

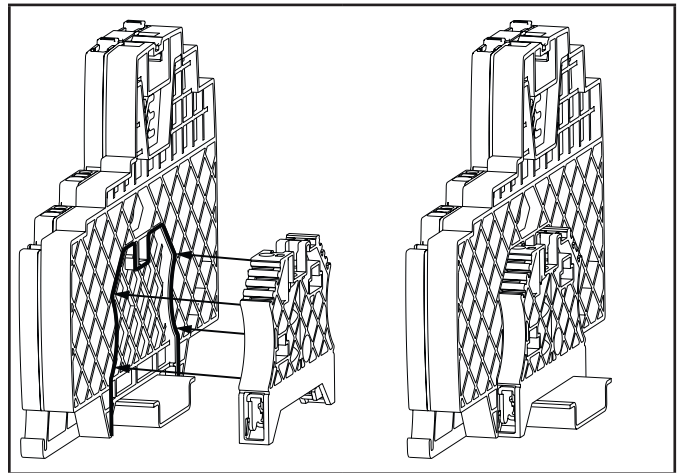
Installing an end plate



To ensure IP20 protection, end plates must always be used if cut cross-connectors are used for the main strands or if the maxGUARD station ends with a potential distribution terminal.



Installing an end bracket with an end plate (left)

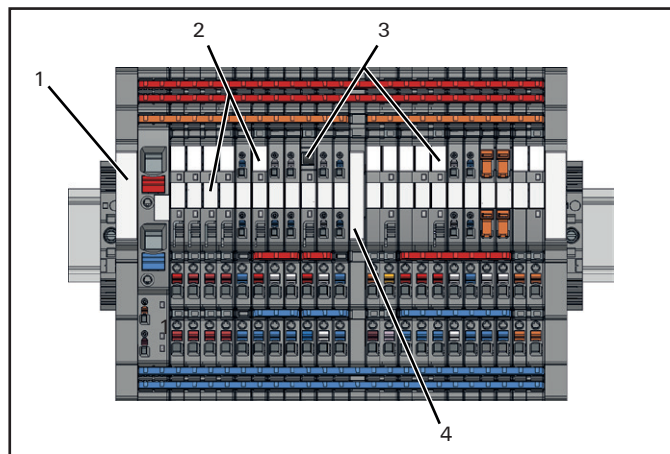


Installing an end bracket with an end plate (right)

End plates are not snapped on to the terminal rail and must therefore be installed between a module and an end bracket. The recess in the end plate is used to accommodate the end bracket.

- Install the end plate as shown in the diagrams.
- Screw down the WEW 35/2 end bracket on the terminal rail tightly (3.5 mm screwdriver).

8.3 Attaching markers

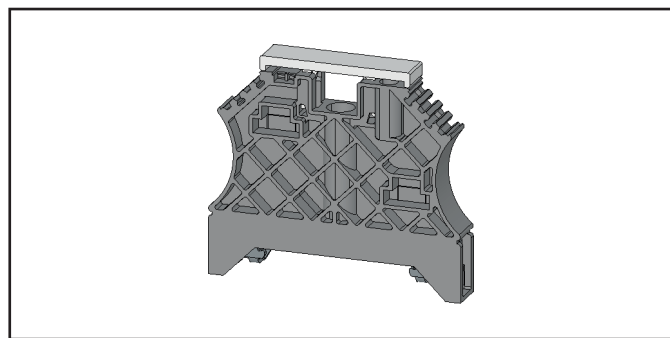


Installing an end bracket

- 1 WAD 8 group marker or EM 8/30 end bracket marker
- 2 WS terminal marker for 6 mm pitch (WS 10/6 or WS 8/6)
- 3 WS terminal marker for 6 mm pitch (WS 10/6 or WS 8/6)
- 4 WAD 5 group marker



We recommend fitting the thumbwheel switch of adjustable load monitors with a terminal marker displaying the adjusted value.



Fitting a marker on an end bracket



The WEW 35/2 end brackets can only be fitted with a marker if they are not installed together with an end plate.

8.4 Installing cross-connectors



WARNING

Explosion risk!

- ▶ Before starting any work, make sure that there is not a potentially explosive atmosphere!
- ▶ For applications in explosive risk zones, observe the installation and construction requirements of EN 60079-15 and/or country-specific regulations.



WARNING

Dangerous contact voltage!

- ▶ Carry out installation and wiring work on the maxGUARD station only when the power supply is disconnected.
- ▶ Make sure that the place of installation (panel etc.) has been disconnected from the power supply!

ATTENTION

Risk of short circuit due to non-insulated cross-connectors!

- ▶ Insert an AMG PP separation plate wherever there are bare cut edges next to one another.

ATTENTION

Risk of malfunction!

- ▶ Do not connect multiple load monitors in parallel or in series.
- ▶ Never connect the signal contacts of the control and alarm modules to the outputs of the load monitors.

ATTENTION

The product can be destroyed!

If the total current is over 20 A, all main strands must each be equipped with two cross-connectors.

Once the maxGUARD station has been mechanically installed, the cross-connectors can be fitted in accordance with the installation drawing or wiring diagram.

To this end, only the ZQV 4N/x cross-connectors specified in section 3.6 shall be used.

Whenever possible, use uncut cross-connectors insulated on both sides. Cut cross-connectors may only be used if cross-connectors with more than ten poles are required.

If cut cross-connectors are used for the load outputs or the internal signal line, the bare cut edges must be insulated against short circuits with separation plates.

The individual contact elements of the cross-connectors do not need to be removed. If a module cannot be connected to a specific main connection channel, the corresponding cross-connection contacts will not be available. Installed cross-connectors will subsequently not be connected to the module.



The block diagrams of the individual modules show the active cross-connection contacts. The respective block diagram is printed on the side of the module (see chapters 5 to 7).

The use of different-coloured cross-connectors simplifies assembly and enhances the clarity of the maxGUARD station.

- ▶ Cut the 50-pole cross-connectors to the required length using the cutting tool.
- ▶ Install the cross-connectors in accordance with the installation drawing or wiring diagram.

8.5 Wiring

	WARNING
	<p>Explosion risk!</p> <ul style="list-style-type: none"> ▶ Before starting any work, make sure that there is not a potentially explosive atmosphere! ▶ For applications in explosive risk zones, observe the installation and construction requirements of EN 60079-15 and/or country-specific regulations.

	WARNING
	<p>Dangerous contact voltage!</p> <ul style="list-style-type: none"> ▶ Carry out installation and wiring work on the maxGUARD station only when the power supply is disconnected. ▶ Make sure that the place of installation (panel etc.) has been disconnected from the power supply!

ATTENTION
<p>Risk of destruction if polarity is incorrect!</p> <ul style="list-style-type: none"> ▶ Connect devices with the correct polarity. ▶ Check that all connecting lines are firmly in place.

Once the maxGUARD station has been mechanically installed and all cross-connectors have been correctly fitted, the wiring can be carried out in accordance with the wiring diagram.

Only copper conductors with a suitable cross-section may be connected.



The wire cross-sections must be measured according to the internal fuse value, not the tripping current of the electronic load monitor (see section 3.5).

We recommend using the following wire-end ferrules:

Wire-end ferrules with plastic collars

Wire cross-section	1.5 mm ² connection	2.5 mm ² connection	16 mm ² connection
0.50 mm ²	9025870000	9025870000	-
0.75 mm ²	9025860000	9025860000	-
1.00 mm ²	9025950000	9025950000	-
1.50 mm ²	0635100000	0635100000	-
2.50 mm ²	-	9019170000	9019180000
4.00 mm ²	-	-	9019210000
6.00 mm ²	-	-	0565700000
10.00 mm ²	-	-	0565800000
16.00 mm ²	-	-	0566000000

Twin wire-end ferrules with plastic collars

Wire cross-section	1.5 mm ² connection	2.5 mm ² connection
0.50 mm ²	9037210000	9037210000
0.75 mm ²	9202820000	9202820000
1.00 mm ²	9036330000	9037270000
1.50 mm ²	-	9037300000

The outside dimensions of crimped wire-end ferrules must conform with IEC-60947-1, table 7. We recommend the following tools for crimping:

- crimping tool for wire-end ferrules from 0.25 mm² to 6 mm² with a trapezoidal indentation crimp, type: PZ 6/5 ZERT (Order No. 9017900000).
- crimping tool for wire-end ferrules from 6 mm² to 16 mm² with an indentation crimp, type: PZ 16 ZERT (Order No. 9017340000).

maxGUARD modules are equipped with PUSH IN connections. Solid and fine-strand wires with wire-end ferrules can be inserted without the need for tools.

Fine-strand wires can be inserted using tools.

- Secure the connection pusher with a slotted screwdriver and simultaneously insert the wire.

Slotted screwdriver blade widths

1.5 mm ² connection	2.5 mm ² connection	16 mm ² connection
2 mm	3.5 mm	6.5 mm



For 16 mm² feed-in module connections, wires can only be inserted with tools.

- Each wire must be the optimal length so that the bending radii comply with the manufacturer's specifications.
- Insulate the wires in accordance with the specifications in section 3.7.
- Connect all wires in accordance with the wiring diagram.




All wires used to wire the maxGUARD station can be fed in from below. A cable conduit above the maxGUARD station is not required.

8.6 Insulation tests

Insulation tests on the maxGUARD station must be carried out before each commissioning and in accordance with the respective national provisions.

9 Operation

	WARNING
	<p>Explosion risk!</p> <p>► Before starting any work, make sure that there is not a potentially explosive atmosphere!</p>

ATTENTION
<p>The product can be destroyed!</p> <p>► Before each commissioning, carry out an insulation test of the station.</p>

ATTENTION
<p>The product can be destroyed!</p> <p>► Make sure that the output voltage is not higher than the input voltage on a permanent basis.</p>

9.1 Commissioning

Before you start the commissioning work, the following requirements must be fulfilled:

- The maxGUARD station must be fully assembled and wired.
- The adjustable load monitors must be correctly configured.
- The power supply must be connected.
- The maxGUARD station must be connected to a control unit if necessary.

- Switch on the power supply.



The electronic load monitors save their operational state. After the power supply is switched back on, the load monitor automatically switches to its last operational state before powering down.



The electronic load monitors are switched off ex works. When first commissioned, the load monitors must therefore be switched on individually.

- Switch on all load monitors individually by pressing the respective reset button "R".

9.2 Switching load monitors on/off



To avoid unexpected operational states, individually switched off load monitors ignore the reset and ON/OFF signals on the internal signal line. Individually switched off load monitors can only be switched on individually.

Switching load monitors on/off individually

- While switched off, press the reset button "R" for 0.1 to 2 seconds.

The load monitor will switch to ready state and the LED will illuminate green.

- While in ready state, press the reset button "R" for 0.1 to 2 seconds.

The load monitor will switch off and the LED will illuminate red.

Manually switching a segment on/off

You can switch on/off all load monitors in a segment using the reset button "R" on an AMG CM control module. All load monitors in the segment must be connected to the control module via the internal signal line.

- Press the reset button "R" on the control module for 0.1 to 2 seconds to couple the ON/OFF signal into the internal signal line.

All ready and tripped load monitors in the segment will switch off and the LEDs will illuminate red.

Switching a segment on/off with a control unit

You can switch off all load monitors in a segment using the ON/OFF signal of an AMG CM control module. All load monitors in the segment must be connected to the control module via the internal signal line.

- To switch off all load monitors in the segment, set the ON/OFF input of the control module to +24 V for longer than 100 ms.

The ON/OFF LED on the control module will illuminate yellow. All load monitors will switch off. The LEDs on the load monitors will illuminate red. The load monitors will remain switched off by permanently setting the level to 24 V.

- To switch all load monitors in a segment back on, set the ON/OFF input of the control module to 0 V.

The ON/OFF LED on the control module will switch off. All load monitors will switch to ready state. The LEDs on the load monitors will illuminate green.

9.3 Resetting load monitors



To avoid unexpected operational states, manually switched off load monitors ignore the reset and ON/OFF signals. Manually switched off load monitors can only be started up manually.

Manual resetting

You can reset individual tripped load monitors using the reset button “R”.

- ▶ While tripped, press the reset button “R” for 0.1 to 2 seconds.

The load monitor will switch off and the LED will illuminate red.

- ▶ While switched off, press the reset button “R” for 0.1 to 2 seconds.

The load monitor will switch to ready state and the LED will illuminate green.

Resetting with a control unit

You can reset all tripped load monitors in a segment using the reset signal. The segment must contain an AMG CM control module or an AMG FIM-C active feed-in module.

- ▶ To reset all load monitors in the segment, set the reset input of the control module or the active feed-in module to +24 V for longer than 100 ms.

The reset LED or the ON/OFF LED will illuminate yellow. All tripped load monitors will switch to ready state. The LEDs on the load monitors will illuminate green.

9.4 Setting a new characteristic

- ▶ Turn the thumbwheel switch until the value for the desired characteristic is visible in the window (see chapter 6).
- ▶ Press the reset button “R” on the load monitor for 0.1 to 2 seconds.

The load monitor will switch off and the LED will illuminate red.

- ▶ While switched off, press the reset button “R” for 0.1 to 2 seconds.

The load monitor will switch to ready state and the LED will illuminate green. The new characteristic will now be active.

10 Disassembly and disposal

10.1 Required tools


To disassemble the maxGUARD station, you will need:


- slotted screwdriver:
 - blade 2 mm, e.g. Weidmüller SDS 0.4X2.0X60 (Order No. 9037160000)
 - blade 3.5 mm, e.g. Weidmüller SDS 0.6X3.5X100 (Order No. 9008330000)
 - blade 6.5 mm, e.g. Weidmüller SDS 1.2X6.5X150 (Order No. 9009010000)
- ▶ Remove all cables and lines connected to the module.
- ▶ Remove all cross-connectors connected to the module.
- ▶ Place a screwdriver in the recess of the clip-in foot.

For feed-in modules we recommend a slotted screwdriver with a blade width of 6.5 mm. For all other modules we recommend a slotted screwdriver with a blade width of 3.5 mm.


- ▶ Press down the screwdriver in the direction of the module to release the clip-in foot.
- ▶ Remove the module.
- ▶ Please observe the instructions for proper disposal.


10.2 Disassembling a module

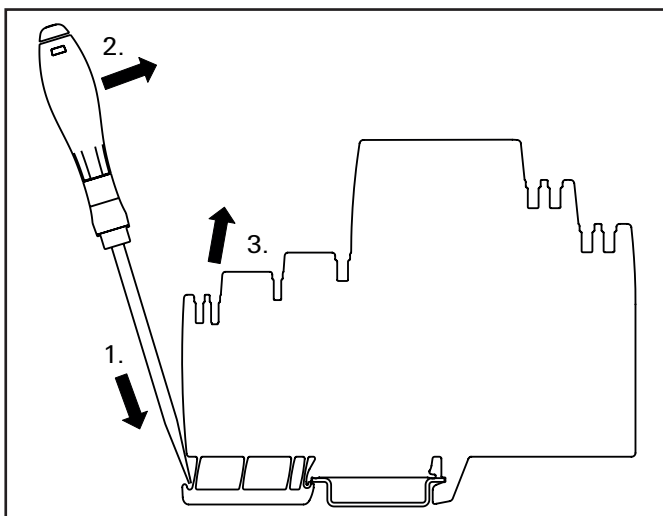
	WARNING
	Explosion risk! <ul style="list-style-type: none"> ▶ Before starting any work, make sure that there is not a potentially explosive atmosphere!

	WARNING
	Dangerous contact voltage! <ul style="list-style-type: none"> ▶ Carry out all disassembly work on the maxGUARD station only when the power supply is disconnected. ▶ Make sure that the place of installation (panel etc.) has been disconnected from the power supply!

10.3 Disassembling a maxGUARD station

	WARNING
	Explosion risk! <ul style="list-style-type: none"> ▶ Before starting any work, make sure that there is not a potentially explosive atmosphere!

	WARNING
	Dangerous contact voltage! <ul style="list-style-type: none"> ▶ Carry out all disassembly work on the maxGUARD station only when the power supply is disconnected. ▶ Make sure that the place of installation (panel etc.) has been disconnected from the power supply!




Disassembling a maxGUARD module

- ▶ Remove all cables and lines.
- ▶ Remove all cross-connectors.
- ▶ Remove the end bracket markers (if present).
- ▶ Unscrew the mounting screws on both end brackets.
- ▶ Remove the end brackets from the terminal rail.

You can now disassemble the station.

- ▶ Disassemble all modules.
- ▶ Please observe the instructions for proper disposal.

10.4 Disposing of a maxGUARD station

	<div data-bbox="427 488 619 524">ATTENTION</div> <p>maxGUARD products are subject to WEEE (EU Directive 2012/19/EU), which regulates the collection and recycling of electrical and electronic equipment.</p> <ul style="list-style-type: none">► Make sure that the products are properly disposed of!
---	--

When all maxGUARD products reach the end of their life cycle, you can return them to Weidmüller, and we will arrange for their proper disposal. This also applies to countries outside the European Union.

- Please pack the products properly and send them to your responsible distributor.

You can find the address of your respective country representative on the [Weidmüller website](#).

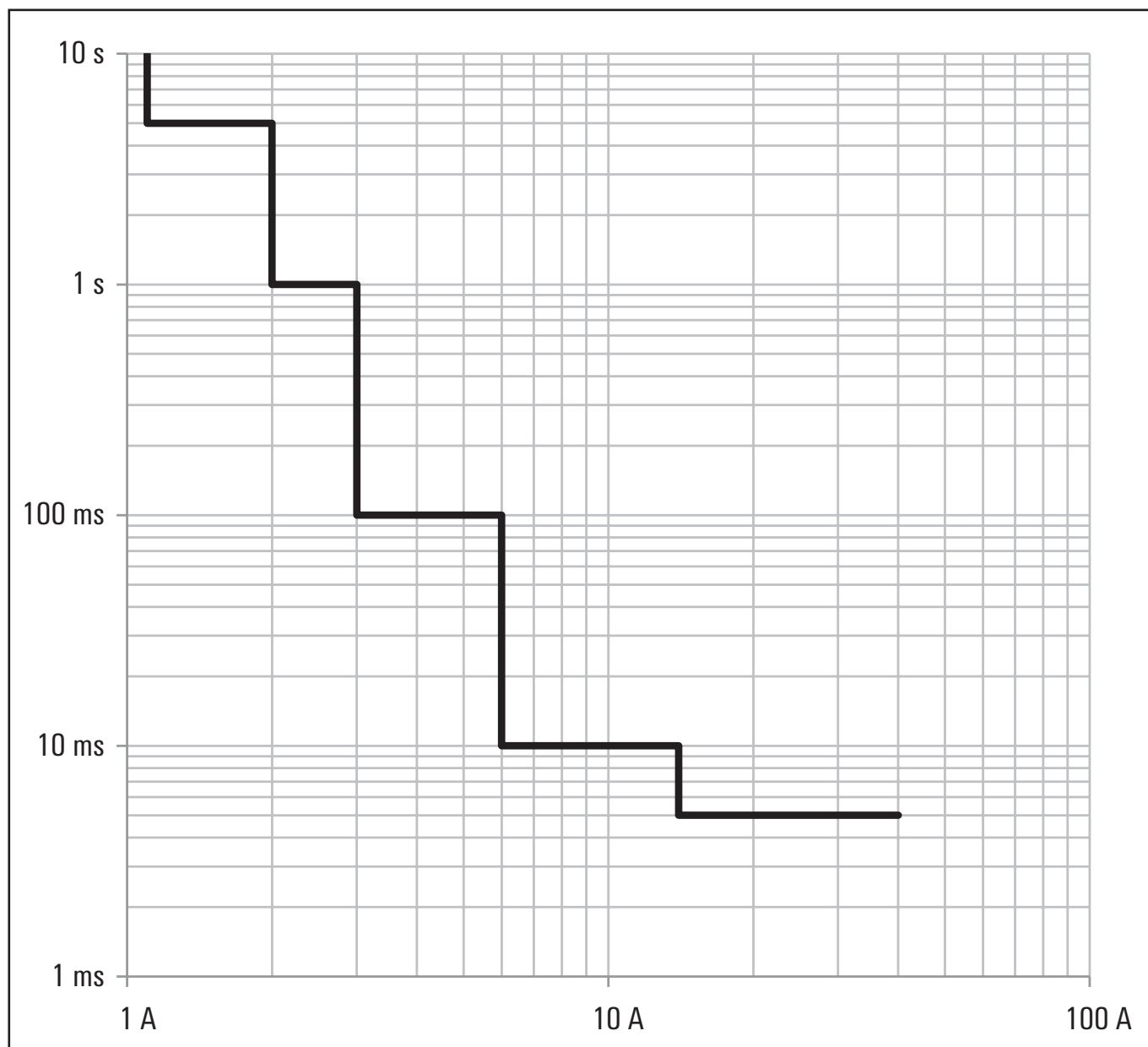
11 LED indicators and troubleshooting

LED		Status	Recommended action
AMG FIM-C... active feed-in modules			
Power LED	PWR	Green: Operating voltage OK	-
		Red, flashing (5 Hz): Low voltage detection tripped	Check the supply voltage
		Off: Module powered down	Check the supply voltage
Alarm LED	Alarm	Red: Alarm on at least one load monitor tripped	Check the LEDs of the connected load monitors and identify the load monitor affected
		Off: No alarm	-
Reset LED	Reset	Yellow: Reset tripped	-
		Off: No reset	-
AMG CM... control modules			
Power LED	PWR	Green: Fault-free operation	-
		Red, flashing (5 Hz): Supply voltage error	Check the supply voltage
		Red: Alarm on at least one load monitor tripped or internal fault	Check the LEDs of the connected load monitors and identify the load monitor affected
		Off: Module powered down	Check the supply voltage Switch on the supply voltage
ON/OFF LED	ON	Yellow: Reset tripped or ON/OFF tripped	-
		Off: No reset and no ON/OFF	-
AMG AM... alarm modules			
Alarm LED	AL	Red: Alarm on at least one load monitor tripped	Check the LEDs on the connected load monitors
		Off: No alarm	-
I>90% LED	I>	Yellow: Overload advance warning on at least one load monitor tripped	Check the LEDs on the connected load monitors
		Off: No overload advance warning	-
AMG ELM... load monitors			
LED		Green: Fault-free operation	-
		Green, flashing: Overload advance warning $I_{OUT} > 90\% I_R$ (only for adjustable load monitors)	Check the connected load circuit and reduce the load if possible
		Red: Load monitor is switched off	Switch on the load monitor with the reset button “R”
		Red, flashing: Load monitor tripped	Switch off the load monitor with the reset button “R”
		Red, flashing fast: Internal error	Check the supply voltage
		Orange (red and green simultaneously): Overtemperature detected (only for adjustable load monitors)	Wait for a recovery in temperature and reset the load monitor
		Red and green, alternating: Reset button “R” deactivated for 30 seconds due to load monitor being switched on five times in ten seconds	Wait for approx. 30 seconds and reset the load monitor Check the connected load circuit for short circuits
		off: Load monitor powered down	Check the supply voltage

ANNEX

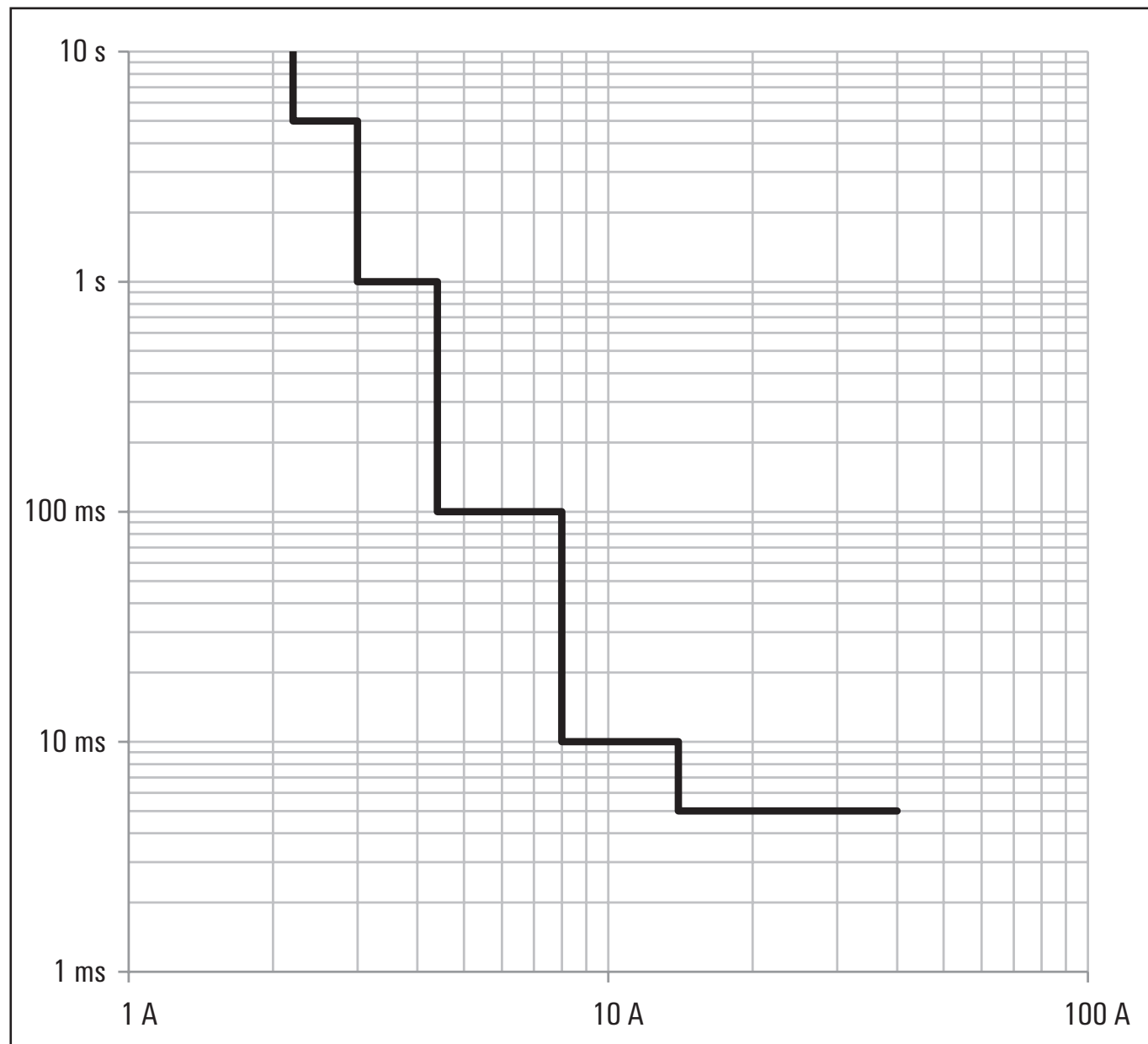
Normal tripping characteristic 1A _N	A-2
Normal tripping characteristic 2A _N	A-3
Normal tripping characteristic 3A _N	A-4
Normal tripping characteristic 4A _N	A-5
Normal tripping characteristic 6A _N	A-6
Normal tripping characteristic 8A _N	A-7
Normal tripping characteristic 10A _N	A-8
Normal tripping characteristic 12A _N	A-9
Normal tripping characteristic 1A _{CL2}	A-10
Normal tripping characteristic 2A _{CL2}	A-11
Normal tripping characteristic 4A _{CL2}	A-12
Lagged tripping characteristic 1A _T	A-13
Lagged tripping characteristic 2A _T	A-14
Lagged tripping characteristic 3A _T	A-15
Lagged tripping characteristic 4A _T	A-16
Lagged tripping characteristic 6A _T	A-17
Lagged tripping characteristic 8A _T	A-18
Lagged tripping characteristic 10A _T	A-19
Lagged tripping characteristic 12A _T	A-20

Normal tripping characteristic 1A_N



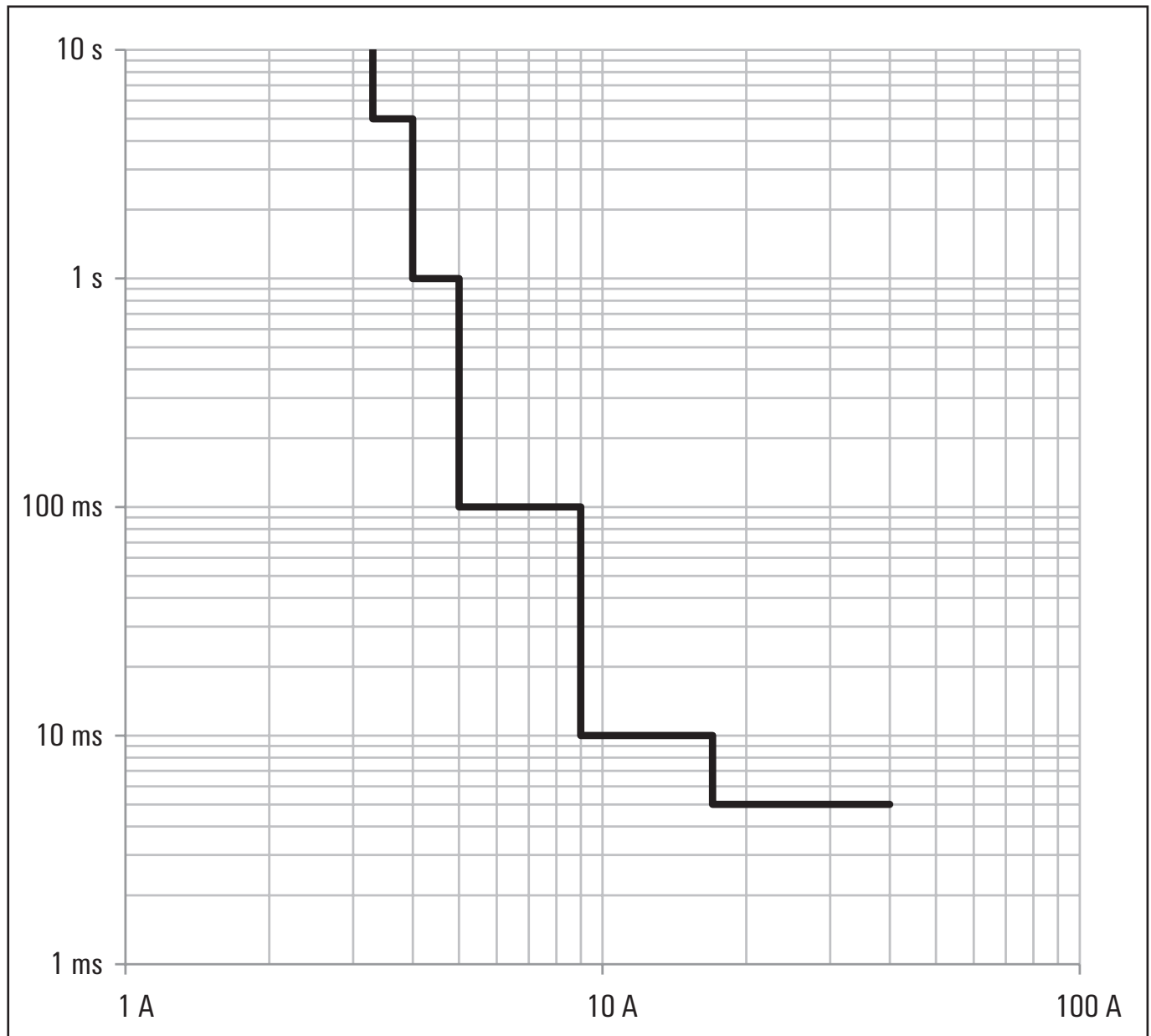
Output current	1.1 A < I ≤ 2 A	2 A < I ≤ 3 A	3 A < I ≤ 6 A	6 A < I ≤ 14 A	I > 14 A
Tripping time	5 s	1 s	100 ms	10 ms	5 ms

Normal tripping characteristic 2A_N



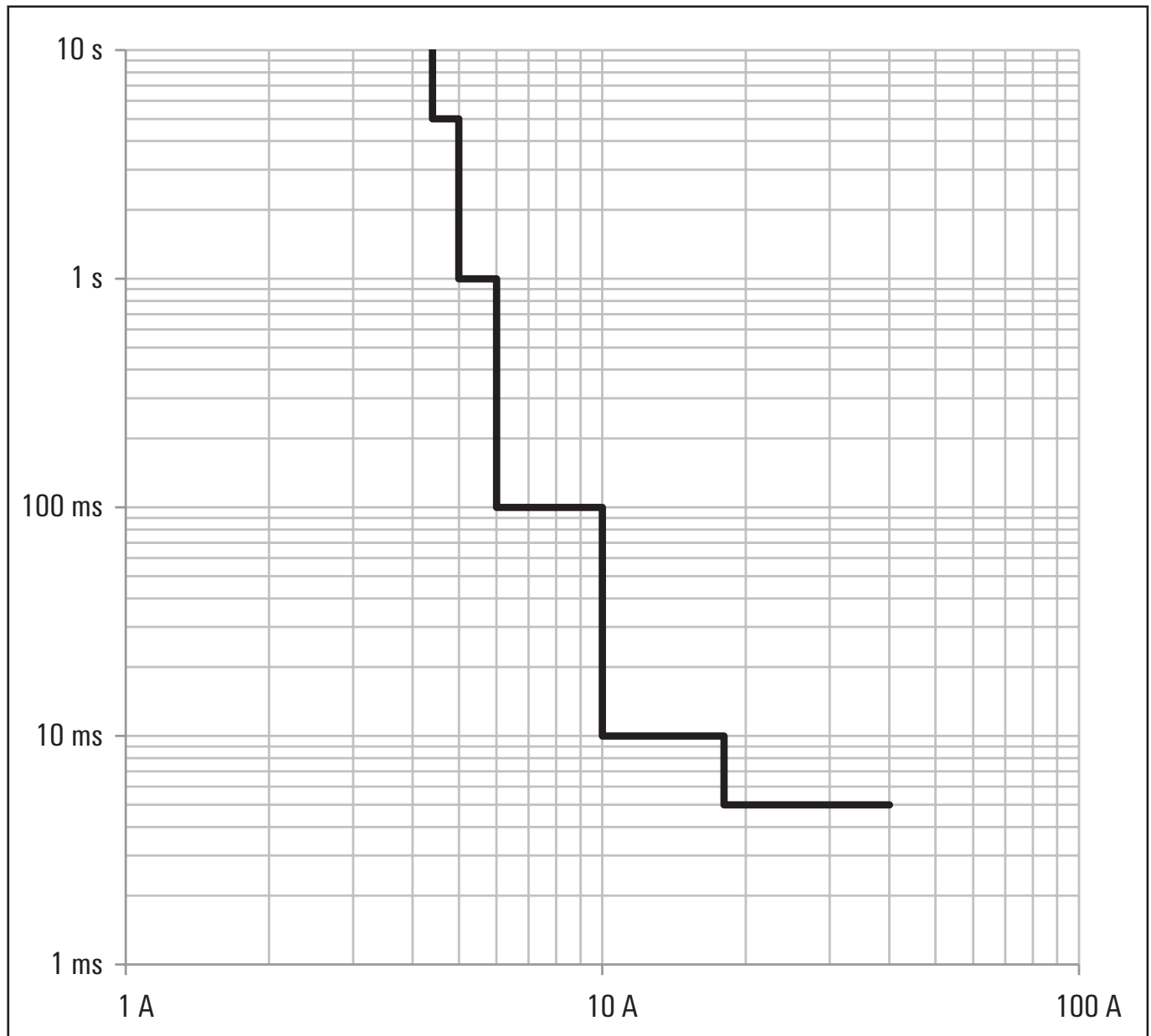
Output current	2.2 A < I ≤ 3 A	3 A < I ≤ 4.4 A	4.4 A < I ≤ 8 A	8 A < I ≤ 14 A	I > 14 A
Tripping time	5 s	1 s	100 ms	10 ms	5 ms

Normal tripping characteristic 3A_N



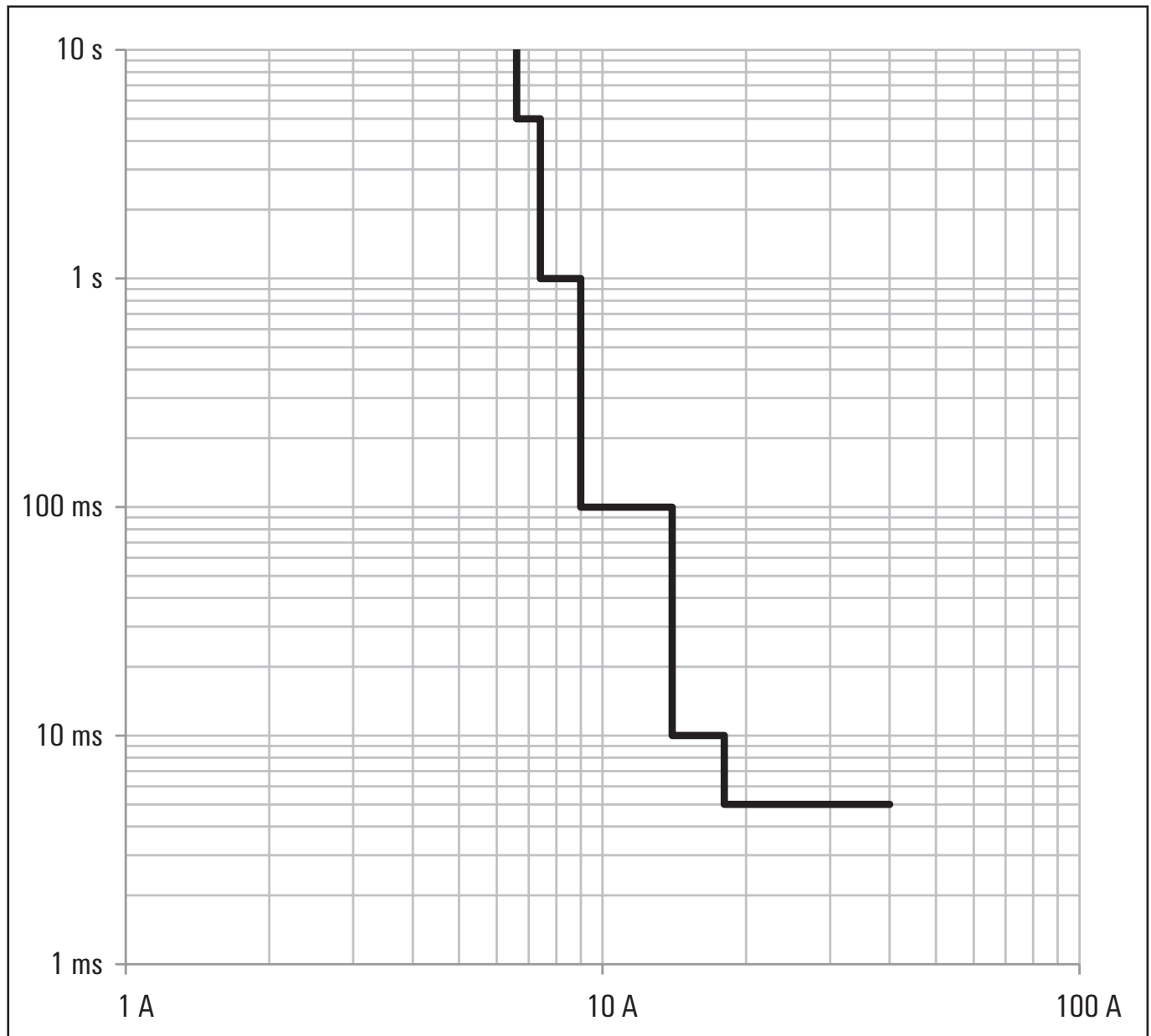
Output current	3.3 A < I ≤ 4 A	4 A < I ≤ 5 A	5 A < I ≤ 9 A	9 A < I ≤ 17 A	I > 17 A
Tripping time	5 s	1 s	100 ms	10 ms	5 ms

Normal tripping characteristic 4A_N



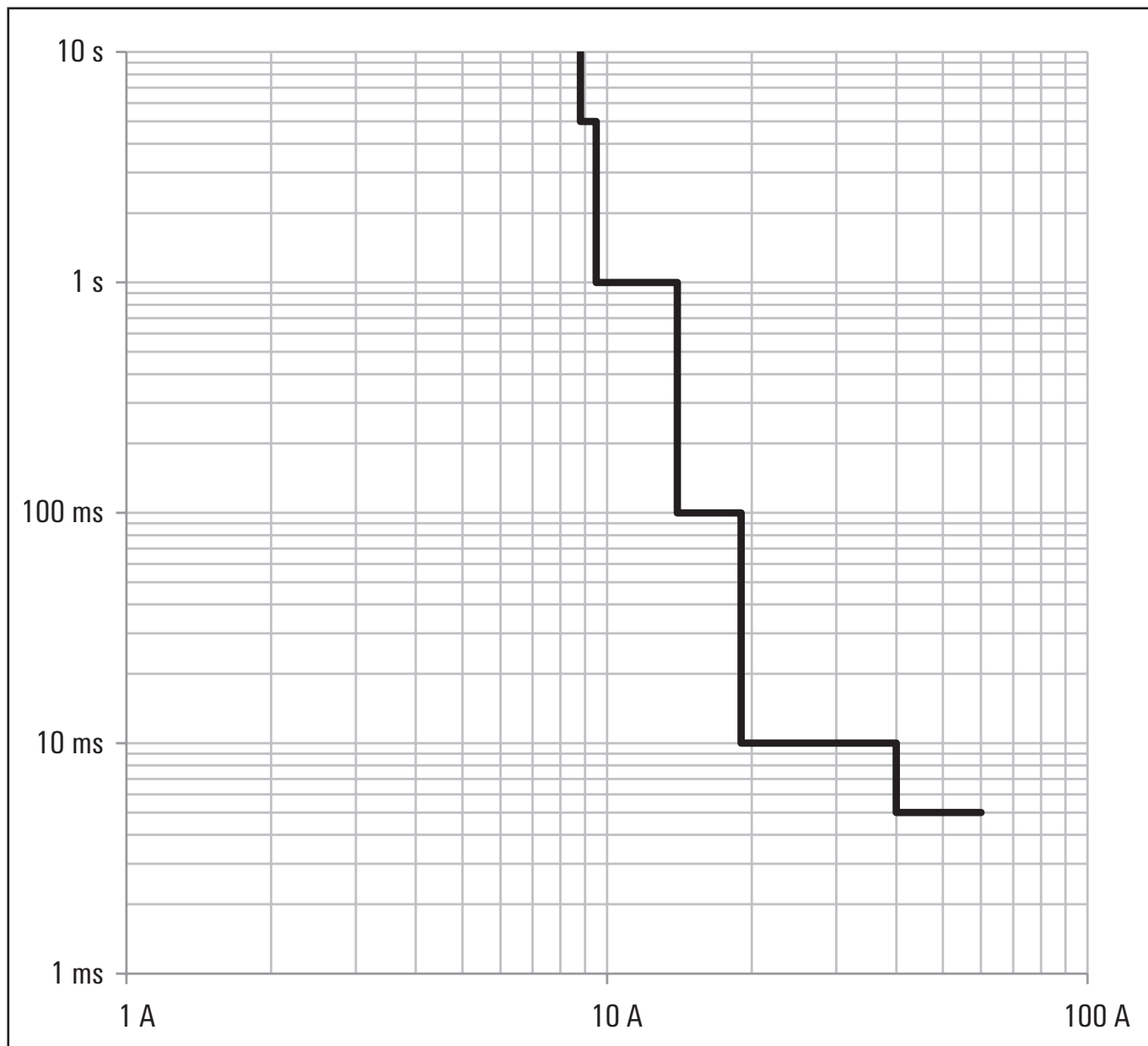
Output current	4.4 A < I ≤ 5 A	5 A < I ≤ 6 A	6 A < I ≤ 10 A	10 A < I ≤ 18 A	I > 18 A
Tripping time	5 s	1 s	100 ms	10 ms	5 ms

Normal tripping characteristic 6A_N



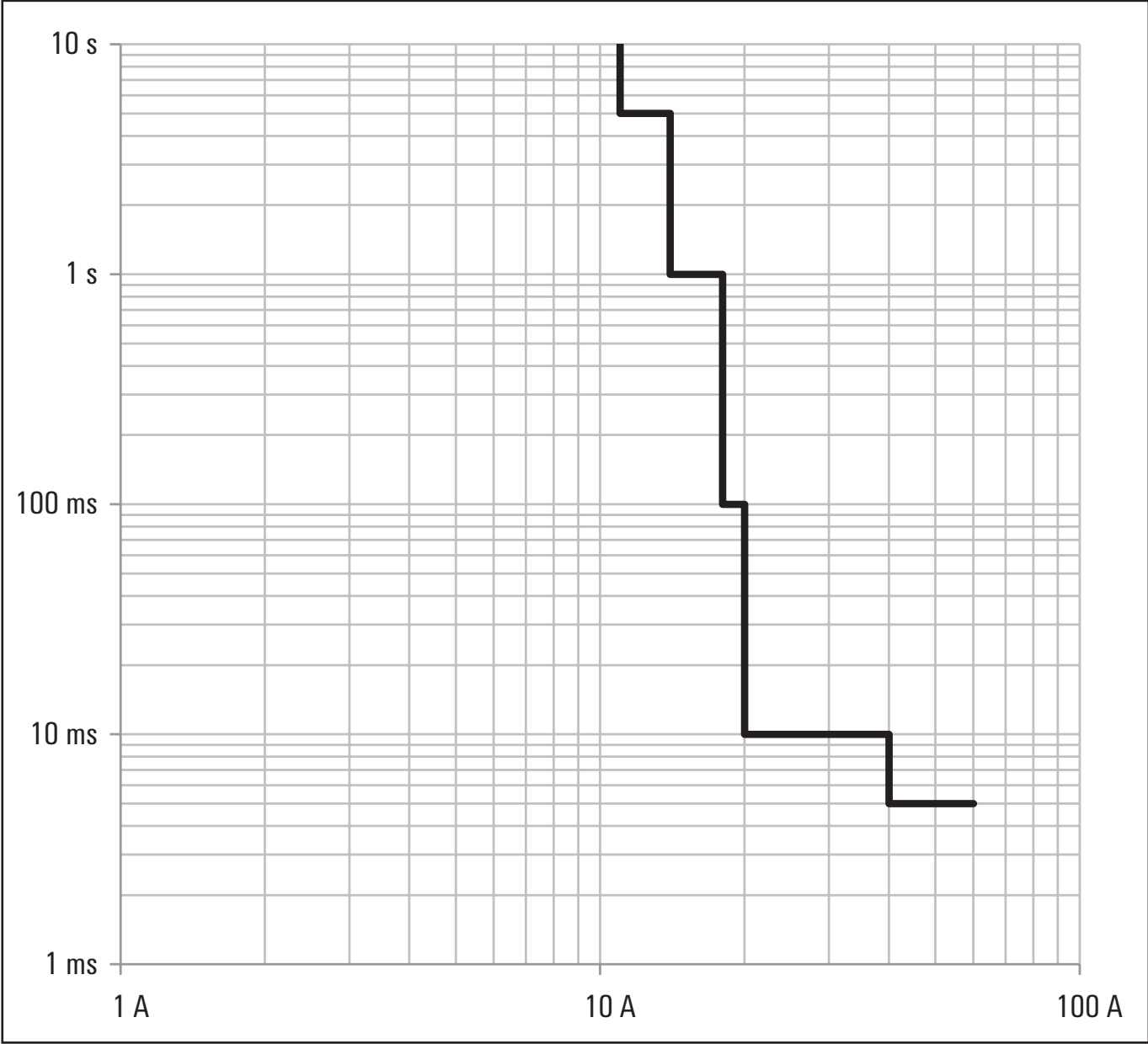
Output current	6.6 A < I ≤ 7.4 A	7.4 A < I ≤ 9 A	9 A < I ≤ 14 A	14 A < I ≤ 18 A	I > 18 A
Tripping time	5 s	1 s	100 ms	10 ms	5 ms

Normal tripping characteristic 8A_N



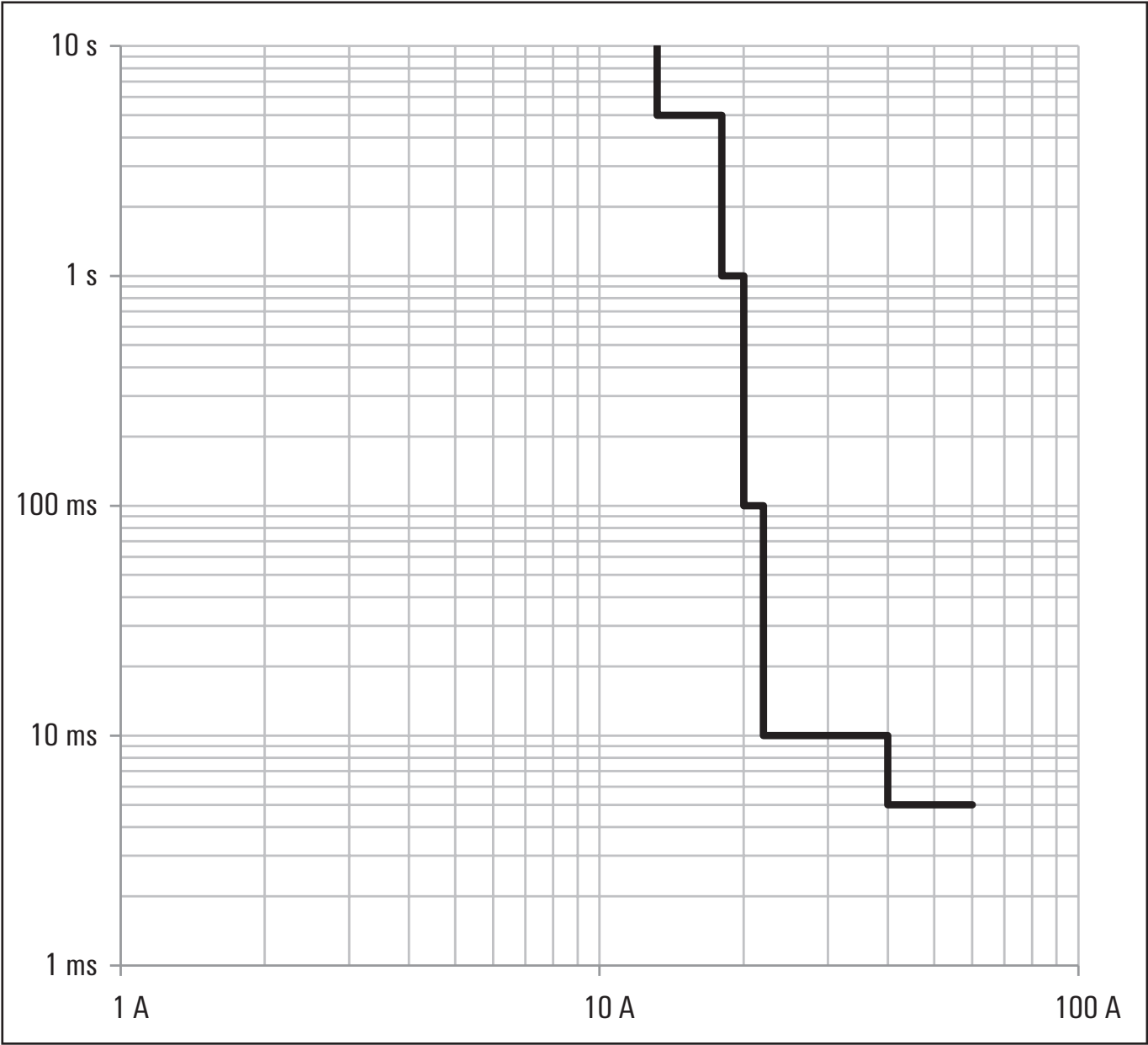
Output current	8.8 A < I ≤ 9.5 A	9.5 A < I ≤ 14 A	14 A < I ≤ 19 A	19 A < I ≤ 40 A	I > 40 A
Tripping time	5 s	1 s	100 ms	10 ms	5 ms

Normal tripping characteristic 10A_N



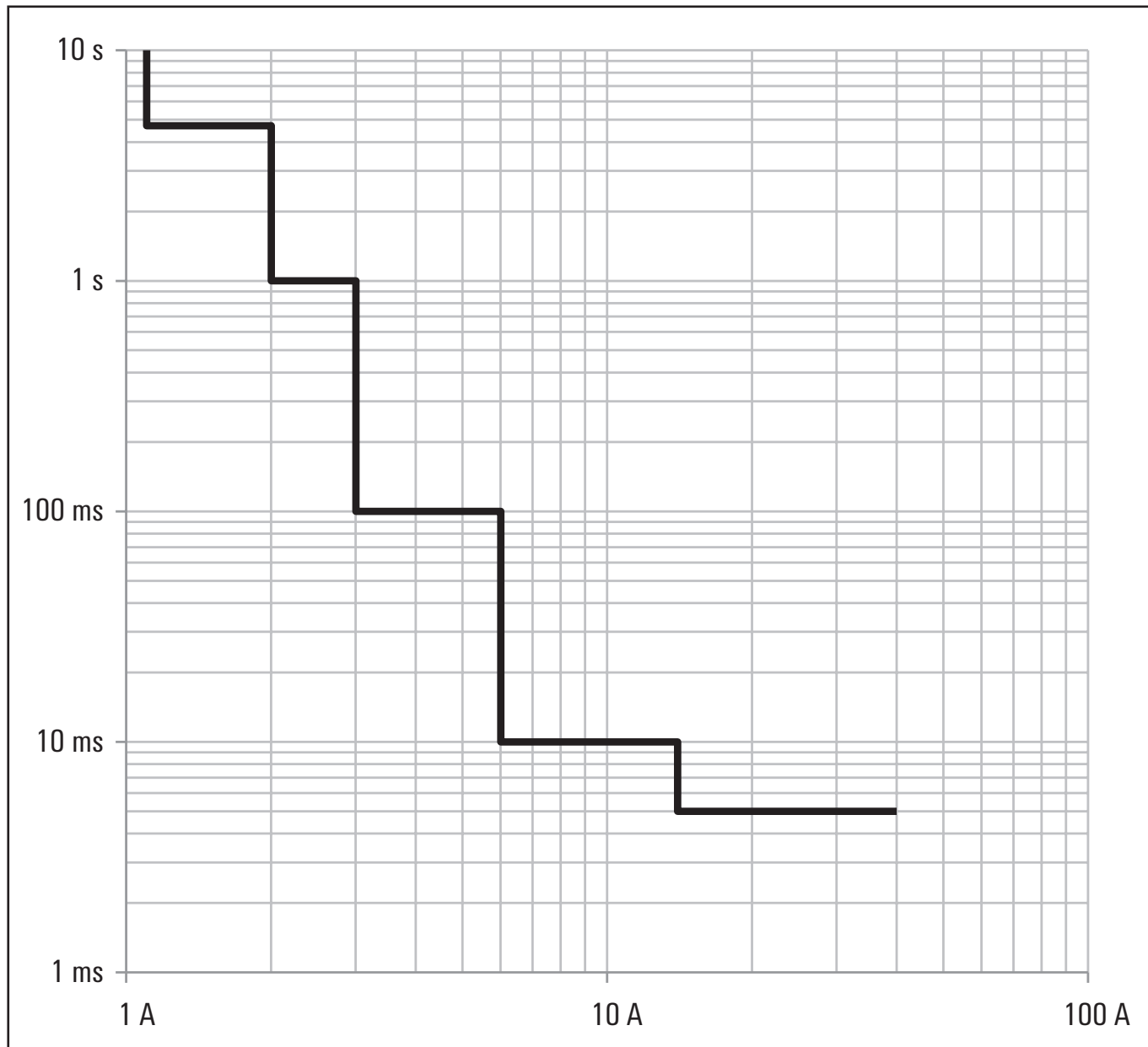
Output current	11 A < I ≤ 14 A	14 A < I ≤ 18 A	18 A < I ≤ 20 A	20 A < I ≤ 40 A	I > 40 A
Tripping time	5 s	1 s	100 ms	10 ms	5 ms

Normal tripping characteristic 12A_N



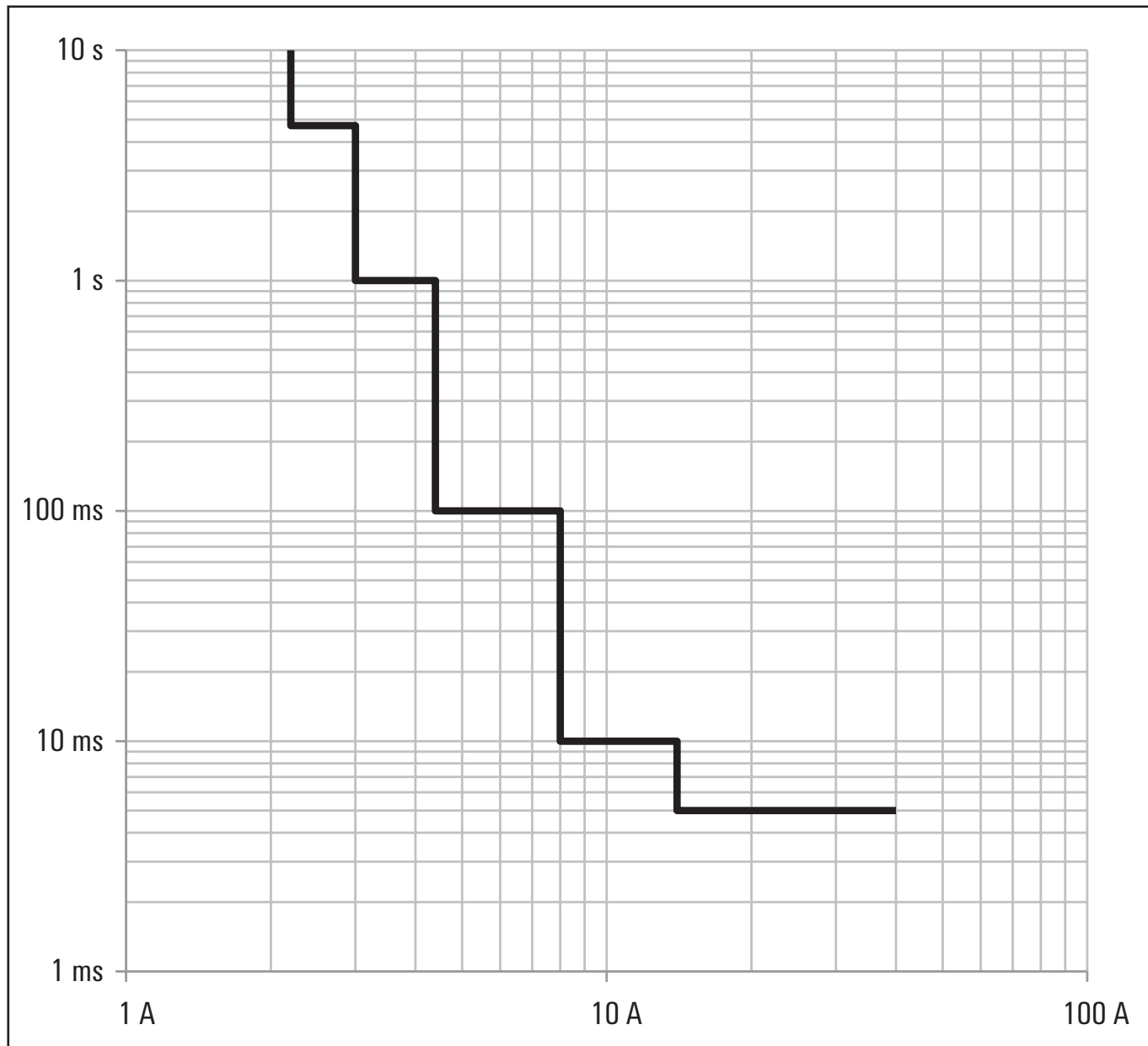
Output current	13.2 A < I ≤ 18 A	18 A < I ≤ 20 A	20 A < I ≤ 22 A	22 A < I ≤ 40 A	I > 40 A
Tripping time	5 s	1 s	100 ms	10 ms	5 ms

Normal tripping characteristic 1A_{CL2}



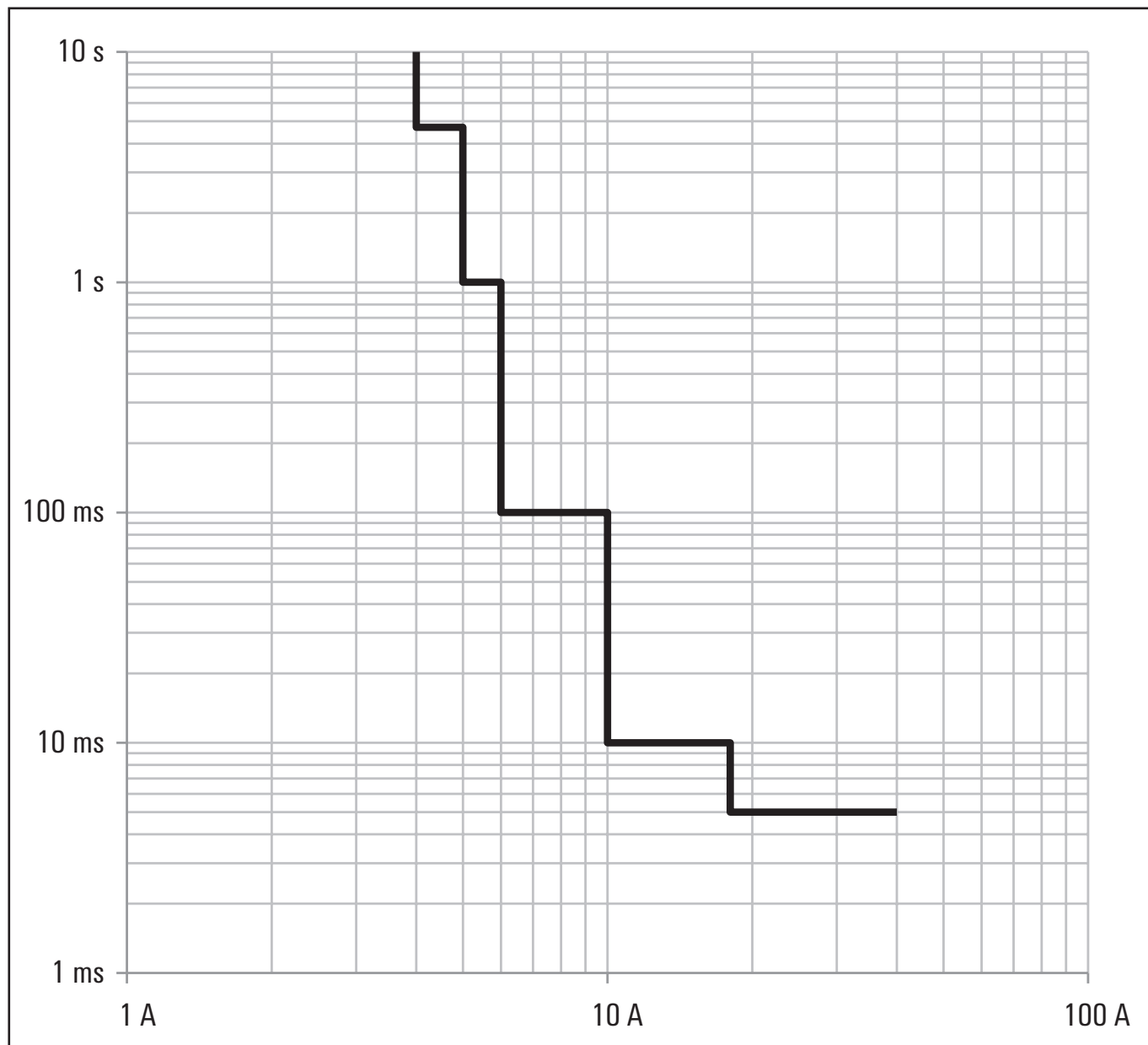
Output current	1.1 A < I ≤ 2 A	2 A < I ≤ 3 A	3 A < I ≤ 6 A	6 A < I ≤ 14 A	I > 14 A
Tripping time	4.7 s	1 s	100 ms	10 ms	5 ms

Normal tripping characteristic 2A_{CL2}



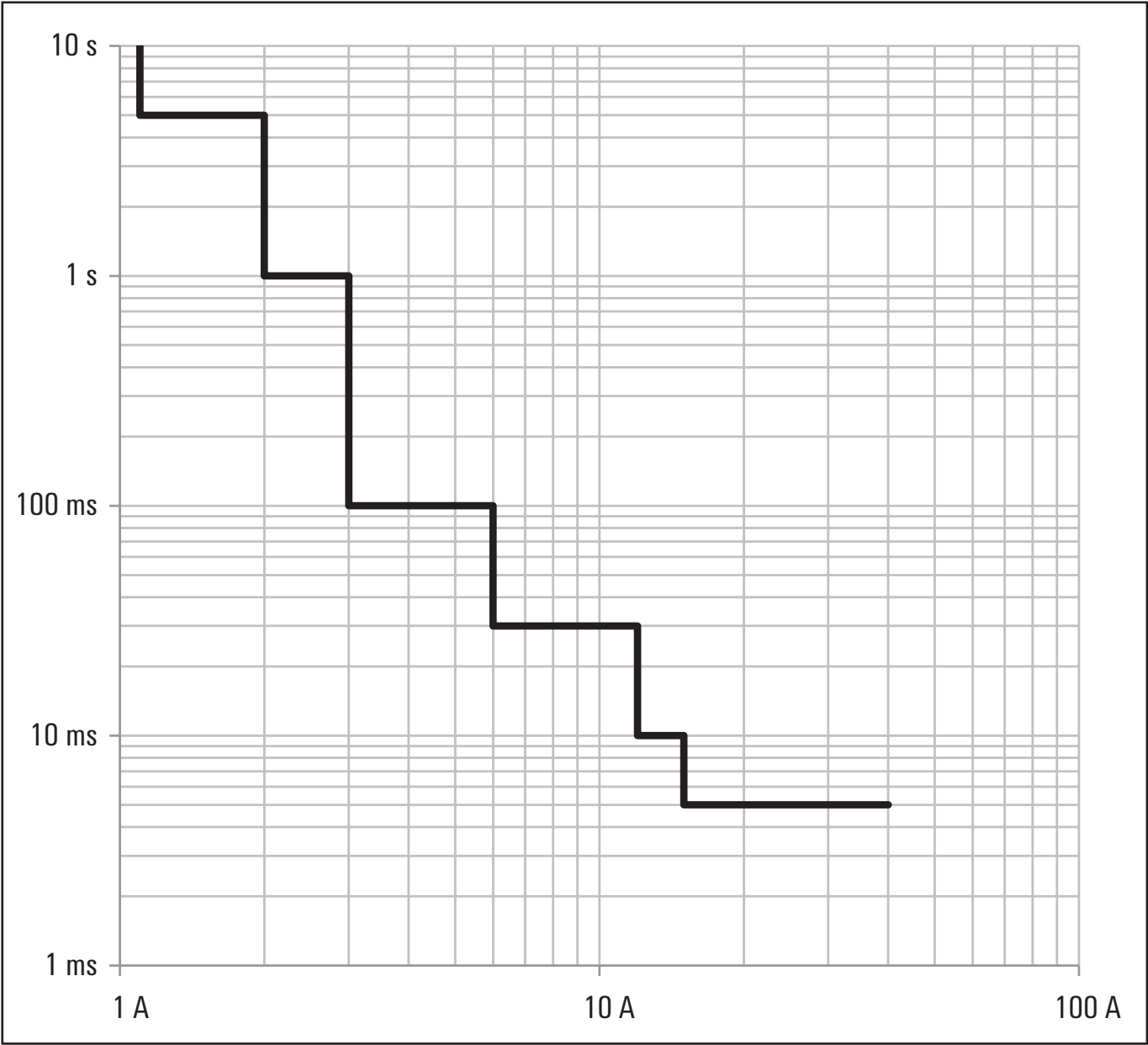
Output current	2.2 A < I ≤ 3 A	3 A < I ≤ 4.4 A	4.4 A < I ≤ 8 A	8 A < I ≤ 14 A	I > 14 A
Tripping time	4.7 s	1 s	100 ms	10 ms	5 ms

Normal tripping characteristic 4A_{CL2}



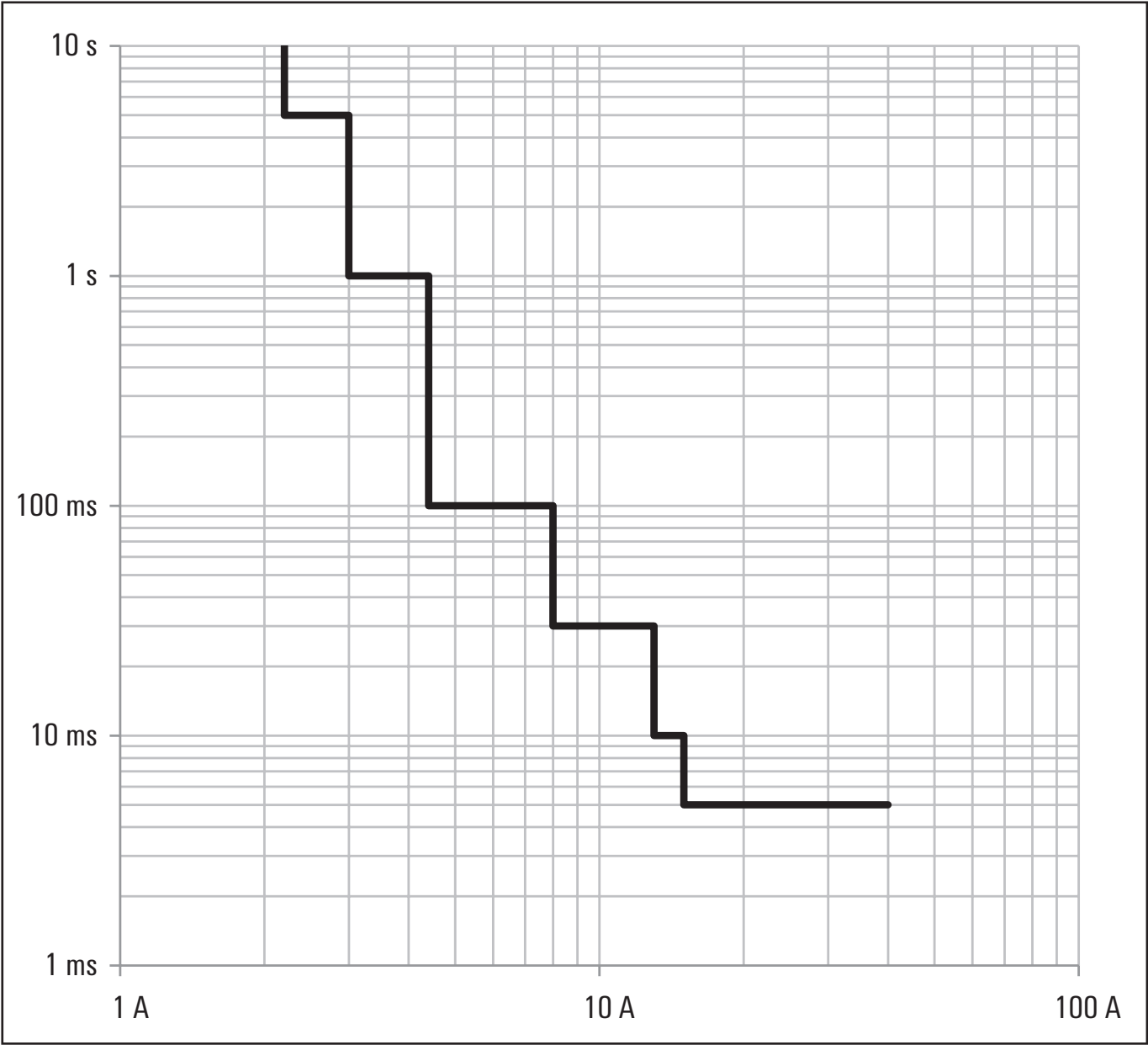
Output current	4 A < I ≤ 5 A	5 A < I ≤ 6 A	6 A < I ≤ 10 A	10 A < I ≤ 18 A	I > 18 A
Tripping time	4.7 s	1 s	100 ms	10 ms	5 ms

Lagged tripping characteristic 1A_T



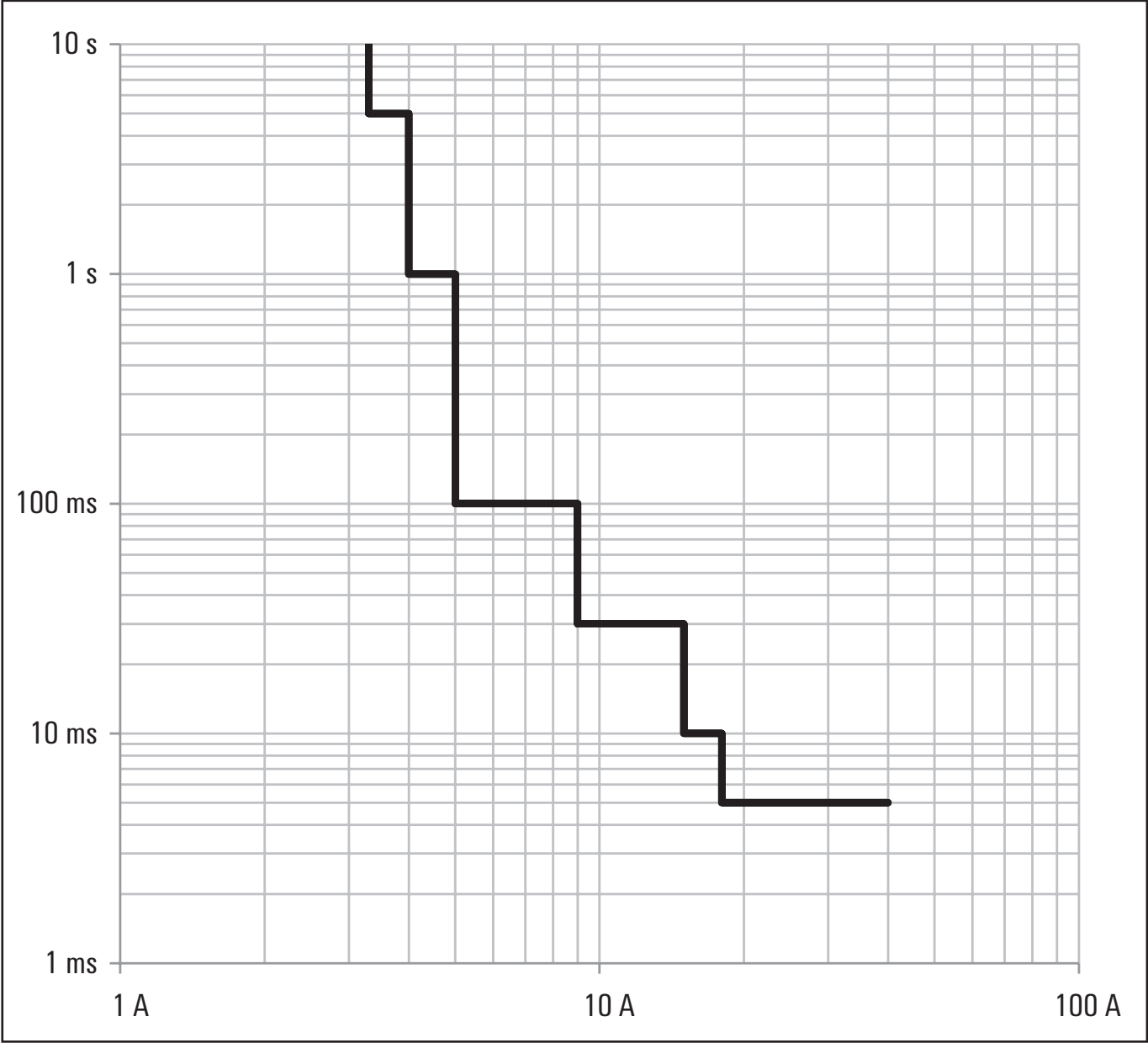
Output current	1.1 A < I ≤ 2 A	2 A < I ≤ 3 A	3 A < I ≤ 6 A	6 A < I ≤ 12 A	12 A < I ≤ 15 A	I > 15 A
Tripping time	5 s	1 s	100 ms	30 ms	10 ms	5 ms

Lagged tripping characteristic 2A_T



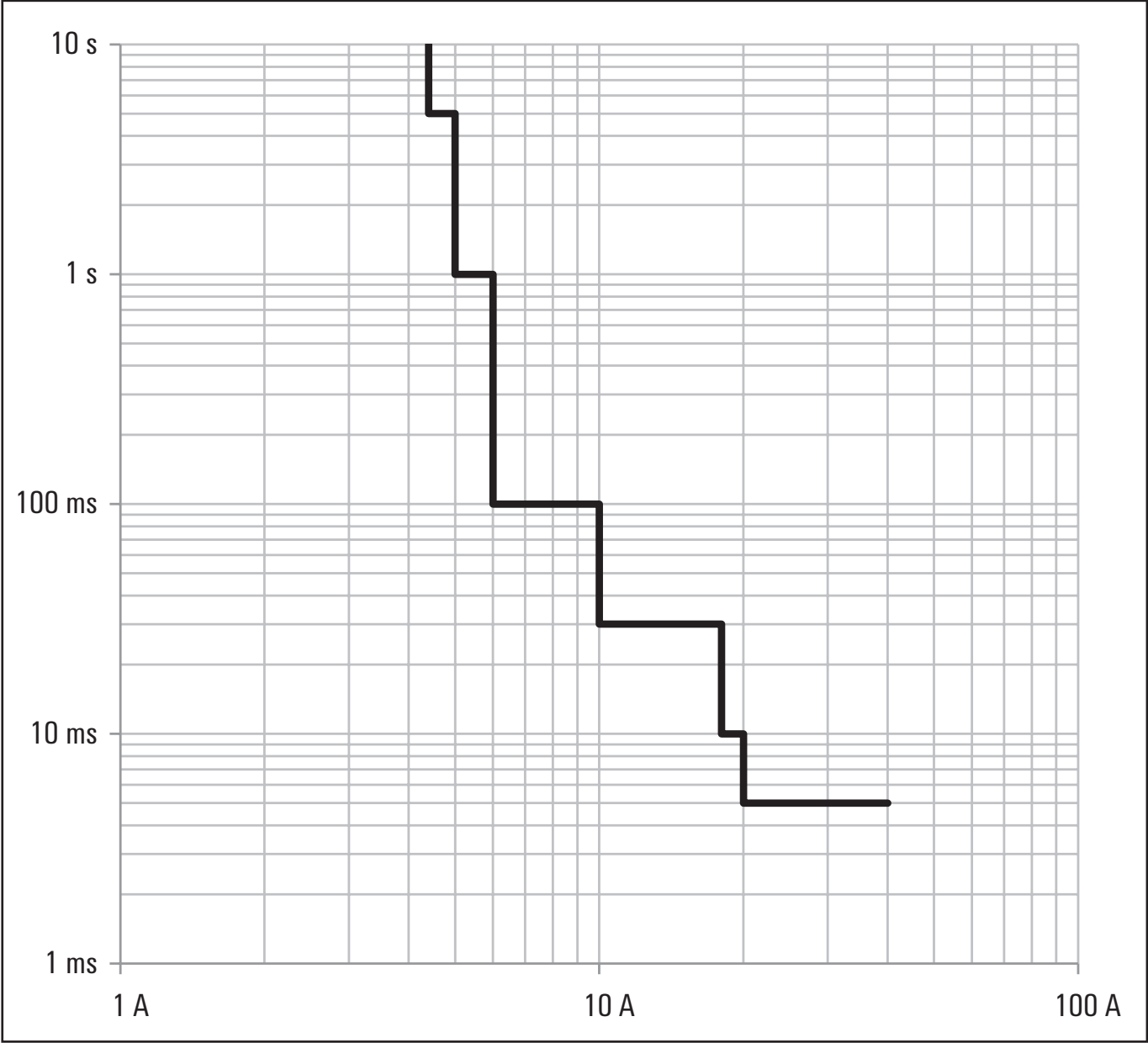
Output current	2.2 A < I ≤ 3 A	3 A < I ≤ 4.4 A	4.4 A < I ≤ 8 A	8 A < I ≤ 13 A	13 A < I ≤ 15 A	I > 15 A
Tripping time	5 s	1 s	100 ms	30 ms	10 ms	5 ms

Lagged tripping characteristic 3A_T



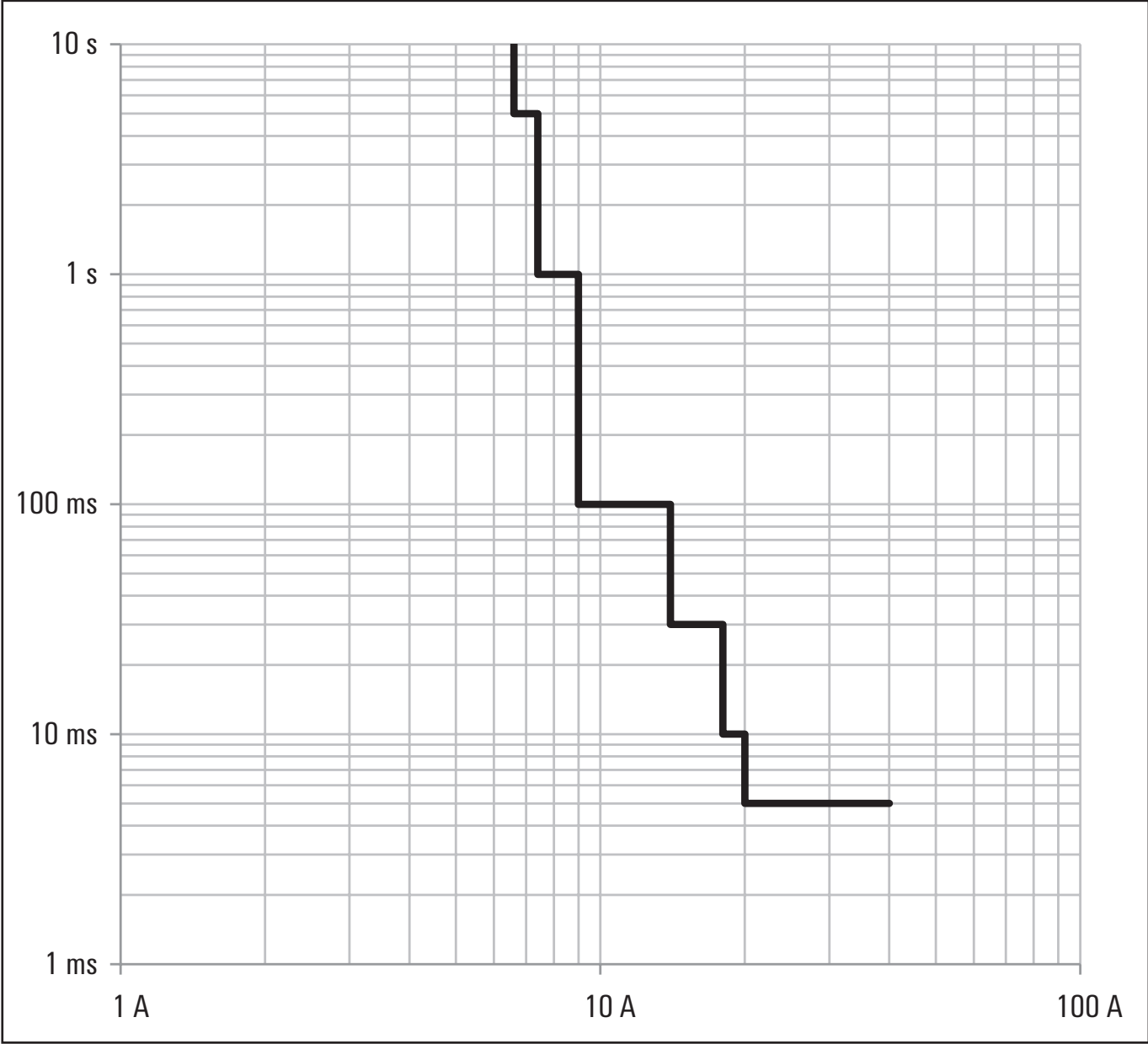
Output current	3.3 A < I ≤ 4 A	4 A < I ≤ 5 A	5 A < I ≤ 9 A	9 A < I ≤ 15 A	15 A < I ≤ 18 A	I > 18 A
Tripping time	5 s	1 s	100 ms	30 ms	10 ms	5 ms

Lagged tripping characteristic 4A_T



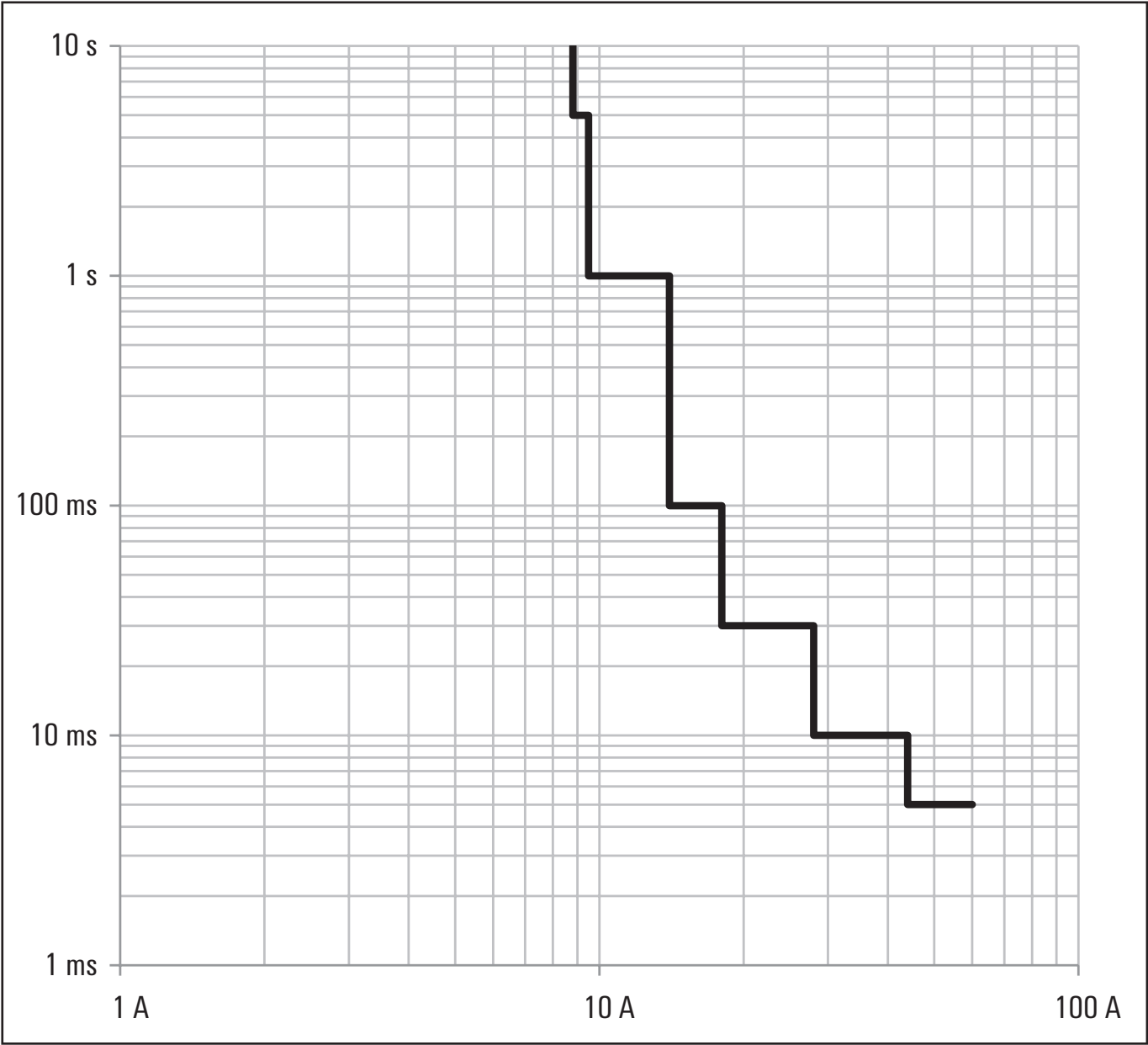
Output current	4.4 A < I ≤ 5 A	5 A < I ≤ 6 A	6 A < I ≤ 10 A	10 A < I ≤ 18 A	18 A < I ≤ 20 A	I > 20 A
Tripping time	5 s	1 s	100 ms	30 ms	10 ms	5 ms

Lagged tripping characteristic 6A_T



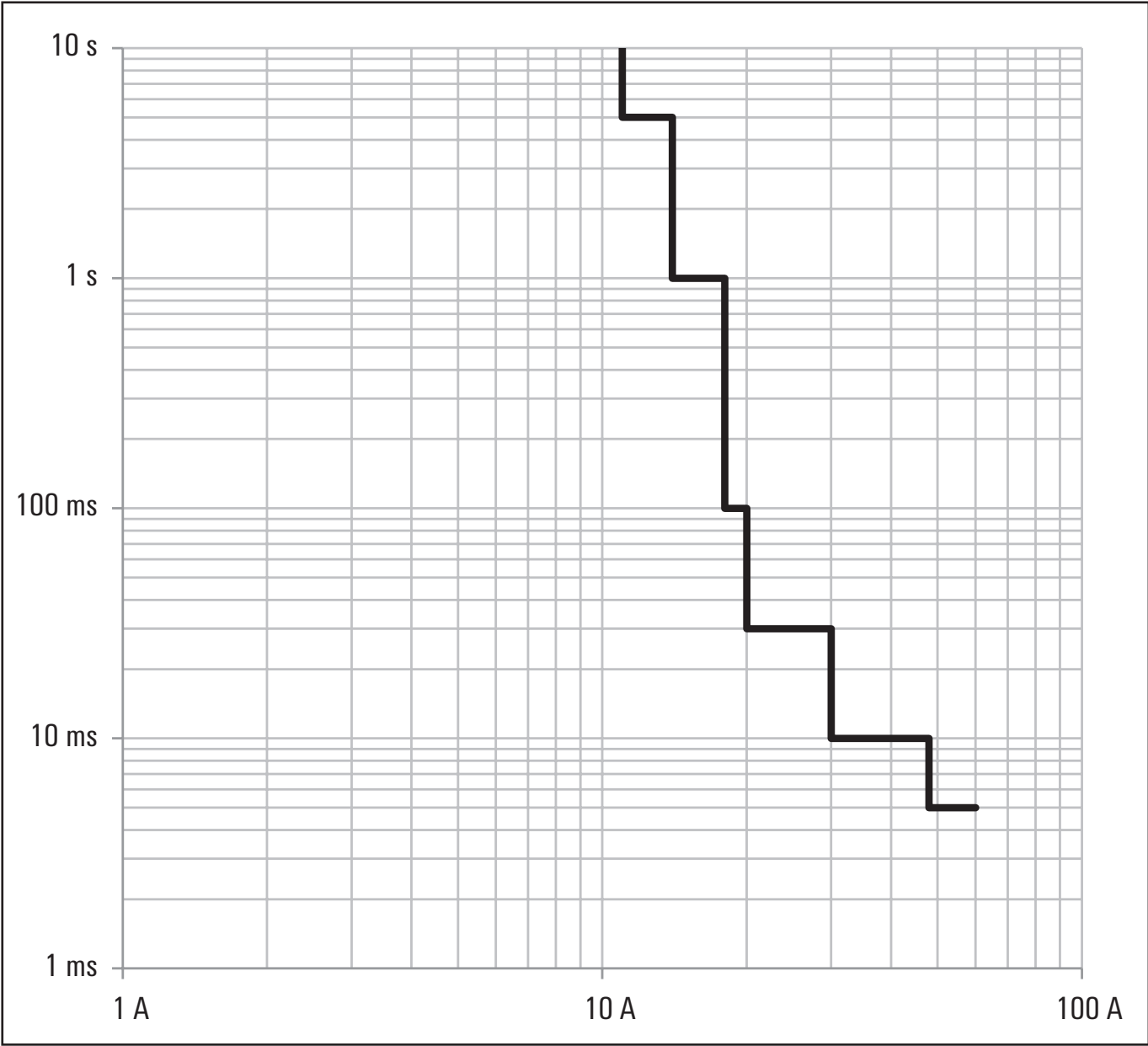
Output current	6.6 A < I ≤ 7.4 A	7.4 A < I ≤ 9 A	9 A < I ≤ 14 A	14 A < I ≤ 18 A	18 A < I ≤ 20 A	I > 20 A
Tripping time	5 s	1 s	100 ms	30 ms	10 ms	5 ms

Lagged tripping characteristic 8A_T



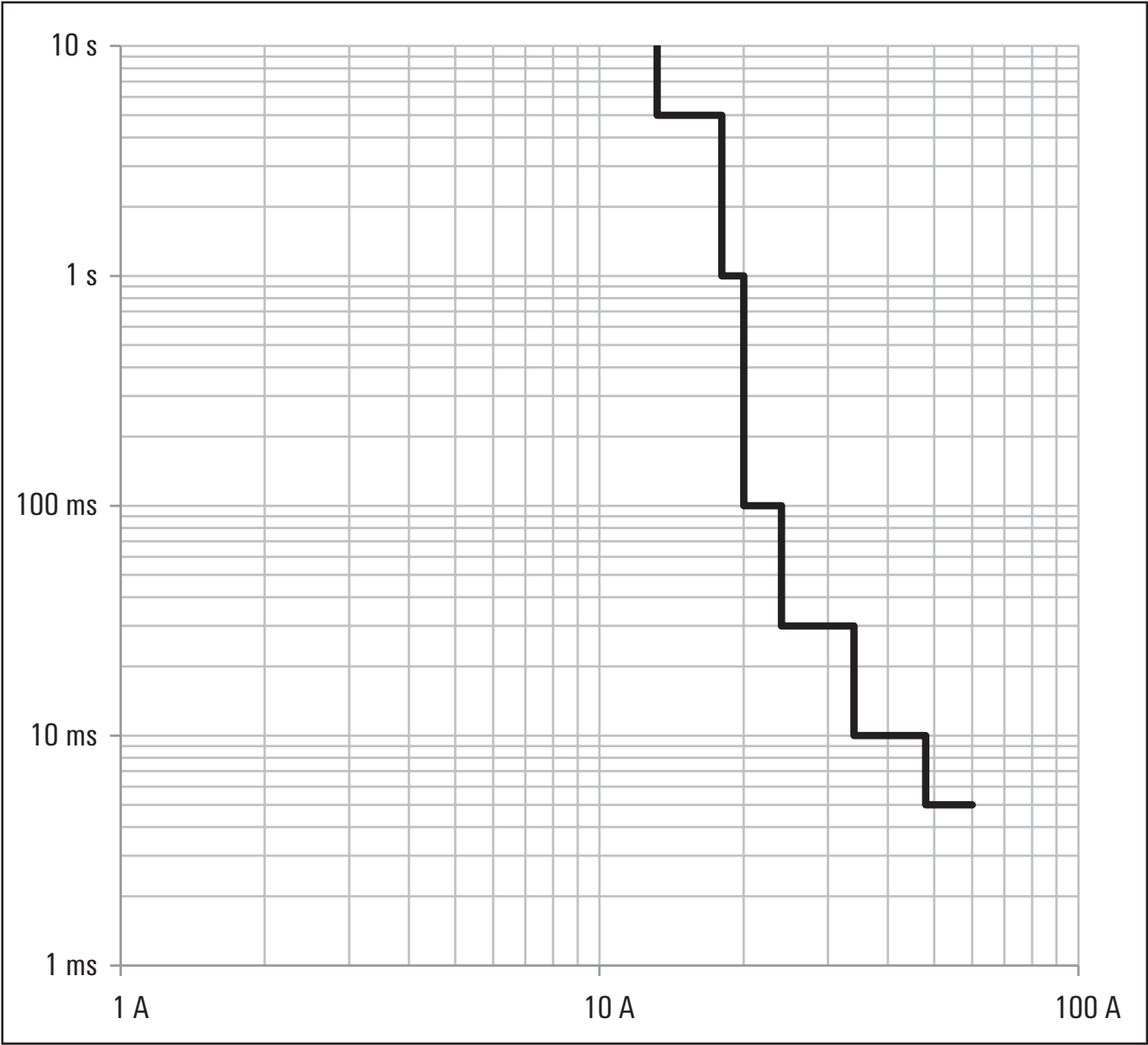
Output current	8.8 A < I ≤ 9.5 A	9.5 A < I ≤ 14 A	14 A < I ≤ 18 A	18 A < I ≤ 28 A	28 A < I ≤ 44 A	I > 44 A
Tripping time	5 s	1 s	100 ms	30 ms	10 ms	5 ms

Lagged tripping characteristic 10A_T



Output current	11 A < I ≤ 14 A	14 A < I ≤ 18 A	18 A < I ≤ 20 A	20 A < I ≤ 30 A	30 A < I ≤ 48 A	I > 48 A
Tripping time	5 s	1 s	100 ms	30 ms	10 ms	5 ms

Lagged tripping characteristic 12A_T



Output current	13.2 A < I ≤ 18 A	18 A < I ≤ 20 A	20 A < I ≤ 24 A	24 A < I ≤ 34 A	34 A < I ≤ 48 A	I > 48 A
Tripping time	5 s	1 s	100 ms	30 ms	10 ms	5 ms

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