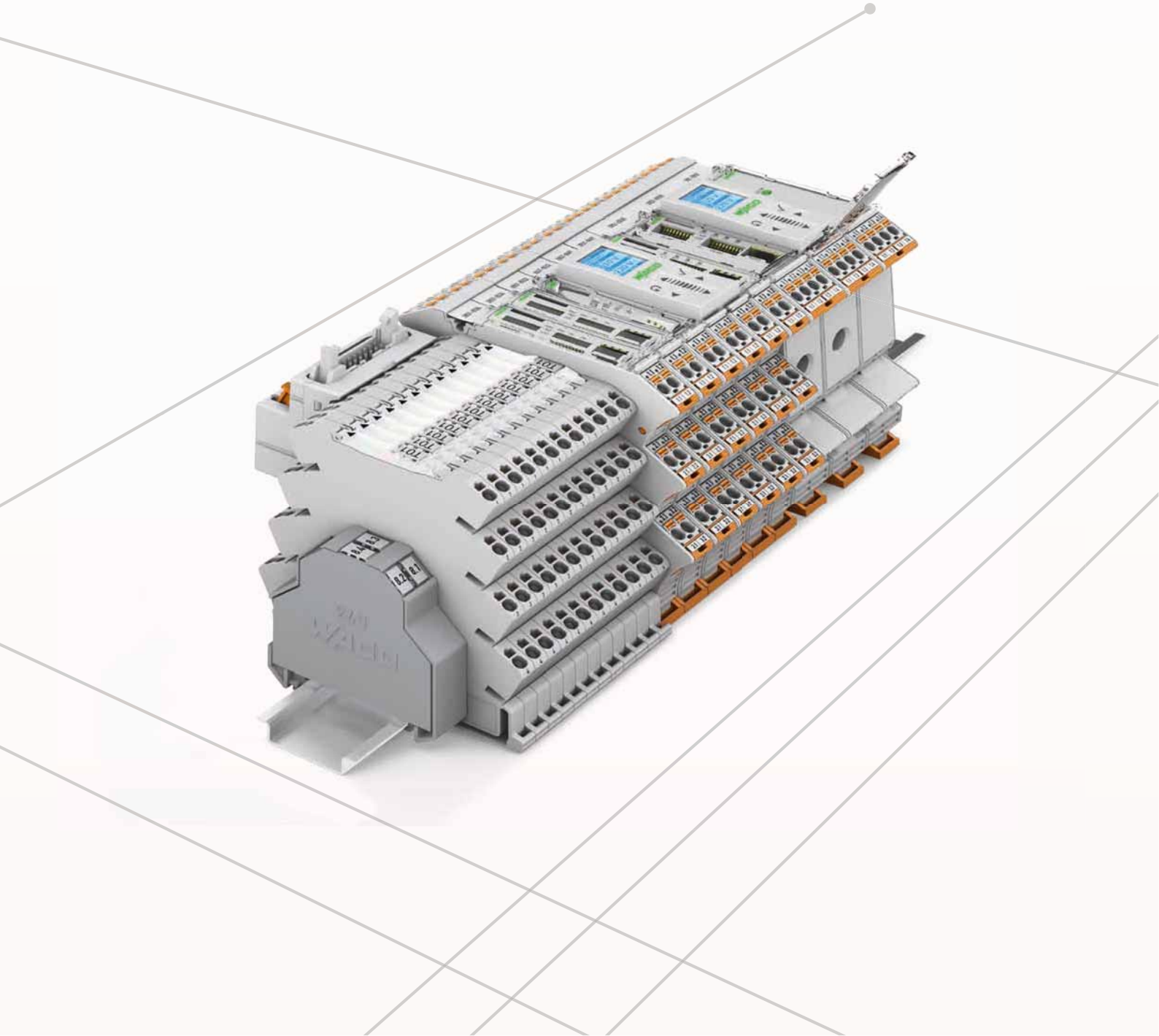
Interface Electronic

Full Line Catalog, Volume 4 – Edition 2017/2018

4



WAGO Full Line Catalogs

Volume 1, Rail-Mounted Terminal Block Systems

- Rail-Mounted Terminal Blocks
- Rail-Mounted Terminal Blocks with Pluggable Connector (X-COM®-SYSTEM)
- Patchboard Systems
- Terminal Strips
- PUSH WIRE® Connectors for Junction Boxes
- Lighting Connectors
- Shield Connecting System

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- SMD PCB Terminal Blocks
- *MULTI CONNECTION SYSTEM (MCS)*
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- Operating & Monitoring
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- Industrial Switches
- Radio Technology, *TO-PASS*® Telecontrol Technology
- IP67 Sensor/Actuator Boxes, IP67 Cables and Connectors

Volume 4, Interface Electronic

- Relay and Optocoupler Modules
- *JUMPFLEX*® Signal Conditioners and Isolation Amplifiers
- Current and Energy Measurement Technology
- *EPSITRON*® Power Supply System
- Interface Modules and System Wiring
- Overvoltage Protection
- Empty Housings

Volume 5, *WINSTA*® – The Pluggable Connection System

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- Snap-In Device Connectors
- Pluggable PCB Connectors
- Distribution Connectors
- Cable Assemblies
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- Distribution Boxes

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Volume 4, Interface Electronics

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Operating WAGO Connection Technologies
Please follow the applicable product-specific termination instructions:

PUSH-IN CAGE CLAMP®

Push-in CAGE CLAMP® terminates the following copper conductors:
solid

stranded

fine-stranded, also with tinned single strands

fine-stranded, tip-bonded

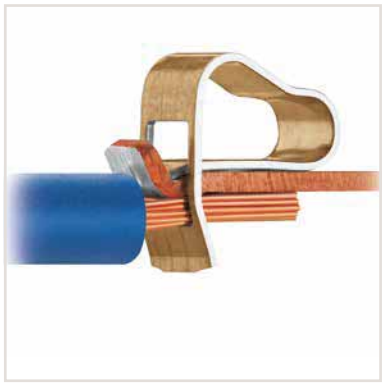
fine-stranded, with ferrule (gastight crimped)

fine-stranded, with pin terminal (gastight crimped)

The universal connection with an additional advantage: Push-in connection
Terminate solid and stranded, as well as ferruled conductors, by simply pushing them in – no tools required.

Termination for all conductor types:
- Open clamping unit
- Insert the conductor
- Release clamp – done!

CAGE CLAMP®



CAGE CLAMP® terminates the following copper conductors:
solid

stranded

fine-stranded, also with tinned single strands

fine-stranded, tip-bonded

fine-stranded, with ferrule (gastight crimped)

fine-stranded, with pin terminal (gastight crimped)

The universal connection for solid, stranded and fine-stranded conductors

Termination:
- Open clamping unit
- Insert the conductor
- Release clamp – done!

Operating WAGO Connection Technologies

Please follow the applicable product-specific termination instructions:

POWER CAGE CLAMP®

POWER CAGE CLAMP terminates the following copper conductors:
solid

stranded

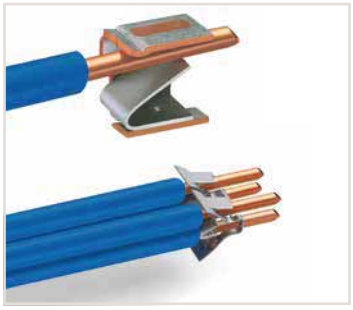
fine-stranded, also with tinned single strands

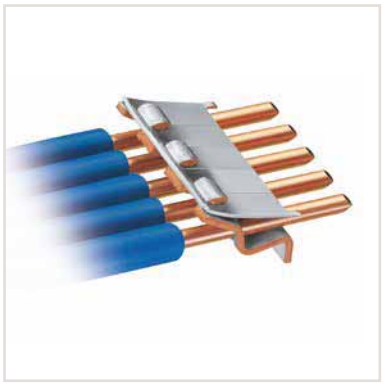
fine-stranded, with ferrule (gastight crimped)

The universal connection for conductors larger than 35 mm² (2 AWG)

Termination:
- Open clamp by turning an Allen wrench counter-clockwise.
- Press the integrated latch to open clamping unit for hands-free wiring.
- Insert the conductor
- A small counter-clockwise rotation closes the clamp, securing conductor

PUSH WIRE®





PUSH WIRE® terminates the following copper conductors:
solid

PUSH WIRE® connection for solid and stranded conductors (depending on the model used)

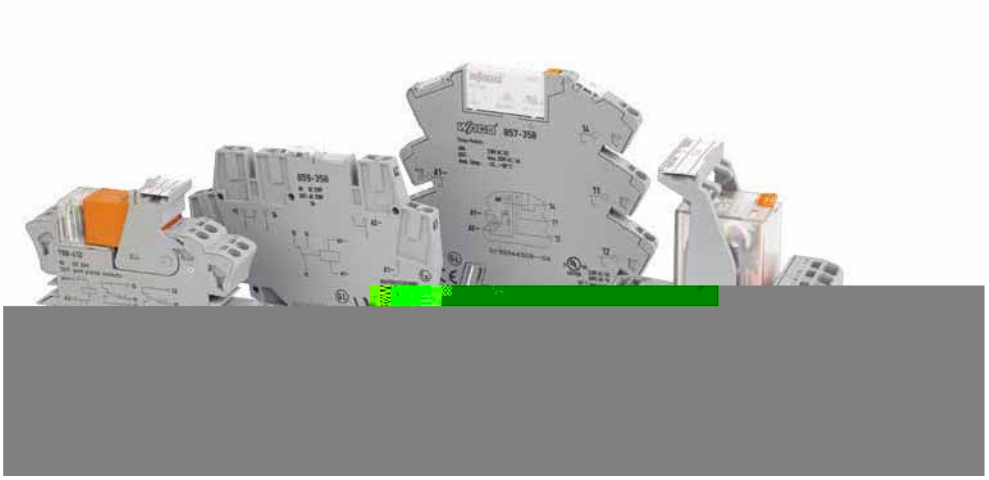
Termination:
Tool-free, twist-free terminations for solid and rigid stranded conductors – simply push into unit

An Interface Solution for

EPSITRON® Power Supply System

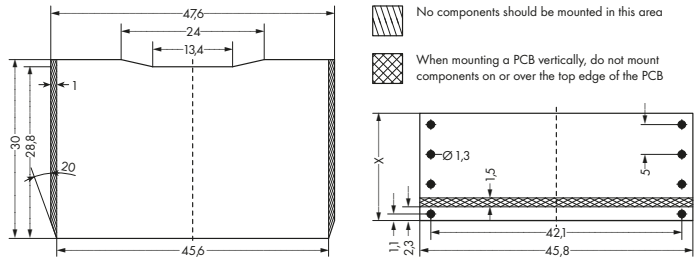
Overvoltage Protection

Relay and Optocoupler Modules



Empty Component Plug Housings for Building Custom Circuits

286/786 Series



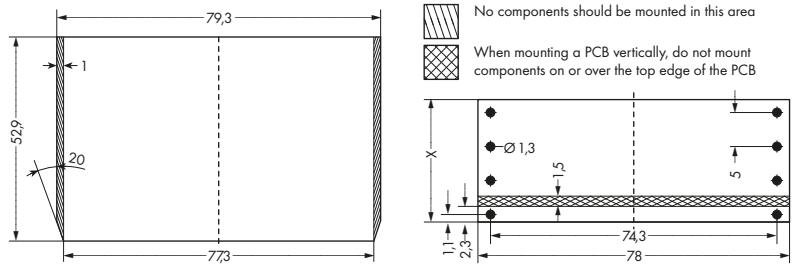
Module width	10	15	20	25
Component height	4.2	9.2	14.2	19.2
X = total height of PCB	8	13	18	23

Empty component plug housing, 286 Series

Type	Pole	Width	Item No.	Pack. Unit
9	4	10 mm wide / 0.394 inch	**286-110**	1
10	6	15 mm / 0.591 inch	**286-111**	1
11	8	20 mm / 0.787 inch	**286-112**	1
12	10	25 mm / 0.984 inch	**286-113**	1

Technical Data

Rated voltage	250 V
Rated impulse voltage	4 KV
Pollution degree	3
per contact	6 A
Module height	82.5 mm (from upper-edge of DIN-rail)



Module width	15	20	25
Component height	9.2	14.2	19.2
X = total height of PCB	13	18	23

Empty component plug housing, 786 Series

Type	Pole	Width	Item No.	Pack. Unit
14	6	15 mm / 0.591 inch	**786-101**	1
15	8	20 mm / 0.787 inch	**786-102**	1
16	10	25 mm / 0.984 inch	**786-103**	1

Technical Data

Rated voltage	250 V
Rated impulse voltage	4 KV
Pollution degree	3
per contact	6 A
Module height	82.5 mm (from upper-edge of DIN-35 rail)

Accessories

Unlocking pliers for component plug housings

	Item No.	Pack. Unit
	210-492	1

WSB Quick marking system, 10 strips with 10 markers, white with black printing

Marking	Item No.	Pack. Unit
plain	209-501	5 cards
1 … 10 (10 x)	209-702	5 cards

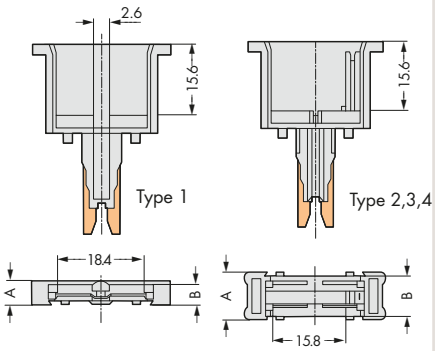
Terminal block for pluggable modules

Description	Width	Item No.	Pack. Unit
Terminal block for pluggable modules			
with 2-conductor terminal blocks, orange separator	12 mm	280-618	1
with 4-conductor terminal blocks, orange separator	12 mm	280-608	1
Terminal block for pluggable modules			
with 2-conductor terminal blocks, orange separator	17 mm	280-619	1
with 4-conductor terminal blocks, orange separator	17 mm	280-609	1
Terminal block for pluggable modules			
with 2-conductor terminal blocks, orange separator	22 mm	280-638	1
with 4-conductor terminal blocks, orange separator	22 mm	280-628	1
Terminal block for pluggable modules			
with 2-conductor terminal blocks, orange separator	27 mm	280-639	1
with 4-conductor terminal blocks, orange separator	27 mm	280-629	1

Conductor range: 0.08 mm² … 2.5 mm² / 28 … 14 AWG; Strip length: 8 … 9 mm / 0.31 … 0.35 in.

Empty Component Plug Housings for Building Custom Circuits

280 Series



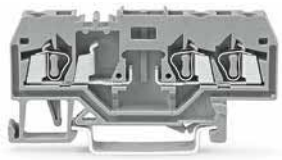
Type	1	2	3	4
A	5	10	10	10
B	3.2	8.2	8.2	8.2

Empty component plug housing			
	Description	Item No.	Pack. Unit
Type 1	2-pole, 5 mm/0.197 inch wide; Plug inside dimensions (W/H/D): 3.2/15/15 mm	280-801	100
Type 2	2-pole, 10 mm/0.394 inch wide; Plug inside dimensions (W/H/D): 8.2/15/15 mm	280-802	50
Type 3	4-pole, 10 mm/0.394 inch wide; Plug inside dimensions (W/H/D): 8.2/15/15 mm	280-804	50

Technical Data

Rated voltage	250 V
Rated impulse voltage	4 KV
Pollution degree	3
per contact	6 A (max.)

2-conductor carrier terminal block



3-conductor carrier terminal block

4-conductor carrier terminal block

Carrier terminal block			
	Description	Item No.	Pack. Unit
2-conductor carrier terminal block	gray, terminal block width: 5 mm/0.197 inch, marking on both sides	280-616	100
2-conductor carrier terminal block	gray, terminal block width: 5 mm/0.197 inch, marking in center position	280-916	100
3-conductor carrier terminal block	gray, terminal block width: 5 mm/0.197 inch	280-610	100
4-conductor carrier terminal block	gray, terminal block width: 5 mm/0.197 inch, marking on both sides	280-606	100
4-conductor carrier terminal block	gray, terminal block width: 5 mm/0.197 inch, marking in center position	280-686	100

Technical Data

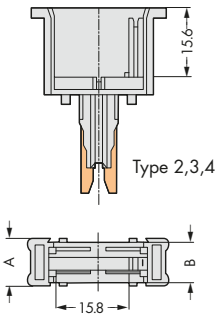
Conductor range	0.08 … 2.5 mm² / 28 … 14 AWG
Strip length	8 … 9 mm / 0.31 … 0.35 inch

Empty component plug housing

	Description	Item No.	Pack. Unit
Type 4	2-pole, 10 mm/0.394 inch wide; Plug inside dimensions (W/H/D): 8.2/15/15 mm	280-803	50

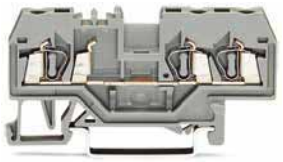
Technical Data

Rated voltage	250 V
Rated impulse voltage	4 KV
Pollution degree	3
per contact	6 A (max.)



Type	1	2	3	4
A	5	10	10	10
B	3.2	8.2	8.2	8.2

2-conductor through terminal block



3-conductor through terminal block

Through terminal block

	Description	Item No.	Pack. Unit
2-conductor, front-entry wiring	gray, terminal block width: 5 mm/0.197 inch, marking on both sides	280-601	100
2-conductor, front-entry wiring	gray, terminal block width: 5 mm/0.197 inch, marking in center position	280-901	100
3-conductor, front-entry wiring	gray, terminal block width: 5 mm/0.197 inch	280-681	100

Technical Data

Conductor range	0.08 … 2.5 mm² / 28 … 12 AWG (12 AWG: THHN, THWN)
Strip length	8 … 9 mm / 0.31 … 0.35 inch

4-conductor through terminal block

2-conductor through terminal block

Through terminal block

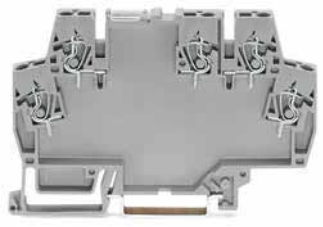
	Description	Item No.	Pack. Unit
4-conductor, front-entry wiring	gray, terminal block width: 5 mm/0.197 inch, marking on both sides	280-621	100
4-conductor, front-entry wiring	gray, terminal block width: 5 mm/0.197 inch, marking in center position	280-833	100
2-conductor, front-entry wiring	gray, terminal block width: 5 mm/0.197 inch	280-101	100

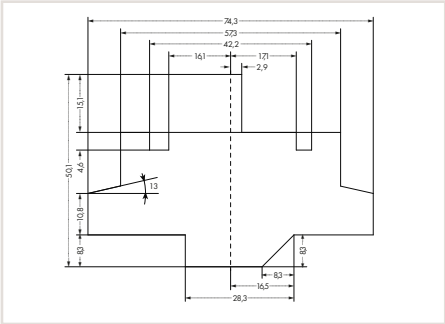
Technical Data

Conductor range	0.08 … 2.5 mm² / 28 … 14 AWG
Strip length	8 … 9 mm / 0.31 … 0.35 inch

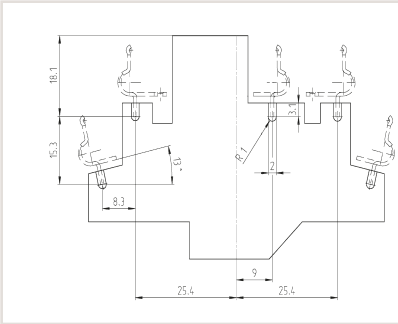
Empty Electronic Terminal Block Housings

859 Series





PCB dimensions



PCB dimensions

Modular housing for mounting electronic components in a rail-mounted terminal block		
	Item No.	Pack. Unit
	859-110	1

Frame to enlarge terminal block width		
	Item No.	Pack. Unit
	859-501	1

Technical Data		
Housing material	PA 66	PA 66
Flammability rating	V0 (UL94)	V0 (UL94)
Color	gray	gray
Protection type	IP20	IP20
Permissible ambient operating temperature	–25 … +70 °C	–25 … +70 °C
Storage temperature	–40 … +85 °C	–40 … +85 °C
Width	6 mm	8 mm
Mounting position	Any	Any
Dimensions (W x H x D)	6 x 56 x 91 mm, height from upper-edge of DIN-rail	6 x 56 x 91 mm, height from upper-edge of DIN-rail
Connection technology	CAGE CLAMP®	CAGE CLAMP®
Conductor range	0.08 … 2.5 mm² / 28 … 14 AWG	0.08 … 2.5 mm² / 28 … 14 AWG
Strip length	5 … 6 mm / 0.2 … 0.24 inch	5 … 6 mm / 0.2 … 0.24 inch

Accessories

859 Series

End and intermediate plate

Description	Item No.	Pack. Unit
End and intermediate plate, 1 mm thick, gray	859-525	100 (4x25)

Push-in type jumper bar, light gray, insulated, 18 A

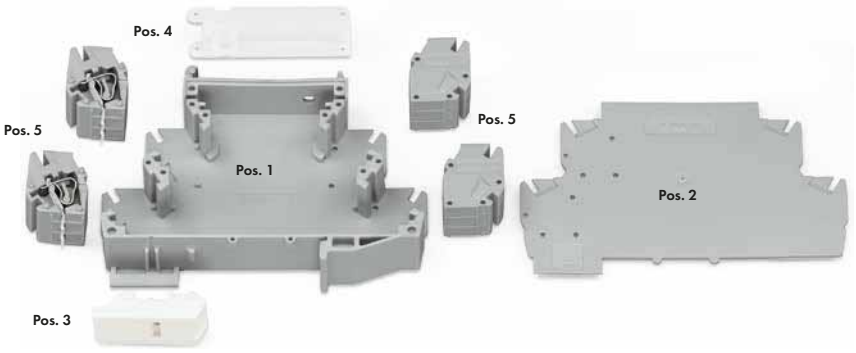
Description		Item No.	Pack. Unit
2-way		859-402	200 (8x25)
3-way		859-403	200 (8x25)
4-way		859-404	200 (8x25)
5-way		859-405	200 (8x25)
6-way		859-406	100 (4x25)
7-way		859-407	100 (4x25)
8-way		859-408	100 (4x25)
9-way		859-409	100 (4x25)
10-way		859-410	100 (4x25)
Item no. suffixes for colored push-in type jumper bars	yellow	... /000-029	
	red	... /000-005	
	blue	... /000-006	

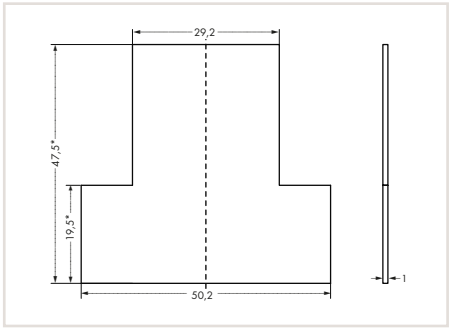
Test pin

Description	Item No.	Pack. Unit
Test pin, 1 mm Ø, with solder connection for test cable	100 (100x1)	1

DIN-Rail-Mount Enclosures

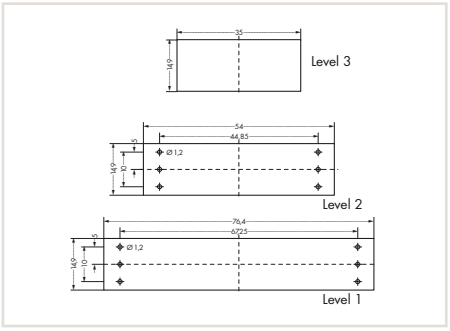
789 Series



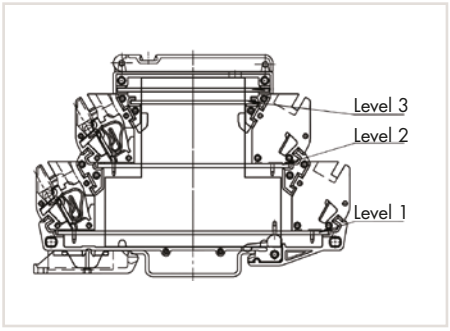


PCB dimensions, horizontal mounting

*less 4.5 mm when mounting a vertical PCB on level 1



PCB dimensions, vertical mounting: (PCB thickness max. 1.5 mm) in level 1;
(PCB thickness max. 1 mm) in level 2 and 3



Universal modular component plug housing, as rail-mount terminal block			
Description	Pos.	Item No.	Pack. Unit
Housing: 55 mm	1	**789-120**	1
Top cover: 55 mm	2	**789-122**	1
Transparent cover	4	**789-124**	1
Release mechanism	3	**789-126**	1
Terminal block, 3-pole: CCC*	5	**789-127**	1
Terminal block, 3-pole: COC*	5	**789-128**	1
Terminal block, 3-pole: CCO*	5	**789-129**	1
Terminal block, 3-pole: OCC*	5	**789-130**	1
Terminal block, 3-pole: OCO*	5	**789-131**	1
Terminal block, 3-pole: OOO*	5	**789-132**	1
Terminal block, 3-pole: OOC*	5	**789-133**	1
Terminal block, 3-pole: COO*	5	**789-134**	1

*C = with clamping spring, O = without clamping spring, enclosure open on the right side

Technical Data	
Rated voltage	250 V
Rated impulse voltage	4 kV
Pollution degree	3
Housing material	PA 66
Flammability rating	V0
Color	gray (similar to RAL 7038)
Protection type	IP20
Permissible ambient operating temperature	–25 … +70 °C
Storage temperature	–40 … +85 °C
Mounting position	Any
Dimensions (W x H x D)	17.5 x 55 x 90 mm, height from upper-edge of DIN-rail
Connection technology	CAGE CLAMP®
Conductor range	0.08 … 2.5 mm² / 28 … 14 AWG
Strip length	9 … 10 mm / 0.35 … 0.39 inch

Accessories

789 Series

Push-in type jumper bar

Description	Item No.	Pack. Unit
I_N 16 A uninsulated, 12-way, to be cut to the required length	789-112	100 (4x25)

Operating tool, with a partially insulated shaft

Description	Item No.	Pack. Unit
Type 2, (3.5 x 0.5) mm blade	210-620	1

Felt-tip pen

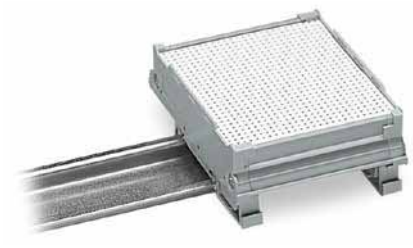
Description	Item No.	Pack. Unit
for permanent marking	210-110	1

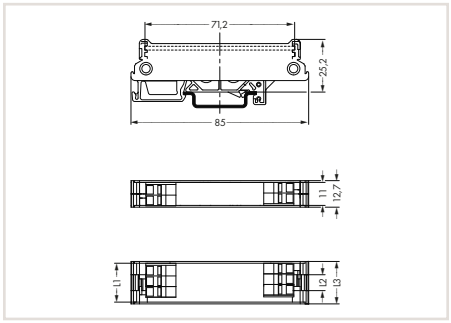
WMB Multi marking system,
10 strips with 10 markers,
white with black printing

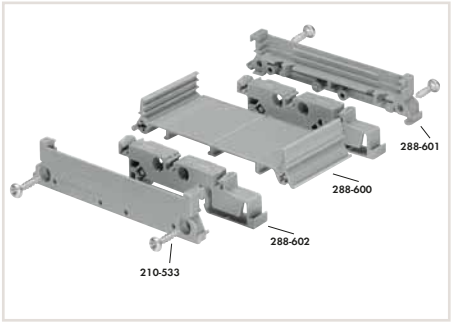
Description		Item No.	Pack. Unit
plain		248-501	5 cards
Marking	1 ...10 (10 x)	248-502	5 cards
	11 ... 20 (10 x)	248-503	5 cards
	21 ... 30 (10 x)	248-504	5 cards
	31 ... 40 (10 x)	248-505	5 cards
	41 ... 50 (10 x)	248-506	5 cards
	1 ... 50 (2 x)	248-566	5 cards
	K 1 ... K 10 (10 x)	248-450	5 cards
	K 11 ... K 20 (10 x)	248-451	5 cards
	K 100 (10 x)	248-452	5 cards
	U 1 ... U 10 (10 x)	248-453	5 cards
	U 11 ... U 20 (10 x)	248-454	5 cards
	U 100 (10 x)	248-455	5 cards

DIN-Rail Mount PCB Carriers

288 Series





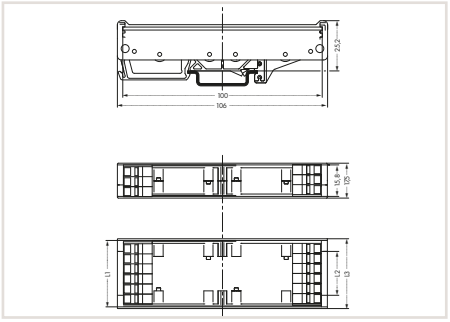


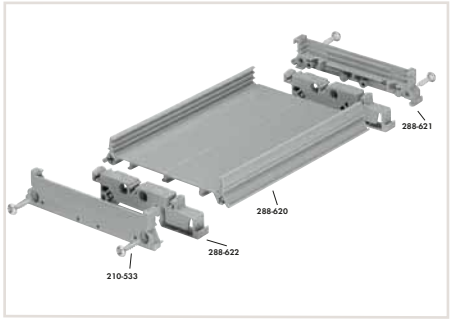
Mounting carrier (size 1

Length calculation for a complete mounting carrier:

PCB length: L1
Base length: L2 = L1 – 11 mm
Mounting carrier length: L3 = L1 + 2 mm
Lateral cover (size 1): 6.35 mm thick
Free space between base and PCB (when using upper PCB groove): 5 mm
PCB tolerances: 1.5 mm ± 0.2 mm (thickness), ± 0.2 mm (length/width); –0.1/+0.3 for milling contours

DIN-rail mount PCB carrier, size 1		
Description	Item No.	Pack. Unit
Lateral cover, size 1, small, 6.35 mm thick	**288-601**	1
Mounting foot for DIN-35 rail	**288-602**	1
Carrier base, size 1, 1 m long	**288-600**	1



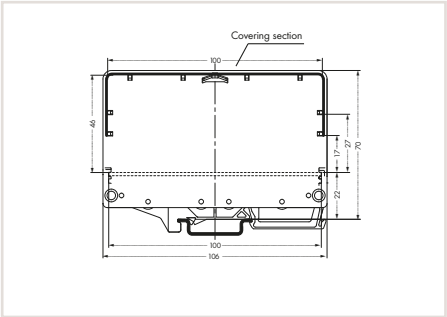


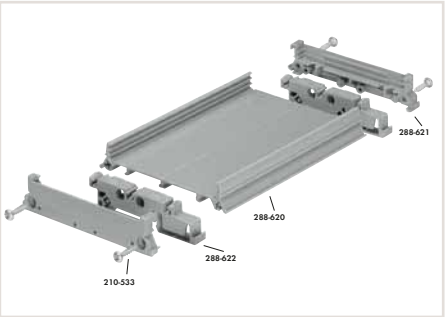
Mounting carrier (size 2

Length calculation for a complete mounting carrier:

PCB length: L1
Base length: L2 = L1 – 15.8 mm
Mounting carrier length: L3 = L1 + 2 mm
Cover length: L4 = L1
Lateral cover (size 2): 8.75 mm thick
Free space between base and PCB (when using upper PCB groove): 5 mm
PCB tolerances: 1.5 mm ± 0.2 mm (thickness), ± 0.2 mm (length/width); –0.1/+0.3 for milling contours

DIN-rail mount PCB carrier, size 2		
Description	Item No.	Pack. Unit
Lateral cover, size 2, small, 8.75 mm thick	**288-621**	1
Mounting foot for DIN-35 rail	**288-622**	1
Carrier base, size 2, 1 m long	**288-620**	1





Mounting carrier (size 2

Length calculation for a complete mounting carrier:

PCB length: L1
Base length: L2 = L1 − 15.8 mm
Mounting carrier length: L3 = L1 + 2 mm
Cover length: L4 = L1
Lateral cover (size 2): 8.75 mm thick
Free space between base and PCB (when using upper PCB groove): 5 mm
PCB tolerances: 1.5 mm ± 0.2 mm (thickness), ± 0.2 mm (length/width); −0.1/+0.3 for milling contours

DIN-rail mount PCB carrier, size 2 with cover		
Description	Item No.	Pack. Unit
Lateral cover, size 2, large, 8.75 mm thick	**288-626**	1
Cover, size 2, 1 m long	**288-627**	1

Accessories

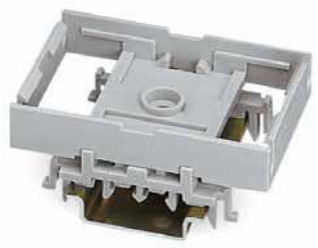
Marking strips

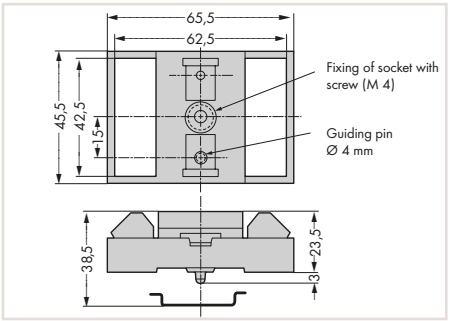
Description	Item No.	Pack. Unit
Phillips screw 2.9 x 13*	**210-533**	25
Marking strip, (7.5 x 0.5) mm, 1 m long, translucent	**709-196**	1

* Two pieces per lateral cover; for a module length of 35 mm or higher; lateral covers must be riveted for smaller modules. Rivet length depends on module length (rivets are not offered by WAGO).

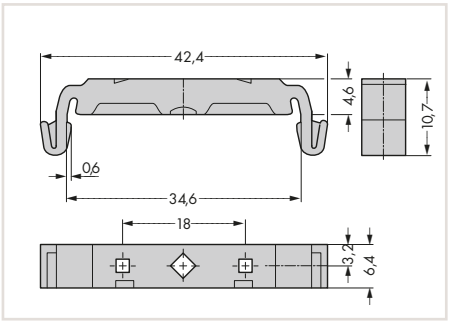
DIN-Rail-Mount PCB Carriers and Feet

288/209 Series

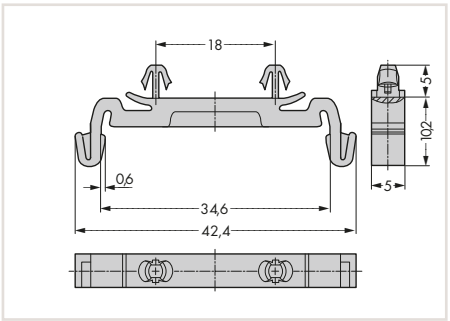


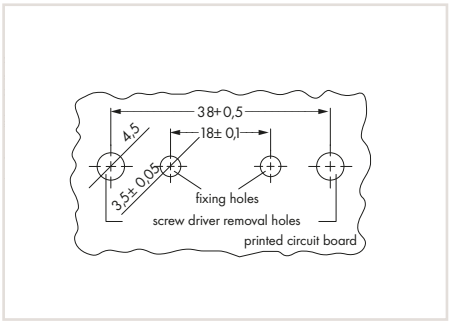


Mounting carrier			
Description		Item No.	Pack. Unit
Mounting carrier	For screw or DIN-rail mounting via universal snap-on type mounting feet (to be ordered separately)	**288-001**	1
Universal mounting foot	Snap-on type, for DIN-15, DIN-32 and DIN-35 rails	**288-002**	10
Mounting carrier for PCBs	Suitable for a "Eurocard" PCB (100 x 160 mm)	**288-003**	1

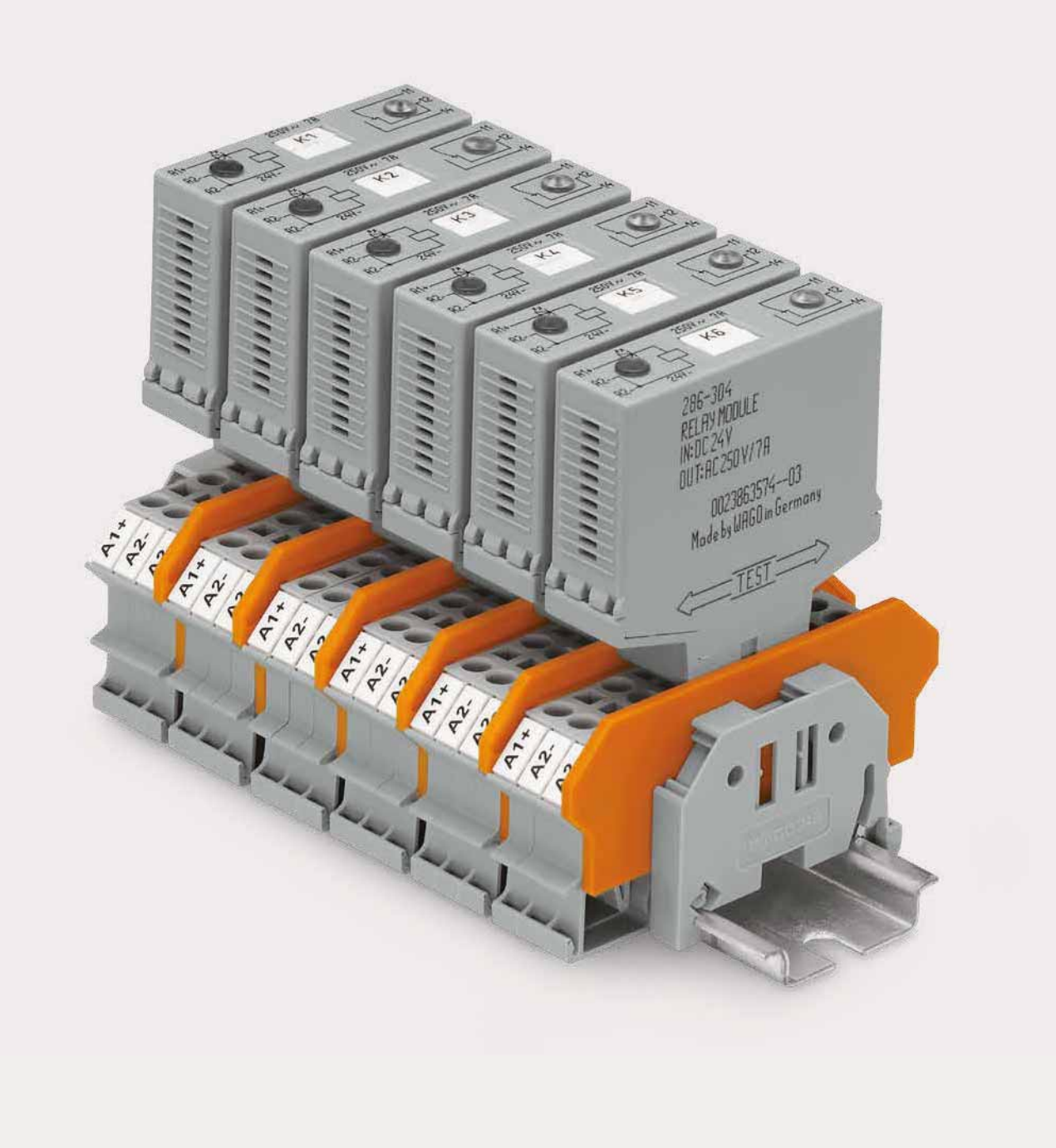


Mounting foot			
Description		Item No.	Pack. Unit
Mounting foot	For screwing onto relay modules, 2 mm Ø holes for mounting screws, 3.2 mm PCB hole diameter, 18 mm distance, for DIN-35 rail mounting	**209-120**	25
Mounting screw	For mounting foot (209-1209	**209-119**	50





Mounting foot			
Description		Item No.	Pack. Unit
Mounting foot	Snaps on relay modules, for 3.5 mm mounting hole diameter, 18 mm distance, for DIN-35 rail mounting	**209-188**	25



Overvoltage Protection

Overvoltage Protection

Rail-Mount Terminal Blocks, with Overvoltage Protection

792 Series 546

Accessories, 792 Series 550

Rail-Mount Terminal Blocks, with Overvoltage Protection

280 Series 552

Double-Deck Terminal Blocks with a Surge Suppression Device

280 Series 570

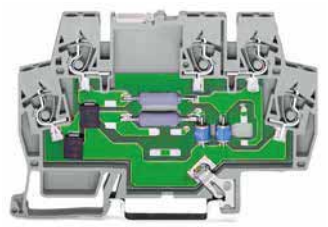
Pluggable Surge Suppression Modules

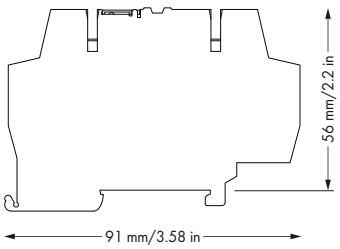
Pluggable Surge Suppression Modules for Carrier Terminal Blocks, 286 Series 580

Pluggable Surge Suppression Modules for Carrier Terminal Blocks, 286 Series 584

Rail-Mount Terminal Blocks with Overvoltage Protection, for DIN-35 Rails

792 Series





Technical Data

Coordination characteristics	X / 1
Protection type	IP00
Degree of protection with end and intermediate plate	IP20
Operating temperature	−40 … +80 °C
Storage temperature	−40 … +80 °C
Dimensions W x H x D	6 x 56 x 91 mm, height from upper-edge of DIN-rail
Connection technology	CAGE CLAMP®
Conductor range	0.08 … 2.5 mm² / 28 … 14 AWG
Strip length	5 … 6 mm / 0.2 … 0.24 inch
Standards/approvals	IEC 61643-21

Short description:
Surge protection devices for IT systems and devices in the voltage range up to 60 V (except special solutions, e.g., telephone systems with call voltage)

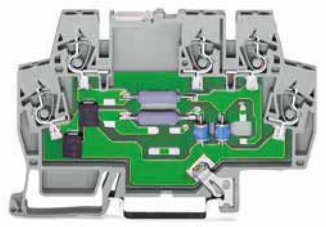
Overvoltage protection is also possible for DIN-35 rail-mount terminal blocks. Multi-stage surge suppression devices in rail-mount terminal blocks (792-80x Series) of just 6 mm width ensure cost-effective protection for control and bus technology (e.g., LON® network, PROFIBUS network, binary signals).

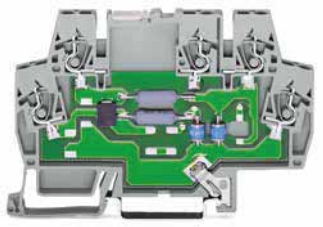
Features:
- Protect your system against overvoltage
- Slim, space-saving design
- Control operational costs by preventing expensive, unplanned downtime
- High operational reliability and system uptime

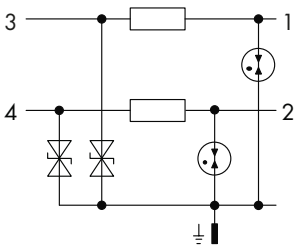
The coordination characteristics give information about the let-through energy of the overvoltage protector and the protection capacity.

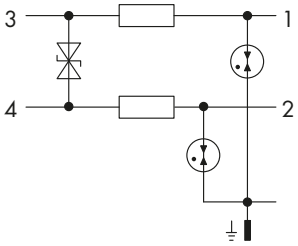
10

Accessories, page 550









Surge suppression module, for signal circuits, 24 VDC nominal voltage, for two signal paths with common discharge connection, for symmetrical interfaces, 2-stage, 6 mm wide

Nominal voltage	Item No.	Pack. Unit
24 VDC	792-800	1

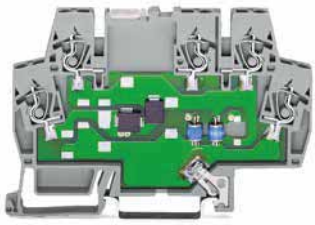
Surge suppression module, for signal circuits, 24 VDC nominal voltage, for two signal paths with common discharge connection, for asymmetrical interfaces, 2-stage, 6 mm wide

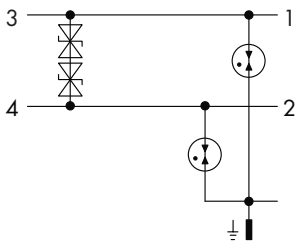
Nominal voltage	Item No.	Pack. Unit
24 VDC	792-801	1

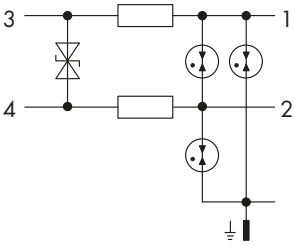
Specific Electrical Data		
Nominal voltage	24 VDC	24 VDC
Max. continuous operating voltage	33 VDC / 23 VAC	33 VDC / 23 VAC
Max. input voltage per EN 50020 Ui		
Max. input current per EN 50020 Ii		
Nominal current	0.5 A	0.5 A
Nominal discharge current I_{SN} (8/20) µs	5 kA per line; 10 kA total	5 kA per line; 10 kA total
Voltage protection level at I_N category C2	≤ 65 V (line/PG); ≤ 110 V (line/line)	≤ 50 V (line/line); ≤ 750 V (line/PG)
Voltage protection level at 1 kV/µs category C3	≤ 45 V (line/PG); ≤ 90 V (line/line)	≤ 45 V (line/line); ≤ 650 V (line/PG)
Series impedance per line	1.8 Ω	1.8 Ω
Response time t_a	≤ 1 ns	≤ 100 ns (line/PG); ≤ 1 ns (line/line)
Limiting frequency	6 MHz (line/PG)	6 MHz (line/PG)
Capacitance C	≤ 1.0 nF (line/PG); ≤ 0.5 nF (line/line)	≤ 5 pF (line/PG); ≤ 1 nF (line/line)

Rail-Mount Terminal Blocks with Overvoltage Protection, for DIN-35 Rails

792 Series







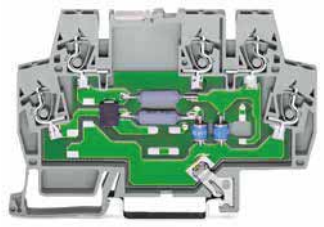
Surge suppression module, for signal circuits, 24 VDC nominal voltage, for two signal paths with common discharge connection, for supply lines, 1-stage, 6 mm wide

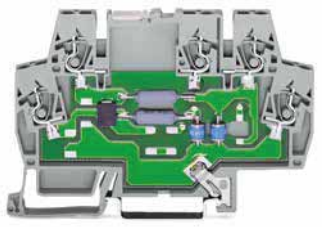
Nominal voltage	Item No.	Pack. Unit
24 VDC	792-802	1

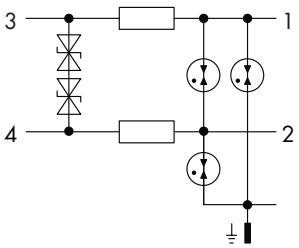
Surge suppression module, for signal circuits, 24 VDC nominal voltage, for two signal paths with common discharge connection, for symmetrical interfaces, 2-stage, for protecting intrinsically safe circuits, 6 mm wide

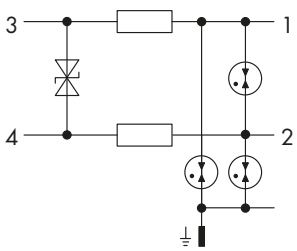
Nominal voltage	Item No.	Pack. Unit
24 VDC	792-803	1

Specific Electrical Data		
Nominal voltage	24 VDC	24 VDC
Max. continuous operating voltage	33 VDC / 23 VAC	33 VDC / 23 VAC
Max. input voltage per EN 50020 Ui		30 V
Max. input current per EN 50020 Ii		0.5 A
Nominal current	10 A	0.5 A
Nominal discharge current I_{SN} (8/20) µs	5 kA (line/PG); 300 A (line/line)	5 kA per line; 10 kA total
Voltage protection level at I_N category C2	≤ 50 V (line/line); ≤ 750 V (line/PG)	≤ 1500 V (line/PG); ≤ 50 V (line/line)
Voltage protection level at 1 kV/µs category C3	≤ 45 V (line/line); ≤ 650 V (line/PG)	≤ 1400 V (line/PG); ≤ 45 V (line/line)
Series impedance per line		1.8 Ω
Response time t_a	≤ 100 ns (line/PG); ≤ 1 ns (line/line)	≤ 100 ns (line/PG); ≤ 1 ns (line/line)
Limiting frequency	7 MHz	6 MHz
Capacitance C	≤ 12 pF (line/PG); ≤ 1 nF (line/line)	≤ 6 pF (line/PG); ≤ 1 nF (line/line)









Surge suppression module, for signal circuits, 48 VDC nominal voltage, for two signal paths with common discharge connection, for symmetrical interfaces, 2-stage, 6 mm wide

Nominal voltage	Item No.	Pack. Unit
48 VDC	792-804	1

Surge suppression module, for signal circuits, 5 VDC nominal voltage, for two signal paths with common discharge connection, for interfaces with high data rates, 2-stage, 6 mm wide

Nominal voltage	Item No.	Pack. Unit
5 VDC	792-805	1

Specific Electrical Data		
Nominal voltage	48 VDC	5 VDC
Max. continuous operating voltage	55 VDC / 38.5 VAC	6 VDC / 4.2 VAC
Max. input voltage per EN 50020 Ui		
Max. input current per EN 50020 Ii		
Nominal current	1.7 A	0.1 A
Nominal discharge current I_{SN} (8/20) µs	5 kA per line; 10 kA total	5 kA per line; 10 kA total
Voltage protection level at I_N category C2	≤ 100 V (line/line); ≤ 750 V (line/PG)	≤ 27 V (line/line); ≤ 50 V (line/PG)
Voltage protection level at 1 kV/µs category C3	≤ 70 V (line/line); ≤ 650 V (line/PG)	≤ 14 V (line/line); ≤ 14 V (line/PG)
Series impedance per line	0.4 Ω	1 Ω
Response time t_a	≤ 100 ns (line/line); ≤ 1 ns (line/PG)	≤ 1 ns
Limiting frequency	10 MHz	250 MHz / 180 MHz (line/PG)
Capacitance C	≤ 0.6 pF (line/PG); ≤ 10 pF (line/line)	≤ 16 pF (line/PG); ≤ 19 pF (line/line)

Accessories
792 Series

End and intermediate plate, 1 mm thick

Color	Item No.	Pack. Unit
gray	859-525	100 (4*25)

Push-in type jumper bar, light gray, insulated, 18 A

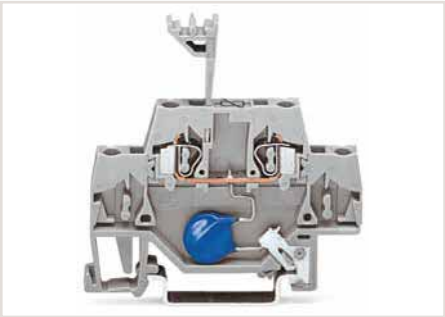
	Item No.	Pack. Unit
2-way	859-402	200 (8x25)
3-way	859-403	200 (8x25)
4-way	859-404	200 (8x25)
5-way	859-405	200 (8x25)
6-way	859-406	100 (4x25)
7-way	859-407	100 (4x25)
8-way	859-408	100 (4x25)
9-way	859-409	100 (4x25)
10-way	859-410	100 (4x25)

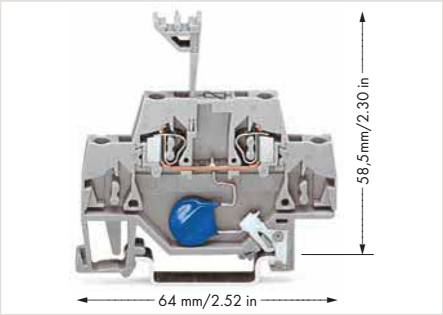
Item no. suffixes for colored push-in type jumper bars	Item No.
yellow	.../000-029
red	.../000-005
blue	.../000-006

Miniature WSB Quick marking system, 10 strips with 10 markers each, white with black printing

		Item No.	Pack. Unit
plain		248-501	5
Marking	1 ...10 (10 x)	248-502	5
	11 ... 20 (10 x)	248-503	5
	21 ... 30 (10 x)	248-504	5
	31 ... 40 (10 x)	248-505	5
	41 ... 50 (10 x)	248-506	5
	1 ... 50 (2 x)	248-566	5
	K 1 ... K 10 (10 x)	248-450	5
	K 11 ... K 20 (10 x)	248-451	5
	K 100 (10 x)	248-452	5
	U 1 ... U 10 (10 x)	248-453	5
	U 11 ... U 20 (10 x)	248-454	5
	U 100 (10 x)	248-455	5

Terminal Blocks with Surge Suppression Device and Direct Connection to the DIN-35 Rail
280 Series





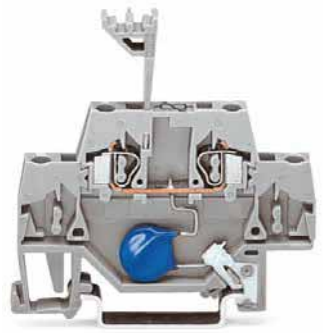
General Specifications	
Connection technology	CAGE CLAMP®
Conductor range	0.08 … 2.5 mm² / 28 … 14 AWG
Strip length	8 … 9 mm / 0.31 … 0.35 inch
Terminal block width	5 mm/0.197 inch

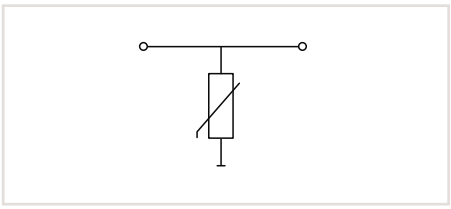
Short description:
Terminal blocks with surge suppression device and direct connection to the DIN-35 rail; these single-stage surge suppression devices are equipped either with 280 Series gas-filled surge arrester (coarse), varistor (medium) or suppressor diode (fine).

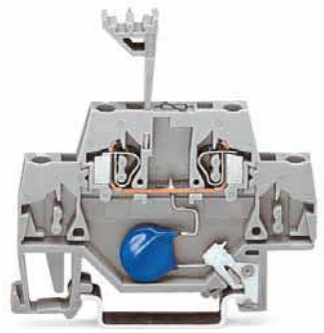
Features:
- Protect your system against overvoltage
- Slim, space-saving design
- Control operational costs by preventing expensive, unplanned downtime
- High operational reliability and system uptime

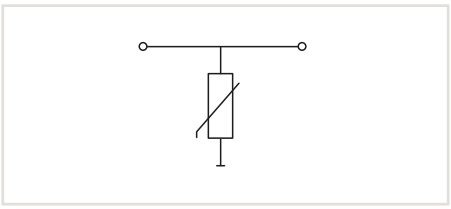
10

Accessories,
see page 578







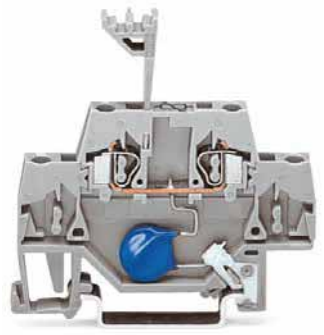


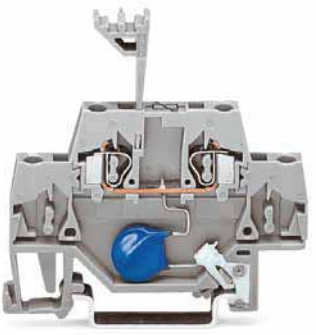
Terminal block, with varistor		
U_{BN}	Item No.	Pack. Unit
24 VDC	280-502/281-609	50

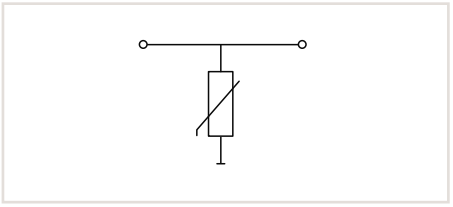
Terminal block, with varistor		
U_{BN}	Item No.	Pack. Unit
48 VDC	280-502/281-610	50

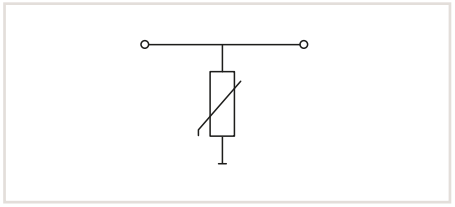
Specific Technical Data		
Nominal operating voltage U_{BN}	24 VDC	48 VDC
Maximum continuous operating voltage U_C	31 VDC	65 VDC
Nominal discharge current (8/20 µs) per line I_N	60 A	300 A
Max. discharge current (8/20 µs) I_{max}	250 A	1.2 kA
Capacitance	≤ 1.25 nF	≤ 0.5 nF
Voltage protection level (8/20 µs) U_P	77 VDC	135 VDC

Terminal Blocks with Surge Suppression Device and Direct Connection to the DIN-35 Rail
280 Series





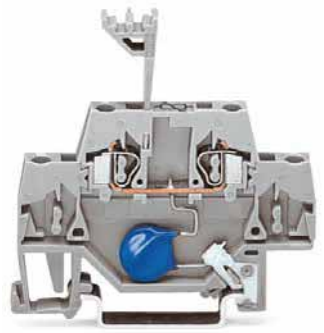


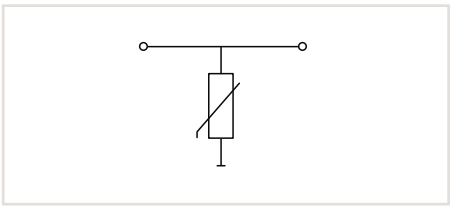


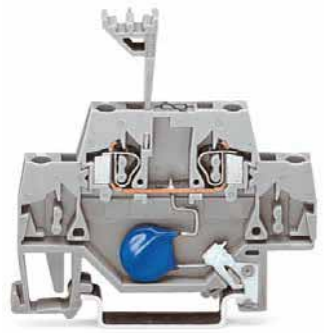
Terminal block, with varistor		
U_{BN}	**Item No.**	Pack. Unit
60 VDC	**280-502/281-611**	50

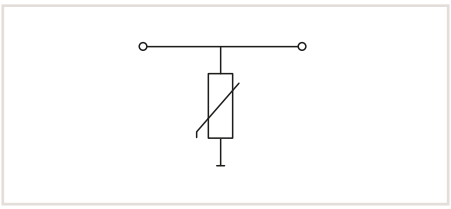
Terminal block, with varistor		
U_{BN}	**Item No.**	Pack. Unit
110 VDC	**280-502/281-612**	50

Specific Technical Data		
Nominal operating voltage U_{BN}	60 VDC	110 VDC
Maximum continuous operating voltage U_C	85 VDC	150 VDC
Nominal discharge current (8/20 µs) per line I_N	300 A	300 A
Max. discharge current (8/20 µs) I_{max}	1.2 kA	1.2 kA
Capacitance	≤ 0.48 nF	≤ 0.22 nF
Voltage protection level (8/20 µs) U_P	165 VDC	300 VAC







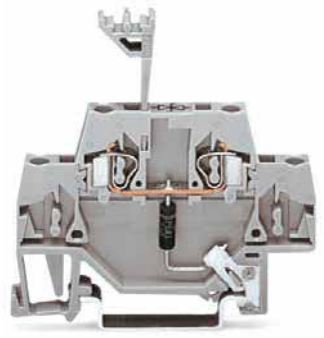


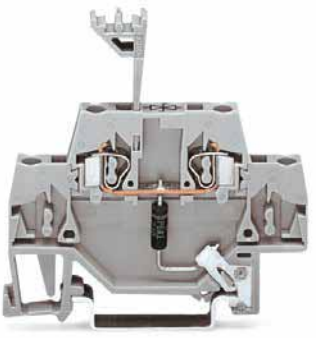
Terminal block, with varistor		
U_{BN}	Item No.	Pack. Unit
24 VAC	280-502/281-613	50

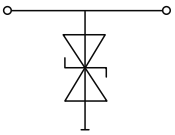
Terminal block, with varistor		
U_{BN}	Item No.	Pack. Unit
115 VAC	280-502/281-614	50

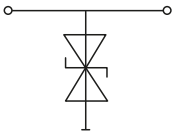
Specific Technical Data		
Nominal operating voltage U_{BN}	24 VAC	115 VAC
Maximum continuous operating voltage U_C	30 VAC	140 VAC
Nominal discharge current (8/20 µs) per line I_N	60 A	300 A
Max. discharge current (8/20 µs) I_{max}	250 A	1.2 kA
Capacitance	≤ 1.05 nF	≤ 0.18 nF
Voltage protection level (8/20 µs) U_P	93 VAC	360 VAC

Terminal Blocks with Surge Suppression Device and Direct Connection to the DIN-35 Rail
280 Series









Terminal block, with suppressor		
U_{BN}	**Item No.**	Pack. Unit
24 VDC	**280-502/281-602**	50

Terminal block, with suppressor		
U_{BN}	**Item No.**	Pack. Unit
48 VDC	**280-502/281-603**	50

Specific Technical Data		
Nominal operating voltage U_{BN}	24 VDC	48 VDC
Maximum continuous operating voltage U_C	30.8 VDC	58 VDC
Nominal discharge current (8/20 µs) per line I_N	12 A	6.5 A
Capacitance	≤ 1 nF	≤ 0.63 nF
Voltage protection level (8/20 µs) U_P	50 VDC	92 VDC

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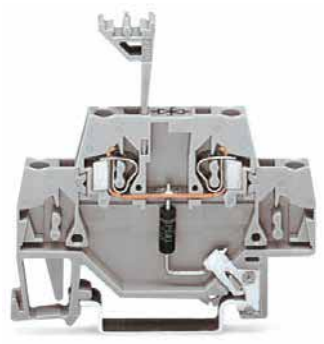
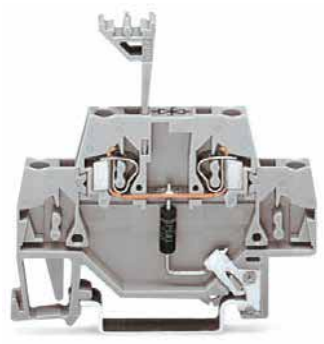
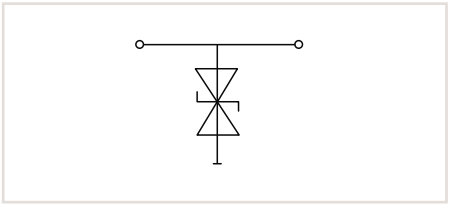
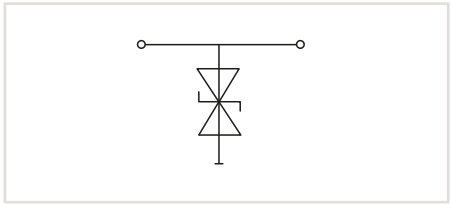






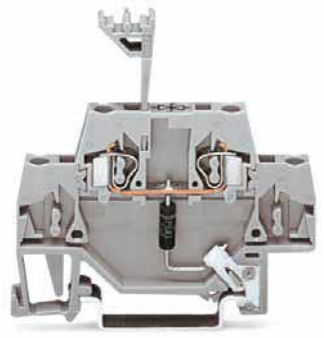


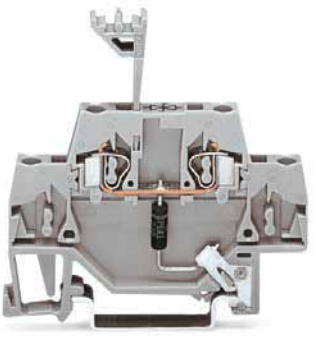
Terminal block, with suppressor		
U_{BN}	Item No.	Pack. Unit
60 VDC	280-502/281-604	50

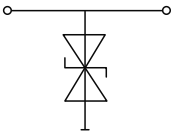
Terminal block, with suppressor		
U_{BN}	Item No.	Pack. Unit
110 VDC	280-502/281-605	50

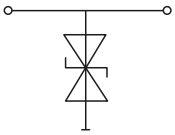
Specific Technical Data		
Nominal operating voltage U_{BN}	60 VDC	110 VDC
Maximum continuous operating voltage U_C	77 VDC	136 VDC
Nominal discharge current (8/20 µs) per line I_N	4.8 A	2.7 A
Capacitance	≤ 0.55 nF	≤ 0.4 nF
Voltage protection level (8/20 µs) U_P	125 VDC	219 VDC

Terminal Blocks with Surge Suppression Device and Direct Connection to the DIN-35 Rail
280 Series









Terminal block, with suppressor		
U_{BN}	**Item No.**	Pack. Unit
24 VAC	**280-502/281-606**	50

Terminal block, with suppressor		
U_{BN}	**Item No.**	Pack. Unit
115 VAC	**280-502/281-607**	50

Specific Technical Data		
Nominal operating voltage U_{BN}	24 VAC	115 VAC
Maximum continuous operating voltage U_C	28 VAC	133 VAC
Nominal discharge current (8/20 µs) per line I_N	9.3 A	1.7 A
Capacitance	≤ 0.8 nF	≤ 0.35 nF
Voltage protection level (8/20 µs) U_P	65 VAC	384 VAC

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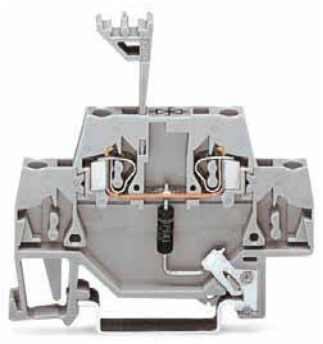
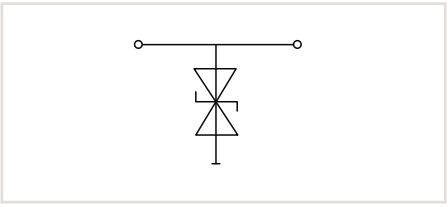
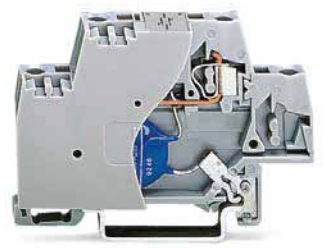


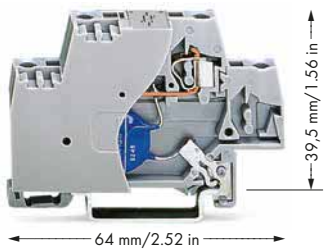


Terminal block, with suppressor		
U_{BN}	**Item No.**	Pack. Unit
230 VAC	**280-502/281-608**	50

Specific Technical Data	
Nominal operating voltage U_{BN}	230 VAC
Maximum continuous operating voltage U_C	253 VAC
Nominal discharge current (8/20 µs) per line I_N	1.1 A
Capacitance	≤ 0.36 nF
Voltage protection level (8/20 µs) U_P	548 VAC

Terminal Blocks with Surge Suppression Device and Direct Connection to the DIN-35 Rail
280 Series





General Specifications	
Connection technology	CAGE CLAMP®
Conductor range	0.08 … 2.5 mm² / 28 … 14 AWG
Strip length	8 … 9 mm / 0.31 … 0.35 inch
Terminal block width	10 mm / 0.394 inch

Short description:
Terminal blocks with surge suppression device and direct connection to the DIN-35 rail; these single-stage surge suppression devices are equipped either with 280 Series gas-filled surge arrester (coarse), varistor (medium) or suppressor diode (fine).

Features:
- Protect your system against overvoltage
- Slim, space-saving design
- Control operational costs by preventing expensive, unplanned downtime
- High operational reliability and system uptime

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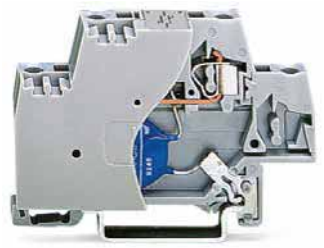
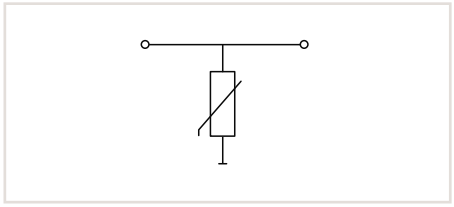
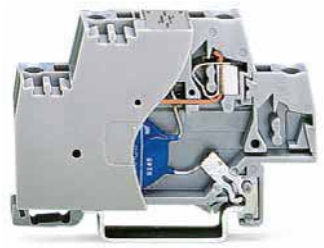
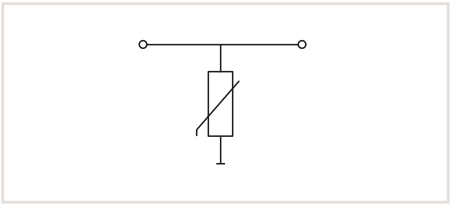
Accessories,
see page 578







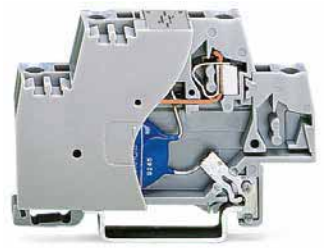


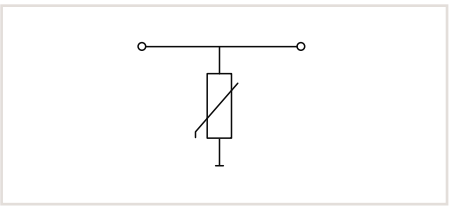
Terminal block, with varistor and end plate		
U_{BN}	Item No.	Pack. Unit
24 VDC	280-502/281-582	25

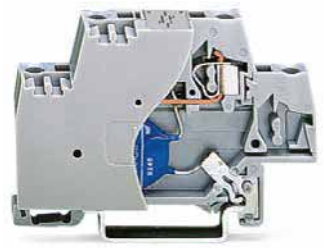
Terminal block, with varistor and end plate		
U_{BN}	Item No.	Pack. Unit
48 VDC	280-502/281-583	25

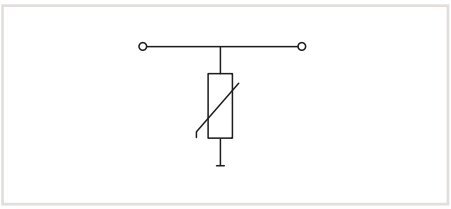
Specific Technical Data		
Nominal operating voltage U_{BN}	24 VDC	48 VDC
Maximum continuous operating voltage U_C	31 VDC	56 VDC
Nominal discharge current (8/20 µs) per line I_N	300 A	300 A
Max. discharge current (8/20 µs) I_{max}	1 kA	1 kA
Capacitance	≤ 4.6 nF	≤ 2.8 nF
Voltage protection level (8/20 µs) U_P	77 VDC	135 VDC

Terminal Blocks with Surge Suppression Device and Direct Connection to the DIN-35 Rail
280 Series





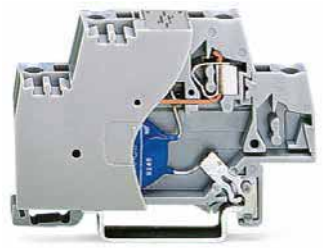


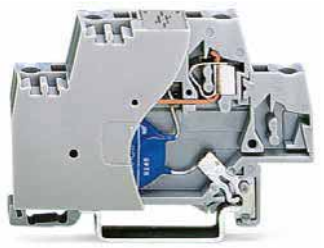


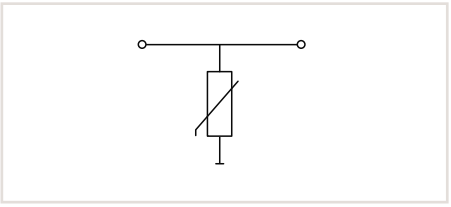
Terminal block, with varistor and end plate		
U_{BN}	**Item No.**	Pack. Unit
60 VDC	**280-502/281-584**	25

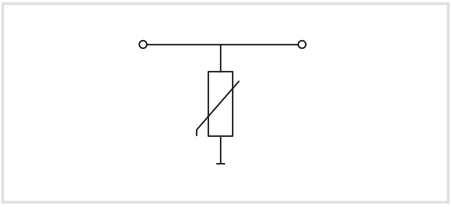
Terminal block, with varistor and end plate		
U_{BN}	**Item No.**	Pack. Unit
110 VDC	**280-502/281-585**	25

Specific Technical Data		
Nominal operating voltage U_{BN}	60 VDC	110 VDC
Maximum continuous operating voltage U_C	85 VDC	150 VDC
Nominal discharge current (8/20 µs) per line I_N	1 kA	1 kA
Max. discharge current (8/20 µs) I_{max}	4.5 kA	4.5 kA
Capacitance	≤ 1.7 nF	≤ 0.8 nF
Voltage protection level (8/20 µs) U_P	165 VDC	300 VDC







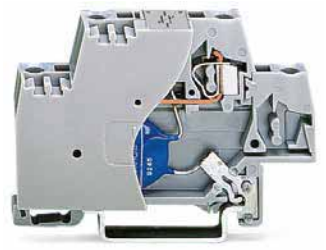


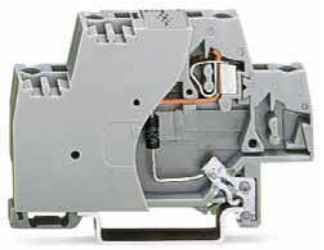
Terminal block, with varistor and end plate		
U_{BN}	Item No.	Pack. Unit
24 VAC	280-502/281-586	25

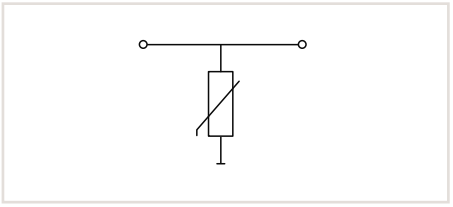
Terminal block, with varistor and end plate		
U_{BN}	Item No.	Pack. Unit
115 VAC	280-502/281-587	25

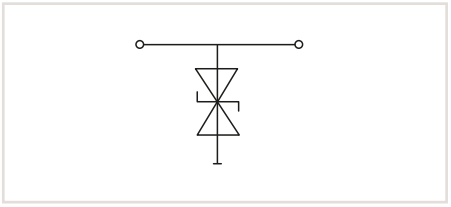
Specific Technical Data		
Nominal operating voltage U_{BN}	24 VAC	115 VAC
Maximum continuous operating voltage U_C	30 VAC	150 VAC
Nominal discharge current (8/20 µs) per line I_N	300 A	1 kA
Max. discharge current (8/20 µs) I_{max}	1 kA	4.5 kA
Capacitance	≤ 3.5 nF	≤ 0.57 nF
Voltage protection level (8/20 µs) U_P	93 VAC	395 VAC

Terminal Blocks with Surge Suppression Device and Direct Connection to the DIN-35 Rail
280 Series





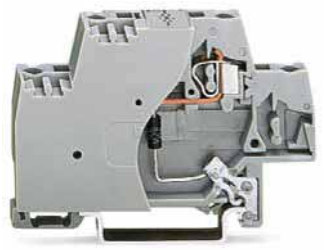


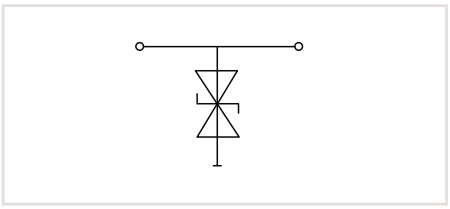


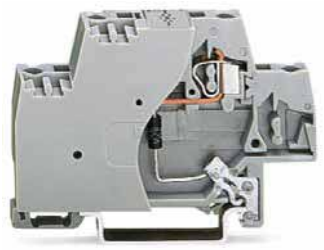
Terminal block, with varistor and end plate		
U_{BN}	**Item No.**	Pack. Unit
230 VAC	**280-502/281-588**	25

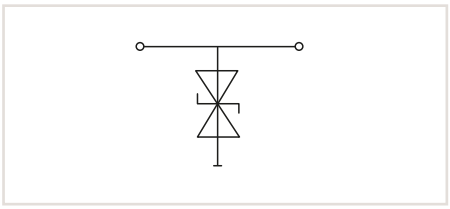
Terminal block, with suppressor diode and end plate		
U_{BN}	**Item No.**	Pack. Unit
24 VDC	**280-502/281-589**	25

Specific Technical Data		
Nominal operating voltage U_{BN}	230 VAC	24 VDC
Maximum continuous operating voltage U_C	275 VAC	28 VDC
Nominal discharge current (8/20 µs) per line I_N	1 kA	169 A
Max. discharge current (8/20 µs) I_{max}	4.5 kA	
Capacitance	≤ 0.32 nF	≤ 2.7 nF
Voltage protection level (8/20 µs) U_P	710 VAC	59 VDC







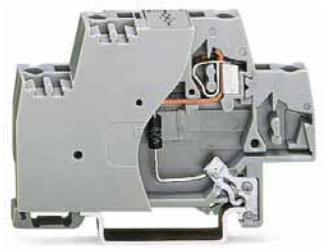


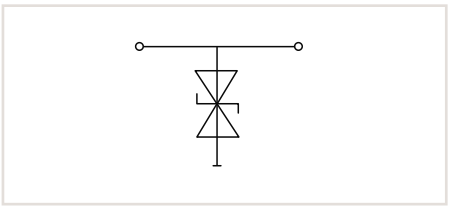
Terminal block, with suppressor diode and end plate		
U_{BN}	**Item No.**	Pack. Unit
48 VDC	**280-502/281-590**	25

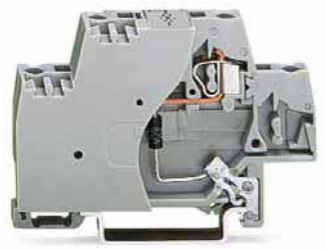
Terminal block, with suppressor diode and end plate		
U_{BN}	**Item No.**	Pack. Unit
60 VDC	**280-502/281-591**	25

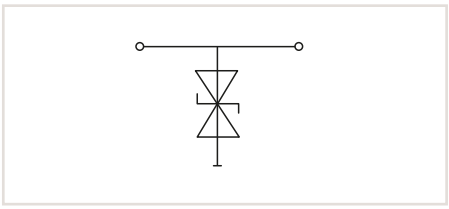
Specific Technical Data		
Nominal operating voltage U_{BN}	48 VDC	60 VDC
Maximum continuous operating voltage U_C	53 VDC	70 VDC
Nominal discharge current (8/20 µs) per line I_N	90 A	69 A
Max. discharge current (8/20 µs) I_{max}		
Capacitance	≤ 1.7 nF	≤ 1.35 nF
Voltage protection level (8/20 µs) U_P	111 VDC	146 VDC

Terminal Blocks with Surge Suppression Device and Direct Connection to the DIN-35 Rail
280 Series





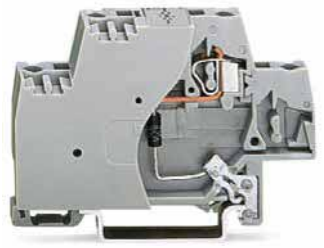


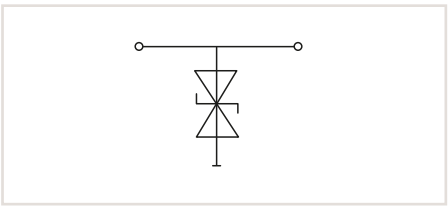


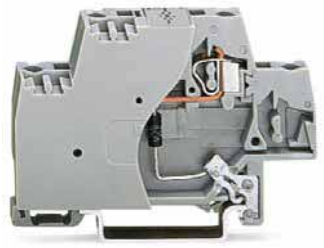
Terminal block, with suppressor diode and end plate		
U_{BN}	**Item No.**	Pack. Unit
110 VDC	**280-502/281-592**	25

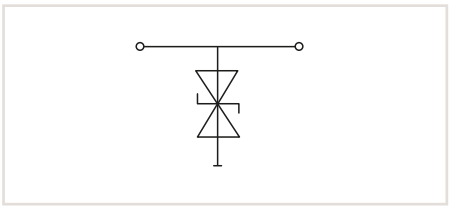
Terminal block, with suppressor diode and end plate		
U_{BN}	**Item No.**	Pack. Unit
24 VAC	**280-502/281-593**	25

Specific Technical Data		
Nominal operating voltage U_{BN}	110 VDC	24 VAC
Maximum continuous operating voltage U_C	128 VDC	26 VAC
Nominal discharge current (8/20 µs) per line I_N	38 A	143 A
Capacitance	≤ 0.85 nF	≤ 2.4 nF
Voltage protection level (8/20 µs) U_P	265 VDC	70 VAC







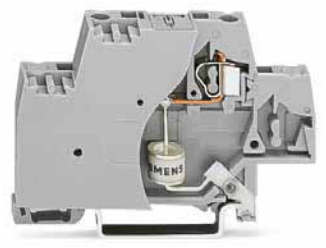


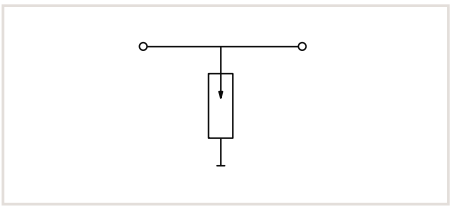
Terminal block, with suppressor diode and end plate		
U_{BN}	**Item No.**	Pack. Unit
115 VAC	**280-502/281-594**	25

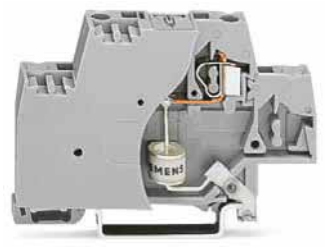
Terminal block, with suppressor diode and end plate		
U_{BN}	**Item No.**	Pack. Unit
230 VAC	**280-502/281-595**	25

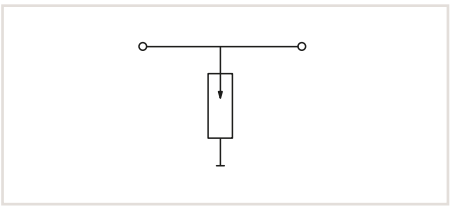
Specific Technical Data		
Nominal operating voltage U_{BN}	115 VAC	230 VAC
Maximum continuous operating voltage U_C	133 VAC	253 VAC
Nominal discharge current (8/20 µs) per line I_N	26 A	14 A
Capacitance	≤ 0.63 nF	≤ 0.4 nF
Voltage protection level (8/20 µs) U_P	388 VAC	706 VAC

Terminal Blocks with Surge Suppression Device and Direct Connection to the DIN-35 Rail
280 Series









Terminal block, with gas-filled surge arrester		
U_{BN}	**Item No.**	Pack. Unit
24 VAC/DC	**280-503/281-579**	25

Terminal block, with gas-filled surge arrester		
U_{BN}	**Item No.**	Pack. Unit
115 VAC/DC	**280-503/281-580**	25

Specific Technical Data		
Maximum continuous operating voltage U_C	70 VAC/90 VDC	180 VAC/230 VDC
Nominal discharge current (8/20 µs) per line I_N	5 kA	5 kA
Capacitance	≤ 2 pF	≤ 2 pF
Voltage protection level (8/20 µs) U_P	600 VAC	650 VAC

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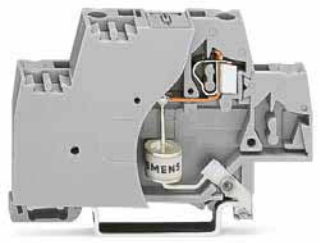
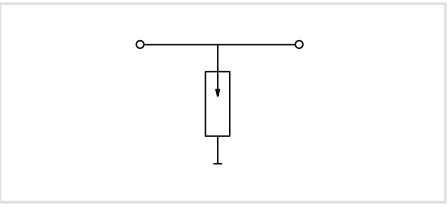
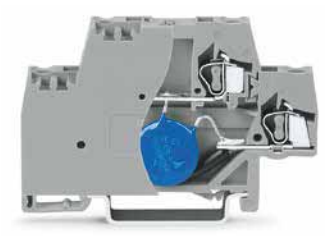


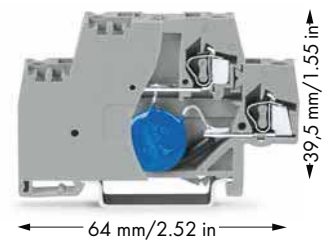


Terminal block, with gas-filled surge arrester		
U_{BN}	**Item No.**	Pack. Unit
230 VAC/DC	**280-503/281-581**	25

Specific Technical Data	
Maximum continuous operating voltage U_C	450 VAC/600 VDC
Nominal discharge current (8/20 µs) per line I_N	5 kA
Capacitance	≤ 2 pF
Voltage protection level (8/20 µs) U_P	1100 VAC

Double-Deck Terminal Blocks with a Surge Suppression Device
280 Series





General Specifications	
Connection technology	CAGE CLAMP®
Conductor range	0.08 … 2.5 mm² / 28 … 14 AWG
Strip length	8 … 9 mm / 0.31 … 0.35 inch
Terminal block width	10 mm / 0.394 inch

Short description:
These single-stage surge suppression devices are equipped either with 280 Series gas-filled surge arrester (coarse), varistor (medium) or suppressor diode (fine).

Features:
- Protect your system against overvoltage
- Slim, space-saving design
- Control operational costs by preventing expensive, unplanned downtime
- High operational reliability and system uptime

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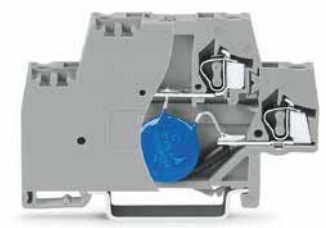
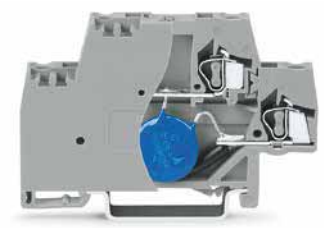
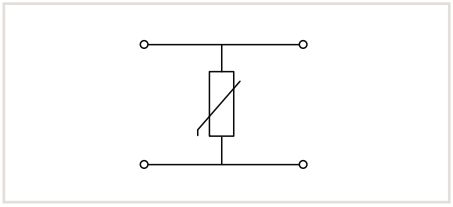
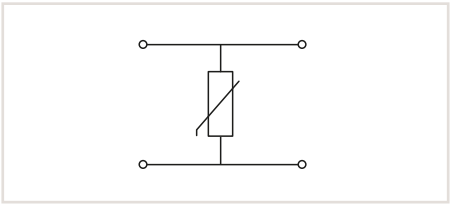
Accessories,
see page 578







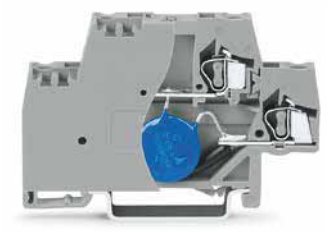


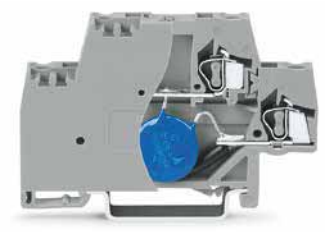
Terminal block, with varistor and end plate		
U_{BN}	Item No.	Pack. Unit
24 VDC	280-504/281-582	25

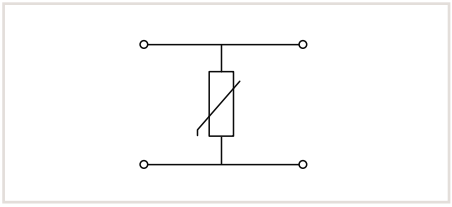
Terminal block, with varistor and end plate		
U_{BN}	Item No.	Pack. Unit
48 VDC	280-504/281-583	25

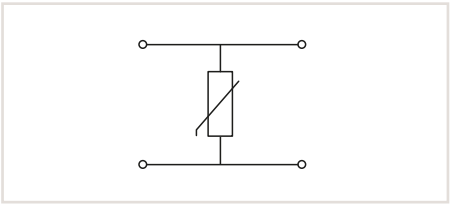
Specific Technical Data		
Nominal operating voltage U_{BN}	24 VDC	48 VDC
Maximum continuous operating voltage U_C	31 VDC	56 VDC
Nominal discharge current (8/20 µs) per line I_N	300 A	300 A
Max. discharge current (8/20 µs) I_{max}	1 kA	1 kA
Capacitance	≤ 4.6 nF	≤ 2.8 nF
Voltage protection level (8/20 µs) U_P	77 VDC	135 VDC

Double-Deck Terminal Blocks with a Surge Suppression Device
280 Series





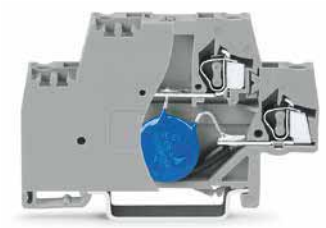


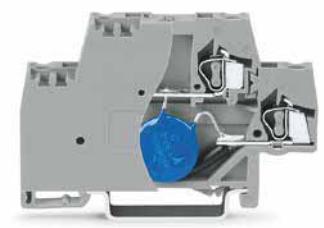


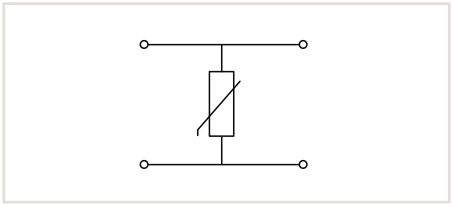
Terminal block, with varistor and end plate		
U_{BN}	**Item No.**	Pack. Unit
60 VDC	**280-504/281-584**	25

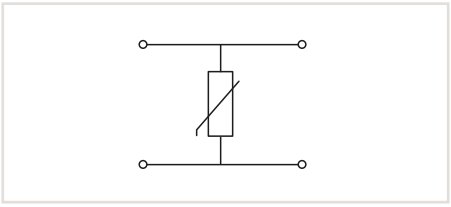
Terminal block, with varistor and end plate		
U_{BN}	**Item No.**	Pack. Unit
110 VDC	**280-504/281-585**	25

Specific Technical Data		
Nominal operating voltage U_{BN}	60 VDC	110 VDC
Maximum continuous operating voltage U_C	85 VDC	150 VDC
Nominal discharge current (8/20 µs) per line I_N	1 kA	1 kA
Max. discharge current (8/20 µs) I_{max}	4.5 kA	4.5 kA
Capacitance	≤ 1.7 nF	≤ 0.8 nF
Voltage protection level (8/20 µs) U_P	165 VDC	300 VDC







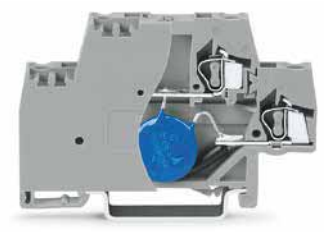


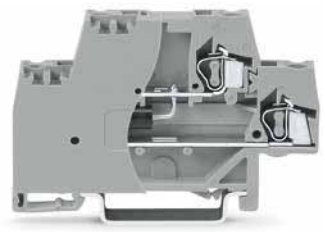
Terminal block, with varistor and end plate		
U_{BN}	**Item No.**	Pack. Unit
24 VAC	**280-504/281-586**	25

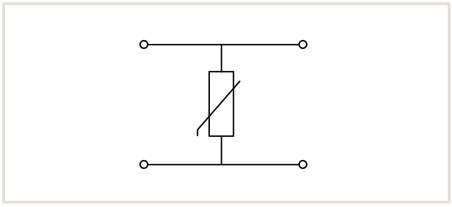
Terminal block, with varistor and end plate		
U_{BN}	**Item No.**	Pack. Unit
115 VAC	**280-504/281-587**	25

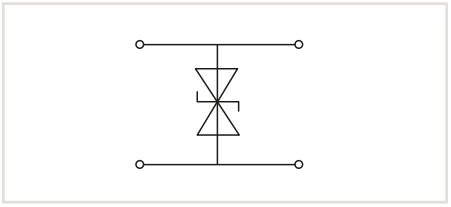
Specific Technical Data		
Nominal operating voltage U_{BN}	24 VAC	115 VAC
Maximum continuous operating voltage U_C	30 VAC	150 VAC
Nominal discharge current (8/20 µs) per line I_N	300 A	1 kA
Max. discharge current (8/20 µs) I_{max}	1 kA	4.5 kA
Capacitance	≤ 3.5 nF	≤ 0.57 nF
Voltage protection level (8/20 µs) U_P	93 VAC	395 VAC

Double-Deck Terminal Blocks with a Surge Suppression Device
280 Series





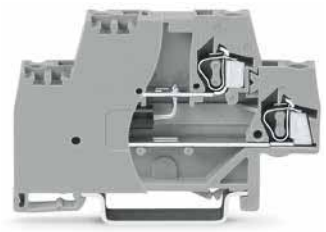


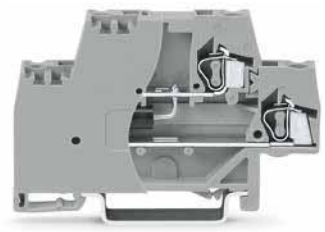


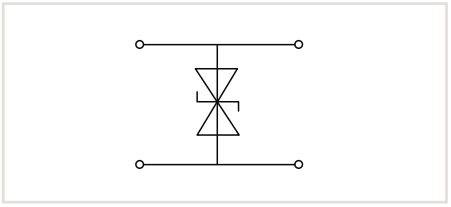
Terminal block, with varistor and end plate		
U_{BN}	**Item No.**	Pack. Unit
230 VAC	**280-504/281-588**	25

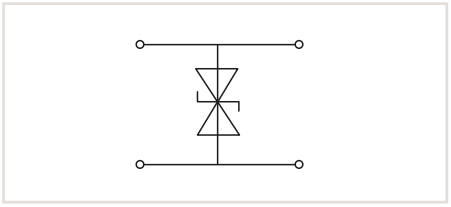
Terminal block, with suppressor diode and end plate		
U_{BN}	**Item No.**	Pack. Unit
24 VDC	**280-944/281-589**	25

Specific Technical Data		
Nominal operating voltage U_{BN}	230 VAC	24 VDC
Maximum continuous operating voltage U_C	275 VAC	28 VDC
Nominal discharge current (8/20 µs) per line I_N	1 kA	169 A
Max. discharge current (8/20 µs) I_{max}	4.5 kA	
Capacitance	≤ 0.32 nF	≤ 2.7 nF
Voltage protection level (8/20 µs) U_P	710 VAC	59 VDC







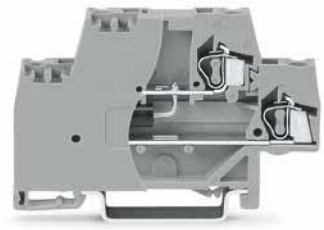


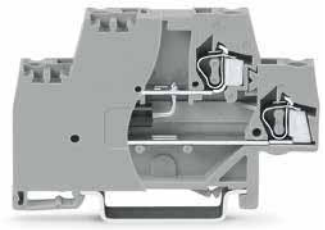
Terminal block, with suppressor diode and end plate		
U_{BN}	**Item No.**	Pack. Unit
48 VDC	**280-944/281-590**	25

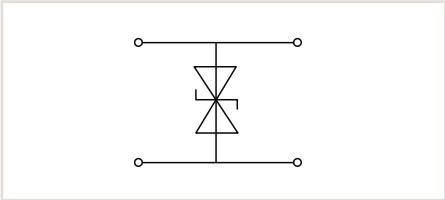
Terminal block, with suppressor diode and end plate		
U_{BN}	**Item No.**	Pack. Unit
60 VDC	**280-944/281-591**	25

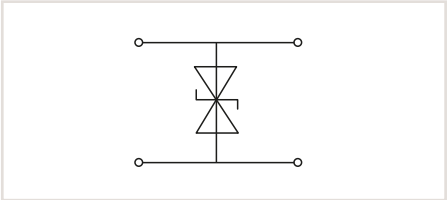
Specific Technical Data		
Nominal operating voltage U_{BN}	48 VDC	60 VDC
Maximum continuous operating voltage U_C	53 VDC	70 VDC
Nominal discharge current (8/20 µs) per line I_N	90 A	69 A
Max. discharge current (8/20 µs) I_{max}		
Capacitance	≤ 1.7 nF	≤ 1.35 nF
Voltage protection level (8/20 µs) U_P	111 VDC	146 VDC

Double-Deck Terminal Blocks with a Surge Suppression Device
280 Series





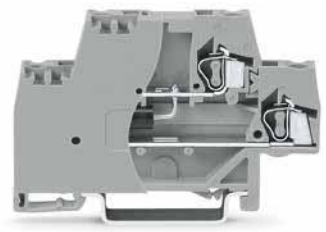


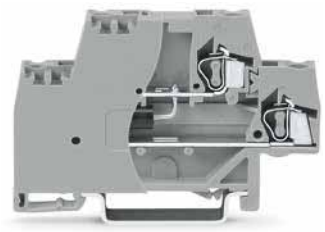


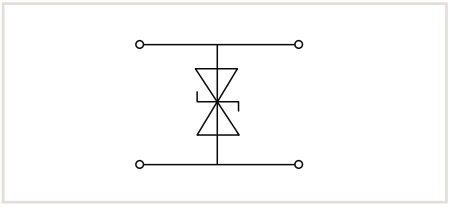
Terminal block, with suppressor diode and end plate		
U_{BN}	**Item No.**	Pack. Unit
110 VDC	**280-944/281-592**	25

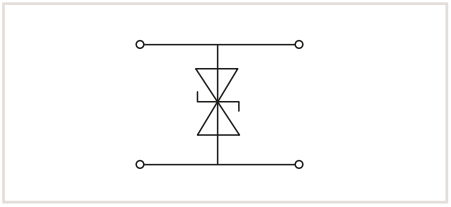
Terminal block, with suppressor diode and end plate		
U_{BN}	**Item No.**	Pack. Unit
24 VAC	**280-944/281-593**	25

Specific Technical Data		
Nominal operating voltage U_{BN}	110 VDC	24 VAC
Maximum continuous operating voltage U_C	128 VDC	26 VAC
Nominal discharge current (8/20 µs) per line I_N	38 A	143 A
Max. discharge current (8/20 µs) I_{max}		
Capacitance	≤ 0.85 nF	≤ 2.4 nF
Voltage protection level (8/20 µs) U_P	265 VDC	70 VAC









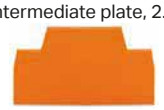
Terminal block, with suppressor diode and end plate		
U_{BN}	Item No.	Pack. Unit
115 VAC	280-944/281-594	25

Terminal block, with suppressor diode and end plate		
U_{BN}	Item No.	Pack. Unit
230 VAC	280-944/281-595	25

Specific Technical Data		
Nominal operating voltage U_{BN}	115 VAC	230 VAC
Maximum continuous operating voltage U_C	133 VAC	253 VAC
Nominal discharge current (8/20 µs) per line I_N	26 A	14 A
Max. discharge current (8/20 µs) I_{max}		
Capacitance	≤ 0.63 nF	≤ 0.4 nF
Voltage protection level (8/20 µs) U_P	388 VAC	706 VAC

Accessories
280 Series

End and intermediate plate, 2.5 mm thick



Color	Item No.	Pack. Unit
orange	280-341	100 (4x25)
gray	280-340	100 (4x25)

Insulation stop, 5 pcs/strip

Color	Diameter	Item No.	Pack. Unit
white	0.08 … 0.2 mm² “s” (0.14 mm² “f-st”)	280-470	200 (8x25)
light gray	0.25 … 0.5 mm²	280-471	200 (8x25)
dark gray	0.75 … 1 mm²	280-472	200 (8x25)

Comb-style jumper bar, insulated, $I_N = I_N$ of terminal block

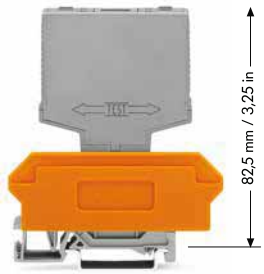
	Item No.	Pack. Unit
2-way	280-482	200 (8x25)
3-way	280-483	200 (8x25)
10-way	280-490	50 (2x25)

Alternate comb-style jumper bar, insulated, $I_N = I_N$ of terminal block

	Item No.	Pack. Unit
2-way	280-492	200 (8x25)

Pluggable Surge Suppression Modules for Carrier Terminal Blocks

286 Series

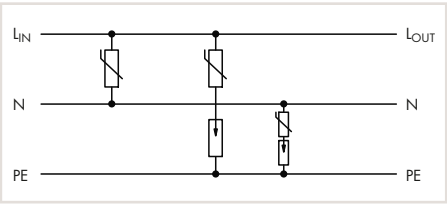


General Specifications	
Nominal current	10 A
Response time between L/N and PE	1 µs
Response time between L and N	25 ns
Rated nominal voltage	250 V
Rated surge voltage	4 kV
Pollution degree	2
Permissible ambient operating temperature	−25 … +85 °C
Dimensions (mm) W x H x D incl. terminal block for pluggable modules	17 x 82.5 x 73 mm
Module width	15 mm / 0.591 inch

Short description:
Two- and three-stage pluggable surge suppression modules (286 Series) for data, measurement, control, or power circuits are also available.

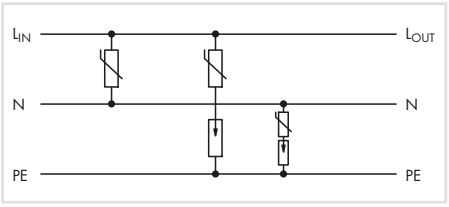
Features:
- Protect your system against overvoltage
- Slim, space-saving design
- Control operational costs by preventing expensive, unplanned downtime
- High operational reliability and system uptime

Note:
For isolation measurement, the ground contact at the transient suppression module must be disconnected.



Surge suppression module, for signal circuits, 24 VAC/DC nominal voltage, for two signal paths with common discharge connection, pluggable on rail-mounted terminal block, 15 mm wide

U_{BN}	Item No.	Pack. Unit
24 VAC/DC	286-836	1



Surge suppression module, for signal circuits, 115 VAC nominal voltage, for two signal paths with common discharge connection, pluggable on rail-mount terminal block, 15 mm wide

U_{BN}	U_{max}	Item No.	Pack. Unit
115 VAC	150 VAC	286-835/115-000	1

Specific Technical Data

Nominal operating voltage U_{BN}	24 VAC/DC	115 VAC
Operating voltage U_{max}	35 VAC/45 VDC	150 VAC
Nominal discharge current between L/N and PE	300 A	1 kA
Nominal discharge current between L and N	300 A	1 kA
Max. surge current between L/N and PE	1 kA	4.5 kA
Max. surge current between L and N	1 kA	4.5 kA
Protection level between L/N and PE	700 V	1 kV
Protection level between L and N	100 V	400 V

Accessories

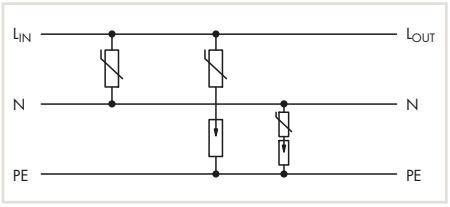
WMB marker card,
10 strips with 10 markers per card

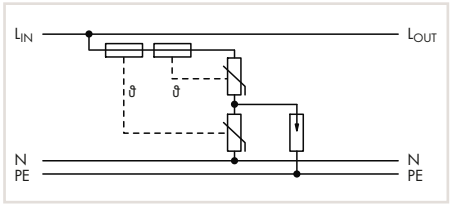
Marking	Item No.	Pack. Unit
F	209-791	5
1 … 10	209-702	5
Lin, N, PE Lout, N, PE, Lin, N, PE	249-655	5

Marking	Item No.	Pack. Unit
F	209-791	5
1 … 10	209-702	5
Lin, N, PE Lout, N, PE, Lin, N, PE	249-655	5

Pluggable Surge Suppression Modules for Carrier Terminal Blocks

286 Series





Surge suppression module, for signal circuits, 230 VAC nominal voltage, for two signal paths with common discharge connection, pluggable on rail-mount terminal block, 15 mm wide

U_{BN}	U_{max}	Item No.	Pack. Unit
230 VAC	275 VAC	286-835	1

Surge suppression module, for signal circuits, 115 VAC nominal voltage, for two signal paths with common discharge connection, with optical indication, 15 mm wide

U_{BN}	Item No.	Pack. Unit
115 VAC	286-838/115-000	1

Specific Technical Data

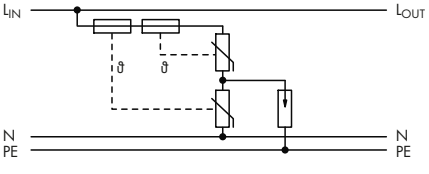
Nominal operating voltage U_{BN}	230 VAC	115 VAC
Operating voltage U_{max}	275 VAC	150 VAC
Nominal discharge current between L/N and PE	1 kA	1 kA
Nominal discharge current between L and N	1 kA	1 kA
Max. surge current between L/N and PE	4.5 kA	2.5 kA
Max. surge current between L and N	4.5 kA	2.5 kA
Protection level between L/N and PE	1.3 kV	800 V
Protection level between L and N	700 V	400 V

Accessories

WMB marker card,
10 strips with 10 markers per card

Marking	Item No.	Pack. Unit
F	209-791	5
1 … 10	209-702	5
Lin, N, PE Lout, N, PE, Lin, N, PE	249-655	5

Marking	Item No.	Pack. Unit
F	209-791	5
1 … 10	209-702	5
Lin, N, PE Lout, N, PE, Lin, N, PE	249-655	5



Surge suppression module, for signal circuits, 230 VAC nominal voltage, for two signal paths with common discharge connection, with optical indication, pluggable on rail-mount terminal block, 15 mm wide

U_{BN}	Item No.	Pack. Unit
230 VAC	286-838	1

Specific Technical Data

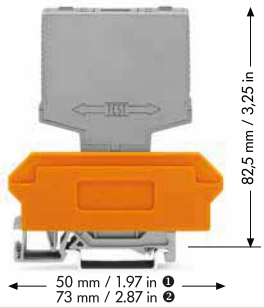
Nominal operating voltage U_{BN}	230 VAC
Operating voltage U_{max}	300 VAC
Nominal discharge current between L/N and PE	1 kA
Nominal discharge current between L and N	1 kA
Max. surge current between L/N and PE	2.5 kA
Max. surge current between L and N	2.5 kA
Protection level between L/N and PE	1 kV
Protection level between L and N	800 V

Accessories

WMB marker card,
10 strips with 10 markers per card

Marking	Item No.	Pack. Unit
F	209-791	5
1 … 10	209-702	5
Lin, N, PE Lout, N, PE, Lin, N, PE	249-655	5

Pluggable Surge Suppression Modules for Carrier Terminal Blocks
286 Series



General Specifications	
Permissible ambient operating temperature	–25 … +85 °C
Dimensions (mm) W x H x D	Module width* x 50 x 51

*Type-dependent

Short description:
Two- and three-stage pluggable surge suppression modules (286 Series) for data, measurement, control, or power circuits are also available.

Features:
- Protect your system against overvoltage
- Slim, space-saving design
- Control operational costs by preventing expensive, unplanned downtime
- High operational reliability and system uptime

Note:
For isolation measurement, the ground contact at the transient suppression module must be disconnected.

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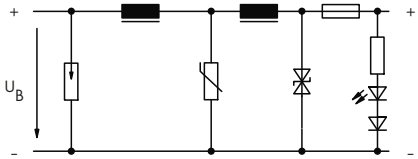


Surge suppression module, for signal circuits, 24 VDC nominal voltage, for one signal path, plugged on rail-mount terminal block, 20 mm wide

U_{BN}	Item No.	Pack. Unit
24 VDC	286-833	1

Specific Technical Data

Nominal operating voltage U_{BN}	24 VDC
Operating voltage U_{max}	30 VDC
Nominal current	0.1 A
Nominal voltage per EN 60664-1	
Nominal discharge current between L/N and PE	
Nominal discharge current between L and N	5 kA
Max. surge current between L/N and PE	
Max. surge current between L and N	5 kA
Protection level between L/N and PE	
Protection level between L and N	≤ 59 V
Response time between L/N and PE	
Response time between L and N	≤ 10 ns
Contact resistance/inductivity	20 mΩ / 2 x 7 µH

Accessories

WMB marker card,
10 strips with 10 markers per card

Marking	Item No.	Pack. Unit
F	209-791	5
1 … 10	209-702	5
+/-	209-652	5
Lin, PE, PE, N, Lout, PE, PE, N	249-652	5

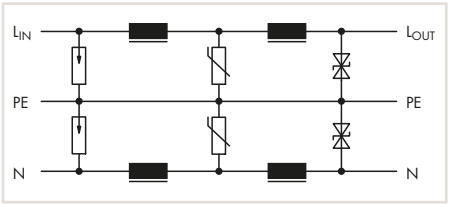
Terminal block for pluggable modules

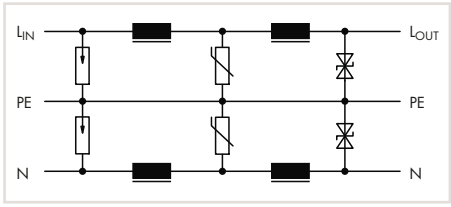
Width	Item No.	Pack. Unit
with 2-conductor terminals blocks, orange separator ❶	22 mm	280-638	1
with 4-conductor terminals blocks, orange separator ❷	22 mm	280-628	1
with 4-conductor terminals blocks, marker plate ❷	25 mm	280-764	1

Conductor range: 0.08 … 2.5 mm² / 28 … 14 AWG;
Strip length: 8 … 9 mm / 0.31 … 0.35 inch

Pluggable Surge Suppression Modules for Carrier Terminal Blocks

286 Series





Surge suppression module, for signal circuits, 12 VDC nominal voltage, for two signal paths with common discharge connection, 20 mm wide		
U_{BN}	Item No.	Pack. Unit
12 VDC	286-834	1

Surge suppression module, for signal circuits, 24 VDC nominal voltage, for two signal paths with common discharge connection, plugged on rail-mount terminal block, 20 mm wide		
U_{BN}	Item No.	Pack. Unit
24 VDC	286-834/024-000	1

Specific Technical Data

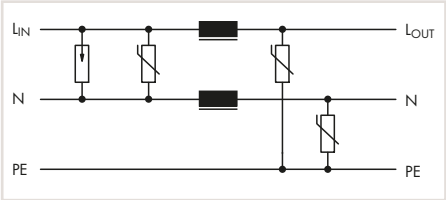
Nominal operating voltage U_{BN}	12 VDC	24 VDC
Operating voltage U_{max}	14 VDC	30 VDC
Nominal current	6 A	6 A
Nominal voltage per EN 60664-1		
Nominal discharge current between L/N and PE	1.5 kA	1.5 kA
Nominal discharge current between L and N		
Max. surge current between L and N		
Max. surge current between L/N and PE	1.5 kA	1.5 kA
Protection level between L and N		
Protection level between L/N and PE	≤ 22 V	≤ 59 V
Response time between L/N and PE	≤ 10 ns	≤ 10 ns
Response time between L and N		
Contact resistance/inductivity	50 mΩ / 14 µH	50 mΩ / 14 µH

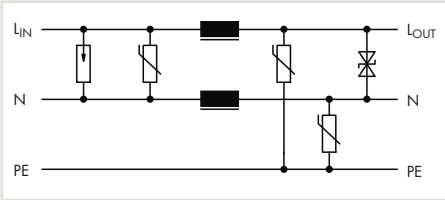
10

Accessories

WMB marker card, 10 strips with 10 markers per card			
Marking	Item No.	Pack. Unit	
F	209-791	5	
1 … 10	209-702	5	
+/-	209-652	5	
Lin, PE, PE, N, Lout, PE, PE, N	249-652	5	

Terminal block for pluggable modules	Width	Item No.	Pack. Unit	Width	Item No.	Pack. Unit
with 2-conductor terminals blocks, orange separator ❶	22 mm	280-638	1	22 mm	280-638	1
with 4-conductor terminals blocks, orange separator ❷	22 mm	280-628	1	22 mm	280-628	1
with 4-conductor terminals blocks, marker plate ❷	25 mm	280-764	1	25 mm	280-764	1
Conductor range: 0.08 … 2.5 mm² / 28 … 14 AWG; Strip length: 8 … 9 mm / 0.31 … 0.35 inch						





Surge suppression module, for signal circuits, 24 VAC/DC nominal voltage, for two signal paths with common discharge connection, plugged on rail-mount terminal block, 20 mm wide

U_{BN}	Item No.	Pack. Unit
24 VAC/DC	286-831	1

Surge suppression module, for signal circuits, 24 VAC/DC nominal voltage, for two signal paths with common discharge connection, plugged on rail-mount terminal block, 20 mm wide

U_{BN}	Item No.	Pack. Unit
24 VAC/DC	286-832	1

Specific Technical Data

Nominal operating voltage U_{BN}	24 VAC/DC	24 VAC/DC
Operating voltage U_{max}	30 VAC / 38 VDC	30 VAC / 38 VDC
Nominal current	6 A	6 A
Rated nominal voltage	250 V	250 V
Rated surge voltage	4 kV	4 kV
Pollution degree	2	2
Nominal discharge current between L/N and PE	200 A	200 A
Nominal discharge current between L and N	1.5 kA	1.5 kA
Max. surge current between L and N	1.5 kA	1.5 kA
Max. surge current between L/N and PE	500 A	500 A
Protection level between L/N and PE	≤ 93 V	≤ 93 V
Protection level between L and N	≤ 93 V	≤ 59 V
Response time between L/N and PE	≤ 25 ns	≤ 25 ns
Response time between L and N	≤ 25 ns	≤ 5 ns
Contact resistance/inductivity	25 mΩ / 2 x 7 µH	25 mΩ / 2 x 7 µH

Accessories

WMB marker card, 10 strips with 10 markers per card

Marking	Item No.	Pack. Unit
F	209-791	5
1 … 10	209-702	5
PE, N, Lin, PE, N, Lout	209-911	5

Marking	Item No.	Pack. Unit
F	209-791	5
1 … 10	209-702	5
PE, N, Lin, PE, N, Lout	209-911	5

Terminal block for pluggable modules*

Width	Item No.	Pack. Unit
22 mm	280-638	1
22 mm	280-628	1
25 mm	280-764	1

Width	Item No.	Pack. Unit
22 mm	280-638	1
22 mm	280-628	1
25 mm	280-764	1

with 2-conductor terminals blocks, orange separator ❶

with 4-conductor terminals blocks, orange separator ❷

with 4-conductor terminals blocks, marker plate ❷

Conductor range: 0.08 … 2.5 mm² / 28 … 14 AWG; Strip length: 8 … 9 mm / 0.31 … 0.35 inch

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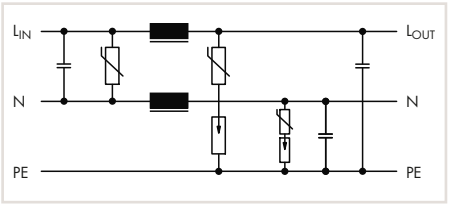
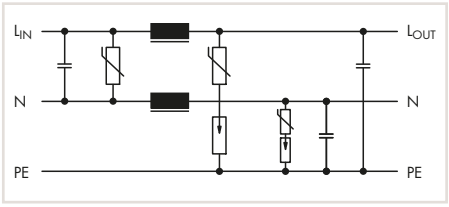
Pluggable Surge Suppression Modules for Carrier Terminal Blocks

286 Series





Surge suppression module, for signal circuits, 110 VDC nominal voltage, for two signal paths with common discharge connection, 2-stage, plugged on rail-mount terminal block, 25 mm wide

Item No.	Pack. Unit
286-844	1

Surge suppression module, for signal circuits, 220 VDC nominal voltage, for two signal paths with common discharge connection, 2-stage, pluggable on rail-mount terminal block, 25 mm wide

Item No.	Pack. Unit
286-841	1

Specific Technical Data

Nominal operating voltage U_{BN}	110 VDC	220 VDC
Operating voltage U_{max}	180 VDC	320 VDC
Nominal current	6 A	6 A
Rated nominal voltage	250 V	250 V
Rated surge voltage	4 kV	4 kV
Pollution degree	2	2
Nominal discharge current between L/N and PE	600 A	600 A
Nominal discharge current between L and N	600A	600A
Max. surge current between L and N	1.5 kA	1.5 kA
Max. surge current between L/N and PE	1.5 kA	1.5 kA
Protection level between L/N and PE	≤ 900 V	≤ 900 V
Protection level between L and N	≤ 650 V	≤ 650 V
Response time between L/N and PE	≤ 1 µs	≤ 1 µs
Response time between L and N	≤ 25 ns	≤ 25 ns
Contact resistance/inductivity	- / 2 x 0.8 mH	- / 2 x 0.8 mH

10

Accessories

WMB marker card, 10 strips with 10 markers per card

Marking	Item No.	Pack. Unit
F	209-791	5
1 … 10	209-702	5
PE, N, Lin, PE, N, Lout	209-911	5

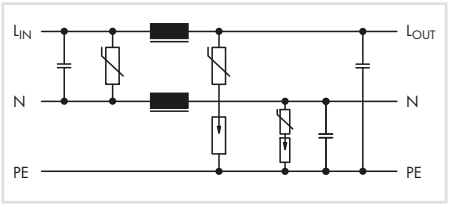
Marking	Item No.	Pack. Unit
F	209-791	5
1 … 10	209-702	5
PE, N, Lin, PE, N, Lout	209-911	5

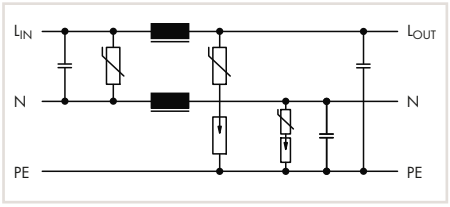
Terminal block for pluggable modules

Width	Item No.	Pack. Unit
with 2-conductor terminals blocks, orange separator ❶	27 mm	280-639	1
with 4-conductor terminals blocks, orange separator ❷	27 mm	280-629	1
with 4-conductor terminals blocks, marker plate ❷	30 mm	280-765	1

Width	Item No.	Pack. Unit
with 2-conductor terminals blocks, orange separator ❶	27 mm	280-639	1
with 4-conductor terminals blocks, orange separator ❷	27 mm	280-629	1
with 4-conductor terminals blocks, marker plate ❷	30 mm	280-765	1

Conductor range: 0.08 … 2.5 mm² / 28 … 14 AWG; Strip length: 8 … 9 mm / 0.31 … 0.35 inch





Surge suppression module, for signal circuits, 115 VAC nominal voltage, for two signal paths with common discharge connection, 2-stage, pluggable on rail-mount terminal block, 25 mm wide

Item No.	Pack. Unit
286-843	1

Surge suppression module, for signal circuits, 230 VAC nominal voltage, for two signal paths with common discharge connection, 2-stage, pluggable on rail-mount terminal block, 25 mm wide

Item No.	Pack. Unit
286-842	1

Specific Technical Data

Nominal operating voltage U_{BN}	115 VAC	230 VAC
Operating voltage U_{max}	140 VAC	250 VAC
Nominal current	6 A	6 A
Rated nominal voltage	250 V	250 V
Rated surge voltage	4 kV	4 kV
Pollution degree	2	2
Nominal discharge current between L/N and PE	600 A	600 A
Nominal discharge current between L and N	600A	600A
Max. surge current between L and N	1.5 kA	1.5 kA
Max. surge current between L/N and PE	1.5 kA	1.5 kA
Protection level between L/N and PE	≤ 900 V	≤ 900 V
Protection level between L and N	≤ 650 V	≤ 650 V
Response time between L/N and PE	≤ 1 µs	≤ 1 µs
Response time between L and N	≤ 25 ns	≤ 25 ns
Contact resistance/inductivity	- / 2 x 0.8 mH	- / 2 x 0.8 mH

Accessories

WMB marker card, 10 strips with 10 markers per card

Marking	Item No.	Pack. Unit
F	209-791	5
1 … 10	209-702	5
PE, N, Lin, PE, N, Lout	209-911	5

Marking	Item No.	Pack. Unit
F	209-791	5
1 … 10	209-702	5
PE, N, Lin, PE, N, Lout	209-911	5

Terminal block for pluggable modules

Width	Item No.	Pack. Unit
27 mm	280-639	1
27 mm	280-629	1
30 mm	280-765	1

Width	Item No.	Pack. Unit
27 mm	280-639	1
27 mm	280-629	1
30 mm	280-765	1

with 2-conductor terminals blocks, orange separator ❶

with 4-conductor terminals blocks, orange separator ❷

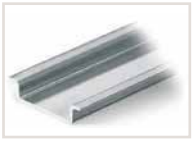
with 4-conductor terminals blocks, marker plate ❷

Conductor range: 0.08 … 2.5 mm² / 28 … 14 AWG; Strip length: 8 … 9 mm / 0.31 … 0.35 inch

10

Accessories and Tools

Shield Connecting Systems, Marking Systems, Accessories and Tools

			Page
	Shield Clamping Saddles	790 Series	595
	Spring-Equipped Shield Clamping Saddles	790 Series	597
	Busbar Carriers	790 Series	602
	Marking Systems		606
	End Stops for DIN-35 and DIN-15 Rails		613
	**Carrier Rails, Collective Jumper Carriers and Rail-Mount Terminal Block Covers**		614
	Operating Tools		620
	Stripping Tools		624
	Crimping Tools for Ferrules		625
	Cable Cutter		625
	Test and Measurement Devices		630
	General Test Accessories		632

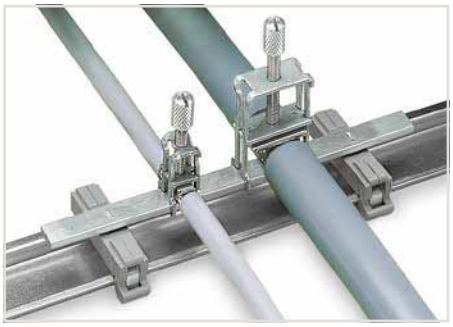
Shield Connection System, 790 Series
Description and Installation

Carrier with grounding foot* (790-113),
45 mm long, busbar 90° to the rail

*for all sizes of shield clamping saddles

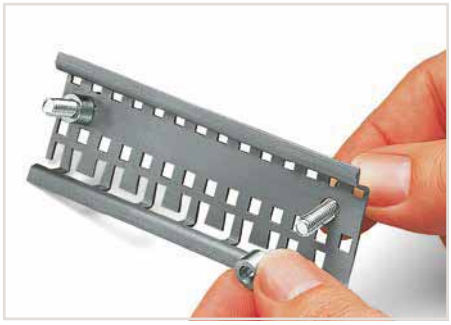
Carrier with grounding foot* (790-114),
45 mm long, busbar parallel to the rail

*for all sizes of shield clamping saddles

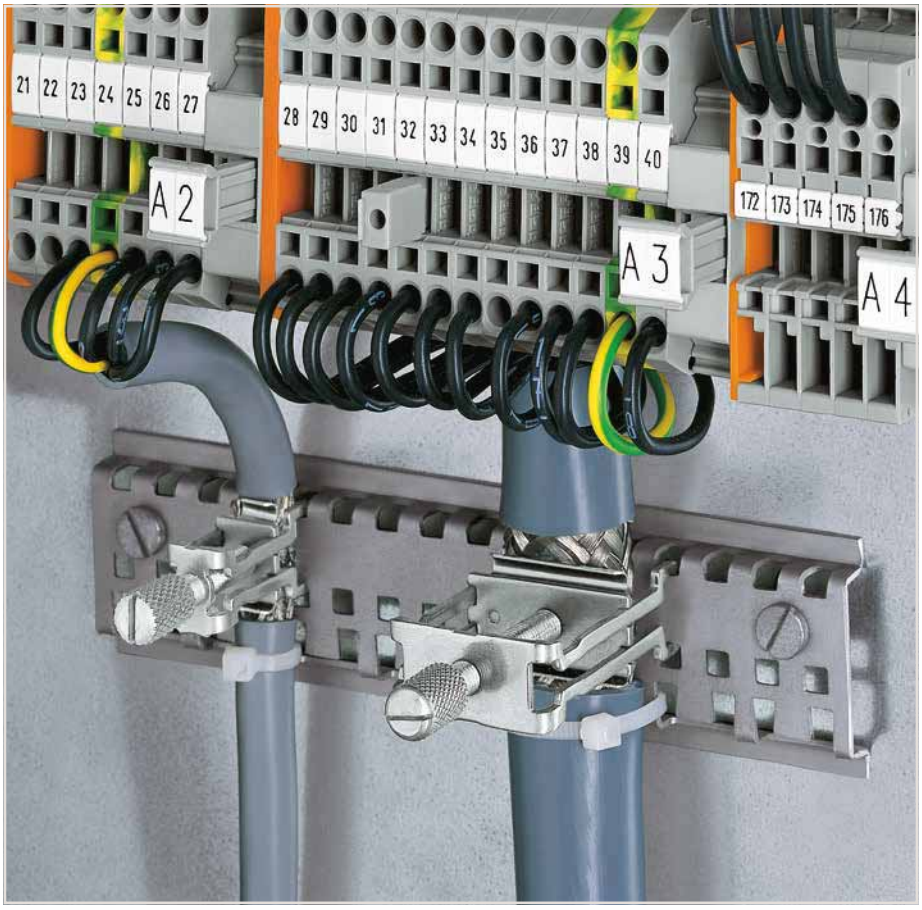


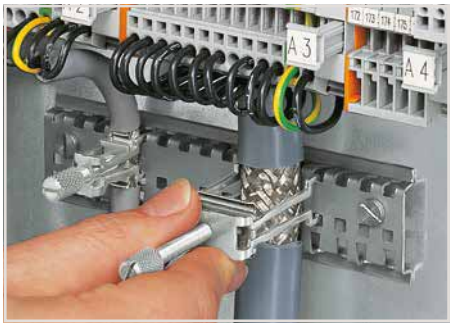
Carrier with grounding foot* (790-115),
125 mm long, busbar parallel to the rail

*for all sizes of shield clamping saddles

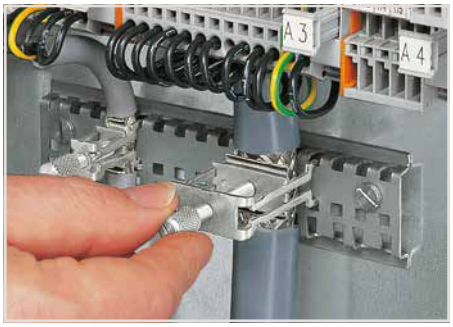


Fitting spacer sleeve to a specialty slotted carrier rail





Fitting an additional clamping saddle.



Tightening/removing a shield clamping saddle.

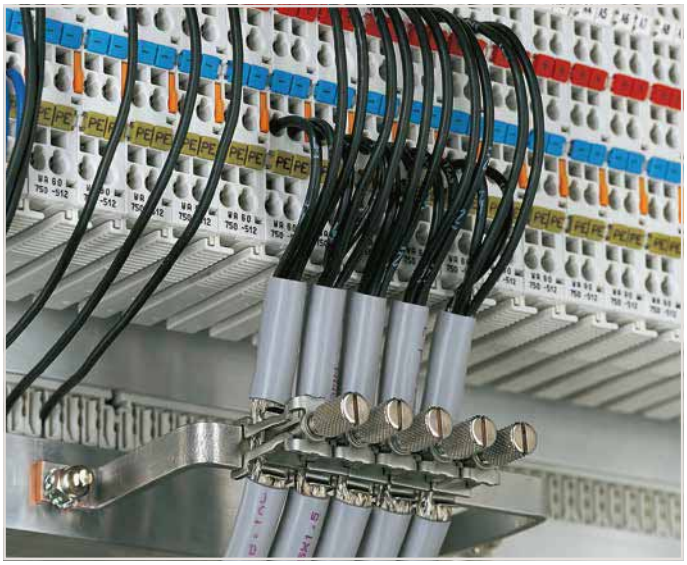
After connection, tighten the knurled screw to complete the installation.
Recommended tightening torque: 0.5 Nm

To remove the clamping saddle, unscrew until ratcheted mechanism is released, then slightly tip saddle and remove the clamping saddle.

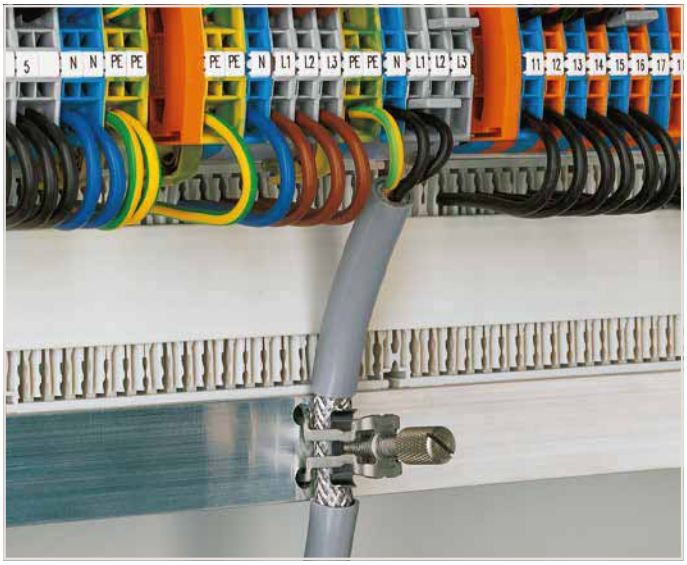
Shield Connection System, 790 Series
Installation

Carrier with grounding foot – busbar parallel to the rail

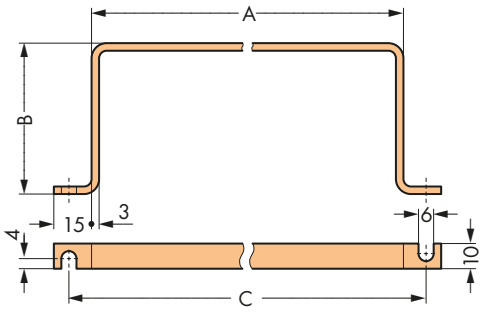
Insulated mounting carriers for a common shield reference potential, independent of housing potential



U-shaped (10 x 3) mm copper busbar



Snap shield clamping saddles into any metal plate (max. thickness: 3 mm).



Dimensions in mm

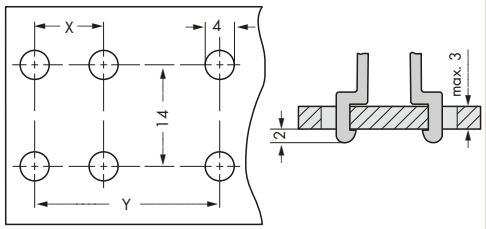
Item No.	A	B	C	Item No.	A	B	C
for I/O module series 750 (5 E/A)							
790-190	63	60	83	**790-192**	63	35	83
for I/O module series 750 (8 E/A)							
790-191	100	60	118	**790-193**	100	35	118

Dimensions in mm

Hole dimensions for panel mounting

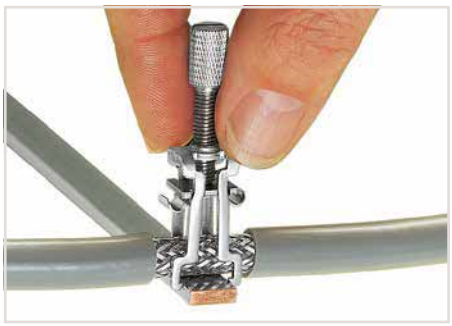
Shield (screen) clamping saddle size

Distance	X
11 mm	9.5 mm
Distance	Y
19 mm	17.5 mm
27 mm	25.5 mm
43 mm	41.5 mm



Additionally, the spring material is part of the clamping saddle, providing a good electrical connection (the system also acts as a partial strain relief). The spring element integrated in the shield clamping saddle compensates deformation and settling that results from a connected shield.

Shield Connection System, 790 Series
Installation



Assembly:

The shield clamping saddle is shipped ready for direct connection to the (10 x 3) mm busbar or to a drilled mounting plate. After connection, tighten the knurled screw to complete the installation.
Maximum tightening torque: 0.5 Nm

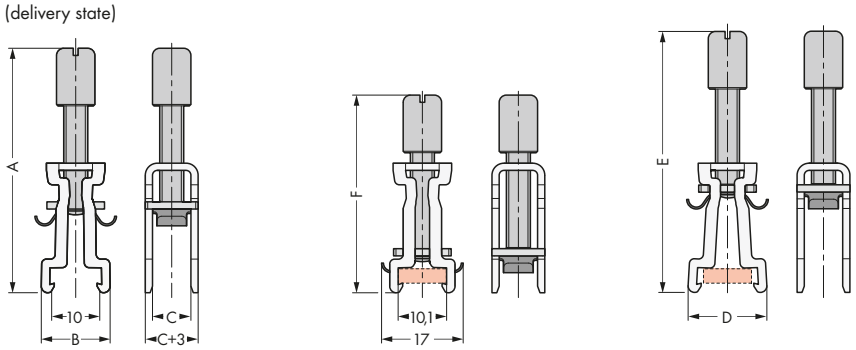
Removal:

To remove the clamping saddle, unscrew until ratcheted mechanism is released, then slightly tip saddle and remove the clamping saddle.

Installation position (delivery state)

Closed position

Removal position

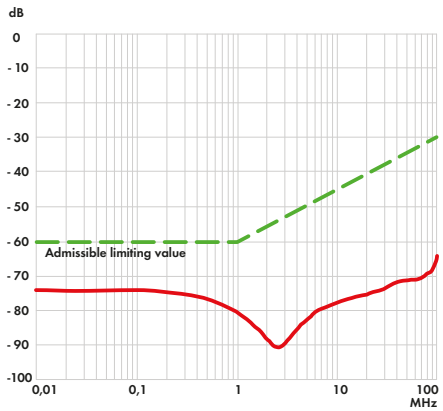


Dimensions in mm

Item No.	A	B	C	D	E	F
790-108	51	15	8	16	55	42
790-116	53	15	16	16	57	45
790-124	78	15	24	16	83	58
790-140	97	15	40	16	100	73

Dimensions in mm

Negative Shield Attenuation



WAGO's Shield Connection System is highly effective because the clamping unit can be brought very close to the unshielded part of the cable.

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Shield Clamping Saddles
790 Series

Shield clamping saddle, 11 mm wide, max. shield diameter of 8 mm
Note: Cannot be used for connecting ground conductors!

	Item No.	Pack. Unit
	790-108	50 (10)

Shield clamping saddle, 19 mm wide, 7 … 16 mm shield diameter
Note: Cannot be used for connecting ground conductors!

	Item No.	Pack. Unit
	790-116	50 (10)

Shield clamping saddle, 27 mm wide, 6 … 24 mm shield diameter
Note: Cannot be used for connecting ground conductors!

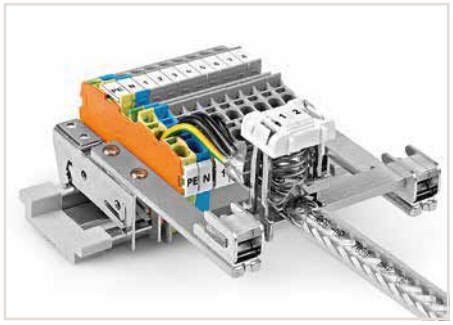
	Item No.	Pack. Unit
	790-124	50 (10)

Shield clamping saddle, 43 mm wide, 22 … 40 mm shield diameter
Note: Cannot be used for connecting ground conductors!

	Item No.	Pack. Unit
	790-124	50 (10)

Spring-Equipped Shield Clamping Saddles, 790 Series
Installation

Shield clamping saddles are available in three different sizes for shield diameters ranging from 3 to 20 mm



Application example

Compress the clamping saddle until fully engaged

Mounting a clamping saddle on a specialty slotted carrier rail (790-145).
When releasing the saddle, do not place your finger under the clamping spring!

Removing the shield clamping saddle.

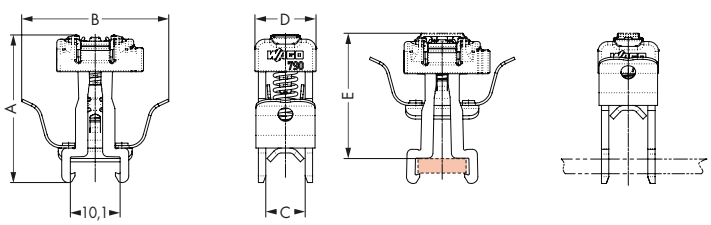
Shield clamping saddle contacts shield conductor and specialty slotted carrier rail (790-145).

Labelling using a marking strip.

Labelling using WMB markers.

Delivery position

Mounting position



Dimensions in mm

Item No.	A	B	C	D	E*
790-208	30	29.9	8	12.4	25.8
790-216	34.6	28.3	16	21.8	30.2
790-220	45.6	28.3	24	30	41.2

*Height with WMB marker

Dimensions in mm

Spring-Equipped Shield Clamping Saddles
790 Series

Shield clamping saddle, 12.4 mm wide, 3 … 8 mm shield diameter
Note: Cannot be used for connecting ground conductors and strain relief!

Item No.	Pack. Unit
790-208	50

Shield clamping saddle, 21.8 mm wide, 6 … 16 mm shield diameter
Note: Cannot be used for connecting ground conductors and strain relief!

Item No.	Pack. Unit
790-116	25

Shield clamping saddle, 27 mm wide, 6 … 20 mm shield diameter
Note: Cannot be used for connecting ground conductors and strain relief!

Item No.	Pack. Unit
790-124	25

Shield Clamps and Shield Termination
791 and 709 Series

Insert the shield termination into the female plug using the operating tool.

Shield clamp, 10 … 17 mm shield diameter, max. 63 mm high, 23 mm wide
Note: Cannot be used for connecting ground conductors!

	Item No.	Pack. Unit
	791-117	50

Shield termination, includes cable ties for 5 mm and 10 mm shield diameter

	Item No.	Pack. Unit
	709-350	100 (25)

Shield clamp, 1.5 … 6.5 mm shield diameter, max. 40 mm high, 10 mm wide
Note: Cannot be used for connecting ground conductors!

	Item No.	Pack. Unit
	791-107	50

Shield termination, includes cable ties for 5 mm and 10 mm shield diameter

	Item No.	Pack. Unit
	709-352	100 (25)

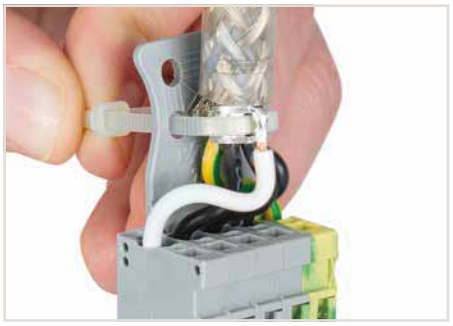
Fit the shield termination to the shield cable.

Shield clamp, 5 … 11 mm shield diameter, max. 47 mm high, 17 mm wide
Note: Cannot be used for connecting ground conductors!

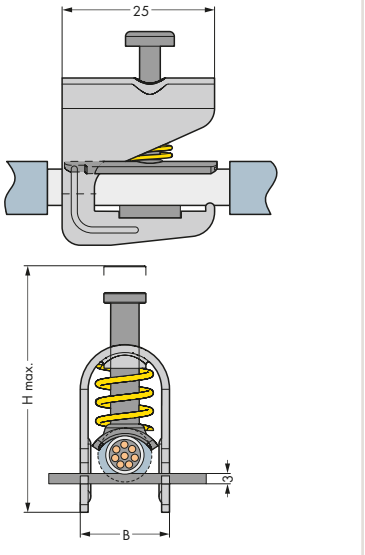
	Item No.	Pack. Unit
	791-111	50

Shield clamp, 16 … 24 mm shield diameter, max. 78 mm high, 30 mm wide
Note: Cannot be used for connecting ground conductors!

	Item No.	Pack. Unit
	791-124	50



Secure both shield cable and shield termination to the strain relief plate using cable ties.



Dimensions in mm

Shield termination connected to an X-COM® female plug

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Accessories for Shield Connection Systems

Carrier with grounding foot, busbar parallel to the rail, 15 mm long, for (10 x 3) mm copper busbars, for shield clamping saddles (790-108)

Item No.	Pack. Unit
790-110	25

Carrier with grounding foot, busbar parallel to the rail, 25 mm long, for (10 x 3) mm copper busbars, for shield clamping saddles (790-108, 790-116) and shield clamps (791-111, 791-117)

Item No.	Pack. Unit
790-112	25

Carrier with grounding foot, busbar 90° to the rail, 45 mm long, for (10 x 3) mm copper busbars, for shield clamping saddles (790 Series)

Item No.	Pack. Unit
790-113	25

Carrier with grounding foot, busbar parallel to the rail, 45 mm long, for (10 x 3) mm copper busbars, for shield clamping saddles (790 Series) and shield clamps (791 Series)

Item No.	Pack. Unit
790-114	25

Carrier with two grounding feet, busbar parallel to the rail, 125 mm long, for (10 x 3) mm copper busbars

Item No.	Pack. Unit
790-115	25

Busbar, tin-plated, 1000 mm long, copper (10 x 3) mm, I_N 140 A

Item No.	Pack. Unit
210-133	1

Busbar, tin-plated, 30 mm long, copper (10 x 3) mm

Item No.	Pack. Unit
790-133	20

Busbar, tin-plated, 50 mm long, copper (10 x 3) mm

Item No.	Pack. Unit
790-134	20

Carrier rail, specialty slotted, 1000 mm long, tin-plated

Item No.	Pack. Unit
790-145	1

Spacer sleeve, for carrier rail, for M5-size screw, specialty slotted

Item No.	Pack. Unit
790-144	200 (100)

Accessories for Shield Connection Systems

Insulated mounting foot, for busbar with screw M4 x 8 mm		
Color	Item No.	Pack. Unit
gray	790-100	50 (25)

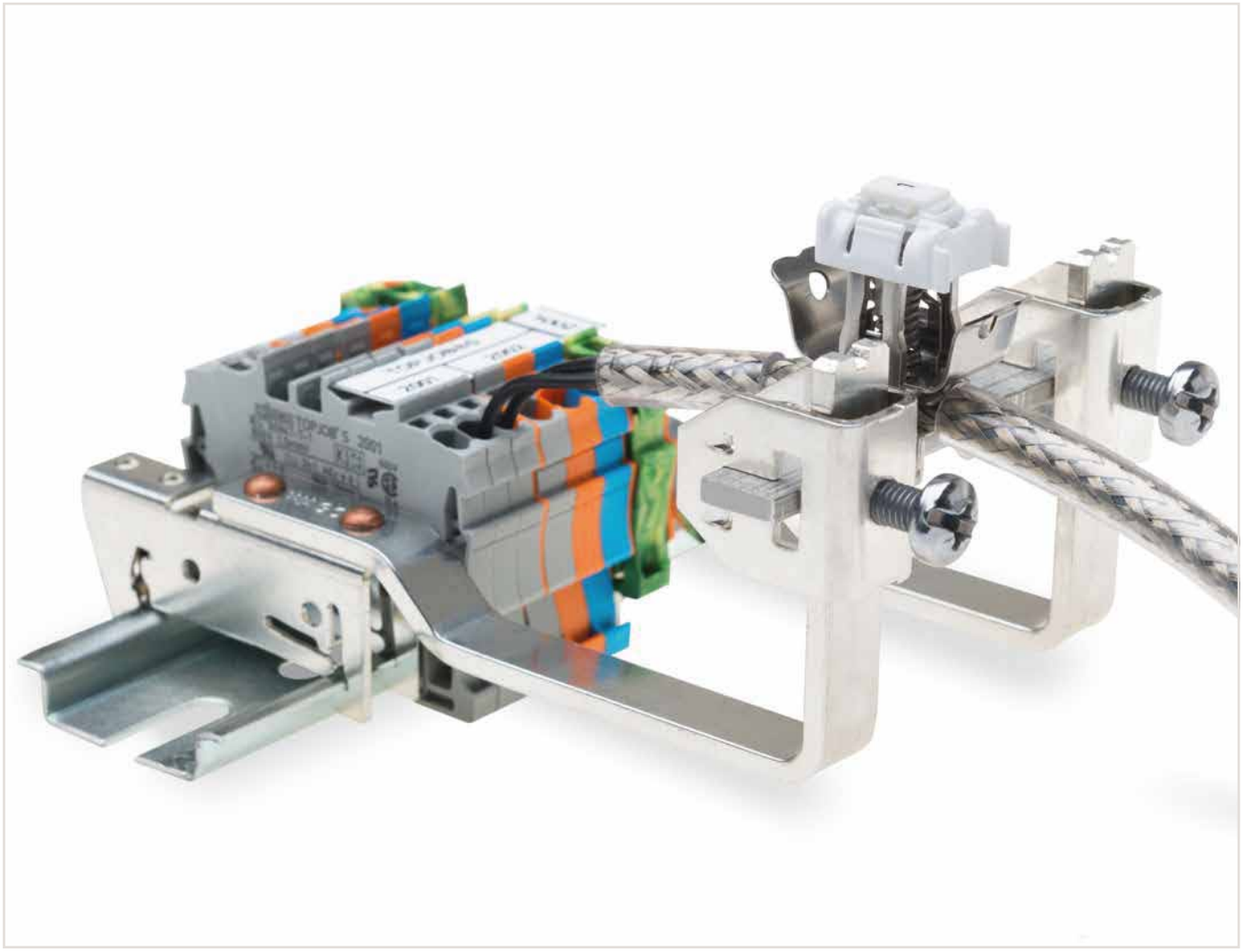
Insulated mounting foot, for busbar with (3.5 x 9) mm sheet metal screw		
Color	Item No.	Pack. Unit
gray	790-101	50 (25)

U-shaped busbar, copper (10 x 3) mm, for 750 Series I/O Modules		
	Item No.	Pack. Unit
for 5 I/O	790-190	25 (5)

U-shaped busbar, copper (10 x 3) mm, for 750 Series I/O Modules		
	Item No.	Pack. Unit
for 8 I/O	790-191	25

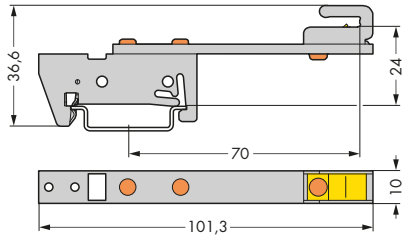
U-shaped busbar, copper (10 x 3) mm, for 750 Series I/O Modules		
	Item No.	Pack. Unit
for 5 I/O	790-192	25

U-shaped busbar, copper (10 x 3) mm, for 750 Series I/O Modules		
	Item No.	Pack. Unit
for 8 I/O	790-193	25



Busbar Carriers
790 Series

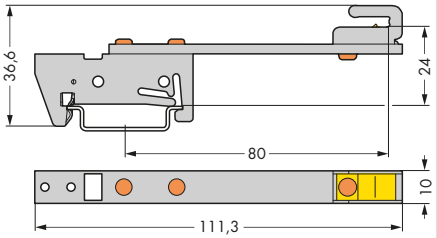
Dimensions in mm



Busbar carrier, for (10 x 3) mm copper busbars, single side, straight, 70 mm between center of DIN-rail and busbar carrier

Item No.	Pack. Unit
790-300	10

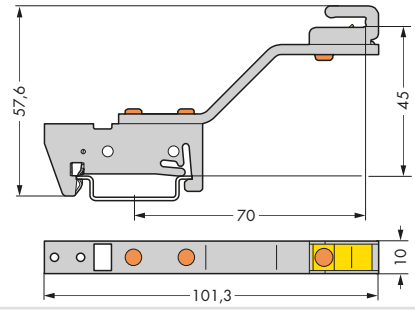
Dimensions in mm



Busbar carrier, for (10 x 3) mm copper busbars, single side, straight, 80 mm between center of DIN-rail and busbar carrier

Item No.	Pack. Unit
790-302	10

Dimensions in mm

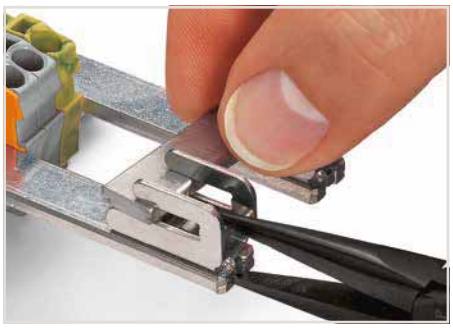


Busbar carrier, for (10 x 3) mm copper busbars, single side, angled, 70 mm between center of DIN-rail and busbar carrier

Item No.	Pack. Unit
790-301	10

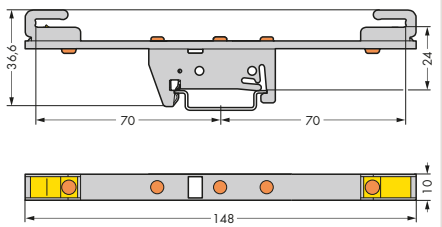
Place the busbar in the busbar carrier.

Remove the busbar carrier using an operating tool (type 3, 5.5 x 0.8 mm blade).



To remove the busbar, compress the spring using pliers.

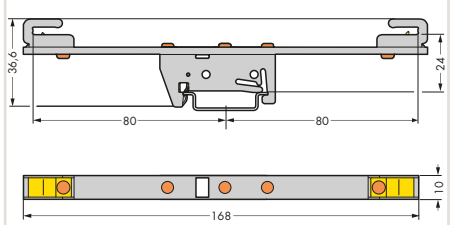
Dimensions in mm



Busbar carrier, for (10 x 3) mm copper busbars, both sides, straight, 70 mm between center of DIN-rail and busbar carrier

Item No.	Pack. Unit
790-310	10

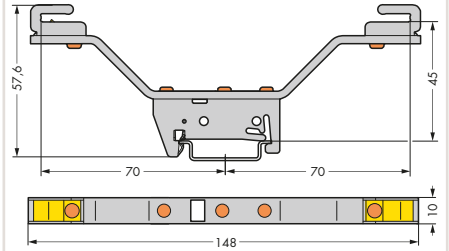
Dimensions in mm



Busbar carrier, for (10 x 3) mm copper busbars, both sides, straight, 80 mm between center of DIN-rail and busbar carrier

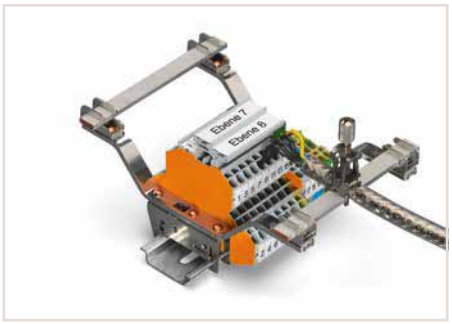
Item No.	Pack. Unit
790-312	10

Dimensions in mm



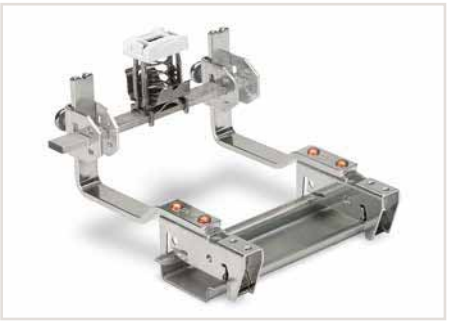
Busbar carrier, for (10 x 3) mm copper busbars, both sides, angled, 70 mm between center of DIN-rail and busbar carrier

Item No.	Pack. Unit
790-311	10



Application example

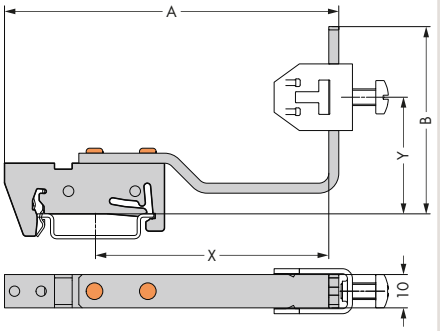
Busbar Carriers with a T-Connector (Flexible) and T-Connector
790 Series



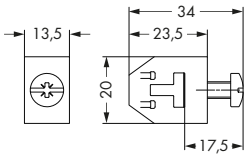
Horizontal mounting position of the busbar

Dimensions in mm

	A	B	X	Y
790-350/790-398	100	56	70	15 ... 52
790-352/790-398	100	99	70	15 ... 92
790-360/790-398	115	56	85	15 ... 52
790-362/790-398	115	99	85	15 ... 92



Dimensions in mm



Vertical mounting position of the busbar

Busbar carrier with a T-connector, flexible, for (10 x 3) mm copper busbars, 70 mm between center of DIN-rail and busbar carrier, 56 mm high

Item No.	Pack. Unit
790-350/790-398	12

Busbar carrier with a T-connector, flexible, for (10 x 3) mm copper busbars, 70 mm between center of DIN-rail and busbar carrier, 99 mm high

Item No.	Pack. Unit
790-352/790-398	12

Busbar carrier with a T-connector, flexible, for (10 x 3) mm copper busbars, 85 mm between center of DIN-rail and busbar carrier, 56 mm high

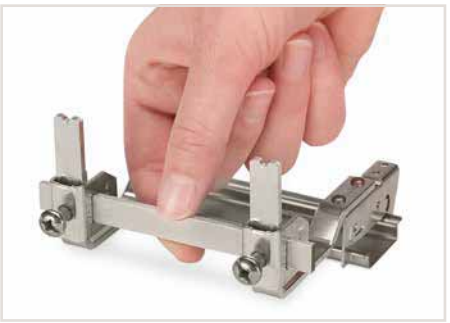
Item No.	Pack. Unit
790-360/790-398	12

Busbar carrier with a T-connector, flexible, for (10 x 3) mm copper busbars, 85 mm between center of DIN-rail and busbar carrier, 99 mm high

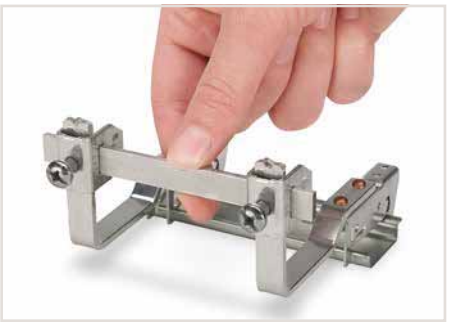
Item No.	Pack. Unit
790-362/790-398	25

T-connector, connects two (10 x 3) mm copper busbars

Item No.	Pack. Unit
790-398	10



The height of the busbar can be adjusted.



Secure the busbar by tightening the screws at the required position.

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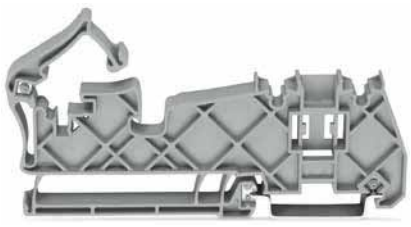
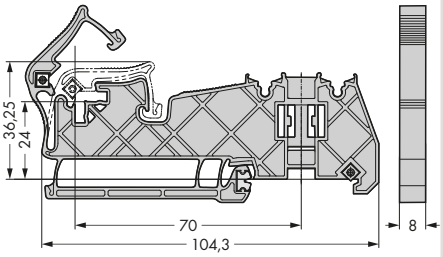
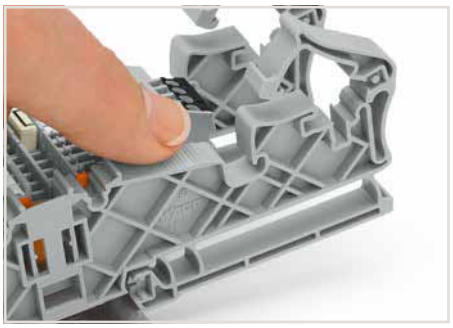
Busbar Carriers
790 Series



Dimensions in mm

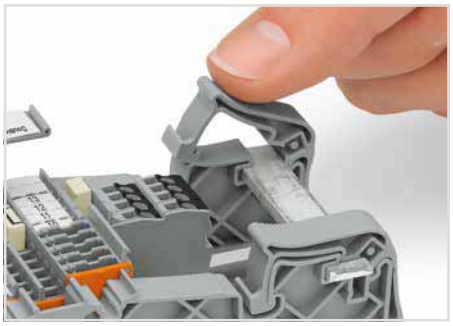


Busbar carrier, for (10 x 3) mm copper busbars, no contact to DIN-rail, insulated		
Color	**Item No.**	Pack. Unit
gray	**790-400**	20



Snap the busbar carrier onto DIN-35 rail.

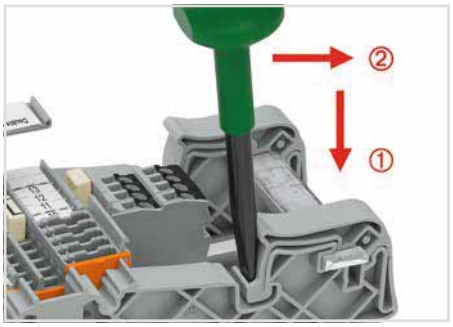
Vertical mounting position of the busbar



Place the busbar in the carrier holder.

Horizontal mounting position of the busbar

Snap the mounting bracket into position.



Release the mounting bracket by pushing the operating tool down ① and then forward ②.

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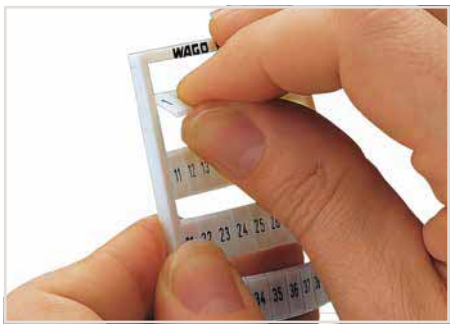
Marking Systems
Description and Installation

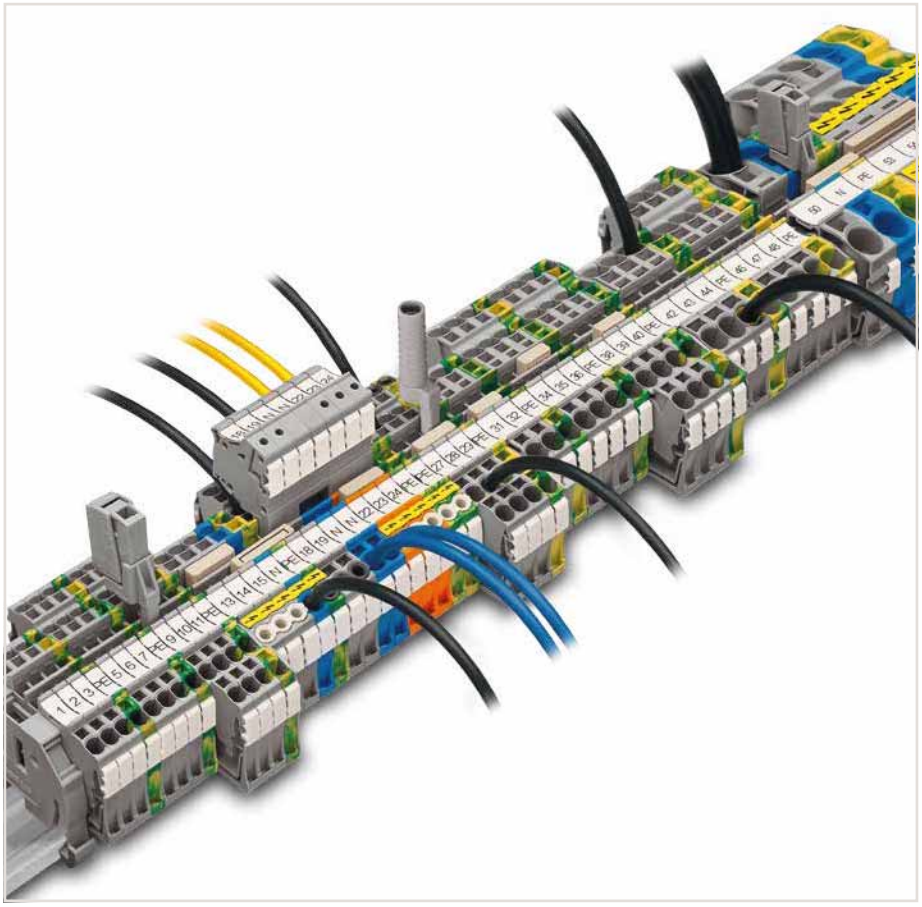


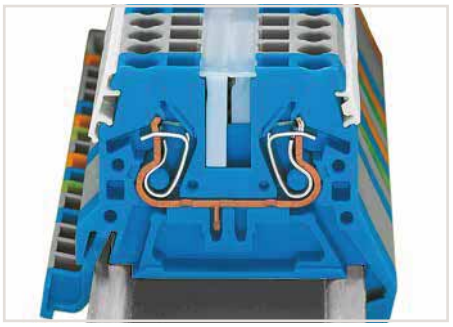
WMB Multi Marking System:
Separating a strip from the WMB or WMB marker card

Stretching a strip.

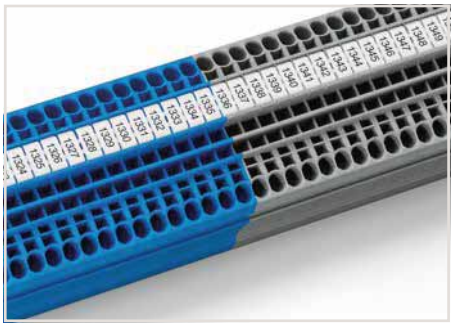
Separating an individual marker from the strip – for larger terminal blocks.

Mini-WSB (WAGO Quick Marking System):
Marking via Mini-WSB Quick markers.

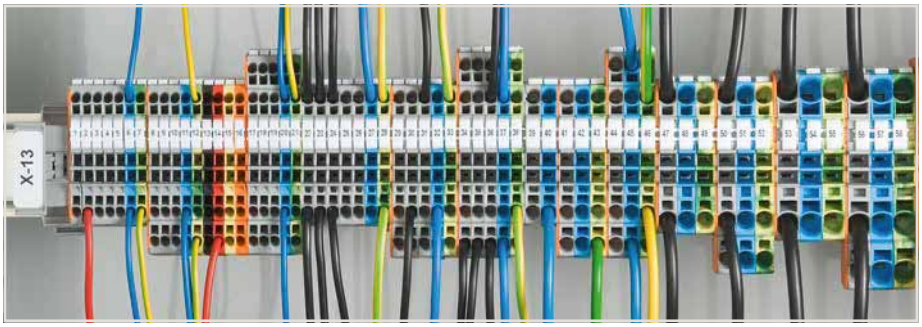




WMB markers in Mini-WSB marker slots
Marking strip, translucent
Mini-WSB markers

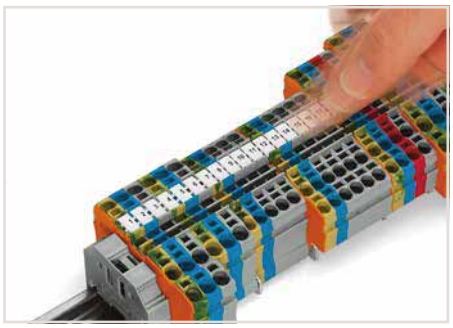


WMB Inline

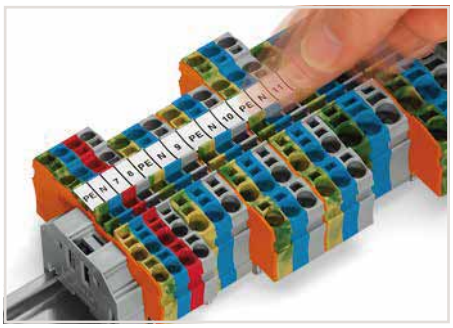


WMB Inline

11

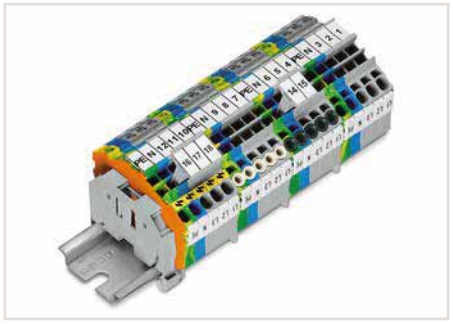


WMB Inline
Snapping a strip into the marker slots.



Marking strips:
Snapping a strip into the marker slots.

WMB “decade” marking

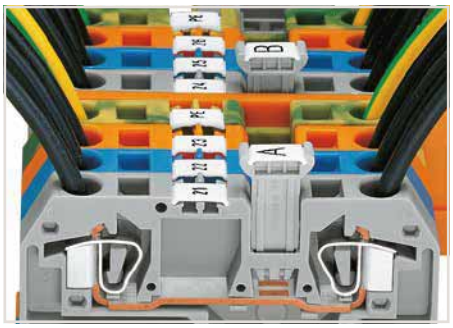


Group marker carriers for TOPJOB® S terminal blocks –
Snap-on type for jumper slot

Height adjustable group marker carrier (249-116) for TOPJOB®S marking strips (2009-110)

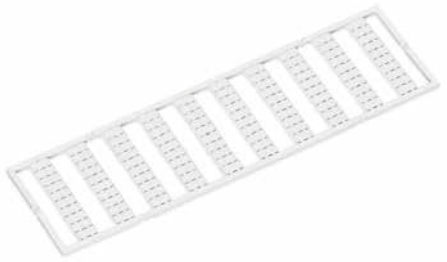
Group marking on N-busbar carrier used as an end stop

Height-adjustable group marker carrier



Additional group marking

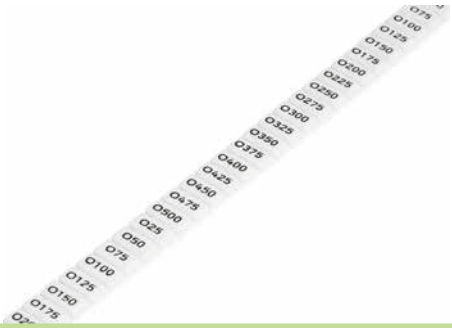
WMB Multi Marking Systems
for Terminal Block Widths 3.5 mm, 4 … 4.2 mm and from 5 mm



- 5 mm wide markers for continuous marking of 270, 280, 780, 869, 870, 880 and individual marking of 281 … 285, 781 … 785, 2002, 2003, 2022, 2004, 2006, 2010 and 2016 Series terminal blocks
- 5 … 5.2 mm wide markers for continuous marking of 270, 280, 780, 869, 870, 880, 2002, 2003 and 2022 Series terminal blocks and individual marking of terminal blocks larger than 5/5.2 mm
- 4 … 4.2 mm wide markers for continuous marking of 279 and 2001 Series terminal blocks
- 3.5 mm wide markers for continuous marking of 2000 and 2020 Series terminal blocks

WMB Multi Marking System, 10 strips with 10 markers per card, unprinted					
Marking	5 mm Item No.	5 … 5.2 mm Item No.	4 … 4.2 mm Item No.	3.5 mm Item No.	Pack. Unit
white	793-501	793-5501	793-4501	793-3501	5
yellow	793-501/000-002	793-5501/000-002	793-4501/000-002		5
red	793-501/000-005	793-5501/000-005	793-4501/000-005		5
blue	793-501/000-006	793-5501/000-006	793-4501/000-006		5
gray	793-501/000-007	793-5501/000-007	793-4501/000-007		5
orange	793-501/000-012	793-5501/000-012	793-4501/000-012		5
brown		793-5501/000-014	793-4501/000-014		5
light green	793-501/000-017	793-5501/000-017	793-4501/000-017		5
green	793-501/000-023	793-5501/000-023	793-4501/000-023		5
violet	793-501/000-024	793-5501/000-024	793-4501/000-024		5

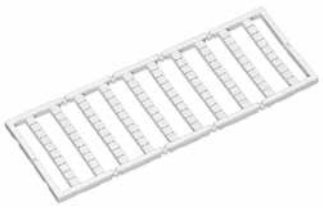
WMB Inline, plain, 2,000 WMB markers (4 mm) per reel, 4 … 4.2 mm stretchable		
Color	Item No.	Pack. Unit
white	2009-114	1



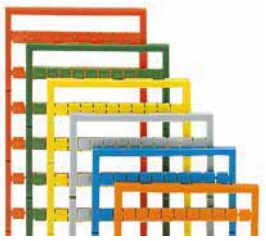
WMB Inline, plain, 1,500 WMB markers (5 mm) per reel, 5 … 5.2 mm stretchable		
Color	Item No.	Pack. Unit
white	2009-115	1

11

Mini-WSB Quick Marking System



Mini-WSB Quick Marking System, white, 10 strips with 10 markers per card, 5 mm wide markers		
Marking	Item No.	Pack. Unit
plain	248-501	5



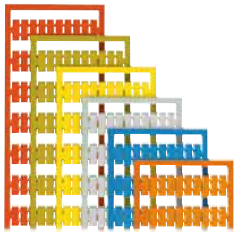
Mini-WSB Quick Marking System, 10 strips with 10 markers per card, 5 mm wide markers, unprinted		
Color	Item No.	Pack. Unit
yellow	248-501/000-002	5
red	248-501/000-005	5
blue	248-501/000-006	5
gray	248-501/000-007	5
orange	248-501/000-012	5
light green	248-501/000-017	5
green	248-501/000-023	5
violet	248-501/000-024	5

Mini-WSB Quick Marking System, white, 10 strips with 10 markers per card, 5 mm wide markers			
Suitable for:	Marking	Item No.	Pack. Unit
4-conductor terminal blocks	1, , 2, , 3, , 4, , 5, ; to 46, , 47, , 48, , 49, , 50, ; (each 1x)	264-900	5
	U, , V, , W, , N, , PE, ; (10x)	264-901	5
	L1, , L2, , L3, , N, , PE, ; (10x)	264-902	5
	1, , 1, , 1, , 1, , 1, ; (10x)	264-903	5
	2, , 2, , 2, , 2, , 2, ; (10x)	264-904	5
	3, , 3, , 3, , 3, , 3, ; (10x)	264-905	5

Mini-WSB Inline, plain, 1,700 Mini-WSB markers per reel, 5 mm wide markers		
Color	Item No.	Pack. Unit
white	2009-145	1

Specific Marking

WSB Quick Marking System, white, 10 strips with 10 markers per card, 4 mm wide WSB markers			
Suitable for:	Marking	Item No.	Pack. Unit
Fuse plugs (281-5..).	plain	209-701	5



WSB Quick Marking System, 10 strips with 10 markers per card, 4 mm wide markers, plain		
Color	Item No.	Pack. Unit
yellow	209-701/000-002	5
red	209-701/000-005	5
blue	209-701/000-006	5
gray	209-701/000-007	5
orange	209-701/000-012	5
light green	209-701/000-017	5
green	209-701/000-023	5
violet	209-701/000-024	5

WSB Quick Marking System, for fuse plugs (281-5..), white, 10 strips with 10 markers per card, 4 mm wide markers, plain		
Marking	Item No.	Pack. Unit
F1, ..., F10 (10x)ab	209-787	5
F11, ..., F20 (10x)	209-700/209-124	5
F21, ..., F30 (10x)	209-700/209-125	5
F31, ..., F40 (10x)	209-700/209-126	5
F41, ..., F50 (10x)	209-700/209-127	5

WSB Quick Marking System, white, 10 strips with 10 markers per card, 5 mm wide markers			
Suitable for:	Marking	Item No.	Pack. Unit
Matrix patchboards	plain	209-501	5

WSB Quick Marking System, 10 strips with 10 markers per card, 5 mm wide markers, plain		
Color	Item No.	Pack. Unit
yellow	209-501/000-002	5
red	209-501/000-005	5
blue	209-501/000-006	5
gray	209-501/000-007	5
orange	209-501/000-012	5
light green	209-501/000-017	5
green	209-501/000-023	5
violet	209-501/000-024	5

WSB Quick Marking System, white, 10 strips with 10 markers per card, horizontal marking			
Suitable for:	Marking	Item No.	Pack. Unit
Matrix patchboards	1 ... 10 (10x)	209-502	5

WSB Quick Marking System, white, 10 strips with 10 markers per card, horizontal marking			
Suitable for:	Marking	Item No.	Pack. Unit
Matrix patchboards	1 ... 50 (2x)	209-566	5

Specific Marking

WSB Quick Marking System, white, 10 strips with 10 markers per card, horizontal marking			
Suitable for:	Marking	Item No.	Pack. Unit
Matrix patchboards	X (100x)	209-500/209-035	5

WFB continuous marking strip, 1000 mm long			
Suitable for:	Color	Item No.	Pack. Unit
Matrix patchboards Rail-mount terminal blocks, Classic	transparent	210-612	10

Carrier for WFB continuous marking strip, snaps into marker slot			
Suitable for:	Color	Item No.	Pack. Unit
Matrix patchboards Rail-mount terminal blocks, Classic	gray	209-185	200 (25)

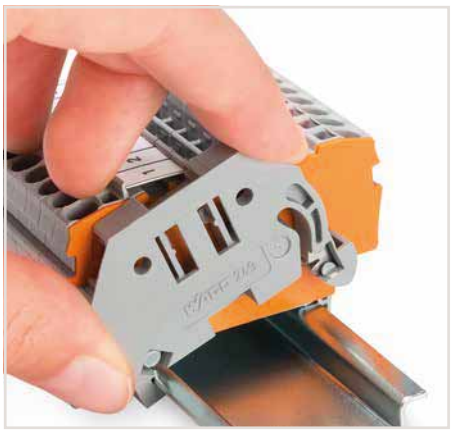
Marker carrier, for POWER CAGE CLAMP terminal blocks 35/50/95 mm² (2, 2/0, 4/0 AWG) Width: 10.4 mm			
Suitable for:	Color	Item No.	Pack. Unit
285-135 285-150 285-195 811 Series	gray	285-442	25

Marking strip, plain, 7.5 mm wide, 50 m reel			
Suitable for:	Color	Item No.	Pack. Unit
281-530 and 870, 869, 862, 270 Series	transluscent	709-177	1

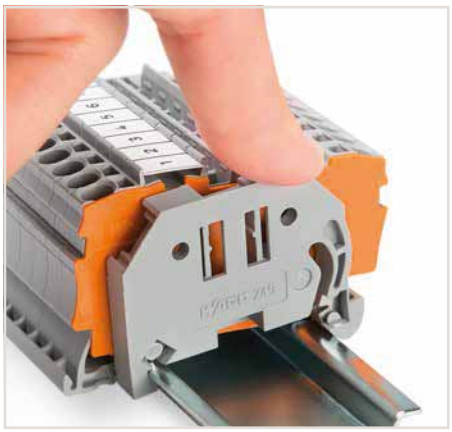
Marking strip, plain, 7.5 mm wide, 50 m reel			
Suitable for:	Color	Item No.	Pack. Unit
870, 869, 862, 270 Series	white	709-178	1

Marking strip, plain, 7.5 mm wide, 1 m long, for center group marking			
Suitable for:	Color	Item No.	Pack. Unit
870, 869 Series	transluscent	709-196	1

Screwless End Stops for DIN-35 and DIN-15 Rails, Mounting Carriers
Installation



Simply snap on.



That's it!

Removing an end stop from the DIN-rail.

Snap on – that's it! Assembling the new WAGO screwless end stop is as simple and quick as snapping a WAGO rail-mount terminal block onto the rail.

Without any tools!

This allows rail-mount terminal blocks to be safely secured, at low cost, against any movement on all DIN-35 rails per DIN EN 50022 (35 x 7.5 mm; 35 x 15 mm).

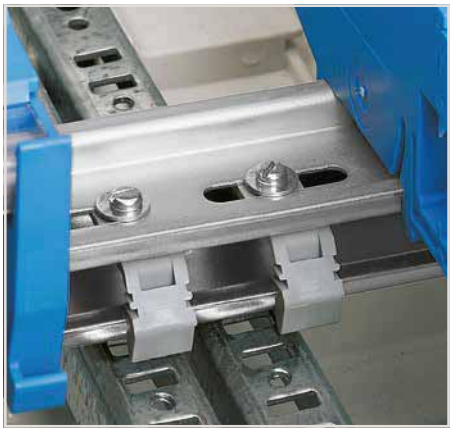
Entirely without screws!

The "secret" of the excellent tight fit lies in the two small clamping plates which keep the end stop in position, even if the rails are mounted vertically.

Simply snap on – that's it!

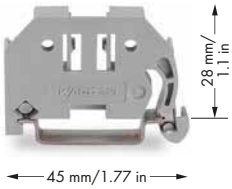
In addition, costs are significantly reduced when using large numbers of end stops.

Additional benefit: Three marker slots for all WAGO rail-mount terminal block markers and one snap-in hole for WAGO adjustable height group marker carriers offer individual marking options.



Isolated mounting of a carrier rail in a distribution box for protection class II

Screwless End Stops for DIN-35 Rails, Mounting Carriers



Screwless end stop, for DIN-35 rail, 6 mm wide		
Color	**Item No.**	Pack. Unit
gray	**249-116**	100 (25)

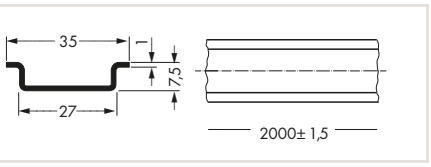
Screwless end stop, for DIN-35 rail, 10 mm wide		
Color	**Item No.**	Pack. Unit
gray	**249-117**	50 (25)

Mounting carrier, for isolated mounting on DIN-35 rails		
Color	**Item No.**	Pack. Unit
gray	**209-106**	25

Screwless end stop, for DIN 35 rail, 14 mm wide		
Color	**Item No.**	Pack. Unit
gray	**249-197**	10

Carrier Rails, Rail End Caps, Angled Support Brackets

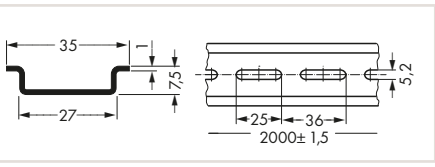
Dimensions in mm



Steel carrier rail, I_N 76 A
(based on 1 m length),
35 x 7.5 mm, 1 mm thick,
2 m long, per EN 60715, unslotted

	Item No.	Pack. Unit
galvanized	210-113	10
continuously galvanized	210-505	1

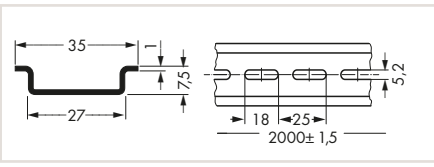
Dimensions in mm



Steel carrier rail, I_N 76 A (based on 1 m length),
35 x 7.5 mm, 1 mm thick, 2 m long,
25 mm hole width, 36 mm hole spacing,
per EN 60715, slotted

	Item No.	Pack. Unit
galvanized	210-112	10 (1)
continuously galvanized	210-504	1

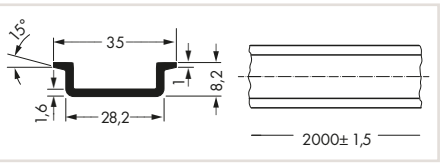
Dimensions in mm



Steel carrier rail, I_N 76 A (based on 1 m length),
35 x 7.5 mm, 1 mm thick, 2 m long,
18 mm hole width, 25 mm hole spacing,
per EN 60715, slotted

	Item No.	Pack. Unit
slotted	210-115	1

Dimensions in mm



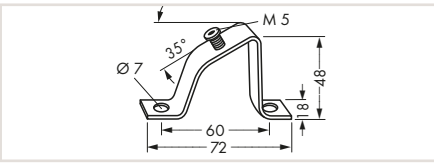
Aluminum carrier rail, I_N 76 A
(based on 1 m length),
35 x 8.2 mm, 1.6 mm thick,
2 m long, similar to EN 60715

	Item No.	Pack. Unit
unslotted	210-196	10

Rail end cap, for DIN-35 rail (7.5 mm high)

Color	Item No.	Pack. Unit
gray	209-109	50 (25)

Dimensions in mm

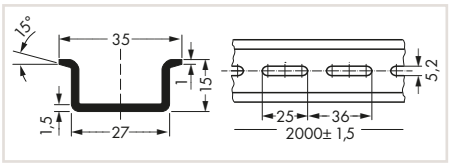


Angled support bracket, without screw

	Item No.	Pack. Unit
	210-148	10
	210-149	100 (20)

11

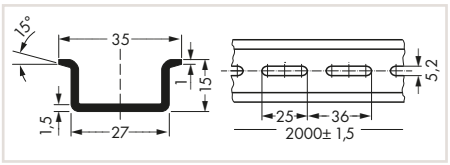
Dimensions in mm



Steel carrier rail, I_N 125 A
(based on 1 m length),
35 x 15 mm, 1.5 mm thick,
2 m long, similar to EN 60715

	Item No.	Pack. Unit
slotted	210-197	10
unslotted	210-114	10

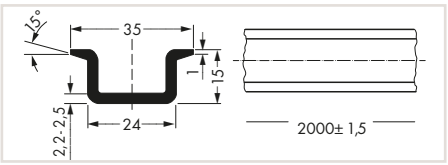
Dimensions in mm



Steel carrier rail, I_N 125 A
(based on 1 m length),
35 x 15 mm, 1.5 mm thick,
2 m long, similar to EN 60715

	Item No.	Pack. Unit
slotted	210-508	1
unslotted	210-506	1

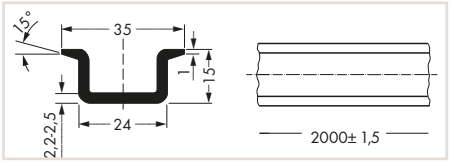
Dimensions in mm



Steel carrier rail, I_N 125 A
(based on 1 m length),
35 x 15 mm, 2.3 mm thick,
2 m long, per EN 60715

	Item No.	Pack. Unit
slotted	210-118	10

Dimensions in mm

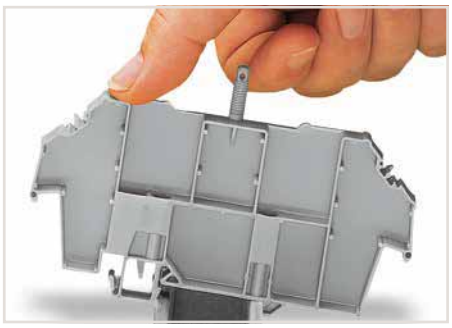


Copper carrier rail, I_N 309 A
(based on 1 m length),
35 x 15 mm, 2.3 mm thick,
2 m long, per EN 60715

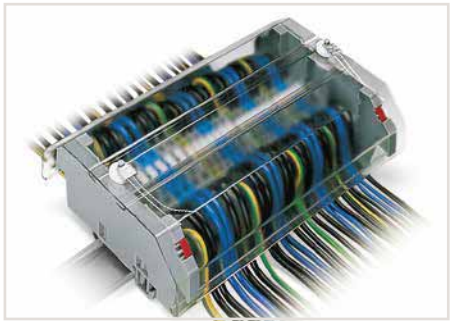
	Item No.	Pack. Unit
unslotted	210-198	10

Transparent Covers for Rail-Mount Terminal Blocks, Usable with Lead Seals, 709 Series

Description and Installation

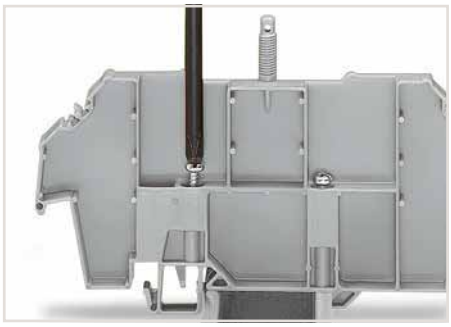


Snapping a cover carrier onto the DIN-rail.



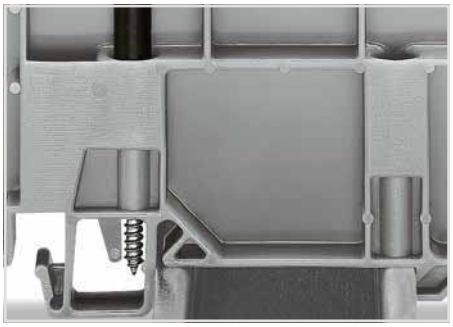
Application example:
Cover (type 1) without safety warning

Application example:
Cover (type 1) with safety warning

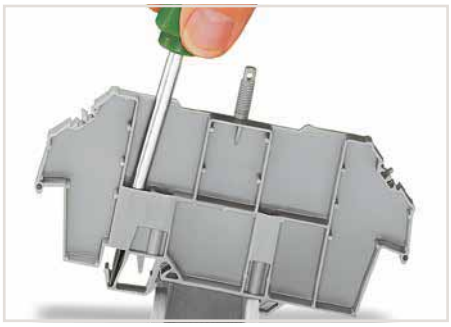


Tightening both securing screw (left) and mounting screw (right).

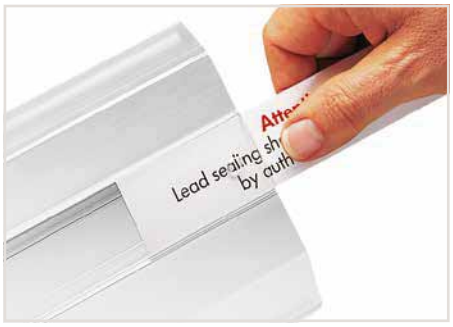
Application example:
Cover (type 1) with safety warning



Securing screw – prevents lifting off from the rail.
Mounting screw – prevents the cover carrier from being moved on the rail.



Removing a cover carrier from the DIN-rail.



Inserting a marking strip into the cover.

Cover with lead seals:
Using covers without lead seals, the thread dome-head can be broken off.

11

Transparent Covers for Rail-Mount Terminal Blocks, Usable with Lead Seals
709 Series

Cover, type 1, for cover carrier (type 1), 1 m long

	Item No.	Pack. Unit
	709-153	10

Cover, type 2, for cover carrier (type 2), 1 m long

	Item No.	Pack. Unit
	709-154	10

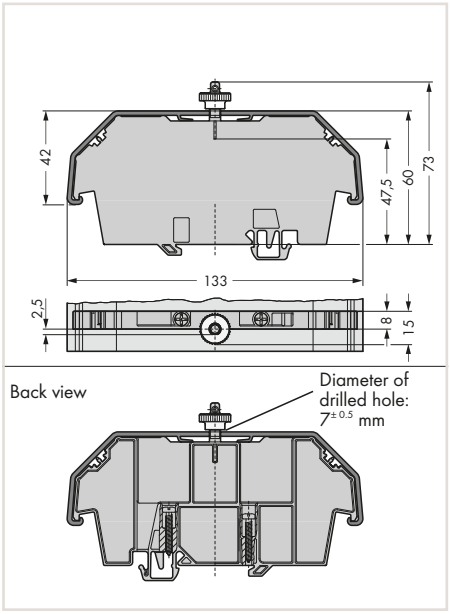
Spare mounting/securing screw, for cover

	Item No.	Pack. Unit
	209-196	200 (25)

Spare knurled nut, for cover

	Item No.	Pack. Unit
	210-549	100 (25)

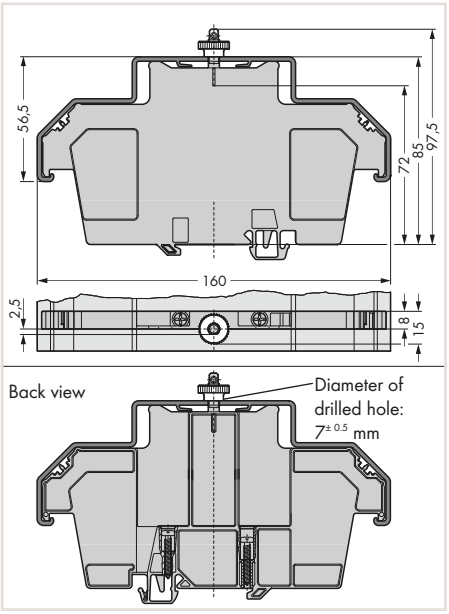
Dimensions in mm



Cover carrier, type 1, for 279 to 282, 880 Series rail-mount terminal blocks, incl. mounting/securing screws and knurled nut, for 264 Series Mini terminal blocks, for 270 Series sensor and actuator blocks

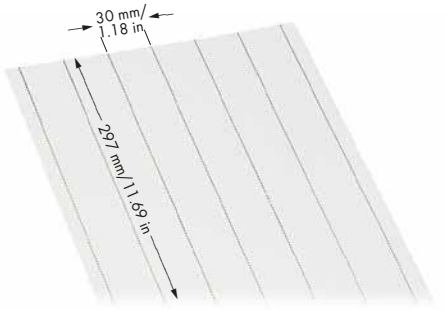
	Item No.	Pack. Unit
	709-167	10

Dimensions in mm



Cover carrier, type 2, for 283 to 285 Series Rail-Mount Terminal Blocks, incl. mounting/securing screws and knurled nut, for 279 to 281 Series Double- and Triple-Deck Terminal Blocks, 780 to 785, 775, 776 and 777 Series TOPJOB® Rail-Mount Terminal Blocks

	Item No.	Pack. Unit
	709-168	10



Marking card with 6 marking strips, for group marking or safety instructions

	Item No.	Pack. Unit
plain	709-183	1

11

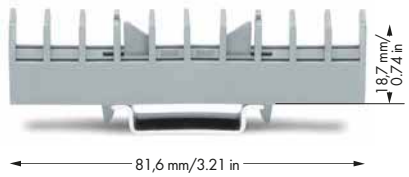
Collective Jumper Carriers

Collective jumper carrier, for DIN-35 rail, for 2000 to 2016 Series jumpers

Color	Item No.	Pack. Unit
gray	2009-180	25

Collective carrier for adjacent jumpers, for DIN-35 rail, for 279 to 284 Series Adjacent Jumpers and 215 Series Banana Plugs
The collective carrier can be snapped onto DIN-35 rails.
It serves as a depository for adjacent jumpers and banana plugs during maintenance work.

Color	Item No.	Pack. Unit
gray	209-100	50 (25)

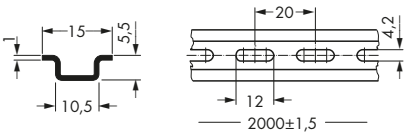


Collective jumper carrier, for DIN-35 rail, compatible with jumpers for transverse switching terminal block (282-811) and longitudinal switching disconnect terminal block (282-821)
The collective carrier can be snapped onto DIN-35 rails.
It serves as a depository for jumpers during maintenance.

Color	Item No.	Pack. Unit
gray	282-369	25

Carrier Rails and Screwless End Stops for DIN-35 Rails

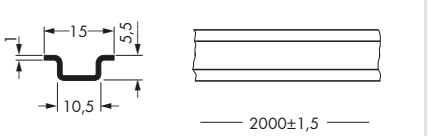
Dimensions in mm



Steel carrier rail, I_N 57 A
(based on 1 m length),
15 x 5.5 mm, 1 mm thick,
2 m long, per EN 60715

	Item No.	Pack. Unit
slotted	210-111	1

Dimensions in mm



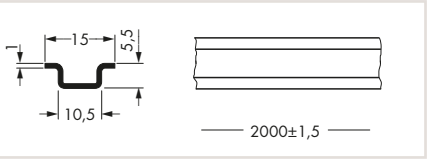
Steel carrier rail, I_N 57 A
(based on 1 m length),
15 x 5.5 mm, 1 mm thick,
2 m long, per EN 60715

	Item No.	Pack. Unit
unslotted	210-295	1

Screwless end stop, for DIN-15 rail, 6 mm wide

Color	Item No.	Pack. Unit
gray	249-101	25

Dimensions in mm



Aluminum carrier rail, I_N 57 A
(based on 1 m length),
15 x 5.5 mm, 1 mm thick,
2 m long, per EN 60715

	Item No.	Pack. Unit
unslotted	209-296	10

Operating Tools

Operating tool with a partially insulated shaft, type 1, (2.5 x 0.4) mm blade, for 279, 726, 727, 2000, 2001 and 2020 Series

	Item No.	Pack. Unit
	210-719	1

Set of operating tools with a partially insulated shaft, type 1, (2.5 x 0.4) mm blade, type 2, (3.5 x 0.5) mm blade, type 3, (5.5 x 0.8) mm blade

	Item No.	Pack. Unit
	210-722	1

Operating tool with a partially insulated shaft, (2.5 x 0.4) mm blade, short, for 279, 726, 727, 2000, 2001 and 2020 Series

	Item No.	Pack. Unit
	210-647	1

Operating tool with a partially insulated shaft, type 2, (3.5 x 0.5) mm blade, for 260, 261, 262, 264, 270, 280, 281, 290, 775, 776, 777, 769, 780, 781, 869, 870, 880, 2002, 2003, 2004, 2005 and 2022 Series

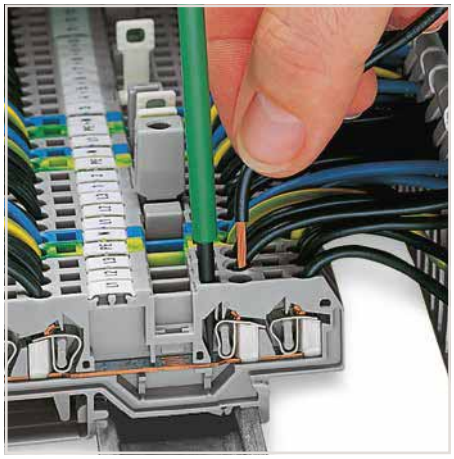
	Item No.	Pack. Unit
	210-720	1

Operating tool with a partially insulated shaft, (2.5 x 0.4) mm blade, short, angled, for 279, 2000, 2001 and 2020 Series

	Item No.	Pack. Unit
	210-648	1

Operating tool with a partially insulated shaft, type 3, (3.5 x 0.8) mm blade, for 282, 283, 284, 285, 782, 783, 784, 785, 2006, 2010 and 2016 Series

	Item No.	Pack. Unit
	210-721	1



The blade dimensions of the above-listed operating tools with a partially insulated shaft are ideal for easy operation of front-entry terminal blocks.

Set of operating tools in a box

Operating Tools

Operating tool with a partially insulated shaft, (3.5 x 0.5) mm blade, short, for 260, 261, 262, 264, 270, 280, 281, 869, 870 and 880 Series

	Item No.	Pack. Unit
	210-657	1

Operating tool, insulated, for 279 Series

	Item No.	Pack. Unit
1-way	209-129	1
2-way	279-432	1
3-way	279-433	1
10-way	279-440	1

Operating pliers, for side-entry rail-mount terminal blocks (281, 282, 283 and 284 Series)

	Item No.	Pack. Unit
	210-141	1

Operating tool with a partially insulated shaft, (3.5 x 0.5) mm blade, short, angled, ideal for 280 Series Actuator/Sensor Terminal Blocks and for 260, 261, 262, 264, 280, 281, 869, 870, 880, 2002, 2004 Series

	Item No.	Pack. Unit
	210-658	1

Operating tool, insulated, for 264 Series (1- and 2-way only) and 280, 281 Series (up to 3-way only)

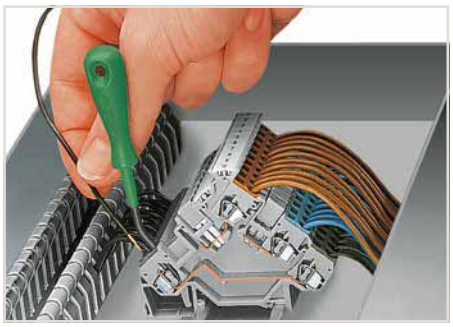
	Item No.	Pack. Unit
1-way	209-130	1
2-way	280-432	
3-way	280-433	
4-way	280-434	
5-way	280-435	
6-way	280-436	
7-way	280-437	
8-way	280-438	
9-way	280-439	
10-way	280-440	

Operating tool, insulated, for 281 Series

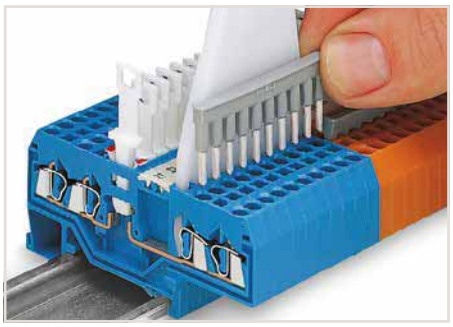
	Item No.	Pack. Unit
10-way	280-432	1

Operating pliers, for side-entry rail-mount terminal blocks (279 and 280 Series)

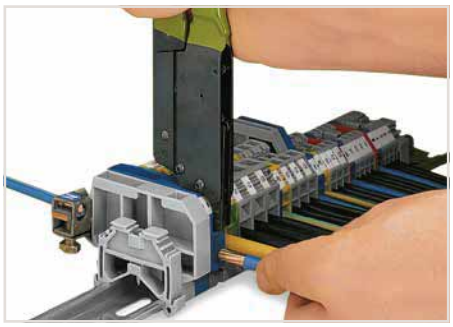
	Item No.	Pack. Unit
	210-143	1



The blade dimensions (DIN 5264) of the above-listed operating tools are ideal for operating 280 Series Front-Entry Sensor/Actuator Terminal Block.

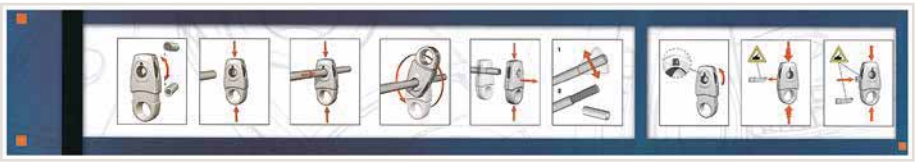


Commoning front-entry disconnect terminal blocks via comb-style jumper bar using a 10-pole operating tool.

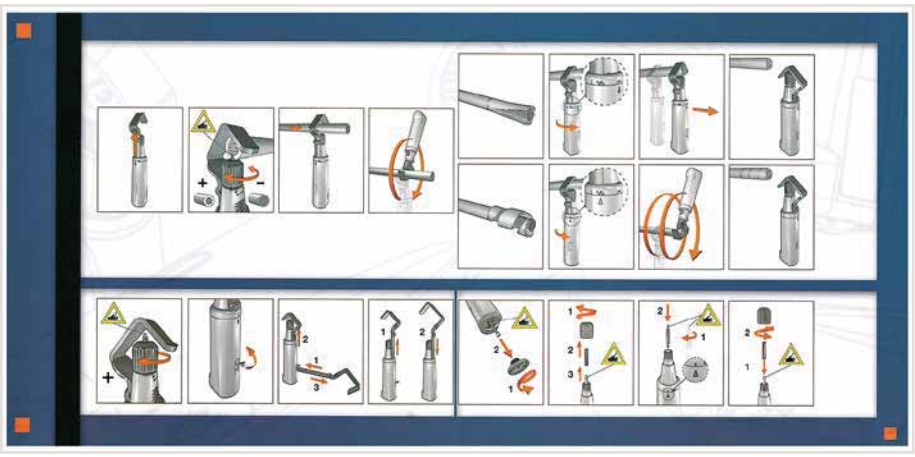


When operating the handles beyond the locked position, the ratchet allows the tool to open and be removed from the terminal block.

Cable Strippers
Installation



Cable Stripper (206-171):
- 10-position adjustment wheel ensures consistent stripping results
- Precision via 10-position blade cutting depth adjustment
- Strips the sheath from multi-core and fiber optic cables up to 11 mm/0.43 inch diameter
- Safe and easy to use through closed stripping cavity



Cable Stripper (206-174):
- Safe and easy to use: Three locking positions for circular, longitudinal and spiral cuts
- High cable stripping capacity of up to 40 mm diameter
- Ergonomic design features rests for thumb, index and pinky fingers to ease raising of the cable retention hook
- Replacement blades can be stored within the tool's handle

Set the cable diameter.

Strip the cable.

Cable Strippers

Cable stripper, for round cables with 2.5 … 11 mm outer diameter

	Item No.	Pack. Unit
	206-171	1

Cable stripper, for round cables with 4.5 … 45 mm outer diameter

	Item No.	Pack. Unit
	206-174	1

Replacement blade, for 2.5 … 11 mm Ø, for 206-171 Cable Stripper

	Item No.	Pack. Unit
	206-170	1

Replacement blade, for 4.5 … 45 mm Ø, for 206-174 Cable Stripper

	Item No.	Pack. Unit
	206-173	1

Stripping Tools

„Quickstrip 10" wire stripper, 0.02 … 10 mm² "f-st" (6 mm² "s"), wire cutter up to 10 mm² "f-st" (1.5 mm² "s")

	Item No.	Pack. Unit
	206-124	1

„Quickstrip 16" wire stripper, 4 … 16 mm², wire cutter up to 10 mm² "f-st" (1.5 mm² "s")

	Item No.	Pack. Unit
	206-125	1

„Standard" blade cassette, 0.02 … 10 mm², for wire stripper (206-124)

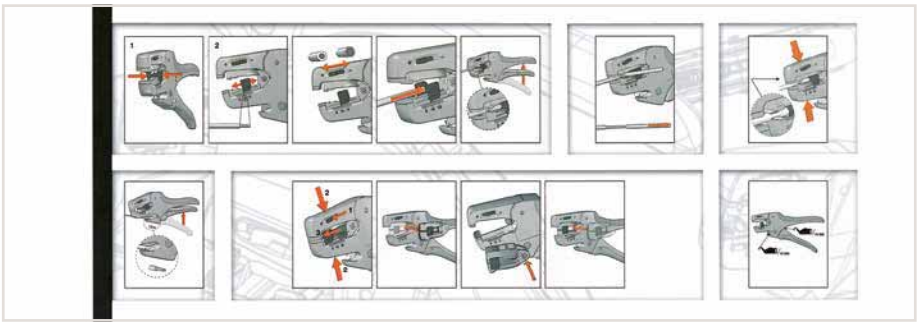
	Item No.	Pack. Unit
	206-126	1

V-blade cassette, 0.1 … 4 mm², for PTFE, for wire stripper (206-124)

	Item No.	Pack. Unit
	206-127	1

„Standard" blade cassette, 4 … 16 mm², for wire stripper (206-125)

	Item No.	Pack. Unit
	206-128	1



Operating instructions are included.

Wire Strippers:
- Automatically adjusts to conductor size
- Stripping blades cause no damage to conductor strands
- Gripping pressure of jaws adjusts automatically to conductor insulation diameter
- Clamping jaws and stripping blades automatically open once the stripping process is completed – no splaying of the conductor strands
- Exact strip length may be set by sliding black setting stop
- Stripping blades can be replaced
- Self-sharpening, fully protected cutter (replaceable*)
- Entire body made of glass-fiber-reinforced polyamide

*applies to Microstrip

Cutting a conductor.

Stripping a conductor.

Crimping Tools

„Variocrimp 4" crimping tool, for insulated and uninsulated ferrules, 0.25 … 4 mm²/24 … 12 AWG

Item No.	Pack. Unit
206-204	1

„Variocrimp 16" crimping tool, for insulated and uninsulated ferrules, 6 … 16 mm²/10 … 6 AWG

Item No.	Pack. Unit
206-216	1

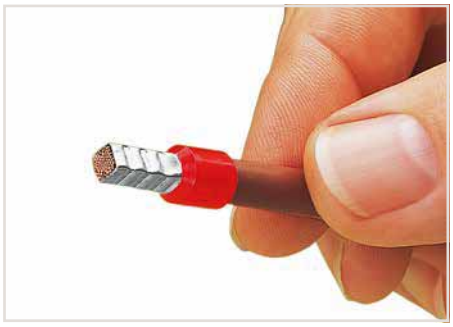
Cable cutter, for copper and aluminum cables up to 35 mm² (2 AWG)

Item No.	Pack. Unit
206-118	1

Insert the ferruled conductor into the crimping station.

Squeeze handles until ratchet mechanism is released.

Cutting a cable.

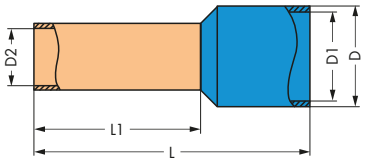


A perfect gas-tight crimp – both electrically and mechanically reliable

Only for "Variocrimp 16":
Adjust conductor cross-section with crimping tool in open position.

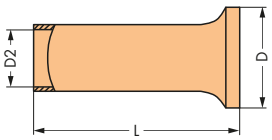
Application notes:
- The built-in crimping pressure control of "Variocrimp 4" automatically adjusts the crimping force to the conductor cross-section. Select the wire gauge on "Variocrimp 16" before crimping.
- Only one crimping station is needed to handle the specified conductor range.
- Uniform, compact crimping on all four sides for high conductor retention
- No need to center the conductor into the ferrule
- Crimping can be performed from either side (for left- or right-handed users).
- Built-in ratchet mechanism ensures gas-tight crimp connection.
- Crimping tools open automatically after crimping operation is complete.
- Ergonomically designed handles.

Insulated and Uninsulated Ferrules per DIN 46228, Part 4/09.90



Ferrule, insulated, electro-tin-plated, electrolytic copper, gastight crimped, per DIN 46288, Part 4/09.09

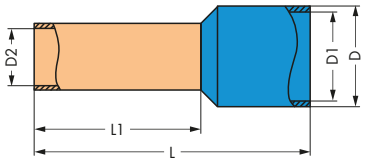
Conductor Size	Color	Strip Length	L	L 1	D	D 1	D 2	Item No.	Pack. Unit
0.25 mm² / 24 AWG	yellow	7 mm / 0.28 inch	10,5	6	2,5	2	0,8	216-321	1000
0.25 mm² / 24 AWG	yellow	9 mm / 0.35 inch	12,5	8	2,5	2	0,8	216-301	1000
0.34 mm² / 24 AWG	green	7 mm / 0.28 inch	10,5	6	2,5	2	0,8	216-322	1000
0.34 mm² / 24 AWG	green	9 mm / 0.35 inch	12,5	8	2,5	2	0,8	216-302	1000
0.5 mm² / 22 AWG	white	7 mm / 0.28 inch	11,5	6	3	2,5	1,1	216-221	1000
0.5 mm² / 22 AWG	white	9 mm / 0.35 inch	13,5	8	3	2,5	1,1	216-201	1000
0.75 mm² / 20 AWG	gray	8 mm / 0.31 inch	12	6	3,3	2,8	1,3	216-222	1000
0.75 mm² / 20 AWG	gray	10 mm / 0.39 inch	14	8	3,3	2,8	1,3	216-202	1000
1 mm² / 18 AWG	red	8 mm / 0.31 inch	12	6	3,6	3	1,5	216-223	1000
1 mm² / 18 AWG	red	10 mm / 0.39 inch	14	8	3,6	3	1,5	216-203	1000
1.5 mm² / 16 AWG	black	8 mm / 0.31 inch	12	6	4	3,4	1,8	216-224	1000
1.5 mm² / 16 AWG	black	10 mm / 0.39 inch	14	8	4	3,4	1,8	216-204	1000
2.08 mm² / 14 AWG	yellow	10 mm / 0.39 inch	14,5	8	4,2	3,6	2,05	216-205	1000
2.5 mm² / 14 AWG	blue	10 mm / 0.39 inch	15	8	4,8	4,2	2,3	216-206	1000
4 mm² / 12 AWG	gray	12 mm / 0.47 inch	16,8	9,5	5,4	4,8	2,9	216-207	1000
6 mm² / 10 AWG	yellow	14 mm / 0.55 inch	20	12	6,8	6,3	3,5	216-208	100
10 mm² / 8 AWG	red	16 mm / 0.63 inch	21	12	8,1	7,5	4,6	216-209	100
16 mm² / 6 AWG	blue	23 mm / 0.91 inch	28	18	9,6	8,8	5,8	216-210	100



Ferrule, uninsulated, electro-tin-plated, electrolytic copper, gastight crimped, per DIN 46288, Part 4/09.90

Conductor Size	Strip Length	L	D	D 2	Item No.	Pack. Unit
0.25 mm² / 24 AWG	5 mm / 0.2 inch	5	1,7	0,75	216-151	1000
0.25 mm² / 24 AWG	7 mm / 0.28 inch	7	1,7	0,75	216-131	1000
0.34 mm² / 24 AWG	5 mm / 0.2 inch	5	1,7	0,85	216-152	1000
0.34 mm² / 24 AWG	7 mm / 0.28 inch	7	1,7	0,85	216-132	1000
0.5 mm² / 22 AWG	6 mm / 0.48 inch	6	2,1	1	216-121	1000
0.5 mm² / 22 AWG	8 mm / 0.31 inch	8	2,1	1	216-101	1000
0.75 mm² / 20 AWG	6 mm / 0.48 inch	6	2,3	1,2	216-122	1000
0.75 mm² / 20 AWG	8 mm / 0.31 inch	8	2,3	1,2	216-102	1000
1 mm² / 18 AWG	6 mm / 0.48 inch	6	2,5	1,4	216-123	1000
1 mm² / 18 AWG	8 mm / 0.31 inch	8	2,5	1,4	216-103	1000
1.5 mm² / 16 AWG	6 mm / 0.48 inch	6	2,8	1,7	216-124	1000
1.5 mm² / 16 AWG	8 mm / 0.31 inch	8	2,8	1,7	216-104	1000
2.5 mm² / 14 AWG	10 mm / 0.39 inch	10	3,4	2,2	216-106	1000
4 mm² / 12 AWG	10 mm / 0.39 inch	10	4	2,8	216-107	1000
6 mm² / 10 AWG	12 mm / 0.47 inch	12	4,7	3,5	216-108	250
10 mm² / 8 AWG	12 mm / 0.47 inch	12	5,8	4,5	216-109	250
16 mm² / 6 AWG	12 mm / 0.47 inch	15	7,5	5,8	216-110	250

Rail-Mount Terminal Blocks, TOPJOB® S
Insulated and Uninsulated Ferrules per DIN 46228, Part 4/09.90



Ferrule, insulated, electro-tin-plated, electrolytic copper, gastight crimped, per DIN 46288, Part 4/09.09

Conductor Size	Color	Strip Length	L	L 1	D	D 1	D 2	Item No.	Pack. Unit
0.5 mm² / 22 AWG	white	12 mm / 0.47 inch	16	10	3,1	2,6	1	216-241	1000
0.75 mm² / 20 AWG	gray	12 mm / 0.47 inch	16	10	3,3	2,8	1,2	216-242	1000
0.75 mm² / 20 AWG	gray	14 mm / 0.55 inch	18	12	3,3	2,8	1,2	216-262	1000
1 mm² / 18 AWG	red	12 mm / 0.47 inch	16	10	3,5	3	1,4	216-243	1000
1 mm² / 18 AWG	red	14 mm / 0.55 inch	18	12	3,5	3	1,4	216-263	1000
1.5 mm² / 16 AWG	black	12 mm / 0.47 inch	16	10	4	3,5	1,7	216-244	1000
1.5 mm² / 16 AWG	black	14 mm / 0.55 inch	18	12	4	3,5	1,7	216-264	1000
1.5 mm² / 16 AWG	black	20 mm / 0.79 inch	24	18	4	3,5	1,7	216-284	1000
2.5 mm² / 14 AWG	blue	12 mm / 0.47 inch	17	10	4,7	4,2	2,2	216-246	1000
2.5 mm² / 14 AWG	blue	14 mm / 0.55 inch	19	12	4,7	4,2	2,2	216-266	1000
2.5 mm² / 14 AWG	blue	20 mm / 0.79 inch	25	18	4,7	4,2	2,2	216-286	1000
4 mm² / 12 AWG	gray	14 mm / 0.55 inch	20	12	5,4	4,8	2,8	216-267	1000
4 mm² / 12 AWG	gray	20 mm / 0.79 inch	26	18	5,4	4,8	2,8	216-287	500
6 mm² / 10 AWG	yellow	14 mm / 0.55 inch	20	12	6,8	6,3	3,5	216-208	100
6 mm² / 10 AWG	yellow	20 mm / 0.79 inch	26	18	6,9	6,3	3,5	216-288	500
10 mm² / 8 AWG	blue	20 mm / 0.79 inch	28	18	8,4	7,6	4,5	216-289	500
16 mm² / 6 AWG	blue	23 mm / 0.91 inch	28	18	9,6	8,8	5,8	216-210	100

Crimping Tools

Crimping Tool 25,
for insulated and uninsulated ferrules,
crimping range: 10 mm², 16 mm² and 25 mm²

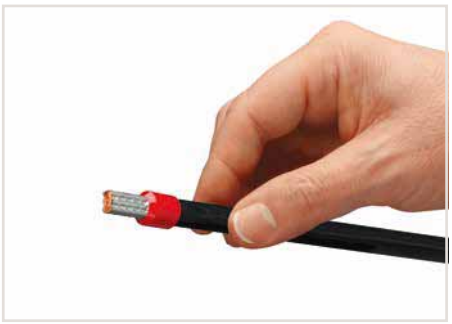
Item No.	Pack. Unit
206-225	1

Crimping Tool 50,
for insulated and uninsulated ferrules,
crimping range: 35 mm² and 50 mm²

Item No.	Pack. Unit
206-250	1

Insert the ferruled conductor into the crimping station.

Squeeze handles until ratchet mechanism is released.



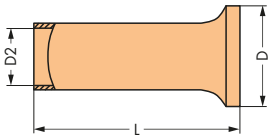
A perfect gas-tight crimp – both electrically and mechanically reliable

Application notes:
- Improved crimping for higher conductor retention
- Crimping can be performed from either side (for left- or right-handed users).
- Built-in ratchet mechanism ensures gas-tight crimp connection.
- Crimping tools open automatically after crimping operation is complete.
- Ergonomically designed handles.

What is a "gas-tight" connection?
In a gas-tight connection, the conductor and the ferrule are compressed, eliminating all spaces. Under normal atmospheric conditions, neither a liquid nor gaseous medium can penetrate the crimped connection.
Oxidation between crimped single conductors is prevented, virtually eliminating the possibility of any increase in the crimped connection's resistance. In some exceptional cases, minute, isolated spaces may be present. However, these instances can be considered as closed off due to the twisted conductor.
Inadequate crimping can allow the conductor to be pulled out of the connection Hollow spaces also remain, permitting oxidation formation and leading to an increase in contact resistance.

Elevated resistance is detrimental for both signal transmission (signal flow is damped) and power transmission, resulting in power loss and contact heating (risk of fire).
Crimping tools with built-in ratchets are recommended, such as the WAGO Variocrimp tools. These tools open automatically after the crimping operation is complete. Space-saving crimping from all four sides is ideal for spring clamp termination.
Ferruled conductor cross-sections specified for WAGO products are based on this crimping method.

High-Current Rail-Mount Terminal Blocks
Insulated and Uninsulated Ferrules per DIN 46228, Part 4/09.90



Ferrule, uninsulated, electro-tin-plated, electrolytic copper, gastight crimped, per DIN 46288, Part 4/09.90						
Conductor Size	Strip Length	L	D	D 2	Item No.	Pack. Unit
25 mm² / 4 AWG	25 mm / 0.98 inch	25	9,5	7,3	216-413	50
35 mm² / 2 AWG	25 mm / 0.98 inch	25	11	8,3	216-414	50
35 mm² / 2 AWG	30 mm / 1.18 inch	30	11	8,3	216-424	50
50 mm² / 1 AWG	30 mm / 1.18 inch	30	13	10,3	216-425	50
50 mm² / 1 AWG	35 mm / 1.38 inch	35	13	10,3	216-435	50

Test and Measurement Devices
206 Series

Profi LED+, 2-pole voltage tester with LED display, removable 4 mm Ø test probes

Item No.	Pack. Unit
206-707	1

Profi LED+, 2-pole voltage tester with LED display, removable 4 mm Ø test probes

Item No.	Pack. Unit
206-706	1

Spare test probes, 4 mm Ø (2 pieces)

Item No.	Pack. Unit
206-808	25

Additional Profi LED+ features:
- Automatic measurement range selection
- Single-pole phase testing AC >100 V
- Two-pole sequence testing (R and L)
- Continuity testing
- FI/RCD testing (30 mA) via buttons
- One-hand operation for SCHUKO and CEE sockets
- LED torch lamp function
- Automatic backlight
- Auto power-off function
- CAT IV 1000 V
- TÜV/GS tested and approved
- IEC/EN 61243-3 (DIN VDE 0682-401)

Additional Profi LED+ features:
- Automatic measurement range selection
- Single-pole phase testing AC >100 V
- Two-pole sequence testing (R and L)
- Continuity testing
- FI/RCD testing (30 mA) via buttons
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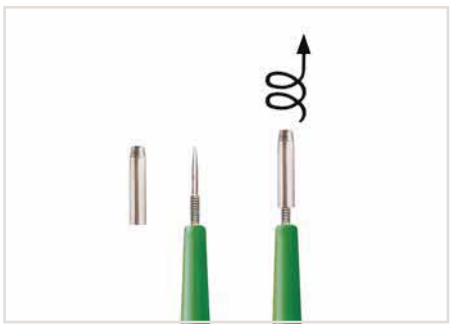


Profi-LED+:
- Improved socket contact via 4 mm Ø test probes
- Removable test probes for small test ports (suitable for all WAGO terminal blocks)

Test and Measurement Devices
206 Series

Multi-Tester, digital multimeter with non-contact voltage tester

Item No.	Pack. Unit
206-810	1

Clamp-Multi-Tester

Item No.	Pack. Unit
206-816	1

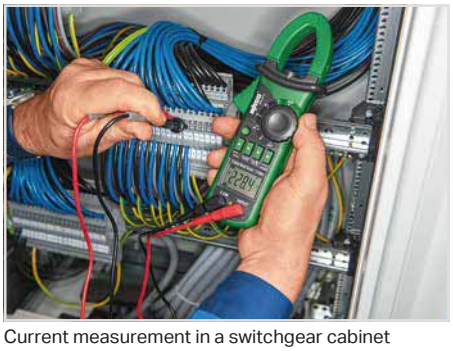
Testboy, with integrated flashlight, non-contact voltage tester

Item No.	Pack. Unit
206-804	1

Additional Multi-Tester features:
- Contact-less voltage test AC >100 V (optical and acoustical)
- Resistance measurement up to 20 MΩ
- Acoustical continuity test
- Diode test
- Data hold function
- Auto power-off function
- LED torch lamp function
- CAT IV 600 V
- TÜV/GS tested and approved
- IEC/EN 61010-1 (DIN VDE 0411)

Voltage testing in switchgear cabinet
Additional Clamp-Multi-Tester features:
- DC and AC current up to 600 A
- True RMS and min./max. value measurement
- DC and AC voltage up to 600 V
- Manual or automatic measurement range selection
- Resistance up to 60 MΩ
- Capacitance measurement, acoustical continuity test
- Diode test, data hold function
- Large LCD with backlight
- LED measuring point lighting
- CAT III 600 V overvoltage protection
- IEC/EN 61010-1 (DIN VDE 0411)
- Includes batteries, measurement leads and carrying bag

A device that will reliably detect AC voltage in cables, sockets, fuses, switches, outlets and other installations.
Testboy can detect the following:
- Live conductors
- Cable breaks
- Blown fuses (in cartridges or holders)
- Defective switches
- Defective lamps in strings of lights



Current measurement in a switchgear cabinet

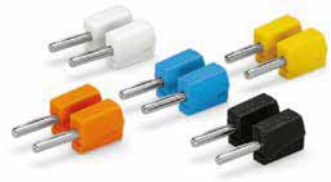
General Test Accessories

Measuring range category	CAT I
Test voltage (AC)	30 V
Test voltage (DC)	60 V
Test current	10 A

Test plug, with 500 mm cable, 2 mm Ø		
Color	Item No.	Pack. Unit
red	210-136	50 (1)

Measuring range category	CAT I
Test voltage (AC)	30 V
Test voltage (DC)	60 V
Test current	10 A

Test plug, with 500 mm cable, 2.3 mm Ø		
Color	Item No.	Pack. Unit
yellow	210-137	50 (1)



Measuring range category	CAT I
Test voltage (AC)	30 V
Test voltage (DC)	60 V
Test current	20 A
Connection Data	
Connection technology	CAGE CLAMP®
Solid conductor	0.08 … 2.5 mm² / 28 … 14 AWG
Fine-stranded conductor	0.08 … 2.5 mm² / 28 … 14 AWG
Strip Length	9 … 11 mm / 0.35 … 0.43 inch

Banana plug, for 4 mm socket diameter, color mixed, 10 x orange, white, black, blue, yellow		
	Item No.	Pack. Unit
	215-111	50

Measuring range category	CAT I
Test voltage (AC)	30 V
Test voltage (DC)	60 V
Test current	20 A
Connection Data	
Connection technology	CAGE CLAMP®
Solid conductor	0.08 … 2.5 mm² / 28 … 14 AWG
Fine-stranded conductor	0.08 … 2.5 mm² / 28 … 14 AWG
Strip Length	9 … 11 mm / 0.35 … 0.43 inch

Banana plug, for 4 mm socket diameter		
Color	Item No.	Pack. Unit
orange	215-211	50
red	215-212	50
black	215-311	50
green	215-411	50
yellow	215-511	50
white	215-611	50
blue	215-711	50
gray	215-811	50
green-yellow	215-911	50

Technical Section

Technical Section

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JUMPFLEX® Signal Conditioners

857 Series

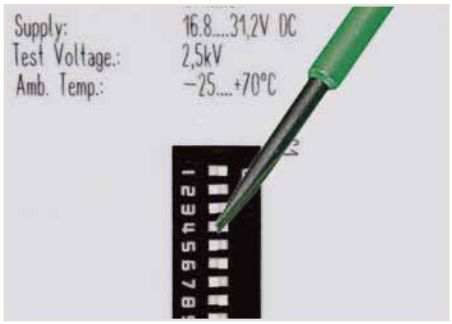
Housed in a 6 mm-wide package, the *JUMPFLEX*® Signal Conditioners feature eight Push-in CAGE CLAMP® connections and a common profile. These features play a key role in forming the basis for a successful overall solution. Additional benefits include: "safe isolation," extended operating temperature range and calibrated, configurable signals. Combined with excellent technical specifications, these features lead to a line of advanced signal conditioning solutions that maximize panel space while reducing signal wiring and downtime.

Directly Connect:
Simple, push-in termination of solid and ferruled conductors – no operating tool needed.

PUSH-IN CAGE CLAMP®

Highest Safety:
All devices provide "safe isolation" with 2.5 kV test voltage according to DIN EN 61010-1.

Configuration Options



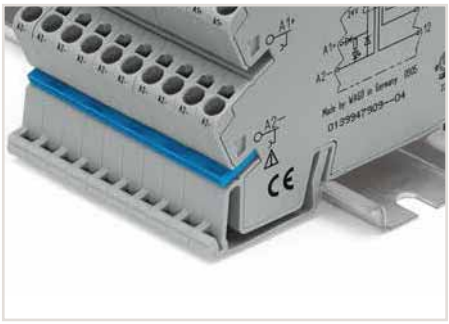
Configuration via DIP switch

Industry's most compact – "True" 6.0 mm (0.23 inch) width maximizes panel space.

Configuration via *JUMPFLEX*®-ToGo Smartphone App

For extreme applications – Extended temperature range of −25 °C to +70 °C to support more applications.

Configuration via PC software



Commoning, not discrete wiring – Same outline allows use of a single in-line, push-in jumper.

Configuration via push/slide switch

2857 Series

The success of the 857 Series *JUMPFLEX*® Signal Conditioners shaped the design of the new 2857 Series. Just like the 857 Series, usability and absolute reliability are at the core of the 2857 Series. However, the 2857 Series takes flexibility to new levels by providing several convenient configuration options. In addition to DIP switches, PC configuration software and a smartphone configuration app, there is also a touch panel display. Every aspect has been engineered for maximum flexibility – exactly what you'd expect from WAGO.

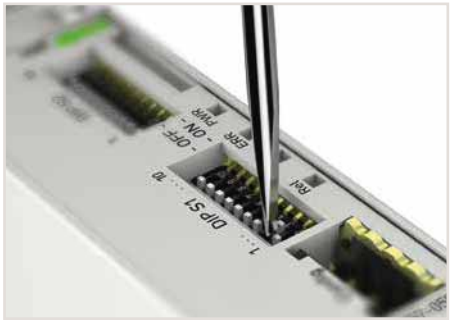
Directly Connect:
Simple, push-in termination of solid and ferruled conductors – no operating tool needed.

PUSH-IN CAGE CLAMP®

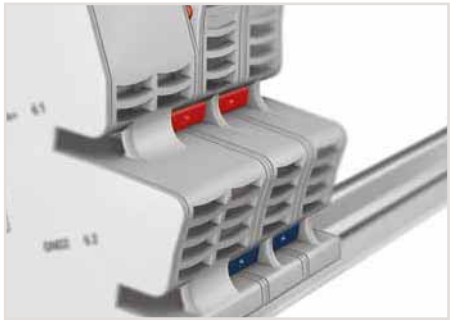
Highest Safety:
All devices provide "safe isolation" with 4 kV test voltage according to DIN EN 61010-1.

4 kV

Configuration Options



Configuration via DIP switch



Commoning, not discrete wiring – Same outline allows use of a single in-line, push-in jumper.

Configuration via *JUMPFLEX*®-ToGo Smartphone App

For extreme applications – Extended temperature range of –40 °C to +70 °C to support more applications.

Configuration via PC software

Lock-out seal option

Configuration via touch panel – an innovative display

Pluggable connection technology

Isolation Amplifiers
with a Power Supply

Pre-Configured Isolation Amplifiers

Pre-configured isolation amplifiers convert, amplify, filter and electrically isolate analog standard signals (e.g., 0 … 10 V into 0 … 20 mA).

Configurable Isolation Amplifiers

For signal conditioners, and particularly two-wire signal conditioners, the measured signal is often in the 4 … 20 mA range as a current value. For the analog input card of a PLC, however, input voltages in the ranges of 0 … 10 V or 0 … 5 V are required.
Configurable isolation amplifiers support various standard signals at the input and output; the devices also convert, amplify, filter and electrically isolate analog standard signals. DIP switches accessible from the side can be used to configure the input and output signals. Measurement range configuration via DIP switch is calibrated.

Universal Isolation Amplifiers

In addition to the configurable isolation amplifiers, the universal isolation amplifiers can also be configured via PC configuration software or smartphone app. The configuration software also offers additional options, such as special input and output signal combinations with intermediate values or inversion of the analog output. An error message can be signaled via digital switching output.

Bipolar Isolation Amplifiers

Bipolar measurement signals often require processing, e.g., when motor currents are measured in both directions of rotation. Bipolar signals are also processed for recording distances or for better resolution of measurement signals.

Repeater Power Supplies

Repeater power supplies energize transmitters.
Two-wire transmitters regulate their own current consumption proportional to the measured value; the 4 … 20 mA connection provides auxiliary power for the transmitter and the magnitude of the current is the same as the output measured value.
Three-wire transmitters usually have an active current output for the measured value and additional connections for the supply voltage (auxiliary power).

Signal Splitters

Signal splitters divide a standard signal into two signals. The measured signal can be supplied to different downstream devices without interference.
Example: A signal conditioner supplies 4 … 20 mA input current. 20 mA.
Output 1 is configured to 4 … 20 mA and transmits the measured value to a controller.
Output 2 is configured to 0 … 20 mA and regulates a controller.

Isolation Amplifiers
without a Power Supply

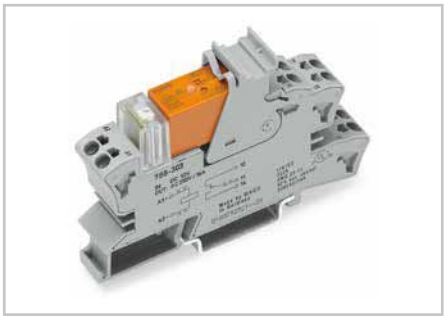
Passive Isolators

Passive isolators draw their power from the input signal (4 … 20 mA) and require no additional wiring or auxiliary power.

Loop-Powered Isolation Amplifiers

Loop-powered isolation amplifiers draw their power from the output signal (4 … 20 mA) and require no additional wiring or auxiliary power.

Relay Modules



Relay Modules

Conveniently Interface Electronics and Peripheral Devices

In modern automation systems, electromechanical relays safely connect process peripherals with electronic control, alarm and monitoring systems. For example, relays perform the following tasks:

- Electrical isolation with high isolation levels between input and output circuits
- Adjust different signal levels
- Signal amplification and/or signal multiplication if varying potentials coexist

The comprehensive design of modern relays provides applications with the following benefits:

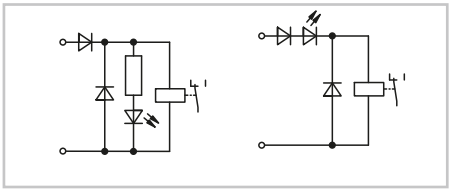
- Immunity to electromagnetic interference and transient voltages
- High, short-term overload capacity on both input and output sides
- Minimal switching loss
- A single module that switches both direct and alternating currents

WAGO offers a complete range of relay modules that perform these tasks for a wide range of applications. Depending on the task and application requirements, there is a choice of relay modules with differently rated voltages, contacts, contact materials, housings and designs. In addition to standard switching relays, other relay models are available including bistable, timer, latching and safety relays with force-guided contacts.

Definitions of Several Important Technical Terms

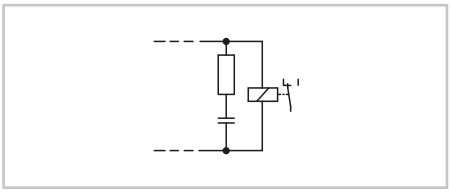
Coil-Side

The relays can be used within the stated temperature range with nominal voltage plus tolerance at 100% continuous rating. According to the type and application, the relays are triggered with a DC or AC signal. The DC versions (residual ripple ≤ 6%) are, unless otherwise stated, equipped with LED function indicators, a recovery diode and a reverse voltage protection diode. The functional details are shown in the wiring diagram.



Possible input circuits of relay modules

AC versions of select relays equipped with series connected rectifiers (refer to the wiring diagrams) can be triggered with AC and DC at the stated nominal voltage.
The free-wheel function is in this case actuated by the rectifier. The only input circuit on purely AC relays is the status display.
To guarantee safe operation, residual voltages (due to the cable capacitance of long connection lines or leakage currents of semi-conductor switches and their protective circuits) must be lower than the release voltage of the relays.
For DC relays, the release voltage is specified with ≤ 5 % of the nominal voltage; for AC relays, it is 15 % of the nominal voltage (per EN 61810).
The relay may not reset if a high residual voltage exists. Depending on the reason for the residual voltage, changing the cable routing or a parallel connection of an RC element of R = 100 … 220 Ω and C = 220 … 470 nF could remedy this situation.



Optionally, modules specially developed for this application are available, e.g., sockets with a miniature switching relay and integrated base load module (857-358/006-000).

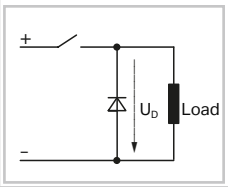
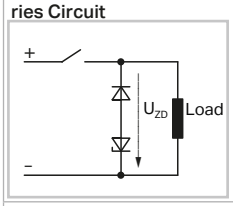
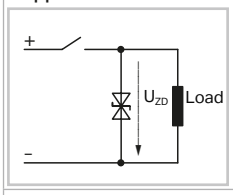
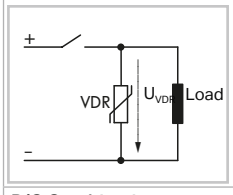
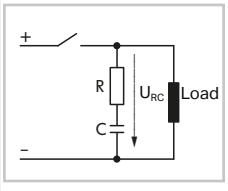
Contact Materials

For contact reliability, the contact resistance over the entire operating life of the relay should remain relatively low and constant. A variety of contact materials can be selected depending on the load type, switching current, switching voltage and the desired number of switching cycles. The accompanying table shows the materials, their properties and applications when used with WAGO relay modules.

Contact Material	Properties and Applications	Application Range
AgNi 0.15 + Au	Excellent corrosion resistance, low and constant contact resistances at extremely low switching power, for dry circuits	µV ... 30 V µA ... 0.2 A
AgCd O + Au	Low welding tendency, high burn-off resistance at higher switching power, suitable for small switching loads	≥ 5 V ≥ 10 mA
Ag Cd 0, with gold flash	Low welding tendency, high burn-off resistance at higher switching power, Au as storage protection	≥ 12 V ≥ 100 mA
Ag Ni 0.15	Good mechanical stability, low welding tendency and low contact resistance, universal use at moderate loads	≥ 12 V 5 mA ... 10 A
Ag Sn 0_2	Low welding tendency, extremely high burn-off resistance at high switching power, suitable for circuits with high switch on/off loads, DC circuits	≥ 5 V / 100 mA ≥ 10 V / 10 mA ≥ 24 V / 1 mA
Ag alloy, with gold flash	Good mechanical stability, low welding tendency, large application range for small to medium switching power	10^{-3} W

Contact Protective Circuit

When switching off inductive loads, such as contactors and solenoid valves, transients occur with peak voltages up to several thousand volts. These transients often exceed the permissible EMC standard limits and must therefore be limited by external circuits. They also cause an electric arc at the switching contact, which can destroy the contact or can significantly diminish the relay's service life and reliability. The following protective circuits, which are outlined in the table, are connected directly to the source in parallel to the load and have proven to be successful.

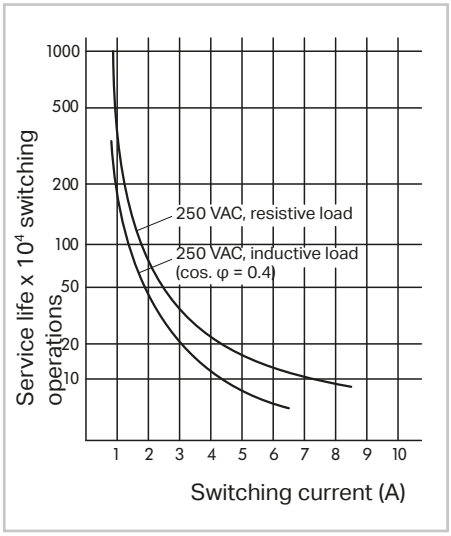
Load Circuit	Additional Fall Delay	Defined Induction Voltage Limitation	Bipolar-Effective Attenuation		
Diode 	Large	Yes (U_D)	No	Advantages: Disadvantages:	• Easy implementation • Cost-effective, reliable • Uncritical dimensioning • Small induction voltages • Attenuation only via load resistor
Diode/Zener Diode Series Circuit 	Medium to small	Yes (U_{ZD})	No	Advantages: Disadvantages:	• Uncritical dimensioning • Attenuation only above U_{ZD}
Suppressor Diode 	Medium to small	Yes (U_{ZD})	Yes	Advantages: Disadvantages:	• Cost-effective • Uncritical dimensioning • Limitation of positive peaks • Suitable for AC voltage • Attenuation only above U_{ZD}
Varistor 	Medium to small	Yes (U_{VDR})	Yes	Advantages: Disadvantages:	• High energy absorption • Uncritical dimensioning • Suitable for AC voltage • Attenuation only above U_{VDR}
R/C Combination 	Medium to small	No	Yes	Advantages: Disadvantages:	• RF attenuation via power storage • Suitable for AC voltage • Level-independent attenuation • Accurate dimensioning required • High inrush current

12

Relay Modules

Service Life

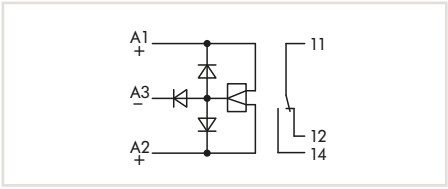
A distinction must be made between the mechanical life, which indicates the number of switching cycles without contact load, and the electrical service life at maximum load, which indicates the number of switching cycles with maximum switching power and resistive load. Reduced power increases the service life compared to the value of the maximum load. The following figure shows the typical curve between switching current and service life of a relay.



More details upon request

Description of Select Relays

Bistable Switching Relays



Bistable switching relays have three coil contacts. According to the wiring scheme, the relay is switched into "working condition" (contacts 11 ... 14 closed) by the common connection A3 and the connection A2 and into "rest position" (contacts 11 ... 14 opened) by the connection A1. After removing the control signal, the relay returns to its respective position and can only be switched over by a control signal circuit. The bistable switching relays are only available for direct voltage with positive or negative triggering.

Current Pulse Switching Relays

One current pulse is needed to change the relay from the rest position to the working position and vice versa. During the triggering process, one of two status indicators displays the actual contact position. The current pulse switching relay is available for direct and alternating voltage.

Safety Relays

Force-guided safety relays have become increasingly recommended and specified for self-regulated systems as they provide protection for personnel, machines and installations. Relays with force-guided contacts are an essential safety component for these circuits, particularly when defects occur. For these applications, WAGO offers specialty relay modules with force-guided contacts as based on EN 61810-3.

If a partial or complete standstill is required in the event of a failure (e.g., in medical technology or chemical processes), each control contact can be polled and evaluated.
Irrespective of whether a single or complete control for the NO contact is implemented, the SF relay operates in such a way that the other equipment is switched off even if a NO contact is welded. The failure is recognized by the control contact while the other contacts are still able to open to interrupt circuits.

Timer Relays

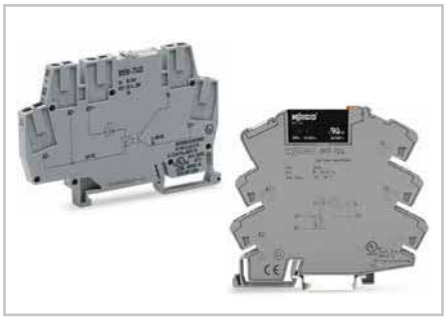
WAGO's timer relay modules are electromechanical timer relays with an integrated time response, e.g., per EN 61812-1. The time ranges can be adjusted via potentiometer for either continuously variable or linear operation.
A status LED indicates the switching condition of the relay.

Optocouplers

Optocouplers – The Modern and Powerful Alternative

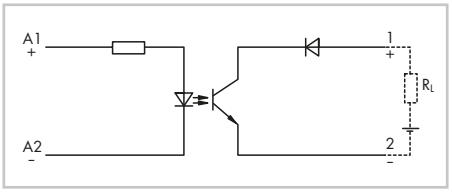
As a link between process peripherals and electronic control, alarm and monitoring systems, optocoupler modules boast the following advantages over electromechanical relays:
- Longer service life – no mechanical wear
- High switching frequency because of fast switching times
- Vibration resistance
- No contact bouncing
- "Noiseless" switching
- Low control power

WAGO provides a full range of optocouplers for all interfaces between control and load circuits in applications where the following advantages are needed:
- Electrically isolate input and output circuits
- Adjust different signal levels
- Signal amplification

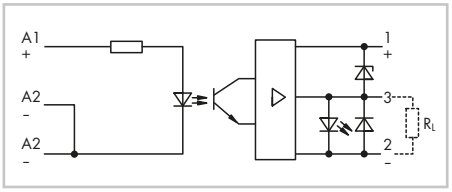


Input circuit

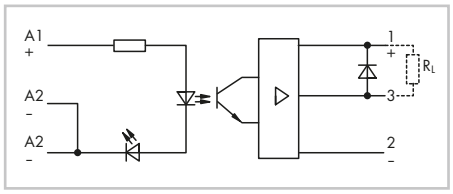
According to the type, triggering the optocoupler modules is performed via DC voltage (residual ripple RR <6%) or AC voltage (50 … 60 Hz).
In the DC type, a reverse voltage protection diode is always provided; in the AC type optocoupler element, a rectifier is included. The optocoupler modules are equipped with a LED function indication at either the input side or at the load side, as shown in the wiring diagram.



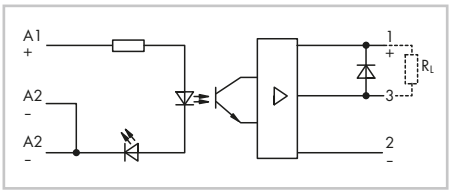
2-wire output



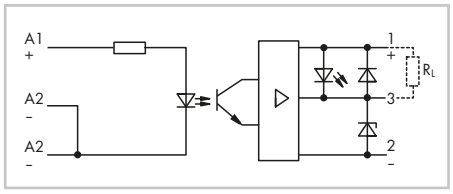
3-wire high-side switching output



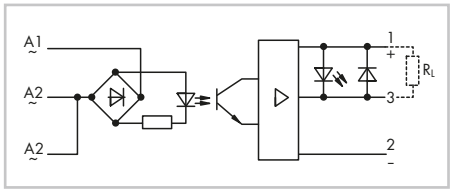
DC triggering with LED function indication in the triggering circuit



3-wire low-side switching output



DC triggering with LED function indication in the load circuit



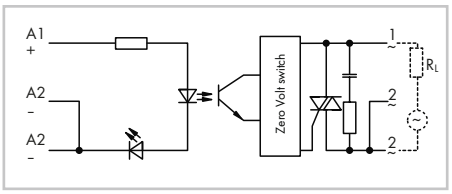
AC triggering with LED function indication in the load circuit

Due to the low threshold voltages, it must be ensured that interference and residual voltages (caused by the cable capacitance of long connection lines or leakage currents of semi-conductor switches and their protective circuits) do not cause any malfunctions.

Output Circuit

Depending on the application, an optocoupler module for DC or AC voltage consumers can be selected on the load side. In the case of DC outputs, they can be:
- 2-wire output
- 3-wire high-side switching output
- 3-wire low-side switching output

In addition to these different functional outputs, the output voltage range and the maximum switching current must be observed.
To ensure proper operation, the specified polarity must be observed.
In order to protect the output transistors, inductive loads must always be equipped with a protective circuit, e.g., a recovery diode. For other types of protective measures, the cut-off voltage peaks must be lower than the indicated cut-off voltage of the output transistors. For the AC outputs a Triac is used as the switching element.



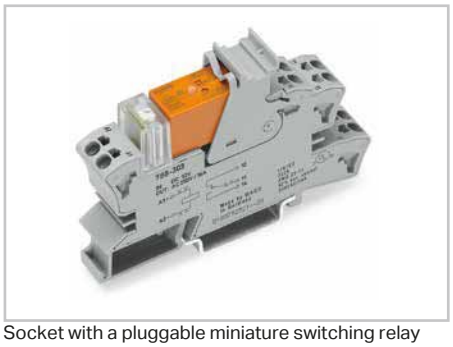
In order to avoid high inrush currents, the AC output is equipped with a zero-voltage switch which turns on the load at the zero-voltage point. In the current zero-crossing, the Triac will cut off the load. Besides observing the maximum switching voltage and maximum switching current for inductive loads, ensure the provision of a protection circuit to cut-off peaks to a value below the reverse voltage.

Housings and Designs

Modern equipment design requires multiple components that can meet diverse challenges:
User- and maintenance-friendly, limited budgets, safety and availability, simplicity in design and usage.

WAGO offers relay and optocoupler modules in various designs to overcome any of the restraints posed by space requirements.

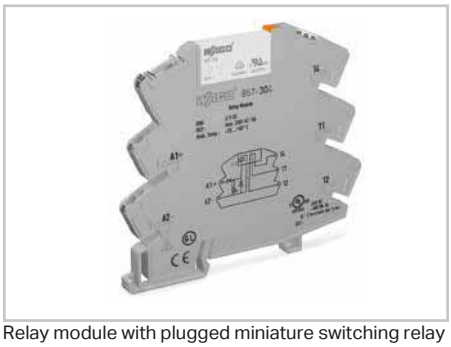
Sockets with a Miniature Switching Relay or a Solid-State Relay, 788 Series



Socket with a pluggable miniature switching relay

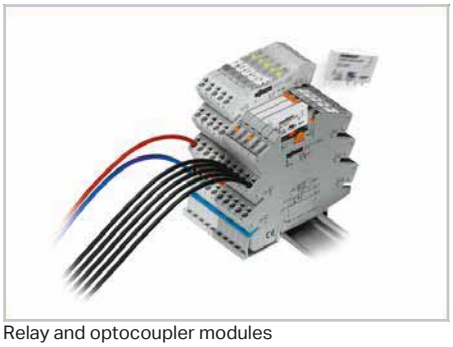
WAGO 788 Series Relay Sockets are an excellent platform for industrial and process automation switching relay applications. Featuring plug-and-play, miniature switching relays (1 or 2 changeover contacts), the 788 Series relays are ultra-compact, fitting where other relays won't.
A compact design (W x H x D: 15 x 53 x 86 mm) is just one of the 788 Series' unique and highly beneficial features.
A robust, easy-to-use lever lifts/ejects relays, simplifying replacement – even if relay modules are side-by-side.
For flexibility and the reduction of part numbers, the 788 Series can be ordered as: a fully equipped relay module, a relay and LED for switching status indication, or as individual components.

Relay and Optocoupler Modules, 857 Series



Relay module with plugged miniature switching relay

WAGO's 857 Series Relay and Optocoupler Modules are supplied in 6 mm-wide housing and share a common profile.
The modules feature a single, flexible in-line jumper system, eliminating discrete wiring. The pluggable relays can simply be replaced from the top.

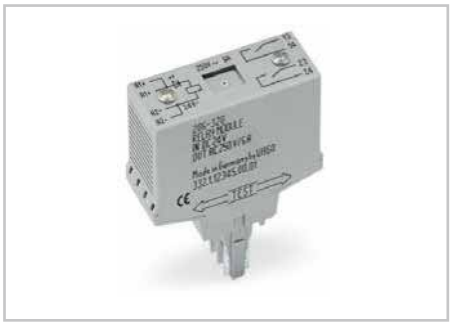


Relay and optocoupler modules

Pluggable Function Modules for Carrier Terminal Blocks, 286 Series

Pluggable function modules for carrier terminal blocks

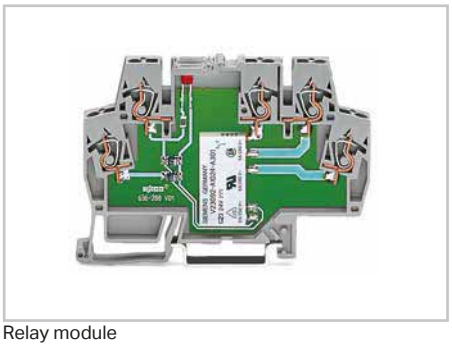
Pluggable modules for carrier terminal blocks maximize flexibility while simplifying maintenance.
The carrier terminal block is mounted on the DIN-rail and wired just like a standard terminal block.
For ease of maintenance, the modules are replaced in one step without altering the wiring. This intelligent design also saves space and reduces wiring costs.



Pluggable relay modules for carrier terminal blocks

A comprehensive range of function modules is available to complement these relay and optocoupler modules. The modules seamlessly integrate any required function into control cabinets via pluggable modules.

Rail-Mount Terminal Blocks with Relay and Optocoupler, 859 Series



Relay module

With a wide range of relays and optocouplers, the 859 Series will suit any industrial interface application.
The compact, 6 mm-wide housing is ideal for space-restricted control panels.
Simple commoning at the control and load side streamlines looping through of common input and output potentials.

Sockets with an Industrial Relay, 858 Series

Socket with an industrial relay

A robust design and vibration-proof CAGE CLAMP® Spring Pressure Connection Technology ensure continuous and uninterrupted operation for any system.
The right choice for applications requiring up to four changeover contacts. Dual conductor entries enable customized potential distribution.

Relay Modules in a DIN-Rail Mount Enclosure, 789 Series

Relay module in a DIN-rail-mount enclosure

WAGO 789 Series Switching Relays serve a wide variety of applications, from basic lighting control – homes, hotels and commercial structures – to comprehensive industrial control cabinets.
Just 17.5 mm wide, the compact DIN-rail-mount enclosure is ideal for distribution boards and meter cabinets.
The relay modules with manual operation allow simple emergency operation to be implemented.

Interface Modules

Safe and Maintenance-Free Connections

Interface modules connect electronics to electrical systems at the control level and perform:
- signal transmission between control and field level (system, machine), as well as
- signal distribution between control and field level

and vice versa. Here, the control signals from pre-assembled, plug-in connections are applied to terminal block connections.
WAGO offers a wide range of interface modules for commonly used connector types. Using these interface modules, the following benefits are provided for system wiring:
- Simple and time-saving planning and calculation
- Quick wiring, commissioning and troubleshooting thanks to clearly laid-out wiring and highly legible pole markings – decrease wiring errors
- Safe and maintenance-free connection of signal lines using CAGE CLAMP® terminal strips
- Space-saving, high-density wiring

The interface modules can be delivered as standard, in a universal DIN-rail mounting carrier for the following connectors:

D-Subminiature Connector per DIN 41652

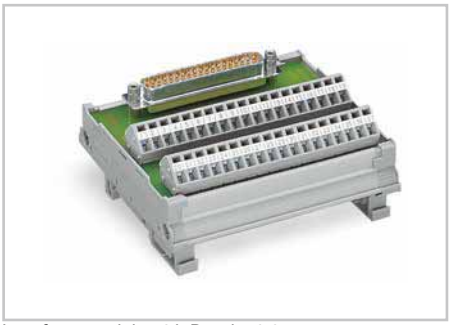
Interface modules for male and female connectors are available with 9, 15, 25, 37 or 50 contacts. Compared with the standard solder connection, the mating connector with IDC connection offers additional advantages.

Pluggable Connector per DIN 41651

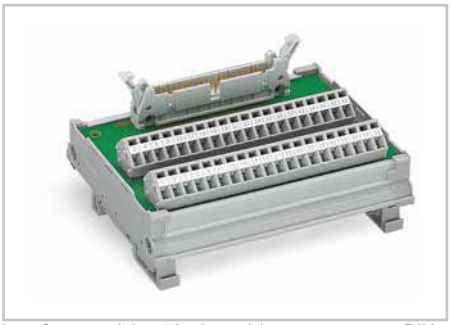
Interface modules with 10-, 14-, 16-, 20-, 26-, 34-, 40-, 50- and 64-pole pluggable connectors are available for ribbon cable connectors.

RJ-45 Interface Modules

The RJ-45 interface modules are switchgear cabinet components for passive and structured network cabling. A range of DIN-rail-mount RJ-45 interface modules in different variants are available for the various applications:
- with shield clamping saddles
- as crossover
- with additional power contacts



Interface module with D-subminiature connector per DIN 41652



Interface module with pluggable connector per DIN 41651

RJ-45 Interface Modules

EPSITRON® – Advanced Power Supply System
787 Series

PRO Power Supplies

Slimline, 1- and 3-phase, switched-mode power supplies feature a wide input voltage range, stabilized, adjustable 12, 24 or 48 VDC output voltage, output power up to 960 W and high efficiency. An integrated PowerBoost (up to 100% output power for 4 seconds or alternatively 150% for 8 s) allows reliable starting of heavy loads with high inrush currents, eliminating expensive oversizing of the power supply. The TopBoost function, which provides a much higher output current of up to 60 A for 50 ms, permits use of standard circuit breakers for protection on the secondary side. This enables safe tripping within the time limits required by the EN 60204 standard.

Select devices utilize the LineMonitor feature for current and voltage monitoring, fault memory and parameterization options via LCD display, on-unit function keys, or free monitoring software and available RS-232 interface from a PC and PLC. This allows the power supply to replace additional devices, such as phase failure and phase sequence monitoring devices or operational hour meters. Power supplies without LineMonitor offer a DC OK contact for output voltage monitoring and a stand-by mode to switch off the device output via remote input, while minimizing power consumption. Foolproof, pluggable CAGE CLAMP® connectors permit efficient pre-wiring.

CLASSIC Power Supplies

Single-phase, two-phase and three-phase, primary switch mode, industrial power supplies provide a wide input voltage range and robust metal housings. The CLASSIC Power Supplies have a stabilized, adjustable output voltage and provide short-circuit and overload protection. The devices achieve high efficiency and the integrated LED status indicator conveniently provides operational status at a glance. Foolproof, pluggable CAGE CLAMP® connectors permit efficient pre-wiring.
The CLASSIC Power Supplies are available in four nominal output voltages: 12, 24 or 48 VDC, as well as 30.5 VDC for AS-Interface networks.
Depending on the voltage, outputs of up to 960 W are available.
CLASSIC Power Supplies with outputs of up to 120 W comply with the EN 60335-1 standard, making them suitable for use in devices and machines subject to EN 60335-2 (so-called household appliance standard).
CLASSIC Power Supplies with outputs of 120 W and higher are provided with a TopBoost, enabling the use of conventional circuit breakers for secondary-side protection.
Virtually all devices of the CLASSIC Power family are provided with DNV GL approval for use in shipbuilding or onshore/offshore applications.

ECO Power Supplies

Single-phase and three-phase, switched-mode power supplies in sturdy metal housing offer a wide input voltage range, without manual switching. The stabilized, front-panel adjustable 24 VDC output voltage is protected against open and short circuits, and constant current operation is provided in the overload range up to 180%. LEDs quickly provide operational status at a glance. CAGE CLAMP® provides fast, vibration-proof and maintenance-free terminations, allowing DIN-rail mounting in several positions as well as screw mounting without a DIN-rail. These devices also have conformity with EN 60335-1, allowing use in appliance building.
Individual devices with ATEX, IEC Ex and ANSI/ISA 12.12.01 approval are available for use in Zone 2 hazardous areas.

COMPACT Power Supplies

Single-phase, DIN-rail-mount power supplies are used in meter boards, junction boxes, small and system distribution boxes or flat control panels in buildings and industrial applications. Devices with nominal output voltages of 5, 12, 18 or 24 VDC are protected from overloads and short circuits, are provided with an integrated status LED and offer outputs of up to 150 W.
Some devices come with a pluggable female connector with integrated Push-in connection technology, ensuring particularly rapid and convenient wiring.
This family also includes devices that comply with EN 60335-1 and are suitable for use in appliance building.
Devices with DNV GL approval are also available for use in shipbuilding and onshore/offshore applications.

Electronic Circuit Breakers (ECBs)

Configurable protection via 2-, 4- or 8-channel ECBs, for shutting down faulty 12, 24 or 48 VDC current paths. Offering adjustable trip times, ECBs respond to short circuits/overloads quicker than traditional circuit breakers or fuses, or when unintended start-ups must be prevented in the event of a ground fault (see EN 60204). This is particularly advantageous when using long cables between a power supply and load where loop resistance may be very high. Due to their faster and more precise tripping characteristics, as well as the possibility to set at six times the nominal current, ECBs have clear benefits. The devices also come with integrated current and voltage monitoring, the possibility to charge high capacitive loads, a slim design, pluggable connection technology, as well as marking and sealing options.
ECBs with active current limitation are also available as an option. These advanced features enable ECBs to reliably prevent voltage drops in the event of a short circuit.
A group message notifies whether channels have tripped. A remote reset is also possible. Furthermore, the digital signals provided enable the simple polling and switching of each individual channel. Voltage and current values can also be transferred.

Uninterruptible Power Supplies (UPS)

Uninterruptible power supplies (UPS) reliably compensate for long power outages. They consist of a charger and controller, as well as a connected battery of varying capacities. In battery operation, 24 VDC can be provided for several hours depending on the load current and battery capacity. The charger and controller are supplied with 24 VDC from an external power supply – capacity must be matched to the load. Parameterization and diagnostics are simplified by an optionally integrated LCD with keypad, or free software using an RS-232 interface (for connection to a PC or PLC). The battery modules come with battery control technology. They have an integrated microcontroller with temperature sensor, allowing for temperature-controlled charging via charger and controller, which extends the battery's service life. The remaining battery life is determined, according to which the charger and controller can generate a signal for battery replacement.

EPSITRON® – Advanced Power Supply System
787 Series

Redundancy Modules

Redundancy modules have two integrated power diodes for parallel connection of power supplies, while improving power supply availability or increasing the total current for the 12, 24 or 48 VDC loads.
An optional signal contact reports the failure of one or both input voltages, which is also displayed via LED.

Capacitive Buffer Modules

Maintenance-free capacitive buffer modules ensure smooth operation and protect data during shorter 24 VDC power interruptions. Depending on the output current and buffer capacity, buffer times up to several seconds can be achieved. While control units are particularly sensitive to short power interruptions, an integrated signal contact reports buffer operation, offering the control unit sufficient time for preventive measures (e.g., saving valuable production data or program parameters).

DC/DC Converters

Available in a 6 mm wide housing or DIN-rail-mount enclosure, DC/DC converters are ideal for applications where it is not necessary to use a separate power supply with special voltage due to low power requirements (e.g., when supplying sensors, actuators or DALI bus devices).

DIN-Rail-Mount Modules – Power Supplies

Standard transformer power supplies with bridge rectifier, smoothing capacitors and stabilized output voltage via longitudinal voltage regulator are ideal for supplying small loads with nominal output voltages of 24, 12, ±12 and ±15 VDC. Their low residual ripple makes them particularly well suited for applications using analog technology. The DIN-rail-mount modules feature CAGE CLAMP® technology for fast, vibration-proof and maintenance-free connections.

DIN-Rail-Mount Modules – Constant Voltage Sources

Constant voltage sources provide stabilized 24 VDC voltage via integrated longitudinal voltage regulator. The DIN-rail-mount modules feature CAGE CLAMP® technology for fast, vibration-proof and maintenance-free connections.

Communication Cables

The communication cables connect the RS-232 interface of the following devices to a PC or PLC RS-232 interface: power supplies with integrated LineMonitor (787-85x), ECBs (787-86x), UPS charger and controller (787-87x), power supply with integrated UPS charger and controller (787-1675). When combined with free software, users can easily set device parameters and perform diagnostics.

Overvoltage Protection

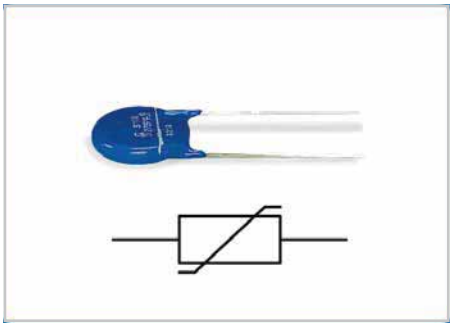
Overvoltage protection for increased safety and longer on-line operation

On-the-line overvoltages cause most operating failures for measuring, control, data and power lines. Failure of electronic and semiconductor components due to surges can cause operating interruptions. The overvoltage (also called transients) can be generated by switching electrical equipment on or off or by lighting discharges. Depending on the application, protective measures for systems and devices can be broken down into:

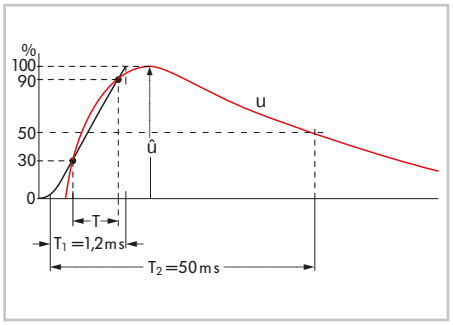
- Coarse protection
- Medium protection
- Fine protection

The boundaries between these levels of protection may not be sharply defined. To implement the appropriate protection measures, various components are used for discharging transient overvoltage, depending on the protection type. The following components have proven performance in these applications:

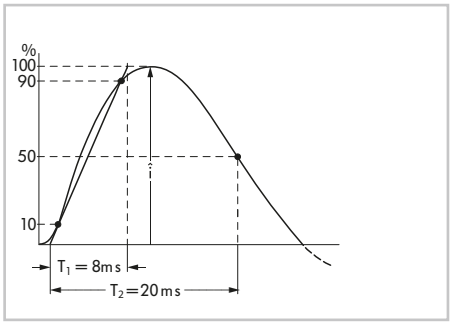
Varistor



A varistor is a voltage-dependent resistor, in which the resistance becomes low after their "nominal voltage" is exceeded and for the voltage range above it, and can thus cut off any overvoltages through high discharge currents. Varistors can age with continued surge conduction, resulting in lower impedance even in the lower voltage range. However, this normally only occurs when a varistor frequently discharges transients. In this case, they must be replaced and specific time intervals.

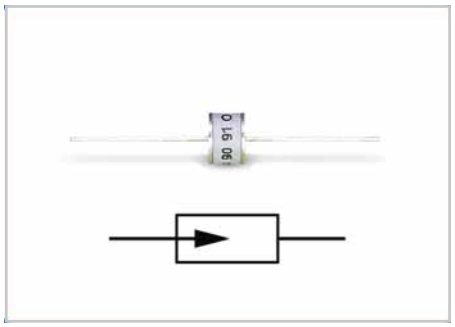


Voltage pulses 1.2/50
IEC 60060-1



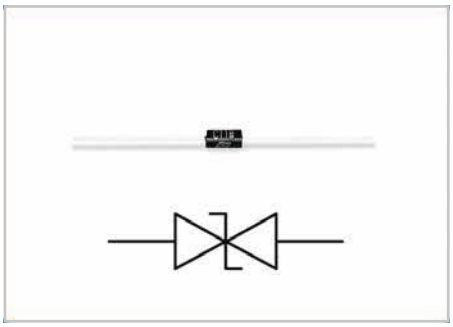
Current pulses 8/20
per EN 62475:2010

Gas-filled surge arrester



The gas filled surge arrester is comprised of two electrodes in a ceramic or glass tube filled with a pressurized inert gas.
Once the ignition voltage is reached, resistance drops due to ionization and current begins to flow. The resistance of the device drops from high to low as it conducts. The voltage across the device after the arc is struck is typically 10 ... 30 V. Therefore, the current will continue to flow until the voltage drops below this level. As this is not a guaranteed occurrence in typical power situations, a fuse must precede the device to ensure disconnection from the supply. This is always the case if the nominal voltage of the protected network is greater than 12 VDC and the nominal voltage of the power supply and the protected circuit is greater than 100 mA.

Suppressor Diode



Suppressor diodes have electrical characteristics similar to Zener diodes, but are rated for surge currents.
Once the rated breakdown voltage is exceeded (in the non-conductive direction), the diode becomes a conductor. The suppressor diode differs from a Zener in its higher current carrying capability and faster response time (in the picosecond range).

Test Impulse

Surge arresters are subject to standardized test pulses in order to classify capabilities; the effectiveness of protection measures with reference to dissipation capacity and voltage arresting. The form and level of the test pulses are defined by IEC 60060-1 and EN 62475:2010. Preference is given to voltage pulses of 1.2/50 and current pulses of 8/20.

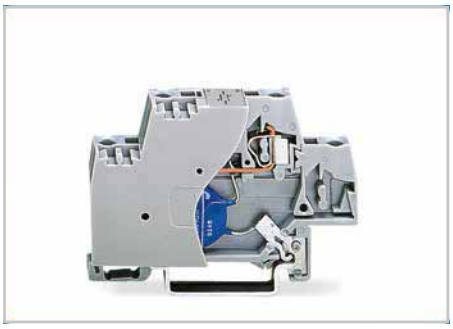
Application Recommendations

The advantages of gas-filled surge arresters lie in their high current carrying capacity, making them ideal for coarse protection. One disadvantage, particularly in the medium protection range, is the relatively long response time, as well as the power follow current.

Varistors have a considerably shorter response time; however they also have lower leakage currents. This makes them more suitable for medium protection as they offer limited applications for coarse protection.

If the connection lines of electronic equipment are already "fine" protected, general coarse and medium protection measures are sufficient. If this is not the case, suppressor diodes with a very short response time may be employed as fine protection. WAGO offers a complete range of modular terminal blocks with integrated surge arresters for coarse, medium and fine protection.

Depending on the application, one can choose the appropriate type from the previously mentioned surge arresters. These are electrically connected in the modular terminal blocks between the connection point and mounting rail. Snapping the terminal block onto the grounded (earthed) mounting rail automatically ensures the required overvoltage protection.



Double-deck terminal block, with varistor direct connection to DIN-35 rail

Frequently, only one surge arrester is fitted for cost reasons. However, due to the fact that one surge arrester alone cannot optimally ensure several protection functions, combinations are recommended. Care must be taken to ensure that the single-stage protection devices are decoupled sufficiently by inductors or resistors.

In addition to single-stage surge arresters, WAGO also offers multistage surge arresters, combining components for different applications. These pluggable modules are snapped into "carrier" terminal blocks. These are DIN rail-mounted and offer secure and maintenance-free CAGE CLAMP® terminations for conductors 0.08 mm2/28 AWG to 2.5 mm2/14 AWG.

Pluggable surge suppression modules with on-unit warnings

Interference suppression modules are a special category here.
In addition to overvoltage protection, a high frequency interference filter can be added to the circuitry. This filter cannot only protect the equipment from high frequency energy transmitted by connecting wires, but also prevents a transmission of disturbances to the supply lines. The main component of a filter is an LC network, which produces a mismatch between the filter impedance and the impedance of the disturbance path. This reflects any disturbance back to its source.

Definition of Several Important Technical Terms

Nominal Operating Voltage (U_{BN})

The nominal operating voltage corresponds to the voltage which may be permanently connected to the appropriate connection terminals of the overvoltage protection module. Alternating voltages are quoted as effective values.

Max. Operating Voltage (U_{Bmax})

The maximum operating voltage corresponds to the voltage which may be permanently connected to the appropriate connection terminals without the operating properties changing or activating the individual module's protection elements.

Nominal Current (I_N)

The nominal current corresponds to the current which may permanently flow through the connection terminals of the overvoltage protection device.

Nominal Discharge Current (I_{SN})

The nominal discharge current is the maximum value of a current having the 8/20 µs waveform, which can flow through the surge arrester five times within a time period of 30 seconds (VDE) without destroying it.

Max. Surge Current (I_{Smax})

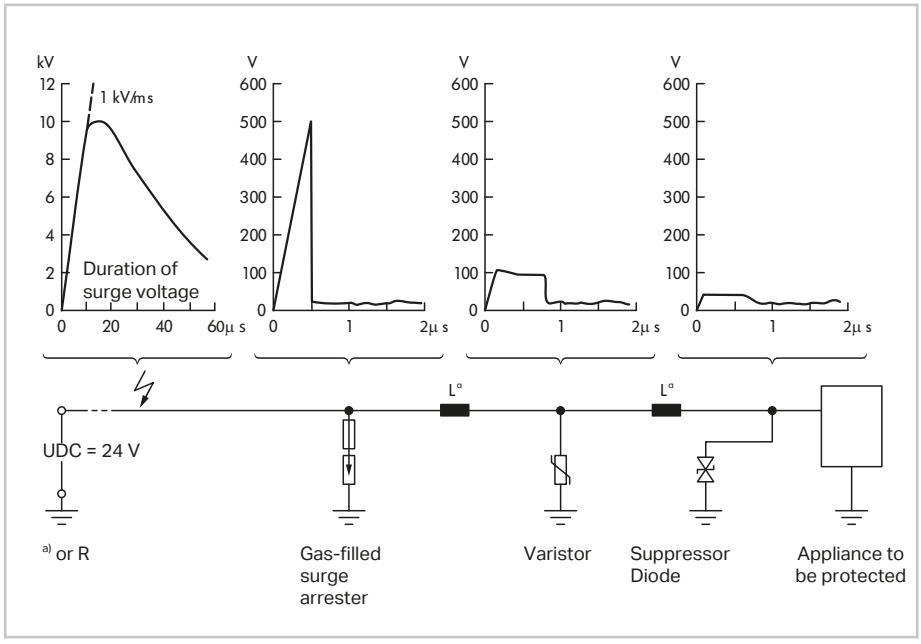
The maximum surge current I_{Smax} defines the maximum value of a current having the 8/20 µs waveform, which can flow through the surge arrester once without destroying it.

Protection Level (U_P)

The protection level is the value of the residual voltage occurring on the "protected" side of the surge arrester when applying the rated discharge current.

Response Time (t_{resp})

The response time is primarily based on the physical properties of the surge arresters and is dependent upon the wave front duration of the surge voltage. WAGO's data refers to a voltage rise 1kV/µs.

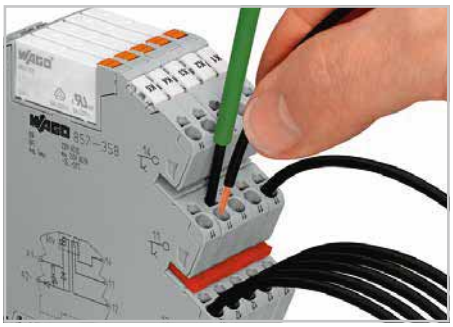


Function diagram of a multi-stage surge voltage protection module

Installation Notes

Relay and Optocoupler Modules, 859 Series

Inserting a conductor via screwdriver.



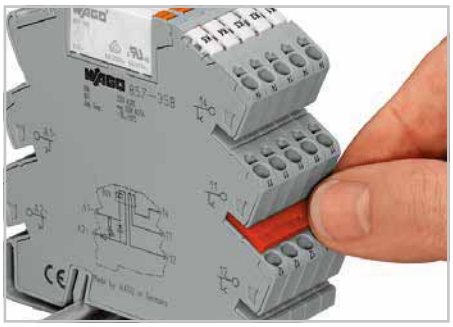
Easy commoning using adjacent jumpers.

Marking via Mini-WSB Quick Marking System.

Relay and Optocoupler Modules, 857 Series

Inserting a conductor via screwdriver.

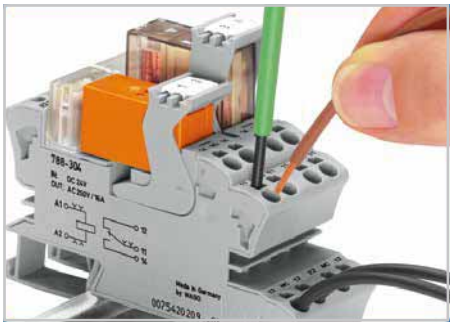
Removing a relay via ejector.



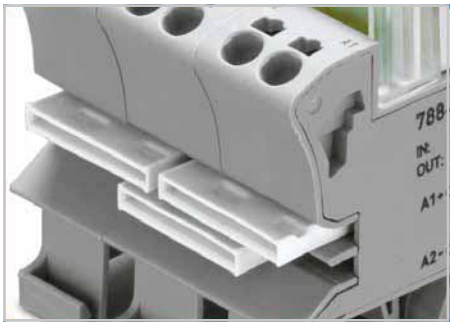
Easy commoning using adjacent jumpers.

Marking via WMB Multi Marking System.

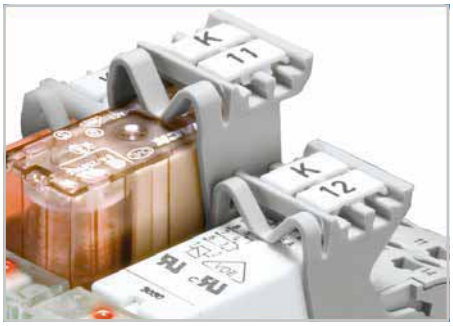
Sockets with a Miniature Switching Relay, 788 Series



Inserting a conductor via screwdriver.

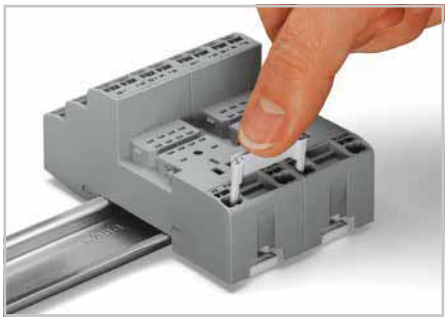


Easy commoning using adjacent jumpers.

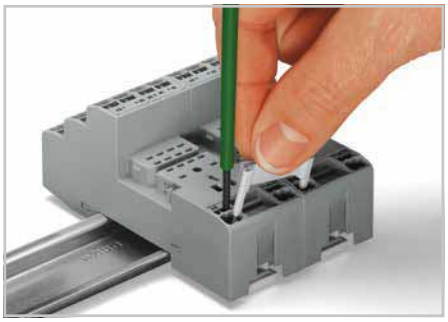


Marking using WMB Multi markers and group marker carriers.

Sockets with an Industrial Relay, 858 Series



Easy commoning using adjacent jumpers.

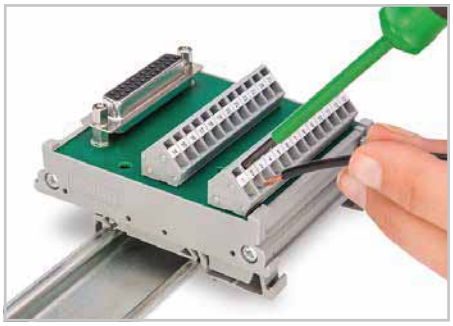


Removing a conductor via screwdriver.

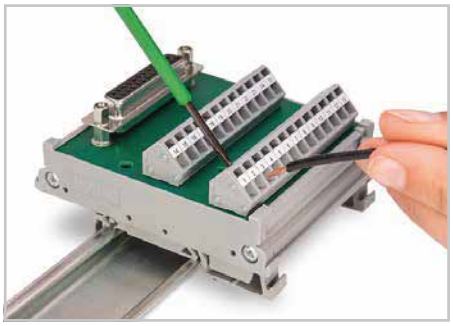
Marking using WMB Multi markers and group marker carriers.

Installation Notes

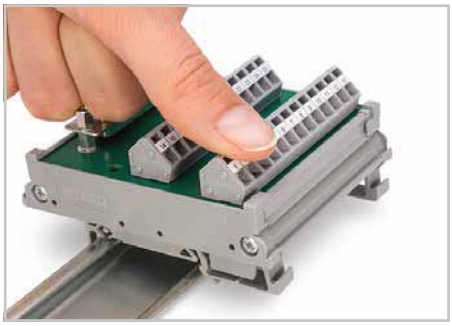
DIN-Rail-Mounted Interface Modules, 289 Series



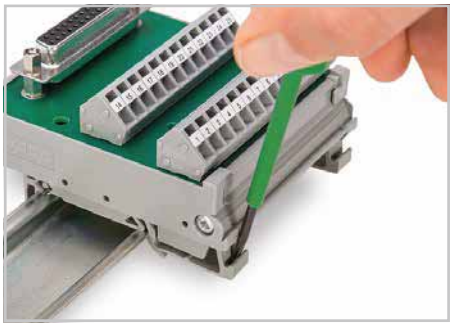
"Front-entry" conductor termination



"Side-entry" conductor termination

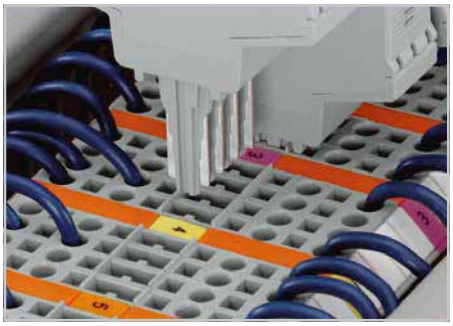


Snapping a module onto DIN-rail.



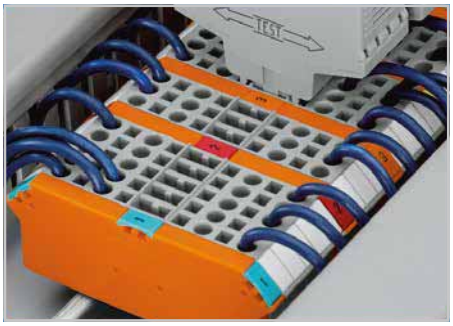
Removing a module from the DIN-rail.

Pluggable Function Modules for Carrier Terminal Blocks, 286 Series



Coding ensures correct polarity.

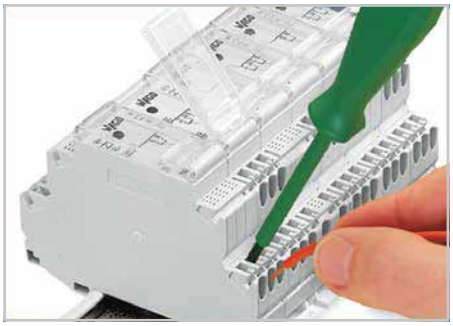
Pluggable electronic modules on 2- or 4-conductor carrier terminal blocks



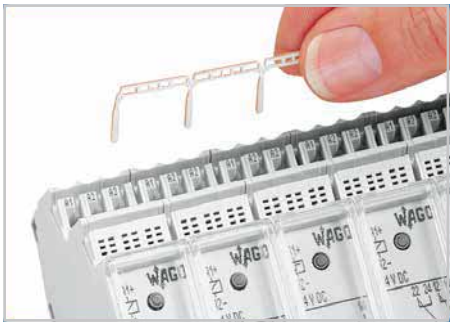
Marking via WMB Multi Marking System.

Function testing via touch-proof test slots.

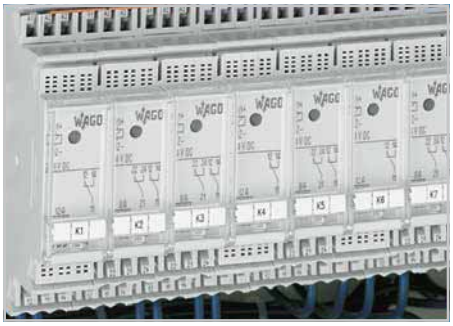
Relay Modules in a DIN-Rail Mount Enclosure, 789 Series



Inserting a conductor via screwdriver.

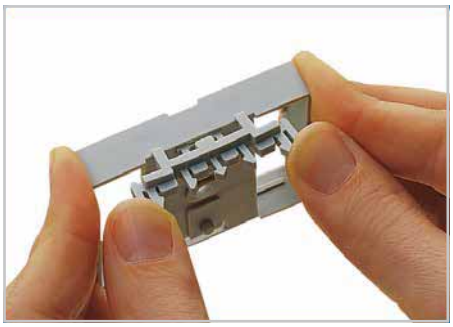


Easy commoning via adjacent jumpers.

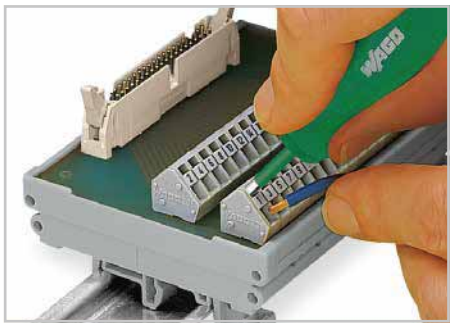


Marking via Mini-WSB Quick Marking System.

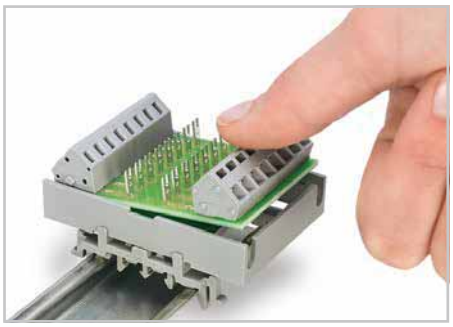
Interface Modules, 289 Series



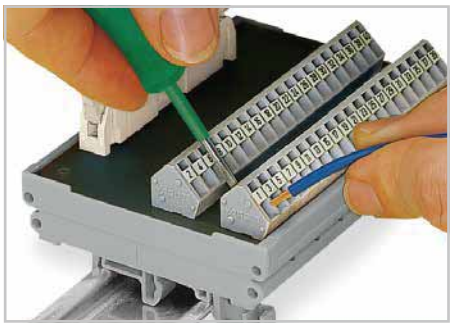
Mounting carrier, gray, snap-fit mounting of universal mounting feet



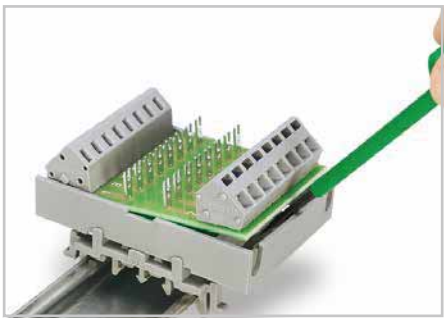
"Front-entry" conductor termination



Fitting an individual module to the mounting carrier.



"Side-entry" conductor termination



Removing an individual module from the mounting carrier.

Interface Modules, 289 Series

Product Support From

Consulting:

- Selecting fieldbus systems
- Using components
- Combining components
- Assistance in preparing your bid

Contact

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Email:	info@wago.com
Online:	www.wago.com

12

The Very Beginning...

Experience:

- Trained staff
- PLC
- Fieldbus systems
- Projects:
  - Automotive industry
  - Machine building
  - Chemical industry
  - Food processing
  - Building automation
  - Process engineering
  - Process control
  - and many more

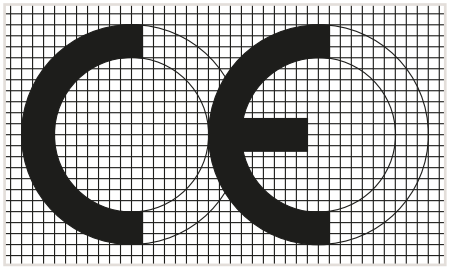
Support:

- Product documentation
- Manuals
- Application notes
- By telephone
- On-site

CE Marking and EC Directives

CE Conformity Marking:

The CE conformity marking consists of the characters "CE" with the following script:



Communauté Européenne
(European Community)

The CE conformity marking must be applied to all electrical equipment; should on-unit marking not be possible, mark the smallest packing unit. With this marking, manufacturers attest conformity of their products to relevant directives.

In addition to the CE marking, manufacturers provide an EC "Declaration of Conformity" for their products. This declaration of conformity must be retained and submitted to a national surveillance authority upon request.

EC directives are legally binding specifications for the European Union. Their goal is aligning legal and administrative specifications in the various EU member countries, in order to prevent trading hindrances arising from different national specifications.

In order to launch a product on the market, it must comply with the relevant directives. Several directives may apply for one single product, for example, EMC and low voltage directives.

Low Voltage Directive (LVD)
The safety of electrical equipment is guaranteed by the Low Voltage Directive. The LVD covers all electrical equipment operating with a voltage between 50 and 1000 VAC and between 75 and 1500 VDC. Products falling within the scope of the LVD that are designed in such a way that they can be used in other electrical devices and whose safety, for the most part, is dependent on how these components were built into the end product and what features the end product has are defined as basic components in accordance with the LVD. The LVD doesn't apply to basic components.

EMC Directive
The EMC Directive implies that a product must meet the limits of the radiated electromagnetic disturbance and also requires that a product must be immune to electromagnetic interference. Electromagnetic passive components or components with no direct function, like resistors, diodes, capacitors, switching relays or cables (in the form of passive printed circuit boards) are not considered as apparatus within the meaning of the EMC Directive.

Machinery Directive
The Machinery Directive does not apply to WAGO products.

Explosive Atmospheres Directive (ATEX)
Directive for devices and protective systems intended for use in hazardous locations.

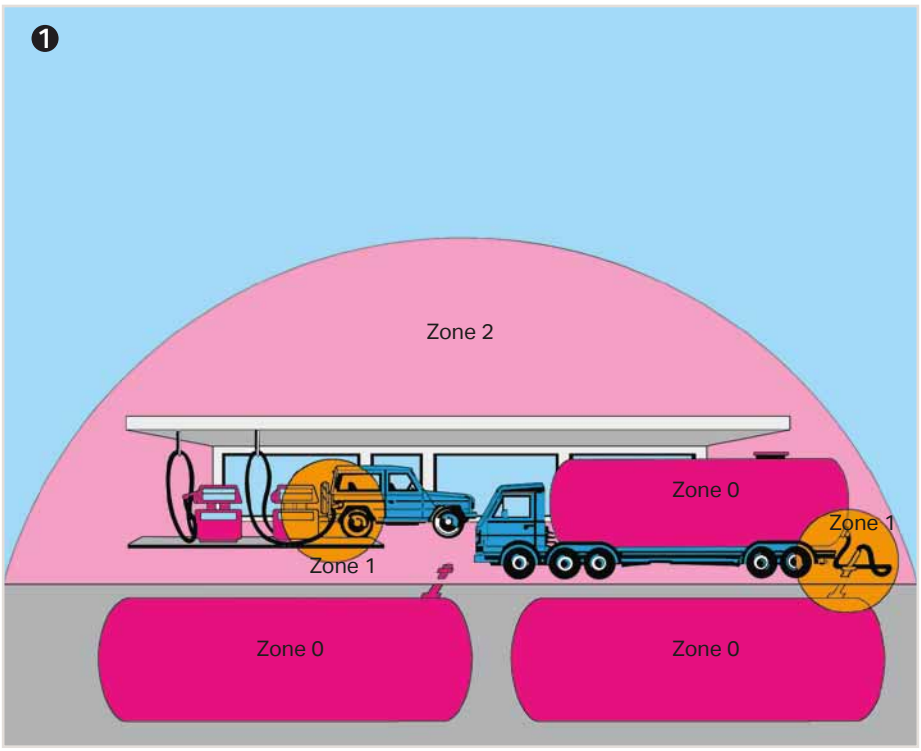
Radio Equipment Directive
A device or relevant component thereof, capable of communication by emitting and/or receiving radio waves utilizing the spectrum allocated to terrestrial/space radio communication, falls within the scope of the Radio Equipment Directive. As such, these devices and components are tested and labeled accordingly. This label implicitly includes both Low Voltage and EMC Directives, since the Radio Equipment Directive also encompasses the safety targets for both of these directives.

General Technical Information
for Electrical Equipment Used in Hazardous Areas

Hazardous Areas

Hazardous environments are areas in which the atmosphere may become explosive. An explosive atmosphere is a mixture of flammable substances in the form of gases, vapors or mixtures with air under atmospheric conditions in critically mixed ratios such that excessive high temperature, arcs or sparks may cause an explosion.

DIN EN 1127-1 and all other related standards that are commonly known divide up hazardous areas according to the likelihood of the occurrence of an explosive atmosphere into the following zones:



❶ Hazardous areas due to explosive gases, vapors and mists

Zone 0

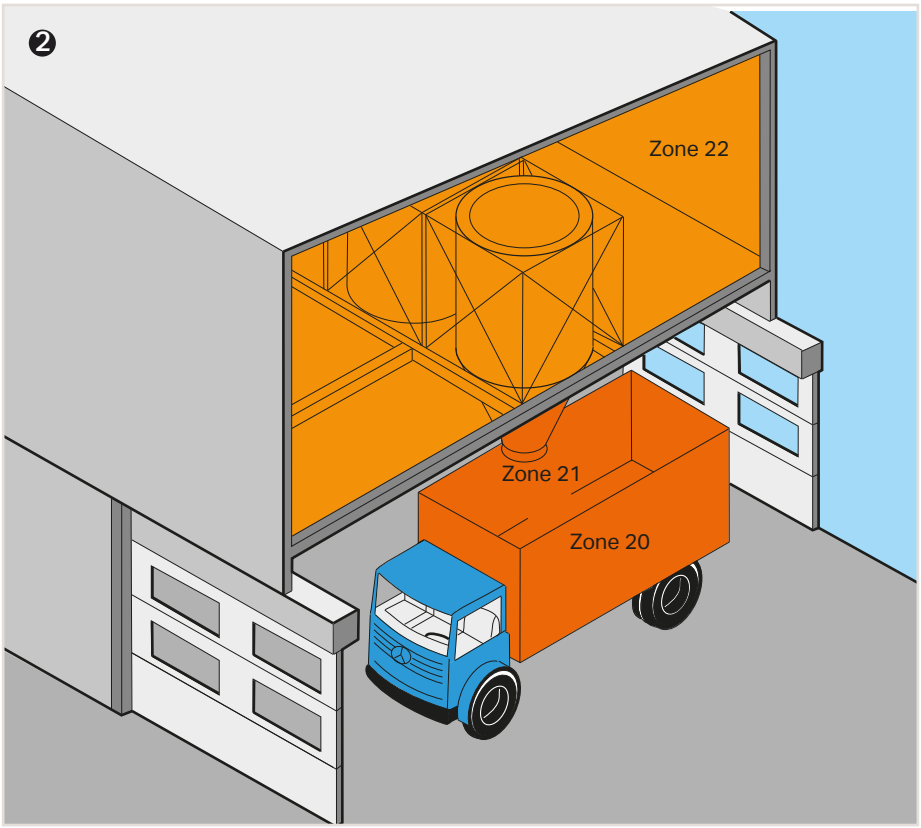
Areas in which an explosive atmosphere is present continuously, for long periods or frequently.

Zone 1

Areas in which an explosive atmosphere is likely to occur occasionally during normal operation.

Zone 2

Areas in which an explosive atmosphere is likely to occur rarely or only for a short period during normal operation.



❷ Hazardous areas due to explosive dust/air mixtures

Zone 20

Areas in which an explosive atmosphere due to dust/air mixtures is present continuously, for long periods or frequently and in which dust deposits of known or excessive thickness may form. Dust deposits alone do not constitute a Zone 20.

Zone 21

Areas in which the occurrence of an explosive atmosphere due to dust/air mixtures is to be expected occasionally and in which deposits or layers of combustible dust can generally be present.

Zone 22

Areas in which an explosive atmosphere due to dust/air mixtures is not likely to occur during normal operation and, if it occurs, will only exist for a short period, or in which accumulations or layers of combustible dust are present.

Please refer to the manuals for more information on explosion protection.

Electromagnetic Compatibility and Mechanical Strength
(Industrial and Residential Areas)

Immunity to Interference for Industrial Areas per EN 61000-6-2

Test Specification		Test Values	Evaluation Criteria *)
EN 61000-4-2	ESD	4 kV/8 kV (contact/air)	B
EN 61000-4-3	Electromagnetic fields	10 V/m: 80 MHz ... 1 GHz	A
		3V/m: 1.4 ... 2.0 GHz	A
		1V/m: 2.0 ... 2.7 GHz	A
EN 61000-4-4	Burst	1 kV/2 kV (data/supply)	B
EN 61000-4-5	Surge	Data: - / 1 kV (line : line – line : ground)	B
		DC supply: 0.5 kV / 0.5 kV (line : line – line : ground)	B
		AC supply: 1 kV / 2 kV (line : line – line : ground)	B
EN 61000-4-6	RF disturbances	10 V/m, 80 % AM (0.15 ... 80 MHz)	A
EN 61000-4-8	Magnetic field	30 A/m, 50/60Hz	A
*)	Criteria A: The device must work in accordance with the regulations during and after the test. Criteria B: The device must work in accordance with the regulations after the test.		

Emission of Interference for Residential Areas per EN 61000-6-3

Test Specification		Limit Values Quasi Peak	Frequency Range	Distance
EN 55016-2-1	AC supply, conducted	66 ... 56 dB(µV)	150 ... 500 kHz	
		56 dB(µV)	500 kHz ... 5 MHz	
		60 dB(µV)	5 ... 30 MHz	
EN 55016-2-1	DC supply/data line	79 dB(µV)	150 ... 500 kHz	
	conducted	73 dB(µV)	500 kHz ... 30 MHz	
EN 55016-2-3	radiated	30 dB(µV/m)	30 ... 230 MHz	10 m
		37 dB(µV/m)	230 MHz ... 1 GHz	10 m
EN 55022	Telecommunications/	84 ... 74 dB(µV)	150 ... 500 kHz	
	Mains connection, conducted	74 dB(µV)	500 kHz ... 30 MHz	

Emission of Interference for Industrial Areas per EN 61000-6-4

Test Specification		Limit Values Quasi Peak	Frequency Range	Distance
EN 55016-2-1	AC supply, conducted	79 dB(µV)	150 ... 500 kHz	
		73 dB(µV)	500 kHz ... 30 MHz	
EN 55016-2-3	radiated	40 dB(µV/m)	30 ... 230 MHz	10 m
		47 dB(µV/m)	230 MHz ... 1 GHz	10 m
EN 55022	Telecommunications/	97 ... 87 dB(µV)	150 ... 500 kHz	
	Mains connection, conducted	87 dB(µV)	500 kHz ... 30 MHz	

Mechanical Strength per EN 61131-2

Test Specification		Frequency Range	Limit Values
IEC 60068-2-6	Vibration	5 Hz ≤ f < 9 Hz	1.75 mm amplitude (permanently)
			3.5 mm amplitude (short term)
		9 Hz ≤ f < 150 Hz	0.5 g (permanent)
			1 g (short term)
		Note on vibration test:	
		a) Frequency change: max. 1 octave/minute	
		b) Vibration direction: 3 axes	
IEC 60068-2-27	Shock		15 g
		Note on shock test:	
		a) Type of shock: half sine	
		b) Shock duration: 11 ms	
		c) Shock direction: 3x in positive and 3x in negative direction for each of the three mutually perpendicular axes of the test specimen	

Electromagnetic Compatibility and Mechanical Strength (marine applications)

Immunity to Interference in the Shipping Industry per Germanischer Lloyd

Test Specification		Test Values	Evaluation Criteria *)
IEC 61000-4-2	ESD	6 kV / 8 kV (contact – air)	B
IEC 61000-4-3	Electromagnetic fields	10 V/m 80 MHz ... 2 GHz	A
IEC 61000-4-4	Burst	1 kV / 2 kV (data – supply)	A
IEC 61000-4-5	Surge	0.5 kV / 1 kV (line : line – line : ground)	A
IEC 61000-4-6	RF disturbances	10 V, 80 % AM (0.15 ... 80 MHz)	A
Type Test	AF disturbances (harmonics)	3 V, 2 W	A
Type Test	High voltage	755 VDC	-
		1500 VAC	-
*)	Criteria A: The device must work in accordance with the regulations during and after the test. Criteria B: The device must work in accordance with the regulations after the test.		

Immunity to Interference in the Shipping Industry per Germanischer Lloyd

Test Specification		Limit Values Quasi Peak	Frequency Range	Distance
Type Test	EMC 1, conducted (allows for ship bridge control applications)	96 ... 50 dB(µV)	10 ... 150 kHz	
		60 ... 50 dB(µV)	150 ... 350 kHz	
		50 dB(µV)	350 kHz ... 30 MHz	
Type Test	EMC 1, radiated	80 ... 52 dB(µV/m)	150 ... 300 kHz	3 m
	(allows for ship bridge control applications)	52 ... 34 dB(µV/m)	300 kHz ... 30 MHz	3 m
		54 dB(µV/m)	30 MHz ... 2 GHz	3 m
	except for:	24 dB(µV/m)	156 ... 165 MHz	3 m
Type Test	EMC 2, conducted (allows for machine room applications)	120 ... 69 dB(µV)	10 ... 150 kHz	
		79 dB(µV)	150 ... 500 kHz	
		73 dB(µV)	500 kHz ... 30 MHz	
Type Test	EMC 2, radiated	80 ... 50 dB(µV/m)	150 kHz ... 30 MHz	3 m
	(allows for machine room applications)	60 ... 54 dB(µV/m)	30 ... 100 MHz	3 m
		54 dB(µV/m)	100 MHz ... 2 GHz	3 m
	except for:	24 dB(µV/m)	156 ... 165 MHz	3 m

Mechanical Strength per Germanischer Lloyd

Test Specification		Frequency Range	Limit Values
IEC 60068-2-6	Vibration (category A, C)	2 Hz ≤ f < 13.2 Hz	±1.0 mm amplitude (permanent)
		13.2 Hz ≤ f < 100 Hz	0.7 g (permanent)
		Note on vibration test: a) Frequency change: max. 1 octave/minute b) Vibration direction: 3 axes	
IEC 60068-2-6	Vibration (category A-D)	2 Hz ≤ f < 25 Hz	±1.6 mm amplitude (permanent)
		25 Hz ≤ f < 100 Hz	4 g (permanent)
		Note on vibration test: a) Frequency change: max. 1 octave/minute b) Vibration direction: 3 axes	

Specifications and Test Results

The following standards apply to the design and application of the electrical components contained in this catalog:

DIN VDE 0100
Construction of high current installations with nominal voltages up to 1000 V

EN 50110-1
VDE 0105-1
Operation of electrical installations

IEC 61140
EN 61140
VDE 0140-1
Protection against electric shock – Common aspects for installation and equipment

IEC 60664-1
EN 60664-1
VDE 0110-1
Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests

IEC 60204-1
EN 60204-1
VDE 0113-1
Safety of machinery – Electrical equipment of machines – Part 1: General requirements

EN 50178
VDE 0160
Electronic equipment for use in power installations

IEC 62305-1
EN 62305-1
VDE 0185-305-1
Protection against lightning – Part 1: General principles

IEC 60060-1
HD 588.1 S1
VDE 0432-1
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UL Directives

UL 1059; ANSI 1059
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UL 486E
Equipment wiring terminals for use with aluminum and/or copper conductors

UL 508
Industrial control equipment

ANSI/ISA12.12.01
Nonincendive electrical equipment for use in Class I and Class II, Division 2 and Class III, Divisions 1 and 2 hazardous (classified) locations

Ship Classifications

ABS (American Bureau of Shipping)
Steel Vessels
Part 4: Vessel Systems and Machinery

BV (Bureau Veritas)
Rules for the classification of steel ships and offshore units

DNV (Det Norsk Veritas)
Det Norsk Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norsk Veritas' Offshore Standards: 2007

GL (Germanischer Lloyd)
Rules for Classification and Construction
VI Additional Rules and Guidelines
7 Guidelines for the Performance of Type Test
2 Test Requirements for Electrical/Electronic
Devices and Systems

LR (Lloyds Register)
Type Approval System
Test Specification Number1

RINA (Registro Italiano Navale)
Rules for the classification of ships
Part C – Machinery, systems and fire protection Ch.3, Sect.6, Table1

BSH (Federal Maritime and Hydrographic Agency)
Certificate on measurement of safe distance
to the standard magnetic and steering magnetic compass in accordance with ISO
R 695 and DIN EN 60945 Section 11.2

KR (Korean Register of Shipping)
List of approved Manufacturers And Type Approval Equipment; Pt.6, Ch.1, Sec.3 of the Rules for Classification, Steel Ships

NKK (Nippon Kaiji Kyokai)
Guidance for the approval and type approval of materials and equipment for marine use

PRS (Polski Rejestr Statkow)
Publication No.11/P
Enviromental Tests on Marine Equipment

Electrical Engineering Laboratory:
Product Safety for Our Customers

WAGO's Minden, Germany laboratory is an "accredited test lab for electrical and mechanical tests on terminal blocks and connectors, as well as for environment simulations."

Accreditation, as ISO/IEC 17011:2004 defines, is a third party-attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks.

Accreditation, according to DIN EN ISO/IEC 17025, is granted by the Deutsche Akkreditierungsstelle GmbH DAkkS (German Accreditation Office GmbH DAkkS). This national accreditation office, which was established by the German Federal Ministry for Economics and Technology (BMWi), certifies that our test laboratory is officially recognized as possessing the necessary expertise to conduct defined tests and types of tests independently and objectively.

Through obtaining the accreditation, the following objectives were achieved:

- Exceeding customer requirements
- Workflow optimization
- Clearly defined processes
- Clear organization and structure
- Greater transparency
- Consistent, high-quality laboratory testing
- Maximum traceability
- Traceable measurement results
- Sustainable quality awareness

High-Voltage Test

Visitor Center

Conductor Retention Force Testing

Vibration- and Shock-Resistance Testing

DAkkS
Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Beliehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichnerin der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung

Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

WAGO Kontakttechnik GmbH & Co. KG
Hansastraße 27, 32423 Minden

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

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Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 18.12.2014 mit der Akkreditierungsnummer D-PL-19704-01 und ist gültig bis 17.12.2019. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 5 Seiten.

Registrierungsnummer der Urkunde: **D-PL-19704-01-00**

Frankfurt am Main, 18.12.2014

Im Auftrag Dipl.-Ing. (FH) Ralf Egner
Abteilungsleiter

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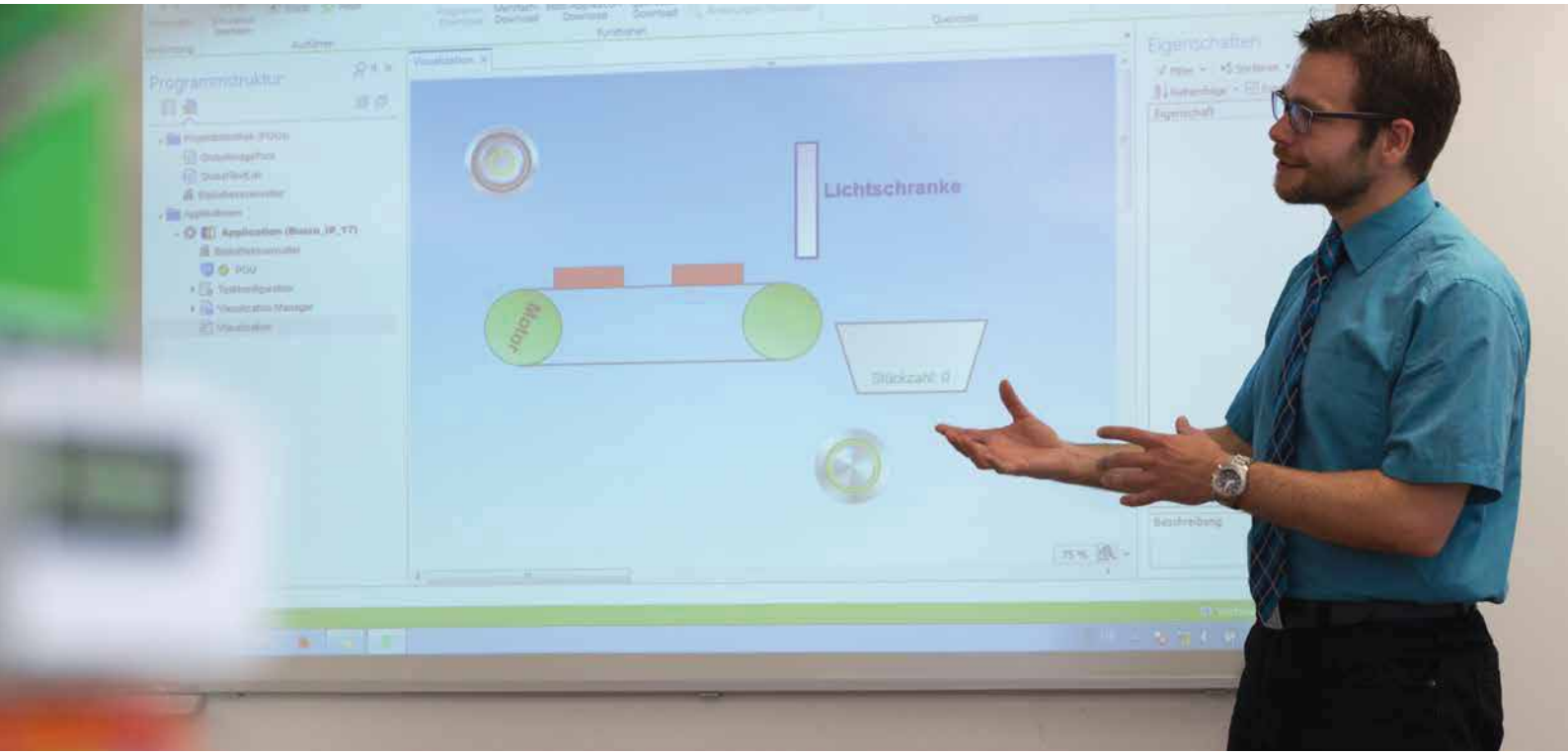

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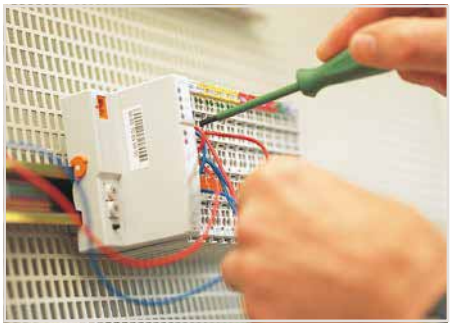

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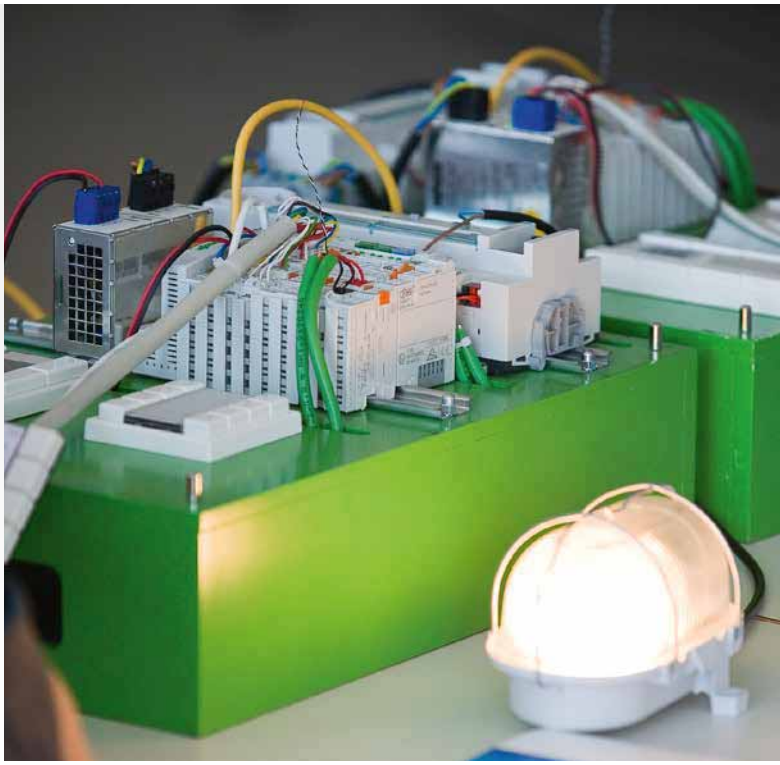

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Special Corporate Seminars

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