

Description

Wiring of load and signal lines in a space-saving manner will become ever more important for designers of electrical plants and systems, because all control cabinets and control boxes will have to be more and more compact due to the growing decentralisation of the entire automation technology. A significant cost reduction for the complete power distribution including wiring in the control cabinet will also play an important role.

The 18plus module holds a complete mounting and power distribution system for DIN rail mounting which has, together with the busbars, a fully-featured 80 A power distribution for the DC 24 and DC 48 voltage level without additionally required terminals and connection lines. It allows a cost-effective realisation of e.g. an 11-way protection system, because you only have to plug in the 11 required 2210-S, ESS30 or ESX10 circuit breakers or protectors into the ready slots of the connection modules. Each connection module can be operated with max. 20 A load current.

The signalling circuits of the individual devices for the group signalling by means of an integral auxiliary make contact are already pre-wired in this system. Line entry of the DC 24 V / DC 48 V supply for LINE+, 0 Volt and functional earth FE is by means of plug-in type busbars. If no FE potential is supplied, all FE terminals may also be used as additional 0-Volt distribution.

All electrical connections are made by means of push-in terminals with the following properties:

- All conductors can be plugged in easily and without tools
- Reliable contact making
- Firm connection of the conductors due to high pull-out forces
- Facilitated operation with any tool
- Contact reliability in the event of shock and vibration
- Gas-tight connection
- Maintenance-free

All pushers were designed in four different colours (red, blue, orange, grey) so as to easily distinguish the different voltage potentials and functions of the device.

Red =	conductor: supply 24 V/48 V/LINE+ or protected load output/LOAD+	
Blue =	return conductor: supply 0 Volt	or load/0 Volt
Orange =	functional earth supply FE	or load/FE
Grey =	signalling circuits:	
	supply 24V/terminal 13	or signal output terminal 14, LED load terminal 17

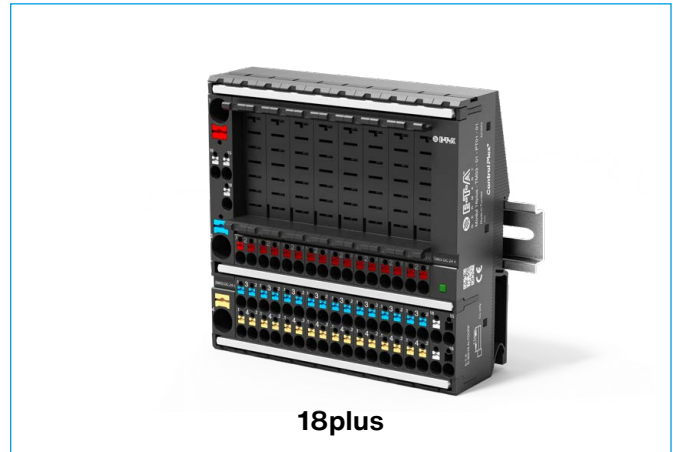
The 18plus module can be used in combination with the following plug-in type overcurrent protection devices:

- **Thermal-magnetic circuit breaker 2210-S**
- **Electronic circuit breakers ESS30-S003**
- **Electronic circuit protectors ESX10-103, ESX10-S103**

The 18plus module consists of three different basic modules:

- **18plus-EM-... supply module**
terminal 1 (LINE +), terminal 3 (0 V), terminal 4 (FE)
terminal 13 (aux. contact input)
- **18plus-AM-... connection module**
terminal 2.1/2.2 (LINE +), terminal 3.1/3.2 (0 V), terminal 4.1/4.2 (FE)
- **18plus-SM-... signalling module**
terminal 14 (aux. contact output)
terminal 17 (GND for integral signal load 10mA with LED indication)

The 18plus-AM connection module has been designed to accommodate single pole circuit breakers and other overcurrent protection devices. Those will be plugged into the 18plus-AM connection modules. The single-way AM modules can be mounted side by side, enabling bigger distribution systems with up to 30 slots. Each AM module is fitted with 4 mm² push-in terminals for double connection of DC 24 V / DC 48 V loads via L+, 0V and FE, the max. load current is 20 A per slot.



By mounting the individual 18plus-AM connection modules side-by-side, all internal wiring connections are established for the group signalling. The make contacts of the plugged in electro-mechanical or electronic circuit breakers are connected in series on this occasion. In addition, a 10 mA load is included in the 18plus-SM signalling module holding a green LED indication. This also enables the connection of PLC or ET200 inputs with a high internal resistance value.

18plus module fitted with 2210-S:

The integral auxiliary contact (make contact) of the thermal-magnetic 2210-S circuit breakers can be used for the group signalling. All required terminals (make contacts opening in the event of a failure) in the 18plus module are connected in series for this purpose. Group signalling is realised via terminal 13 integrated in the supply module, the signal output is located in the 18plus-SM signal module, terminal 14. An additional signal load of 10 mA can be realised via the 0 V terminal of the control at terminal 17.

18plus module fitted with ESS30-S003:

The 0 V reference potential of the 18plus-AM connection module for the ESS30-S is already directly connected to the 0 V potential of the 18plus-EM supply terminal and is then looped through to the next AM element over the blade terminals on the side. This means: The side-by-side mounting (plug together) of the individual AM modules simultaneously establishes all internal wirings for the 0 V potential and for the group fault indication (series connection of make contacts).

The ESS30-S003 has an integral auxiliary contact (change over contact). The SC-S0 contact is used for the group fault indication. For this purpose the contacts for this signalling are already connected in series in the 18plus modules. These are connected via two terminals – 13 (supply in 18plus-EM) and 14 (output in 18plus-SM).

18plus module fitted with ESX10-103/ESX10-S103:

The 0 V reference potential of the 18plus-AM connection module for the ESX10-103 or the ESX10-S103 is already directly connected to the 0 V potential of the 18plus-EM supply terminal and is then looped through to the next AM element over the blade terminals on the side. This means: The side-by-side mounting (plug together) of the individual AM modules simultaneously establishes all internal wirings for the 0 V potential and for the group fault indication (series connection of make contacts).

The ESX10-103 or ESX10-S103 have an integral auxiliary contact (change over contact). The SC-S0 contact is used for the group fault indication. For this purpose the contacts for this signalling are already connected in series in the 18plus modules. These are connected via two terminals – 13 (supply in 18plus-EM) and 14 (output in 18plus-SM).

Technical Data

Plug-in type circuit breakers	2210-S; ESS30-S003; ESX10-103; ESX10-S103;
Rated voltage	DC 24 V; 10 V...30 V DC 48 V; 10 V...60 V (without signal path max. DC 24 V) Observe the voltage specifications of the protective device
Rated insulation voltage	AC 250 V
Main circuit, rated current I_N	
supply module	80 A (IEC 60947-7-1) 65 A (UL1059)
connection module	20 A (IEC 60947-7-1) 16 A (UL1059)
Signal circuits, rated current I_N	
min. current (terminals 13 – 14)	min. 10 mA at DC 10 V
max. current	max. 1 A at DC 24 V
integral current load (terminals 13 – 17)	typically 12 mA at DC 24 V
Busbar for power distribution	
insulated busbar	I_{max} 80 A (65 A UL 1059)
Ambient temperature	-30 °C ... +60 °C
Installation temperature	+5 °C ... +60 °C
Storage temperature	-40 °C ... +70 °C
Mounting position	as desired
Creepage resistance	PTI 600
Mounting	symmetrical rail EN 50022-35x7.5 symmetrical rail EN 50022-35x15/1.5
EM supply module	
terminals (1; 3; 4)	push-in terminal PT 16 0.5 – 16 mm ² ; rigid (without) wire end ferrule* 20 – 6; AWG 0.5 – 16 mm ² ; flexible (without) wire end ferrule* 20 – 6; AWG 0.5 – 16 mm ² ; flexible with wire end ferrule* without plastic sleeve 0.5 – 16 mm ² ; flexible with wire end ferrule* with plastic sleeve
terminals (13; 15; 16)	push-in terminal PT 4 0.2 – 6 mm ² ; rigid (without) wire end ferrule* 24 – 12; AWG 0.2 – 4 mm ² ; flexible (without) wire end ferrule* 24 – 12; AWG 0.25 – 4 mm ² ; flexible with wire end ferrule* without plastic sleeve 0.25 – 4 mm ² ; flexible with wire end ferrule* with plastic sleeve
AM connection module	
terminals ferrule* (2.1; 2.2; 3.1; 3.2; 4.1; 4.2)	push-in terminal PT 4 0.2 – 6 mm ² ; rigid (without) wire end ferrule* 24 – 12; AWG 0.2 – 4 mm ² ; flexible (without) wire end ferrule* 24 – 12; AWG 0.25 – 4 mm ² ; flexible with wire end ferrule* without plastic sleeve 0.25 – 4 mm ² ; flexible with wire end ferrule* with plastic sleeve

Technical Data

SM signalling module	push-in terminal PT 4 0.2 – 6 mm ² ; rigid (without) wire end ferrule* 24 – 12; AWG 0.2 – 4 mm ² ; flexible (without) wire end ferrule* 24 – 12; AWG 0.25 – 4 mm ² ; flexible with wire end ferrule* without plastic sleeve 0.25 – 4 mm ² ; flexible with wire end ferrule* with plastic sleeve
Wire stripping length	
Push-in terminal PT 16	18 mm
Push-in terminal PT 4	11 mm
Insulation co-ordination (IEC 60664-1)	
Main circuit	rated impulse voltage 4kV pollution degree 3 Overvoltage category III
Auxiliary circuit	rated impulse voltage 0,8 kV pollution degree 3 Overvoltage category III
Dielectric strength	
Main circuit to main circuit	1500 V
Main circuit to auxiliary circuit	1500 V
Auxiliary circuit to auxiliary circuit	1500 V
Insulation resistance	> 100 MΩ (DC 500 V)
Typical internal resistance values	
Main circuit (EM1 – AM2.1/2.2);	without device 5 mΩ
Auxiliary circuit (1 x EM, 4 x AM, 1 x SM); (13 – 14 / make contact)	without device 60 mΩ; (+5 mΩ for each added AM)
Typical mounting values (circuit breaker)	
Typical push-in force	approx. 130 N
Typical pull-out force	approx. 150 N
Number of push-on operations	
devices	50
busbar	20
Mass	
18plus EM	approx. 70 g
18plus AM	approx. 60 g
18plus SM	approx. 45 g
Vibration (sinusoidal)	
test to IEC 60068-2-6, test Fc	5 g (57-500Hz), ± 0,38 mm (10-57 Hz)
Shock	
test to IEC 60068-2-27, test Ea	25 g (11 ms)
Humidity	
test to IEC 60068-2-78, test Cab	240 hrs. in 95 % RH
Corrosion	
Test to DIN IEC 60068-2-11, test Ka	96 hours in 5 % salt mist

*) Application note: We recommend a square crimp shape when using wire end ferrules.

Approvals

Approval authority	Standard	File-Certificate Nr.	Rated voltage
UL	UL1059, CSA C22.2, No. 158	E335289 V1 S3	65 A / 16 A / 1 A (signal)

CE logo

CE logo according to EN 60947-7-1

Features and Benefits

- Complete mounting and power distribution system for rail mounting
- Together with the busbars it holds a fully-fledged 80 A potential distribution of the DC 24 V / DC 48 V control voltage without additionally required connection terminals or connecting cables
- All electrical connections are implemented via screwless push-in terminals. All pushers were designed in four different colours (red, blue, orange, grey) so as to easily distinguish the different voltage potentials and functions of the device.

Supply terminals PLUS connecting terminals PLUS signalling terminals

PLUS integral wiring harness PLUS flexible circuit breaker population ...

... mutually complete their effects

- Modular compact power distribution system for rail mounting as a complete package
- Load wiring with integral terminals without additional potential distribution
- Plug-in type overcurrent protection for all requirements in the DC 24 V / DC 48 V area
- Integral power distribution up to 80 A
- Integral group signal wiring, make contacts
- Future bus connection for **ControlPlex**® applications
- Push-in terminals for reliable wiring, even with shock and vibration

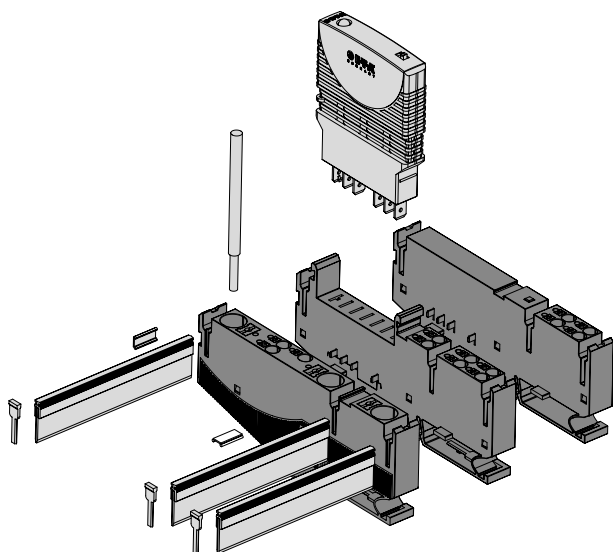
User benefits

- Saves component costs for wiring and for additional parts because the cable harness and the potential distribution are already included
- Reduces costs through facilitated electrical planning, easy mounting in system and plant service and easy procurement etc.
- Perfectly matches centralised and decentralised power distribution concepts
- Saves expenses in logistics through use of only few, standardised components
- High application flexibility through population with different circuit breaker models

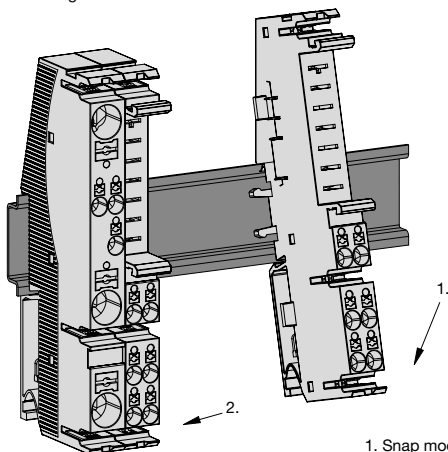
Available versions

18plus-EM02-00-PT01-01	18plus supply module, compact version with group signalling make contact
18plus-AM02-00-PT01-01	18plus connection module for 2210-S, ESS30-S003, ESX10-103/ESX10-S103 circuit breakers, compact version with group signalling make contact
18plus-SM02-01-PT01-01	18plus signalling module for compact version with group signalling make contact, with integral 10 mA signal load
18plus-SM00	18plus spacer / empty housings

Mounting

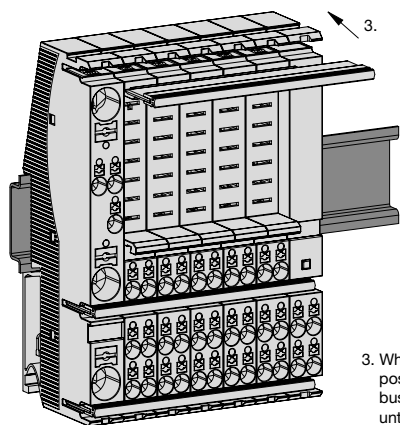


Mounting the modules:



1. Snap module onto rail
2. Push modules on the rail until they catch on audibly

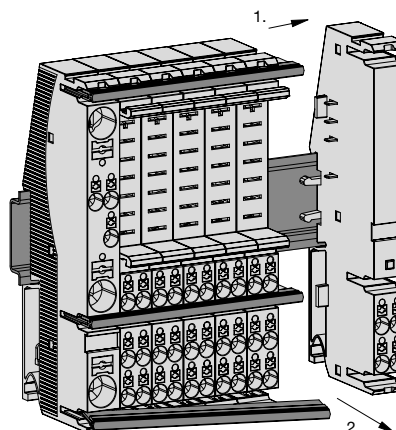
Mounting the busbars:



3. When all modules are positioned correctly, insert busbars in correct position until stop

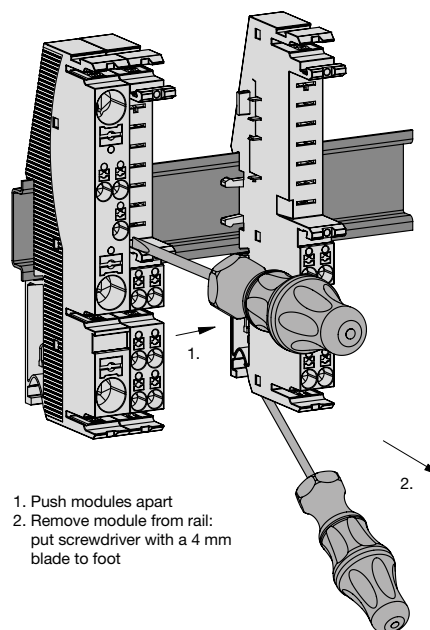
Disassembly

Removing the busbars:



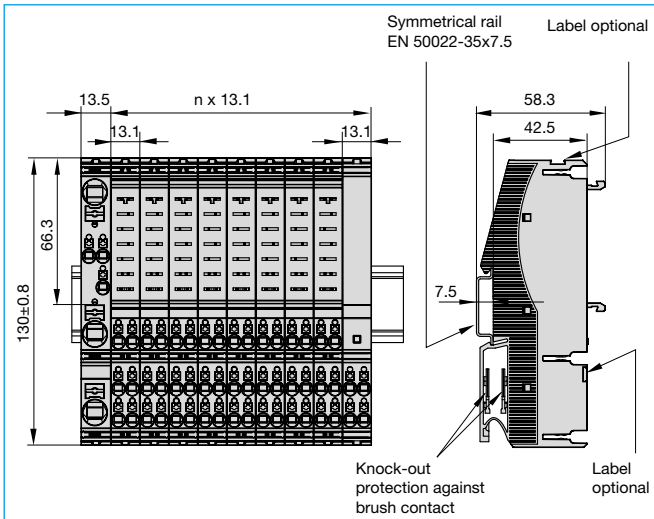
1. Push away signalling module to remove busbar
2. Pull busbar out of the groove

Removing the modules:

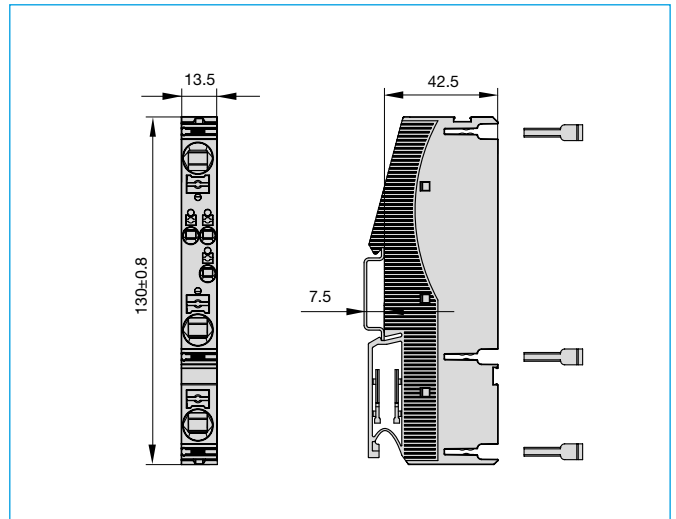


1. Push modules apart
2. Remove module from rail: put screwdriver with a 4 mm blade to foot

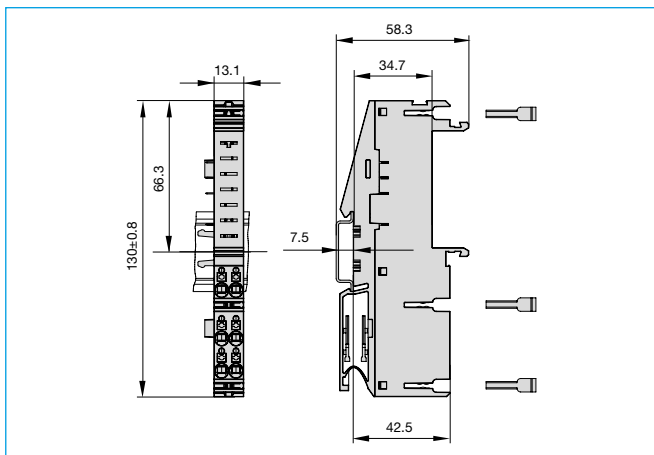
Dimensions of socket system



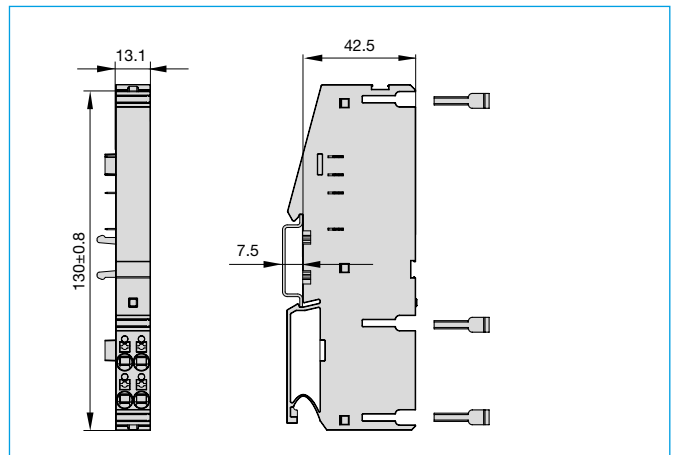
Dimensions EM



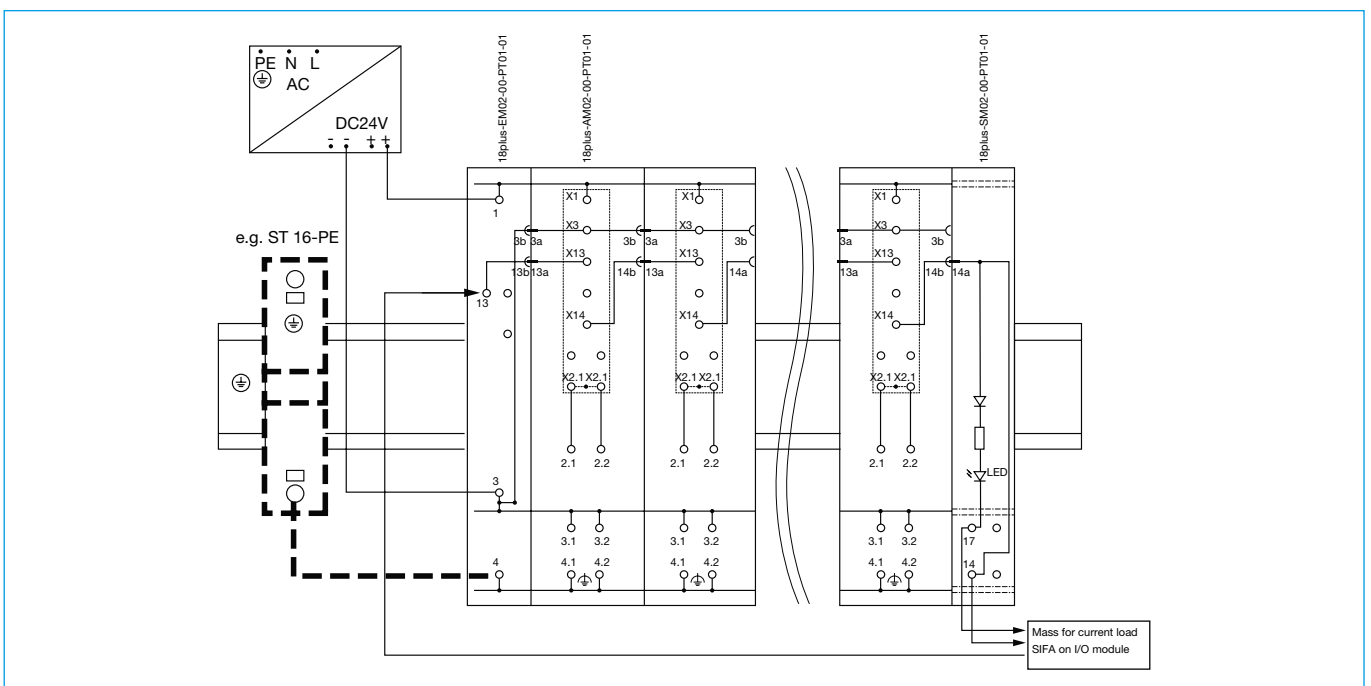
Dimensions AM



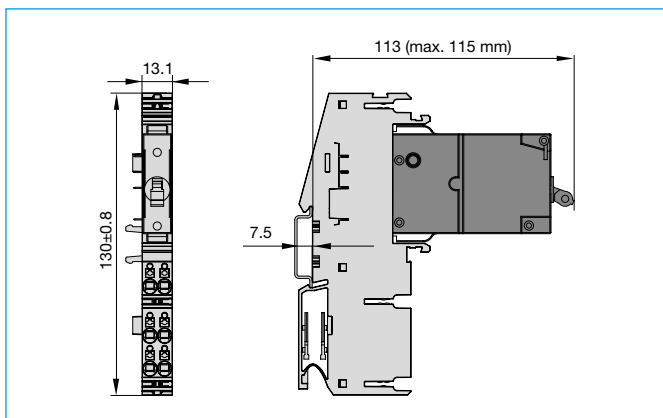
Dimensions SM



Wiring diagram, without circuit breakers



Dimensions, with 2210-S

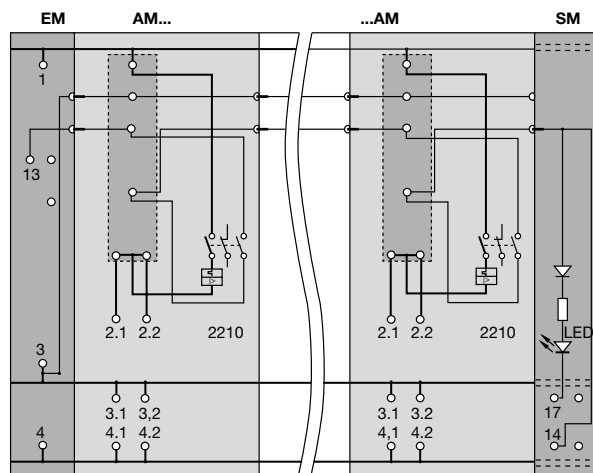


Pin assignment, with 2210-S

2210-S.. 18plus module compact

2	X1	
12 (n.a.)	X3	
24	X13	
23	X14	
11 (n.a.)		
1	X2.1, X2.2	

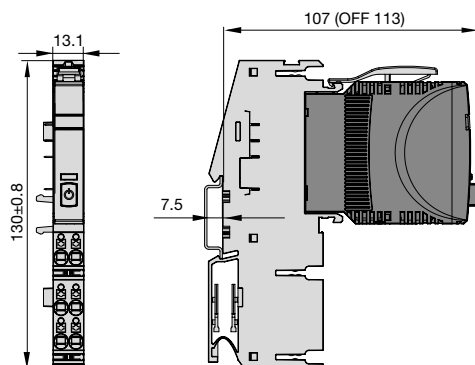
Schematic diagram, with 2210-S



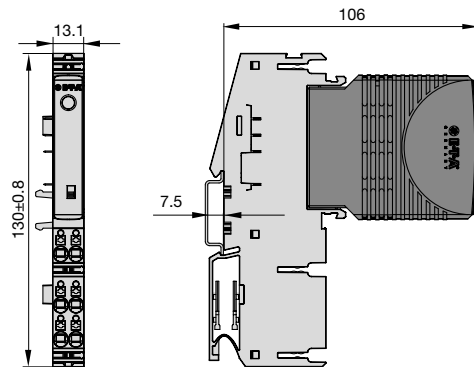
EM		SM	
1	line	14	signalling
3	0 Volt	17	load 24 V / 10 mA
4	FE		
13	signalling		
AM			
2.1, 2.2	load		
3.1, 3.2	0 Volt		
4.1, 4.2	FE		

Dimensions, with ESS30-S003

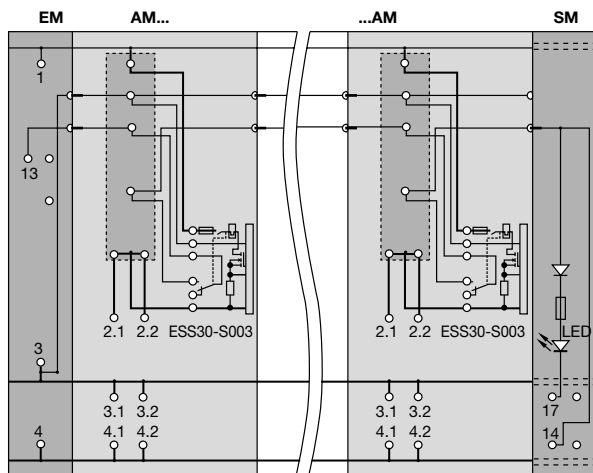
With optional retaining clip:



Dimensions, with ESX10-103 / ESX10-S103

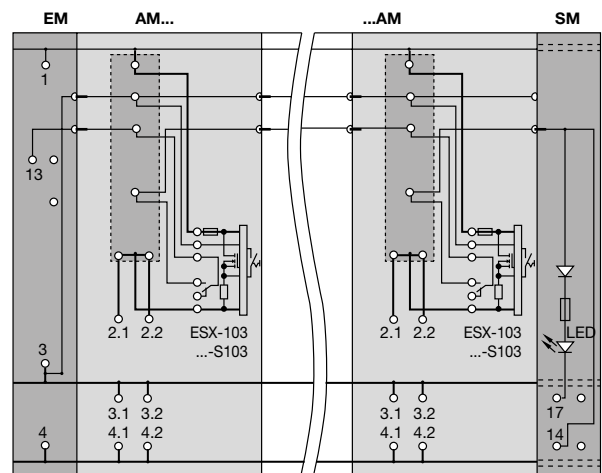


Schematic diagram, with ESS30-003



EM		SM	
1	line	14	signalling
3	0 Volt	17	load 24 V / 10 mA
4	FE		
13	signalling		
AM			
2.1, 2.2	load		
3.1, 3.2	0 Volt		
4.1, 4.2	FE		

Schematic diagram, with ESX10-103 / ESX10-S103



EM		SM	
1	line	14	signalling
3	0 Volt	17	load 24 V / 10 mA
4	FE		
13	signalling		
AM			
2.1, 2.2	load		
3.1, 3.2	0 Volt		
4.1, 4.2	FE		

Pin assignment, with ESS30-S003

ESS30-S003 18plus module compact

LINE (+)	X1
GND	X3
SC	X13
SO	X14
SI (n.a.)	
LOAD (+)	X2.1, X2.2



Pin assignment, with ESX10-103 / ESX10-S103

ESX10-103 18plus module compact

LINE (+)	X1
GND	X3
SC	X13
SO	X14
SI (n.a.)	
LOAD (+)	X2.1, X2.2



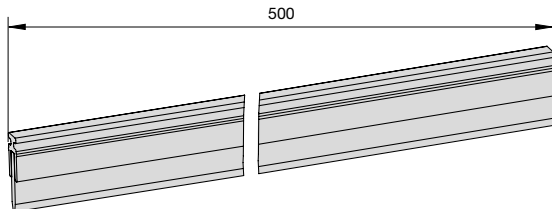
Accessories

Busbar

X 222 611 02 busbar for LINE, 0 V, FE, grey insulation, 500 mm

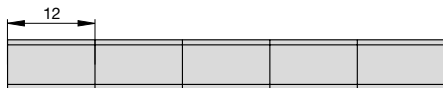
FTG-Busbar

X 223 571 01 busbar for LINE, 0 V, FE, grey insulation, 500 mm



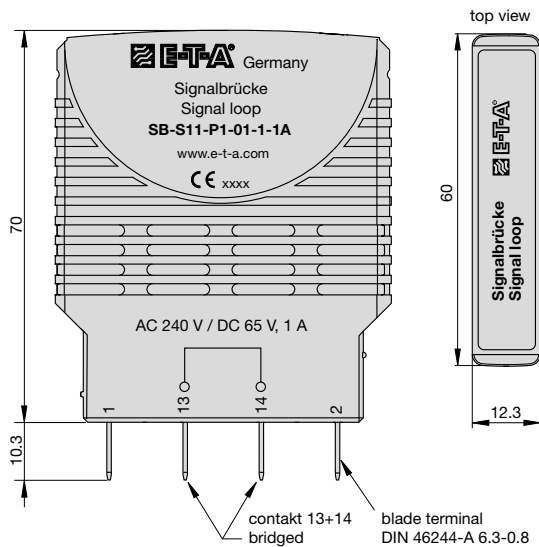
X 222 977 50

white marking label, unmarked, packaging unit = 50 pcs, (10 strips, 1 strip consists of 5 labels)

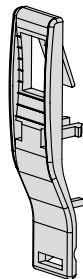


Jumper

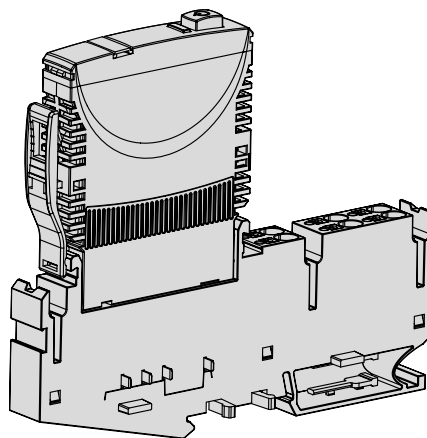
SB-S11-P1-01-1-1A



Retaining clip Y 311 978 01

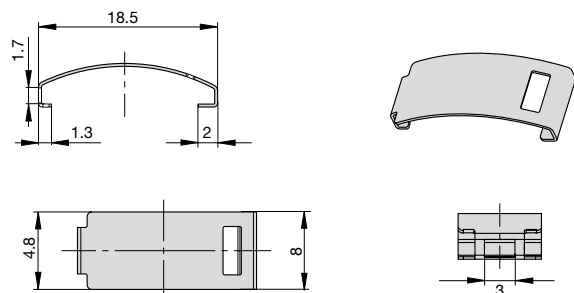


Installation example with ESS30-S with optional retaining clip



Retaining clip Y 307 754 01

Retaining clip for ESS20 / ESX10 / SB-S11-P1-01-1-1A



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