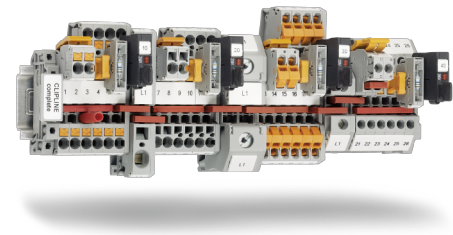


Terminal blocks

Notes for the installation of terminal blocks from Phoenix Contact



Application note
108769_en_05


© Phoenix Contact 2023-08-31

1 Description

This document provides an overview of the installation of terminal blocks from Phoenix Contact.
It describes how to connect copper conductors.
Please also observe the notes printed on the product and the instructions supplied.

Table of contents

1	Description	1
2	Requirements on personnel.....	2
3	Mounting terminal blocks.....	2
4	Installing terminal blocks.....	2
4.1	Screw connection	3
4.2	Spring-cage connection.....	3
4.3	Push-in connection	4
4.4	Push-X connection	4
4.5	Fast connection	5
4.6	PowerTurn connection.....	5
4.7	Bolt connection.....	6
4.8	Barrier connection	6
4.9	Spade connection.....	7
5	Distributor terminal block.....	7
6	Fuse terminal blocks.....	8
7	Accessories	10
7.1	Bridges	10
7.1.1	Plug-in bridges (FBS...)	10
7.1.2	Insertion bridges (EB...).....	10
7.1.3	Chain bridge (KB...).....	11
7.1.4	Fixed bridge (FBI...).....	11
7.1.5	Step bracket (STL...)	11
7.2	Disconnect points and connectors.....	11
7.3	Test adapters.....	11

 Make sure you always use the latest documentation.
It can be downloaded at phoenixcontact.net/products.

2 Requirements on personnel

Only electrically qualified personnel may install and operate terminal blocks.

The qualified personnel must be familiar with the basics of electrical engineering. They must be able to recognize and prevent danger.



This symbol on the packaging indicates that only personnel familiar with electrical engineering is allowed to install and operate the device.

3 Mounting terminal blocks

- When mounting terminal blocks side by side, ensure that the required air clearances and creepage distances are observed. This is particularly important if different sizes or series are mounted side by side.
- Install terminal blocks and accessories in suitable housings. Observe the specifications for touch protection.

DIN rail mounting

- Mount an end bracket onto the DIN rail.
- Snap on the terminal blocks.
- Place terminal blocks with clamp foot onto the DIN rail with the tensioning screw loosened. Tighten the screw to the specified torque.
- For optical or electrical separation, partition plates or covers can be snapped on between the terminal blocks.
- When the terminal blocks are mounted side by side, fit the corresponding cover to the end terminal block with the open half of the housing.
- Finally, snap on another end bracket.

Direct mounting

Some terminal block ranges can be directly screwed to a mounting surface via flanges or securing pins.

- Use suitable screws to secure terminal blocks with flanges on the intended mounting surface.
- For terminal blocks with an open half of the housing, fit the corresponding cover and flange to the end terminal block.

4 Installing terminal blocks

Only use accessories and tools recommended by Phoenix Contact.

Observe the corresponding technical data.

You will find information:

- On the product
- On the packing label
- In the supplied documentation
- On the web at phoenixcontact.net/products under the product
- Packing slips and application notes for the Ex area can be found in the product download area at phoenixcontact.net/products.
- In the catalog

Defective terminal blocks

- Only operate properly working terminal blocks.
- Immediately decommission defective terminal blocks.
- Replace damaged terminal blocks. Repairs are not possible.

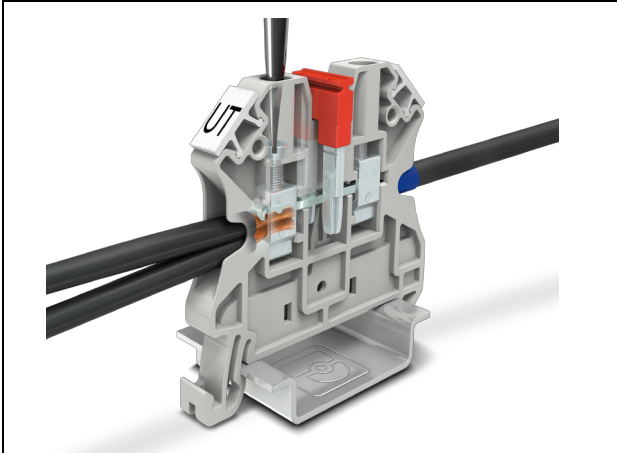
4.1 Screw connection

Series

DIK...	SSK...	UKH...	UT...
MUT...	STU...	UK...	UTI...
			UTME...

Example

Figure 1 Screw connection



Connecting conductors

- Strip the conductors to the specified length.
- Flexible conductors can be fitted with ferrules.
Crimp the ferrules using crimping pliers. Ensure that the test requirements in accordance with DIN 46228-4 are met.
The length of the ferrule corresponds to the stripping length of the conductor.
- Insert the conductors into the terminal points as far as they will go.
- Tighten the screws of all terminal points. Observe the specified torque.
We recommend to also tighten the terminal points of terminal blocks that are not used.
- If you want to connect more than one conductor per terminal point, check the specifications regarding the connection capacity. The specifications apply to the connection of two conductors of the same cross-section and the same conductor type.
- To open the terminal point and remove the conductor, release the terminal screw.

4.2 Spring-cage connection

Series

MSB...	MZFK...	STIO...	ZDIK...
MSBV...	ST...	STME...	ZVIOK...
MSDB...	STI...	STU...	

Example

Figure 2 Spring-cage connection



Connecting conductors

- Strip the conductors to the specified length.
- Flexible conductors can be fitted with ferrules.
Crimp the ferrules using crimping pliers. Ensure that the test requirements in accordance with DIN 46228-4 are met.
The length of the ferrule corresponds to the stripping length of the conductor.
- Push a screwdriver into the angular actuation shaft to open the terminal point.
Use a suitable bladed screwdriver. For tool recommendations, please refer to the accessories.
- Insert the conductor into the round connection opening as far as it will go.
- Remove the screwdriver to establish the conductor connection.
- Reinsert the screwdriver into the actuation shaft to release the conductor.

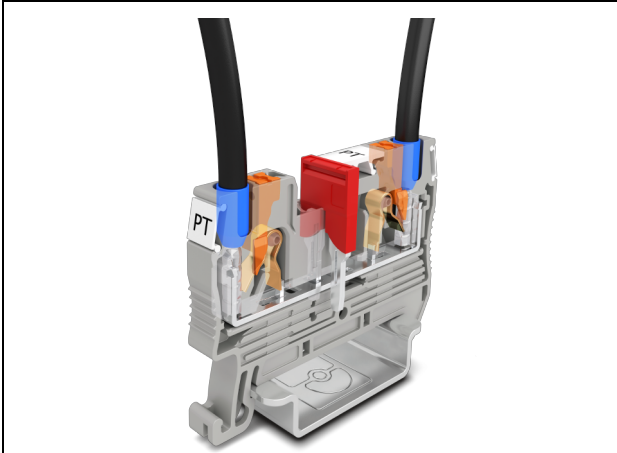
4.3 Push-in connection

Series

MP...	PT...	PTIO...	PTRV...
MPT...	PTCB...	PTMC...	PTU...
	PTI...	PTME...	PTV...

Example

Figure 3 Push-in connection



Connecting conductors

- Strip the conductors to the specified length.
- Flexible conductors can be fitted with ferrules.
Crimp the ferrules using crimping pliers. Ensure that the test requirements in accordance with DIN 46228-4 are met.
The length of the ferrule corresponds to the stripping length of the conductor.
- Rigid conductors and flexible conductors with ferrules can be inserted directly into the round opening of the terminal block without using tools.
- For small conductor cross-sections and flexible conductors without ferrules, you first have to open the terminal point.
Push the push button down using a bladed screwdriver.

Releasing the conductor

- Push down the push button using a suitable tool to release the conductor.

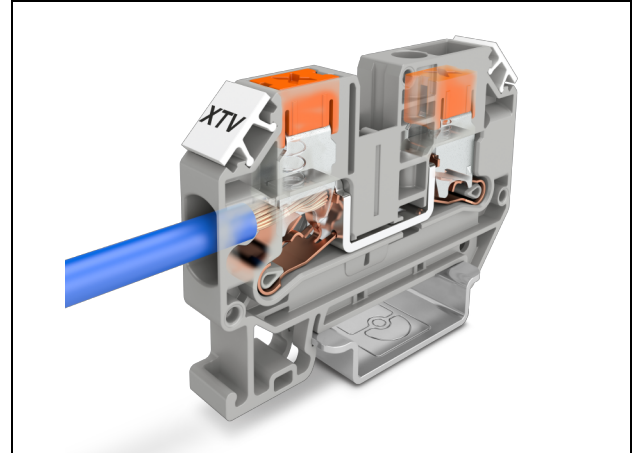
4.4 Push-X connection

Series

XT...
XTV...

Example

Figure 4 Push-X connection



Connecting conductors

- Strip the conductors to the specified length.
- Flexible conductors can be fitted with ferrules.
- Insert the conductor up to the end of the chamber. The pretensioned contact spring is released and snaps shut.

Releasing the conductor

- Push down the push button using a suitable tool to release the conductor.

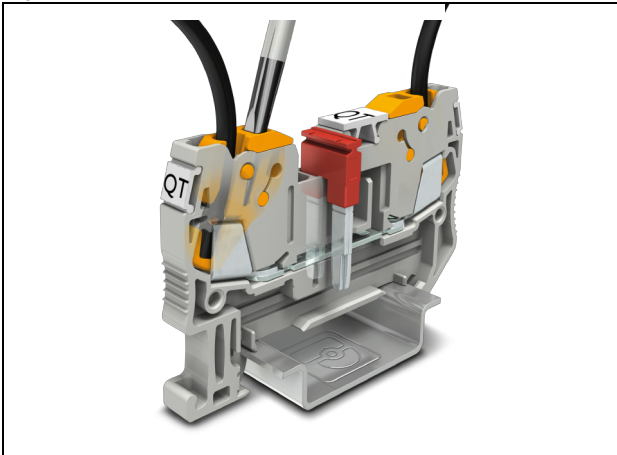
4.5 Fast connection

Series

QT...
QTC...
QTCU...

Example

Figure 5 Fast connection



Connecting conductors

Fast connection is suitable for conductors with PVC and PE insulation. Fast connection terminal blocks have an orange swiveling lever.

- Insert the stripped conductor into the round conductor guide of the rotary connection up to the stop.
- Insert a bladed screwdriver into the angular orange-colored actuation shaft.
- Rotate the conductor connection to the middle of the terminal block until it snaps into place.

Reconnection

- Before reconnecting the conductor, cut off the wired point of the conductor at an adequate distance.

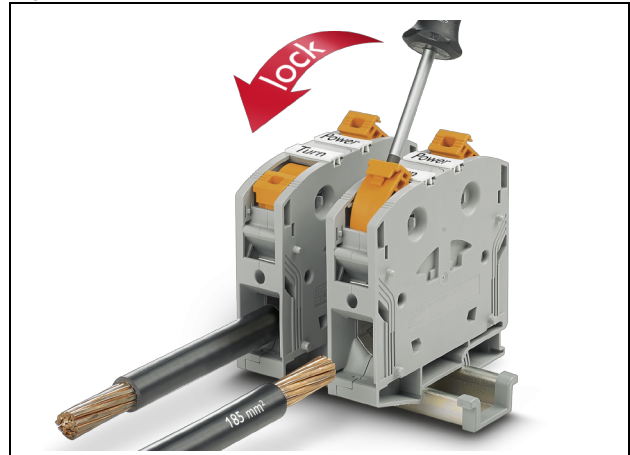
4.6 PowerTurn connection

Series

PTPOWER

Example

Figure 6 PowerTurn connection



Connecting conductors

- Insert a screwdriver for opening and closing the lever as far as it will go. Only use a suitable bladed screwdriver (e.g., SZF 3-1,0X5,5, 1206612).
- Press the lever down until the three markings point to one another.
- Absorb mechanical loads at the connection point. Make sure there is enough space for the wiring.

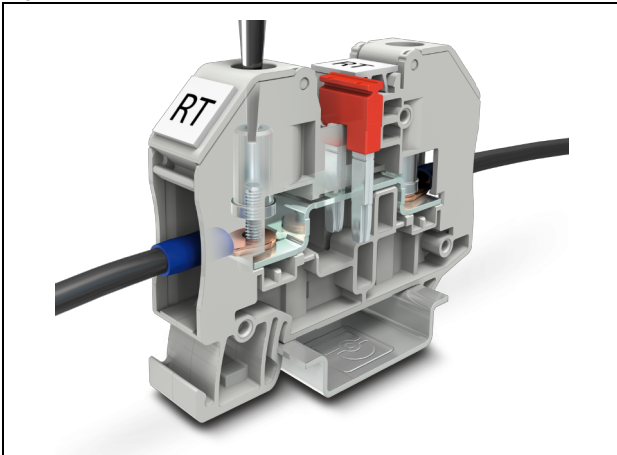
4.7 Bolt connection

Series

HV...	RT...	UHV...
OTTA...	RBO...	

Example

Figure 7 Bolt connection



Connecting conductors

- Strip off the conductors. Provide the conductors with a ring cable lug in accordance with DIN 46234, DIN 46235, or DIN 46237. The stripping length depends on the ring cable lug.
If you connect two conductors, only use cable lugs for crimp connections in accordance with DIN 46235.
- Crimp the ring cable lugs using suitable crimping pliers. Ensure that the test requirements are met.
- Use insulated cable lugs or insulate the cable lugs using a shrink sleeve.
- Insert the ring cable lug, the washer, and the hex nut into the connection point in this order.
- Tighten the hex nut to the specified torque using a socket wrench. For tool recommendations, please refer to the accessories.
- Use a maximum of two cable lugs per bolt.

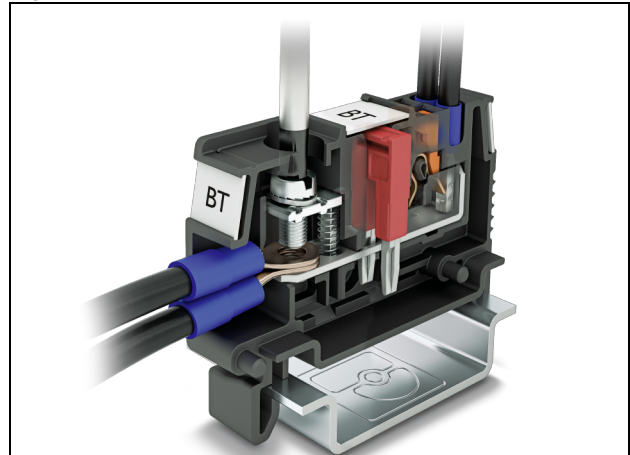
4.8 Barrier connection

Series

BT...
BTO...
BTH...

Example

Figure 8 Barrier connection



Connecting conductors

- Strip off the conductors. Provide the conductors with a ring cable lug in accordance with DIN 46234, DIN 46235, or DIN 46237. The stripping length depends on the ring cable lug.
If you connect two conductors, only use cable lugs for crimp connections in accordance with DIN 46235.
- Crimp the ring cable lugs using suitable crimping pliers. Ensure that the test requirements are met.
- Insert the ring cable lug into the connection point.
- Tighten the screw to the specified torque.
- Use a maximum of two cable lugs per bolt.

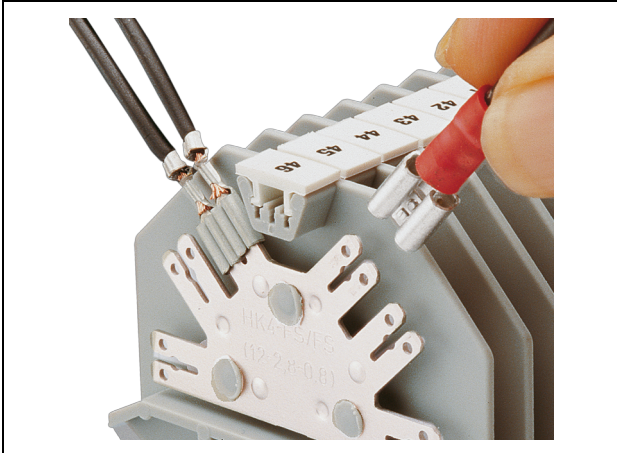
4.9 Spade connection

Series

UHK...	UVKB...	VSN...
UKK...	PVB...	VBST...
USK...		VBSTB...

Example

Figure 9 Spade connection



Connecting conductors

- Strip off the conductors. Fit the conductors with a slip-on sleeve according to EN 61210. The stripping length depends on the slip-on sleeve.
- Crimp the slip-on sleeve using suitable crimping pliers. Ensure that the test requirements are met.
- Push the slip-on sleeve onto the connection point.

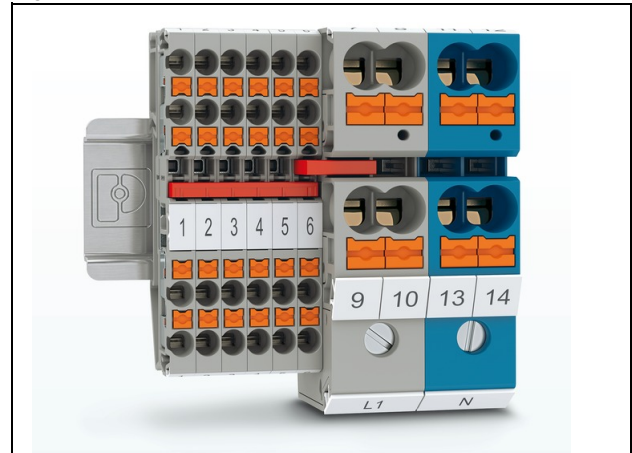
5 Distributor terminal block

Series

PTU...	UDB...
STU...	UKH...

Example

Figure 10 Distributor terminal blocks (example)



If you use distributor terminal blocks for power distribution, observe the conditions for reducing the conductor cross-sections within a circuit.

Here, the requirements of IEC 60364-4-43 (DIN VDE 0100-430) apply, for example.

6 Fuse terminal blocks

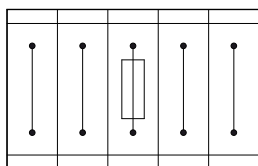
You can use cartridge fuse-links with dimensions of 5 x 20 mm or 6.3 x 32 mm in fuse terminal blocks from Phoenix Contact.

In fuse terminal blocks with cartridge fuse-links, the fuses heat up much less under **rated load** than under **overload**. The rated load is determined from the rated current and the maximum voltage drop. In the event of an overload, a much higher power dissipation results, which is equivalent to the maximum power dissipation in accordance with IEC 60127-2.

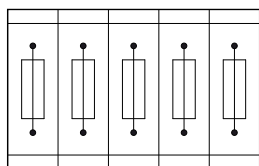
Compound or separate arrangement

In industrial applications, fuse terminal blocks are either arranged as a compound or individually with other terminal blocks. Therefore, the same current and fuse-link may result in a different heat dissipation.

Figure 11 Arrangement



Separate arrangement
Block consisting of one fuse terminal block and four feed-through terminal blocks



Compound arrangement
Block consisting of five fuse terminal blocks

Overload or short-circuit protection

You can use fuse terminal blocks for general overall area protection (for overload and short-circuit protection).

Some fuse terminal blocks are used exclusively for short-circuit protection according to IEC 60364-4-43. Safety terminal blocks for short-circuit protection are used, for example, in control circuits in which no overload occurs. Examples are coils in safety circuits, LED displays, or similar devices.

Use cases

The four different use cases are shown in [Table 1](#) and [Table 2](#).

	Overload protection	Short-circuit protection only
Separate arrangement	✓	✓
Compound arrangement	✓	✓

DIN EN 60947-7-3

The safety requirements for fuse terminal blocks are specified in DIN EN 60947-7-3. This standard takes these specifications into account:

- Cartridge fuse-links (5 x 20 mm or 6.3 x 32 mm) according to IEC 60127-1 and IEC 60127-2
 - Rated current
 - Rated voltage
 - Maximum voltage drop
 - Tripping characteristics
- Terminal blocks in accordance with EC 60947-7-1

Selecting cartridge fuse holders and cartridge fuse-links

- Select the cartridge fuse holders in accordance with the maximum power dissipation (self-heating) of the cartridge fuse-links.
- Check the temperature increase in closed fuse holders according to the application and installation.
- **Higher ambient temperatures** represent an additional strain on fuse-links.
Take the shift in the rated current into account in this kind of application.

Maximum power dissipation at 23°C

When selecting cartridge fuse-links, make sure that the maximum power dissipation is not exceeded. Information on this can be obtained from the manufacturer of the fuse.

For technical data on the power dissipation of other fuse terminal blocks, see phoenixcontact.com/products.

Table 1 Cartridge fuse-links **5 x 20 mm**, in accordance with DIN EN 60947-7-3:2009-4

Terminal block or plug	U ¹⁾	Overload protection		Short-circuit protection only		I _{max} [A]
	[V]	Separate	Compound	Separate	Compound	
P-FU 5X20-5	400	1.6 W	1.6 W	4.0 W	2.5 W	6.3
P-FU 5X20	400	1.6 W	1.6 W	4.0 W	2.5 W	6.3
PT 4-HESI (5X20)	400	1.6 W	1.6 W	4.0 W	2.5 W	6.3
PT 4-PE/L-HESI	500	1.6 W	1.6 W	4.0 W	2.5 W	6.3
PTTB 4-HESI	500	1.6 W	1.6 W	4.0 W	2.5 W	6.3
PT 6-DREHSI (5X20)	1000	4.0 W	2.5 W	2.0 W	1.3 W	10
UT 4-HESI (5X20)	500	1.6 W	1.6 W	4.0 W	2.5 W	10
ST 4-HESI (5X20)	500	1.6 W	1.6 W	4.0 W	2.5 W	6.3
ZFK 6-DREHSI (5X20)	800	4.0 W	2.5 W	4.0 W	4.0 W	6.3
QTC 2,5-HESI (5X20)	500	1.6 W	1.6 W	4.0 W	2.5 W	6.3
UK 10-DREHSI	800	4.0 W	2.5 W	4.0 W	4.0 W	10
USIG with ST-SI	500	2.5 W	2.5 W	4.0 W	4.0 W	6.3
UK-SI	400	1.6 W	1.6 W	4.0 W	2.5 W	6.3
UK 5-HESI	800	2.5 W	2.5 W	4.0 W	2.5 W	6.3
UKK 5-HESI (5X20)	400	2.5 W	1.6 W	4.0 W	2.5 W	6.3
UK 4-TG with ST-SI-UK 4	250	1.6 W	1.6 W	4.0 W	1.6 W	6.3

¹ The rated operating voltage is determined by the selected cartridge fuse-link.

Table 2 Cartridge fuse-links **6.3 x 32 mm** in accordance with DIN EN 60947-7-3:2009-4

Terminal block or plug	U ¹⁾	Overload protection		Short-circuit protection only		I _{max} [A]
	[V]	Separate	Compound	Separate	Compound	
P-FU 6,3X32	630	2.5 W	2.5 W	4.0 W	2.5 W	10
PT 6-HESI (6,3X32)	630	2.5 W	2.5 W	4.0 W	2.5 W	10
UT 6-HESI (6,3X32)	630	2.5 W	2.5 W	4.0 W	2.5 W	10
ST 4-HESI (6,3X32)	500	2.5 W	2.5 W	4.0 W	2.5 W	10
ZFK 6-DREHSI (6,3X32)	500	2.5 W	2.5 W	4.0 W	2.5 W	10
UK 10-DREHSI	400	2.5 W	2.5 W	4.0 W	2.5 W	10
USIG with ST1-SI	500	2.5 W	2.5 W	4.0 W	2.5 W	10
UK 6,3-HESI	500	2.5 W	1.6 W	4.0 W	2.5 W	10
UKK 5-HESI (6,3X32)	400	2.5 W	1.6 W	4.0 W	2.5 W	10

¹ The rated operating voltage is determined by the selected cartridge fuse-link.

7 Accessories

7.1 Bridges

Connect the desired number of positions to form terminal block groups with the same potential. Different bridges can be used for this purpose.

- Plug-in bridge (FBS...)
- Insertion bridge (EB...)
- Chain bridges (KB...)
- Fixed bridges (FBI...)
- Step brackets (STL...)

If neighbored bridges are located directly opposite of each other, you have to fit an insulation plate, a cover, or a partition plate in between. This is necessary to maintain the required air clearances and creepage distances.

From a certain voltage onwards, you have to insert an insulation plate or a cover at the ends of the bridge rail.

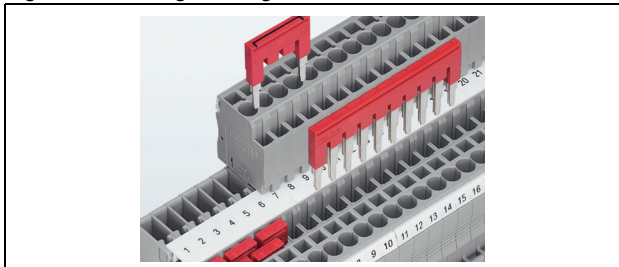
If the bridges are used for bridging between non-adjacent terminal blocks, the rated voltage is reduced.

Observe the maximum rated currents when using bridges.

Make sure the bridges are fitted correctly before proceeding with startup.

7.1.1 Plug-in bridges (FBS...)

Figure 12 Plug-in bridges



- Connect the desired number of positions to form terminal block groups with the same potential.
- To do so, push a plug-in bridge into the function shaft of the terminal block as far as it will go.
- Terminal blocks with a double function shaft can be used in the same way to implement flexible chain bridging or bridging between non-adjacent terminal blocks.
- When mounting plug-in bridges with more than 20 positions, you must mount the bridge from the outside inwards. First insert the two outer contact tabs into the bridge shaft. Then mount the bridge inwards from both sides.

Bridging between non-adjacent terminal blocks

- Disconnect the contact tab of the bridge for the terminal to be skipped at the predetermined breaking point.

Cut-to-length bridges

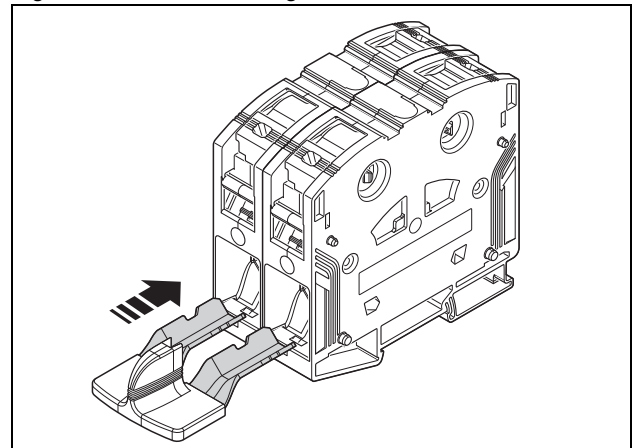
- If you use cut-to-length bridges, the rated voltage is reduced.
- To maintain the required air clearances and creepage distances, install the intended covers and partition plates.
- If cut-to-length bridges are located directly opposite of each other, you have to fit an insulation plate, a cover, or a partition plate in between.

Reducing bridge

A reducing bridge enables terminal blocks with different rated cross-sections to be connected easily. Power blocks can be created using the reducing bridge.

7.1.2 Insertion bridges (EB...)

Figure 13 Insertion bridges



- Insert the bridge into the open terminal points of the terminal blocks as far as it will go.
- Close the terminal point to fasten the bridge in the terminal block.
- Depending on the terminal block type, insert the conductor into the terminal point above or below the bridge metal.
- Note that the maximum connection cross-section is generally reduced by one level.

7.1.3 Chain bridge (KB...)

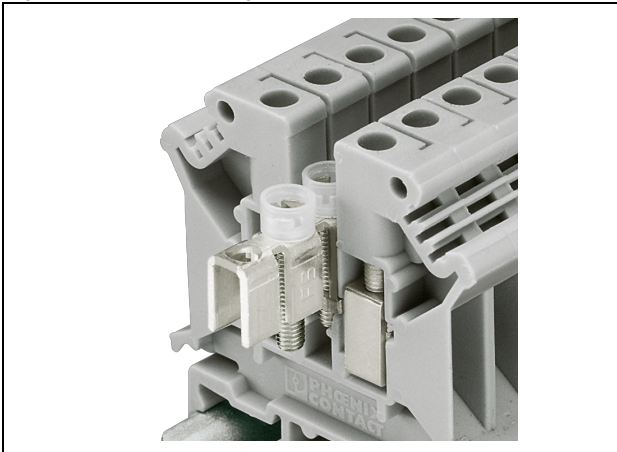
Figure 14 Chain bridges



- Remove the flap on the first chain bridge so that you obtain a support bracket for laying the subsequent bridge.
- After inserting the support bracket into the bridge shaft, mount the other chain bridge.

7.1.4 Fixed bridge (FBI...)

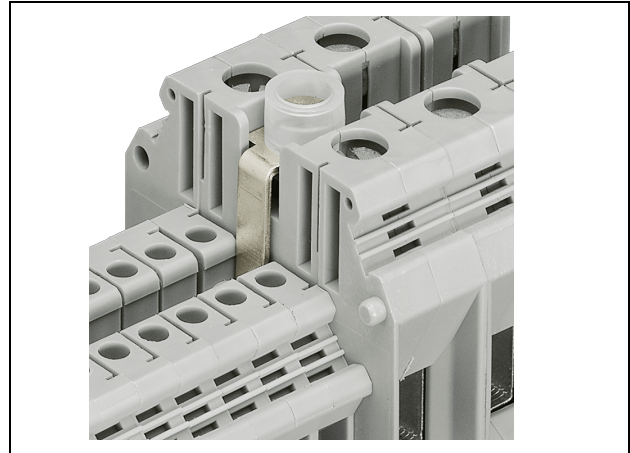
Figure 15 Fixed bridge



- Insert the fixed bridges into the bridge shaft of the terminal blocks. Tighten the bridge screws to the specified torque.
- You can separate any number of positions from the multi-position bridge strips.

7.1.5 Step bracket (STL...)

Figure 16 Step bracket



The step bracket enables bridging of terminal blocks of different sizes.

- Mount the step bracket into the bridge shaft of the terminal blocks. Screw tight the step bracket.

7.2 Disconnect points and connectors

- Only operate the disconnect points of test disconnect terminal blocks and connections when the system is at no load and switched off. Exceptions are specified in the documentation.

The maximum current carrying capacity of test disconnect terminal blocks and terminal blocks with connections are often reduced compared to equivalent feed-through terminal blocks.

7.3 Test adapters

- In the case of hazardous voltages, create the test circuit using our test adapters only after the circuit was disconnected.
- After measurement, only dismantle the test circuit when the system is at no load and switched off.