Protection Relay
RE_ 610

Installation Manual

ABB REF 610

ABB REM 610

ABB REU 610

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Contents

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1.   Introduction

1.1.   This manual

This manual contains instructions for unpacking and installing the protection relay RE_ 610, as well as general information about different mounting kits available.

In addition to the relay, the delivery contains:

- Product documentation (refer to Section 1.4. Product documentation)
- Snap ferrite ring for CT /VT connections
- Battery for real-time clock and non-volatile memory
- Printable labels for programmable indicator LEDs

1.2.   Use of symbols

This publication includes the following icons that point out safety-related conditions or other important information:

The electrical warning icon indicates the presence of a hazard which could result in electrical shock.

The warning icon indicates the presence of a hazard which could result in personal injury.

The caution icon indicates important information or warning related to the concept discussed in the text. It might indicate the presence of a hazard which could result in corruption of software or damage to equipment or property.

The information icon alerts the reader to relevant facts and conditions.

The tip icon indicates advice on, for example, how to design your project or how to use a certain function.

1.3.   Intended audience

1.4.   Product documentation

In addition to the relay and this manual, the delivery contains the following relay-specific documentation:

Table 1.4.-1   REF 610 product documentation

Name	Document ID
Technical Reference Manual	1MRS755310
Technical Reference Manual, ANSI version	1MRS755535
Operator's Manual	1MRS755311
Operator's Manual, ANSI version	1MRS755539

Table 1.4.-2   REM 610 product documentation

Name	Document ID
Technical Reference Manual	1MRS752263-MUM
Technical Reference Manual, ANSI version	1MRS755537
Operator's Manual	1MRS752264-MUM
Operator's Manual, ANSI version	1MRS755538

Table 1.4.-3   REU 610 product documentation

Name	Document ID
Technical Reference Manual	1MRS755769
Technical Reference Manual, ANSI version	1MRS755972
Operator's Manual	1MRS755770
Operator's Manual, ANSI version	1MRS755971

Either the IEC or the ANSI version of the manual is included.

1.5.   Document conventions

2.   Safety information

Dangerous voltages can occur on the connectors, even though the auxiliary voltage has been disconnected.

Non-observance can result in death, personal injury or substantial property damage.

Only a competent electrician is allowed to carry out the electrical installation.

National and local electrical safety regulations must always be followed.

The frame of the device has to be carefully earthed.

When the plug-in unit has been detached from the case, do not touch the inside of the case. The relay case internals may contain high voltage potential and touching these may cause personal injury.

The device contains components which are sensitive to electrostatic discharge. Unnecessary touching of electronic components must therefore be avoided.

Breaking the sealing tape on the upper handle of the device will result in loss of guarantee and proper operation will no longer be insured.

3.	# Unpacking

Relay products require careful handling before installation on site. Examine the delivered products to ensure that they have not been damaged during transport.

If a product has been damaged, a claim should be made to the transport contractor and the local representative of ABB should be promptly notified.

3.1.	## Identifying the product

Compare the order number of the relay with the ordering information to verify that you have received the right product.

You can find the order number on a label under the lower handle of the relay.

> When checking the order number of the relay plug-in unit, be careful not to lift the handle more than 25º (approx. 40 mm). Lifting the handle any further detaches the plug-in unit from the case.
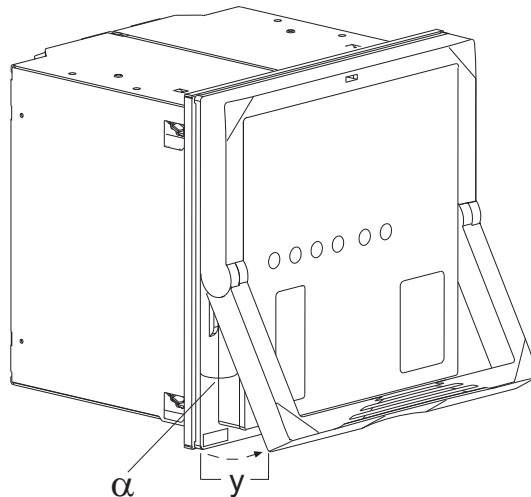
A040165

Fig.   3.1.-1   Checking the order number of the relay

α = 25º
y = 40 mm

3.2.	## Electrostatic discharge (ESD)

The relay products contain components that are sensitive to electrostatic discharge. The electronic circuits are well protected by the enclosure: avoid removing the plug-in unit and the human-machine interface (HMI) unnecessarily.

3.3.	## Disposal of packing material

The packing material of cardboard is 100% recyclable.

4.   Mounting

RE_ 610 can be:

- Flush mounted
- Semi-flush mounted
- Semi-flush mounted in a 25º angle
- Rack mounted
- Wall mounted
- Mounted to a 19" equipment frame
- Mounted with a RTXP 18 test switch to a 19" rack

You need separate mounting kits for the different methods except for the flush-mounting method. This section also includes instructions on how to install the optional lens sensors for an arc protection system (REF 610 only).

The relay's construction with a detachable plug-in unit allows an easy installation. Before mounting the relay, detach the plug-in unit from the relay case.

4.1.   Detaching and installing the plug-in unit

Before detaching the plug-in unit from the case, the auxiliary voltage must be disconnected.

To detach the plug-in unit:

1. Lift the lower handle until the spring-loaded locks on both sides of the handle are released and the unit is pushed about 6 mm out of the case. This separates the connectors.
2. Pull the unit out of the case.

The relay features an automatic short-circuit mechanism in the current transformer (CT) connector. Therefore, detaching the plug-in unit will not open the secondary circuit of the CT which otherwise could cause dangerously high voltages.

Signal connectors are left open when the plug-in unit is detached.
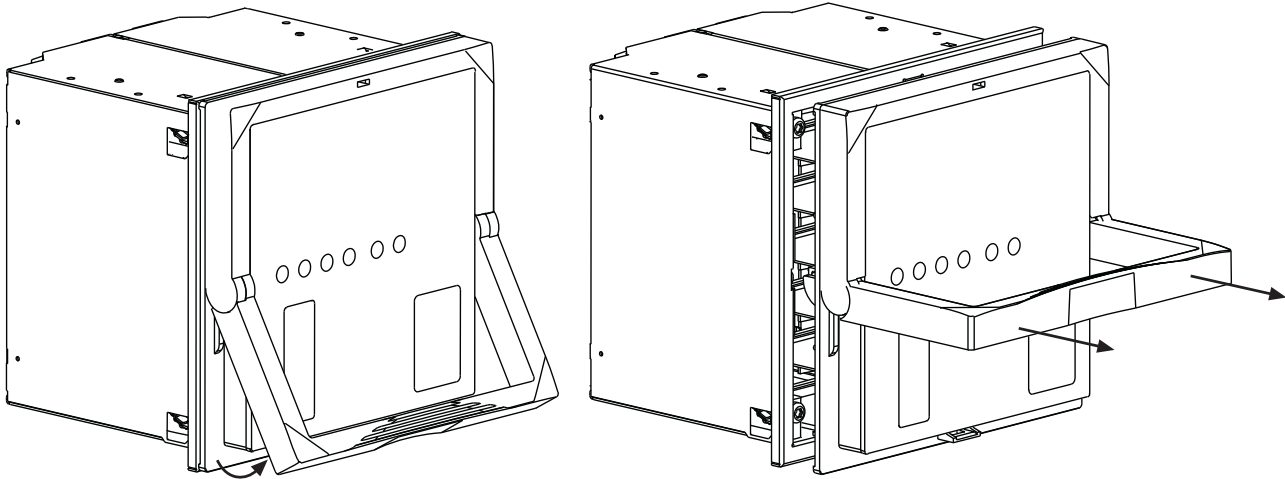
Fig. 4.1.-1   Detaching a plug-in unit from the case

Before fitting a relay plug-in unit into a relay case, check that the unit and the case have the same order number.

The order number of the case is printed on the bottom plate inside the case. However, if a substitute plug-in unit has to be used instead of the original unit, ensure that at least the first 10 characters in the order numbers of the case and the plug-in unit are identical, as in the following example (the same principle applies to all RE_ 610 relays):

Order number of the relay case	**REM610C55HCMP XX**
Order number of the plug-in unit	**REM610C55HCNR XX**

However, it is highly recommended that all characters in the order number, except for those indicating a spare part, should match the ones of the case.

The relay features a built-in mechanical coding system which allows that a plug-in unit with voltage or current measuring inputs only can be plugged into a corresponding case. This helps to prevent dangerous situations from arising in case a non-suitable plug-in unit is fitted into a relay case.

Forcing a non-suitable plug-in unit into a case breaks the relay and may cause dangerous situations.

When installing a plug-in unit into a case:

1. Check that the handle is down in its initial position.
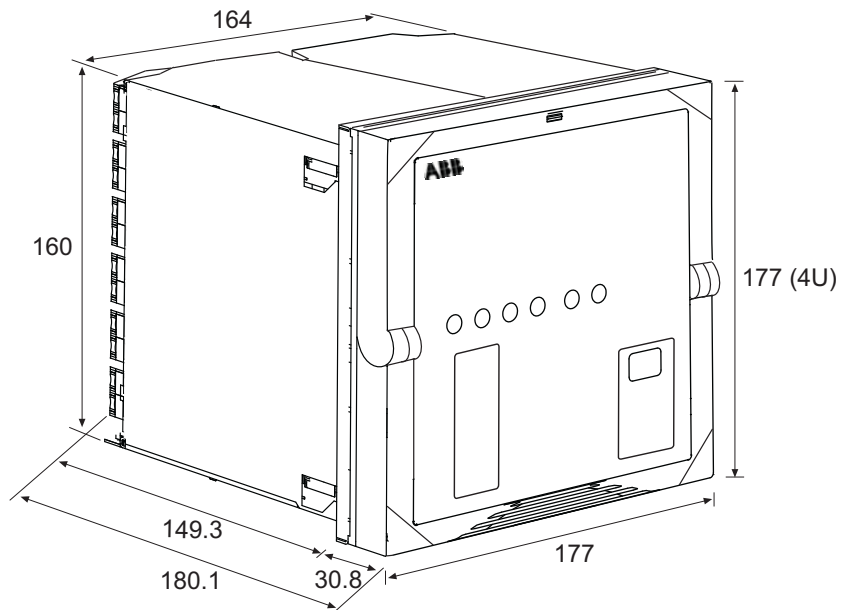2. Push the unit into the case until the locks click; see Fig. 4.1.-2.
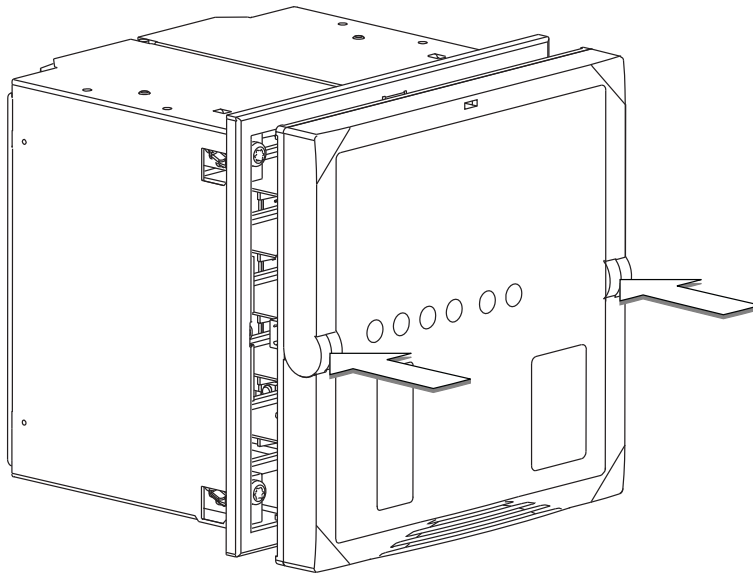
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Fig. 4.1.-2   Installing a plug-in unit into the case

4.2.   Mounting dimensions

Frame width mm	Frame height mm	Frame depth mm
177	177	149.3

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Fig. 4.2.-1   Main dimensions of RE_ 610

4.3.   Flush mounting

All the mounting accessories for flush mounting are included in the case.

To flush mount the case to the cut-out in the panel:

1. Loosen the four M5 fixing screws approximately 7 turns.
2. Mount the case to the panel cut-out; see Fig. 4.3.-1.
3. Tighten the screws; see Fig. 4.3.-2. The allowed range for the fixing screws' tightening torque is 0.7...1 Nm.

The enclosure class of the flush-mounted device is IP 54 on the front side. The rear side fulfils the IP 20 requirements. The top of the flush-mounted device fulfills the IP 40 requirements.

A device equipped with optic connections requires a minimum depth of 180 mm.
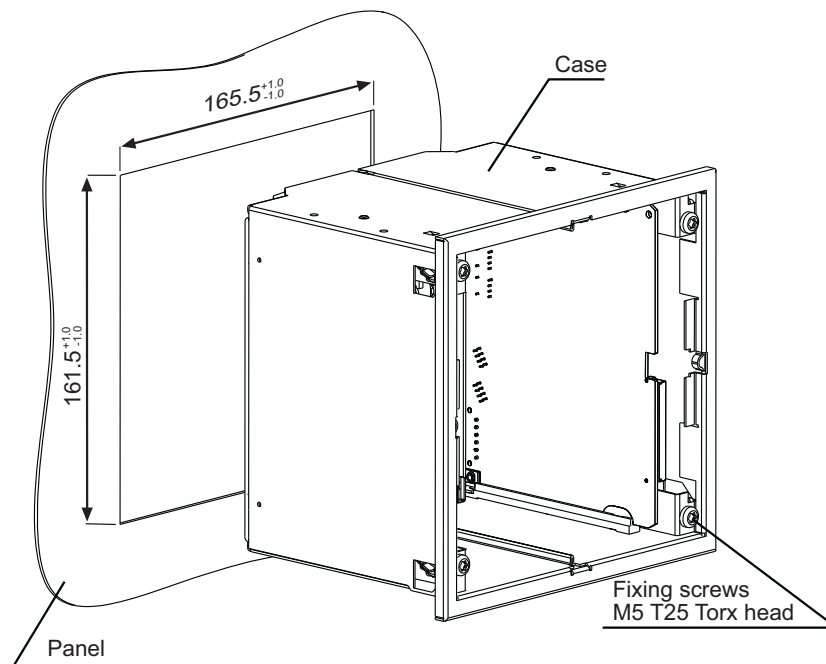
Fig. 4.3.-1   *Flush mounting a case into a panel cut-out*
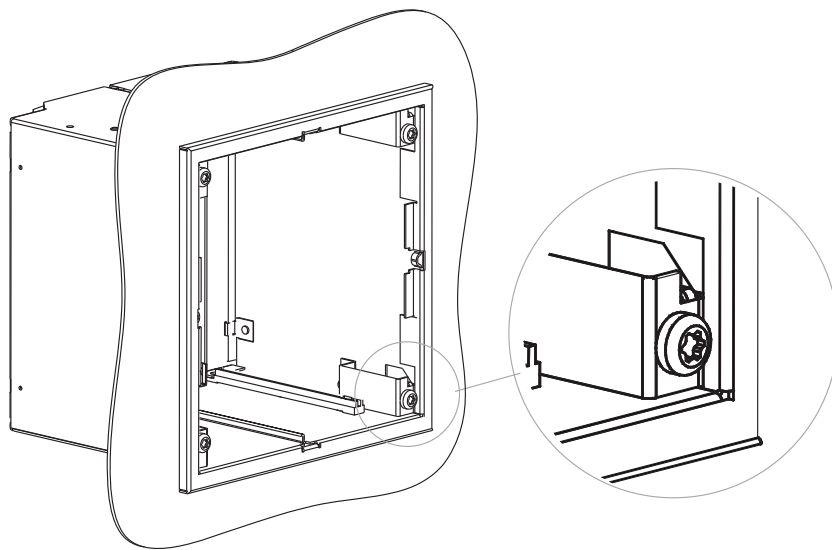
A040170

Fig. 4.3.-2   Case flush mounted, tightening the screws

149,3

30,8
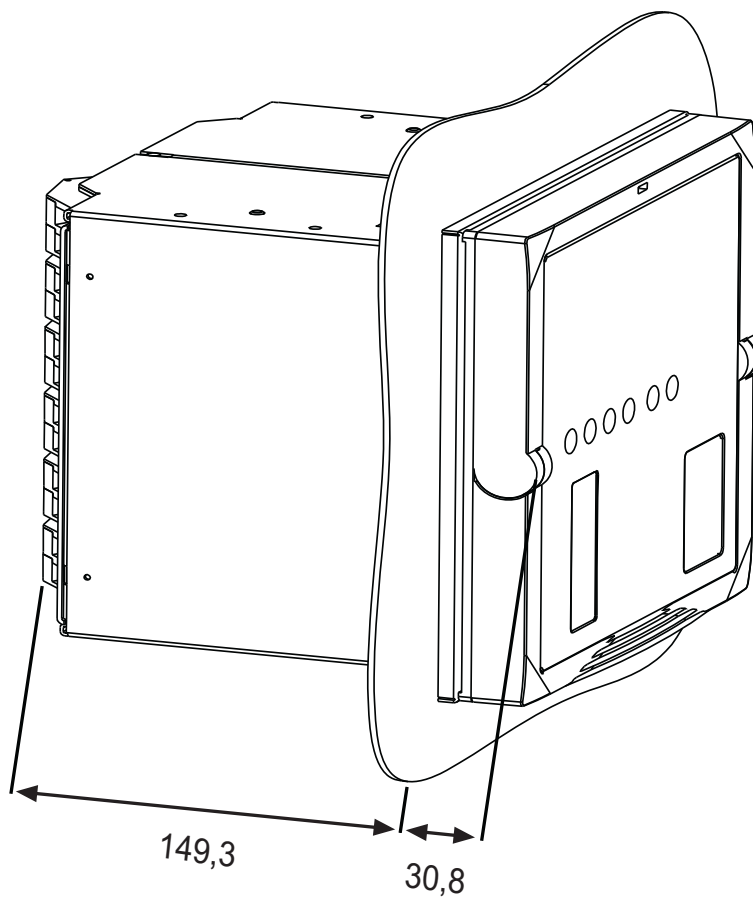
A040171

Fig. 4.3.-3   Relay (case and plug-in unit) flush mounted

4.4.   Semi-flush mounting

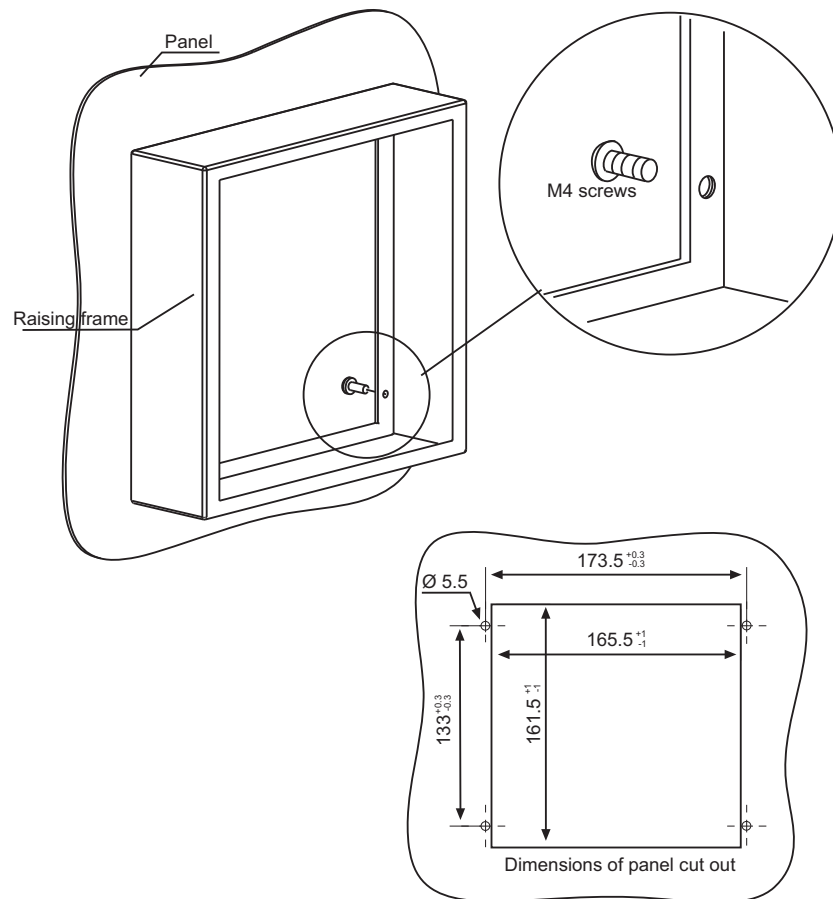The semi-flush mounting kit contains (for order number, refer to Chapter 6. Accessories):

- Raising frame
- Gasket
- Screws

The gasket is used when an IP 54 degree of protection (according to IEC 60529) is required for the front side. If the gasket is not used, an IP 50 degree of protection is obtained.

Mount the raising frame to the cut-out in the panel with four screws according to the Fig. 4.4.-1.

> A device equipped with optic connections requires a minimum depth of 130 mm
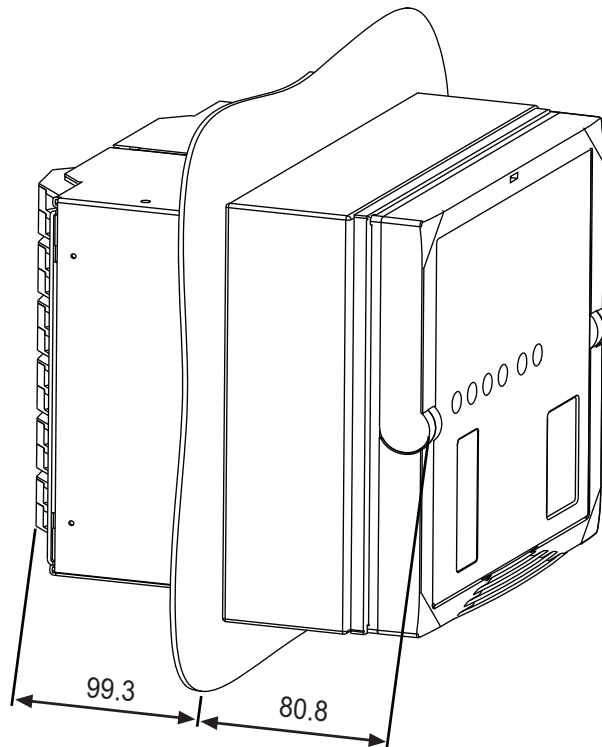
Fig. 4.4.-1   Mounting raising frame
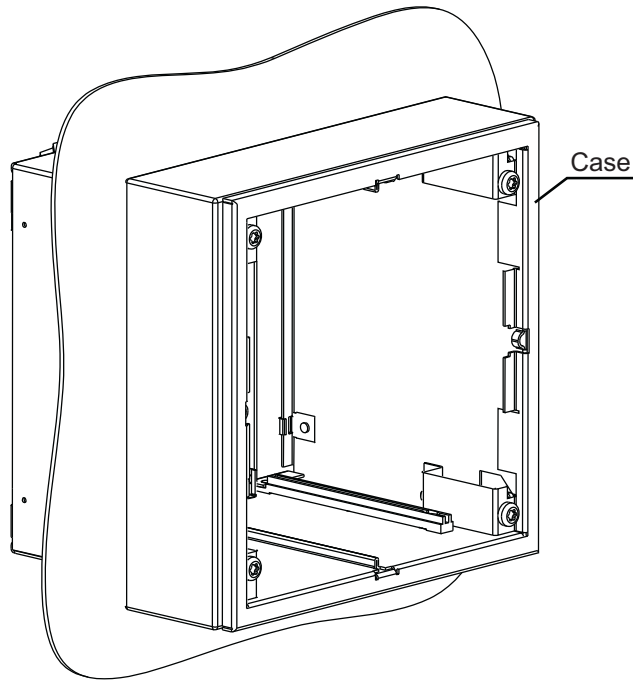
Fig. 4.4.-2   Mounting case

For instructions on how to mount the case to the raising frame, refer to Section 4.3. Flush mounting.

Fig. 4.4.-3   Relay (raising frame, case and plug-in unit) semi-flush mounted

4.5.   **Inclined semi-flush mounting**

The inclined semi-flush mounting kit (for order number, refer to Chapter 6. Accessories) allows you to mount the relay to a 25° angle. The mounting kit contains:

• Angled frame
• Gasket
• Screws

The gasket is used when an IP 54 degree of protection is required for the front side. If the gasket is not used, the device fulfills the IP 50 requirements.
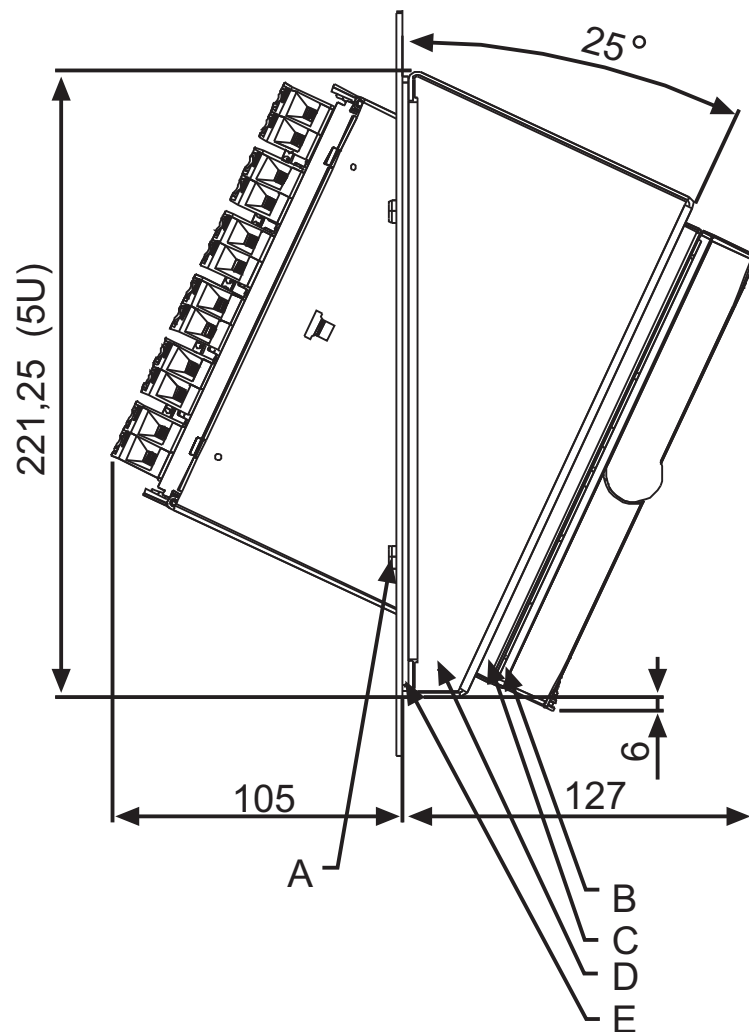

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Fig. 4.5.-1   Inclined semi-flush mounting

A) M4 x 0.7 screws
B) Plug-in unit
C) Case
D) Angled frame
E) Gasket

Mount the angled frame to the cut-out in the panel with four screws.

The recommended panel thickness is 2 mm at the minimum.

A051484
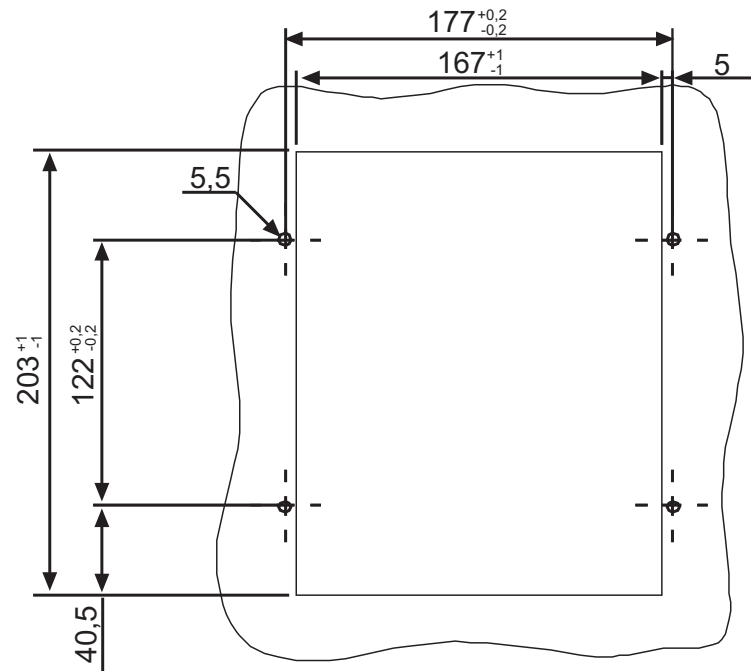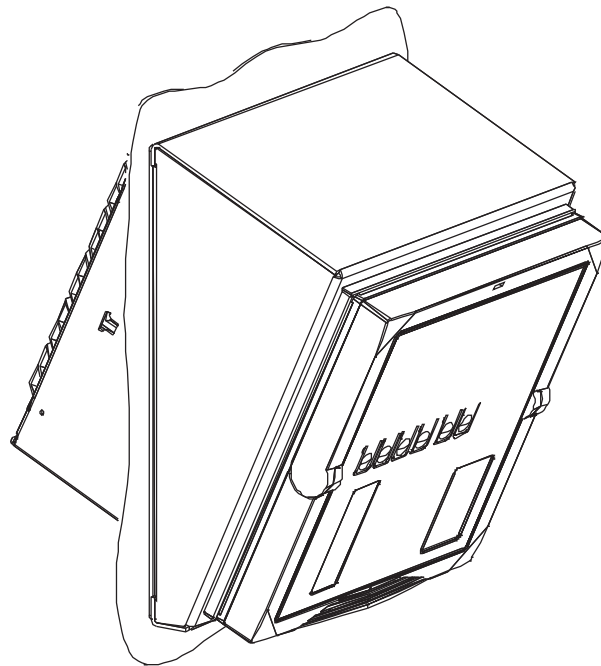
Fig. 4.5.-2   Panel cut-out dimensions

A051486

Fig. 4.5.-3 Relay (angled frame, case and plug-in unit) mounted in a 25° angle

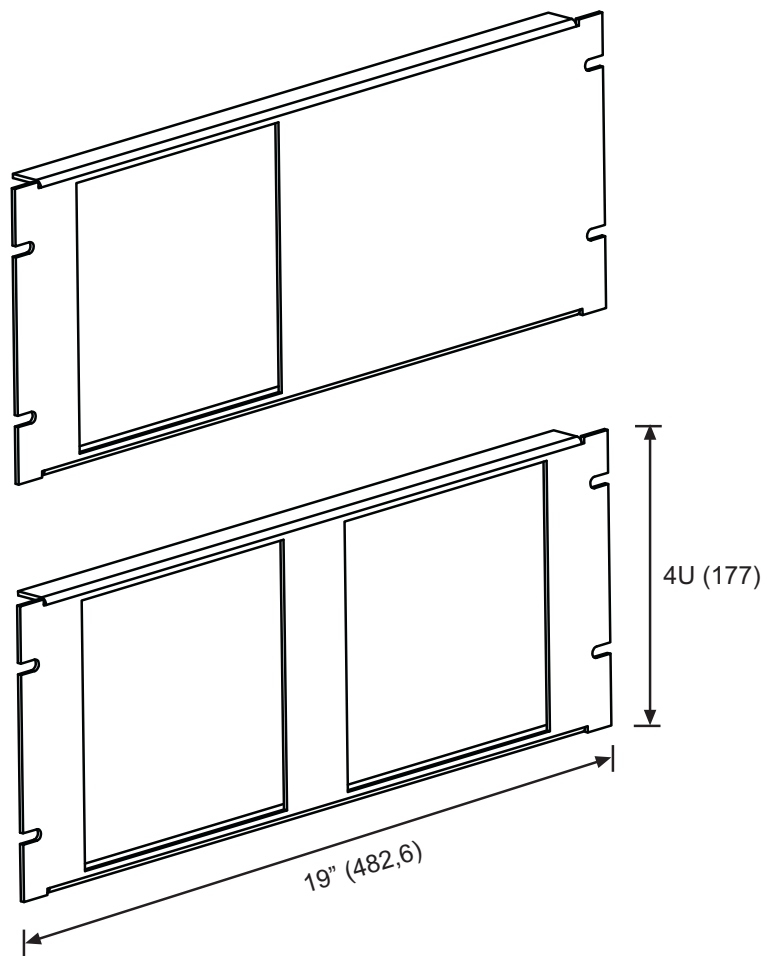For instructions on how to mount the case to the angled frame, refer to Section 4.3. Flush mounting.

4.6. Rack mounting

The relay can be mounted to a 19" rack by using a mounting panel. The required mounting panel type depends on the number of relays mounted. For order numbers, refer to Chapter 6. Accessories.
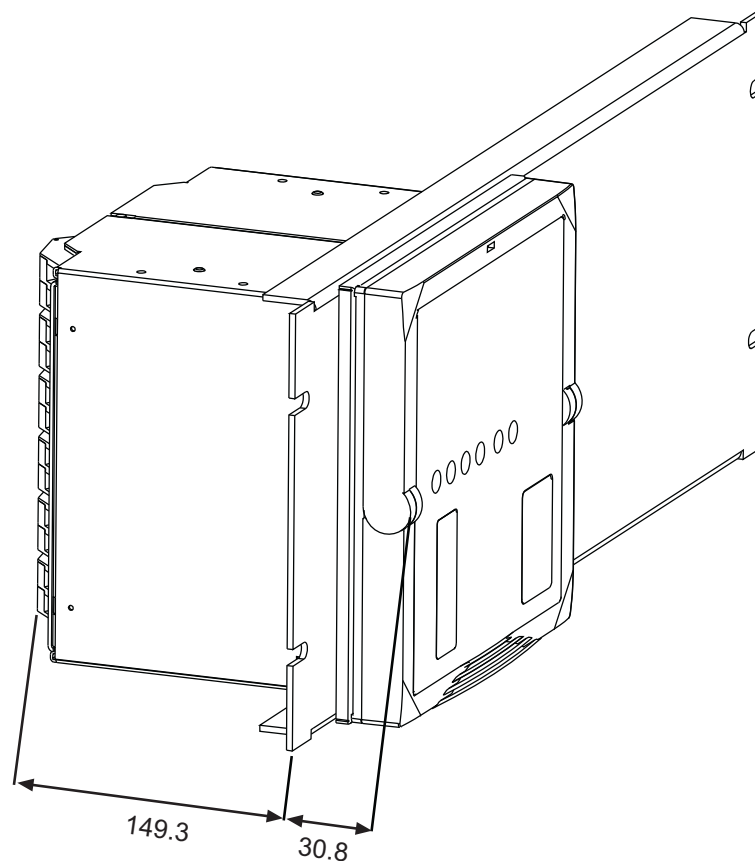
> A device equipped with optic connections requires a minimum depth of 180 mm.

Fig. 4.6.-1   19" rack mounting panels

For instructions on how to mount the case to the panel, refer to Section 4.3. Flush mounting.

149.3   30.8

A040173

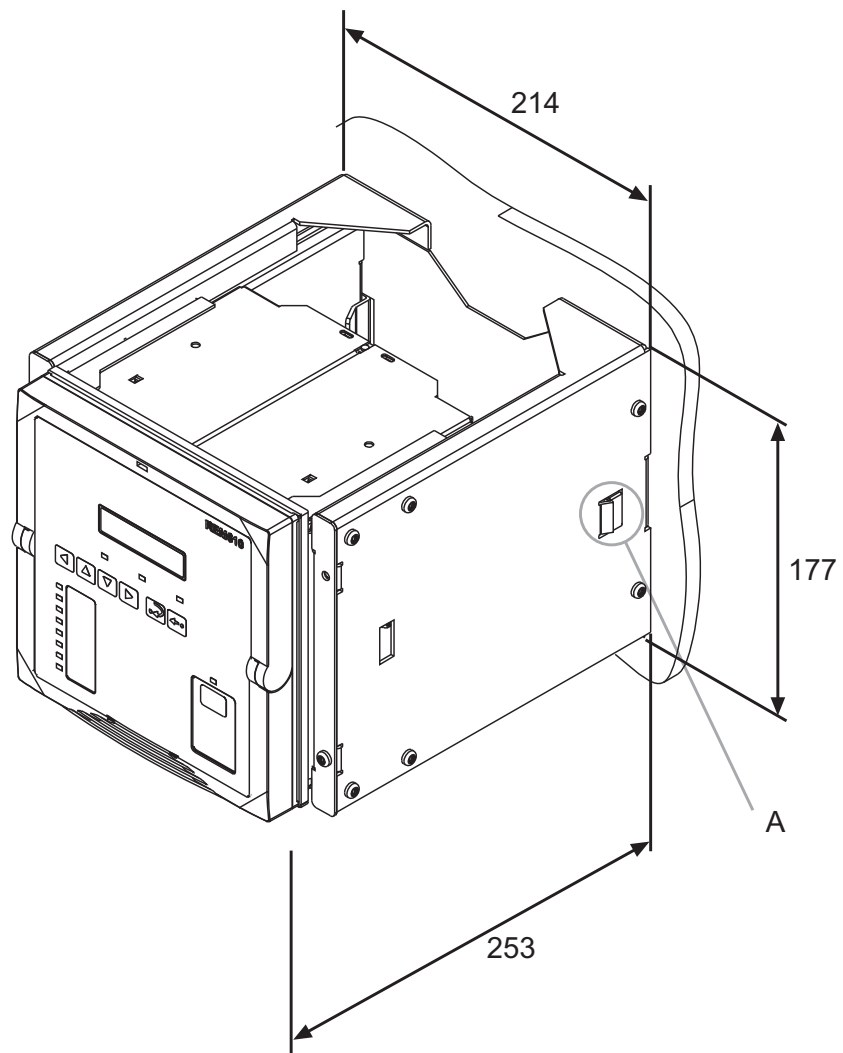*Fig. 4.6.-2   Relay (case and plug-in unit) rack mounted*

4.7.   Wall mounting

The wall mounting kit (for order numbers, refer to Chapter 6. Accessories) allows you to mount the relay on a wall (projection mounting). The mounting kit contains:

- Two two-piece mounting brackets (frame and rail parts). The mounting brackets are made of steel sheet (light grey, Pantone 420).
- Back plate
- Screws
- Detailed mounting instructions
- Dimensions for screw holes

When connecting the wires, a wall-mounted relay can be pulled out 160 mm and turned 45 (or 90) degrees downwards (or upwards). The part in item "A" in Fig. 4.7.-1 and in Fig. 4.7.-2 locks the relay to selected (pushed-in or pulled-out) position. Release the relay by pushing the locks.
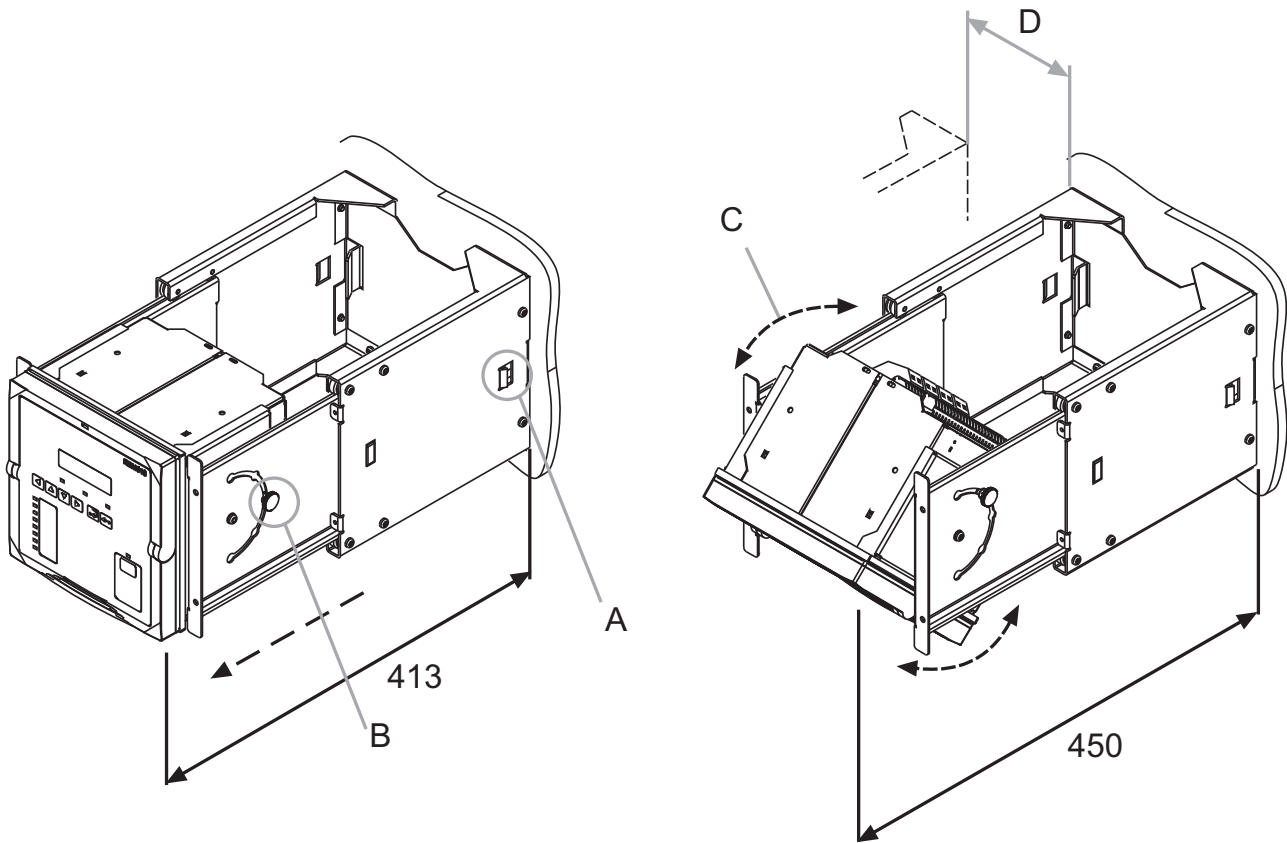
Fig. 4.7.-1   Relay (case and plug-in unit) wall mounted

A) Locks the relay to selected position (pushed-in or pulled-out)

Rotate the relay by loosening the knurled-head screw, see item "B" in Fig. 4.7.-2.

Fig. 4.7.-2   Wall-mounted relay in pulled-out position and rotated

A) Locks the relay to selected position (pushed-in or pulled-out)
B) Knurled-head screw
C) 50 mm space needed above and below the frame for rotating
D) Min 50 mm spacing between two kits

4.8.   19" rack mounting with RTXP 18

The relay can be mounted together with a RTXP 18 test switch to a 19" rack by using a mounting kit. For order number, refer to Chapter 6. Accessories. The mounting kit is complete and contains a wired RTXP 18 test switch and all required parts for mounting.

> A device equipped with optic connections requires a minimum depth of 180 mm.

For instructions on how to mount the case to the panel, refer to Section 4.3. Flush mounting.
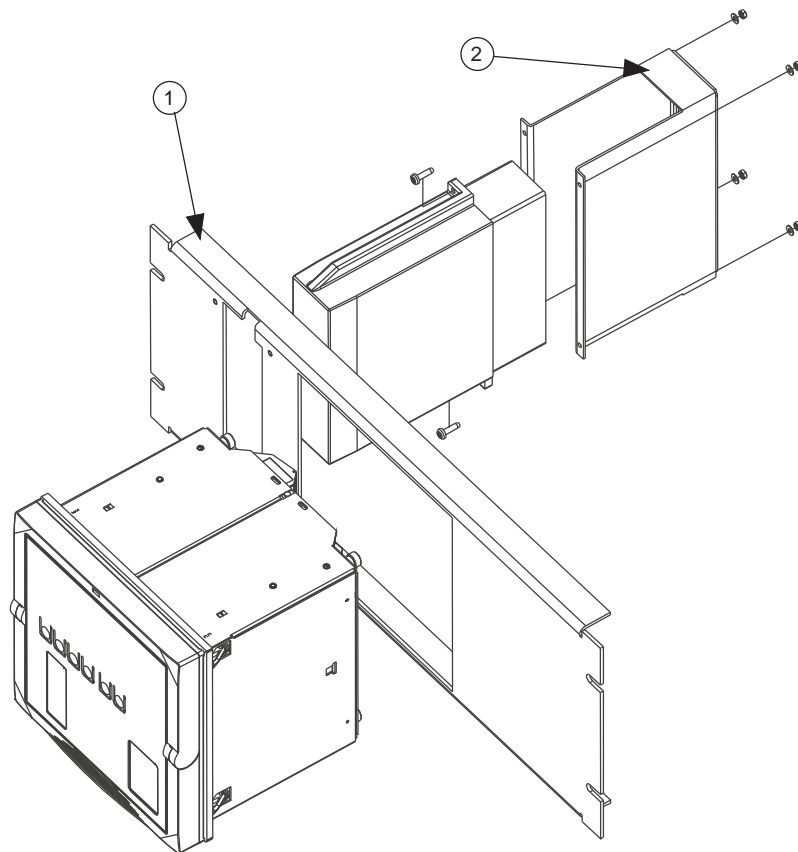
A040179

Fig. 4.8.-1   Mounting of the relay and the frame for a RTXP 18 test switch

1) Mounting panel
2) Metallic frame

4.9.   19" equipment frame mounting (Combiflex)

The relay can be mounted to a 19" equipment frame (4U high, Combiflex) by using a mounting kit. The type of mounting kit to be ordered depends on whether the relay is to be installed to the frame as it is or in combination with a test switch of type RTXP 18. For order numbers, refer to Chapter 6. Accessories.

When mounting only the relay, use a 19" equipment frame mounting kit (Combiflex) for single relay. The mounting kit contains two mounting brackets of type 1MRS061208, see item 1 in Fig. 4.9.-1.

When mounting a relay with a test switch (RTXP 18) by its side, use a 19" equipment frame mounting kit (Combiflex) for single relay and RTXP 18. The mounting kit is complete and contains a wired RTXP 18 test switch and all required parts for mounting.
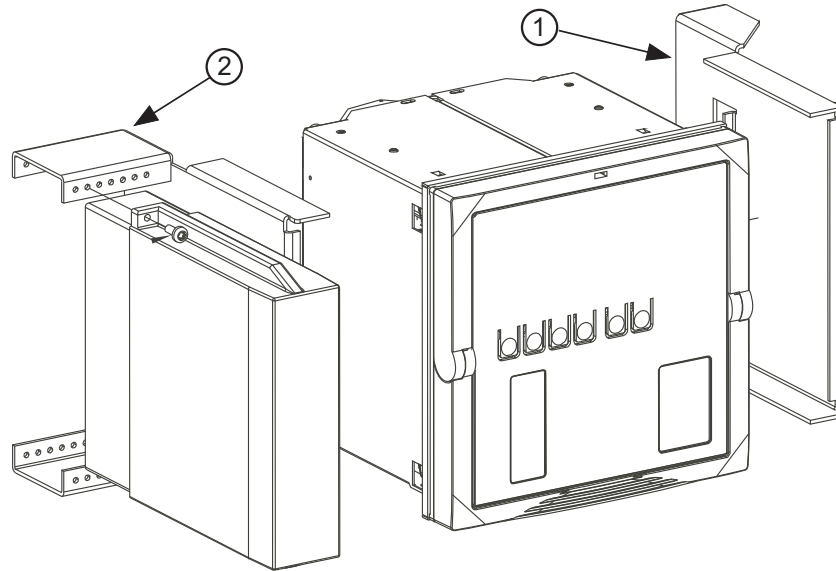
The mounting brackets are made of hot galvanized steel sheet. Mount the mounting brackets to the case by using the same fixing screws as in flush mounting. The case contains all the mounting accessories needed. Mount the case to the 19" equipment frame.
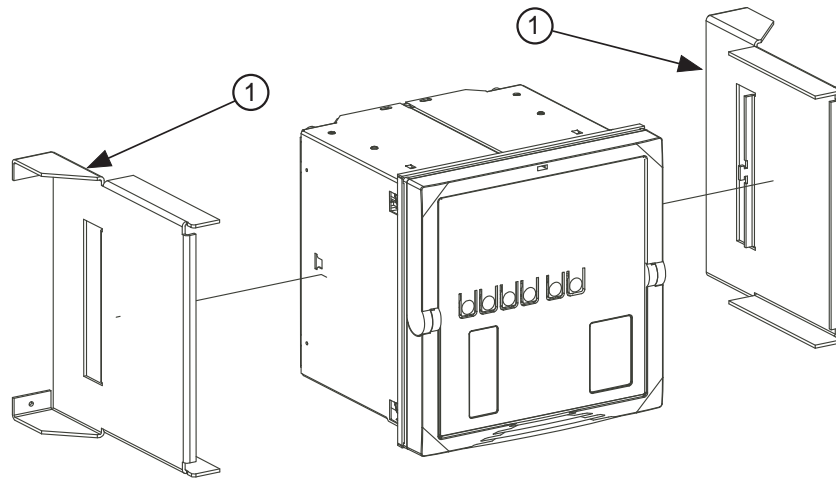
Fig. 4.9.-1   Mounting the relay to a 19" equipment frame

1) Mounting bracket type 1MRS061208

Fig. 4.9.-2   Mounting the relay and test switch RTXP 18 to a 19" equipment frame

1) Mounting bracket type 1MRS061208
2) Mounting bracket type 1MRS061207

4.10.   Lens sensors for arc protection system (REF 610 only)

The arc protection is used to detect arc situations in air insulated metal-clad switch gears.

The place of installation of the optional lens sensors in the switch gear cubicle depends on the kind of arc protection system to be used. Refer to the application examples in the Technical Reference Manual for further information on the alternatives.

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To mount the lens sensor, drill a hole (Ø 10 mm) in the wall of the space to be supervised. Fit the lens sensor to the hole and fasten it with a self-tapping M3 screw. Alternatively, the lens sensor can be fastened with a cable tie. To do this, secure the cable tie to a suitable point of attachment on the cubicle wall and wrap the cable tie tightly around the sensor. Make sure that the cable tie lies in the groove of the sensor to prevent it from blocking the light.
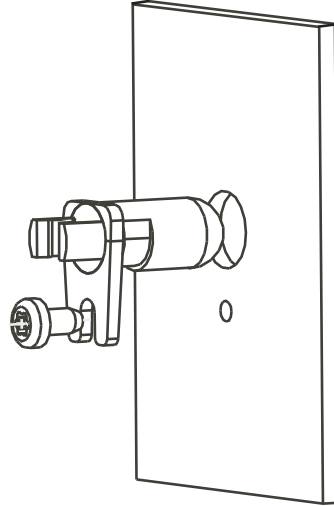
A040182

Fig. 4.10.-1   Mounting of the lens sensor
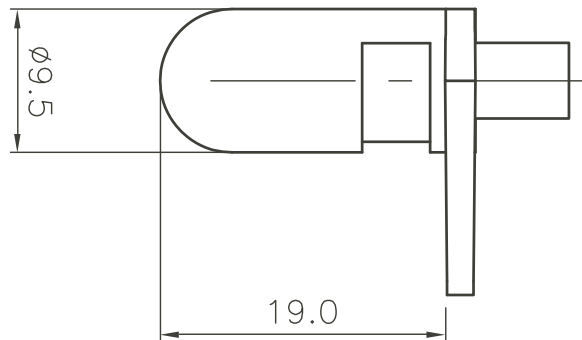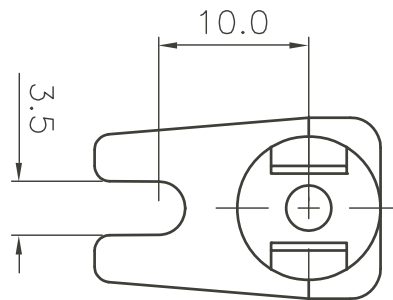
A040183

Fig. 4.10.-2   Dimensions of the lens sensor

5.   **Connections**

Connection terminals are described in the Technical Reference Manual. Each contact has its own identification number, X2.1, for instance. The numbering of the contacts runs from top to bottom, except connectors X2.1, X5.5 and X5.8 which are numbered from bottom to top; see Fig. 5.2.-1 and Fig. 5.2.-3.
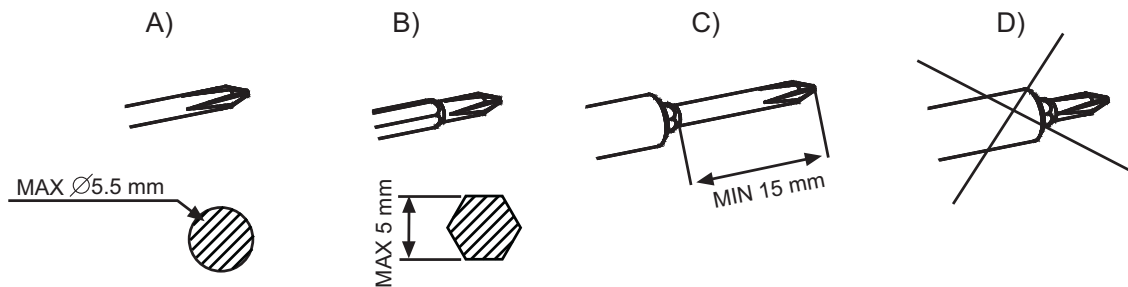
Terminal blocks of screw-compression and ring-lug type are used for electrical connections. Transceivers of snap-in type (X5.3) are used for plastic fibre-optic connections and transceivers of ST-type (X5.4) for glass fibre-optic connections.

Lens sensor inputs (X5.1 and X5.2) are used for arc protection (REF 610 only), see Fig. 5.2.-2.

If terminals of screw-compression type are used:

1. Open the screw terminal before inserting a wire into it for the first time. To open the screw terminal, turn the fixing screw anti-clockwise until the terminal hole is wide open (the inside of the terminal hole is surrounded by metal).
2. Insert the wire and turn the fixing screw clockwise until the wire is firmly fixed.

Only use screwdriver and insert bits for Phillips (PH 1) cross-recessed head screws (M3.5) when handling CT/VT terminals (X2.1) of screw-compression type.

A040184

Fig. 5.-1   Screwdriver and insert bits for CT/VT terminals of screw-compression type

It is also possible to use terminals of ring-lug type for the CTs/VTs. If using terminals of ring-lug type:

1. Open the lid that covers the ring-lug fixing screw (every fixing screw has its own lid) with the tip of a screwdriver.
2. Screw off the screw, slide it through the terminal lug and screw it back on.
3. Close the lid.

5.1.   Mounting instructions for snap ferrite ring

Install the snap ferrite ring around the wires for current/voltage measurement as follows:

1. Place the snap ferrite ring on a flat surface. To open the ring, use the key included in the package by pressing it gently into the key holes on the snap ferrite ring as shown in Fig. 5.1.-1.
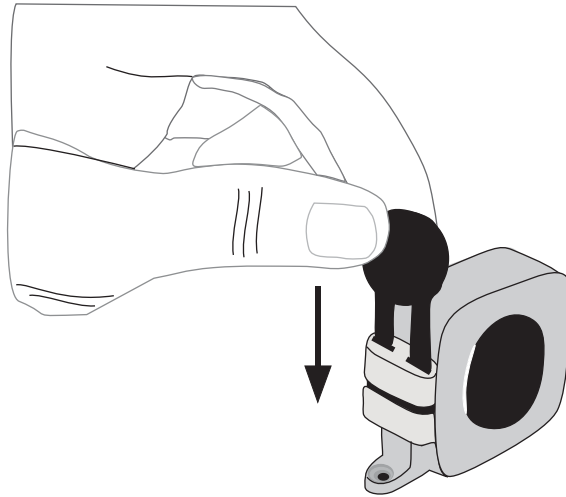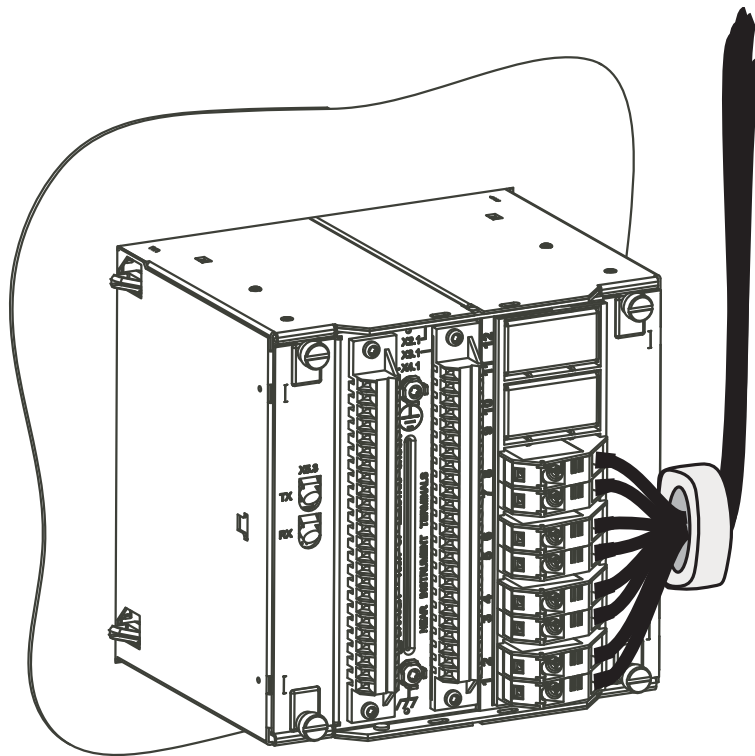
A040185

Fig. 5.1.-1   *Opening the snap ferrite ring before installation*

2. Remove the key from the keyholes by carefully pulling it out with one hand while holding the snap ferrite ring with the other hand.

3. Place the snap ferrite ring around the wires for current/voltage measurement and lock the ring by closing it. The snap ferrite ring should be installed as close to the terminal block as possible. Fig. 5.1.-2 shows the preferred position of the snap ferrite ring after installation.

> If the protection relay is installed in a place where it is subject to vibration, such as on marine applications, the snap ferrite ring needs to be attached to a stationary part of the switch gear cubicle. This can easily be done by fastening the snap ferrite ring to the cubicle wall with a screw.

A040186

Fig. 5.1.-2   Snap ferrite ring installed

5.2.   **Electrical connections**

All connections are made on the rear of the case. No soldering is needed.

Each signal connector (X3.1 and X4.1) terminal is dimensioned for one 0.2...2.5 mm^2 wire or two 0.2...1.0 mm^2 wires.

Connect the wires from the CTs/VTs to the right device according to the phase order and the connection diagram. Each terminal for CTs/VTs is dimensioned for one 0.5...6.0 mm^2 wire or for two maximum 2.5 mm^2 wires.

A separate earth lead of at least 2.5 mm^2 has to be connected from the protective earth screw between connectors X4.1 and X3.1 (the upper screw; see Fig. 5.2.-1) to the earth bar.

When using RTD sensors or thermistors for REM 610, use a double shielded cable. Connect the cable shields to the chassis earth screw between connectors X4.1 and X3.1 (lower screw; see Fig. 5.2.-1).
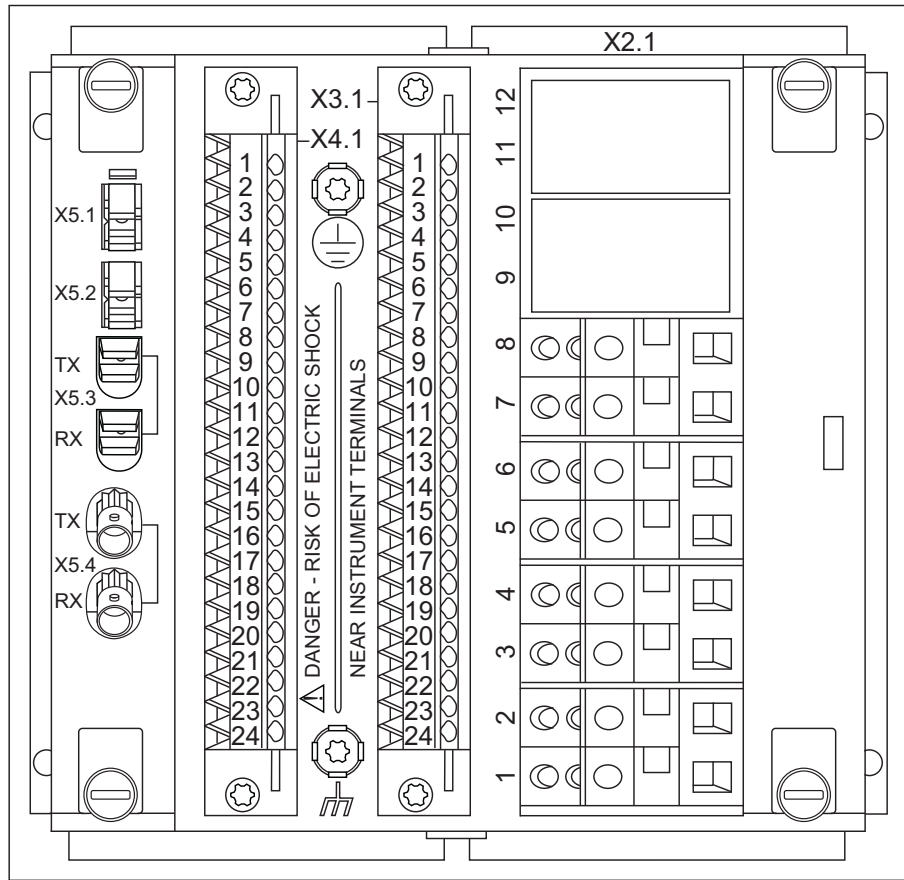
Terminals on the optional communication modules for RS-485 (see Fig. 5.2.-1 and Fig. 5.2.-3) are dimensioned for one 0.08...1.5 mm^2 wire or for two maximum 0.75 mm^2 wires.
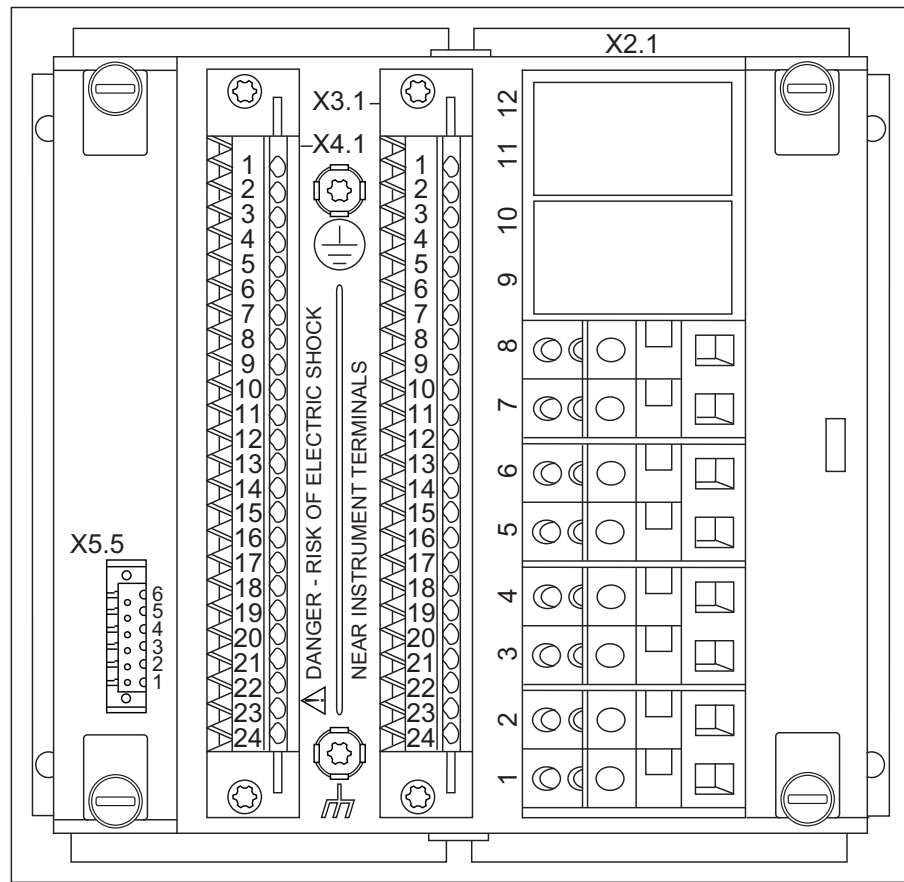
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Fig. 5.2.-1   Rear view of RE_ 610 with the RS-485 communication module
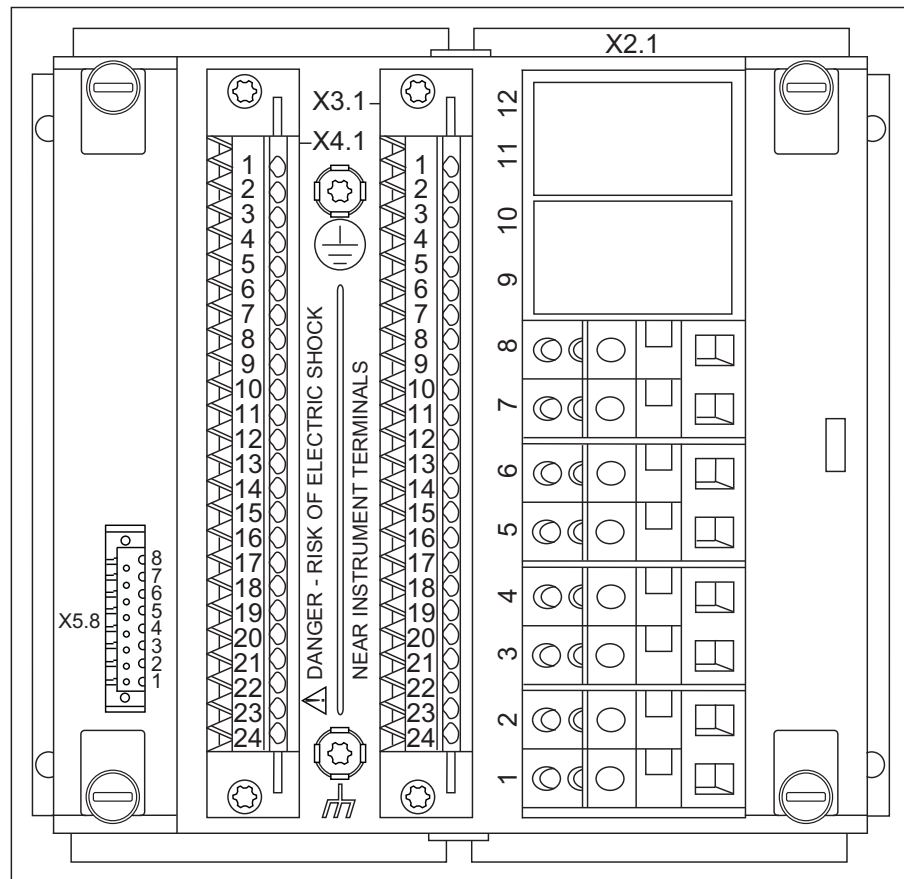
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Fig. 5.2.-2   Rear view of RE_ 610 with the fibre-optic communication module for plastic and glass fibre with light sensor inputs

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Fig. 5.2.-3   Rear view of RE_ 610 with the DNP 3.0 communication module for RS-485
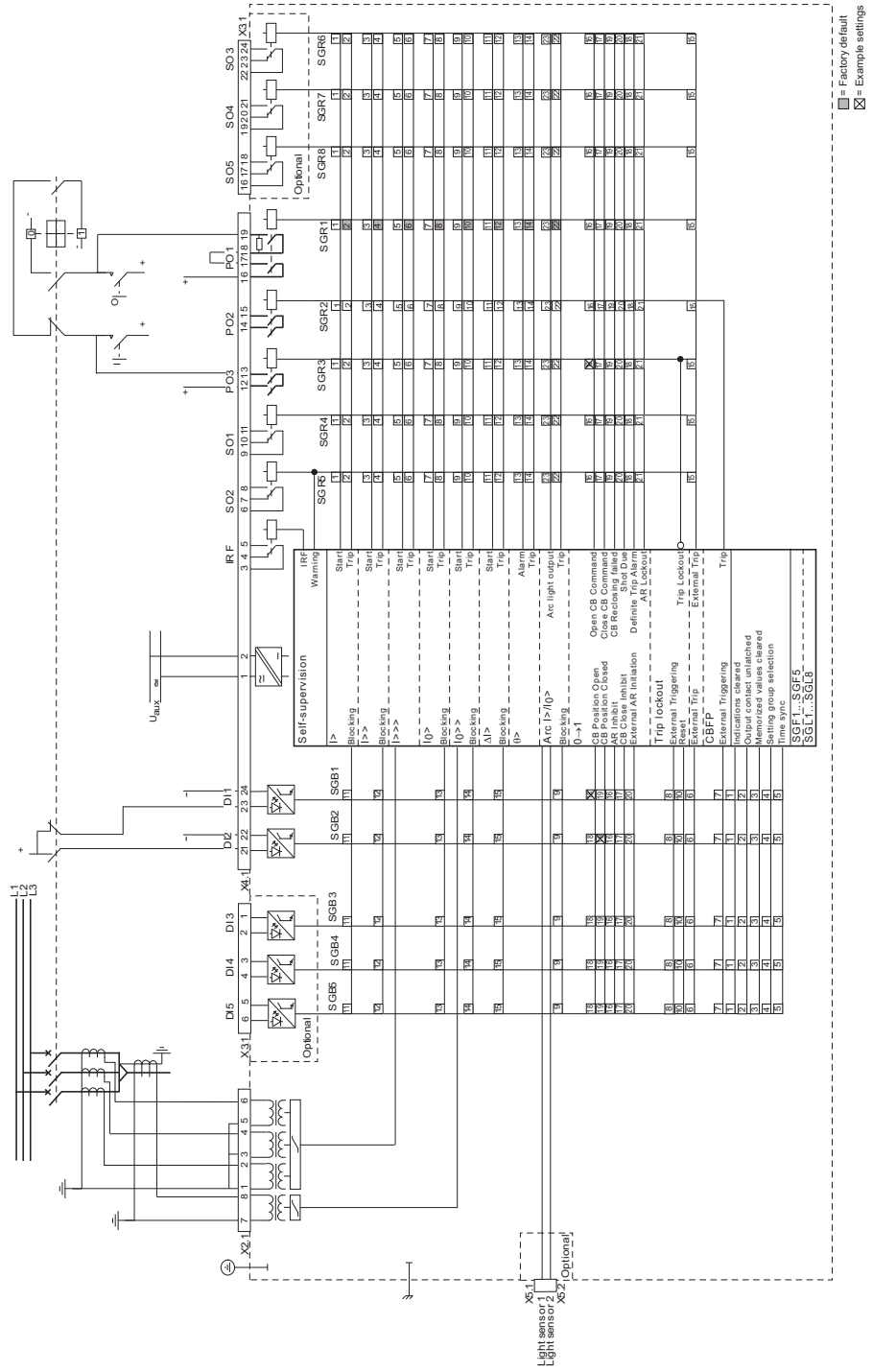
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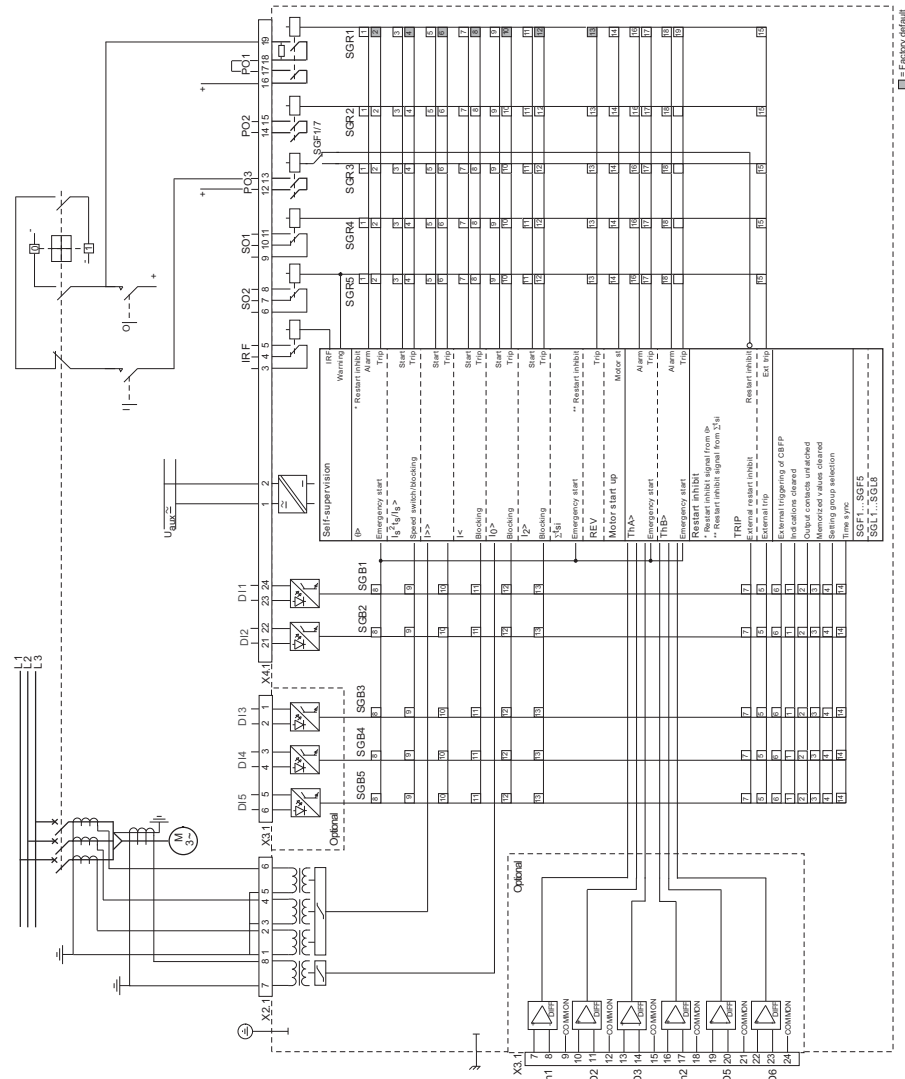*Fig. 5.2.-4   Connection diagram (REF 610 rev. C)*

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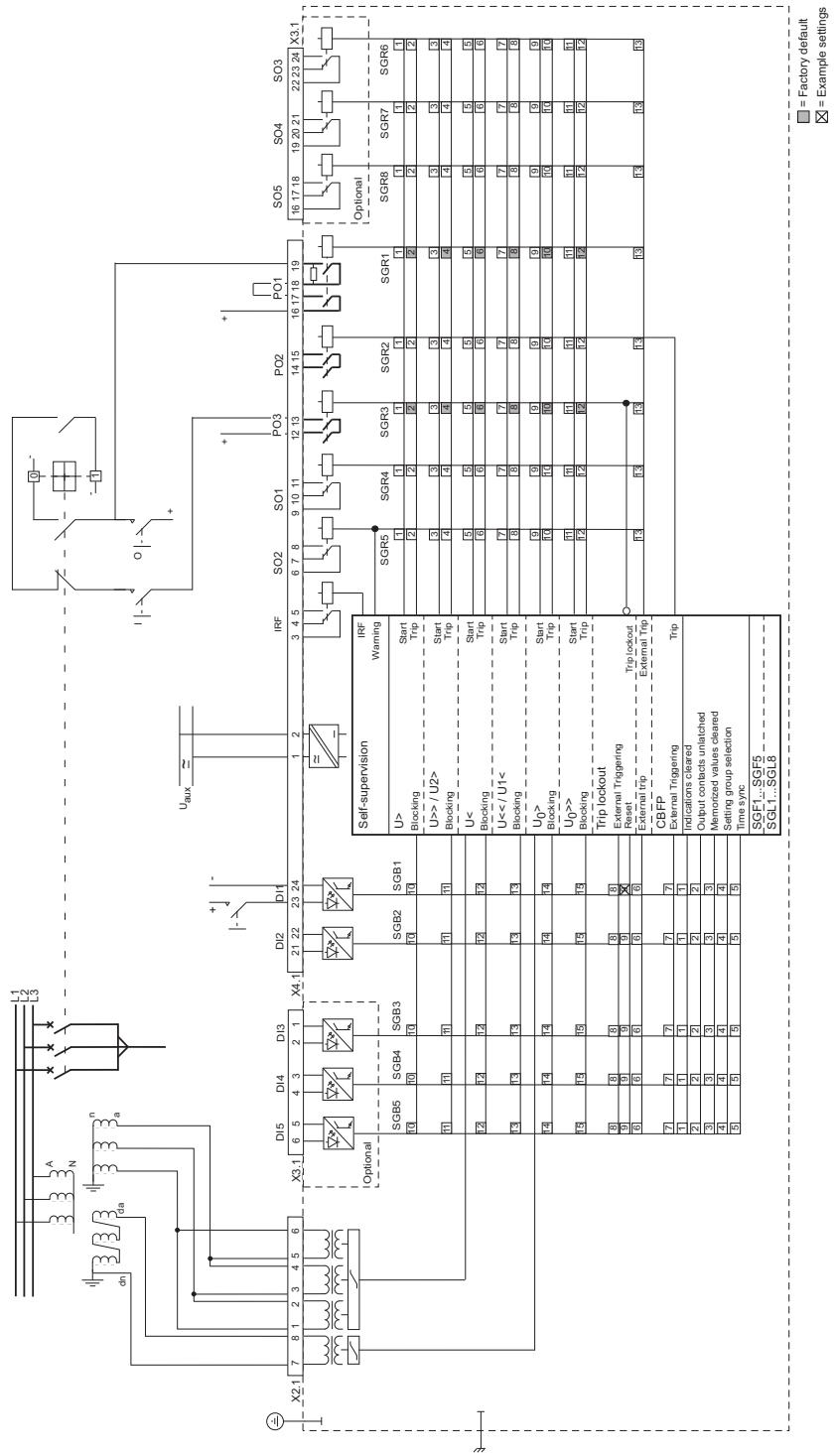*Fig. 5.2.-5 Connection diagram (REM 610 rev. C)*

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Fig. 5.2.-6   Connection diagram (REU 610 rev. C)

6.   Accessories

Table 6.-1   Available accessories

Item	Order number
Semi-flush mounting kit	1MRS050696
Inclined semi-flush mounting kit, 25° angle	1MRS050831
Wall mounting kit	1MRS050697
19" rack mounting kit, two relays side-by-side	1MRS050695
19" rack mounting kit, single relay	1MRS050694
19" rack mounting kit, single relay and RTXP18:	
for REM 610	1MRS090938
for REF 610	1MRS090939
for REU 610	1MRS090937
19" equipment frame mounting kit (Combiflex), single relay and RTXP18:	
for REM 610	1MRS090924
for REF 610	1MRS090925
for REU 610	1MRS090936
19" equipment frame mounting kit (Combiflex), single relay	1MRS050779
Pre-manufactured lens-sensor and optic fibre for arc protection:	
1.5 m ±3%	1MRS120534-1.5
3 m ±3%	1MRS120534-3.0
5 m ±3%	1MRS120534-5.0
Front communication cable	1MRS050698
Communication modules:	
Plastic fibre	1MRS050889
Plastic fibre with inputs for arc protection	1MRS050890
RS-485	1MRS050892
RS-485 with inputs for arc protection	1MRS050888
Plastic and glass fibre	1MRS050891
Plastic and glass fibre with inputs for arc protection	1MRS050885
RS-485 including DNP 3.0 protocol	1MRS050887
RS-485 including DNP 3.0 protocol and inputs for arc protection	1MRS050886

7.   Abbreviations

Abbreviation	Description
CT	Current transformer
LED	Light-emitting diode
RTD	Resistance temperature device

ABB