RE_61_ Protection Relay

Installation Manual
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1. **Introduction**

This manual contains instructions for unpacking and installing the protection relay RE_ 61_, as well as general information about different mounting kits available. In addition to the relay and this manual, the delivery includes:

- Certificate of verification
- Operator’s Manual
- Snap ferrite ring for CT connections

1.1. **About this manual**

This document provides instructions on how to install the protection relay RE_ 61_.

## 2. Safety Information

<table>
<thead>
<tr>
<th>Icon</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>!</td>
<td>Dangerous voltages can occur on the connectors, even though the auxiliary voltage has been disconnected</td>
</tr>
<tr>
<td>!</td>
<td>National and local electrical safety regulations must always be followed</td>
</tr>
<tr>
<td>!</td>
<td>The device contains components which are sensitive to electrostatic discharge. Unnecessary touching of electronic components must therefore be avoided</td>
</tr>
<tr>
<td>!</td>
<td>The frame of the device has to be carefully earthed</td>
</tr>
<tr>
<td>STOP</td>
<td>Only a competent electrician is allowed to carry out the electrical installation</td>
</tr>
<tr>
<td>STOP</td>
<td>Non-observance can result in death, personal injury or substantial property damage</td>
</tr>
<tr>
<td>STOP</td>
<td>Breaking the sealing tape on the upper handle of the device will result in loss of warranty and proper operation will no longer be guaranteed</td>
</tr>
<tr>
<td>STOP</td>
<td>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.</td>
</tr>
</tbody>
</table>
3. **Unpacking**

Relay products, although of robust construction, require careful handling prior to 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. The order number is found on a label under the lower handle of the relay:

**Warning!**

When checking the order number of the relay plug-in unit, be careful not to lift the handle beyond 25° (approx. 40 mm). Lifting the handle any further will detach the plug-in unit from the case.

\[ \alpha = 25° \]
\[ y = 40 \text{ mm} \]

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

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 and therefore unnecessary removals of the plug-in unit and the Human-Machine Interface (HMI) must be avoided.

3.3. **Disposal of packing material**

The packing material of cardboard is 100% recyclable.
4. Mounting

RE_ 61_ can be flush mounted, semi-flush mounted (or inclined 25°), raising frame, rack mounted, wall mounted, mounted to a 19" equipment frame or mounted with a RTXP 18 test switch to a 19" rack. You will 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, the plug-in unit has to be detached from the relay case.

4.1. Detaching and installing the plug-in unit

Prior to detaching the plug-in unit from the case, the auxiliary voltage must be disconnected. To detach the plug-in unit, 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 will separate the connectors and you can easily 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 will be left open when the plug-in unit is detached.

![Fig. 4.1.-1 Detaching the plug-in unit from the case](image)

Note!

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 ten characters in the order numbers of the case and the plug-in unit are identical, as in the following example for REM 610 (the same principle applies to all RE_ 61_ relays):

| Order number of the relay case | REM610A55HCMP |
| Order number of the plug-in unit | REM610A55HCNR |
In order to obtain the identical functionality to that of the original product, 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 that helps to prevent dangerous situations from arising, should a non-suitable plug-in unit be fitted into a relay case.

**Danger!**

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

To install a plug-in unit into a case, first check that the lower handle is down in its initial position and then push the unit into the case until the locks click; see the figure below:

![Installing the plug-in unit into the case](image)

*Fig. 4.1.-2 Installing the plug-in unit into the case*
4.2. Mounting dimensions

<table>
<thead>
<tr>
<th>Frame width mm</th>
<th>Frame height mm</th>
<th>Frame depth mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>177</td>
<td>177</td>
<td>149.3</td>
</tr>
</tbody>
</table>

Fig. 4.2.-1 Main dimensions of RE_61_
4.3. **Flush mounting**

You will not need a separate mounting kit when flush mounting the relay. All mounting accessories are included in the case.

To flush mount the case to the cut-out in the panel, first loosen the 4 M5 fixing screws approximately 7 turns. Mount the case to the mounting cut-out and tighten the screws; see Fig. 4.3.-1. The allowed value range for the fixing screws’ tightening torque is 0.7...1Nm.

The enclosure class of the flush-mounted device is IP 54 on the front side, while the rear side fulfils the IP 20 requirements (top of the relay: IP 40).

**Caution!**

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

*Fig. 4.3.-1 Flush mounting of a case*
Fig. 4.3.-2  Relay (case and plug-in unit) flush mounted
4.4. Semi-flush mounting

The semi-flush mounting kit (1MRS050696) includes a raising frame, a gasket and screws and is needed for the semi-flush mounting of a relay. The gasket is used when an IP 54 degree of protection (according to the 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 figure below.

Caution!
A device equipped with optic connections requires a minimum depth of 130 mm
For instructions on how to mount the case to the raising frame, refer to section Flush mounting.

Fig. 4.4.-2 Relay (raising frame, case and plug-in unit) semi-flush mounted
4.5. Rack mounting

The relay can be mounted to a 19" rack using one of two different mounting panels. The type of mounting panel required depends on the number of relays mounted. When mounting only one relay, use mounting kit number 1MRS050694. When mounting two relays next to each other, use mounting kit number 1MRS050695.

Caution!

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

![19" rack mounting panels](image1)

*Fig. 4.5.-1 19"- rack mounting panels*

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

![Relay (case and plug-in unit) rack mounted.](image2)

*Fig. 4.5.-2 Relay (case and plug-in unit) rack mounted.*
4.6. Wall mounting

Kit 1MRS050697 is used for mounting the relay on a wall, that is, projection mounting, and contains two two-piece mounting brackets (frame and rail parts), a backplate and screws. The mounting brackets are made of steel sheet (light grey, Pantone 420). The kit also includes detailed mounting instructions and dimensions for screw holes.

A wall-mounted relay can be pulled out 160 mm and turned 45 (or 90) degrees downwards (or upwards) when the wires are to be connected. Part “A” locks the relay to selected (pushed-in or pulled-out) position, see figures below. The relay is released by pushing the locks. By loosening the knurled-head screw “B”, the relay can be rotated, see Fig. 4.6.-2.

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Fig. 4.6.-1 Relay (case and plug-in unit) wall mounted

Fig. 4.6.-2 Wall-mounted relay in pulled-out position and rotated
4.7. **19" rack mounting with RTXP 18**

The relay can be mounted together with a RTXP 18 test switch to a 19" rack using mounting kit number 1MRS050783. The kit includes the mounting panel (1) and the metallic frame (2) for mounting the RTXP 18 test switch to the panel, see the figure below.

Caution!

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 Flush mounting.

![Fig. 4.7.-1 Mounting of the relay and the frame for a RTXP 18 test switch](image_url)
4.8. **19” equipment frame mounting (Combiflex)**

The relay can be mounted to a 19” equipment frame (4U high, Combiflex) using two different types of mounting brackets. The type of mounting brackets to be ordered depends on whether the relay is to be installed to the frame as is or in combination with a test switch of type RTXP 18. When mounting only the relay, use two mounting brackets of type 1MRS061208 (1), see Fig. 4.8.-1. When mounting the relay with a test switch (RTXP 18) by its side, use one mounting bracket of type 1MRS061208 (1) and one of type 1MRS061207 (2), see Fig. 4.8.-2.

The mounting brackets are made of hot galvanized steel sheet. Mount the mounting brackets to the case using the same fixing screws as in flush mounting. The case includes all mounting accessories needed. Mount the case to the 19” equipment frame.

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**Fig. 4.8.-1  Mounting of only the relay to the 19” equipment frame**

**Fig. 4.8.-2  Mounting of the relay and test switch RTXP 18 to the 19” equipment frame**
4.9. Lens sensors for arc protection system (REF 610 only)

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

The place of installation of the optional lens sensors in the switchgear 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.

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.

Fig. 4.9.-1  Mounting of the lens sensor

Fig. 4.9.-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 while 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 anticlockwise 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 terminals (X2.1) of screw-compression type.

![Fig. 5.1 Screwdriver and insert bits for CT terminals of screw-compression type](image)

If terminals of ring-lug type are used:

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 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. The snap ferrite ring will open.

![Fig. 5.1.-1 Opening the snap ferrite ring before installation](image1)

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 measurement and lock the ring by closing it. The snap ferrite ring should be installed as close to the terminal block as possible. The figure below shows the preferred position of the snap ferrite ring after installation.

**Note!**

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 switchgear cubicle. This can easily be done by fastening the snap ferrite ring to the cubicle wall with a screw.

![Fig. 5.1.-2 Snap ferrite ring installed](image2)
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 to the right device according to the phase order and the connection diagram. Each terminal for CTs 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 (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_ 61_ with the RS-485 communication module*
Fig. 5.2.-2 Rear view of RE_ 61_ with the fibre-optic communication module for plastic and glass fibre
Fig. 5.2.-3  Rear view of RE_61_ with the DNP 3.0 communication module for RS-485
6. References

Other available manuals:

REM 610
- Technical Reference Manual, 1MRS 752263-MUM
- Operator’s Manual, 1MRS 752264-MUM

REF 610
- Technical Reference Manual, 1MRS 755310
- Operator’s Manual, 1MRS 755311

The following accessories are available:

<table>
<thead>
<tr>
<th>Item</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-flush mounting kit</td>
<td>1MRS050696</td>
</tr>
<tr>
<td>Inclined (25(^\circ)) semi-flush mounting kit</td>
<td>1MRS050831</td>
</tr>
<tr>
<td>Wall mounting kit</td>
<td>1MRS050697</td>
</tr>
<tr>
<td>19” Rack mounting kit, side-by-side</td>
<td>1MRS050695</td>
</tr>
<tr>
<td>19” Rack mounting kit, single relay</td>
<td>1MRS050694</td>
</tr>
<tr>
<td>19” Rack mounting kit for single relay and RTXP18</td>
<td>1MRS050783</td>
</tr>
<tr>
<td>19” equipment frame mounting (CombiFlex), plain bracket</td>
<td>1MRS061208</td>
</tr>
<tr>
<td>19” equipment frame mounting (CombiFlex), bracket for RTXP18</td>
<td>1MRS061207</td>
</tr>
<tr>
<td>Pre-manufactured lens-sensor and optic fibre for arc protection</td>
<td>1MRS120534-1.5, 1MRS120534-3.0, 1MRS120534-5.0</td>
</tr>
<tr>
<td>Front communication cable</td>
<td>1MRS050698</td>
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