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ABB Inc.
Distribution Automation
4300 Coral Ridge Drive
Coral Springs, FL 33065, USA
Toll-free: 1 (800) 523-2620
Phone: +1 954-752-6700
Fax: +1 954 345-5329
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This product has been designed to be connected and communicate data and information via a network interface which should be connected to a secure network. It is the sole responsibility of the person or entity responsible for network administration to ensure a secure connection to the network and to take the necessary measures (such as, but not limited to, installation of firewalls, application of authentication measures, encryption of data, installation of anti virus programs, etc.) to protect the product and the network, its system and interface included, against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB is not liable for any such damages and/or losses.

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This product complies with the directive of the Council of the European Communities on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive 2004/108/EC) and concerning electrical equipment for use within specified voltage limits (Low-voltage directive 2006/95/EC). This conformity is the result of tests conducted by ABB in accordance with the product standards EN 50263 and EN 60255-26 for the EMC directive, and with the product standards EN 60255-1 and EN 60255-27 for the low voltage directive. The product is designed in accordance with the international standards of the IEC 60255 series and ANSI C37.90. This IED complies with the UL 508 certification.
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 IED has to be carefully grounded.

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

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

- Whenever changes are made in the IED, measures should be taken to avoid inadvertent tripping.
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- This manual
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- Mounting the IED
  - Required tools
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## Section 5 Connecting
- Required tools
Section 1 Introduction

1.1 This manual

The installation manual contains instructions on how to install the IED. The manual provides procedures for mechanical and electrical installation. The chapters are organized in chronological order in which the IED should be installed.

1.2 Intended audience

This manual addresses the personnel responsible for installing the product hardware.

The installation personnel must have basic knowledge of handling electronic equipment.

1.3 Product documentation

1.3.1 Product documentation set

The application manual contains application descriptions and setting guidelines sorted per function. The manual can be used to find out when and for what purpose a typical protection function can be used. The manual can also be used when calculating settings.

The communication protocol manual describes a communication protocol supported by the IED. The manual concentrates on vendor-specific implementations.

The engineering guide provides information for IEC 61850 engineering of the protection IEDs with PCM600 and IET600. This guide concentrates especially on the configuration of GOOSE communication with these tools. The guide can be used as a technical reference during the engineering phase, installation and commissioning phase, and during normal service. For more details on tool usage, see the PCM600 documentation.

The engineering manual contains instructions on how to engineer the IEDs using the different tools in PCM600. The manual provides instructions on how to set up a PCM600 project and insert IEDs to the project structure. The manual also recommends
a sequence for engineering of protection and control functions, LHMI functions as well as communication engineering for IEC 61850 and other supported protocols.

The installation manual contains instructions on how to install the IED. The manual provides procedures for mechanical and electrical installation. The chapters are organized in chronological order in which the IED should be installed.

The operation manual contains instructions on how to operate the IED once it has been commissioned. The manual provides instructions for monitoring, controlling and setting the IED. The manual also describes how to identify disturbances and how to view calculated and measured power grid data to determine the cause of a fault.

The point list manual describes the outlook and properties of the data points specific to the IED. The manual should be used in conjunction with the corresponding communication protocol manual.

The technical manual contains application and functionality descriptions and lists function blocks, logic diagrams, input and output signals, setting parameters and technical data sorted per function. The manual can be used as a technical reference during the engineering phase, installation and commissioning phase, and during normal service.

### 1.3.2 Document revision history

<table>
<thead>
<tr>
<th>Document revision/date</th>
<th>Product version</th>
<th>History</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/2013-11-22</td>
<td>4.0</td>
<td>First release</td>
</tr>
</tbody>
</table>


### 1.3.3 Related documentation

1.4 Symbols and conventions

1.4.1 Symbols

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 of important facts and conditions.

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

Although warning hazards are related to personal injury, it is necessary to understand that under certain operational conditions, operation of damaged equipment may result in degraded process performance leading to personal injury or death. Therefore, comply fully with all warning and caution notices.

1.4.2 Document conventions

A particular convention may not be used in this manual.

- Abbreviations and acronyms in this manual are spelled out in the glossary. The glossary also contains definitions of important terms.
- Push-button navigation in the LHMI menu structure is presented by using the push-button icons. To navigate between the options, use ↑ and ↓.
- HMI menu paths are presented in bold. Select Main menu/Settings.
• WHMI menu names are presented in bold. Click **Information** in the WHMI menu structure.
• LHMI messages are shown in Courier font.
  
  To save the changes in non-volatile memory, select **Yes** and press ▶.
• Parameter names are shown in italics.
  
  The function can be enabled and disabled with the *Operation* setting.
• Parameter values are indicated with quotation marks.
  
  The corresponding parameter values are "Enabled" and "Disabled".
• IED input/output messages and monitored data names are shown in Courier font.
  
  When the function picks up, the **PICKUP** output is set to TRUE.
• Dimensions are provided both in inches and mm. If it is not specifically mentioned, the dimension is in mm.
Section 2  

Environmental aspects

2.1 Sustainable development

Sustainability has been taken into account from the beginning of the product design including the pro-environmental manufacturing process, long life time, operation reliability and disposing of the IED.

The choice of materials and the suppliers have been made according to the EU RoHS directive (2002/95/EC). This directive limits the use of hazardous substances which are the following:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Proposed maximum concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead - Pb</td>
<td>0.1%</td>
</tr>
<tr>
<td>Mercury - Hg</td>
<td>0.1%</td>
</tr>
<tr>
<td>Cadmium - Cd</td>
<td>0.01%</td>
</tr>
<tr>
<td>Hexavalent Chromium Cr (VI)</td>
<td>0.1%</td>
</tr>
<tr>
<td>Polybrominated biphenyls - PBB</td>
<td>0.1%</td>
</tr>
<tr>
<td>Polybrominated diphenyl ethers - PBDE</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

Operational reliability and long life time have been assured with extensive testing during the design and manufacturing processes. Moreover, long life time is supported by maintenance and repair services as well as by the availability of spare parts.

Design and manufacturing have been done under a certified environmental system. The effectiveness of the environmental system is constantly evaluated by an external auditing body. We follow environmental rules and regulations systematically to evaluate their effect on our products and processes.

2.2 Disposing of the IED

Definitions and regulations of hazardous materials are country-specific and change when the knowledge of materials increases. The materials used in this product are typical for electric and electronic devices.
All parts used in this product are recyclable. When disposing of an IED or its parts contact a local waste handler who is authorized and specialized in disposing electronic waste. These handlers can sort the material by using dedicated sorting processes and dispose of the product according to the local requirements.

Table 2: Materials of the IED parts

<table>
<thead>
<tr>
<th>IED</th>
<th>Parts</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case</td>
<td>Metallic plates, parts and screws</td>
<td>Steel, aluminium</td>
</tr>
<tr>
<td></td>
<td>Plastic parts</td>
<td>PC&lt;sup&gt;1)&lt;/sup&gt;, LCP&lt;sup&gt;2)&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Electronics plug in module</td>
<td>Various</td>
</tr>
<tr>
<td>Plug-in unit</td>
<td>Electronics plug in modules</td>
<td>Various</td>
</tr>
<tr>
<td></td>
<td>Electronics LHMI module</td>
<td>Various</td>
</tr>
<tr>
<td></td>
<td>Plastic parts</td>
<td>PC, PBT&lt;sup&gt;3)&lt;/sup&gt;, LCP, PA&lt;sup&gt;4)&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Metallic parts</td>
<td>Aluminium</td>
</tr>
<tr>
<td>Package</td>
<td>Box</td>
<td>Cardboard</td>
</tr>
<tr>
<td>Attached material</td>
<td>Manuals</td>
<td>Paper</td>
</tr>
</tbody>
</table>

1) Polycarbonate
2) Liquid crystal polymer
3) Polybutylene terephthalate
4) Polyamide
Section 3  Unpacking, inspecting and storing

3.1  Removing transport packaging

IEDs require careful handling.

1. Examine the delivered products to ensure that they have not been damaged during the transport.
2. Remove the transport packaging carefully without force.

💡 The cardboard packaging material is 100% recyclable.

3.2  Inspecting the product

3.2.1  Identifying the product

1. Locate the IED's order number from the label on top of the plug-in unit.
2. Compare the IED's order number with the ordering information to verify that the received product is correct.

3.2.2  Checking delivery items

Check that all items are included in the delivery in accordance with the delivery documents.

3.2.3  Inspecting the IED

IEDs require careful handling before installation on site.

• Check the IED to see if any damage occurred during transportation.

If the IED has damaged during transportation, make a claim against the transport contractor, and notify the local ABB representative.
3.2.4 Returning an IED damaged in transit

If damage has occurred during transport, appropriate actions must be taken against the latest carrier. Please inform the nearest ABB office or representative. Notify ABB immediately if there are any discrepancies in relation to the delivery documents.

3.3 Storing

If the IED is stored before installation, it must be done in the original transport casing in a dry and dust free place in accordance with ANSI C37.90.0. Observe the environmental requirements stated in the technical manual.
Section 4 Mounting

4.1 Checking environmental conditions and mounting space

The mechanical and electrical environmental conditions at the installation site must be within the limits described in the technical manual.

- Avoid installation in dusty, damp places.
- Avoid places susceptible to rapid temperature variations, powerful vibrations and shocks, surge voltages of high amplitude and fast rise time, strong induced magnetic fields or similar extreme conditions.
- Check that sufficient space is available.
  Sufficient space is needed at the front and rear of the IED to allow access to wires and optical fibers and to enable maintenance and future modifications.
  For more details of the checks required for different type of mounting methods, see the respective chapters, such as rack mounting or flush mounting.

4.2 Detaching and installing the plug-in unit

4.2.1 Detaching the plug-in unit

Before detaching the plug-in unit from the case, the auxiliary voltage must be disconnected. Hot swapping may be done only under special circumstances, see the application manual for details.
1. Turn off the power.
2. Open the seal on the front panel by removing the sealing wire, if found.
3. Loosen the knurled screws on the face of the unit and gently remove the face and attached circuit board by grasping the handles on either side of the front panel and pulling the unit straight forward.
   Pulling the board out at an angle or otherwise stressing the board on extraction may damage the unit. Once removed from the case, position the unit face down on a static secured mat.

Do not touch terminals inside the case after removing the plug-in unit. Live terminals can be inside the case.

The signal connectors are left open when the plug-in unit is detached. The CT inputs are still connected to auxiliary current transformers in the analog input module mounted in the case. Thus, CTs are not disconnected or open-circuited. The VT connections are not affected either.
4.2.2 Installing the plug-in unit

1. To reinstall the unit into the case, align and insert the lips on both sides of the tray into the guide rails on the inside walls of the case.

![Guide rail inside the case](image)

2. Push the unit straight inward until it fully seats in the case.
3. Secure the knurled screws.
4. Push in the sealing wires and secure, if necessary.
   Make sure that the unit plugged-in corresponds to the case in which it is inserted based on application requirements.
Check that the plug-in unit and the case have the same serial number or compatible order code numbers before fitting the plug-in unit into the case.

Forcing a non-suitable plug-in unit into the case can break the plug-in unit and the case, and can cause danger.

4.3 Mounting the IED

4.3.1 Required tools

Use only adjustable torque screwdrivers, 5/16" wrench, 1/16" wrench or hex nut driver.

4.3.2 Rack mounting the IED

REF615R is supplied with mounting brackets attached for direct mounting on 19 inch rack system. The IED occupies 3U height in the rack system. No additional components are required.
Figure 3: Dimensions and isometric view of the IED

A 17.12 in. (434.9 mm)  H  18.312 in. (465.1 mm)
B 14.69 in. (373.1 mm)  I  2.25 in. (57.2 mm)
C 1.625 in. (41.3 mm)   J  5.22 in. (132.6 mm)
D 8.21 in. (208.5 mm)  K  9.08 in. (230.6 mm)
E 6.58 in. (167.1 mm)  L  8.33 in. (211.6 mm)
F 1.00 in. (25.4 mm)   M  1.59 in. (40.4 mm)
G 19.00 in. (482.6 mm)

1. Check the mounting space and environmental conditions.
   • When mounting on a swing rack, check that the depth of the unit along with connected wires (depth about 9 inches/225 mm and additional depth for the wires, fiber optic cables) can easily swing out from the panel.
   • Provide at least 2U space above and below the unit to provide adequate ventilation for the IED as well as for the other units in the neighbourhood.
   • Check that either the rack is in a dust-proof panel or the room in which the rack is mounted is well-insulated from environmental dust, water ingress and so on.

2. Mount the rack unit in a 19-inch rack.
3. Tighten the screws.
The IED is supplied with rack-mounting brackets on either side, flush with the IED front LHMI. When there is a limited space available at the back to accommodate the full depth of the IED, it is possible to shift the brackets on either side of the IED to have semi-flush mounting. Check that there is adequate space on the front of the unit for the semi-projection portion of the unit.

Check the allowed minimum bending radius from the optical cable manufacturer.

### 4.3.3 Flush mounting or semi-flush mounting the IED

A mounting kit is needed, when flush mounting or semi-flush mounting the IED in a panel.
Figure 5: Flush mounting kit details

1 6-32 × 3/8 Flat Hd Philips Mach Screw, 82°, 18-8 SS, B18.6.3  8
2 Mounting panel
3 #10, Lock washer, medium split, SSTL, ANSI B18.21.1  6
4 10-32 Hex nut, UNC, SSTL, ANSI B18.6.3  6
5 Panel mount bezel  1
6 Bezel gasket ABB #613641  1

Requirements for installation:

- Panel cut-out and holes for mounting screws as shown in Figure 6.
- For flush mounting, depth behind the panel should be about 9 inches (228.6 mm). Add about 2 inches space for wire, cable duct and so on.
- It should be possible to add or replace the flush mounted IED without excessive dismantling.

When space at the rear is a constrain, check if semi-flush mounting can be adopted.
• For semi-flush mounting, depth behind the panel should be about 7.4 inches (188.0 mm). Add about 2 inches space for wire, cable duct and so on.

Check the allowed minimum bending radius from the optical cable manufacturer.

![Figure 6: Panel cutout and drilling plan for flush or semi-flush mounting]

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>9.250 in. (235.0 mm)</td>
<td>E</td>
<td>6.062 in. (154.0 mm)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>18.500 in. (469.9 mm)</td>
<td>F</td>
<td>5.562 in. (141.3 mm)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>6 × ⌀ 0.220 in. (5.6 mm)</td>
<td>G</td>
<td>5.630 in. (143.0 mm)</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>17.500 in. (444.5 mm)</td>
<td>H</td>
<td>4 × R.030 (0.76) max</td>
<td></td>
</tr>
</tbody>
</table>

1. If the IED is with rack mounting brackets on either side, loosen the four #6-32 fixing screws and remove the brackets. Store them away as spares or for future use.
2. Remove the set screws from the top of the case.
3. Slip the bezel frame over the IED case with flange towards the front of the case. Adjust the position where the bezel has to be fixed as appropriate for flush or semi-flush mounting.
Figure 7: Fixing bezel hardware over the case

1. Dust cover assembly
2. Set screws removed
3. Mounting brackets removed
4. Panel mounting bezel
5. Bezel hardware

4. Attach the bezel frame to the case using 6-32 flat head screws from the kit and four screws left from the removal of the brackets.
5. Mount case on the panel by inserting the bezel through the panel cut-out.
6. Attach the unit to the panel by inserting bezel studs through the panel’s drilled holes. Use 10-32 hex nuts with lock washer from the bezel kit to secure the bezel.
7. Position the clear plastic dust cover (if ordered) on the front of the IED and tighten thumb screws to the bezel studs.
The cover can be used only for flush-mounted installation.

The allowed range for the fixing screws’ tightening torque is 6...9 inch-pounds (0.7...1 Nm).
4.3.4 Mounting lens sensors for an arc flash detector system

Arc flash detector is used to detect arc situations in air insulated metal-clad switchgear.

The arc flash detector system determines where in the switchgear cubicle the optional lens sensors are installed. See the application examples in the application manual for further information on the alternatives.
1. Drill a hole Ø 0.38 inches (10 mm) in the wall of the supervised space.

![Figure 9: Dimensions of the lens sensor](image)

- A 0.14 in. (3.5 mm)
- B 0.39 in. (9.9 mm)
- C Ø 0.37 in. (9.5 mm)
- D 0.75 in. (19.1 mm)

2. Fit the lens sensor into 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.
Figure 10: Mounting the lens sensor

3. Make sure that the cable tie lies in the groove of the sensor to prevent it from blocking the light.
Section 5
Connecting

5.1 Required tools

Only use a screwdriver and insert bits for Phillips (PH 2) cross-recessed head screws when handling terminals of screw-compression type.

5.2 Connecting wires

All connections are made on the rear of the case suitable for ring-lug connection. No soldering is needed.

• Connect each signal connector terminal with one 14 or 16 Gauge wire. Use 12 or 14 Gauge wire for CB trip circuit.
• Connect each ring-lug terminal for CTs/VTs with one 12 Gauge wire.

   See the application manual for product-specific connection diagrams.

5.3 Connecting protective grounding

   The ground lead must be at least a 10 Gauge wire. If the ground lead is long, the cross section of the wire must be increased.

   Use fine copper wire as the ground lead.

1. Loosen the protective ground screw to connect a separate ground protection lead.
Figure 11: The protective ground screw is located at the rear of the IED

The ground lead should be as short as possible but extra length is required for door mounting.

Each IED must have its own ground lead connected to the ground circuit connector.

2. Connect the ground lead to the ground bar.
   Use either stripped wire screwed between a washer cup and the protective ground screw or a ring lug.

   Select a suitable ring lug to fit under the screw.

3. Tighten the protective ground screw.
4. Support the ground lead so that it cannot break or weaken.
   Be aware of the mechanical, chemical and electrochemical environment.

5.4 Connecting analog signals

A connection diagram is needed to connect the analog signals.

1. Remove the fixing screw.
2. Slide the screw through the terminal lug and screw it back on.

5.4.1 Connecting current and voltage inputs

- Connect the wires from the CTs/VTs to the correct device according to the phase order and the connection diagram.
Each terminal for CTs/VTs is dimensioned for one 10 Gauge wire or for two wires of maximum 12 Gauge.

See the specific card variants from the application manual.

5.5 Connecting IED with a test switch

- When the IED is used with a test switch, connect the current and voltage transformers directly to the switch.

5.6 Connecting binary signals

- Connect the wires for the binary signals to the correct device according to the connection diagram.

Each terminal for binary input and output signal is dimensioned for one 14 or 16 Gauge wire.

5.7 Connecting power supply

Always make sure the IED’s ground terminal is connected and grounded effectively.

- Connect the auxiliary voltage of the IED to terminals 1 and 2.
- Connect the positive lead to terminal 1.

The permitted auxiliary voltage range of the IED is marked on top of the IED's LHMI.
5.8 Connecting communication

- Before connecting communication, check that the HW module has the correct communication interfaces.
  The communication module is located on the left side of the IED when viewing the case from the rear.

  See the technical manual for product-specific communication interfaces

5.9 Energizing the IED

- Before connecting the auxiliary power, check that the terminal strip is wired and placed correctly.
- Remove any protective packaging or cover before energizing the unit.

During the start-up all LEDs are lit for a short period.

- Green Normal LED starts to flash
- LCD lights up and IED start-up is displayed
- The main menu is displayed. A steady green Normal LED indicates a successful start-up.

If the IED detects a diagnostic error during start-up, the green Normal LED flashes and the internal fault code is displayed on the LCD.
5.10 Inner assembly of the IED

Figure 13 explains generally how the internal PCB and assemblies are mounted together.

Do not disassemble or assemble the internal components or repair or replace boards at site. For any repairs of boards or assemblies, please contact your local ABB representative.

Figure 13: Inner boards and components assembly of REF615R

1. Backplane PCB
2. PSM card
3. AIM3016/3017 card
4. COM card
5. CCEB
6. BIO card
7. Adaptor PCB
8. AIM3006 card
Section 6 Removing, repairing and exchanging

6.1 Product lifecycle

At some point of the product lifecycle, the IED is upgraded to a next generation unit. When selecting the original product, already consider the upgrading and extension possibilities that the specific product offers for its whole lifecycle.

IED-specific options can be found from Retrofit Solutions Database on the Internet www.abb.com by following the links within ABB Service Guide or via ABB Product Guide from the product specific Service & Support sheet.

6.2 Checking IED information

The IED information includes detailed information about the device, such as version and serial number. The IED information is shown on the display for a few seconds when the device starts up. The same information is found also in the IED menu.

1. Select Main Menu/Information.
2. Select a submenu with ▼ and ▲.
3. Enter the selected submenu with ▼.
4. Browse the information with ▼ and ▲.

The Product identifiers submenu contains product related information like product type, serial number, order number, production date, configuration name, SW version, SW date and HW revision.

The Site identifiers submenu contains information about the site where the IED has been installed.

The HW modules submenu contains information about the HW modules.

The System identifiers submenu contains the unique Technical key which cannot be changed.
6.3 Removing the IED

1. Turn off the power.
2. Detach the plug-in unit from the case.
3. Disconnect the wiring.
4. Loosen the four fixing screws.
5. Detach the case from the panel cut-out.

6.4 Sending the IED for repair

• In case of product problems, contact the nearest ABB office or representative for consultation and instructions.

6.5 Exchanging the IED

• To exchange the IED with another identical unit, remove the IED and install the new one.
  The exchangeable units can be found from the PartsOnLine system, see www.abb.com/partsonline. Use of PartsOnLine requires user registration.
• To exchange an IED to a different unit, change the case and connect the wires.
Section 7  Technical data

7.1  Case and HMI display variants

7.1.1  Front side of the IED

The IED is available with IEC and ANSI display variants.

Figure 14:  Front view with LHMI (ANSI variant)

Figure 15:  Front view with LHMI (IEC variant)

Table 3:  Large display

<table>
<thead>
<tr>
<th>Character size</th>
<th>Rows in the view</th>
<th>Characters per row</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small, mono-spaced (6x12 pixels)</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>
7.1.2 Rear side of the IED

![Rear view of the IED with communication module](image)

**Figure 16: Rear view of the IED with communication module**

7.2 Dimensions

![IED main dimensions](image)

**Figure 17: IED main dimensions**

<table>
<thead>
<tr>
<th>Letter</th>
<th>Measurement</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>17.12 in.</td>
<td>434.8 mm</td>
</tr>
<tr>
<td>B</td>
<td>14.69 in.</td>
<td>373.1 mm</td>
</tr>
<tr>
<td>C</td>
<td>1.625 in.</td>
<td>41.3 mm</td>
</tr>
<tr>
<td>D</td>
<td>8.21 in.</td>
<td>208.5 mm</td>
</tr>
<tr>
<td>E</td>
<td>6.58 in.</td>
<td>167.1 mm</td>
</tr>
<tr>
<td>F</td>
<td>1.00 in.</td>
<td>25.4 mm</td>
</tr>
<tr>
<td>G</td>
<td>19.00 in.</td>
<td>482.6 mm</td>
</tr>
<tr>
<td>H</td>
<td>18.312 in.</td>
<td>465.1 mm</td>
</tr>
<tr>
<td>I</td>
<td>2.25 in.</td>
<td>57.2 mm</td>
</tr>
<tr>
<td>J</td>
<td>5.22 in.</td>
<td>132.6 mm</td>
</tr>
<tr>
<td>K</td>
<td>9.08 in.</td>
<td>230.6 mm</td>
</tr>
<tr>
<td>L</td>
<td>8.33 in.</td>
<td>211.6 mm</td>
</tr>
<tr>
<td>M</td>
<td>1.59 in.</td>
<td>40.4 mm</td>
</tr>
</tbody>
</table>
Table 4: Dimensions

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td></td>
</tr>
<tr>
<td>With mounting ears</td>
<td>19 in. (482.6 mm)</td>
</tr>
<tr>
<td>Without mounting ears</td>
<td>17.12 in. (434.8 mm)</td>
</tr>
<tr>
<td>Height</td>
<td>5.22 in. (132.6 mm)</td>
</tr>
<tr>
<td>Depth</td>
<td>9.08 in. (230.7 mm)</td>
</tr>
<tr>
<td>Weight</td>
<td></td>
</tr>
<tr>
<td>Complete IED</td>
<td>11.9 lb (5.4 kg)</td>
</tr>
<tr>
<td>Plug-in unit (inner chassis) only</td>
<td>5.1 lb (2.31 kg)</td>
</tr>
</tbody>
</table>

7.3 Enclosure class

Table 5: Degree of protection of flush-mounted IED

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front side (with dust cover accessory)</td>
<td>IP 54</td>
</tr>
</tbody>
</table>
## Section 8 Accessories and ordering data

**Table 6: Tools**

<table>
<thead>
<tr>
<th>Item</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM600 V2.5 user tool</td>
<td>PCM600-25</td>
</tr>
</tbody>
</table>

**Table 7: Cables**

<table>
<thead>
<tr>
<th>Item</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable for optical sensors for arc protections 1.5 m</td>
<td>1MRS120534-1.5</td>
</tr>
<tr>
<td>Cable for optical sensors for arc protections 3.0 m</td>
<td>1MRS120534-3.0</td>
</tr>
<tr>
<td>Cable for optical sensors for arc protections 5.0 m</td>
<td>1MRS120534-5.0</td>
</tr>
</tbody>
</table>

**Table 8: Mounting accessories**

<table>
<thead>
<tr>
<th>Item</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bezel/cover kit for panel mounting</td>
<td>2RGA018542A0001</td>
</tr>
</tbody>
</table>

**Table 9: Spare parts**

<table>
<thead>
<tr>
<th>Item</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ45 plug</td>
<td>2RGA019358P0001</td>
</tr>
</tbody>
</table>

**Table 10: Test switches**

<table>
<thead>
<tr>
<th>Item</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>FT-1, FT-14 and FT-19 Flexitest switches</td>
<td>See Descriptive bulletins DB 41-077 and DB 41-078 on <a href="http://www.abb.com/substationautomation">www.abb.com/substationautomation</a></td>
</tr>
</tbody>
</table>
Section 9  Glossary

AIM  Analog input module
ANSI  American National Standards Institute
BIO  Binary input and output
CCEB  Communication card extension board
CT  Current transformer
EMC  Electromagnetic compatibility
HMI  Human-machine interface
HW  Hardware
IEC 61850  International standard for substation communication and modeling
IED  Intelligent electronic device
IET600  Integrated Engineering Toolbox
IP  Internet protocol
LCD  Liquid crystal display
LCP  Liquid crystal polymer
LED  Light-emitting diode
LHMI  Local human-machine interface
PA  Polyamide
PBT  Polybutylene terephthalate
PC  1. Personal computer
  2. Polycarbonate
PCB  Printed circuit board
PCM600  Protection and Control IED Manager
PSM  Power supply module
RoHS  Restriction of the use of certain hazardous substances in electrical and electronic equipment
SW  Software
VT  Voltage transformer
WHMI  Web human-machine interface