INCOM communications adapter module

Instructions apply to:

![UL489: PD-NF, IEC: PD-NF, IZMX16](UL489: PD-RF, IEC: PD-RF, IZMX40)

**WARNING**

1. ONLY QUALIFIED ELECTRICAL PERSONNEL SHOULD BE PERMITTED TO WORK ON THE EQUIPMENT.
2. ALWAYS DE-ENERGIZE PRIMARY AND SECONDARY CIRCUITS IF A CIRCUIT BREAKER CANNOT BE REMOVED TO A SAFE WORK LOCATION.
3. DRAWOUT CIRCUIT BREAKERS SHOULD BE LEVERED (RACKED) OUT TO THE DISCONNECT POSITION.
4. ALL CIRCUIT BREAKERS SHOULD BE SWITCHED TO THE OFF POSITION AND MECHANISM SPRINGS DISCHARGED.

FAILURE TO FOLLOW THESE STEPS FOR ALL PROCEDURES DESCRIBED IN THIS INSTRUCTION LEAFLET COULD RESULT IN DEATH, BODILY INJURY, OR PROPERTY DAMAGE.

**WARNING**

THE INSTRUCTIONS CONTAINED IN THIS IL AND ON PRODUCT LABELS HAVE TO BE FOLLOWED. OBSERVE THE FIVE SAFETY RULES:

- DISCONNECTING
- ENSURE THAT DEVICES CANNOT BE ACCIDENTALLY RESTARTED
- VERIFY ISOLATION FROM THE SUPPLY
- EARTHING AND SHORT-CIRCUITING
- COVERING OR PROVIDING BARRIERS TO ADJACENT LIVE PARTS

DISCONNECT THE EQUIPMENT FROM THE SUPPLY. USE ONLY AUTHORIZED SPARE PARTS IN THE REPAIR OF THE EQUIPMENT. THE SPECIFIED MAINTENANCE INTERVALS AS WELL AS THE INSTRUCTIONS FOR REPAIR AND EXCHANGE MUST BE STRICTLY ADHERED TO PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE SWITCHBOARD.
Section 1: General information

The INCOM Communications Adapter Module (ICAM) (Figure 1) is an accessory that will operate as a communicating device in conjunction with a compatible trip unit/breaker in a master communications network (Figure 2).

The INCOM network sends a burst of data as a 92 - 115.2 kHz carrier signal at a 9600 baud rate over twisted pair conductors to interconnect the many devices comprising the network. These bursts of data can be captured and used in a variety of ways depending upon the manner in which the master computer program is configured. For example, all the settings can be viewed via the master computer. Also, the data for the individual phase current values is available on the network. The software will select the appropriate data, decode it, and display it in a useful manner. Following an overcurrent trip operation, the cause of trip, the value, and the phase or ground current responsible for the trip are available on the network.

The INCOM communications adapter module is a slave device and, as such, requires a master device for control command initiation. Each INCOM communications adapter module provides:

- Circuit breaker Open/Close/Reset control;
- Flashing status LED, indicating the module has power;
- INCOM communication Enable/Disable selection jumper for remote Open/Close control;
- DIN rail mounting (11 mm H, 28 mm W, DIN rail minimum requirement);
- Input power for module from 24 Vdc.

The INCOM communications adapter module is designed to be installed, operated, and maintained by adequately trained people. These instructions do not cover all details or variations of the equipment for its storage, delivery, installation, checkout, safe operation, or maintenance.

If you have any questions or need additional information or instructions, please contact your local Eaton representative or visit www.eaton.com.
Section 2: Installation of remote mount CAM module adapter

This section illustrates the proper installation of the adapter for remote mounting of the CAM module.

Table 1. Kit contents.

<table>
<thead>
<tr>
<th>Qty.</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Adapter harness – CAM module to breaker secondary</td>
</tr>
<tr>
<td>1</td>
<td>Ferrule 2-18 AWG (Weidmüller PN 9004310000)</td>
</tr>
<tr>
<td>1</td>
<td>Installation instructions</td>
</tr>
</tbody>
</table>

This kit does not include the DIN rail for mounting the CAM module.

This kit provides an additional cable adapter for connection from the communications adapter module (CAM) to the circuit breaker when the CAM needs to be mounted remotely such as with a fixed mount circuit breaker (see Figure 3). The adapter consists of a 1 m (3 ft.) length of cable that connects between the CAM module and the breaker secondary. The CAM module should be mounted on a length of standard grounded DIN rail.

**Figure 3.** Connection of adapter cable to the circuit breaker.
Section 3: Basic wiring rules

The following basic rules apply given a system consisting of a single daisy-chained main cable link between master and slave devices (Figure 2). For more complex considerations including star configurations, please refer to the INCOM wiring specification TD17513.

1. Recommended cable specifications:
   - Eaton cable catalog #IMPCABLE, Style #2A95705G01;
   - Belden 9463 cable family;
   - Identical Commscope or Quabbin cables.

2. The maximum system capacity is 10,000 ft. (3048 m) of communications cable and 1,000 slave devices.

3. Non-terminated taps, up to 200 ft. (61 m) in length, off the main link are permitted, but add to the total cable length.

4. Make sure there is a twisted wire pair present that is intended for INCOM network use. Use shielded twisted pair wire to connect each slave device to the INCOM network, daisy-chain style. The polarity of the twisted pairs is not important.

5. Ferrules for use in double connection point daisy-chain wiring are available (Weidmuller part 900431000 [2-#18 AWG]).

The numbered flags on each wire of the cable directly correspond with the breaker secondary terminal designators. When connecting the adapter to the CAM module, ensure the unpopulated plugs are positioned on the left hand side as indicated in Figure 4. Note that the CAM module connector is keyed to fit in only one orientation.

The drain wire may be connected to the SHIELD terminal on the MCAM or the ICAM. Or it may be connected to the grounded DIN rail. If a PCAM or ECAM module is used use the 2-18 AWG ferrule provided to connect the cable drain wire for a proper connection to the power supply ground terminal as shown in Figure 5.
Section 4: INCOM communications adapter module connections

**WARNING**
ALL APPLICABLE SAFETY CODES, SAFETY STANDARDS, AND SAFETY REGULATIONS MUST BE STRICTLY ADHERED TO WHEN INSTALLING, OPERATING, OR MAINTAINING THIS EQUIPMENT. FAILURE TO COMPLY COULD RESULT IN DEATH, BODILY INJURY, OR PROPERTY DAMAGE.

For installation specifics, refer to Figures 7 and 8 on pages 6 and 7 respectively for wiring diagrams, as well as pin-out Table 2 (Power connector) and Table 3 (INCOM connector) on this page.

**Table 2. Power connector pin-outs**

<table>
<thead>
<tr>
<th>Pin number</th>
<th>Input signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24 Vdc +</td>
</tr>
<tr>
<td>2</td>
<td>24 Vdc –</td>
</tr>
<tr>
<td>3</td>
<td>Control signal common</td>
</tr>
<tr>
<td>4</td>
<td>Control open signal</td>
</tr>
<tr>
<td>5</td>
<td>Control close signal</td>
</tr>
</tbody>
</table>

1 Module power uses a 5-pin input connector. Power requirement is 24 Vdc, 10 watts.

**Table 3. INCOM connector pin-outs**

<table>
<thead>
<tr>
<th>Pin number</th>
<th>Input/output signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>INCOM carrier network</td>
</tr>
<tr>
<td>2</td>
<td>INCOM carrier network</td>
</tr>
<tr>
<td>3</td>
<td>Shield</td>
</tr>
</tbody>
</table>

1 Connect shield wire to ground at master device only. Interconnect shielding where devices are daisy-chained.

Section 5: Jumpers and indicator LEDs

Refer to Figure 6 to become familiar with specific jumper and LED locations on the INCOM communications adapter module.

**Figure 6. INCOM communications adapter module (front view, close up).**

**Status LED**
This indicator will be flashing green whenever the module is powered up and when the microprocessor is executing instructions. When the INCOM communications adapter module is connected to a PXR for the first time, this LED will alternate red and green to signal a learning process between both units. This automatic process will take approximately 15 seconds and occurs only once during the initial startup. The LED will also flash red if the module is not connected to or unable to communicate with a PXR trip unit.

**INCOM control jumper**
This jumper provides the user with a means of enabling or disabling remote communication control commands to the PXR trip unit. With jumper placed in the ENABLE position, remote slave action commands, such as Open and Close, can be acted upon. With the jumper in the DISABLE position, commands will not be accepted.

**Source/residual ground selection jumper**
This jumper is not applicable and does not function for PXR style trip units. The source/residual ground setting is programmed via the PXR trip unit front panel display.
The communications module is a separate device that snaps onto a remote mounted DIN rail.

The trip unit auxiliary voltage is 24 Vdc ±10% and should be sourced from a reliable service, with 10 watt capability.

INCOM communication cable is a two conductor with shield type wire in “daisy chain” configuration. The recommended cable (Belden # 9643 or equivalent) has a twisted-pair of wires (#20 AWG stranded 7 x 28 conductors with PVC insulation) having an aluminum/mylar foil shield with drain wire. The polarity of the twisted-pair is not important. Ground the shield at the host computer (device).

Set the jumper on the module to enable or disable the remote open and close communication control commands, as desired.

Connectors are UL®/CSA® rated 300 V, VDE rated 250 V. Recommended: (BL 3.5/90/5BK) Orientation: 90° lead exit, but other lead orientations are possible. Wire gauge: #18 AWG/0.82 mm.

The final device in the daisy-chain configuration must have a 100 ohms termination resistor installed across terminals #1 and #2 on TB #2.

Figure 7. INCOM communication with PXR 20/25.
Choose spring release coil voltage rating as desired if communications is required.

Choose shunt trip rating to be the same as spring release rating if communication is required.

Control power rating must match ST and SR coil rating.

Close duration is two seconds on communication activation when communications control is enabled.

Figure 8. Spring release and shunt trip wiring as shown for optional communication close or open capability.
Section 6: Viewing/setting INCOM address

The PXR 20/25 trip unit is used as the means to display and modify the programmed INCOM address setting of the ICAM module. All modules are shipped with a factory set default address of 4094. The allowable address range is 0001 - 4094.

A trip unit containing a full display, such as the PXR 20 or PXR 25, will provide the ICAM settings in menu form. To set or view ICAM settings on a PXR 20 or PXR 25 limited display, the following sequence is used.

To set or view the address and baud rate, go to the "Settings - Communications - INCOM CAM" menu on the PXR trip unit.

A PXR trip unit display screen is shown in Figure 9. For the PXR INCOM communications adapter module, two communication settings are available and can be viewed as shown in Table 4.

![INCOM CAM](image)

Table 4. ICAM communications setting ranges.

<table>
<thead>
<tr>
<th>Allowable range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication address</td>
</tr>
<tr>
<td>Baud rate</td>
</tr>
</tbody>
</table>

Figure 9. PXR trip unit INCOM settings screen.

Section 7: Network communication protocols

The INCOM communication for the INCOM communications adapter module is based on a master (PC, communicating trip unit, etc.) - slave (INCOM communications adapter module) set of protocols.

For more comprehensive information on the INCOM communications adapter module communication protocol, please see the following reference material:
IL17384 - Part A: INCOM Communications Standard
**Section 8: Troubleshooting**

The most common issues experienced with the installation of a INCOM communications adapter module are addressed below. If you have additional questions or need further information and/or instructions, please contact your local Eaton representative or visit www.eaton.com.

**Observation 1 - Status LED not flashing.**
**Action** - Verify proper input power to the module connectors.

**Observation 2 - Status LED flashing green, but module does not change state in response to master command requests.**
**Action** - Verify correct module address.
**Action** - Verify communication cable is connected correctly from master to module.
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