ECAM instructions for ethernet communications adapter module

Instructions apply to:

<table>
<thead>
<tr>
<th>UL489</th>
<th>IEC</th>
<th>UL489</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>: PD-NF</td>
<td>: PD-NF, IZMX16</td>
<td>: PD-RF</td>
<td>: PD-RF, IZMX40</td>
</tr>
</tbody>
</table>

**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 ethernet communications adapter module (Figure 1) is an accessory that operates as a communicating device in conjunction with a compatible PXR trip unit/breaker via an Ethernet network. The Ethernet Communications Adapter Module (ECAM) provides for monitoring and control of the PXR trip unit using a standard web browser. Supported functions include:

- Metering;
- Control;
- Alarms;
- Command, event and data logging;
- Setpoint monitoring;
- Alarm and logging configuration;
- Breaker control.

Additionally, the ECAM provides data communications to the Eaton Power Xpert Software as an easy means of centralizing and gathering data for long-term data archival, analysis, and trending. Available data differs depending on PXR style. For a complete list of PXR models and functionality, please refer to MN013003EN.

Figure 1. Ethernet communications adapter module (ECAM).

Each ECAM provides:

- Flashing status LED indicating the module has power;
- Ethernet control enable/disable selection jumper;
- DIN rail mounting (11 mm h, 28 mm w, DIN rail minimum requirement);
- Input power for module from 24 Vdc.

The ECAM is designed to be installed, operated, and maintained by adequately trained personal. 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 Sales representative.
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 (Weidmuller 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 2). The adapter consists of a 1 meter (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 2. Connection of adapter cable to the circuit breaker.
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 3. Note that the CAM module connector is keyed to fit in only one orientation.

Section 3: Basic wiring rules

The ECAM communication wiring requires a shielded Ethernet cable. Please refer to the IMPACC™, wiring specification TD17513, for detailed wiring instructions.

Note: For technical documents, please go to www.eaton.com and search for “TD17513.”

Figure 3. Connection to the CAM module.

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 4.

Figure 4. Connection to the CAM module.
Section 4: Ethernet 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 6 and 7 on pages 5 and 6 respectively for wiring diagrams, as well as pin out Table 2 (power connectors) and Table 2 (ethernet connectors) 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>

For installation specifics, refer to Figures 6 and 7 on pages 5 and 6 respectively for wiring diagrams, as well as pin out Table 2 (power connectors) and Table 2 (ethernet connectors) on this page.

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

<table>
<thead>
<tr>
<th>RJ45 pin number</th>
<th>10/100 base-T signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Transmit +</td>
</tr>
<tr>
<td>2</td>
<td>Transmit -</td>
</tr>
<tr>
<td>3</td>
<td>Receive +</td>
</tr>
<tr>
<td>4</td>
<td>Unused</td>
</tr>
<tr>
<td>5</td>
<td>Unused</td>
</tr>
<tr>
<td>6</td>
<td>Receive -</td>
</tr>
<tr>
<td>7</td>
<td>Unused</td>
</tr>
<tr>
<td>8</td>
<td>Unused</td>
</tr>
</tbody>
</table>

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

Section 5: Jumpers and indicator LEDS

Refer to Figure 5 to become familiar with specific jumper and LED locations on the ECAM.

**Figure 5. ECAM communications adapter module (front view - close-up).**

**Microcontroller LED (status)**

The status indicator will be flashing green when the module is powered up and the microprocessor is executing instructions. On power-up, the status LED will be red for approximately 45 seconds while the module boots. When the ethernet communications adapter module is connected to a PRX trip unit for the first time, this LED will alternately flash red and green to signal a learning process between both units. This automatic process will take approximately 20 seconds and occurs only once during the initial startup. The LED will also flash red if the module is not connected or unable to communicate with a PXR trip unit.

**Ethernet control jumper**

The ethernet control jumper provides the user with a means of enabling or disabling remote communication control commands to the PXR trip unit. With the jumper placed in the “Enable” position, remote control commands, such as open, close and reset can be executed. With the jumper in the “Disable” position, commands will not be accepted.

**Source/residual ground selection jumper**

The Source/Residual ground setting is programmed via the PXR trip unit front panel display.
1. The communication module is a separate device that snaps onto a remote mounted DIN rail.
2. The communications module voltage requirement is 240 VDC ± 10% and should be sourced from a high quality supply (6 watts is the burden of the CAM).
3. A shielded CAT5, CAT5e, or CAT6 cable for 10/100 Mb/s ethernet is recommended. The shielded cable is recommended for the best communication reliability in industrial environments. The metal jacket provides a ground to the housing on the ECAM, which is grounded to the breaker housing via the CAM ground pin. Be sure to ground the breaker housing per the instructions in the breaker IL.
4. Set the jumper on the module to enable or disable the communications control as desired.
5. Use shielded ethernet cable.

Figure 6. Ethernet communication with PXR 20/25.
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Figure 7. Communications control (SR and ST wiring).

1. Spring release and shunt trip wiring as shown for optional communication close or open capability.
2. Choose spring release coil voltage rating as desired if communication is required.
3. Choose shunt trip voltage rating to be the same as spring release voltage rating if communication is required.
4. Control power voltage rating must match ST and SR coil voltage rating.
5. Close duration is two seconds on communication activation when COMM control is enabled.
Section 6: Viewing/setting Ethernet address

The PXR trip unit is used as the means to display and modify the programmed Ethernet settings of the ECAM Module. All modules are shipped with the following factory default settings:

- **DHCP enabled**: False
- **IP address**: 10.0.0.2
- **Subnet mask**: /26
- **Default gateway**: 10.0.0.1 (the first two bytes are the same as the IP Address)

For the Ethernet Communications Adapter Module, nine communication settings are available and can be viewed as shown in Table 4. A block diagram of the setting sequence and programming options is shown in Figure 8.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Default</th>
<th>Allowable range</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHCP enabled</td>
<td>0</td>
<td>0 = False; 1 = True</td>
</tr>
<tr>
<td>IP address / default gateway byte 3</td>
<td>10</td>
<td>0 to 255</td>
</tr>
<tr>
<td>IP address / default gateway byte 2</td>
<td>0</td>
<td>0 to 255</td>
</tr>
<tr>
<td>IP address byte 1</td>
<td>0</td>
<td>0 to 255</td>
</tr>
<tr>
<td>IP address byte 0</td>
<td>2</td>
<td>0 to 255</td>
</tr>
<tr>
<td>Subnet mask (CIDR notation)</td>
<td>26</td>
<td>16 to 32</td>
</tr>
<tr>
<td>Default gateway byte 1</td>
<td>0</td>
<td>0 to 255</td>
</tr>
<tr>
<td>Default gateway byte 0</td>
<td>1</td>
<td>0 to 255</td>
</tr>
<tr>
<td>Reset pin</td>
<td>0</td>
<td>0 to 255</td>
</tr>
</tbody>
</table>

The subnet mask uses classless inter-domain routing (CIDR) notation to minimize the number of setpoints required. In CIDR notation, a prefix is shown as a 4-octet quantity, followed by the “/” (slash) character, followed by a decimal value between 0 and 32 that describes the number of significant bits. For example, network 192.168.0.0 with a network mask of 255.255.0.0 is represented as 192.168.0.0/16, with the “/16” indicating the most significant 16 bits are ones and the least significant 16 bits are zeros. Similarly, 192.168.99.0/26 indicates the most significant 26 bits are ones and the least significant 6 bits are zero. This represents a mask of 255.255.255.192, resulting in 64 available addresses from 192.168.99.0 to 192.168.99.63 for devices on this subnet.

The first two bytes of the default gateway are the same as the first two bytes of the IP address.

The reset PIN setpoint is provided to clear passwords and ECAM configuration information. Three special numeric values may be entered to clear the control password, reset the admin password, or reset the ECAM configuration information:

- 9 reset control password;
- 15 reset admin password;
- 31 reset ECAM configuration information.

To set or view the ECAM settings from Table 4, go to the “Settings - Communications - Ethernet CAM” menu on the PXR trip unit. The screen is shown in Figure 8.
Section 7: Troubleshooting

The most common issues experienced with the installation of a ECAM are addressed below. If you have additional questions or need further information and/or instructions, please contact your local Eaton sales representative.

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

Observation 2 - Status LED flashing, but module does not change state in response to master command requests.
Action - Verify correct module address.
Action - Verify the communication cable is connected correctly from the master to the module.
Action - Verify the ethernet control jumper is in the “Enable” position.

Section 8: ECAM operation and web page screen shots

The following screen shots show the ECAM web interface with an 520M trip unit and are used to demonstrate ECAM functionality. Data points will differ depending on trip unit style. For a complete list of PXR models and functionality, please refer to MN013003EN.

Login Screen: Default login is:

- User name: admin
- Password: admin

Screen Shot 1. Login.

The first action after powering the ECAM module is to set the clock. Proper time setting is required for accurate time stamping of data, command, and event logs.

Select “ECAM Configuration” then “Date/Time” to configure the ECAM clock.
Click the Locale tab and select the proper time zone from the drop-down list.
Screen Shot 3.

Click <Apply Settings> for the selected time zone to take effect.

Browse to the Synchronization tab under ECAM Configuration then Date/Time.

Three options are provided for time synchronization:

1. NTP – select NTP, enter up to three NTP server IP addresses, and click <Use NTP>.
3. Trip Unit – select and click <Use Trip Unit> to permit the trip unit to set the ECAM time.
Screen Shot 4.

Verify the proper time.
Screen Shot 5. Data View -> Summary: Default web page to view trip unit information, status, and currents.
Click the Controls hyperlink: open/close breaker if enabled, enable/disable Maintenance mode, reset trip.

Screen Shot 6. Trip unit control.
Data view - Setpoints

PXR 20/25 trip units support read-only access to setpoints over ECAM.

Screen Shot 7. Data View - Setpoints.
Alarm status

View active alarms; Acknowledge/close active alarms; Save alarms to a file.

Screen Shot 8. Alarm status.
Graphical log

Enter the starting and ending dates by clicking on the Date box and selecting the date from the calendar.
Select the starting and ending time using the drop down indicator. Select the time by clicking on it.
Select the value to graph from the right hand drop down box for Plot Selection. Double click the value or select the value and click the <Add> button to graph the parameter.
Separate y axis scaling values are provided for each value graphed.

Data log

Enter the starting and ending dates by clicking on Date box and selecting the date from the calendar.
Select the starting and ending time using the drop down indicator. Select the time by clicking on it.
Enter the number of rows to display on the page in the table Height box.
Click <Apply> to view the logged data.
The Data log can be saved to a file or erased using the buttons provided.

Screen Shot 10. Data logs.
Event log

Either view or erase the Event log using the buttons provided. "View the log" opens a csv file.

Screen Shot 11. Event
Command log
Displays active, terminated, and denied commands executed.

Screen Shot 12. Commands.
Access control

The customer can configure ECAM to allow different levels of security for different users. When the customer first logs into ECAM using the admin, admin login credentials, they are referred to as the “Superuser.” The “Superuser” has the ability to edit/delete user names, update the ECAM firmware, and reset the ECAM to factory settings. For added security the “Superuser” password can only be changed via the setpoints interface from the trip unit.

The next level of user is the “Administrative” or “aUser” (user name begins with an a). The “aUser” can view and control the trip unit, but cannot update the firmware, reset to factory defaults, or create/delete user names and passwords.

The lowest level of security is the “User” (user name begins with a u). The “User” can only view the data on ECAM. All other functions are disabled at this level.

An optional control password can be configured to provide additional security for control functions. This password only needs to be entered once and remains in effect until the web browser session is closed.

The first tab (Web Server) on the Access Control/Web page allows the user to change the ethernet port.

Screen Shot 13. Access control.
The second tab (security) on the Access Control/Web page is where the optional control password is set and changed.

The third tab (Users) on the Access Control/Web page is where the user and administrative user names and passwords are managed.

Screen Shot 15. Access control (continued).
Import/export

The ECAM configuration for alarms, logging, and email can be saved to and retrieved from a file. Click <Create Configuration Archive> on the "Configuration Files" tab to create the archive, then click the link provided to save the archive file to your PC.

Screen Shot 16. Import/export.
ECAM instructions for ethernet communications adapter module

Click <Choose File> on the “Save Configuration to ECAM” tab to retrieve the archive file from your PC and save it to ECAM.

Screen Shot 17. Import/export (continued).
Network
Change network addresses (i.e., static IP, subnet mask, default gateway) and Enable / Disable DHCP. ECAM is shipped with DHCP disabled and a default IP address of 10.0.0.2.

Screen Shot 18. Network.
Email
The ethernet CAM module will send email notifications of events when properly configured.

Screen Shot 19. Trip unit email configuration.
Step 1: Enter the SMTP server settings provided by your organization, ensuring the “Sender Name” field contains an appropriate description. For example, if using two PXR 20 trip units/ECAMs, enter “PXR 20 ECAM 1” or “PXR 20 ECAM 2” as the Sender Name. Click the <Submit Changes> button.

Screen Shot 20. Trip unit email configuration (continued).
Step 2: Enter the recipient name and email addresses, and select the type of events to trigger email notifications. Click the < Submit > button. A test email can be sent from this web page to verify proper recipient and mail server configuration.

Screen Shot 21. Trip unit email configuration (continued).
Step 3: Select the events to trigger email notification on the Templates tab of the Email web page and click <Submit>.

Screen Shot 22. Trip unit email configuration (continued).
Firmware show ECAM and trip unit firmware versions.

Follow these steps to upload new firmware to ECAM.

1. Make sure the latest firmware file is loaded on your local hard drive.
2. Click <Upload Firmware> and select the latest firmware file.
3. Once the file has been selected, double click the filename or click <Open> to download the file.
4. You will be asked to wait a few minutes while the new firmware is loaded. When the new firmware is ready, ECAM will prompt you to click <Yes> to complete the firmware update.
5. Click <Yes> to reboot ECAM and wait approximately two minutes for ECAM to reboot.

Note: The Firmware page also has a button that will clear all configuration data from ECAM memory. Once the command has been initiated, all configurations will be lost.

Screen Shot 23. Firmware configuration settings.
Alarm configuration

Enable alarms and set upper and lower limits for analog alarm values.

Log configuration

Screen Shot 25. Log configuration.
Setpoint configuration

The PXR 20/25 trip unit settings are configured via rotary switches and the LCD screen on the face of the trip unit itself. This page mirrors the setpoints as they are configured on the trip unit.

Screen Shot 26. Setpoint configuration.
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