Honeywell

# Experion PKS
# PROFIBUS Gateway Module User's Guide

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# 2 PROFIBUS Gateway Module (PGM) Overview

The PROFIBUS Gateway Module is an interface module that can be used with C300 Controller to connect and communicate with the Profibus devices. The PGM is developed in the Series C form factor for use with the C300 Controller. The PGM module is an FTE resident module.

As a PROFIBUS gateway, PGM is always a master and communicates with the PROFIBUS compatible slave devices.

The PGM supports the following functions.

- Redundancy
- Experion events and alarms
- Experion Bulk Build utility
- Experion import/export functionality
- Qualification and Version Control
- Peer-to-peer communications

**Attention**

The PGM does not retain RAM across power failure using a battery backed RAM. However, it does retain its configuration in Flash and can resume normal operation upon power up.

### PROFIBUS Communication Profiles

The following information is extracted from the PROFIBUS Technical Description describing the PROFIBUS DP communication profile as defined by the PROFIBUS Standard Definition (EN 50170):

PROFIBUS DP - Decentralized Periphery (DP) is the most frequently used PROFIBUS communication profile. It is optimized for speed, efficiency and low connection costs and is designed especially for communication between automation systems and distributed peripherals.

### PROFIBUS DP Overview

PROFIBUS DP is a master/slave, token passing network, which utilizes a request/response protocol. Basic data exchange operations ensure that on a periodic basis, the master sends an output message to each slave device, which responds in turn with an input message. PROFIBUS DP is typically used as an I/O network. As compared to a traditional I/O network architecture that requires dedicated wiring between each I/O module and the controller device, PROFIBUS offers the advantage of a single network/bus on which all I/O peripheral devices reside.

### PROFIBUS PA Overview

PROFIBUS-PA is one of three PROFIBUS variants that are compatible with each other. PROFIBUS PA is available for applications in process automation with a demand for bus power and intrinsically safe devices. PROFIBUS PA is linked to the DP network with a coupler module. PROFIBUS PA supports the tree or line structures and any combination of these two network topologies.

### Related topics

“Overview of PGM components” on page 13

# 4.2 PGM assembly

The PROFIBUS Gateway Module consists of an Input/Output Terminal Assembly (IOTA) board and the PGM module which is housed within a plastic cover and is mounted onto the IOTA board. The PGM assembly is installed in a control cabinet on vertically-mounted channels specifically for Series C control hardware. The following table provides information on the PGM IOTA board.

| PGM IOTA Board | Description |
|---|---|
| F1 | Fuse. |
| PROFIBUS 1<br>PROFIBUS 2 | Connectors to the PROFIBUS network. |
| FTEA, FTEB | Fault Tolerant Ethernet (FTE) network connectors.<br>FTE A network cable connectors are yellow.<br>FTE B network cable connectors are green. |
| FTE DEVICE INDEX 100, 10, 1 | Three rotary decimal switches used to set the FTE network address (Device Index) of the PGM. |

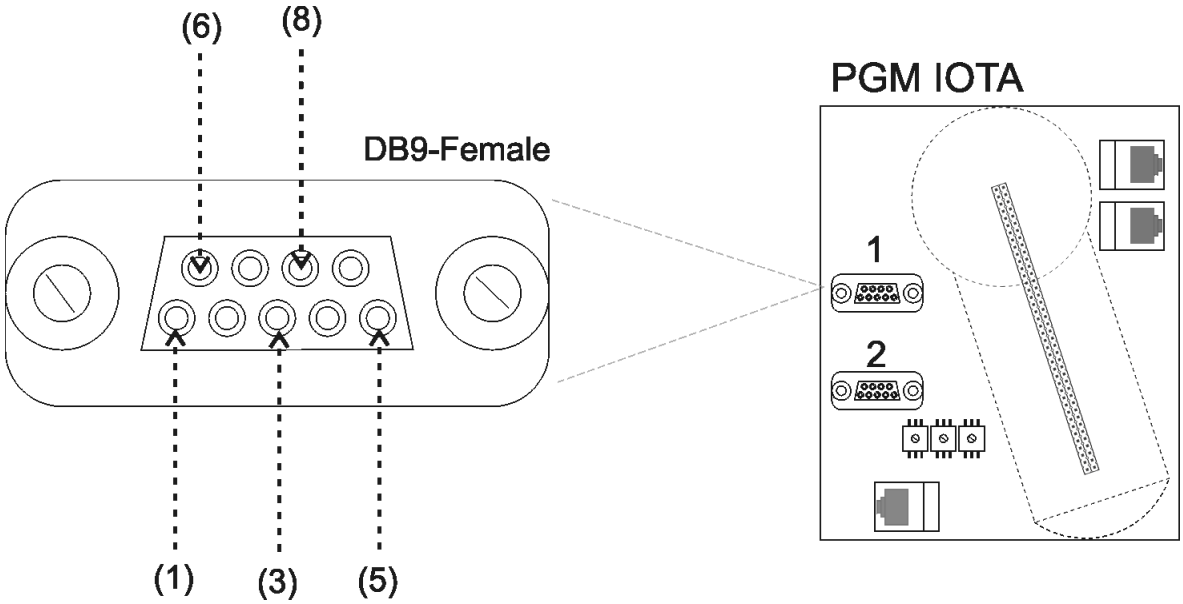
## 4.2.1 CF9 control firewall - 9-port control firewall (CF9)

In the control cabinet, Control Firewall assemblies (CF9) provide connection of control hardware (PGM and C300 Controllers) to the FTE network. STP CAT5 cables connect the FTE-capable control hardware to the Control Firewall IOTA. Two Control Firewall assemblies are required to provide network redundancy, (one CF9 supports the FTE "A" segment and the second supports FTE "B" segment). Eight ports on each control firewall provide connection for up to eight FTE nodes. A 9th port provides an uplink to the supervisory FTE network and level 2 control.

See the *Control Firewall User's Guide* for details about the Control Firewall installation.

# 4.3 PGM IOTA pinouts

The following figure illustrates the pinout diagram of the PGM/IOTA DB9-F connector.




The following table lists the PROFIBUS DB9-F Pin and signal definitions.

| Pin Number | Signal | Description |
|---|---|---|
| Shell | Shield | Shield, Protective Ground |
| 1 | Shield | Shield, Protective Ground (not recommended – see note) |
| 2 | -- | Not Connected |
| 3 | RxD/TxD-P | Receive/Transmit data – plus (B wire, red color) |
| 4 | CNTR-P | Repeater control signal (direction control), RTS signal |
| 5 | DGND | Data ground (reference potential for VP) * |
| 6 | VP | Voltage - plus (P5V), +5V * |
| 7 | -- | Not Connected |
| 8 | RxD/TxD-N | Receive/Transmit data – minus (A wire, green color) |
| 9 | -- | Not Connected |

**Note**

Only the signals shown in the above figure and table are available for PGM. Others are not connected.

The metallic shell shall be used as the primary shield and protective ground connection as it provides the best EMI mitigation.

Pin 1 is provided for compatibility with older systems that use this pin as a shield connection point.

* VP (+5V) and DGND are primarily used for external bus termination. Some devices such as electrical to fiber optic repeaters might require external power from these pins (not to exceed 35 mA). CNTR-P (repeater control) is used in some equipment to determine the direction of transmission/reception.

### 4.3.1 PROFIBUS DP Master LED behavior

The following tables describe the behavior of the LEDs located adjacent to the PROFIBUS 1 and PROFIBUS 2 DB9 connectors on the PGM IOTA (CC-TPOX01). The behavior of the LEDs depends on whether the PGM acting as a primary or acting as a secondary.

#### LED behavior for primary PGM

**Table 1: LED behavior for primary PGM**

| State | Color | LED Indication | Description |
|---|---|---|---|
| 1 | Green | Flashing acyclic (four 100 ms flashes followed by approximately 3 seconds OFF, then repeat) | PGM is in NO DB. |
| 2 | Green | Flashing cyclic | PGM's network configuration load is in progress. |
| 3 | Green | Flashing cyclic | Communication with at least one slave is lost. |
| 4 | Green | ON | Communication with all slaves is established. |
| 5 | None | OFF | Communication to all slaves is lost. |

**Attention**

- State 2 and State 3 result in the same LED indication.
- Condition described in State 2 only occurs during configuration loading.
- Condition described in State 3 is a result of the connectivity problem or PROFIBUS device failure. Therefore, this condition can occur at any time during routine operation.

#### LED behavior for secondary PGM

**Table 2: LED behavior for secondary PGM**

| State | Color | LED Indication | Description |
|---|---|---|---|
| 1 | Green | Flashing acyclic (four 100 ms flashes followed by approximately 3 seconds OFF, then repeat) | PGM is not synchronized with its partner. |
| 2 | Green | Flashing cyclic | PROFIBUS network configuration synchronization is in progress. |
| 3 | Green | ON | This is the default run state for the PGM acting as secondary. |
| 4 | None | OFF | This is the default state at power up, and then transitions to State 1.<br>Refer to Attention |

**Attention**

Both LEDs OFF: This situation persists only for a short time after power cycle. Thereafter, LEDs transitions to State 1.

# 4.4 Installing a PGM

### Prerequisites

Before you install the PGM you should have:

- A control cabinet installed with appropriate channel hardware for mounting the Series C control hardware.
- A Series C power supply hardware installed in the cabinet.
- Installed pair of Control Firewall (CF9) assemblies.
- The PGM assembly (PGM module with IOTA board and mounting hardware). In addition, you need the necessary parts for installing PGM to the control system. See Series C System Cabling in the *Control Hardware Planning Guide* for cable hardware details.
- Ensure the cabinet enclosure is connected to a protective earth ground using #8 AWG solid copper wire. There should be metal to metal contact between the grounding bus bar and the enclosure as well as the channel.

### Perform the following steps to install a PGM

1. Refer to appropriate site location drawings for the specified installation location, PGM Device Index (FTE address), and wiring diagrams.
2. Identify the mounting location on channel and align mounting holes in IOTA with screw hole locations on the channel.
3. Assemble mounting screws, washers and spacers provided. Insert spacers and washers between backside of IOTA and front of channel.

   Ensure that the component side of the IOTA is facing up.

   **CAUTION**
   Do not fully tighten the IOTA mounting screws before installing and tightening the power and ground screws (24V and COM terminals) which can bind during installation or removal. Follow instructions carefully.

4. Position the assembled IOTA board at the proper mounting location.
5. Thread the four mounting screws only half-way to attach the IOTA board to the channel.
6. Tighten the mounting screws securing the IOTA board to the channel.
7. Connect FTE-A and FTE-B Ethernet link cables to the RJ-45 connectors on PGM IOTA board.
   - The yellow Cat5 cable must connect to the **FTEA** connector on the IOTA.
   - The green Cat5 cable must connect to the **FTEB** connector on the IOTA.
8. 
9. Route the FTE cables to the appropriate Control Firewall module location.
   - The Yellow FTE cable is routed to the Control Firewall that supports FTE-A.
   - The Green FTE cable is routed to the Control Firewall that supports FTE-B.
10. Connect **PBLink1** and **PBLink2** cables to the IOTA board.
11. Set the Device Index (**FTE DEVICE INDEX**) of the PGM according to the site documentation by turning the three rotary decimal switches located on the IOTA board. Set the switches to the three digit address ranging from 001 to 509. The left-most switch (100) is used to set the hundreds digit. The middle switch (10) is used to set the tens digit and the right-most switch (1) sets the ones digit.