Pilot Pro™
Parker’s Communications Interface for Process Sample Conditioning Systems
Catalog 4250-Pilot Pro

December 2009

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

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Parker Pilot Pro™

Do you have interest in remote monitoring of your sample conditioning systems? If so, Parker’s Pilot Pro™ can solve your communications interfacing needs.

For process analyzers to achieve optimum performance, process samples must be conditioned properly to ensure consistent and reliable delivery to the analytical system. This must be achieved in order to provide process operators, analyzer engineers, and analyzer technicians, the proper information to optimize maintenance support tasks and unit operational control.

To obtain optimization of real-time sample conditioning systems, key operating parameters such as pressure, temperature, and flow information must be delivered to maintenance and other unit support personnel continuously. In the past, this information was generally gathered by observation of gauges and flow meters. Increased demand for optimized control has resulted in a need for more aggressive parameter monitoring both at the process operational and process analytical levels.

Transmission of data is complicated due to the varying number of bus protocols that exist at the plant level. In some cases, transmission of single parameter information is completed by loop-powered operation from the plant DCS system, PLC, or analytical hardware. In essence, there are many ways to transmit critical process and sample conditioning system information. The Parker Pilot Pro™ system has been developed to simplify data transmission between the analyzer, sample conditioning system, and plant personnel.

The Parker Pilot Pro™ system has been designed with end user needs as a primary focus. From use of standard, field proven hardware, to the unique separation of hazardous zones, Pilot Pro™ has been designed to meet all of the process analyzer engineer’s challenging field application and communications needs. The system has been developed to operate across multiple bus network protocols, such as Ethernet, Modbus, Profibus, CAN, DeviceNet, and even simple analog hard-wired communication architectures.

The system can be purchased in any of three basic enclosure options (all NEMA 4X rated) based on desired communications and mounting approaches. For example, Ethernet protocols can be accommodated by use of the PLC or I/O based enclosure systems. Each of these has the maximum I/O capability of 24 (including AI, AO, DI, and DOs – see system specifications).

The Pilot Pro™ interface can be installed in a variety of positions along the plant architectural structure to meet a variety of end user requirements.
Pilot Pro™ Specifications

Pilot Pro™ Design Basis and Specifications

The Pilot Pro™ product has been designed with a high level of flexibility to accommodate multiple configurations of local area communications networks. The product will accommodate higher level logic control and data transmission for sophisticated control schemes to simple solenoid valve control for stream selection hardware. The following is a brief overview of the product design basis used to complete Parker’s approach to communications and valve operation for sample conditioning systems.

Pilot Pro™ Functional Specifications and Options

Power:

- 24VDC on-board power supply for solenoids, sensors, and analyzers (capability for additional power supplies if needed).
- Power Supply rated for operation in FM Class I Div. II and ATEX Zone 2 areas.

Communications:

- I/O Interface cards for transmission of sensor data and solenoid valve control – Ethernet, Modbus, CAN, DeviceNet, and Profibus-DP.

  **Total I/O:**
  
  - **AI** 6 points maximum
  - **AO** 2 points maximum
  - **DI** 8 points maximum
  - **DO** 8 points maximum

  **Note:** System flexibility allows some modification to individual I/O count.

- Architecture allows accommodation of multiple PLC types (i.e., Allen Bradley, Siemens, Automation Direct, Modicon, etc.).
- Allows use of basic analyzer systems (moisture, O2, pH, etc.) without requiring expensive communications interface.

Enclosures:

- Nema 4X enclosure with electrical hardware rated for ATEX Zone 2 (E Ex ia IIC T6) and FM Class I Div. II operation.
- Available in three sizes based on functionality required (PLC: 16” x 14” x 8.5”; I/O: 12” x 11” x 8.5”; Solenoid Enclosure: 10” x 8” x 6”).
- Conventional pressure indication and control capability within enclosure (pressure gauge designed to mount onto enclosure door for monitoring).

Valves:

- Solenoid valves are 24VDC FM Class I Div. II and ATEX Zone 2 approved and operated in 3-Way NC or NO configurations. (General purpose valves are available for non-hazardous applications.)
- Solenoid valves have manual override and LED indication.
- Alternative solenoid valves and manifolds may be selected depending on service and hazardous area classification.
- Maximum supply pressure is 85psig in hazardous area configuration and 120psig in general purpose configuration.
Interfacing:

- Hazardous zones are separated by a compression barrier allowing removal or addition of sensors from sample conditioning system without compromising classification requirements.
- Pneumatic interfaces can be completed via feed through (limits valve number to eight) or by bulkhead fitting connections. (Note: All bulkheads must be 1/8" or 1/4" Parker CPI or A-Lok fittings.)
- Pneumatic connections may be completed by either push-to-connect or compression fittings.
- Conduit connections are designed for 1/2" conduit hubs but can be adjusted to meet customer needs.

Electrical:

- All electrical hardware was selected based on area classification requirements. The standard Pilot Pro™ system will contain hardware suitable for operation in an FM Class I Div. II environment.
- IS Barriers are Turck or R. Stahl galvanic safety barriers.
- Wire terminal connectors are hazardous duty rated and will vary in size based upon enclosure/operation requested. The system has been designed to accommodate 15mm and 35mm din rail mounted terminal blocks.
- All wires are labeled for clear interpretation of functionality.
- Grounding bus is standard with all Pilot Pro™ systems.

Environmental:

- System designed for -20°C to 50°C ambient temperature environments.
- System adheres to environmental requirements as outlined in NEMA 4X and IEC IP65 standards.
Pilot Pro™ Applications

The Pilot Pro™ product has been designed with consideration of multiple plant level applications. The following is a brief overview of potential applications for Pilot Pro™.

Logic Control for Monitoring Health of Process Analyzer Sample Conditioning Systems
The PLC option of Pilot Pro™ has been designed to accommodate multiple controllers (i.e. Allen Bradley, Automation Direct, Modicon, Siemens, etc.), solenoid valves, pressure regulation hardware, and custom pneumatic and electrical interfaces, all within a single enclosure. The system also provides the capability, via PLC and I/O module interfaces, to communicate across or between multiple protocols, providing a direct link between sample system information and maintenance support personnel. The enclosure may be direct or remote mounted by use of custom pneumatic and electrical interfaces or use of standard bulkhead fittings.

Solenoid Valve Control of Stream Selection Valves
The valve control option allows the end user to utilize existing plant DCS controls to energize solenoid valves for stream selection in existing or new sample system installations. This enclosure provides the end user a landing terminal strip and manifold mounted solenoid valves. The enclosure may be direct or remote mounted by use of custom pneumatic and electrical interfaces or use of standard bulkhead and conduit fittings.

Non-Hazardous PLC and I/O Interface for Sample Conditioning Systems
The Pilot Pro™ system also provides the end user with a non-hazardous option when used in an electrically “safe” zone. This is advantageous where the added cost of hazardous area components may be prohibitive. The standard enclosure may be direct or remote mounted by use of custom pneumatic and electrical interfaces or use of standard bulkhead fittings.

I/O Module Application for Monitoring Sample Conditioning Systems
The I/O version of Pilot Pro™ allows the interface of sample system transmitters and sensors (analog and digital) to a hazardous area rated I/O module and transmit information across a selection of bus protocols (Ethernet, Modbus, CAN, DeviceNet, or Profibus). The enclosure may be direct or remote mounted by use of custom pneumatic and electrical interfaces or use of standard bulkhead fittings.

I/O Module Application for Monitoring Sample Conditioning Systems
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Pilot Pro™ Enclosures

PLC Enclosure

Options:

- Designed to accommodate multiple vendor supplied PLC systems.
- 1/8" and 1/4" O-ring sealed bulkhead connections.
- Pressure regulator and gauge for monitoring and control of inlet pressure to pneumatic circuitry.
- Dual conduit connections for power and signal (more available if needed).
- Custom feed through connections for pneumatics and electronics.
- Feed through accommodate 360° mounting capability to the sample enclosure.
Options:
- 1/8" and 1/4" O-ring sealed bulkhead connections.
- Designed to accommodate multiple vendor supplied I/O Modules (Allen Bradley, WAGO, Acromag, etc.).
- Designed to accommodate math computational modules for data transfer.
- Pressure regulator and gauge for monitoring and control of inlet pressure to pneumatic circuitry.
- Dual conduit connections for power and signal (more available if needed).
- Custom feed through connections for pneumatics and electronics (standard bulkhead options available).
- Feed through accommodate 360° mounting capability to the sample enclosure.
Analog Enclosure (Solenoid Valve Module and Junction Box)

Options:

- 1/8" and 1/4" O-ring sealed bulkhead connections.
- Designed for solenoid valve applications where high level communications are not needed.
- Dual conduit connections for power and signal (more available if needed).
- Custom feed through connections for pneumatics and electronics (standard bulkhead options available).
- Feed throughs accommodate 360° mounting capability to the sample enclosure.
Pilot Pro™ System Features

Custom Feed Through Assemblies for Pneumatics and Hazardous Area Protection

Pneumatic Feed Through

Compression Barrier

Electrical Feed Through

Captured O-Ring Bulkhead Connections
System Example — PLC Option
**Pilot Pro™ Part Number Reference**

**PLP** – This designates a standard Pilot Pro™ enclosure with Parker color/branding requirements and 24VDC power supply.

<table>
<thead>
<tr>
<th>Basic Designator</th>
<th>No. of Analog Inputs*</th>
<th>No. of Analog Outputs</th>
<th>No. of Digital Outputs</th>
<th>No. of Solenoid Valves*</th>
<th>Electrical Feed Through</th>
<th>No. of Pneumatic Bulkheads</th>
<th>Pneumatic Feed Through Fitting Type</th>
<th>Mounting Position</th>
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<tr>
<td>A</td>
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</tbody>
</table>

- * Analog inputs are 4-20mA inputs
- ** Single Bulkhead connections can be adjusted to more than eight ports for non-hazardous locations.

* Solenoid valves quantities are customizable based on area classification requirements.

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**Pilot Pro™ How to Order**

Pilot Pro™ Part Number Reference

**PLP** – This designates a standard Pilot Pro™ enclosure with Parker color/branding requirements and 24VDC power supply.

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<th>Communications Protocol</th>
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</table>

- * Analog inputs are 4-20mA inputs
- ** Single Bulkhead connections can be adjusted to more than eight ports for non-hazardous locations.

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* Solenoid valves quantities are customizable based on area classification requirements.

** Single Bulkhead connections can be adjusted to more than eight ports for non-hazardous locations.
The part number represented above is designed for Ethernet communication between a higher level controller (i.e. PLC, workstation, DCS, etc.), sample conditioning system transmitters and solenoid valves. The system is also designed for close-coupled mounting to a sample conditioning enclosure by use of a pneumatic and electrical feed throughs. Ethernet communication is established by use of an I/O module that converts analog signals to a digital protocol for subsequent transmission to other control hardware. As a standard design, all electronics hardware meets FM Class I Div. II and ATEX Zone 2 requirements.

**Model Depiction of Pilot Pro PLC Option**
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15. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of the agreement. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are hereby canceled and superseded by this agreement.

16. Waiver and Severability. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or court of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

17. Termination. This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may by written notice immediately terminate this agreement for the following reasons:

- (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custodian for all or any part of Buyer's property (c) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by or third party (d) assignment for the benefit of creditors, or (e) the dissolution or liquidation of the Buyer.

18. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the law of the State of Ohio, as applicable to the parties expressly agree in writing to arbitrate the dispute.

19. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patent, trademark, copyright, trade secret or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

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