



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



ENGINEERING YOUR SUCCESS.

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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™ 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.

I/O Module Application for Monitoring Sample Conditioning Systems

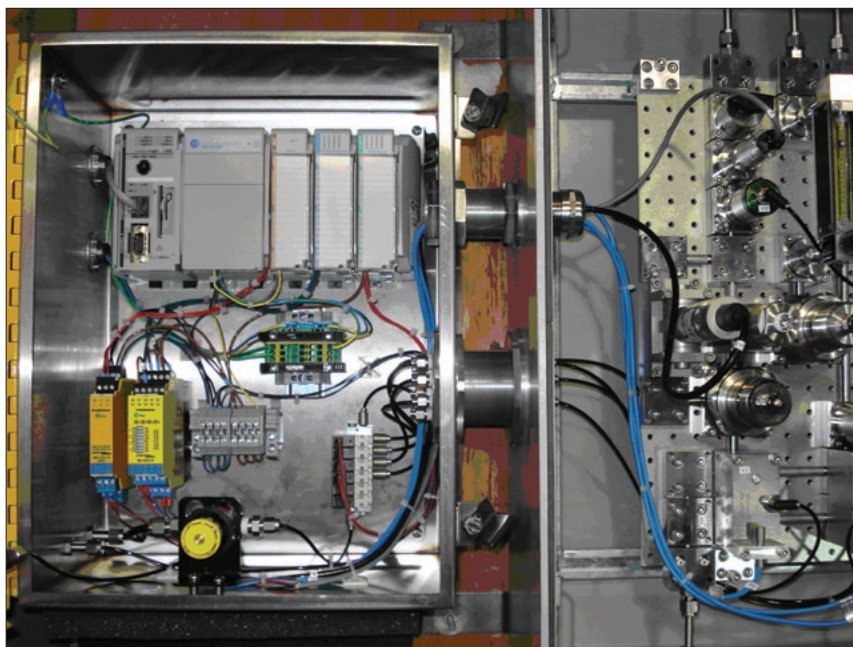
The I/O version of Pilot Pro™ allows the interface of sample system transmitters and sensors (analog and digital) to a hazardous area rated I/O module and transmit information across a selection of bus protocols (Ethernet, Modbus, CAN, DeviceNet, or Profibus). The enclosure may be direct or remote mounted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

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.

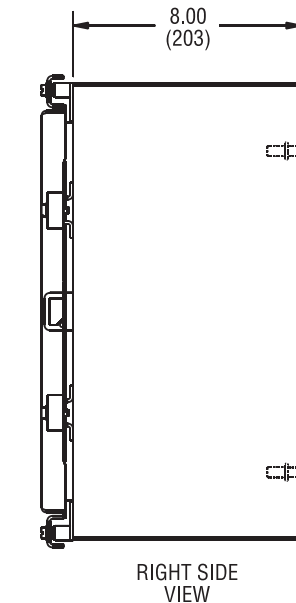
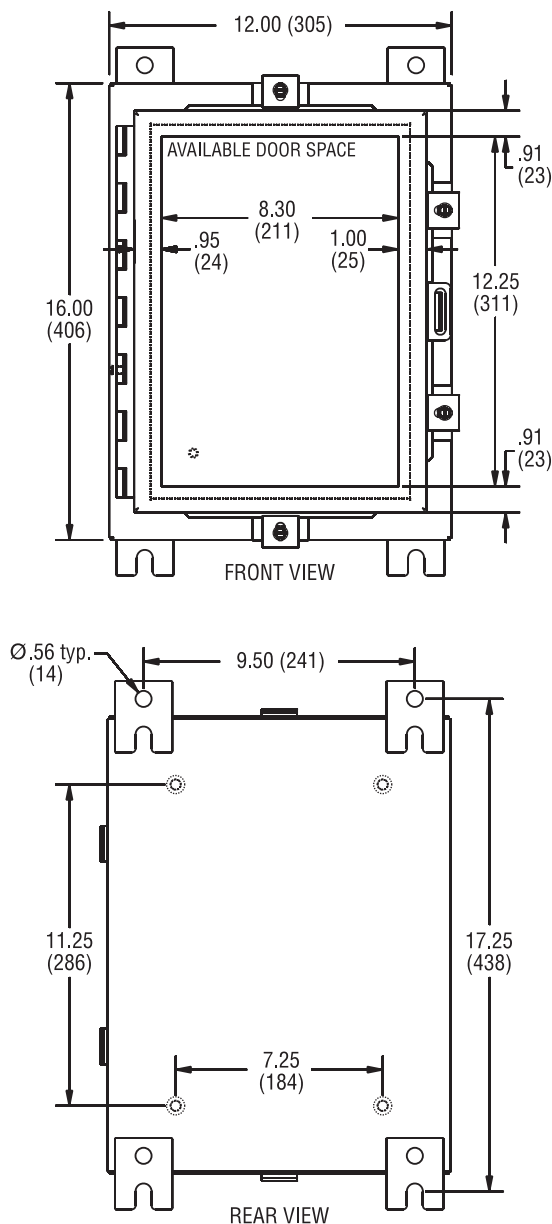
Non-Hazardous PLC and I/O Interface for Sample Conditioning Systems

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 and conduit fittings.



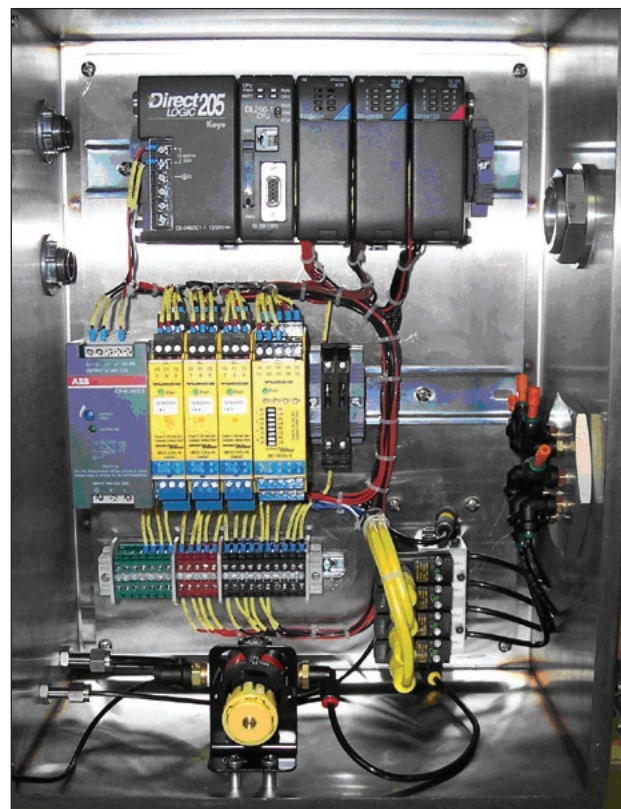
System Application and Interface Example

PLC Enclosure



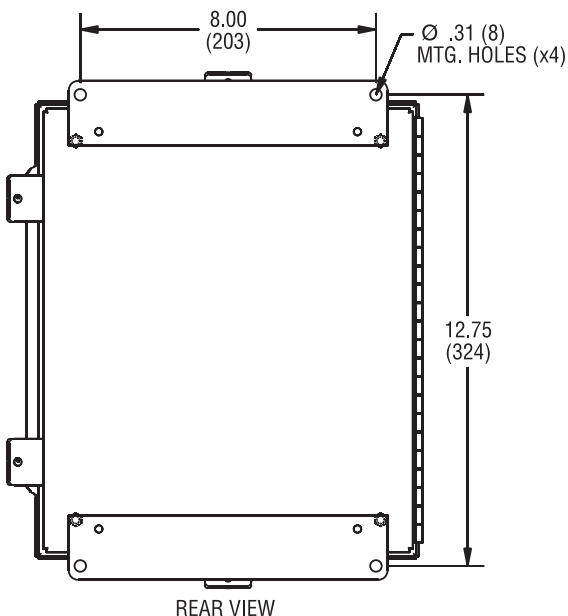
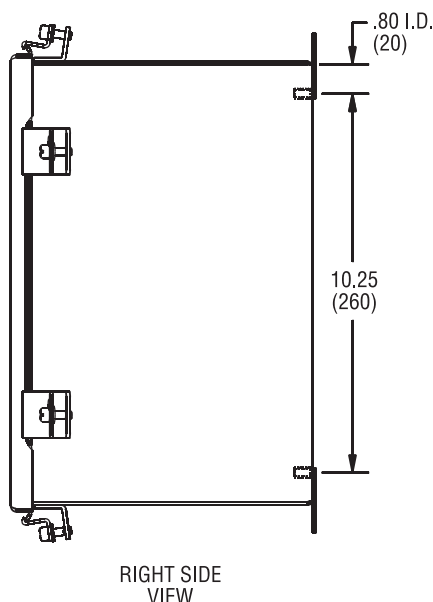
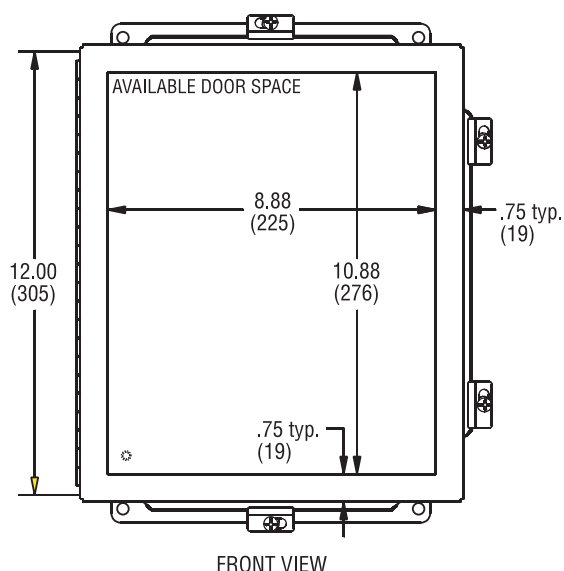
Options:

- 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.



PLC Enclosure – Customer Application Example

IO Solenoid Valve Enclosure

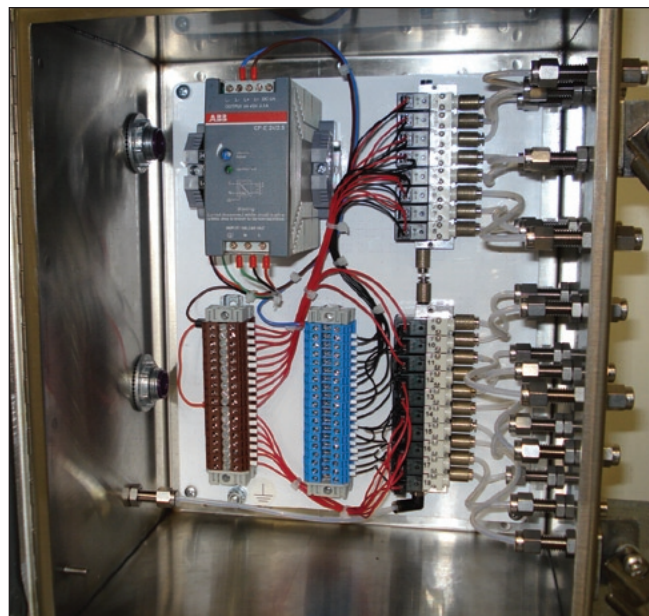
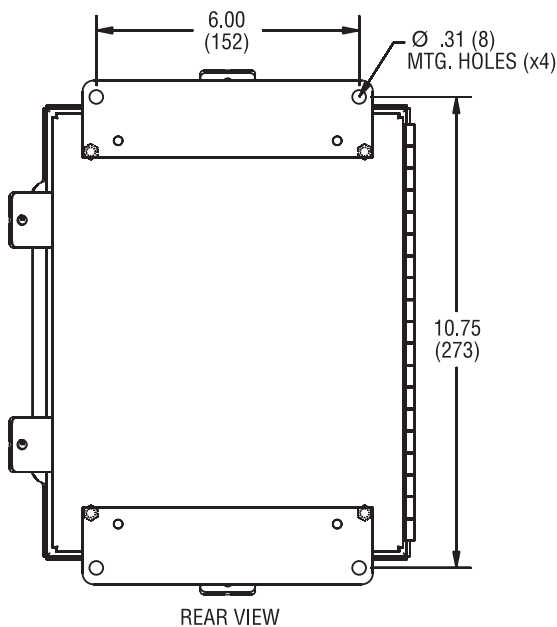
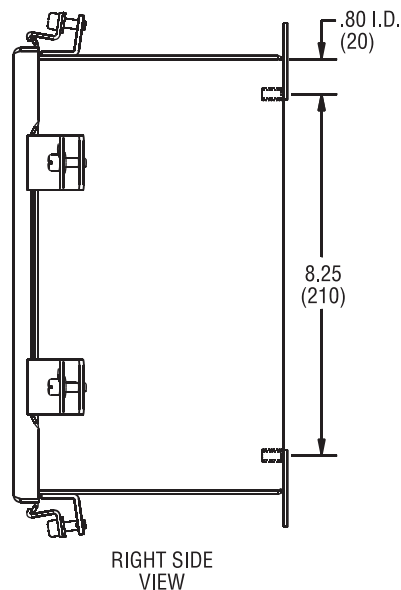
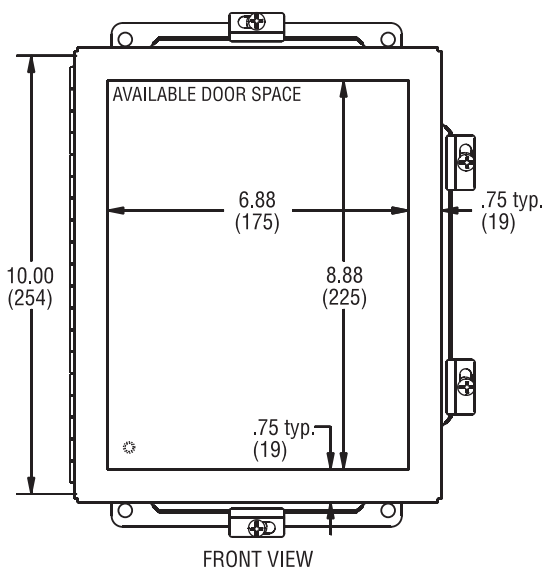


Pilot Pro™ IO/Solenoid Valve Enclosure – Customer Application Example

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)



**Pilot Pro™ Analog Enclosure –
Customer Application Example**

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.

Custom Feed Through Assemblies for Pneumatics and Hazardous Area Protection

Pneumatic Feed Through



Compression Barrier



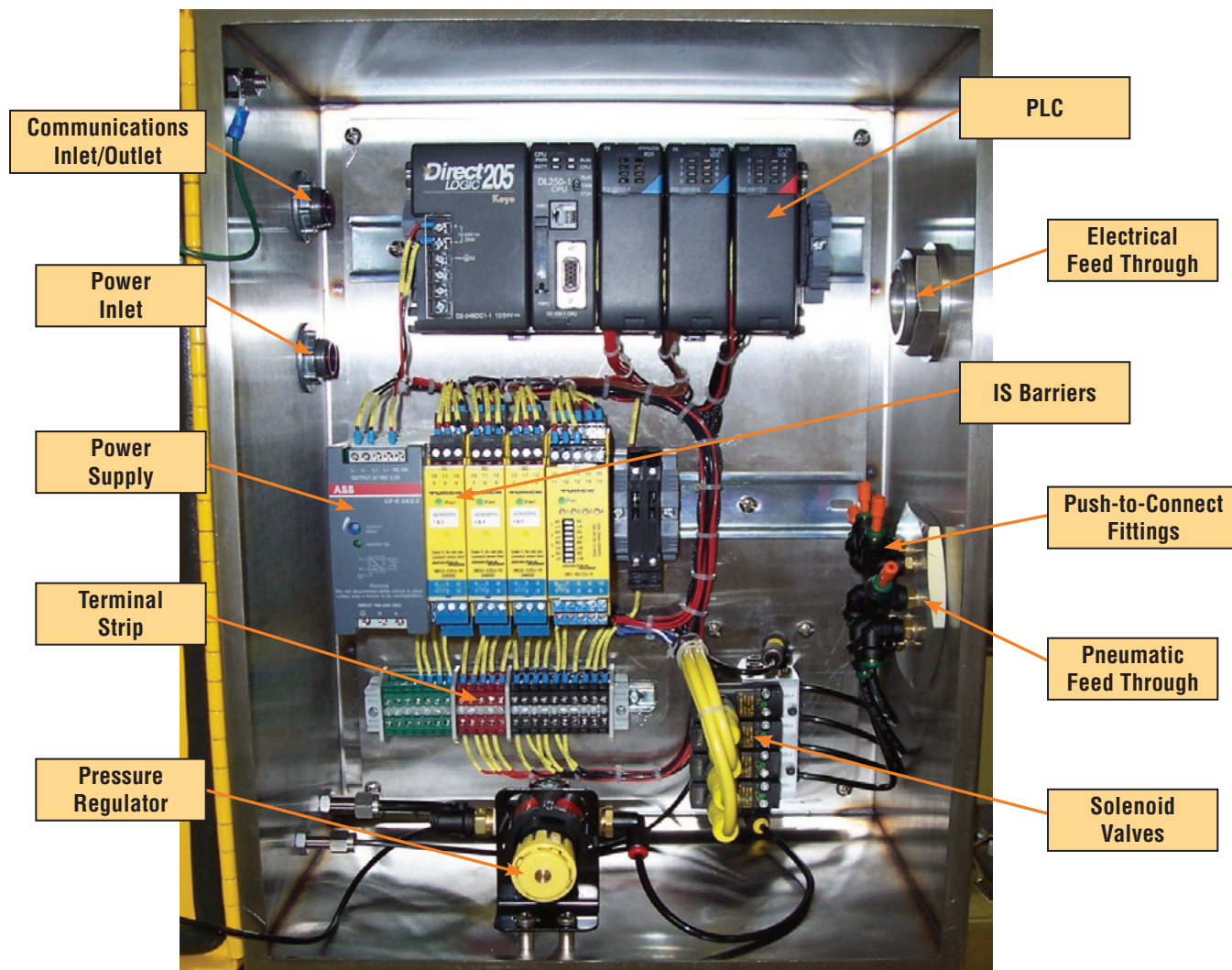
Electrical Feed Through



Captured O-Ring Bulkhead Connections

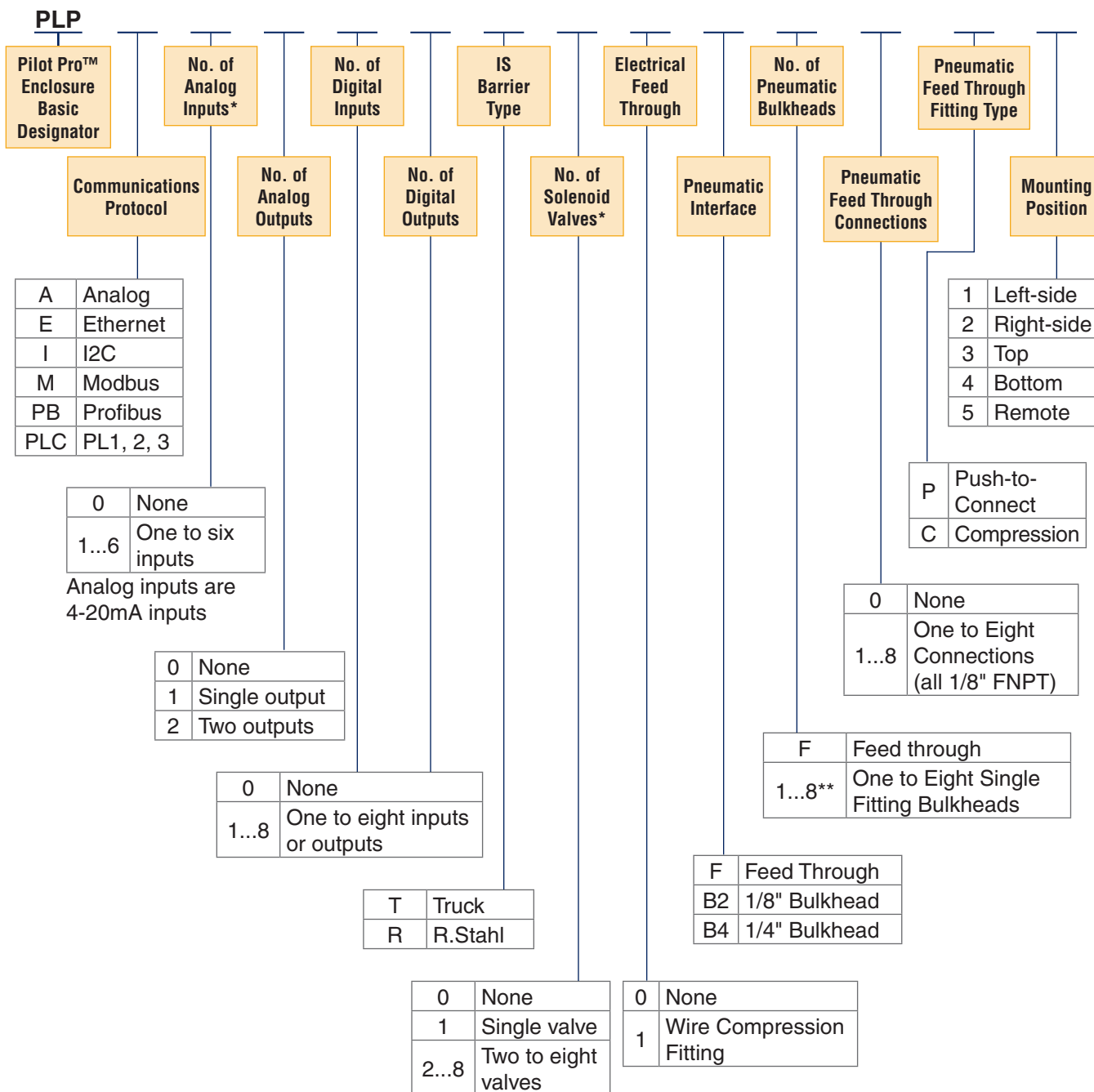


System Example — PLC Option



Pilot Pro™ Part Number Reference

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



* 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.

Example Part Number

PLP E 4 0 0 4 2 4 1 F F 4 1

- 1** = Indicates Enclosure Mounting on Left-Side of Sample Enclosure
- 4** = Pneumatic Connections on Feed through
- F** = Indicates Zero Number of Bulkheads for Pneumatics
- F** = Indicates Pneumatic Feed Through and no Bulkhead Connections for Valve Actuation
- 1** = System has an Electrical Feed Through
- 4** = Number of Solenoid Valves
- 2** = Number of IS Barriers
- 4** = Number of Digital Outputs
- 0** = Number Digital Inputs
- 0** = Number Analog Outputs
- 4** = Total Number of Analog Inputs (Pressure, Temperature, Flow, or Analyzer)
- E** = Ethernet I/O Module



Model Depiction of Pilot Pro PLC Option

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.

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6. LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.

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9. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

10. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

11. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer.

12. Improper use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, 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.

13. Cancellations and Changes. Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

14. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

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 herein merged.

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. Invalidity of any provision of this agreement by legislation or other rule 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: (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 a third party (d) an 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 laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both 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 patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

20. Taxes. Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of Products.

21. Equal Opportunity Clause. For the performance of government contracts and where dollar value of the Products exceed \$10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRAA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated.

01/09



Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 1-800-C-Parker.



AEROSPACE

Key Markets

- Aircraft engines
- Business & general aviation
- Commercial transports
- Land-based weapons systems
- Military aircraft
- Missiles & launch vehicles
- Regional transports
- Unmanned aerial vehicles

Key Products

- Flight control systems & components
- Fluid conveyance systems
- Fluid metering delivery & atomization devices
- Fuel systems & components
- Hydraulic systems & components
- Inert nitrogen generating systems
- Pneumatic systems & components
- Wheels & brakes



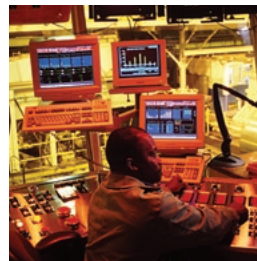
CLIMATE CONTROL

Key Markets

- Agriculture
- Air conditioning
- Food, beverage & dairy
- Life sciences & medical
- Precision cooling
- Processing
- Transportation

Key Products

- CO₂ controls
- Electronic controllers
- Filter driers
- Hand shut-off valves
- Hose & fittings
- Pressure regulating valves
- Refrigerant distributors
- Safety relief valves
- Solenoid valves
- Thermostatic expansion valves



ELECTROMECHANICAL

Key Markets

- Aerospace
- Factory automation
- Life science & medical
- Machine tools
- Packaging machinery
- Paper machinery
- Plastics machinery & converting
- Primary metals
- Semiconductor & electronics
- Textile
- Wire & cable

Key Products

- AC/DC drives & systems
- Electric actuators, gantry robots & slides
- Electrohydraulic actuation systems
- Electromechanical actuation systems
- Human machine interface
- Linear motors
- Stepper motors, servo motors, drives & controls
- Structural extrusions



FILTRATION

Key Markets

- Food & beverage
- Industrial machinery
- Life sciences
- Marine
- Mobile equipment
- Oil & gas
- Power generation
- Process
- Transportation

Key Products

- Analytical gas generators
- Compressed air & gas filters
- Condition monitoring
- Engine air, fuel & oil filtration & systems
- Hydraulic, lubrication & coolant filters
- Process, chemical, water & microfiltration filters
- Nitrogen, hydrogen & zero air generators



FLUID & GAS HANDLING

Key Markets

- Aerospace
- Agriculture
- Bulk chemical handling
- Construction machinery
- Food & beverage
- Fuel & gas delivery
- Industrial machinery
- Mobile
- Oil & gas
- Transportation
- Welding

Key Products

- Brass fittings & valves
- Diagnostic equipment
- Fluid conveyance systems
- Industrial hose
- PTFE & PFA hose, tubing & plastic fittings
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects



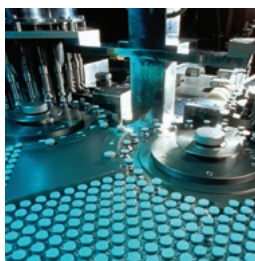
HYDRAULICS

Key Markets

- Aerospace
- Aerial lift
- Agriculture
- Construction machinery
- Forestry
- Industrial machinery
- Mining
- Oil & gas
- Power generation & energy
- Truck hydraulics

Key Products

- Diagnostic equipment
- Hydraulic cylinders & accumulators
- Hydraulic motors & pumps
- Hydraulic systems
- Hydraulic valves & controls
- Power take-offs
- Rubber & thermoplastic hose & couplings
- Tube fittings & adapters
- Quick disconnects



PNEUMATICS

Key Markets

- Aerospace
- Conveyor & material handling
- Factory automation
- Life science & medical
- Machine tools
- Packaging machinery
- Transportation & automotive

Key Products

- Air preparation
- Brass fittings & valves
- Manifolds
- Pneumatic accessories
- Pneumatic actuators & grippers
- Pneumatic valves & controls
- Quick disconnects
- Rotary actuators
- Rubber & thermoplastic hose & couplings
- Structural extrusions
- Thermoplastic tubing & fittings
- Vacuum generators, cups & sensors



PROCESS CONTROL

Key Markets

- Chemical & refining
- Food, beverage & dairy
- Medical & dental
- Microelectronics
- Oil & gas
- Power generation

Key Products

- Analytical sample conditioning products & systems
- Fluoropolymer chemical delivery fittings, valves & pumps
- High purity gas delivery fittings, valves & regulators
- Instrumentation fittings, valves & regulators
- Medium pressure fittings & valves
- Process control manifolds



SEALING & SHIELDING

Key Markets

- Aerospace
- Chemical processing
- Consumer
- Energy, oil & gas
- Fluid power
- General industrial
- Information technology
- Life sciences
- Military
- Semiconductor
- Telecommunications
- Transportation

Key Products

- Dynamic seals
- Elastomeric o-rings
- EMI shielding
- Extruded & precision-cut, fabricated elastomeric seals
- Homogeneous & inserted elastomeric shapes
- High temperature metal seals
- Metal & plastic retained composite seals
- Thermal management



ENGINEERING YOUR SUCCESS.

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