Installation Instructions

Original Instructions

# 836PH Display Solid-state Sanitary Pressure Switch with IO-Link

Catalog Numbers 836PH-D1*x*, 836PH-D2*x*



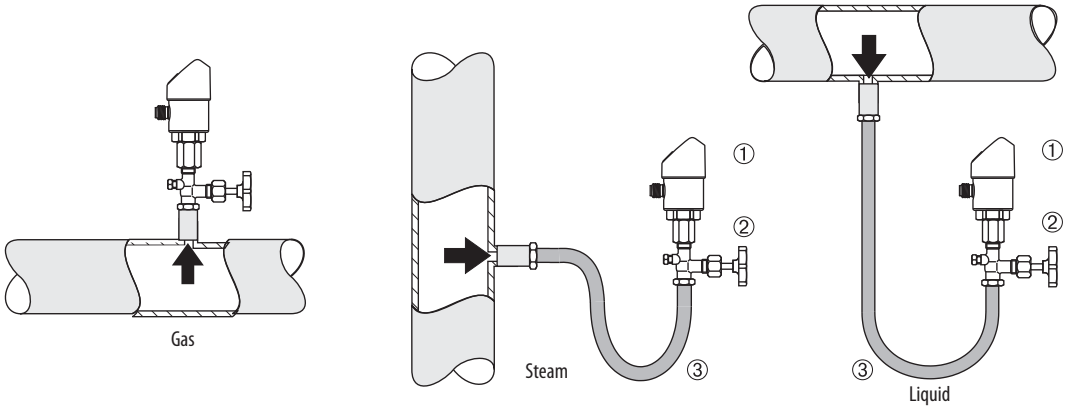
## Safety Considerations

- Read this document for information on installation, handling, mounting, general product specifications, and operation of this product. These installation instructions contain important information on handling the instrument.
- Working safety requires that all safety instructions and work instructions are observed.
- Observe the relevant local accident prevention regulations and general safety regulations for the range of use of the instrument.
- The installation instructions are part of the product and must be kept in the immediate vicinity of the instrument and readily accessible to skilled personnel at any time.
- Skilled personnel must have carefully read and understood the operating instructions before any work begins.
- The Bulletin 836PH-D is a pressure switch for measuring and monitoring absolute and gauge pressures. The device has been safely built with state-of-the-art technology and meets the applicable requirements and EC directives. It can, however, be a source of danger if used incorrectly or for anything other than the designated use.
- Qualified individuals are required for installation and commissioning. Failure to comply results in personal injury or equipment damage.
- Before installation, commissioning and operation, be sure that the appropriate pressure switch has been selected in terms of measuring range, design, and specific measuring conditions.

### Qualified Personnel

Qualified personnel are understood to be personnel who, based on their technical training, knowledge of measurement and control technology, and on their experience and knowledge of the country-specific regulations, current standards and directives, are capable of carrying out the work described and independently recognizing potential hazards.

### Recommended Installation for Optimal Performance



## Specifications

| Attribute | 836PH-D1*x*, 836PH-D2*x* |
|---|---|
| Certifications | CE Marked for all applicable directives - Pressure equipment directive 97/23/EC<br>EMC directive 2004/108/EC/,EN 61326 emission (group 1 , class B) and interference immunity (industrial application)<br>RoHs conformity - 2011/65/EU<br>IO-Link, 3A certified |
| **Environment: Operating Conditions** | |
| Ambient temperature range | -20…+80°C (-4…+176°F) |
| Media | -20…+100°C (-4…+212°F) |
| Storage temperature | -20…+80°C (-4…+176°F) |
| Vibration resistance | 10 g (0.35 oz) (IEC 60068-2-6, under resonance) |
| Shock resistance | 50 g (1.76 oz) (IEC 60068-2-27, mechanical) |
| Humidity | 45…75 % r. h. |
| Ingress protection | IP65 and IP67 |
| Overpressure limit | 2 times (1.7 times for the relative pressure measuring ranges 160 psi, 1,000 psi, and 1,500 psi) |
| **Electrical** | |
| Power supply | 15…35 V DC |
| Current consumption | Switching outputs with:<br>Analog signal 4…20 mA; 70 mA; |
| Total current consumption | 450 mA maximum when operating in IO-Link |
| **Outputs** | |
| Output type | 1 PNP (IO-Link) and 4…20 mA analog |
| Zero offset adjustment | Maximum 3% of span |
| Output thresholds | OUT 1 programmable via push button or IO-Link |
| Output modes | Selectable — Normally open, normally closed, window, hysteresis |
| Output voltage | (Power Supply -1V) |
| Output current | 100 mA maximum |
| Load | Analog signal 4…20 mA: ≤ 0.5 kΩ |
| Service life | 100 million switching cycles |
| Settling time | Analog Signal: 3 ms<br>Switching Output: 20 ms with IO-Link |
| **Accuracy Data** [1] | |
| Analog signal | ≤ ±1.0% of span<br>Including non-linearity, hysteresis, zero offset, and end value deviation (corresponds to measured error per IEC 61298-2). Calibrated in vertical mounting position with process connection facing downwards. |
| Non-linearity | ≤ ±0.5% of span (BFSL, IEC 61298-2) |
| Long-term drift | ≤ ±0.2% of span (IEC 61298-2) |
| Switching output | Switch point accuracy: ≤ ±1% of span; Adjustment accuracy: ≤ ±0.5% of span |
| Display | ≤ ±1.0% of span ± 1 digit |
| **Reference Operation Conditions** | |
| Operating temperature | 15…25°C (59…77°F) |
| Atmospheric pressure | 950…1,050 mbar (13.78…15.23 psi) |
| Humidity | 45…75 % r. h. |
| Nominal position | Process connection lower mount (LM) |

## Specifications

| Attribute | 836PH-D1*x*, 836PH-D2*x* |
|---|---|
| **Electrical Safety** | |
| Short-circuit protection | 4…20 mA, Out 1 vs. V- |
| Reverse polarity protection | V+ and V- |
| Insulation voltage | 500V DC |
| Overvoltage protection | 40V DC |
| **Material** | |
| Wetted parts | |
| Process connection | Stainless Steel 316L |
| Pressure sensing elements | Stainless Steel 316L |
| Non-wetted parts | |
| Housing | Stainless Steel 304 |
| Keyboard | TPE-E |
| Display window | Polycarbonate |
| Display head | Polycarbonate and ABS |
| **Process Connection** | |
| Thread | 1.5 in. tri-clamp<br>2 in. tri-clamp |
| Pressure transmission | Medium: KN92 medicinal white mineral oil |

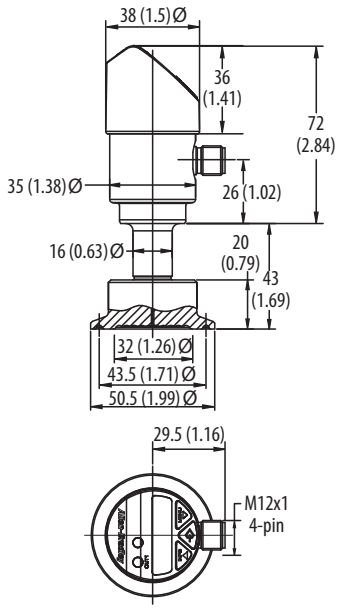
[1] Typical temperature co-efficient of 0 point: 0…22°C (32…71.6°F): 0.7% of span/10K, 20…80°C (68…176°F): 0.2% of span/10K. Typical temperature co-efficient of span: 0…80°C (32…176°F): 0.1% of span/10K.

## IO-Link Specifications

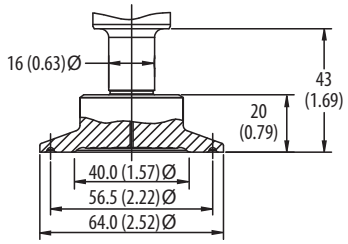
| | |
|---|---|
| IO-Link Protocol | Version 1.1 |
| Minimum Cycle Time | 3 ms |
| Rate | COM2 (38.4 k Baud) |
| Process Data Length | 16 bit (Frame 2.2) |
| Data Storage Support | Yes |

## 1.5 in. Tri-clamp Process Connection and Approximate Dimensions [mm (in.)]

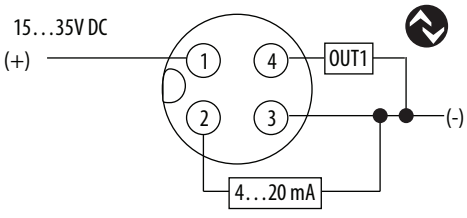
| Attribute | Description |
|---|---|
| Measuring Cell | Piezo resistive measuring cell and metallic measuring diaphragm |
| Application | Measurement and monitoring of absolute and gauge pressures |
| Process Connection | Thread<br>– 1.5 in. tri-clamp<br>– 2 in. tri-clamp |

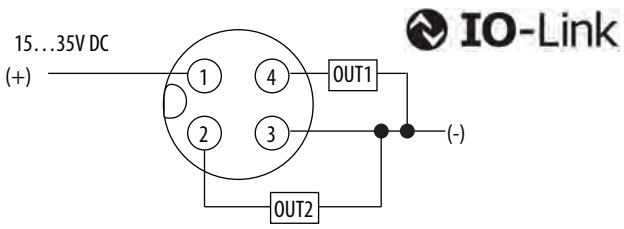



### 2 in. Process Connection and Approximate Dimensions [mm (in.)]




## 1 PNP x 4…20 mA Wiring Diagrams




**IMPORTANT** IO-Link operation is only available when connected to an IO-Link Master such as the 1734-4IOL or any competitive IO-Link Master. While in Standard IO mode (SIO), the sensor operates as a discrete PNP output.

## Mating Cables

889D – F4AC-2 (M12x1 connector).

889D-R4AC-2 (M12x1 right angle connector).

## Measuring Ranges

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Gauge Pressure** | | | | | | | | |
| bar | 0…2 | 0…2.5 | 0…4 | 0…6 | 0…9 | 0…13 | 0…17 | 0…20 |
| psi | 0…30 | 0…36.2 | 0…60 | 0…100 | 0…145 | 0…200 | 0…250 | 0…300 |
| **Absolute Pressure** | | | | | | | | |
| bar | 0…2 | 0…2.5 | 0…4 | 0…6 | 0…10 | 0…13 | 0…17 | 0…20 |
| psi | 0…30 | 0…36.2 | 0…60 | 0…100 | 0…145 | 0…200 | 0…250 | 0…300 |
| **Vacuum and ± Measuring Range** | | | | | | | | |
| bar | -1…+2 | -1…+2.5 | -1…+4 | -1…+6 | -1…+9 | -1…+13 | -1…+17 | -1…+20 |
| psi | -14.5…+30 | -14.5…+36.2 | -14.5…+60 | -14.5…+100 | -14.5…+145 | -14.5…+200 | -14.5…+250 | -14.5…+300 |

**Note:** Overpressure limit 2 times; 1.7 times for the relative pressure measuring ranges 160 psi, 1000 psi, and 1,500 psi.

## Output Signals

| Output Model Type | Switching Output 1 | Switching Output 2 | Analog Signal |
|---|---|---|---|
| 1 PNP x 4…20 mA | PNP | — | 4…20 mA (3-wire) |

# Commissioning

**ATTENTION:** Only for use with the pressure switch if it is in perfect condition with respect to safety.

**Check the following points before commissioning:**

- Leaking fluid is indicative of damage.
- Since this is a safety-relevant component, check the diaphragm for any visible damage.

**Required tool**: Size 27 open-ended spanner and screwdriver.

## Making the Mechanical Connection

- While mounting, make sure that the sealing faces at the instrument are clean and undamaged.
- Only screw in or unscrew the instrument via the spanner flats. Never use the case as a working surface.
- The correct torque depends on the dimensions of the process connection and the gasket used (form/material).
- When screwing in, be careful not to cross the threads.

## Making the Electrical Connection

- The instrument must be earthed via the process connection.
- The power supply for the pressure switch must be made via an energy-limited electrical circuit in accordance with section 9.3 of UL/EN/IEC 61010-1 or an LPS to UL/EN/IEC 60950-1 or class 2 in accordance with UL1310/UL1585 (NEC or CEC). The power supply must be suitable for operation above 2,000 m (6,561.6 ft) should the pressure switch be used at this altitude.
- For cable outlets, make sure that no moisture enters at the cable end. Dismounting and Disposal

## Dismounting and Disposal

**ATTENTION:** Residual media in the dismounted pressure transmitter can result in a risk to persons, the environment, and equipment. Take sufficient precautionary measures.

**Dismounting:** Only disconnect the pressure transmitter once the system has been depressurized.

**Disposal**: Incorrect disposal can put the environment at risk.

Dispose of instrument and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.

## Keys and Functions Programming


Status switching output2 (optional)

Status switching output1

Display mode

- Short Press
  Display of the Unit
- Long Press
  Display of the Set Parameters

Programming mode

- Short Press
  Menu up
  Parameter Value up (Step-wise)
- Long Press
  Menu up
  Parameter Value up (Fast)

**Note**: The pressure switch has two operating modes, the display mode, and the programming mode. The function of the keys depends on the selected operating mode.

**Enter key:** In programming mode, press the enter key once to set the values for the selected parameters.

4-digit indicator display

- Display Pressure Value
- Display Menu Item
- Display Parameter

Display mode

- Short Press
  Display of the Unit
- Long Press
  Enter the Programming Mode

Programming mode

- Short Press (Equals three seconds)
  Menu up
  Parameter Value up (Step-wise)
- Long Press (Equals five seconds)
  Menu down
  Parameter Value Down (Fast)

Display mode

- Short Press
  Display of the Unit

Programming mode

- Short Press
  Select Menu Item
  Confirmation of the Input

**Note**: Short press equals three seconds; long press equals five seconds.

| **Keys** (Simultaneously pressing the info and menu keys exits the programming mode and returns to display mode.) | **Function** | | |
|---|---|---|---|
| | **Display Mode** | **Programming Mode** (Press the menu key for five seconds to enter programming mode.) | |
|   | Short Press:<br>• Display of the unit<br>Long Press:<br>• Display of set parameters | Short press: toggle parameter up (step-wise) | Short press: toggle parameter up (fast scroll) |
|   | Short Press:<br>• Display of the unit<br>Long Press:<br>• Enters programming mode | Short press: toggle parameter down (step-wise) | Long press: toggle parameter down (fast scroll) |

## Parameters

| Parameter | Description |
|---|---|
| SP1/SP2 | Hysteresis function: Switch point switching output (1 or 2) |
| FH1/FH2 | Window function: Window high switching output (1 or 2) |
| RP1/RP2 | Hysteresis function: reset point switching output (1 or 2) |
| FL1/FL2 | Window function: Window low switch output (1 or 2) |
| EF | Extended programming functions |
| RES | Return the set parameter to the factory settings |
| DS1/DS2 | Switch delay time, which must occur without interruption before any electrical signal change occurs (SP1 or SP2) |
| DR1/DR2 | Switch delay time, which must occur without interruption before any electrical signal change occurs (RP1 or RP2) |
| OU1 | Switching function switching output (1 or 2) |
| OU2 | HNO = hysteresis function, normally open<br>HNC = hysteresis function, normally closed<br>FNO = window function, normally open<br>FNC = window function, normally closed |

| Parameter | Description |
|---|---|
| UNIT | Unit switching |
| OSET | Offset adjustment (3% of span) |
| DISM | Display value in display mode<br>CT= actual pressure value; LOW, HIGH = minimum, maximum pressure value<br>OFF= display off;<br>SP1/FH1 = function switch point 1, RP1/FL1 = function reset point 1,<br>SP2/FH2= function switch point 2, RP2/FL2 = function reset point 2 |
| DISU | Display update 1, 2, 5, 10 updates/second |
| DISR | Rotate display indicator by 180° |
| RHL | Clear the minimum and maximum value memories |
| PAS | Password input, 0000= no password<br>Password input digit by digit |
| TAG | Input of a 16-figure alphanumeric measuring point number |

## Menu (Programming and Factory Setting)

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Display Mode** | | | | | | | | | | | | | | | |
| ▼ | ▲ | Press menu key for 5 seconds | | | | | | | | | | | | | |
| **Programming Mode (to set values, press enter** | | | | | | | | | | | | Factory setting : | | | |
| ▼ | ▲ | Enter | | | | | | | | | | | | | |
| **SP1/FH1** | → | **Value** | | (Minimum: MBA +0.5% | | | | | | Maximum: MBE) | | Instrument nominal pressure | | | |
| ▼ | ▲ | Enter | | | | | | | | | | | | | |
| **RP1/FL1** | → | **Value** | | (Minimum: MBA | | | | | | Maximum: SP1 -0.5%) | | Instrument nominal pressure -10% | | | |
| ▼ | ▲ | Enter | | | | | | | | | | | | | |
| **SP2/FH2** | → | **Value** | | (Minimum: MBA +0.5% | | | | | | Maximum: MBE) | | Instrument nominal pressure | | | |
| ▼ | ▲ | Enter | | | | | | | | | | | | | |
| **RP2/FL2** | → | **Value** | | (Minimum: MBA | | | | | | Maximum: SP2-0.5%) | | Instrument nominal pressure -10% | | | |
| ▼ | ▲ | Enter | Enter | | | | | | | | | | | | |
| **EF** | →← | **RES** | → | | **Yes/No** | Reset to factory setting | | | | | | | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **DS1** | → | | **Value** | 0…50 s | | | | | | 0 s | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **DR1** | → | | **Value** | 0…50 s | | | | | | 0 s | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **DS2** | → | | **Value** | 0…50 s | | | | | | 0 s | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **DR2** | → | | **Value** | 0…50 s | | | | | | 0 s | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **OU1** | → | | **PARA** | HNO,HNC,FNO,FNC | | | | | | HNO | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **UNIT** | → | | **Unit** | BAR,MPA,KPA,PSI,KG/cm2 | | | | | | Order-related | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **0SET** | → | | **Yes/No** | Zero point adjustment 3% of span | | | | | | | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **DISM** | → | | **PARA** | ACT, HIGH, LOW,OFF,SP1/FH1,RP1/FL1,SP2/FH2,RP2/FL2 | | | | | | ACT | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **DISU** | → | | **Value** | 1/2/5/10 update/second | | | | | | 5 | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **DISR** | → | | **Yes/No** | Rotate display by 180° | | | | | | | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **RHL** | → | | **Yes/No** | Reset HIGH, LOW | | | | | | | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **PAS** | → | | **Value** | Password | | | | | | without | | | |
| | | ▼ ▲ | Enter | | | | | | | | | | | | |
| | | **TAG** | → | | **Value** | Measuring point number | | | | | | without | | | |
| | | ↓ | ↑ | | | | | | | | | | | | |
| **END** | | | **END** | | Legend: | | | | | | | | | | |
| Press the enter key to return to display mode and exit programming mode. | | | | | MBA = Start of measuring range | | | | | | | | | | |
| **Display Mode** | | | | | MBE = End of measuring range | | | | | | | | | | |

## Notes:

## Rockwell Automation Support

Use the following resources to access support information.

| | | |
|---|---|---|
| **Technical Support Center** | Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates. | https://rockwellautomation.custhelp.com/ |
| **Local Technical Support Phone Numbers** | Locate the phone number for your country. | http://www.rockwellautomation.com/global/support/get-support-now.page |
| **Direct Dial Codes** | Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer. | http://www.rockwellautomation.com/global/support/direct-dial.page |
| **Literature Library** | Installation Instructions, Manuals, Brochures, and Technical Data. | http://www.rockwellautomation.com/global/literature-library/overview.page |
| **Product Compatibility and Download Center (PCDC)** | Get help determining how products interact, check features and capabilities, and find associated firmware. | http://www.rockwellautomation.com/global/support/pcdc.page |

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Rockwell Automation maintains current product environmental information on its website at http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page.



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