

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

Catalog Numbers 836PH-D1x, 836PH-D2x

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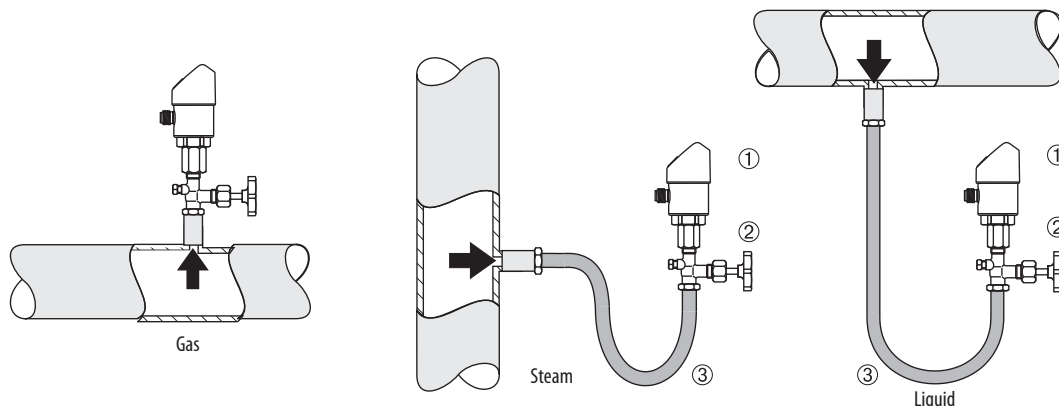
## Safety Considerations

- 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-D1x, 836PH-D2x
Certifications	CE Marked for all applicable directives - Pressure equipment directive 97/23/EC EMC directive 2004/108/EC, EN 61326 emission (group 1, class B) and interference immunity (industrial application) RoHS conformity - 2011/65/EU IO-Link, 3A certified
<b>Environment: Operating Conditions</b>	
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)
<b>Electrical</b>	
Power supply	15...35 V DC
Current consumption	Switching outputs with: Analog signal 4...20 mA; 70 mA;
Total current consumption	450 mA maximum when operating in IO-Link
<b>Outputs</b>	
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: $\leq 0.5 \text{ k}\Omega$
Service life	100 million switching cycles
Settling time	Analog Signal: 3 ms Switching Output: 20 ms with IO-Link
<b>Accuracy Data <sup>1</sup></b>	
Analog signal	$\leq \pm 1.0\%$ of span 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	$\leq \pm 0.5\%$ of span (BFSL, IEC 61298-2)
Long-term drift	$\leq \pm 0.2\%$ of span (IEC 61298-2)
Switching output	Switch point accuracy: $\leq \pm 1\%$ of span; Adjustment accuracy: $\leq \pm 0.5\%$ of span
Display	$\leq \pm 1.0\%$ of span $\pm 1$ digit
<b>Reference Operation Conditions</b>	
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-D1x, 836PH-D2x
<b>Electrical Safety</b>	
Short-circuit protection	4...20 mA, Out 1 vs. V-
Reverse polarity protection	V+ and V-
Insulation voltage	500V DC
Overvoltage protection	40V DC
<b>Material</b>	
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
<b>Process Connection</b>	
Thread	1.5 in. tri-clamp 2 in. tri-clamp
Pressure transmission	Medium: KN92 medicinal white mineral oil

<sup>1</sup> 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.

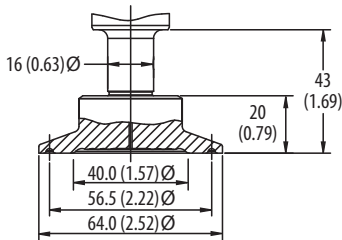
## IO-Link Specifications

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

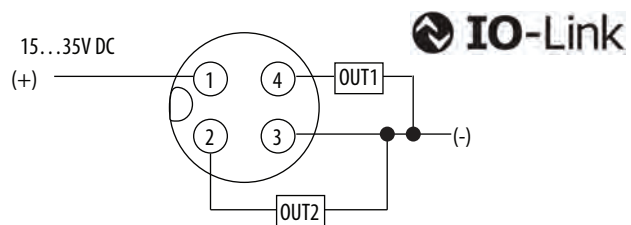
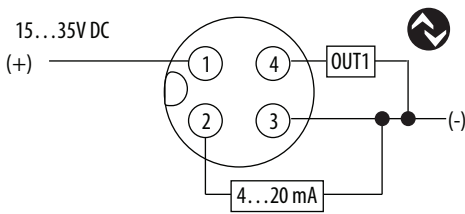
### 1.5 in. Tri-clamp Process Connection and Approximate Dimensions [mm (in.)]

Attribute	Description
Measuring Cell	Piezo resistive measuring cell and metallic measuring diaphragm
Application	Measurement and monitoring of absolute and gauge pressures
Process Connection	Thread – 1.5 in. tri-clamp – 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 dismantled 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: • Display of the unit Long Press: • Display of set parameters	Short press: toggle parameter up (step-wise)	Short press: toggle parameter up (fast scroll)
	Short Press: • Display of the unit Long Press: • 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 HNC = hysteresis function, normally closed FNO = window function, normally open FNC = window function, normally closed

Parameter	Description
UNIT	Unit switching
OSET	Offset adjustment (3% of span)
DISM	Display value in display mode CT= actual pressure value; LOW, HIGH = minimum, maximum pressure value OFF= display off; SP1/FH1 = function switch point 1, RP1/FL1 = function reset point 1, 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 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															
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														
	OSET	→	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									
	▼	▲	Enter														
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.

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

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