Installation Instructions

Original Instructions

Display Solid-state Pressure Switch with IO-Link

Catalog Numbers 836P-D1*x*, 836P-D2*x*, 836PF-D1*x*, 836PF-D2*x*

Summary of Changes

This publication contains new and updated information as indicated in the following table.

Topic	Page
Two new catalog numbers	1
New bullet under Safety Considerations regarding flush diaphragm	1
G 1/2 B Flush Diaphragm added to Process Connection table	3
G 1/2 B Flush Diaphragm dimensional drawing added to Process Connection dimensions	3
Added new bullet to beginning of Making the Mechanical Connection section	4

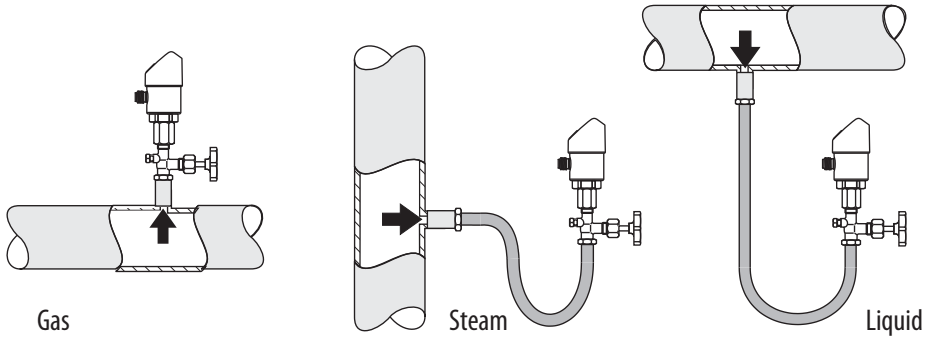
Safety Considerations

- 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 836P-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.
- The Bulletin 836P-D has flush diaphragm for highly viscous or crystallizing media that can clog the bore of the process connection.
- 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 range of measurement, design, and specific conditions of measurement.

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, can implement the work that is described and independently recognize potential hazards.

Recommended Installation for Optimal Performance



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Specifications

Certifications	c-UL-us, safety (for example, Electr.safety overpressure, …), USA, Canada CE conformity - 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
Environment: Operating Conditions	
Ambient Temperature Range	-20…+80 °C (-4…+176 °F)
Media	-20…_85 °C (-4…+185 °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% RH
Ingress protection	IP65 and IP67. The stated ingress protection (per IEC 60529) only applies when plugged in using mating connectors that have the appropriate ingress protection.
Overpressure Limit	1.7 times for the relative pressure measuring ranges 16 psi, 1,000 psi, and 1,500 psi. Two times for the remaining available models.
Electrical	
Power Supply	15…35 V DC
Current Consumption	Switching outputs with: Analog signal 4…20 mA; 70 mA; Without analog signal: 45 mA
Total Current Consumption	With IO-Link: maximum 450 mA including switching current
Outputs	
Output Type	2 x PNP, 1 PNP, and 4…20 mA analog
Zero Offset Adjustment	Maximum 3% of span
Output Thresholds	OUT 1 and OUT 2 are individually adjustable
Output Modes	Selectable - Normally open, normally closed, window, hysteresis
Output Voltage	(Power Supply -1V)
Output Current	With IO-Link: OUT1 maximum 100 mA, OUT2 maximum 250 mA
Load	Analog signal 4…20 mA: ≤ 0.5 kΩ
Service Life	100 million switching cycles
Time to Settle	Analog Signal: 3 ms Switching Output: 20 ms with IO-Link
Accuracy Data	
Analog Signal	≤ ±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	≤ ±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
Temperature Error in Rate Temperature Range	Typical: ≤ ±1.0% of span; Maximum: ≤ ±2.5% of span
Temperature Coefficients in Rated Temperature Range	Mean TC zero point: ≤ ±0.2% of span/10 K (typical); Mean TC span: ≤ ±0.1% of span/10 K (typical)
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)
Electrical Safety	
Short-circuit Protection	4…20 mA, Out 1/Out 2 vs. V-
Reverse Polarity Protection	V+ vs. V-
Insulation Voltage	500V DC
Overvoltage Protection	40V DC

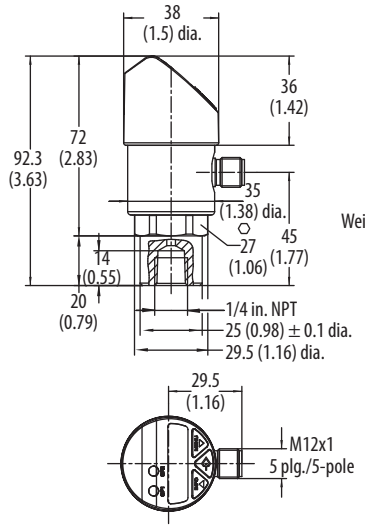
Specifications (Continued)

Material	
Wetted Parts	
Process Connection	Stainless Steel 316 L
Pressure Sensing Elements	< 9.8 bar (142 psi): Stainless Steel 316 L ≥ 9.8 bar (42 psi): Stainless Steel 13-8 PH
Non-wetted Parts	
Housing	Stainless Steel 304
Keyboard	TPE-E
Display Window	Polycarbonate
Display Head	Polycarbonate and ABS
Process Connection	
Thread	1/4 in. NPT Male 1/4 in. NPT Female G 1/4 in. BSPP Male G 1/4 in. BSPP Female G 1/2 in. B Blush

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

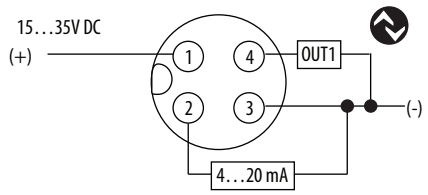
1/4 in. NPT Female Dimensions [mm (in.)]



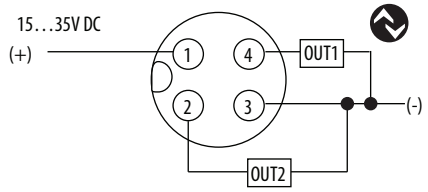
Weight approximately 220 g (7.76 oz)

Wiring Diagrams

1 PNP x 4…20 mA



2 PNP



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.

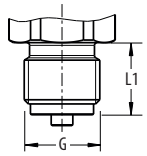
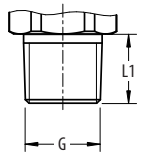
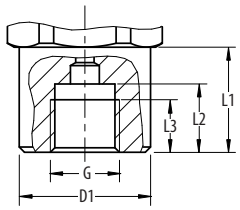
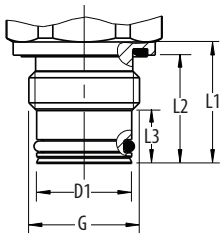
Mating Cables

Catalog Number 889D – F4AC-2 (M12x1 connector)
Catalog Number 889D-R4AC-2 (M12x1 right angle connector)

Process Connection

Attribute	Description
Measuring Cell	Piezoresistive measuring cell and metallic measuring diaphragm
Application	Measurement and monitoring of absolute and gauge pressures
Process Connection	Thread – 1/4 in. NPT female – 1/4 in. NPT male – G 1/4 in. BSPP female – G 1/4 in. BSPP male – G 1/2 in. B Flush Diaphragm

Process Connection [mm (in.)] (Continued)

G 1/4 in. BSPP Male		1/4 in. NPT Male		G 1/4 in. BSPP Female					G 1/2 in. B Flush Diaphragm				
													
G	L1	G	L1	G	L1	L2	L3	D1	G	L1	L2	L3	D1
G 1/4	13 (0.51)	1/4 in. NPT	13 (0.51)	G 1/4 in.	20 (0.79)	13 (0.51)	10 (0.39)	25 (0.98)	G 1/2 in. B	23 (0.91)	20.5 (0.81)	10 (0.39)	Ø 18 (0.71)

Range of Measurement [bar (psi)]

Switch	836P-D1 836PF-D1	836P-D2 836PF-D2
Gauge Pressure	-1…+20 (-14.5…+300)	0…551 (0…8000)
Absolute Pressure/Vacuum	-1…+20 (-14.5…+300)	0…20 (0…300)

IMPORTANT Overpressure Limit 2 times; 1.7 times for the relative pressure measuring ranges 160 psi, 1000 psi, and 1500 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)
2 PNP	PNP	PNP	—

Commissioning

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

Check the following points before commissioning:

- Fluid leakage is indicative of damage.
- Since this product is a safety-relevant component, check the diaphragm for any visible damage.

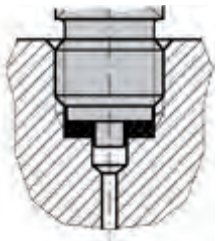
Required tool: Wrench size 27 open-ended wrench and screwdriver.

Making the Mechanical Connection

- For the flush mount connection option, do not remove the protective cap until shortly before mounting. During installation, confirm that the diaphragm is not damaged.
- While mounting, make sure that the sealing faces at the instrument are clean and undamaged.
- Only screw in or unscrew the instrument via the wrench. 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.

Types of Sealing

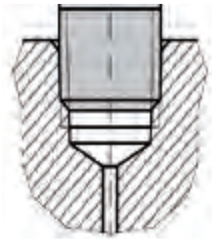
per EN 837



per DIN 3852-E

Figure 1 - Parallel Thread

NPT



Tapered Thread (NPT)

Correct sealing of the process connections with parallel threads at the sealing face must be made using suitable flat gaskets and sealing rings.

The sealing of the tapered threads (for example, NPT thread) is made by providing the thread with additional sealing material such as, PTFE tape (EN 837-2).

Making the Electrical Connection

- The instrument must be grounded 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 2000 m (6561.6 ft) in case the pressure switch be used at this altitude.
- For cable outlets, make sure that no moisture enters at the cable end.

Disconnect 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.

Disconnect: 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.

Programming

Figure 2 - Keys and Functions

Keys (Simultaneously press the Info and Menu Keys to Exit the Programming Mode and return 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)

Table 3 - 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		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											
			OU2	→		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			
			↓↑												
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										

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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Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment can be collected separately from any unsorted municipal waste.

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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Rockwell Otomasyon Ticaret A.Ş., Kar Plaza İş Merkezi E Blok Kat:6 34752 İçerenköy, İstanbul, Tel: +90 (216) 5698400

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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