

Solid-state Pressure Transmitter with SIL 2

Catalog Numbers 836PS1-N1GMGB43A2-D4, 836PS2-N1GMGA87A2-D4

IMPORTANT SAVE THESE INSTRUCTIONS FOR FUTURE USE.

Important User Information



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT Identifies information that is critical for successful application and to understand the product.

Safety Considerations

- Read this document for information on installation, handling, mounting, general product specifications, and operation of this product.
- This installation instruction contains important information on handling the instrument.
- 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 carefully read and understand the operating instructions before any work begins.
- Qualified personnel install and commission the installation. Failure to comply can result 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 measure, design, and specific conditions of measurement.
- The service life of the pressure transmitter is limited by a maximum number of load cycles. The maximum number depends on the pressure profile of the application (extent of change in pressure, time of pressure rise, and pressure drop). Once the maximum number of load cycles has been exceeded, it can lead to leaks through hair-line cracks, which could lead to physical injury and damage to property.
 - Request the maximum number of load cycles from the manufacturer.
 - Replace the pressure transmitter once it has exceeded the maximum number of load cycles.
 - Take safety measures to minimize hazards due to hair-line cracks.
- For hazardous media such as oxygen, acetylene, flammable or toxic gases or liquids, and refrigeration plants, compressors, and all standard regulation, the appropriate codes, or regulations must also be followed.
- Do not use this instrument in safety or emergency stop applications. Incorrect use of the instrument can result in injury.
- If a failure occurs, aggressive media with high temperature and under high pressure or vacuum can be present at the instrument.

Specifications

Attribute	836PS1-N1GMGB43A2-D4, 836PS2-N1GMGA87A2-D4
Certifications	CE Marked for all applicable directives. Pressure equipment directive 97/23/EC. EMC Directive 2004/108/EC, EN 61326 (group 1, class B), and interference immunity (industrial applications). A measurement deviation of up to 1% can be expected when high interference is present. RoHS conformity – 2011/65/EU. SIL 2 functional safety
Environmental Operating Conditions	
Ambient Temperature Range	-20...+80 °C (-4...+176 °F)
Media Temperature	-40...+150 °C (-40...+302 °F) *Derating: $T_{med} = 150 (302) \rightarrow T_{amb,max}=70 (158)^1$
Storage Temperature	-20...+80 °C (-4...+176 °F)
Vibration Resistance	5 g (0.18 oz) (per IEC 60068-2-6, vibration under resonance) ²
Shock Resistance	100 g (3.53 oz) (per IEC 60068-2-27, mechanical shock) ³
Ingress Protection	IP65 and IP67 rated enclosure. The stated ingress protection (per IEC 60529) only applies when plugged in and mating connectors are used that have the appropriate ingress protection.
Electrical	
Power Supply	10... 30V DC
Outputs	
Output Type, Analog	4...20 mA
Permissible load in Ω	$\leq (\text{power supply} - 10V) / 0.02 \text{ A} - (\text{cable length in m} \times 0.14 \Omega)$
Response Time	Settle Time, less or equal to 2 ms (less than 10 ms for temperatures lower than -30 °C [-22 °F])
Accuracy	0.50% of span Optional: 0.25% (only for measured ranges ≥ 0.25 bar and $\leq 1,000$ bar) Includes non-linearity, hysteresis, zero offset, and end value deviation (Corresponds to measured error per IEC 61298-2).
Nonlinearity (IEC 61298-2)	$\leq 0.2\%$ of span BFS (calculated using Best Fit Straight-Line Method)
Non-repeatability	$\leq 0.1\%$ of span
Long-term drift	$\leq \pm 0.2\%$ of span/year
Adjustability of zero point and span	Adjustment is made using potentiometers inside the instrument. Zero point and span: $\pm 5\%$
Reference Conditions (per IEC61298-1)	
Operating Temperature	15...25 °C (59...77 °F)
Atmospheric Pressure	860...1060 mbar
Humidity	45...75% r.h., noncondensing
Power Supply	+24V DC
Mechanical	
Wetted part	Stainless steel
Non-wetted parts	Enclosure: Stainless steel Connector: PA6, Stainless steel Internal Transmission Medium: synthetic oil, Instruments with range >25 bar: Dry measure cell
Weight	Unit: Approximately 0.2 kg (0.45 lbs)

1 If the media temperature is 150 °C (302 °F) the maximum ambient temp is limited to 70 °C (158 °F), because of the cooling effect.

2 Vibration is limited to 5 g on high temperature models (incl. cooling tower).

3 Shock is limited to 100 g on high temperature models (incl. cooling tower).

Vacuum and \pm Measurement Ranges[bar (psi)]

Switch	Range of Measure	Overpressure Limit
836PS2-N1GMGA87A2-D4	-1...+6 (-14.5...+87)	41.4 (600)
836PS1-N1GMGB43A2-D4	-1...+30 (-14.5...+435)	80 (1160)

Process Connections and Over Pressure Limits

Standard	Thread Size	Max Nominal Pressure [bar]	Over-pressure Limit [bar]
EN 837	G ¼ B	400	800

Compound and absolute pressure ranges are available by request. Contact your local Allen-Bradley distributor for additional information.

Functional Safety Data

Process Industry	
Applied Standard	EN 61508-2:2010 and EN 61511:2004; SN29500
Device Type	B
HFT, Hardware Fault Tolerance	0
SFF, Safe Failure Fraction	64%
λ_{total} , Total Failure Rate	126 FIT
λ_{NE} , No Effect Failure Rate	8 FIT
λ_{SU} , Safe Undetected Failure Rate	27 FIT (consider the measured error within -3.5...+10%)
λ_{DD} , Dangerous Detected Failure Rate	51 FIT (loop current < 3.8 mA or > 20.5 mA)
λ_{DU} , Dangerous Undetected Failure Rate	40 FIT (measured error outside of -3.5...+10%, loop current within 3.8...20.5 mA)
PFD_{avg} , Average Probability of Failure on Demand	1.75×10^{-4}
T_{proof} , Proof Test Interval	1 year, Test to discover a signal drift: Deviation from zero point and full scale value < 0.5% of the nominal pressure
Suitable for Safety Integrity Level	SIL 2 (per IEC 61511-1:2003 section 11.4.4, involves prior use, no diagnosis for active error detection that is implemented in the device)
Machine Building Industry	
Applied standards	ISO 13849-1:2008; SN29500
MTTFd, Mean Time To Dangerous Failure	1254 years
Diagnosis	None. (test to discover a signal drift: Deviation from zero point and full scale value < 0.5% of the nominal pressure in a time interval of max. 12 months)

Reference Operating Conditions

- All values apply at a mean ambient temperature of max. 40 °C (104 °F) and for the ambient ratings according to SN 29500 standards.
- The case of the pressure transmitter is undamaged.
- The pressure transmitter is not exposed to heavy vibrations.
- The process connection is suitable for the measuring range.
- The wetted parts are suitable for the medium.
- For safety applications, hydrogen is not permissible as a medium.
- No pressure peaks.
- No static pressures are higher than the values indicated in the data sheet.
- Use a shielded cable that is grounded at least at one end.
- The maximum measured error of -3.5...+10% of span must be considered.
- A measured value of < 3.8 mA and > 20.5 mA has to be interpreted as an error signal by the logic unit.
- The pressure transmitter is only suitable for pressure measurement in applications where the pressure values change dynamically.

For the Process Industry Applications, the following also applies:

- Electromagnetic environment in accordance with EN 61326-1:2006, EN 61326-2-3:2006 and EN 61326-3-2:2008.
- Deviation to EN 61326-3-2:2008: Frequencies below 100 kHz not tested according to IEC 61000-4-6.

For Machine Building Applications, the following also applies:

- Electromagnetic environment in accordance with EN 61326-1:2006, EN 61326-2-3:2006 and EN 61326-3-1:2008.
- In accordance with EN 61326-3-1:2008, for testing in accordance with IEC 61000-4-5, a test level of 2 kV is required. The interference immunity of the 836PS is 1 kV. To achieve a higher interference immunity, external protective measures must be provided.

Commissioning



ATTENTION: Due to personnel safety, only use the pressure transmitter in perfect conditions.

The following conditions must be met before commissioning:

- No fluid is leaking from the pressure sensor,
- No visible damage is present in the measuring diaphragm.

Required Tool: 27 mm (80.6 in.) torque wrench.



ATTENTION: Danger of personal injury or property damage due to media leaks.

Media leaks can lead to serious injury. If the sensor fails, components and parts can be ejected under high pressure. To minimize the leaks, we recommend the following precautions:

- Employ a protective device that helps prevent parts from being ejected. The protective device must not be removable without the use of tools.
- Confirm that the total system pressure does not exceed the lowest maximum pressure of any of its components. If varying or different pressures are to be expected in the system, components must be used that can withstand the maximum expected pressure spikes.
- Confirm that the mounting area is clean and free from burrs.

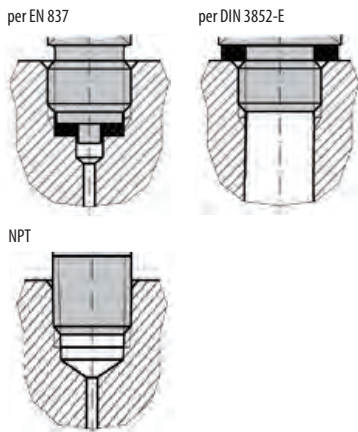
Waste Electrical and Electronic Equipment (WEEE)



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

1. To verify that the pressure transmitter is suitable for the application, read the product label.
2. While mounting, make sure that the process connection seal and mounting threads are clean and undamaged.
3. Seal the process connection as follows:

Figure 1 - Types of Seals — Parallel Thread

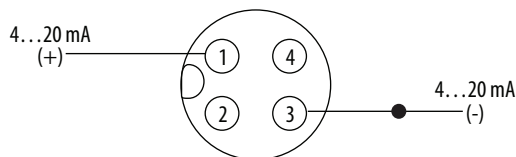


4. Manually screw the instrument and take extra care not to cross the threads. Use the wrench to tighten the pressure transmitter with a suitable torque wrench. The correct torque depends on the dimension of the pressure connection and the sealing used (form/material). The maximum torque is 50 N•m (442.52 lb•in). The specified tightening torque for the high-pressure pipes must be adhered to (see pipe supplier specifications). Non-compliance can damage the instrument or the measuring point.

Electrical Connections

1. See the [Wiring Diagrams on page 4](#) for specific wiring instructions.
2. Ground the sensor enclosure by using the process connection to help protect the transmitter against electromagnetic fields and electrostatic discharge.

Wiring Diagrams



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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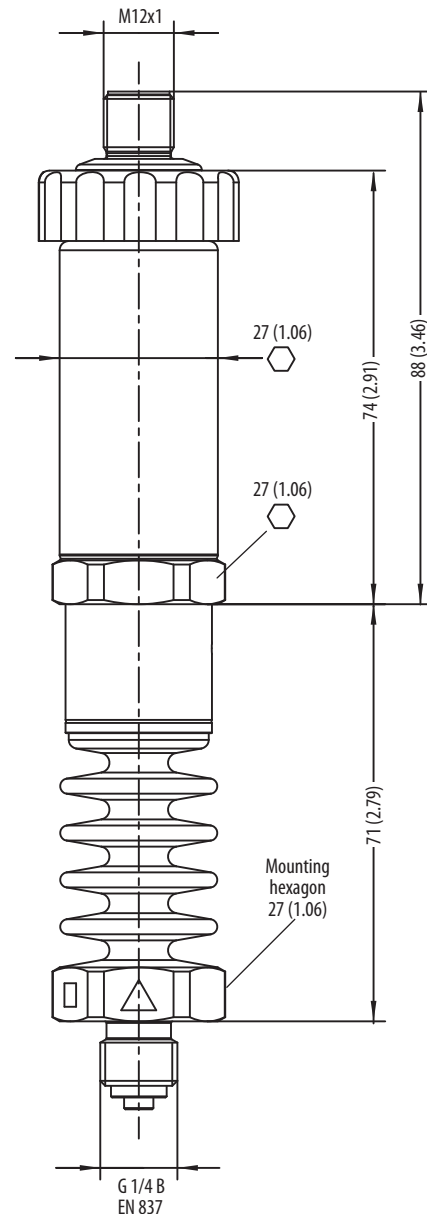
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Mating Cables

Catalog Number 889D-F4AC-2 (M12x1 connector).

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

G 1/4 Male Approximate Dimensions [mm (in.)]



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