Product Compliance Markings

CE 0344 ⟨Ex⟩ II 1 G Eex ia IIC T4

c SP us 221839 I.S. Class I Div. 1 Groups A-D T4
AEx ia IIC T4

Ta = 0 °C… + 50 °C

Ex Cerification by Mensor Corporation, San Marcos, TX USA

EMC: Complies with EN61326, Criteria C.

Limited Warranty

Each Fluke product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is one year and begins on the date of shipment. Parts, product repairs and services are warranted for 90 days. This warranty extends only to the original buyer or end user customer of a Fluke authorized reseller, and does not apply to fuses, disposable batteries or to any product which, in Fluke's opinion, has been misused, altered, neglected or damaged by accident or abnormal conditions of operation or handling. Fluke warrants that software will operate substantially in accordance with its functional specifications for 90 days and that it has been properly recorded on nondefective media. Fluke does not warrant that software will be error free or operate without interruption.

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Following repair, the product will be returned to the Buyer transportation prepaid and the Buyer will be billed for the repair and return transportation charges (FOB Shipping Point).

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FLUKE®

700PEx Series Pressure Modules

Instruction Sheet

Introduction

The Fluke 700PEx Series Pressure Modules allow you to measure pressure with Fluke intrinsically safe calibrators such as the 718Ex. Read this sheet before using the pressure modules. This instruction sheet contains specifications and information about how to avoid damaging the pressure modules and describes how to safely use them in hazardous locations. Refer to your calibrator's Users Manual for complete operating instructions.

The pressure modules measure pressure using an internal microprocessor. They receive operating power from and send digital information to the intrinsically safe calibrators.

- Gage pressure modules have one pressure fitting and measure pressure with respect to atmospheric pressure.
- Differential pressure modules have two pressure fittings and measure the difference between the applied pressure on the high fitting versus the low fitting. A differential pressure module functions like a gage module when the low fitting is open.
- Absolute pressure modules measure relative to a vacuum.

In Case of Difficulty

For service or calibration, call your nearest authorized Fluke Service Center.
For application or operation assistance or information on Fluke products, call:

USA: 1-888-99-FLUKE (1-888-993-5853)
Canada: 1-800-36-FLUKE (1-800-363-5853)
Europe: +31 402-675-200
Japan: +81-3-3434-0181
Singapore: +65-738-5655
Anywhere in the world: +1-425-446-5500

Or, visit Fluke's Web site at www.fluke.com.

To register your product, visit register.fluke.com

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Fluke Europe B.V.
P.O. Box 1186
5602 B.D. Eindhoven
The Netherlands

Box Contents

Each pressure module comes with an installed strap and instruction sheet. All pressure modules, with the exception of the 700P29Ex, come with 1/4 NPT to 1/4 ISO metric adapters.

PN 2106534
(English)
May 2004

Safety Information

In this instruction sheet a Warning identifies conditions and actions that pose hazards to the user. A Caution identifies conditions and actions that may damage the pressure module or equipment under test. International symbols used in this instruction sheet are identified later in the *Symbols* section. Read the entire instruction sheet and the 700PEx CCD (Concept Control Drawing) before using the pressure module.

In case of doubt (due to translation and/or printing errors) refer to the original English instruction sheet.

⚠⚠ Warning

To avoid electric shock, injury, or damage to the pressure module:

- **Use the pressure module only as described in this instruction sheet and the Fluke 700PEx CCD (Concept Control Drawing) otherwise the protection provided by the pressure module may be impaired.**
- **Inspect the pressure module before use. Do not use it if it appears damaged.**
- **Check the cable for damaged insulation. Do not use the pressure module if the cable appears damaged.**
- **Never use the pressure module with the case open. Opening the case invalidates Ex Approval.**
- **This equipment is specified for use in measurement category I (CAT I) pollution degree 2 environments and should not be used in CAT II, CAT III, or CAT IV environments. Voltage transients should not exceed 300 volts for the CAT I applications where this product is used. Measurement transients are defined in IEC1010-1 as 2 µs rise time with a 50 µs duration at 50 % of the maximum amplitude height.**
- **Measurement Category I (CAT I) is defined for measurements performed on circuits not directly connected to the mains.**

Symbols

The following symbols are used on the pressure module or in this instruction sheet.

Table 1. Symbols

CE	Conforms to relevant European directives.
c SP us	Conforms to relevant Canadian and US standards.
⚠	Risk of danger. Important information. See Manual.
Ex	Certified as meeting “instrinsically safe” standards of European approval agencies.
	Pressure.

Faults and Damage

If there is any reason to suspect that the safe operation of the pressure module has been affected, it must be immediately withdrawn from use and precautionary measures must be taken to prevent any further use of the pressure module in an Ex hazardous area.

⚠⚠ Warning

The safety features and integrity of the pressure module may be compromised by any of the following:

- **External damage to the housing**
- **Internal damage to the pressure module**
- **Exposure to pressure loads in excess of the maximum rated pressure**
- **Incorrect storage of the unit**
- **Damage sustained in transit**
- **Correct certification is illegible**
- **Functioning errors occur**
- **Permitted limitations are exceeded**
- **Functioning errors or obvious measurement inaccuracies occur which prevent further measurement by the pressure module**

Safety Regulations

The use of the 700PEx pressure modules meets the requirements of the regulations providing that the user observes and applies the requirements as laid down in the regulations and that incorrect use of the unit is avoided. Use must be restricted to the specified application parameters.

Protecting Yourself from Pressure Releases

⚠⚠ Warning

- **To avoid injury due to the release of high pressure, use only adapters and fittings rated to withstand the appropriate pressure. Ensure that all adapters and fittings are securely connected.**
- **To avoid a violent release of pressure in a pressurized system, slowly bleed off the pressure before you attach or remove the pressure module from the pressure line.**
- **When measuring the pressure of potentially hazardous media, care must be taken to minimize the possibility of leakage. Confirm that all pressure connections are properly sealed.**

Avoiding Mechanical Damage

To avoid damaging the pressure modules, never apply more than 10 ft.-lbf. of torque between the module fittings or between the fittings and the body of the module. Figure 1 shows the correct way and incorrect ways to use a wrench when applying torque to the pressure module fitting.

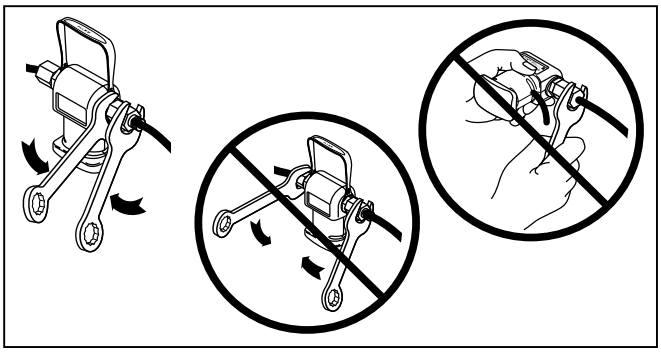

Figure 1.

Avoiding Overpressure Damage

Applying pressure in excess of the burst pressure specified on the pressure modules can destroy the pressure modules.

⚠Caution

Exceeding the maximum rated pressure may affect total uncertainty. If you suspect the module has been over pressured, use the performance test to check it.

Avoiding Corrosion Damage

To avoid corrosion damage, use only with specified media as shown below:

- Isolated: any medium that is compatible with type 316 stainless steel.
- Non-Isolated: dry, non-corrosive gasses only.
- 700P29Ex: use only with a medium that is compatible with Hastelloy C276 and type 316 Stainless Steel.

Recommended Measurement Technique

For best results, the modules should be pressurized to full scale and then vented to zero pressure (atmosphere) prior to zeroing and making measurements.

Zeroing Gage and Differential Modules

1. Connect the pressure module to the intrinsically safe calibrator and select the measure pressure function.
2. Position the module in the same orientation for which it will be used.
3. Vent both high and low side measurement ports to atmosphere.
4. Press the [ZERO] key.

Zeroing Absolute Modules

1. Connect the pressure module to the intrinsically safe calibrator and select the measure pressure function.
2. Apply a vacuum to achieve a pressure below the rated resolution of the pressure module being zeroed.
3. Press the [ZERO] key, and enter 0.0 as the applied pressure.

Alternative procedure if a local precision barometer is available. Do not use the weather service or airport reports.

1. Connect the pressure module to the intrinsically safe calibrator and select the measure pressure function.
2. Press the [ZERO] key.
3. Enter the value from the precision barometer.

Note

Low range pressure modules may be sensitive to gravity. For best results, pressure modules 30 psi and below should be held at the same physical orientation from the time they are zeroed until the measurement is complete.

Pressure Calibration Kit

The Fluke-700PCK Pressure Calibration Kit makes it possible to calibrate pressure modules at ambient temperature with a precision pressure calibrator better than the module specification. A PC running Windows® software is required. The kit is an optional accessory available from your distributor or Fluke.

Performance Test

If you need to check that the pressure module meets its total uncertainty specification, use a dead weight tester or suitable pressure calibrator. Proceed as follows to verify that a pressure module is operating within specification:

1. Read the pressure value with no externally applied pressure to make sure the 0% of scale is correct. When reading the pressure, press the [ZERO] key to remove any zero offset.
2. Connect the pressure module to a precision pressure source.
3. Zero as described earlier in the appropriate “Zeroing” sections.
4. Set the precision pressure source to 20% of the pressure module’s maximum rated pressure.
5. Make sure the reading agrees with precision pressure source value within the total uncertainty specification in Table 2.
6. Set the precision pressure source to 40, 60, 80, and 100%. Then reverse the order from 100, 80, 60, 40, and 20% of maximum rated pressure. Repeat step 5 at each test point.
7. If temperature sensitivity is of concern, repeat steps 1 through 5 at various controlled temperatures.

Cleaning

⚠Caution

- **Measuring substances that leave residue in the sensor may cause permanent damage to the Pressure Module.**
- **Periodically wipe the Pressure Module with a damp cloth and mild detergent. Do not use abrasives or solvents to clean the Pressure Module.**

Table 2. Specifications [1] (% of Maximum Rated Pressure)

Model	Maximum Rated Pressure[2] (Range)	Type	Isolated or Nonisolated	Reference Uncertainty (23 ° ± 3 °C)	Stability (1 Year)	Temp (0 to 50 °C)	Total Uncertainty[3]
Burst pressure: 3X maximum rated pressure, including common mode pressure (700P29Ex and 700P09Ex: 2x). Specifications reflect a confidence interval of 95%.							
700P01Ex	0 to 10 in H_2O 0 to 2.49 kPa 0 to 0.02 bar	Differential[5]	Hi: Nonisolated Low: Nonisolated	0.200 %	0.050 %	0.050 %	0.300 %
700P24Ex	0 to 15.000 psi 0 to 100.00 kPa 0 to 1.0000 bar	Differential[5]	Hi: Isolated Low: Nonisolated	0.025 %	0.010 %	0.015 %	0.050 %
700P05Ex	0 to 30.000 psi 0 to 200.00 kPa 0 to 2.0000 bar	Gage	Isolated	0.025 %	0.010 %	0.015 %	0.050 %
700P06Ex	0 to 100.00 psi 0 to 700.00 kPa 0 to 7.0000 bar	Gage	Isolated	0.025 %	0.010 %	0.015 %	0.050 %
700P27Ex	0 to 300.00 psi 0 to 2000.00 kPa 0 to 20.000 bar	Gage	Isolated	0.025 %	0.010 %	0.015 %	0.050 %
700P09Ex	0 to 1500.0 psi 0 to 10000.0 kPa 0 to 100.000 bar	Gage	Isolated	0.025 %	0.010 %	0.015 %	0.050 %
700P29Ex[4]	0 to 3000 psi 0 to 20680 kPa 0 to 207 bar	Gage, High Pressure	Isolated	0.050 %	0.010 %	0.020 %	0.080 %
700PA4Ex	0 to 15.000 psi 0 to 100.00 kPa 0 to 1000.0 mbar	Absolute	Isolated	0.050 %	0.010 %	0.010 %	0.070 %

1. Use of pressure zero function is required to achieve these specifications.
2. Available pressure units are determined by the calibrator being used.
3. Accuracy specifications apply for 1 year for 0 to 100% of full span from 0 to 50 °C. Typical uncertainty is 1% of full span from -10 °C to 0 °C. Maximum altitude: 2000 m. Humidity range: 0 to 80 %.
4. Only use with Group 2 Fluids compatible with Hastelloy C276 and type 316 Stainless Steel.
5. The maximum line (common mode) pressure shall not exceed the maximum rated pressure.

Table 3. Entity Parameters

Vmax, Ui	Imax, Ii	Pi	Ci	Li
8.7 V	598 mA	1.2 W	5.72 µF	0 mH

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FLUKE-700P27EX