

# FLUKE®

# 716

## *Pressure Calibrator*

### *Instruction Sheet*

#### ***Introduction***

The Fluke Model 716 Pressure Calibrator (hereafter called "Calibrator") calibrates P/I (pressure to current) transmitters, measures pressure via a Fluke 700 Series Pressure Module, measures current up to 24 mA, and supplies loop voltage. The Calibrator simultaneously displays pressure and current measurements.

The Calibrator makes 5-digit pressure readings in the following units: psi, inH<sub>2</sub>O at 4 °C, inH<sub>2</sub>O at 20 °C, kPa, cmH<sub>2</sub>O at 4 °C, cmH<sub>2</sub>O at 20 °C, bar, mbar, kg/cm<sup>2</sup>, inHg, and mmHg. Full scale readings for all pressure ranges can be made in psi, kPa, and inHg units. To avoid display overflow, full scale readings are limited to 1000 psi in cmH<sub>2</sub>O, mbar, and mmHg units and 3000 psi in inH<sub>2</sub>O units. Pressures of at least 15 psi must be measured for meaningful readings in bar and kg/cm<sup>2</sup> units.

Your Calibrator is supplied with a Flex-Stand™ holster, an installed 9 V alkaline battery, one set of TL75 test leads, one set of AC70A alligator clips, and this instruction sheet.

If the Calibrator is damaged or something is missing, contact the place of purchase immediately. Contact your Fluke distributor for information about accessories. See "How to Contact Fluke." To order replacement parts or spares, see "Replacement Parts."

## ***Safety Information***

Use the Calibrator only as specified in this instruction sheet, otherwise the protection provided by the Calibrator may be impaired.

A **Warning** identifies conditions and actions that pose hazard(s) to the user; a **Caution** identifies conditions and actions that may damage the Calibrator or the equipment under test.

### **⚠ Warning**

**To avoid possible electric shock or personal injury:**

- **Never apply more than 30 V between the mA terminals, or between either of the mA terminals and earth ground.**
- **Remove the test leads from the Calibrator before you open the battery door.**
- **Make sure the battery door is closed and latched before you operate the Calibrator.**
- **Do not operate the Calibrator if it is damaged.**
- **Do not operate the Calibrator around explosive gas, vapor, or dust.**
- **When servicing the Calibrator, use only specified replacement parts**
- **To avoid a violent release of pressure in a pressurized system, shut off the isolation valve and slowly bleed off the pressure before you attach or detach the pressure module to the pressure line.**








### **Caution**

**To avoid mechanical, overpressure, or corrosion damage to the Pressure Module, follow all procedures in the related *Instruction Sheet*.**

## ***Explanation of International Symbols***

The symbols in the table below are used on the Calibrator or in this instruction sheet.

**International Symbols**

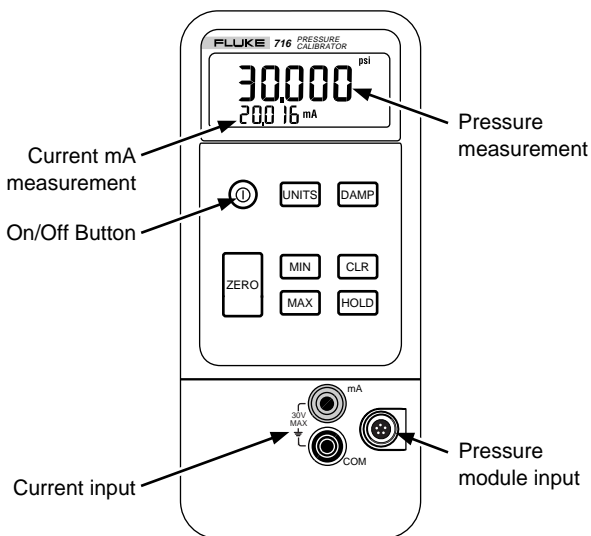
<b>Symbol</b>	<b>Meaning</b>
	Earth ground
	Fuse
	Battery
	Refer to this instruction sheet for information about this feature.
	Double insulated
	Conforms to relevant Canadian Standards Association directives.
	Conforms to European Union directives

## Getting Acquainted with the Calibrator














Press **Ⓢ** to turn the Calibrator on and off. The Calibrator displays pressure and current measurements simultaneously. See the figure below.

The upper part of the display shows the applied pressure. Press **UNITS** to select a different pressure unit. When you cycle the power off and on, the Calibrator retains the pressure unit you last used.

The lower part of the display shows the current (up to 24 mA) applied to the current (mA) inputs. The current inputs are fused with a 0.125 A, 250 V fast fuse (Littelfuse<sup>®</sup> type 2AG).



## Pushbutton Functions

Pushbutton	Function
	Press to select a different pressure unit. For higher pressure module inputs, inappropriate (out-of-range) units are not available.  Press  on while pressing  to source loop voltage.
	Turns pressure reading damping on and off. With damping on, the display does not update as quickly.
	Press to zero the pressure display. Vent pressure to atmosphere before you press this pushbutton. With an absolute Pressure Module, see special instructions below.
	Press and hold to read the minimum pressure and current readings since the power was turned on or  was pressed.
	Press to clear the MIN and MAX memories.
	Press and hold to read the maximum pressure and current readings the power was turned on or  was pressed.
	Press  to freeze the display. The <b>HOLD</b> symbol appears on the display. Press  again to resume normal operation.

## ***Zeroing with Absolute Pressure Modules***

For zeroing, adjust the Calibrator to read a known pressure. This can be barometric pressure, if it is accurately known, for all but the 700PA3 module. An accurate pressure standard can also apply a pressure within range for any Absolute Pressure Module. Adjust the Calibrator reading as follows:

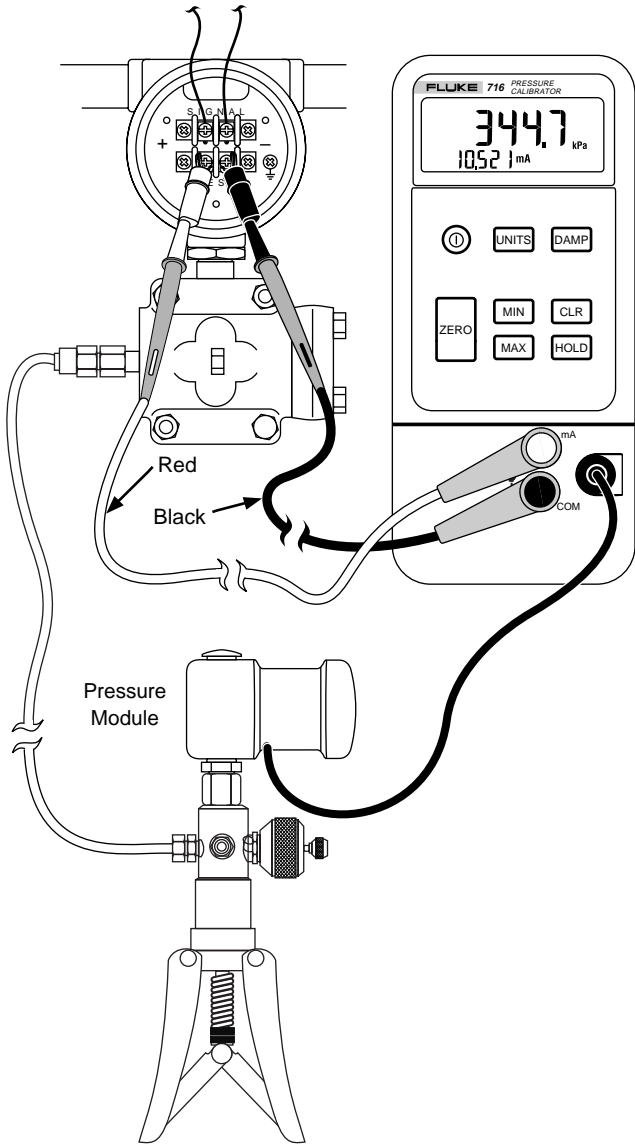
1. Press and hold **ZERO**.
2. Press **CLR** to increase or **HOLD** to decrease the Calibrator reading to equal the applied pressure.
3. Release **ZERO** to exit the zeroing procedure.

To convert measurement units to different units displayed on the Calibrator, use the following sample conversions:

- 1 bar = 750 mm Hg (1 mm Hg = 0.0013332 bar)
- 1 psi = 2.036 in. Hg ( 1 in. Hg = 0.49115 psi).

## ***Calibrating a P/I Transmitter***

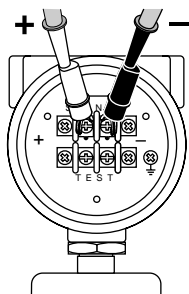
To calibrate a P/I (pressure to current) transmitter, apply a pressure to the transmitter and measure the transmitter's current loop output. Connect the Calibrator to the transmitter as shown in the figure.



## Sourcing Loop Voltage

The Calibrator supplies loop power at 24 V dc to a current transmitter that is disconnected from the system. Use the following procedure:

1. With power off, hold down **UNITS** while pressing **Ⓢ** on. “Loop” appears in the display.
2. Connect the Calibrator in series with the instrument current loop as shown below. “Loop” disappears from the display when the transmitter begins drawing current.
3. Measure loop current in the mA measurement display.
4. Press **Ⓢ** off to deactivate the 24 V dc supply when you are done sourcing loop voltage.



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## Maintenance

For maintenance procedures not described in this instruction sheet, or if the Calibrator needs repair, contact a Fluke Service Center.

## In Case of Difficulty

- Check the battery, test leads, and pressure tubing. Replace as necessary.
- Review this instruction sheet to make sure you are using the Calibrator correctly.



If the Calibrator needs repair, and the Calibrator is under warranty, see the warranty statement for terms. If the warranty has lapsed, the Calibrator will be repaired and returned for a fixed fee.

### **Cleaning**

Periodically wipe the case with a damp cloth and detergent; do not use abrasives or solvents.

### **Calibration**

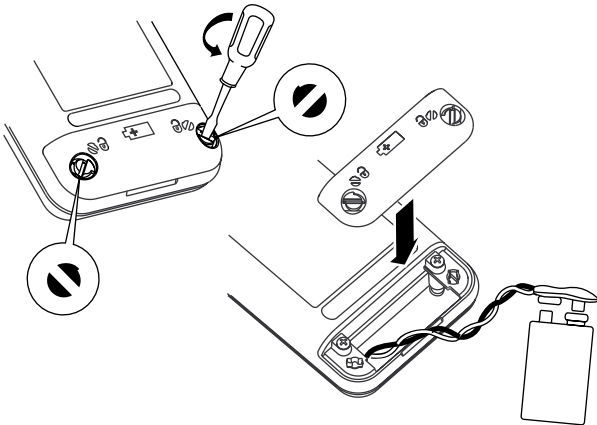
Calibrate your Calibrator once a year to ensure that it performs according to its specifications. A calibration manual is available (PN 686540). Call 1-800-526-4731 from the U.S.A. and Canada. In other countries, contact a Fluke Service Center.

### **Replacing the Battery**

When the **+** symbol appears on the display, replace the battery with a 9 V alkaline battery.

#### **⚠ Warning**

**To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator **+** appears.**



## ***Replacing the Fuse***

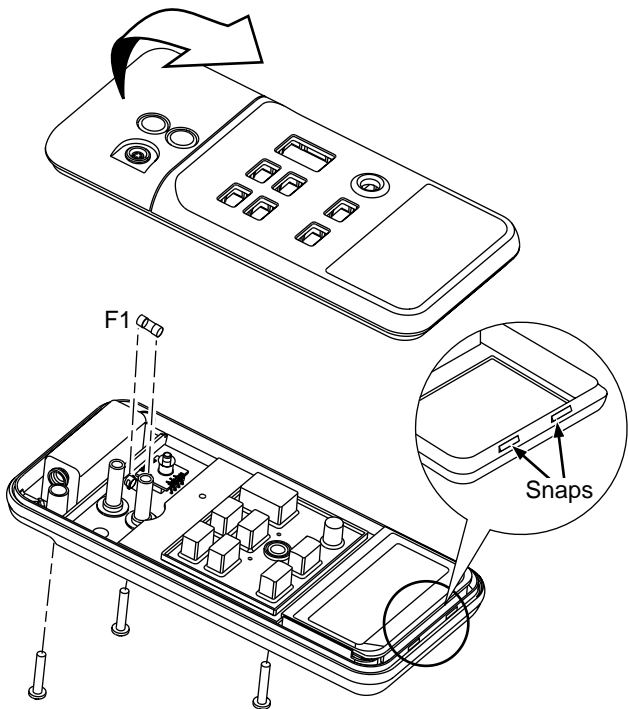
### **⚠ Warning**

**To avoid personal injury or damage to the Calibrator, use only a 0.125A 250 V fast fuse, Littelfuse® 2AG.**

Fuse F1 is probably blown if the mA measurement display reading does not respond to current applied to the current (mA) inputs.

Replace the fuse as follows:

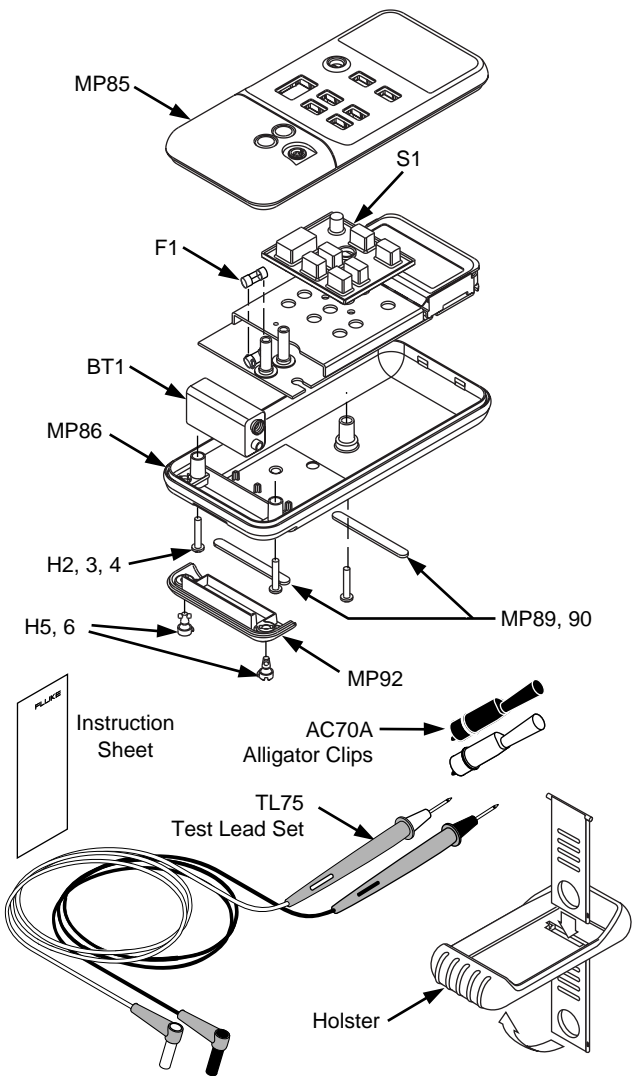
1. Remove the test leads and turn the Calibrator off.
2. Remove the battery door.
3. Remove the three Phillips-head screws from the case bottom and turn the case over.
4. Gently lift the top cover from the end nearest the current (mA) inputs until it unsnaps from the bottom cover.
5. Replace the fuse with a 0.125 A 250 V fast fuse, Littelfuse® type 2AG.
6. Carefully fit the case top and circuit board assembly together, making sure that the O-ring is properly seated between the pressure sensor and the pressure fitting on the case top. Fit the case bottom onto the case top, engaging the two snaps near the display end of the case. Reinstall the three screws.
7. Replace the battery door.



# ***Replacement Parts and Accessories***

## **Replacement Parts**

<b>Item</b>	<b>Description</b>	<b>Part or model no.</b>	<b>Qty.</b>
BT1	9 V battery, ANSI/NEDA 1604A or IEC 6LR61	614487	1
CG81Y	Holster, Yellow	CG81Y	1
F1	Fuse, 125 mA, 250 V fast	686527	1
MP85	716 00 case top	663994	1
MP86	Case bottom	620168	1
H2, 3, 4	Case screw	832246	3
MP89, 90	Non-skid foot	824466	2
MP92	Battery door	619947	1
H5, 6	Battery door fasteners	948609	2
S1	Keypad	687068	1
TL75	Test lead set	TL75	1
AC70A	Alligator clips	AC70A	1
–	716 Instruction Sheet	690008	1
TL20	Industrial test lead set	TL20	Option
–	71X Series Calibration Manual	686540	Option



## **Specifications**

Specifications are based on a one year calibration cycle and apply for ambient temperature from +18 °C to +28 °C unless stated otherwise. “Counts” are the number of increments or decrements of the least significant digit.

### **Pressure Display, Pressure Module Input**

<b>Range</b>	<b>Resolution</b>	<b>Accuracy</b>
(determined by pressure module)		

### **DC mA Input**

<b>Range</b>	<b>Resolution</b>	<b>Accuracy, ±(% of Reading + Counts)</b>
24 mA	0.001 mA	0.025 + 1
<i>Overload protection: 125 mA, 250 V fast acting fuse</i>		
<i>Temperature coefficient: 0.005 % of range per °C for temperature ranges -10 °C to 18 °C and 28 °C to 55 °C</i>		

### **Loop Supply**

24 V dc nominal

## ***How to Contact Fluke***

To order accessories, receive operating assistance, or get the location of the nearest Fluke distributor or Service Center, call:

1-800-443-5853 in U.S.A. and Canada

+31-402-678-200 in Europe

+81-3-3434-0181 Japan

+65-\* -276-6196 Singapore

+1-425-356-5500 from other countries

Address correspondence to:

Fluke Corporation  
P.O. Box 9090,  
Everett, WA 98206-9090  
U.S.A.

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

Visit us on the World Wide Web at: **[www.fluke.com](http://www.fluke.com)**

### **LIMITED WARRANTY & LIMITATION OF LIABILITY**

This Fluke product will be free from defects in material and workmanship for three years from the date of purchase. This warranty does not cover fuses, disposable batteries or damage from accident, neglect, misuse or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, send your defective Calibrator to the nearest Fluke Authorized Service Center with a description of the problem.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.