PM01, PM015, PM100

Hand-held monitors for vacuum and pressure measurement

INSTRUCTION MANUAL

Serial No._____

051910

www.wpiinc.com

World Precision Instruments

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INTRODUCTION

Hand-held and battery operated, PM Series Pressure Monitors simplify vacuum and pressure measurements. An integral transducer and digital display allow easy and accurate pressure readings. Three separate versions measure pressures in the range of ±1 psi, ±15 psi, or ±100 psi. A range switch allows measurement in units of psi or kPa for the100 psi version, and psi or mm Hg for the 1 and 15 psi versions. Pressure can be read on the built-in LCD display, or monitored on the recorder output.

Standard versions are equipped with a 9V alkaline battery. Rechargeable versions use a nickel/cadmium battery and come complete with a charger.

SPECIFICATIONS

	PM01	PM015	PM100
Pressure Ranges	±1 psi (±52 mm Hg)	±15 psi (±775 mm Hg)	±100 psi (±690 kPa)
Proof Pressure	20 psi (1035 mm Hg)	30 psi (1550 mm Hg)	150 psi (1035 kPa)
Resolution	0.001 psi (1 mm Hg)	0.01 psi (1 mm Hg)	0.1 psi (1 kPa)
Output	1V/psi	100 mV/psi	10 mV/psi
Output Range	±1.0 V	±1.5 V	±1.0 V
Linearity	0.5% full-scale		
Temperature Effect	1.0% full-scale (0-70 C)		
Zero	Screwdriver-adjust		
Response Time	30 ms		
Power	One 9V alkaline or rechargeable battery		
Battery Life	200 hr (alkaline battery) 25 hr (rechargeable battery)		
Output Connector	Mini-phone, 0.141″		
Output Impedance	1000 Ω		
Pneumatic Connectors	Barbed, for 1/8″ or 3/16″ ID soft tubing		
Dimensions	3.12″ (w), 5.88″ (l), 1.5″ (d)		
Weight	0.5 lbs (0.25 kg)		

PM Series Pressure Monitors come with 4 ft of 1/8″ ID soft vinyl tubing. A mini-phone-to-BNC cable for the Record output (WPI #**CLB102**) is optional. Non-rechargeable versions contain one 9V alkaline battery. Rechargeable versions come with one nickel/cadmium battery and a 120/240V-switchable battery charger.

CONTROLS

On/Off	Turns instrument power on and off.
Zero	Adjusts the meter reading to zero at ambient pressure.
psi/kPa	Selects the pressure range; psi or kPa for the PM100, (psi/mm Hg) psi or mm Hg for the PM01 and PM015.
Port A & B	Inverting (Port A) and Non-inverting (Port B) inputs to the pressure transducer.
Charger	Input for the charger (rechargeable versions only).
Record	Voltage output proportional to pressure.

OPERATING INSTRUCTIONS

WARNING: DO NOT USE ANY OF THE PM SERIES PRESSURE MONITORS WITH WATER OR AQUEOUS SOLUTIONS, ESPECIALLY SALT SOLUTIONS.

Power up

Turn the instrument on by moving the On/Off switch to the On position. For non-rechargeable units using alkaline batteries, battery life is approximately 200 hours. Rechargeable units will operate for approximately 25 hours on fully-charged nickel/cadmium batteries. The rechargeable units can be operated continuously by connecting the charger to the charger input, either with or without batteries in the unit.

Fluid connections

Soft tubing, such as the vinyl tubing supplied with the unit, can be slipped directly onto the barbed ports of the Pressure Monitor. The outer diameters of the ports are 0.190″ (4.8 mm), so tubing can be used with inner diameters of 1/8″, 3/16″ or 5/32″.

When using pressures higher than 30 psi with the PM100, the tubing clamps supplied with the unit should be used. Insert the tubing through the clamp, and push the tubing firmly onto the barbed port. Screw the clamp onto the tubing at the port.

Do not apply pressures greater than the proof pressure to either of the ports. For the PM100 the proof pressure is 150 psi (1035 kPa); for the PM015 the proof pressure is 30 psi (1550 mm Hg); for the PM01 the proof pressure is 20 psi (1035 mm Hg).

For standard operation, pressure tubing should be connected to Port B, which will give readings of the correct sign, positive or negative, on the meter. Readings from Port A will always be opposite in sign to those applied.

Readings taken using just one port are relative to ambient pressure and are termed gauge measurements (as opposed to absolute.).

Differential readings

For differential readings, pressure tubing may be connected to both ports. The meter display the difference in pressure between Port B and Port A, (Port B - Port A).

What fluids can be used?

The transducer in the Pressure Monitor is compatible with most non-aqueous fuels, oils, refrigerants, hydraulic fluids, and non-corrosive gases. Fluids must generally be compatible with silicon gel, plastic, aluminum, RTV, silicon, and glass.

Selecting the range

Select the units displayed on the meter using the psi/kPa switch on the PM100, or the psi/mm Hg switch on the PM015 and PM01. No zeroing is necessary when the range is switched.

Zeroing

If the Pressure Monitor drifts from a reading of zero at ambient pressure, adjust the Zero potentiometer with a small screwdriver.

Recording

A voltage output proportional to the pressure is available at the Record output. This voltage may be used to monitor pressure on a chart recorder, oscilloscope or other recording equipment. Connection is made via a mini-phone plug (0.141″ outer diameter). A mini-phone-to-BNC cable is available (WPI #**CLB102**).

For the PM01 Pressure Monitor the Record output is 300 mV/psi (±0.3 V full scale); for the PM015 Pressure Monitor the Record output is 100 mV/psi (±1.5 V full scale); for the PM100 the output is 10 mV/psi (±1 V full scale).

Replacing the battery

When the battery begins to run low, a LO BAT indication will be displayed on the meter. Remove the battery by sliding open the battery compartment on the rear of the instrument and disengaging the old battery from the clip. Replace with a comparable battery; a 9V alkaline type (WPI No. 2101) for the PM01D, PM015D and PM100D, or 7.2V nickel/cadmium type (WPI No. 3414) for the PM01R, PM015R and PM100R. Alkaline batteries may be used in the PM01R, PM015R and PM100R, but no attempt should be made to recharge these batteries, or to use the charger while these batteries are in the instrument. CHARGING AN ALKALINE CELL MAY CAUSE IT TO EXPLODE.

Charging the batteries

Batteries may be recharged in the PM01R, PM015R and PM100R by plugging the charging unit into a line-powered outlet and plugging the power jack of the charger

into the Pressure Monitor Charger input. Batteries may be charged with the unit turned on or off, but the batteries will charge more slowly with the unit turned on. The Pressure Monitor will function without a battery, if the charger is connected.

PRESSURE CONVERSIONS

	psi	in. H_2O	in. Hg	kPa	mBar	cm H_2O	mm Hg
psi	1.000	27.680	2.036	6.8947	68.947	70.308	51.715
in. H_2O	0.036127	1.000	0.073554	0.2491	2.491	2.5400	1.8683
in. Hg	0.4912	13.596	1.000	3.3864	33.864	34.532	25.400
kPa	0.14504	4.0147	0.2953	1.000	10.000	10.1973	7.5006
mBar	0.01450	0.40147	0.02953	0.100	1.000	1.01973	0.75006
cm H_2O	0.014223	0.3937	0.028958	0.09806	0.9806	1.000	0.7355
mm Hg	0.019337	0.53525	0.039370	0.13332	1.3332	1.3595	1.000

NOTE: In. H_2O at 39° F; in. Hg at 32° F; cm H_2O at 4° C; mm Hg at 0° C

CALIBRATION

Calibration of the pressure readings should be unnecessary under normal circumstances. If the Pressure Monitor appears to be out of calibration during its warranty period, it should be returned to the factory for inspection and recalibration. You may calibrate the instrument yourself, however this will void the warranty if it is still in effect. First, zero the instrument at ambient pressure. Then remove the cover by unscrewing the four screws on the back of the instrument. Apply a known pressure to Port B of the Pressure Monitor and adjust the trimming potentiometer labelled R11 on the circuit board until the meter displays the correct pressure. For best accuracy the applied pressure should be at least half of the full-scale reading.

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