Fluke

PV350

Pressure/Vacuum Transducer Module

Instruction Sheet

Shown with Fluke 83 Series III DMM

Purchased in 2001 for ME/ES 308 – Instrumentation & Measurements Course.

Operating Environment

Temperature	Humidity
-10 to 10°C	Uncontrolled Humidity
10 to 30 °C	0 to 95% Relative Humidity
30 to 40 °C	0 to 75% Relative Humidity
40 to 50 °C	0 to 45% Relative Humidity
50 to 55 °C	0 to 35% Relative Humidity

Temperature Derating (Add to Basic Accuracy Specification. °C = ambient temperature)

Temperature Range	Derating
28° to 55°C	0.016% x (°C - 28)
18° to 28°C	No derating
0° to 18°C	0.048% x (18 - °C)
-10° to 0°C	0.264% x (9° - °C)

GENERAL

Weight: 12 oz, (336 grams)

Battery: Standard 9V battery (NEDA #1604, 6F22, 006P)

Battery Life: 300 hours (typical) for Carbon-zinc
400 hour (typical) for Alkaline

Vibration: 3g @ 55 Hz

Shock: 1 meter drop

Electrical Cable: Black PVC, will withstand up to 105°C

Cable Length: 8 feet

Pressure Port Connection: 1/4 inch NPT

Connector: Brass 1/4-in male flare to1/4-in female pipe thread

Table 3. List of Replaceable Parts

JF PN	Description
446823	Battery, Primary, 9V, 0-15 mA
650903	Case Bottom, PV350
919790	Case Top, PV350
913207	Fitting, BR, SAE, 45, 1/4 FPT
926873	PV350 Instruction Sheet
926881	PV350 Quick Reference Guide
927009	Replacement Cable Assembly

For application or operation assistance or information on Fluke products, call:

800-44-FLUKE (800-443-5853) in U.S.A. and Canada
31 40 644200 in Europe
206-356-5500 from other countries

The phone number for replacement parts is 1-800-526-4731

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Instruction Sheet

INTRODUCTION

The PV350 Pressure/Vacuum Transducer Module (the module) measures gauge pressure; the difference between atmospheric (barometric) pressure and the pressure (or vacuum) applied to the pressure port on the transducer. It then converts that measurement to 1 mV dc per unit. A module and a high-performance digital multimeter (DMM) with min/max function become a datalogger capable of measuring peak high and peak low.

CONTENTS

- Pressure/Vacuum Transducer Module
- 1/4 -inch male flare to 1/4-inch female pipe thread connector
- 9V battery
- Instruction Sheet, Quick Reference guide, and warranty card

SAFETY INFORMATION

WARNING

To avoid eye injury, always wear approved safety glasses when working with this instrument.

To avoid injury from pressure explosion:

- **Be sure that pressure is removed before disconnecting any hoses or tubing from the PV350 transducer.**
- **Follow accepted safety procedures for systems on which pressure or vacuum measurements are made.**
- **Make sure the PV350 is serviced by a qualified technician.**

⚠ Safety Standards: Complies with test pressure requirements of ANSI/ISA S82.03-1988, Protection Class III per IEC 1010-1-1990, Annex H.

PN 926873 May 1992 Rev. 4, 9/97

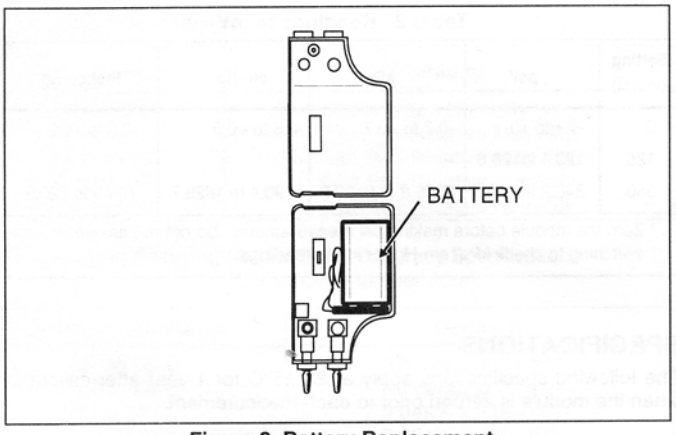
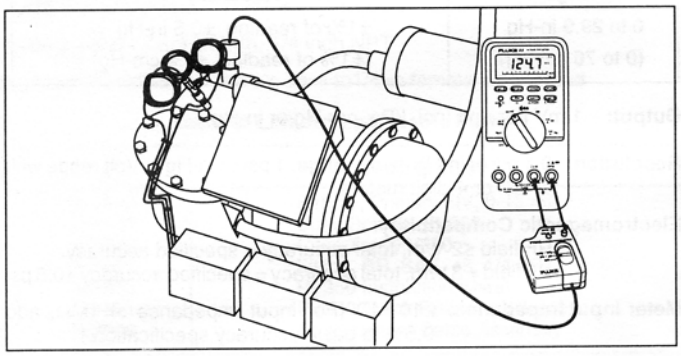


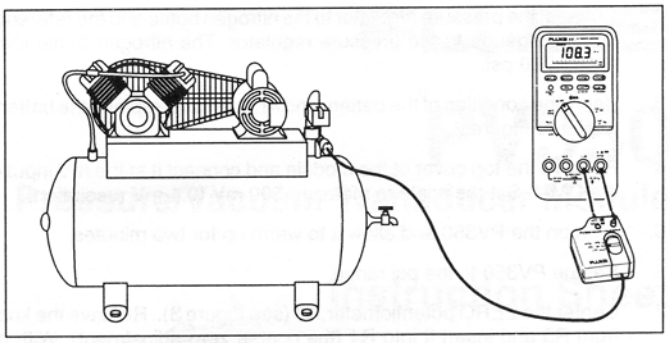
Figure 2. Battery Replacement

1. Turn the module OFF and unplug it from the DMM.
2. Remove the screw from the back of the module, separate the case, and replace the battery.
3. To reassemble, line up the holes in the case with the metric/english switch and zero knob. Then snap the two halves together. Reinstall the screw.

TYPICAL APPLICATIONS



Pressure for HVAC/R Super Heat Measurements



Measure Pneumatic Pressures

psi = inches of H_2O x (3.6127×10^{-2})	inches of H_2O = psi x 27.68
psi = mm of H_2O x (1.4223×10^{-3})	mm of H_2O = psi x 703.1
psi = cm of H_2O x (14.223×10^{-3})	cm of H_2O = psi x 70.3
psi = bar x (14.503)	bar = psi x 0.0689
psi = lbs/ft^2 x (6.9444×10^{-3})	lbs/ft^2 = psi x 144
psi = mbar x (1.4503×10^{-2})	mbar = psi x (68.9513)
psi = Pascals x (1.4503×10^{-4})	Pascals = psi x (6.895×10^{3})
All H_2O conversion factors are @ 4°C	

Conversion Factors

HOW TO CALIBRATE THE PV350

Calibrate the PV350 yearly to ensure that it meets its performance specifications.

Table 1. Recommended Equipment

Instrument	Minimum Specification	Recommended Model
Precision pressure reference	500 psi, 0.25% of reading accuracy	Crystal Engineering inHg/PSIG Multical or equivalent
Pressure source	Nitrogen gas bottle with pressure regulator, >750 psi	Tescom pressure regulator Model 44-2214-24 1V
DMM	0 to 500 mV (minimum) with 0.1 mV resolution 10 MΩ input impedance	Fluke 45 or equivalent

1. Allow the PV350 to stabilize at room temperature, away from drafts, for at least 30 minutes. Turn on the DMM and, if required by its operating instructions, allow it to warm up as indicated.

2. Connect the pressure regulator to the nitrogen bottle and the reference pressure gauge to the pressure regulator. The nitrogen bottle must have >750 psi.

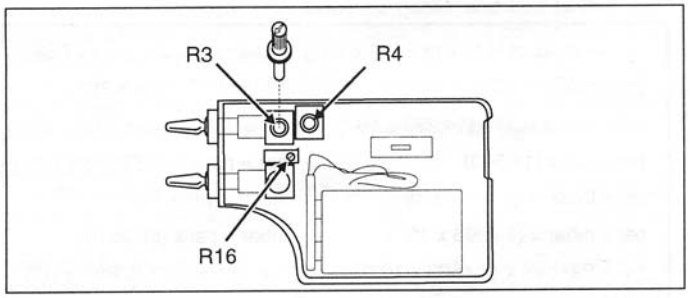
3. Verify the condition of the battery and if necessary, replace the battery. (Refer to Figure 2.)

4. Remove the top cover of the module and connect it to the mV input of the DMM. Set the scale to measure 500 mV (0.1 mV resolution).

5. Turn on the PV350 and allow it to warm up for two minutes.

6. Set the PV350 to the psi range.

7. Center the ZERO potentiometer,R3 (see Figure 3). Remove the knob from R3 and insert it into R4 (the coarse zero adjustment). With no pressure applied, set the reading to 0.0 mV ± 0.3 mV. Insert the knob back into R3, and adjust the final reading to 0.0 mV ± 0.1 mV.



8. Connect the sensor to the pressure reference and nitrogen bottle pressure calibration system.

9. Adjust the pressure regulator to about 250 psi.The readings on the reference pressure gauge and the reading from the PV350 should agree within ±0.1% of the point, ±0.3 psi: approximately ±0.6 mV or ±0.6 psi. Adjust R16 as necessary.

10. Adjust the pressure regulator to about 350 psi. The readings on the reference pressure gauge and the PV350 should agree within ±0.1% of the point, ±0.3 psi: approximately ±0.7 mV or ±0.7 psi. If necessary, adjust R16 to bring the reading into specification and recheck the 250 psi point. It may be necessary to repeat steps 9 and 10 until both points are within specification.

11. Reduce pressure to zero and switch the module OFF.

HOW TO VERIFY CALIBRATION

1. Connect the sensor (transducer) to a pressure calibration standard, and plug the module into the DMM.

2. Be sure the system is vented, then zero the module.

3. Enter the pressure settings shown in Table 2 and check for the indicated readings

NOTE

To save time, verify each reading (psi, kPa, cm of Hg, and inches of Hg) before changing the pressure setting.

Table 2. Readings in mV

Setting (in psi)	psi*	kPa	cm-Hg	Inches-Hg
0	-0.1 to +0.1	-0.7 to +0.7	-0.5 to +0.5	-0.2 to +0.2
125	123.4 to126.6	--	--	--
350	346.2 to 353.8	2386.8 to 2439.2	1790.4 to 1829.7	704.9 to 720.3

* Zero the module before making psi measurements. Do not re-zero when switching to check kPa, cm-Hg, or in-Hg readings.

SPECIFICATIONS

The following specifications apply at 23 ±5°C for 1 year after calibration when the module is zeroed prior to each measurement.

Pressure

Range	Accuracy
0.5 to 350 psig	±1% of reading ±0.3 psig
(3.447 to 2413 kPa)	(±1% ±2.1 kPa)
350 to 500 psig	±5% of reading ±1 psig typical
(2413 to 3447 kPa)	(±5% ±7.0 kPa)

Vacuum

Range	Accuracy
0 to 29.9 in-Hg	±1% of reading ±0.5 in-Hg
(0 to 76 cm-Hg)	(±1% of reading ±1.3 cm-Hg)

Output: 1 mV per unit (psi, kPa, cm-Hg or in-Hg)

Resolution: 0.1 psi or in-Hg in mV range, 1 psi or in-Hg in Volt range with 3 1/2- or 4-digit meters.

Electromagnetic Compatibility:
RF field ≤2 V/m, total accuracy = specified accuracy.
RF field = 3 V/m, total accuracy = specified accuracy +0.5 psi

Meter Input Impedance: ≥10 MΩ (For input impedance of 1MΩ, add 0.5% to basic accuracy specification.)

Maximum working pressure: 500 psi.

Burst Pressure: 1000 psi.

Storage Temperature: -51 to 71°C

PV350

Pressure/Vacuum Transducer Module

Quick Reference Card

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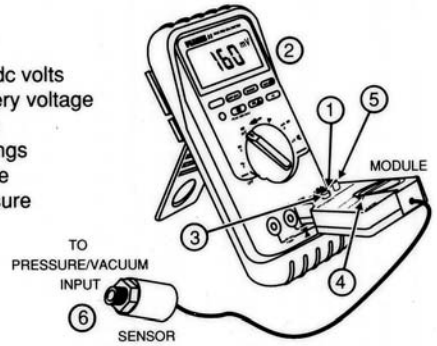
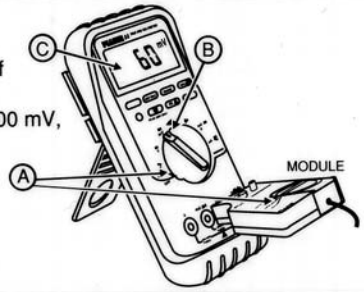
OPERATION

1. Red dot to dc volts
2. Check battery voltage
3. Select units
4. Select settings
5. Zero module
6. Apply pressure



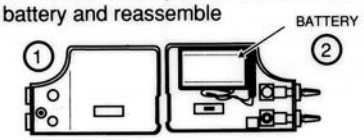
BATTERY TEST

A. DMM and module off
B. DMM to mV range
C. If display less than100 mV, replace battery



BATTERY REPLACEMENT

1. Remove from DMM and inputs. Remove screw
2. Replace battery and reassemble



Temp. Refrigerant — Code							
°F	12-F	22-V	502-R	°F	12-F	22-V	502-R
-60	19.0	2.0	7.2	26	25.4	49.9	60.1
-55	17.3	9.2	3.9	27	26.1	51.2	61.5
-50	15.4	6.2	0.2	28	26.9	52.4	62.8
-45	13.3	2.7	1.9	29	27.7	53.6	64.2
-40	11.0	0.5	4.1	30	28.5	54.9	65.6
-35	8.4	2.6	6.5	31	29.3	56.2	67.0
-30	5.5	4.9	9.2	32	30.1	57.5	68.4
-25	2.3	7.4	12.1	33	30.9	58.8	69.9
-20	0.6	10.1	15.3	34	31.7	60.1	71.3
-18	1.3	11.3	16.7	35	32.6	61.5	72.8
-16	2.1	12.5	18.1	36	33.4	62.8	74.3
-14	2.8	13.8	19.5	37	34.3	64.2	75.9
-12	3.7	15.1	21.0	38	35.2	65.6	77.4
-10	4.5	16.5	22.6	39	36.1	67.1	79.0
-8	5.4	17.9	24.2	40	37.0	68.5	80.5
-6	6.3	19.3	25.8	41	37.9	70.0	82.1
-4	7.2	20.8	27.5	42	38.8	71.5	83.8
-2	8.2	22.4	29.3	43	39.8	73.0	85.4
0	9.2	24.0	31.1	44	40.7	74.5	87.0
1	9.7	24.8	32.0	45	41.7	76.0	88.7
2	10.2	25.6	32.9	46	42.7	77.6	90.4
3	10.7	26.5	33.9	47	43.6	79.2	92.1
4	11.2	27.3	34.9	48	44.7	80.8	93.9
5	11.8	28.2	35.9	49	45.7	82.4	95.6
6	12.3	29.1	36.9	50	46.7	84.0	97.4
7	12.9	30.0	37.9	55	52.0	92.6	106.6
8	13.5	30.9	38.9	60	57.7	101.6	116.4
9	14.1	31.8	39.9	65	63.8	111.2	126.7
10	14.6	32.8	41.0	70	70.2	121.4	137.6
11	15.2	33.7	42.1	75	77.0	132.2	149.1
12	15.8	34.7	43.1	80	84.2	143.6	161.2
13	16.5	35.7	44.3	85	91.8	155.7	174.0
14	17.1	36.7	45.4	90	99.8	168.4	187.4
15	17.7	37.7	46.5	95	108.3	181.8	201.4
16	18.4	38.7	47.7	100	117.2	195.9	216.2
17	19.0	39.8	48.9	105	126.6	210.8	231.7
18	19.7	40.9	50.0	110	136.4	226.4	247.9
19	20.4	41.9	51.2	115	146.8	242.7	264.9
20	21.0	43.0	52.5	120	157.7	259.9	282.7
21	21.7	44.1	53.7	125	169.1	277.9	310.4
22	22.4	45.3	54.9	130	181.0	296.8	320.8
23	23.2	46.4	56.2	135	193.5	316.6	341.2
24	23.9	47.6	57.5	140	206.6	337.3	362.6
25	24.6	48.8	58.8	145	220.3	358.9	385.0

PN 926881 JUNE 1992