**INSTRUCTION
MANUAL**

PM750D, PM755D

Capacitive Sensor – Process Monitor

Measurement Systems
from
LION PRECISION

Introduction

The LION PRECISION PROCESS MONITOR (PM750, PM755) is an electronics module and probe combination which measures the distance between the probe and a conductive target or the amount (thickness) of a nonconductive material. The output can be configured to provide ±10V analog voltage or a switched NPN or PNP open collector transistor which switches when the analog voltage crosses zero volts.
The system is available with or without a steel mouting frame and also as a stacked system of synchronized PCBs.

Mounting

Mounting with steel frame
Use four #6-32 screws to secure the frame in position.

**Mounting without steel frame (PCB only)**
Use #4 or #6 screws (or similar) through the mounting holes in the PCB to secure the board(s) in position.

Mounting the probe
Mount the probe within measurement range of the target.
The probe must be securely mounted. Any variance in the probe postion will appear as changes in the target.
The closer the probe is to the target, the greater the output sensitivity. Usually, closer is better.

Mechanical Dimensions

1.6"
38mm

4.1"
104mm

1.8"
147mm

Multi-Channel "Stacked" System
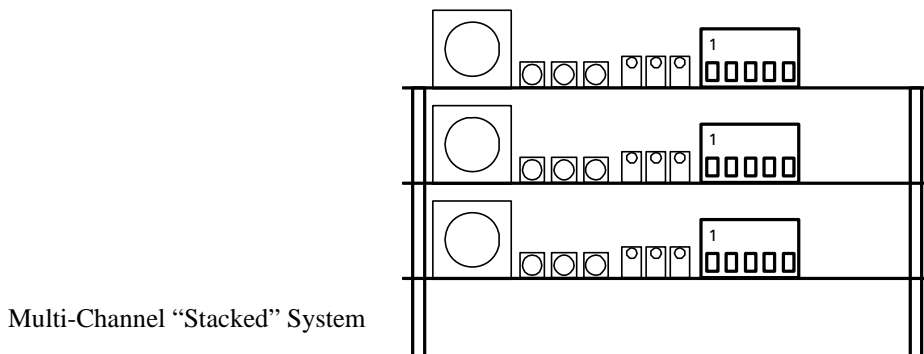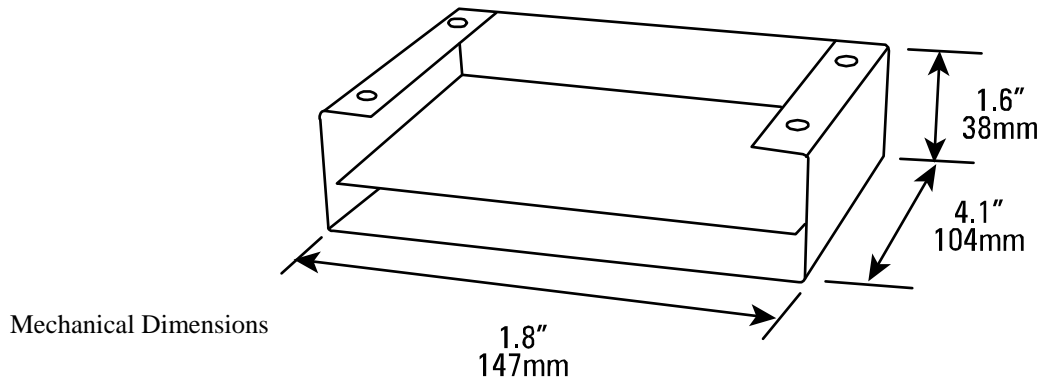
Connections

Input power
Three versions are available: ±15VDC, 115VAC, 220VAC

> Synchronized, multiple channel systems built as "stacks" must have DC power supplied to each PCB individually.

±15VDC
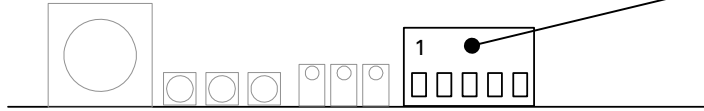
J9-1	-15VDC, 150mA max.
J9-2	+15VDC, 45mA max.
J9-3	Ground
J9-4	Output (Digital and Analog)
J9-5	PNP Power In

115/220VAC
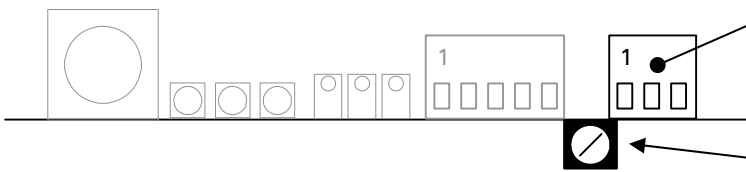
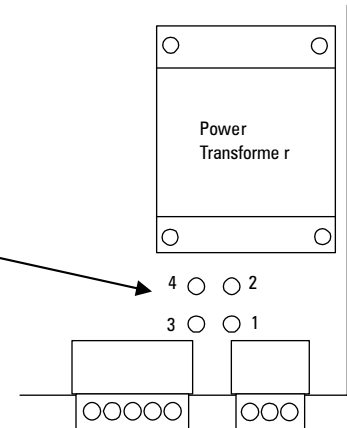|	
J8-1	Line
J8-2	Common/Neutral
J8-3	Earth/Chassis Ground

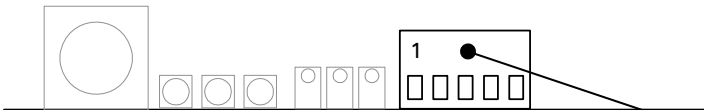|	
Fuse	220V 0.5A (5x20mm)

Voltage Conversion
Soldered-in wires convert between 115VAC and 220VAC.

115VAC – Solder wires between points 1 & 2, points 3 & 4.

220VAC – Solder wire beween points 2 & 4.

Power Transforme r

4 ○ ○ 2
3 ○ ○ 1

Output Signal

J9-1	-15VDC, 150mA max.
J9-2	+15VDC, 45mA max.
J9-3	Ground
J9-4	Output (Digital and Analog)
J9-5	PNP Power In (see page 4)

Configuring the output

Jumpers configure the output connection to provide either an analog ±10V output or open collector NPN or PNP switched output. The NPN/PNP outputs switch when the analog voltage crosses zero volts. The outputs can be further configured to have a positive or negative correlation to the target behavior.

> Warning:
> A shorting strap must be on EITHER JP4, or JP5 but NEVER BOTH.

Analog Output Configuration
- Remove shorting strap from JP5
- Add shorting strap to JP4 according to table below

JP4, Analog Output Confiuration	
1-2	Positive output As probe approaches target or nonconductive material increases in quantity or density the output voltage becomes more positive
2-3	Negative output As probe approaches target or nonconductive material increases in quantity or density the output voltage becomes more negative.
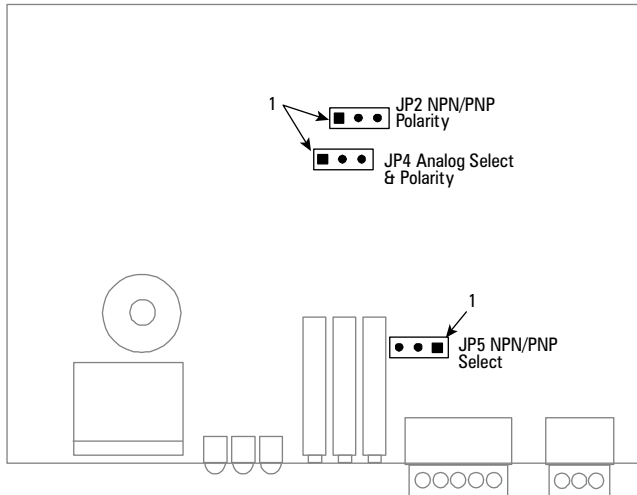
NPN/PNP Output Configuration
- Remove shorting strap from JP4
- Add shorting strap to JP5 according to table below
- Set output polarity with JP2 according to table below
- Maximum current through outputs is 200mA
- When using PNP, PNP Power In (J9-5) is required (details next page)

JP5, NPN/PNP Select	
1-2	NPN
2-3	PNP

JP2, NPN/PNP Polarity	
1-2 (NPN)	Analog voltage > 0VDC = "0" or "Low" output
1-2 (PNP)	Analog voltage > 0VDC = "1" or "High" output
2-3 (NPN)	Analog voltage > 0VDC = "1" or "High" output
2-3 (PNP)	Analog voltage > 0VDC = "0" or "Low" output

PNP Power In
The PNP transistor requires a power input connection (J9-5). This input power is connected to the PNP emitter and provides the voltage which will appear at the output when the PNP output is switched to "high." This is usually connected to the +15VDC connection on J9-2 but can be connected to an external power source up to 40VDC. See schematic below.

Pull-Up Resistors
Removable internal pull-up (pull-down) resistors are provided for the NPN and PNP output transistors. The NPN output is pulled up to +15VDC and the PNP output is pulled down to 0VDC. Both resistors are 3K. These resistors can be removed if required for proper installation and operation of the system. See schematic below.
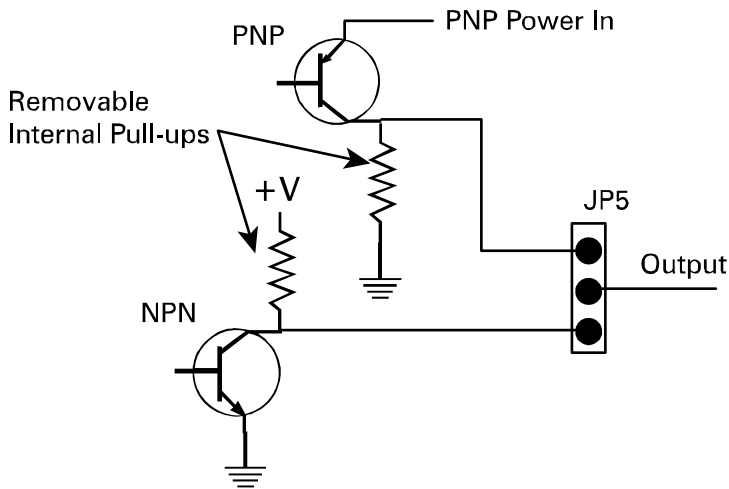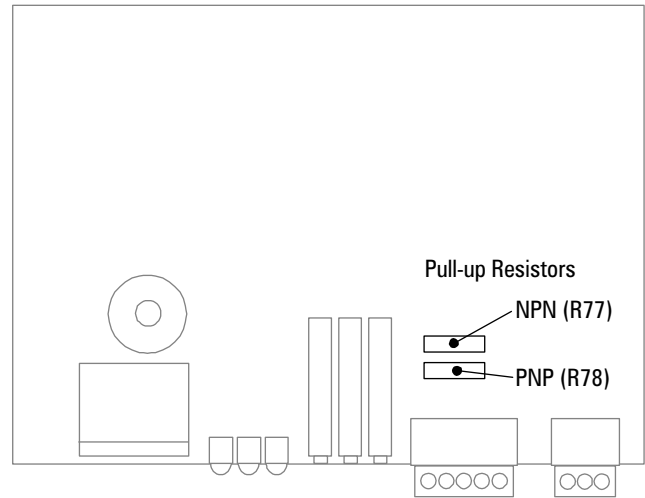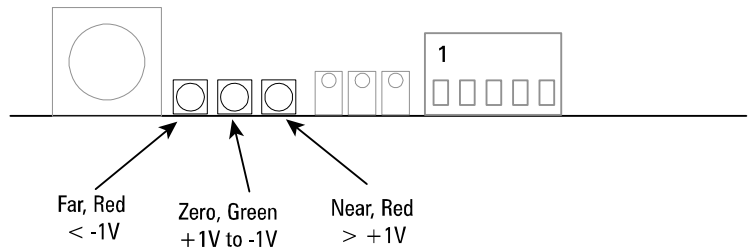
LED Indicators

The LEDs provide an approximation of the analog
output voltage:
Under -1VDC the Far red LED is on.
Between ±1VDC, the green LED is on.
Over +1VDC the Near red LED is on.

Far, Red
< -1V

Zero, Green
+1V to -1V

Near, Red
> +1V

Adjustments

There are three adjustments:
> Coarse Zero, Fine Zero, and Scale (Gain).

The Zero adjustments add a DC offset to the analog
output voltage.
The Scale adjustment sets the sensitivity.
Sensitivity is the amount of voltage change
corresponding to a given change in the conductive
target position or nonconductive target quantity.
The specific application will determine the specifics of the adjustment procedure.

Scale (Gain)

Fine Zero
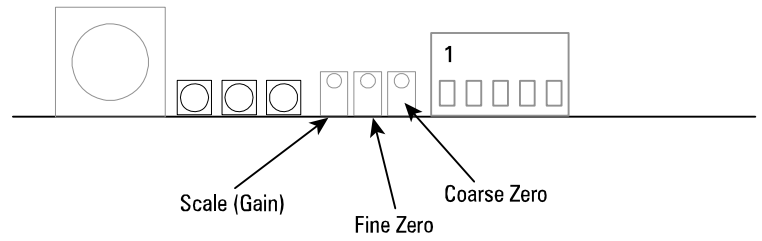
Coarse Zero

Typical adjustment for analog voltage output:
1. Set the target to a nominial condition.
2. Adjust output to zero with Coarse and Fine Zero adjustments.
3. Set the target to a maximum or minimum condition.
4. Use Scale adjustment to Adjust output to desired voltage (10V typically).

Typical adjustment for NPN/PNP output:
The PNP/NPN outputs switch at zero volts. Typical adjustments keep the good target condition on one side of zero and the
bad target conidition on the other side of zero. The following setup assumes the good condition causes the analog voltage to
be more positive.
1. Set the target to a condition very near the desired switch-point.
2. Adjust output to 0V with Coarse and Fine Zero adjustments.
3. Set the target to a known good or bad condition.
4. Adjust output to 2V or greater with Scale adjustment. (Output polarity will depend on application and jumper
   settings.)
5. For in-process switch-piont adjustments, use Fine Zero.

Specifications

Resolution: C1-C Probe, Standard Range	7µinch RMS *† 108nm RMS
Bandwidth:	Up to 15kHz (-3dB) *
Maximum Zero Drift:	0.02%F.S./°F * 0.04%F.S./°C
Output Voltage:	±10VDC
Output Impedance:	0 Ohms
Switched Output:	NPN or PNP Open Collector 200mA maximum
Operating Temperature Range:	40°F-120°F 4°C-50°C
Drive Frequency:	1MHz
Input Power:	±15VDC ±10% 115VAC 240VAC†
*Dependent on probe type and range †For maximum resolution, switching power supplies should have a switching frequency over 100kHz.	

Mechanical Specifications

1.6″ 38mm

4.1″ 104mm

1.8″ 147mm