

# DIGITAL PRESSURE METERS



**DPM-1100**



**DPM-1200**



**DPM-1300**

**USER MANUAL**

**PROCON**  
**DPM-1100/1200/1300**  
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<p style="text-align: center;"><b>PROCON</b> <b>DPM-1100/1200/1300</b> <b>DIGITAL PRESSURE METERS</b></p>
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The Model DPM-1000 Series is a Microprocessor based Digital Pressure Meter family. They measure both gas and liquid pressures and provide multiple engineering unit displays for the results. The DPM-1300 adds temperature measurement. The following are highlights of some of the main features.

DPM-1100:

- -13.50 TO 100.00 PSI RANGE
- 0.5% FS ACCURACY
- PRESSURE SCALES INCLUDE PSI, inH<sub>2</sub>O, cmH<sub>2</sub>O, AND mmHG
- DIGITAL CALIBRATION – NO POTS TO TURN
- 5 DIGIT LCD PLUS SCALE INDICATION
- BATTERY LIFE DISPLAY (0 to 100%)
- PROGRAMMABLE DIGITAL FILTER
- LCD CONTRAST IS SOFTWARE ADJUSTABLE
- 16 BIT PRESSURE MEASUREMENT
- DIGITAL ZERO ADJUST

DPM-1200:

Includes all the features of the DPM-1100 and:

- MAX and MIN PRESSURE VALUE STORAGE
- RS232 SERIAL COMMUNICATIONS

DPM-1300:

Includes all the features of the DPM-1100 and:

- MAX and MIN PRESSURE VALUE STORAGE
- RS232 SERIAL COMMUNICATIONS
- YSI 700 TEMPERATURE PROBE INTERFACE
- 0.0-100.0 C / 32.0-212.0 F TEMPERATURE RANGE
- 0.5% FS ACCURACY
- MAX and MIN TEMPERATURE VALUE STORAGE





OPTIONAL ACCESSORIES:



- DPM1000PU 120 VAC POWER ADAPTER, U.S.
- DPM1000PE 220 VAC POWER ADAPTER, EUROPE
- DPM1000C RS-232 CABLE
- DPM1000HC HARD CARRYING CASE

## SYSTEM INDICATORS

Four indicators are provided to identify the Current Operating Mode.

**PRESSURE SCALE** – The pressure scale is indicated by an identifier bar. The RANGE key will toggle the pressure units among PSI, mmHG, inHg and cmH<sub>2</sub>O. The following is a breakdown of the available pressure scales and the measurement range for each scale:

<u>Identifier Bar</u>	<u>Pressure Units</u>	<u>Pressure Range</u>
	PSIG	-13.50 to 100.00
	mmHg	-698 to 5171
	inH <sub>2</sub> O	-374 to 2771
 (flashing)	cmH <sub>2</sub> O	-950 to 7037

 bar  
 no bar

**NOTE:** If the measured pressure is outside of the range of the instrument, the display will display -HI- or -Lo-.

**NOTE:** InH<sub>2</sub>O, cmH<sub>2</sub>O and mmHg ranges are calibrated for 20 degrees Celsius.

**TEMPERATURE SCALE (MODEL DPM-2100 ONLY)** – The temperature can be displayed in either degrees Celsius or Fahrenheit. When temperature is displayed, the RANGE key will toggle the temperature units between Fahrenheit and Celsius.

<u>Temperature Units</u>	<u>Temperature Range</u>
Degrees C	0.0 to 100.0
Degrees F	32.0 to 212.0

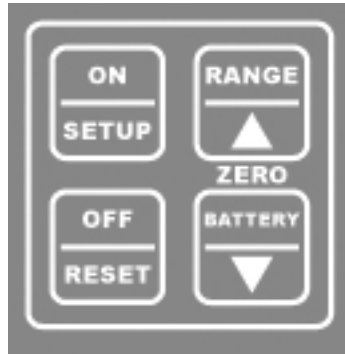
**NOTE:** If the measured temperature is outside of the range of the instrument, the display will display -HI- or -Lo-. If a probe is not connected, the display will show “no probe”.

**LOW BATTERY** – When the battery life reaches 10 percent, the display will show the message “lo bat” once every minute.

**LINE POWER** – When meter is running from the supplied wall transformer, the display will show “Line” instead of the battery life remaining.

## KEYS – DPM-1100

Four tactile-touch keys are provided for system operation.



**ON/SETUP** – The function of this key is dependant on the Current Operating Mode as follows:

POWER OFF – If this key is pressed while the power is turned OFF, the power will be turned ON

PRESSURE MEASUREMENT – If this key is pressed while the pressure is being displayed, the Setup Mode will be entered.

SETUP MODE – Pressing this key while in the Setup Mode will sequence the display through the available parameters.

**OFF/RESET** – The function of this key is dependant on the Current Operating Mode as follows:

PRESSURE MEASUREMENT – If this key is pressed while the pressure is being displayed, the power will be turned OFF

SETUP MODE – Pressing this key while in the Setup Mode will exit the Setup Mode and automatically save all settings.

**RANGE/UP** – The function of this key is dependant on the Current Operating Mode as follows:

PRESSURE MEASUREMENT – If this key is pressed while the pressure is being displayed, the unit will step through the available pressure ranges (PSI, inH<sub>2</sub>O, cmH<sub>2</sub>O and mmHg).

SETUP MODE – If this key is pressed in the Setup Mode, the value of the displayed setting will increment. Pressing and holding this key will cause the rapid automatic incrementing of the displayed setting.

**BATTERY/DOWN** – The function of this key is dependant on the Current Operating Mode as follows:

PRESSURE MEASUREMENT – If this key is pressed while the pressure is being displayed, the unit will display the percent (0 to 100) of battery life remaining.

NOTE: If the optional wall mount power supply is used, the unit will display “Line”.

SETUP MODE – If this key is pressed in the Setup Mode, the value of the displayed setting will decrement. Pressing and holding this key will cause the rapid automatic decrementing of the displayed setting.

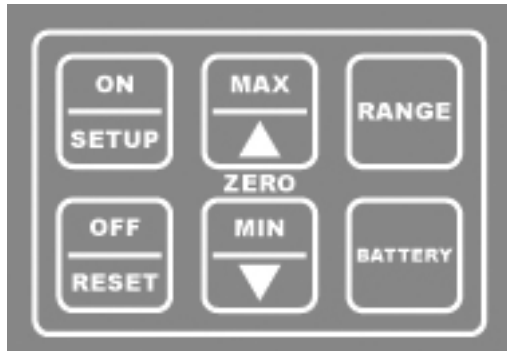
**ZERO** – This function is a combination of two keys (RANGE and BATTERY). If both keys are depressed and held for 5 seconds, the pressure display will be zeroed.

NOTE: If the BATTERY key is depressed first, it will prevent the range from being changed in the process.



## KEYS – DPM-1200

Six tactile-touch keys are provided for system operation.



**ON/SETUP** – The function of this key is dependant on the Current Operating Mode as follows:

POWER OFF – If this key is pressed while the power is turned OFF, the power will be turned ON

PRESSURE MEASUREMENT – If this key is pressed while the pressure is being displayed, the Setup Mode will be entered.

SETUP MODE – Pressing this key while in the Setup Mode will sequence the display through the available parameters.

**OFF/RESET** – The function of this key is dependant on the Current Operating Mode as follows:

PRESSURE MEASUREMENT – If this key is pressed while the pressure is being displayed, the power will be turned OFF

SETUP MODE – Pressing this key while in the Setup Mode will exit the Setup Mode and automatically save all settings.

MIN/MAX MODE – Pressing this key when a Min or Max Value is being displayed (MIN or MAX key is held down) will cause that value in that capture register to be reset to the current reading.

**MAX/UP** – The function of this key is dependant on the Current Operating Mode as follows:

PRESSURE MEASUREMENT – If this key is pressed while the pressure is being displayed, the unit will display the maximum pressure detected since the capture register was last reset.

SETUP MODE – If this key is pressed in the Setup Mode, the value of the displayed setting will increment. Pressing and holding this key will cause the rapid automatic incrementing of the displayed setting.

**MIN/DOWN** – The function of this key is dependant on the Current Operating Mode as follows:

PRESSURE MEASUREMENT – If this key is pressed while the pressure is being displayed, the unit will display the minimum pressure detected since the capture register was last reset.

SETUP MODE – If this key is pressed in the Setup Mode, the value of the displayed setting will decrement. Pressing and holding this key will cause the rapid automatic decrementing of the displayed setting.

**ZERO** – This function is a combination of two keys (MAX/UP and MIN/DOWN). If both keys are depressed and held for 5 seconds, the pressure display will be zeroed.

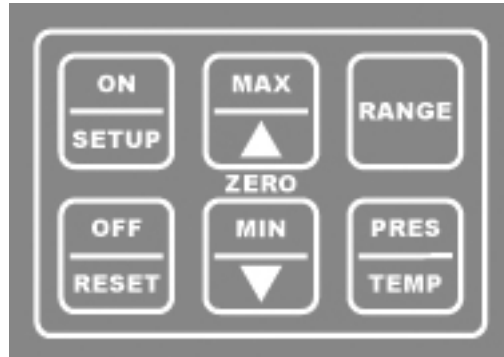
**RANGE** – The function of this key is to select the desired display engineering units. When viewing pressure it will sequence through the four ranges (PSI, inH<sub>2</sub>O, cmH<sub>2</sub>O and mmHg).

**BATTERY** - If this key is pressed while the pressure is being displayed, the unit will display the percent (0 to 100) of battery life remaining.

NOTE: If the optional wall mount power supply is used, the unit will display “Line”.

## KEYS – DPM-1300

Six tactile-touch keys are provided for system operation.



**ON/SETUP** – The function of this key is dependant on the Current Operating Mode as follows:

POWER OFF – If this key is pressed while the power is turned OFF, the power will be turned ON

PRESSURE MEASUREMENT – If this key is pressed while the pressure is being displayed, the Setup Mode will be entered.

SETUP MODE – Pressing this key while in the Setup Mode will sequence the display through the available parameters.

**OFF/RESET** – The function of this key is dependant on the Current Operating Mode as follows:

PRESSURE MEASUREMENT – If this key is pressed while the pressure or temperature is being displayed, the power will be turned OFF

SETUP MODE – Pressing this key while in the Setup Mode will exit the Setup Mode and automatically save all settings.

MIN/MAX MODE – Pressing this key when a Min or Max Value is being displayed (MIN or MAX key is held down) will cause that value in that capture register to be reset to the current reading.

**MAX/UP** – The function of this key is dependant on the Current Operating Mode as follows:

PRESSURE MEASUREMENT – If this key is pressed while the pressure is being displayed, the unit will display the maximum pressure detected since the capture register was last reset.

TEMPERATURE MEASUREMENT – If this key is pressed while the temperature is being displayed, the unit will display the maximum temperature detected since the capture register was last reset.

SETUP MODE – If this key is pressed in the Setup Mode, the value of the displayed setting will increment. Pressing and holding this key will cause the rapid automatic incrementing of the displayed setting.

**MIN/DOWN** – The function of this key is dependant on the Current Operating Mode as follows:

PRESSURE MEASUREMENT – If this key is pressed while the pressure is being displayed, the unit will display the minimum pressure detected since the capture register was last reset.

TEMPERATURE MEASUREMENT – If this key is pressed while the temperature is being displayed, the unit will display the minimum temperature detected since the capture register was last reset.

SETUP MODE – If this key is pressed in the Setup Mode, the value of the displayed setting will decrement. Pressing and holding this key will cause the rapid automatic decrementing of the displayed setting.

**ZERO** – This function is a combination of two keys (MAX/UP and MIN/DOWN). If both keys are depressed and held for 5 seconds, the pressure display will be zeroed.

**RANGE** – The function of this key is to select the desired display engineering units. When viewing pressure it will sequence through the four ranges (PSI, inH<sub>2</sub>O, cmH<sub>2</sub>O and mmHg). When viewing temperature, it will toggle between Centigrade and Fahrenheit.

**PRES/TEMP** – The function of this key is to toggle between pressure and temperature displays.

## SETUP MODE

The Setup Mode allows the user to adjust the configuration of the meter. The Setup Mode is entered by pressing The ON/SETUP key when the unit is on. The parameter and the current value will alternately flash in the display. The following table indicates the Parameters that are available, their meaning and available setting range:

<u>PARAMETER</u>	<u>DESCRIPTION</u>	<u>RANGE</u>
BAT	REMAINING BATTERY LIFE	0 - 100 %
CONT	CONTRAST	0 - 15
AOFF	AUTO OFF TIMER	0 - 30 MINUTES
BEEP	KEY BEEP LENGTH	0 - 15
FCON	DIGITAL FILTER CONSTANT	1 - 255

**BAT – (MODEL 1300 ONLY)** This parameter gives an indication of the remaining battery power. The battery life is displayed as percent of life.

**CONT** – This parameter controls the contrast of the LCD display. A Higher setting will cause the display to darken. A lower setting will cause the display to lighten.

**AOFF** – This parameter determines the period of inactivity before the meter is turned OFF. A timer is started when the meter is turned ON and is reset each time a key is pressed. When the timer reaches the value set in this parameter, the power is automatically turned OFF.

NOTE: Setting this parameter to 0 disables the Auto Off timer. When running from line power, the meter will not automatically shut off.

**BEEP** – This parameter controls the length of the audio feedback beep (click) that occurs when a key is depressed. A Higher setting will cause a longer (louder) beep. If the value is set to 0, the beep is eliminated.

**FCON** – This parameter controls the Filter Constant. The software has a Digital Filter that averages the pressure readings to produce a stable display. This setting determines the number of samples that are averaged in the digital filter. Increasing this setting will cause a more stable display. However, it will also cause a slower response to small changes in pressure. The best setting is the smallest number that provides a stable display.

## INPUTS



**PRESSURE INPUT** – Male luer lock connector is used for the pressure input.

**POWER INPUT** – A 2.5 mm jack is provided for the optional 9 VDC power supply that may be used for continuous run applications. It bypasses the internal battery when plugged in.

**RS232** – This is the serial interface connector. **(MODELS 1200 AND 1300 ONLY)**

**TEMPERATURE INPUT** – A ¼" phono jack is provided to accept any standard YSI Series 700 Temperature Probe. **(MODEL 1300 ONLY)**

## COMMUNICATIONS

Since the meter does not handle a great deal of data, the link has been optimized to allow the user, through very simple instructions, to control and interrogate the meter. The following section describes the JPC Protocol used by the meter. NOTE: RS232 is only available on DPM-1200 and DPM-1300 models.

The JPC Protocol consists of 6 basic commands:

- R - READ
- W - WRITE
- U - UPLOAD
- Q - QUICKSEND
- V - VERSION
- X - CANCEL

The data format is standard ASCII and all data are BCD values.

The following is a breakdown of each of the commands and the way they are accessed. The meter will echo all characters that are typed to it. When used with a terminal, this will provide the appropriate display. When used with a computer system, this will provide direct feedback of the fact that unit has accepted the data.

All commands are completed with a carriage return from the computer. All commands will be acknowledged by a carriage return, line feed (\$0D,\$0A). If a command is not valid, the meter will respond with "??". All commands are not case sensitive.

## READ/WRITE COMMANDS

The READ command is utilized to read from the meter any of the gathered data. The command is entered as a letter followed by 2 numbers, followed by a carriage return:

R(Location)(Return)

The 'R' indicates to the meter that the command is to be a READ command.

The Location contains two digits that indicate the data location that is to be read.

The carriage return indicates that the command is to be activated.

The WRITE command allows the user to update the system settings. The write command is entered as a letter followed by 7 numbers, followed by a carriage return.

W(Location)(Data) (Return)

The 'W' indicates to the meter that the command is to be a WRITE command.

The Location contains two digits that indicate the data location that is to be read.

The Data contains five digits that indicate the data that is to be written at the desired Location.

The carriage return indicates that the command is to be activated.



LOCATION	ACCESS	DESCRIPTION	RANGE
01	R	% BATTERY LIFE REMAINING	0-100
02	R/W	CONTRAST	0-15
03	R/W	AUTO POWER OFF	0-30
04	R	RESERVED	0-65535
05	R	RESERVED	0-65535
06	R	RESERVED	0-65535
07	R	RESERVED	0-65535
08	R	FILTER CONSTANT	0-255
09	R	RESERVED	0-65535
10	R	MODEL	0 = DPM-1100 1 = DPM-1200 2 = DPM-1300
11	R	PRESSURE (PSI)	-13.50 – 100.00
12	R	MAX PRESSURE (PSI)	-13.50 – 100.00
13	R	MIN PRESSURE (PSI)	-13.50 – 100.00
14	R	TEMPERATURE (C)	0.0 – 100.0
15	R	MAX TEMPERATURE (C)	0.0 – 100.0
16	R	MIN TEMPERATURE (C)	0.0 – 100.0

The following is an example of how the Read/Write commands are used. For display purposes, the symbol <cr> will be used to identify a carriage return (\$0D), and the symbol <lf> will be used to identify a line feed (\$0A).

**Data Sent**

R03<cr>

**Data Returned**

R03<cr><lf>  
00010<cr><lf>

**Meaning**

Echo of Command Sent  
Auto Off is set to 10 minutes

W0300000<cr>

W0300000<cr><lf>

Echo of Command Sent  
Change Auto off to disabled

## **UPLOAD COMMAND**

The Upload command allows the user to read all of the selected device data from locations 1 through 16 with a single command. The data will be transmitted as a single block with each location separated by a carriage return, linefeed (\$0D,\$0A).

The following is the format for this command:

U (Return)

See the table in the Read Command section for details on the data structure.

## **QUICKSEND COMMAND**

Quicksend is a feature that allows the user to receive an automatic update of all of the meter data without any user interaction. When the Quicksend feature is turned ON, the meter will automatically send all of the device data every half second. The Quicksend feature is toggled ON and OFF with the Quicksend command.

The following is the format for the 'Q' command:

Q (RETURN)

See the table in the Read Command section for details on the data structure.

## **VERSION COMMAND**

The Version command allows the user to read the Software Version that the unit is running.

To read the Version, the following syntax is used:

V (RETURN)

## **CANCEL COMMAND**

The CANCEL command is simply a way to re-establish proper control, should an error occur or an incorrect command be transmitted. For the most part, an incorrect command will simply be ignored and the meter will prepare for an additional command. However, a command may be cancelled midstream by transmitting an 'X' (ASCII). This command does not require a carriage return, nor will it acknowledge with a carriage return. However, it will echo an 'X' to indicate that the CANCEL command has been received.

The command may also be utilized as a clear and/or acknowledgement of the meter being on line.

## MANUAL REVISIONS

<u>Revision #</u>	<u>Program #</u>	<u>Revisions Made</u>
Rev 01	DT7325CA	Preliminary Manual

## LIMITED WARRANTY

**WARRANTY: JPC CONTROLS.** WARRANTS ITS NEW PRODUCTS TO BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP UNDER THE SERVICE FOR WHICH THEY ARE INTENDED. THIS WARRANTY IS EFFECTIVE FOR TWELVE MONTHS FROM THE DATE OF SHIPMENT.

**EXCLUSIONS:** THIS WARRANTY IS **IN LIEU OF** ANY OTHER WARRANTY EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF **MERCHANTABILITY** OR FITNESS FOR A PARTICULAR PURPOSE.

**JPC CONTROLS** IS NOT LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

NO PERSON OTHER THAN AN OFFICER IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR ASSUME ANY LIABILITY.

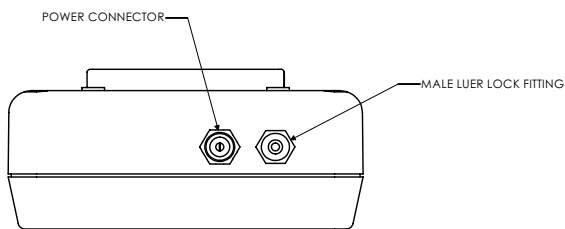
**REMEDIES:** THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY SHALL BE: (1) THE REPAIR OR REPLACEMENT OF DEFECTIVE PARTS OR PRODUCTS, WITHOUT CHARGE. (2) AT THE OPTION OF **JPC CONTROLS**, THE REFUND OF THE PURCHASE PRICE.

## SPECIFICATIONS

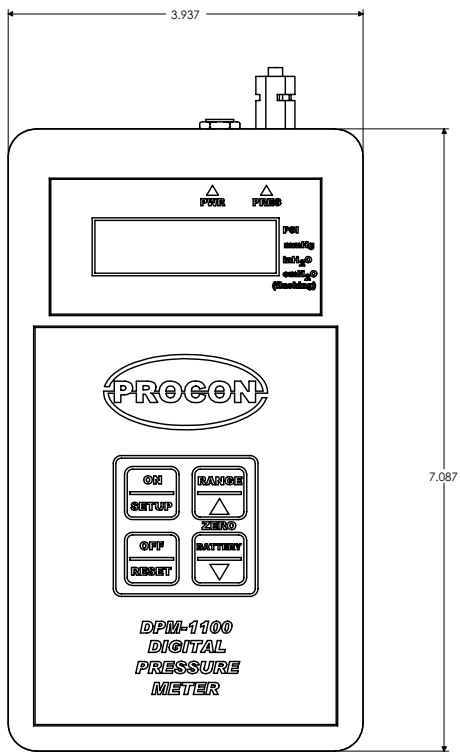
### DPM-1100/DPM-1200/DPM-1300 DIGITAL PRESSURE METERS

PRESSURE RANGE	-13.50 to 100.00 PSI -374 to 2771 inH <sub>2</sub> O @ 20C -950 to 7037 cmH <sub>2</sub> O @ 20C -698 to 5171 mmHg @ 20C
PRESSURE RESOLUTION	0.01 PSI 1 inH <sub>2</sub> O 1 cmH <sub>2</sub> O 1 mmHg
PRESSURE ACCURACY	+/- 0.5% FS
TEMPERATURE RANGE (DPM-1300 MODELS ONLY)	0.0 to 100.0 °C 32.0 to 212.0 °F
TEMPERATURE RESOLUTION	0.1 °C 0.1 °F
TEMPERATURE ACCURACY	+/- 0.5% FS
DISPLAY	Six, 0.35 Inch High, Seven Segment, LCD Uniplanar digits.
SETUP MEMORY	EEPROM, All Parameters
MEMORY RETENTION	10 Years w/o Power
OPERATING RANGE	0 to 50 Degrees C
STORAGE RANGE	-40 to 60 Degrees C
CONSTRUCTION	Enclosure – ABS Plastic. Face – Lexan, Back Printed

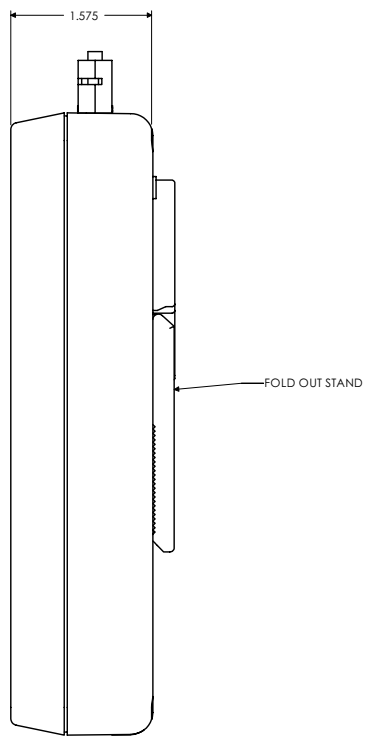
SIZE	7.09 x 3.94 x 1.56 inches 180 x 100 x 40 mm (HxWxD)
WEIGHT	≤ 1 lbs. (0.45 kg)
CONNECTIONS	Power – 2.5mm Center Negative RS-232 – 1/8 inch phono Pressure – Male Luer Temperature – 1/4 inch phono
TEMPERATURE SENSOR	Directly compatible with all YSI Series 700 Temperature Probes or equivalent
PRESSURE MEDIA	Any pure fluid or gas that is compatible with Pyrex, Glass, Silicon, Alumina Ceramic, Epoxy, RTV, gold, aluminum, and nickel.
POWER	LINE: 9VDC, Center Negative BATTERY: 9V Alkaline
POWER CONSUMPTION	ON: less than 6mA OFF: less than 20μA
BATTERY LIFE	CONTINUOUS: 80 hrs. OFF: 12 months



TOP VIEW



FRONT VIEW



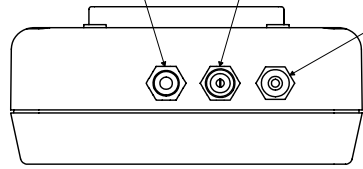
SIDE VIEW

TOLERANCES UNLESS OTHERWISE SPECIFIED		<b>JPC CONTROLS</b> 102 COMPASS PT. DR. SUITE D, ST. CHARLES, MO 63301 (636) 946-3300 FAX (636) 724-2492 www.jpcccontrols.com					
DPM-1100 DIGITAL PRESSURE METER PHYSICAL DIMENSIONS							
APPROVAL		OWN	MPJ	DATE	SCALE	1-1	CHWD
ENG	DATE	BY					BY
ALL DIMENSIONS ARE IN INCHES							
GA	DATE	SHEET	1 OF 1	44	730700	30	00
PATH = E:\CC\17307\17307PHYSICAL.SLDDRW							

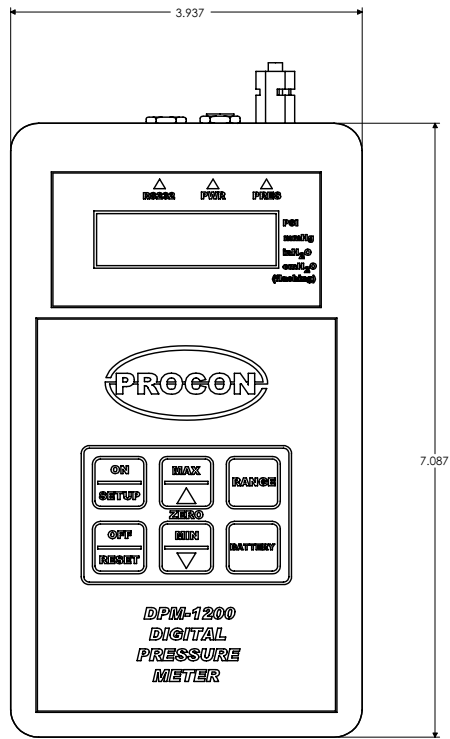
RS232 CONNECTOR  
AUDIO JACK 3.5mm 4 COND

POWER CONNECTOR

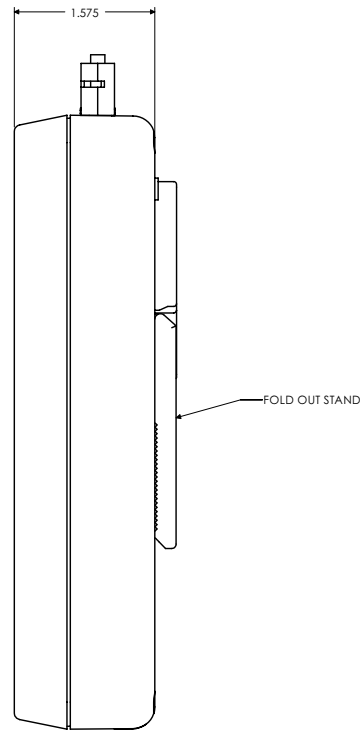
MALE LUER LOCK FITTING



TOP VIEW



FRONT VIEW



SIDE VIEW

TOLERANCES UNLESS OTHERWISE SPECIFIED		<b>JPC CONTROLS</b>		102 COMPASS PT. DR. SUITE D, ST. CHARLES, MO 63301 (636) 746-3300 FAX: (636) 724-2472 www.jpcccontrols.com	
<b>DPM-1200 DIGITAL PRESSURE METER PHYSICAL DIMENSIONS</b>					
APPROVAL		BY	MPJ	DATE	04/28/03
ENG	DATE	GA	DATE	1 OF 1	44
ALL DIMENSIONS ARE IN INCHES				SCALE	1=1
PATH: E:\CC\17308\7308PHYSICAL.SLDDRW				CHKD	30
				BY	00

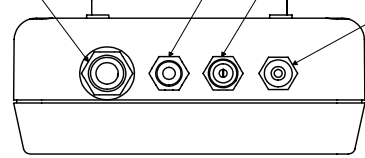


TEMPERATURE CONNECTOR  
1/4" PHONE JACK (COMPATIBLE  
WITH YELLOW SPRINGS  
700 SERIES PROBES)

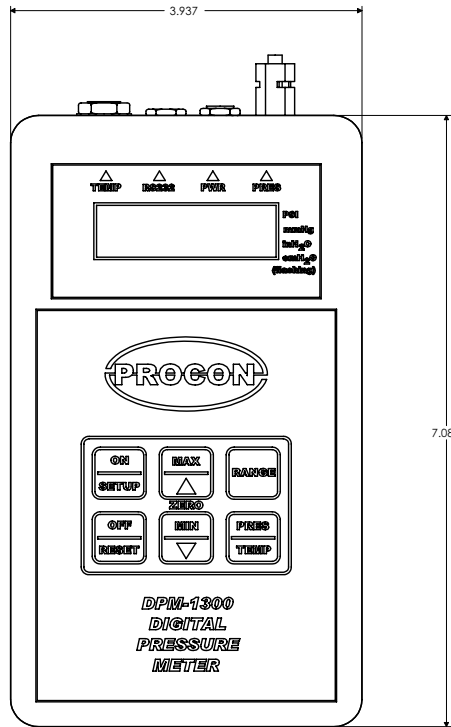
RS232 CONNECTOR  
AUDIO JACK 3.5mm 4 COND

POWER CONNECTOR

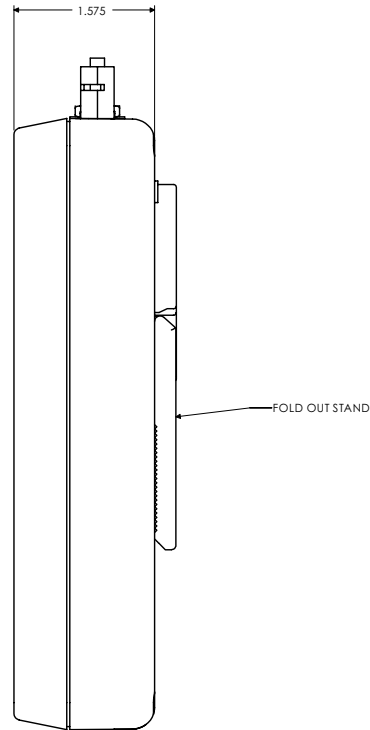
MALE LUER LOCK



TOP VIEW



FRONT VIEW



SIDE VIEW

TOLERANCES UNLESS OTHERWISE SPECIFIED		<b>JPC CONTROLS</b>		102 COMPASS PT. DR. SUITE D, ST. CHARLES, MO 63301 (636) 946-3300 FAX (636) 724-2475 www.jpccontrols.com	
DPM-1300 DIGITAL PRESSURE METER PHYSICAL DIMENSIONS					
APPROVAL		DRN	MPJ	DATE	SCALE
ENG	DATE	SHEET			CHRD
GA	DATE	1 OF 1		44	BY
PATH -E:\C\C\DT7309\7309PHYSICAL.SLDRAW				730900	30 00

**NOTES**