User Manual

TRIPLETT

DPR400

Differential Pressure and Airflow with Pitot Tube Meter

Please read this manual before switching the unit on.
Important safety information inside.

Contents

1.Features

- Larger LCD display with backlight.
- Relative time clock on MAX MIN and AVG provides a time reference for measurement.
- Pressure, velocity or air flow measurement provides Zero Adjust.
- Display pressure, Air velocity or air flow plus environment Temperature simultaneously.
- Easy to calculate the area of a rectangular or circular duct.
- USB interface, USB to UART Bridge Controller..
- Low battery indication, and Auto Power Off mode (Sleep mode) increases.

2.Specifications

2-1.General Specifications

Operating Conditions	0 to 50°C
Storage Conditions	-10 to 60°C
Power Supply	1×9V Battery
Low Battery Indicator	Yes
Dimensions	203mm×75mm×50mm
Relative Humidity	Non condensing (<10°C) 90% RH (10°C to 30°C)75% RH (30°C to 40°C)45% RH (40°C to 50°C)(Without Condensation)

2-2.Manometer specification

Accuracy	±0.3%FSO(25°C)		
Repeatability	±0.2% (Max.+/ -0.5% FSO)		
Linearity/Hysteresis	±0.29% FSO		
Pressure Range	5000 Pa		
Maximum Pressure	10psi		
Response Time	0.5 Seconds typical		
Over range Indicator	Err.1		
Under range Indicator	Err.2		
	Units	Range	Resolution
	PSI	0.7252	0.0001
	mbar	50.00	0.01
	inH_2O	20.07	0.01
	mmH_2O	509.8	0.1
	Pa	5000	1

1psi*27.68=inH_2O
1psi*68.947=mbar
1psi*703.072=1*mmH_2O
1psi*6894.6=Pa
FSO:Full Scale Output

2-3.Range of Air Velocity

Air Velocity	Range	Resolution	Accuracy
m/s(meter per second)	1.00-80.00	0.01	±2.5% of reading at 10.00 m/s
ft/min(feet per minute)	200-15733	1	accuracy is function of velocity and duct size
km/h(kilometers per hour)	3.6-288.0	0.1	
MPH(miles per hour)	2.24-178.66	0.01	
Knots(nautical miles per hour)	2.0-154.6	0.1	

2-4.Rang of Air Flow

Air Flow	Range	Resolution
CFM	0-99.999ft^3/min	0.0001 to 100
CMM	0-99.999m^3/min	0.001 to 100

CFM(ft^3/min)=Air Velocity(ft/min)×Area(ft^2)
CMM(m^3/min)=Air Velocity(m/s)×Area(m^2)×60
CFM: cubic feet per minute
CMM: cubic meters per minute

2-5.Range of Temperature

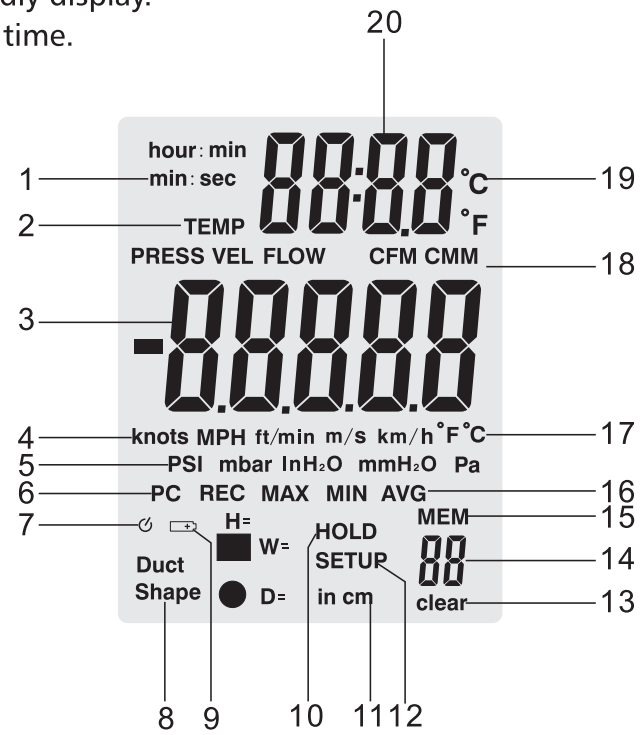
	Range	Resolution	Accuracy
°C	0 to 50.0°C	0.1	±1.0°C
°F	32.0 to 122.0°F	0.1	±2.0°F

3.Button

1.Press ⏻ to turn the thermometer on or off.
2.Press "**MAN/MIX**" to step through the maximum, minimum, and average readings. To exit the MAN/MIX/AVG mode, press the "**MAN/MIX**" button for 2 seconds to return to normal operation.
3.Press "**P/V/F**" to show the air velocity, press "**P/V/F**" secondly to show the high and length of a rectangular or the diameter circular duct, press "**P/V/F**" thirdly to show the air flow, press "**P/V/F**" to show differential pressure again.
4.Press "**Hold/Zero**" to freeze or unfreeze the displayed readings. Press "**Hold/Zero**" button and hold 2 seconds to zero out the display.
5.Press "**Save/Clear**" button to store sample data. Or press "**Save/Clear**" button to clear sample data in Recall mode.
6.Press "**Setup**" button to turn on the backlight. Press it again to turn off the backlight. Press "**Setup**" button for 3 seconds to start or exit Setup. (See "Changing Setup Options.")
7.Press "**Unit▲**" to changes the temperature units. In Setup mode, press "**Unit▲**" to scroll to the Setup option you want to change or press "**Unit▲**" to increase the displayed setting. In Recall mode, press "**Unit▲**" to select the desired sample number.
8.Press "**Unit▼**" to Changes secondly showing number units. In Setup mode, press "**Unit▼**" to scroll to the Setup option you want to change or press "**Unit▼**" to increase the displayed setting. In Recall mode, press "**Unit▲**" to select the desired sample number.
9.Press "**Avg/Rec**" button and hold 2 seconds to enter Recall mode. In Recall mode, press "**Avg/Rec**" to calculate the sample data. In Setup mode, press "**Avg/Rec**" button to enter a Setup option. Press "**Avg/Rec**" again to store the displayed setting in memory.

4.Display Elements

1.min : sec or hour : min Display..
2.Pressure, Velocity, Flow or temperature modes are active
3.Primary Display.
4.Units of air velocity.
5.Units of pressure.
6.The indication of meter communicating to PC.
7.Auto Power Off mode indicators.
8.Duct Shape choices.
9.Low battery indicator. Replace the battery as soon as the low battery indicator appears.
10.Data Hold indicator.
11.The units of H, W or D.
12.Entering or exiting setup mode.
13.Indicates that a stored sample (or all samples) is about to be deleted from memory.
14.The sample memory is being accessed and the number of samples.
15.Annunciators showing that sample memory is being accessed.
16.REC, MAX, MIN and AVG indicators.
17.Temperature units of primary display.
18.Units of air flow.
19.Temperature units of secondly display.
20.Digits for temperature and time.



5.Changing Setup Options

Use Setup to chose duct shape and set the duct parameters. Sleep mode, Max/min/avg mode menu setting and clear memory. The thermometer stores the settings in its memory.

5-1.Setup Options

Option	Menu item	Settings
Duct dimension units Duct Shape and parameters	Unit Duct Shape	Set duct dimension units in or cm set area of measuring air flow
Auto Power Off mode	SLP	auto off or on
menu setting	ENU	1, 2,or 3
clear Memory	Mem clear	Yes or No

5-2.Entering or Exiting Setup

When the thermometer is in Setup mode, the display shows SETUP.
Press "**Setup**" button for 2 seconds start or exit Setup.

5-3.Changing a Setup Option

- Press "**Unit▲**" or "**Unit▼**" to scroll to the setup option you want to change.
- Press "**Avg/Rec**" to indicate that you want to change this setting.
- Press "**Unit▲**" or "**Unit▼**" until the setting you want to use appears on the display.

Press "**Avg/Rec**" to store the new setting in memory.
Notes: Setup is disabled in **MIN MAX/AVG** mode.

5-4.Duct dimension units Setting

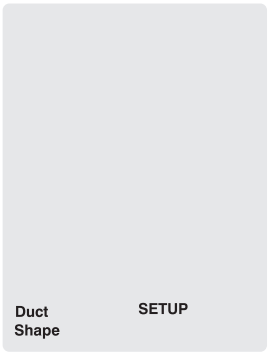
- When the meter is in Setup mode, Press "**Unit▲**" or "**Unit▼**" to scroll to the duct
- dimension units setup option.
- Press "**Avg/Rec**" button. It shows "**in**" or "**cm**" on the display.
- Press "**Unit▲**" or "**Unit▼**" to scroll to the setup option you want to change.
- Press "**Avg/Rec**" to store the new setting in memory.

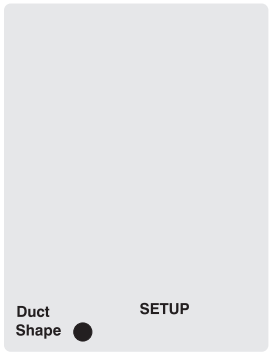
5-5.Duct Shape and Parameters Setting

When the meter is in parameters setup mode. The screen is show number of the last duct shape and size that is entered. If the duct is different than the stored version, then find the proper duct type for the measurement (rectangular or round).

5-6.Choose Duct Shape

- When the meter is in setup mode, Press "**Unit ▲**" or "**Unit ▼**" to scroll to the duct shape setup option.
- Press "**Avg/Rec**" button. The screen shows the "■"(rectangle) or "●"(circular).
- Press "**Unit ▲**" or "**Unit ▼**" to scroll to the setup option you want to change.
- Press "**Avg/Rec**" to store the new setting in memory and enter parameters setup option.





5-7.Parameters Setting

- If duct is rectangle, the height of duct numbers and “H=”will be first shown in the primary show.
- Press "**Unit ▲**" or "**Unit ▼**" button to select the decimal point.
- Press "**Save/Clear**" to change the station of flashing digit and press "**Unit ▲**" or to "**Unit ▼**" change the flashing digit from 0 to 9.
- Pres "**Avg/Rec**" button, the width of duct numbers and “W=”will be shown in the primary show.
- Press "**P/V/F**" button to select the next digit.
- Press "**Save/Clear**" to change the station of flashing digit and press "**Unit ▲**" or to "**Unit ▼**" change the flashing digit from 0 to 9.
- Press "**Avg/Rec**" to store the new parameters in memory.
- If duct is circular, the diameter of duct numbers and “D=”will be shown in the primary show then select the duct diameter that you want to use in the same way.

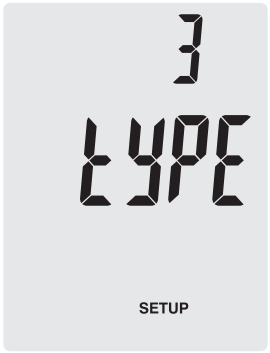
5-8.Auto Power Off Mode

The meter enters sleep mode (default). That is to say, the meter will automatically shut off after 20 minutes if no button press occurs for 20 minutes. When the meter is in Setup mode, the display shows SETUP.

Press "**Unit▲**" or "**Unit▼**" to scroll to the "SLP" page . Press "**Avg/Rec**" to indicate "On" or "OFF". Press "**Unit▲**" or "**Unit▼**" until the setting you want to use appears on the display. Press "**Avg/Rec**" to store the new setting in memory. On (sleep mode on) or 0FF (sleep mode off).

5-9.Menu Setting

- When the meter is in Setup mode, Press "**Unit ▲**" or "**Unit ▼**" to scroll to the Mode Menu setup option.
- Press "**Unit ▲**" or "**Unit ▼**" to scroll to the setup option you want to change.
- There are three choices for selecting.
  "1". Display pressure and air velocity value.
  "2". Display air velocity and air flow value.
  "3". Display pressure, air velocity and air flow value.
- Press "**Avg/Rec**" to store the new setting in memory.



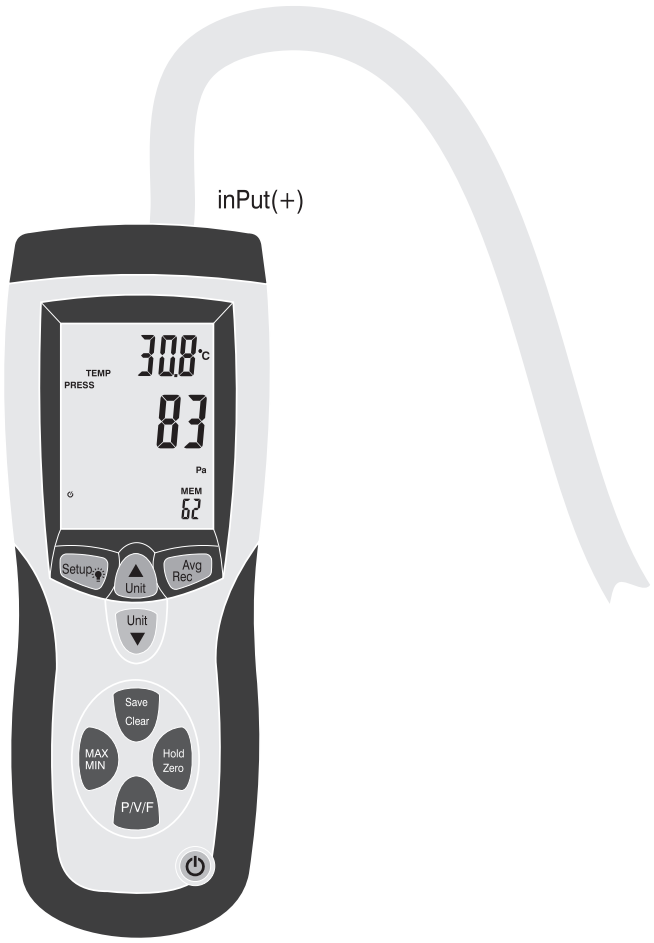
5-10.Clear Memory Setting

- When the meter is in Setup mode, Press "**Unit ▲**" or "**Unit ▼**" to scroll to the clear memory setup option.
- Press "**Save/Clear**" to select the desired sample. There are three choices for selecting.
  PRESS VEL FLOW: clear all pressure, velocity and flow sample data.
  PRESS: clear all pressure sample data.
  VEL: clear all velocity sample data.
  FLOW: clear all flow sample data.
- Press "**Unit ▲**" or "**Unit ▼**" until the display show "YES", Press "**Avg/Rec**" , then clear the memory.

5-11.Measuring Pressure

The Primary Display number is Pressure value, the device measures Gauge/Differential Pressure 5000Pa, it features 5 selectable units of measure: PSI, mbar, Pa, inH_2O, mmH_2O.

- Press **"P/V/F"** to enter the pressure mode and press **"Unit▼"** to select unit.
- Connect a single hose to the "Input (+)" port, leaving the "Ref (-)" port unconnected.
- With the tubing open to ambient conditions press and hold **"Hold/Zero"** for 2 seconds to zero out the display.
- Place the input hose in a different zone than the Meter.
- The Meter displays the differential pressure of the input zone with respect to the reference zone. For instance, a positive reading means that the input zone is positively pressured with respect to the Meter location or its reference zone.

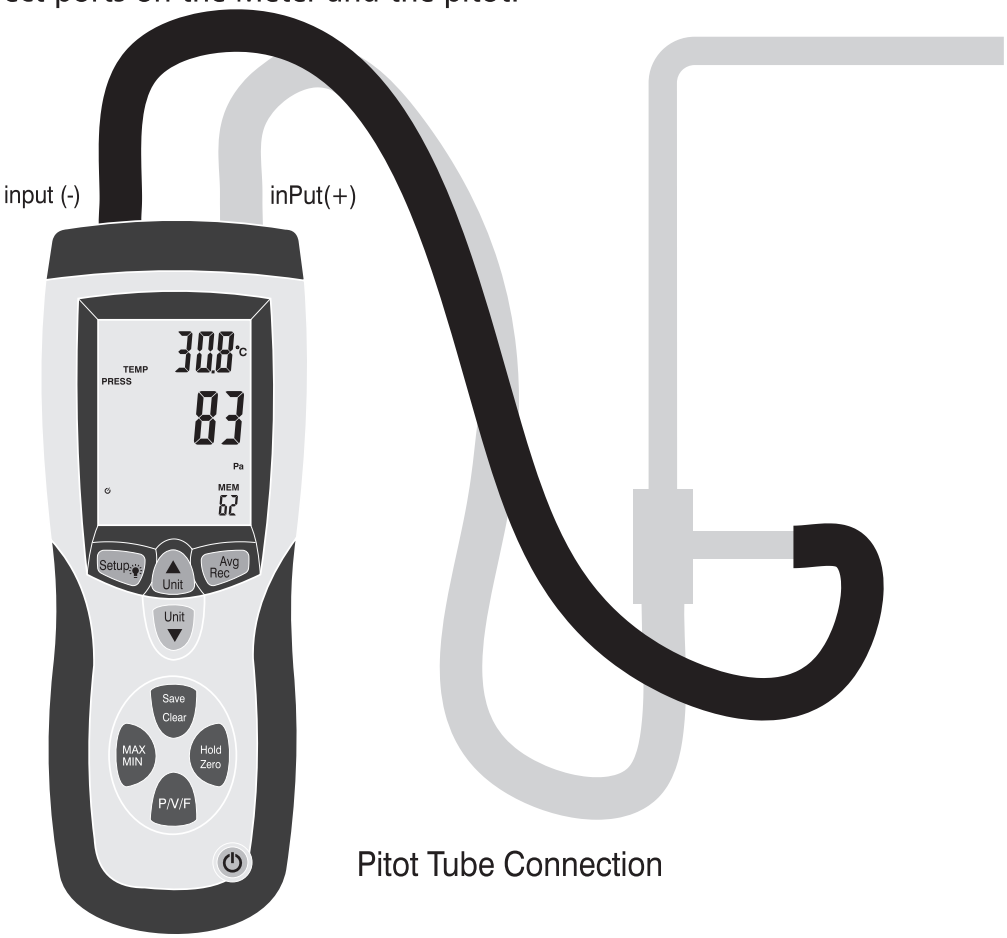


5-12.Measuring Velocity

The Meter uses standard ambient conditions (temperature=21.1 ℃/70 ℉, barometric pressure= 14.7 PSI / 1013 mbar), to approximate actual velocity and flow.

The primary display number is air velocity, the device measures air velocity, and it features 5 selectable units of velocity measure: m/s, ft/min, km/h, MPH, knots.

- Press **"P/V/F"** to enter Velocity mode and press **"Unit▼"** to select unit.
- Connect the hoses to the pitot tube and to the Meter. The "Input (+)" pressure port on the Meter connects to the white hose from the total pressure connection of the pitot tube. The "Ref (-)" pressure port on the Meter connects to the black hose from the static pressure connection of the pitot tube. the tubing open to ambient conditions press and hold **"Hold/Zero"** for 2 seconds to zero out the display.
- When make the measurement, the pitot tube tip should against the measured wind as shown in upper figure, and ensure that the axis of the duct is aligned with the fluid flow for ±10°. If Measure Velocity measures negative and show "Error"on the display, check to make sure that the hoses are attached to the correct ports on the Meter and the pitot.



Pitot Tube Connection

5-13.Measuring Flow

- Press "**P/V/F**" to enter air flow mode and press "**Unit▼**" to select unit..
- The Meter shows the duct shape and size. The Meter stores the last duct shape and size that is entered. If the duct is different than the stored version, press "**Setup**" button to find the proper duct type for the measurement (rectangular or round). Refer to Step duct shape and parameters setting..(“Changing Setup Options.")

Notes:

HOLD, Save, MIN/MAX/AVG, Zero, and Setup can be used when measuring pressure, velocity and flow.

5-14.Displaying Temperature

Ambient temperature is displayed on the secondly show as a reference. The temperature can be displayed in either °C or °F. Press "**Unit▲**" to select unit °C or °F.

5-15.Holding the Displayed Readings

- Press "**Hold/Zero**" to freeze the readings on the display .The display shows HOLD.
- Press "**Hold/Zero**" again to turn off the HOLD function

5-16.Viewing the MIN, MAX, and AVG Readings

- Press "**MAN/MIX**" to step through the maximum (MAX), minimum (MIN), or the average (AVG) readings. The elapsed time since entering MAX/ MIN/AVG mode, or the time at which the minimum or maximum occurred appears on the display.
- Press "**P/V/F**" to show the maximum, minimum, and average of pressure, velocity or flow, and temperature value.
- Press "**MAN/MIX**" button for 2 seconds to to exit MAX/MIN/AVG mode.

5-17.Saving Samples

The Meter saves various samples in its three major modes. To save a sample, do the following:

- When taking a sample, press "**Save/Clear**" to store the sample. The Meter can save up to 99 samples in each of its three modes.
- If the memory is full (99 samples have been stored), more samples cannot be stored. If the user attempts to store another sample, the Meter shows "FU" and does not save new readings.

5-18.Recall and Clearing Sample Data

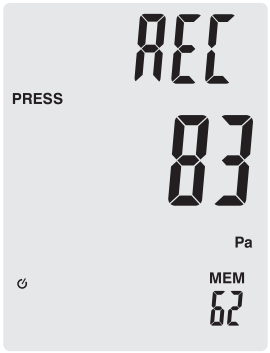
- The Meter stores data that sometime will need to be recall and periodically to be cleared. Individual samples or the entire data memory can be cleared. When the memory is full (99 samples), it shows"**FU**" (Full) on the display when **"Save/Clear"** is pressed and the Meter emits short beeps and will not save any value unless some samples are cleared.

To recall sample data, do the following:

- Press **"P/V/F"** to recall samples for that mode.
- Press **"Avg/Rec"** (RECALL)and hold the button for 2 second to recall samples. The last measurement saved appears first. Use **"Unit▲"** and **"Unit▼"** to locate the desired sample.
- Once the samples are taken, press **"Avg/Rec"** to view the average of all the samples.
- Press **"Avg/Rec"** and hold the button for 2 second to exit recall mode.

To clear individual sample data, do the following:

- Press **"P/V/F"** to recall samples for that mode.
- Press **"Avg/Rec"** (RECALL) and hold the button for 2 second to recall samples. Use **"Unit▲"** and **"Unit▼"** to select the desired sample.
- Press **"Save/Clear"** to clear the sample. Note that the number of samples displayed is reduced.
- Press **"Avg/Rec"** and hold the button for 2 second to exit recall mode. To clear all sample data, Refer to Step clear memory setting..("Changing Setup Options.")



5-19.Error Codes

An error message will appear on the display if the meter fails an internal diagnostic test. And it will freeze all the buttons.

OL: Pressure or air velocity value is over the range.

-OL: Pressure value is below the range.

Error: air velocity or air flow is below the range.

5-20.Replacing the Batteries

- Turn off the thermometer if necessary.
- Loosen the screw and remove the battery door.
- Replace 9V batteries.
- Replace the battery door and tighten the screw.

Warranty

Triplett / Jewell Instruments extends the following warranty to the original purchaser of these goods for use. Triplett warrants to the original purchaser for use that the products sold by it will be free from defects in workmanship and material for a period of (2) two years from the date of purchase. This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons in any way or purchased from unauthorized distributors so as, in our sole judgment, to injure their stability or reliability, or which have been subject to misuse, abuse, misapplication, negligence, accident or which have had the serial numbers altered, defaced, or removed. Accessories, including batteries are not covered by this warranty.