The Series 477AV Handheld Digital Manometer is available with pressure, flow, and velocity measurements along with a number of other features. The 477AV uses a highly accurate differential pressure sensor to offer ±0.5% full scale accuracy. It displays negative, positive, and differential pressure. For pressure, flow, and velocity there are selectable English and metric units, as seen in the model chart below. The built-in air velocity and volumetric flow calculations conserve time associated with cumbersome manual calculations. Additionally, up to 40 readings can be saved—perfect for HVAC technicians making Pitot tube traverses of airflow readings across a duct. The accuracy that the 477AV Series provides is critical to maintenance personnel and technicians to ensure proper performance.

The digital display offers a backlight feature for easier viewing in darker areas. Meanwhile, battery conservation is monitored and displayed in the event of low battery condition. The digital manometer will automatically shut off after 20 minutes to prevent over flow, over pressure condition. The digital manometer will automatically shut off after 20 minutes to prevent over flow, over pressure condition. The display offers a backlight feature for easier viewing in darker areas. Meanwhile, battery conservation is monitored and displayed in the event of low battery condition. The digital manometer will automatically shut off after 20 minutes to prevent over flow, over pressure condition. The digital manometer will automatically shut off after 20 minutes to prevent over flow, over pressure condition. The accuracy that the 477AV Series provides is critical to maintenance personnel and technicians to ensure proper performance.

<table>
<thead>
<tr>
<th>Model</th>
<th>Pressure Range</th>
<th>Velocity Range</th>
<th>Available Pressure Units</th>
</tr>
</thead>
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</tr>
<tr>
<td>477AV-4</td>
<td>0-1,000 in w.c.</td>
<td>0-200 psi</td>
<td>psi, kPa, mm Hg, mbar, Pa, ft w.c., oz/in^2, hPa, cm w.c., in w.c., ft w.c., in Hg, psi, oz/in^2, mm w.c., mm Hg, mbar, Pa, kPa, hPa.</td>
</tr>
<tr>
<td>477AV-00</td>
<td>0-4,000 in w.c.</td>
<td>0-0.2 psi</td>
<td>psi, kPa, mm Hg, mbar, Pa, ft w.c., oz/in^2, hPa, cm w.c., in w.c., ft w.c., in Hg, psi, oz/in^2, mm w.c., mm Hg, mbar, Pa, kPa, hPa.</td>
</tr>
<tr>
<td>477AV-0</td>
<td>0-10.0 in w.c.</td>
<td>0-0.1 psi</td>
<td>psi, kPa, mm Hg, mbar, Pa, ft w.c., oz/in^2, hPa, cm w.c., in w.c., ft w.c., in Hg, psi, oz/in^2, mm w.c., mm Hg, mbar, Pa, kPa, hPa.</td>
</tr>
<tr>
<td>477AV-1</td>
<td>0-20.0 in w.c.</td>
<td>0-0.2 psi</td>
<td>psi, kPa, mm Hg, mbar, Pa, ft w.c., oz/in^2, hPa, cm w.c., in w.c., ft w.c., in Hg, psi, oz/in^2, mm w.c., mm Hg, mbar, Pa, kPa, hPa.</td>
</tr>
<tr>
<td>477AV-2</td>
<td>0-40.0 in w.c.</td>
<td>0-0.4 psi</td>
<td>psi, kPa, mm Hg, mbar, Pa, ft w.c., oz/in^2, hPa, cm w.c., in w.c., ft w.c., in Hg, psi, oz/in^2, mm w.c., mm Hg, mbar, Pa, kPa, hPa.</td>
</tr>
<tr>
<td>477AV-3</td>
<td>0-200.0 in w.c.</td>
<td>0-1.0 psi</td>
<td>psi, kPa, mm Hg, mbar, Pa, ft w.c., oz/in^2, hPa, cm w.c., in w.c., ft w.c., in Hg, psi, oz/in^2, mm w.c., mm Hg, mbar, Pa, kPa, hPa.</td>
</tr>
<tr>
<td>477AV-4</td>
<td>0-10.0 psi</td>
<td>0-0.2 psi</td>
<td>psi, kPa, mm Hg, mbar, Pa, ft w.c., oz/in^2, hPa, cm w.c., in w.c., ft w.c., in Hg, psi, oz/in^2, mm w.c., mm Hg, mbar, Pa, kPa, hPa.</td>
</tr>
<tr>
<td>477AV-5</td>
<td>0-20.0 psi</td>
<td>0-0.4 psi</td>
<td>psi, kPa, mm Hg, mbar, Pa, ft w.c., oz/in^2, hPa, cm w.c., in w.c., ft w.c., in Hg, psi, oz/in^2, mm w.c., mm Hg, mbar, Pa, kPa, hPa.</td>
</tr>
<tr>
<td>477AV-6</td>
<td>0-100.0 psi</td>
<td>0-0.4 psi</td>
<td>psi, kPa, mm Hg, mbar, Pa, ft w.c., oz/in^2, hPa, cm w.c., in w.c., ft w.c., in Hg, psi, oz/in^2, mm w.c., mm Hg, mbar, Pa, kPa, hPa.</td>
</tr>
<tr>
<td>477AV-7</td>
<td>0-200.0 psi</td>
<td>0-1.0 psi</td>
<td>psi, kPa, mm Hg, mbar, Pa, ft w.c., oz/in^2, hPa, cm w.c., in w.c., ft w.c., in Hg, psi, oz/in^2, mm w.c., mm Hg, mbar, Pa, kPa, hPa.</td>
</tr>
<tr>
<td>477AV-8</td>
<td>0-500.0 psi</td>
<td>0-2.0 psi</td>
<td>psi, kPa, mm Hg, mbar, Pa, ft w.c., oz/in^2, hPa, cm w.c., in w.c., ft w.c., in Hg, psi, oz/in^2, mm w.c., mm Hg, mbar, Pa, kPa, hPa.</td>
</tr>
</tbody>
</table>

Displaying Pressure, Velocity, and Flow
The instrument measures pressure using a piezoelectric sensor. When the 477AV is powered on the pressure value and the unit of measurement will be shown. If you select the velocity or flow mode, then velocity or flow will be displayed instead. The mode selection will persist even after the instrument is turned off. In velocity and flow modes, if the reading exceeds 9,999, then a “K” will be displayed next to the unit of measurement and the display will read in units of 1,000 times the original unit of measurement.
Battery Installation
The unit is shipped with a 9 volt alkaline battery which must be installed before operation. When battery replacement becomes necessary, use only a 9 volt alkaline type such as Duracell® MN1604, Eveready® 522 or equivalent. Zinc-carbon types, often labeled heavy-duty are not recommended because of the increased potential for leakage. Alkaline batteries also offer a better value since they last up to three times longer in this device. To install the batteries:
1. Remove the two screws holding the bottom end-cap (marked BATTERY) in place.
2. Connect the battery to the enclosed battery clip observing correct polarity. Be careful not to trap wires between the battery, case, or foam pads which retain the battery. This could make it difficult to install the battery or remove it later for replacement.
3. Be sure the rubber gasket is properly seated in the gasket channel of the end-cap. Notice that the end-cap will only fit one way because the holes are slightly off center.
4. Place the “z” shaped wrist strap clip in one of the screw recesses and tighten the screws. Do not over-tighten.
5. Attach wrist strap to the clip.

Pressure Connectors
The 477AV has two barbed connector ports for use with 1/8” (3.18 mm) or 3/16” (4.76 mm) I.D. tubing.
- For a single positive pressure, remove the end caps from the connectors and connect the tubing to port marked “+” and vent the opposite port to atmosphere.
- For a single negative pressure (vacuum), connect the tubing to port marked “−” and vent the opposite port to atmosphere.
- To measure differential pressure, connect higher pressure to port marked “+” and lower pressure to port marked “−”. Manometer will indicate the difference between the two ports. Velocity and volumetric flow can be found similarly if that is the current mode.

Buttons and Menus
The 477AV’s menu is controlled with four buttons labeled MENU, UP, DOWN, and ENTER. The buttons are shown in Figure 2.

On/Off Power
Pressing and holding the ON/OFF button will turn the unit on or off.

Zeroing Readings
The 477AV is calibrated at the factory, but users are recommended to zero the instrument before each use. To set a new zero point, press and hold the ZERO button with both ports vented to atmospheric pressure. This setting can be cleared only by a factory default.

Display Backlight
The 477AV has a display backlight to be used in the dark or in poor lighting conditions. It can be turned on or off by pressing and holding the MENU and ENTER buttons at the same time. The backlight setting is not saved after the 477AV is turned off.

Display Hold
To hold or freeze a value, press and hold down the HOLD button. When the Hold function is enabled, the pressure/velocity/flow reading will not change, and the unit of measure will toggle with the word “HOLD”. If the Store function is used when Hold is enabled, the reading on the display (not the actual reading) will be stored. This function cannot be used when a menu is being displayed.

Storing Readings
Pressing and holding the STORE button will store a reading in the memory. The display will flash ‘MEM’ and the reading’s memory location (e.g. “MEM” and “5”). The 477AV has the ability to store up to 40 readings in the memory. Readings that are saved will remain in memory even if the unit is powered off. If the Hold function is enabled, then the stored value will be the value on the display (not the actual reading).

Measurement Mode
The 477AV can be set to display pressure, velocity, or volumetric flow. The mode can be changed by pressing and holding the HOLD and STORE buttons simultaneously. Once a mode is selected, the menu will continue to prompt for unit of measurement, K-factor, duct shape and duct size when applicable. Duct size and shape are input in inches or centimeters, depending on whether the primary unit of measure is metric or English. Settings for all modes are retained in the memory even if the mode is changed or the 477AV is turned off.

The mode cannot be changed if there are readings saved in memory, or if the Hold feature is on. (This prevents a user from accidentally saving readings with different units of measure.) If a user tries to access the mode submenu when readings are saved, the display will flash “ERR Log”. If a user tries to access the mode submenu when the Hold feature is active, the display will flash “ERR Hold”.
1. Press and hold the UP and DOWN arrows simultaneously.
2. Using the UP and DOWN arrows, find the mode (velocity, pressure, or flow) you want.
3. Press ENTER to confirm the desired mode.
4. The display will prompt for units of measurement. Scroll through the options with the UP and DOWN arrows until the unit of choice is found.
5. Press ENTER.
Advanced Menu
In addition to the features accessible directly from the buttons, there is an advanced menu that allows access to stored values in memory, mode of operation, digital dampening, measurement statistics, calibration, power saving, audible alarm, and factory defaulting the device. The complete diagram of the advanced menu can be found on the last page of this instruction manual or the back of the device.

1. Press and release the MENU button to access the advanced menu.
2. Use the UP and DOWN arrow buttons to cycle through the menu options.
3. Press ENTER once the desired option is selected.
4. Use the UP and DOWN arrow buttons to make changes to that option.
5. Press ENTER to save the changes.
6. Press MENU button to return to the menu or home screen.

Memory (MEM)
Saved readings can be viewed by pressing MENU and then ENTER. There will be two options: “LOG” and “AVG”.

“LOG” shows saved readings in the order they were stored. “AVG” displays the average value of the saved readings and is updated based on the content of the log files. Empty memory locations are not shown. If no readings have been stored, the display will read “---”. When the memory is full, the display will flash “ERR FULL” and discard the reading. A reading cannot be stored when a menu is being displayed.

Erasing Stored Readings
Stored readings can be erased using the menu.
1. Press MENU and MEM will be displayed.
2. Press ENTER.
3. Press ENTER as “LOG” is displayed on top of the screen.
4. Scroll using the UP and DOWN arrows to the value you wish to erase (or any of the values you wish to erase all).
5. Press ENTER.
6. This will take you to the “Erase” submenu. The “Erase” submenu has three options: “no” will do nothing, “OnE” will erase the most recently viewed reading, and “ALL” will erase all stored readings.

It should be noted that the measurement mode cannot be changed unless the memory values are erased. (This prevents a user from accidentally saving readings with different units of measure.)

Changing Measurement Mode
Besides changing the measurement mode using the front buttons, it can also be changed in the menu. The 477AV can be set to display pressure, velocity, or volumetric flow. Once a mode is selected, the menu will continue to prompt for unit of measurement, K-factor, duct shape and duct size when applicable. Duct size and shape are input in inches or centimeters, depending on whether the primary unit of measure is metric or standard. Settings for all modes are retained in the memory even if the mode is changed or the 477AV is turned off.

The mode cannot be changed if there are readings saved in memory, or if the Hold feature is on. (This prevents a user from accidentally saving readings with different units of measure.) If a user tries to access the mode submenu when readings are saved, the display will flash “ERR Log”. If a user tries to access the mode submenu when the Hold feature is active, the display will flash “ERR Hold”.

1. Press MENU and MEM will be displayed.
2. Press DOWN arrow and MODE will be displayed.
3. Press ENTER.
4. Using the UP and DOWN arrows, find the mode (velocity, pressure, or flow) you want.
5. Press ENTER to confirm the desired mode.
6. The display will prompt for units of measurement. Scroll through the options with the UP and DOWN arrows until the unit of choice is found.
7. Press ENTER.

Damping Function
The “DAMP” submenu compensates for the fluctuating readings by averaging input values to display a more stable readout. The damping value can be set to any number between 1 to 9. The default value is set to 4. Here are the steps to change the damping value.

1. Press MENU.
2. Scroll using the UP and DOWN arrows to select “DAMP” and press ENTER.
3. Using the UP and DOWN arrows, choose a number in the range of 1 to 9 and press ENTER.

Statistics
Minimum and maximum readings can be viewed in the “STAT” submenu. While they are being viewed, the unit of measure will toggle with the word “MIN” or “MAX”. The minimum and maximum values can be reset by pressing and holding the ENTER button when viewing the values. They are also reset when the 477AV is turned off, and when the mode of operation is changed. Here are the steps to get to minimum and maximum values.

1. Press MENU.
2. Scroll down to STAT and press ENTER.
3. Scroll to view the minimum and maximum values.

Calibration
If the measurements are not reading within specifications compared to a calibrated reference, the zero and span values can be adjusted in the calibration menu. When zero calibration is performed, both ports should be vented to atmospheric pressure. When span calibration is performed, positive pressure equivalent to the max end of the factory pressure range should be applied to the positive pressure port with the negative port vented to atmospheric pressure. This setting can be cleared by a factory default.

1. Press MENU and MEM will be displayed.
2. Press DOWN arrow until CAL is displayed.
3. Press ENTER.
4. Vent the pressure ports to atmospheric pressure.
5. Press and hold ENTER.
6. Press DOWN arrow.
7. Apply pressure to the positive pressure port.
8. Press and hold ENTER.

Auto Power Off
The 477AV will turn off if no key is pressed for a set amount of time. The default time is 20 minutes, but may be changed using the menu to any value from 1 – 20 minutes, or disabled. Here are the steps.
1. Press MENU.
2. Scroll with the UP and DOWN arrows to “OFF” option and press ENTER.
3. Using the UP and DOWN arrows, select a minute value for the auto-shut off.
4. Press ENTER to lock in that value.
5. Press MENU twice to return to the main screen.

Sound
The 477AV can be set to beep during button presses. This feature can be turned on or off using the “BEEP” menu option. Here are the steps.
1. Press MENU.
2. Scroll down to the “BEEP” menu option and press ENTER.
3. Using the UP and DOWN arrows, select “ON” or “OFF” and press ENTER.

Factory Default
The 477AV can be reset to factory conditions using the menu’s “RSET” option. This will reset all settings, including a zero or span. Here are the steps.
1. Press MENU.
2. Scroll using the UP and DOWN arrows to “RSET” and press ENTER.
3. Scroll down to “YES” and press ENTER.

Over Pressure/Under Pressure Alarm
If over pressure or under pressure is applied to the unit, “OvFL” or “UnFL” will display respectively and an audible alarm will sound. The threshold is ±10% of the 477AV’s range. Do not exceed the maximum rated pressure of this manometer; doing so could cause a permanent damage to the sensor, rupture the housing, and/or cause injury.

Battery Monitor
The Series 477AV Handheld Digital Manometer is not field serviceable and should be returned if repair is needed (field repair should not be attempted and may void warranty). Be sure to include a brief description of the problem plus any relevant application notes. Contact customer service to receive a return goods authorization number before shipping.
Figure 3.
477AV Menu Options

Press and hold the ENTER button to set zero or span.

Press and hold the ENTER button to reset to factory defaults.

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