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 V alkaline battery which must be installed before operation. When battery replacement becomes necessary, use only a 9 V 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 the 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.

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 unit.

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 if you want 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 accidently 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 measurement 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 Hold”. 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 to 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 477AV monitors its battery voltage whenever it’s powered on. If the voltage is low, the “LOW BAT” icon will appear on the display. A weak battery can cause inaccurate measurements. It is recommended to replace the battery as soon as possible to ensure top functionality. Do not leave an exhausted battery in the unit due to potential leakage.

Maintenance

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.
PRESS AND HOLD THE ENTER BUTTON TO SET ZERO OR SPAN.

PRESS AND HOLD THE ENTER BUTTON TO RESET TO FACTORY DEFAULTS.

Figure 3: 477AV menu options

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