MICROMANOMETER
ALNOR® MODEL AXD620
AIRFLOW™ INSTRUMENTS
MODEL PVM620

OPERATION AND SERVICE MANUAL

P/N 1980588, REV E
FEBRUARY 2016

ALNOR

AIRFLOW INSTRUMENTS

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b. Pumps are warranted for hours of operation as set forth in product or operator's manuals;

c. Parts repaired or replaced as a result of repair services are warranted to be free from defects in workmanship and material, under normal use, for 90 days from the date of shipment;

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Service Policy

Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any malfunction is discovered, please contact your nearest sales office or

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Chapter 1

Unpacking and Parts Identification

Carefully unpack the instrument and accessories from the shipping container. Check the individual parts against the list of components below. If anything is missing or damaged, notify TSI immediately.

1. Carrying case
2. Instrument
3. Pressure tubing
4. Static pressure tip
5. USB cable
6. CD-ROM with downloading software

Chapter 2

Setting-up

Supplying Power to the Alnor Model AXD620/Airflow Instruments PVM620

The Alnor AXD620/Airflow Instruments PVM620 is powered with four size AA batteries.

Installing the Batteries

Insert four AA batteries as indicated by the diagram located on the inside of the battery compartment. The Alnor AXD620/Airflow Instruments PVM620 is designed to operate with either alkaline or NiMH rechargeable batteries, although it will not recharge NiMH batteries. Battery life will be shorter if NiMH batteries are used. Carbon-zinc batteries are not recommended because of the danger of battery acid leakage.

Using the Optional AC Adapter

When using the AC adapter, the batteries (if installed) will be bypassed. Be sure to provide the correct voltage and frequency, which is marked on the back of the AC adapter. The AC adapter will not recharge the batteries.

Connecting to a Computer

Use the Computer Interface USB Cable to connect the instrument to a computer.

For information on how to download stored data see Chapter 3 LogDat2™ Downloading Software.

Caution: This symbol is used to indicate that the data port of the Alnor AXD620/Airflow Instruments PVM620 is **not** intended for connection to a public telecommunications network. Connect the USB data port only to another USB port.

Chapter 3

Operation

Keypad Functions

ON/OFF Key	Press to turn the Alnor Model AXD620/Airflow Instruments PVM620 on and off. During the power up sequence the display will show the following: Model Number, Serial Number and Software Revision.
Arrow (▲▼) Keys	Press to scroll through choices while setting a parameter.
↵ (Enter) Key	Press to accept a value or condition.
Arrow (➤or ➤) and Menu Soft Keys	Press arrow keys to change choices while setting a parameter. Press the Menu soft key to select the Menu selections, which are Display Setup, Pressure Zero, Settings, Flow Setup, Actual/Std Set up, Data Logging, and Calibration.

Common Terms

In this manual there are several terms that are used in different places. The following is a brief explanation of the meanings of those terms.

Sample	Consists of all of the measurement parameters stored at the same time.
Test ID	A group of samples. The statistics (average, minimum, maximum, and count) are calculated for each test ID. The maximum number of test IDs is 100.

Time Constant	The time constant is an averaging period. It is used to dampen the display. If you are experiencing fluctuating flows, a longer time constant will slow down those fluctuations. The display will update every second, but the displayed reading will be the average over the last time constant period. For example, if the time constant is 10 seconds, the display will update every second, but the displayed reading will be the average from the last 10 seconds. This is also referred to as a “moving average”.
Log Interval	The logging interval is a frequency period that the instrument will log readings. For example, if the logging interval is set to 30 minutes, each sample will be the average of the last 30 minutes.

Menus

DISPLAY SETUP

Display setup menu is where you will setup the desired parameters to be displayed on the running screen. With a parameter highlighted you can then use the ON soft key to have it show up on the running screen or select the OFF soft key to turn off the parameter. Use PRIMARY soft key to have a parameter show up on the running screen in a larger display. Only one parameter can be selected as a primary, and up to 2 secondary parameters can be selected at one time.

PRESSURE ZERO

To zero the pressure reading, select the Pressure Zero menu. The instrument will indicate if the pressure zero was successful.

SETTINGS

Settings menu is where you can set the general settings. These include Language, Beeper, Select Units, Time Constant, Contrast, Set Time, Set Date, Time Format, Date Format, Number Format, Backlight and Auto Off. Use the ➤ or ➤ soft keys to scroll through the settings for each option and use the ↵ key to accept settings.

FLOW SET UP

In Flow Setup mode, there are four types: Round Duct, Rectangle Duct, Duct Area, and K-Factor. Use the ◄ or ► soft keys to scroll through the types and then press the ↵ key to accept the desired type. To change the setting, highlight the **Enter Settings** option and press the ↵ key.

Press/Kfact allows for calculating flow rate from diffusers or flow stations with pressure taps using the instruments pressure ports and K-factors. The K-factors are obtained from the diffuser or flow station manufacturer. For more information, refer to Application Note TSI-114.

- Up to 5 K-factors can be pre-programmed for quick use.
- When **Flow** is set as the **Primary** measurement in the **Display Setup** menu, the K-factor will also be displayed.

When measuring **Flow** as the **Primary** measurement, the parameters can be quickly changed by pressing the ▲ or ▼ key while on the main measurement screen. Make adjustments with the ▲ or ▼ arrow keys and press ↵ to accept, or enter the **Select Kfactor** menu to choose a different pre-programmed flow value.

ACTUAL/STANDARD SETUP

Choose Actual/Standard measurements and parameters in the Act/Std Setup menu. Within this menu, you can also select Standard Temperature, Standard Pressure and a source for the actual temperature. The actual barometric pressure must be entered to convert air velocity and volume measurements to actual conditions. The Entered Temp range is from -40 to 1832°F (-40 to 1000°C).

DATA LOGGING

Measurements

Measurements to be logged are independent of measurements on the display, and must; therefore, be selected under **DATA LOGGING → Measurements**.

- When set to **ON**, measurement will be logged to memory.
- When set to **DISPLAY**, measurement will be logged to memory if it is visible on the main running screen.
- When set to **OFF**, measurement will not be logged to memory.

Log Mode/Log Settings

You can set Log Mode to Manual, Auto-save or Cont-key.

- Manual mode does not automatically save data, but instead prompts you to save a sample.
- In Auto-save mode, you manually take samples that are automatically logged.
- In Cont-key mode, you start taking readings and logging by pressing the ↵ key. The instrument will continue taking measurements until the ↵ key is pressed again.
- Auto-save and Cont-Key modes have the following additional Log Settings:

Mode	Log Settings
Auto-save	Log Interval
Cont-key	Log Interval

- Pressing the ▲▼ keys simultaneously will lock the keypad to prevent unauthorized adjustments to the instruments. To unlock the keypad, press the ▲▼ keys simultaneously.

Delete Data

Use this to delete all data, delete test or delete sample.

% Memory

This option displays the memory available. Delete All, under Delete Data, will clear memory and reset the memory available.

LogDat2™ Downloading Software

The Alnor AXD620/Airflow Instruments PVM620 comes with special software called LogDat2 Downloading Software, which is designed to provide you with maximum flexibility and power. To install this software on your computer, follow the instructions on the label of the LogDat2 CD-ROM.

To download data from the Alnor AXD620/Airflow Instruments PVM620, connect the supplied computer interface USB cable to the Alnor AXD620/Airflow Instruments PVM620 and to a computer USB port. Then run the LogDat2 downloading software. Within the LogDat2 software, either select the tests to be downloaded or double-click on a test to open it.

Chapter 4

Maintenance

The Alnor Model AXD620/Airflow Instruments PVM620 requires very little maintenance to keep it performing well.

Recalibration

To maintain a high degree of accuracy in your measurements, we recommend that you return your Alnor Model AXD620/Airflow Instruments PVM620 to TSI for annual recalibration. Please contact one of TSI's offices or your local distributor to make service arrangements and to receive a Return Material Authorization (RMA) number. To fill out an online RMA form, visit TSI's website at

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The Alnor Model AXD620/Airflow Instruments PVM620 can also be recalibrated in the field using the CALIBRATION menu. These field adjustments are intended to make minor changes in calibration to match a user's calibration standards. The field adjustment is **NOT** intended as a complete calibration capability. For complete, multiple-point calibration and certification, the instrument must be returned to the factory.

Cases

If the instrument case or storage case needs cleaning, wipe it off with a soft cloth and isopropyl alcohol or a mild detergent. Never immerse the Alnor Model AXD620/Airflow Instruments PVM620. If the enclosure of the Alnor Model AXD620/Airflow Instruments PVM620 or the AC adapter becomes broken, it must be replaced immediately to prevent access to hazardous voltage.

Storage

Remove the batteries when storing the unit for more than one month to prevent damage due to battery leakage.

Chapter 5

Troubleshooting

Table 5-1 lists the symptoms, possible causes, and recommended solutions for common problems encountered with the Alnor Model AXD620/Airflow Instruments PVM620. If your symptom is not listed, or if none of the solutions solves your problem, please contact TSI.

Table 5-1: Troubleshooting the Alnor Model AXD620/Airflow Instruments PVM620

Symptom	Possible Causes	Corrective Action
No Display	Unit not turned on	Switch unit on.
	Low or dead batteries	Replace batteries or plug in AC adapter.
	Dirty battery contacts	Clean the battery contacts.
Reading fluctuates / unstable	Fluctuating flow	Reposition probe in less-turbulent flow or use longer time constant.
No response to keypad	Keypad locked out	Unlock keypad by pressing ▲▼ keys simultaneously.
Instrument Error message appears	Memory is full	Download data if desired, then DELETE ALL memory.
	Fault in instrument	Factory service required on instrument.

WARNING!
The pressure sensor is protected from damage up to 7 psi (48 kPa or 360 mmHg). At higher pressure it can burst!

Appendix A

Specifications

Specifications are subject to change without notice.

Static / Differential Pressure:
Range[1]: -15 to +15 in. H_2O (-28.0 to +28.0 mm Hg, -3735 to +3735 Pa)
Accuracy: ±1% of reading ±0.005 in. H_2O (±0.01 mm Hg, ±1 Pa)
Resolution: 0.001 in. H_2O (0.1 Pa, 0.01 mm Hg)

Velocity From a Pitot Tube:
Range[2]: 250 to 15500 ft/min (1.27 to 78.7 m/s)
Accuracy[3]: ±1.5% at 2000 ft/min (10.16 m/s)
Resolution: 1 ft/min (0.1 m/s)

Duct Size:
Range: 1 to 500 inches in increments of 0.1 in.
(2.5 to 1270 cm in increments of 0.1 cm)

Volumetric Flow Rate:
Range: Actual range is a function of actual velocity, pressure, duct size, and K factor

Instrument Temperature Range:
Operating: 40 to 113°F (5 to 45°C)
Storage: -4 to 140°F (-20 to 60°C)

Instrument Operating Conditions:
Altitude up to 4000 meters
Relative humidity up to 80% RH, non-condensing
Pollution degree 1 in accordance with IEC 664
Transient over voltage category II

Data Storage Capabilities:
Range: 12,700+ samples and 100 test IDs

Logging Interval:
Intervals: 1 second to 1 hour

Time Constant:
Intervals: User selectable

External Meter Dimensions:
3.3 in. × 7.0 in. × 1.8 in. (8.4 cm × 17.8 cm × 4.4 cm)

Meter Weight:
Weight with batteries: 0.6 lbs (0.27 kg)

Power Requirements:
Four AA-size batteries (included) or AC adapter (optional) 9 VDC, 300 mA, 4-18 watts (input voltage and frequency vary depending on which adapter is used)

[1] Overpressure range = 7 psi (190 in. H_2O, 360 mmHg, 48 kPa).
[2] Pressure velocity measurements are not recommended below 1,000 ft/min (5 m/s) and are best suited to velocities over 2000 ft/min. Range can vary depending on barometric pressure.
[3] Accuracy is a function of converting pressure to velocity. Conversion accuracy improves when actual pressure values increase.