

MICROMANOMETER ALNOR® MODEL AXD610 AIRFLOW™ INSTRUMENTS MODEL PVM610

OPERATION AND SERVICE MANUAL

P/N 1980587, REV F
SEPTEMBER 2014



START SEEING THE BENEFITS OF REGISTERING TODAY!

Thank you for your TSI instrument purchase. Occasionally, TSI releases information on software updates, product enhancements and new products. By registering your instrument, TSI will be able to send this important information to you.

<http://register.tsi.com>

As part of the registration process, you will be asked for your comments on TSI products and services. TSI's customer feedback program gives customers like you a way to tell us how we are doing.



UNDERSTANDING, ACCELERATED

TSI Incorporated - Visit our website **www.tsi.com** for more information.

USA	Tel: +1 800 874 2811	India	Tel: +91 80 67877200
UK	Tel: +44 149 4 459200	China	Tel: +86 10 8219 7688
France	Tel: +33 4 91 11 87 64	Singapore	Tel: +65 6586 6388
Germany	Tel: +49 241 523030		

©2013 TSI Incorporated

Printed in U.S.A.

Copyright©

TSI Incorporated / 2007-2014 / All rights reserved.

Address

TSI Incorporated / 500 Cardigan Road / Shoreview, MN 55126 / USA

Fax No.

(651) 490-3824

Limitation Of Warranty And Liability (effective April 2014)

(For country-specific terms and conditions outside of the USA, please visit www.tsi.com.)

Seller warrants the goods, excluding software, sold hereunder, under normal use and service as described in the operator's manual, to be free from defects in workmanship and material for **24 months**, or if less, the length of time specified in the operator's manual, from the date of shipment to the customer. This warranty period is inclusive of any statutory warranty. This limited warranty is subject to the following exclusions and exceptions:

- a. Hot-wire or hot-film sensors used with research anemometers, and certain other components when indicated in specifications, are warranted for 90 days from the date of shipment;
- 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;
- d. Seller does not provide any warranty on finished goods manufactured by others or on any fuses, batteries or other consumable materials. Only the original manufacturer's warranty applies;
- e. This warranty does not cover calibration requirements, and seller warrants only that the instrument or product is properly calibrated at the time of its manufacture. Instruments returned for calibration are not covered by this warranty;
- f. This warranty is **VOID** if the instrument is opened by anyone other than a factory authorized service center with the one exception where requirements set forth in the manual allow an operator to replace consumables or perform recommended cleaning;
- g. This warranty is **VOID** if the product has been misused, neglected, subjected to accidental or intentional damage, or is not properly installed, maintained, or cleaned according to the requirements of the manual. Unless specifically authorized in a separate writing by Seller, Seller makes no warranty with respect to, and shall have no liability in connection with, goods which are incorporated into other products or equipment, or which are modified by any person other than Seller.

The foregoing is **IN LIEU OF** all other warranties and is subject to the **LIMITATIONS** stated herein. **NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR MERCHANTABILITY IS MADE. WITH RESPECT TO SELLER'S BREACH OF THE IMPLIED WARRANTY AGAINST INFRINGEMENT, SAID WARRANTY IS LIMITED TO CLAIMS OF DIRECT INFRINGEMENT AND EXCLUDES CLAIMS OF CONTRIBUTORY OR INDUCED INFRINGEMENTS. BUYER'S EXCLUSIVE REMEDY SHALL BE THE RETURN OF THE PURCHASE PRICE DISCOUNTED FOR REASONABLE WEAR AND TEAR OR AT SELLER'S OPTION REPLACEMENT OF THE GOODS WITH NON-INFRINGEMENTS.**

TO THE EXTENT PERMITTED BY LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE LIMIT OF SELLER'S LIABILITY FOR ANY AND ALL LOSSES, INJURIES, OR DAMAGES CONCERNING THE GOODS (INCLUDING CLAIMS BASED ON CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) SHALL BE THE RETURN OF GOODS TO SELLER AND THE REFUND OF THE PURCHASE PRICE, OR, AT THE OPTION OF SELLER, THE REPAIR OR

REPLACEMENT OF THE GOODS. IN THE CASE OF SOFTWARE, SELLER WILL REPAIR OR REPLACE DEFECTIVE SOFTWARE OR IF UNABLE TO DO SO, WILL REFUND THE PURCHASE PRICE OF THE SOFTWARE. IN NO EVENT SHALL SELLER BE LIABLE FOR LOST PROFITS, BUSINESS INTERRUPTION, OR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR INCIDENTAL DAMAGES. SELLER SHALL NOT BE RESPONSIBLE FOR INSTALLATION, DISMANTLING OR REINSTALLATION COSTS OR CHARGES. No Action, regardless of form, may be brought against Seller more than 12 months after a cause of action has accrued. The goods returned under warranty to Seller's factory shall be at Buyer's risk of loss, and will be returned, if at all, at Seller's risk of loss.

Buyer and all users are deemed to have accepted this LIMITATION OF WARRANTY AND LIABILITY, which contains the complete and exclusive limited warranty of Seller. This LIMITATION OF WARRANTY AND LIABILITY may not be amended, modified or its terms waived, except by writing signed by an Officer of Seller.

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 representative, or call Customer Service department at +44 (0) 149 4 459200 (UK), (800) 874-2811 (USA), or (1) 651-490-2811 (International).

CONTENTS

CHAPTER 1 UNPACKING AND PARTS IDENTIFICATION	1
CHAPTER 2 SETTING-UP	3
Supplying Power to the Alnor AXD610/Airflow Instruments	
PVM610	3
Installing the Batteries	3
CHAPTER 3 OPERATION	5
Keypad Functions	5
CHAPTER 4 MAINTENANCE	7
Recalibration	7
Cases	7
Storage	7
CHAPTER 5 TROUBLESHOOTING	9
APPENDIX A SPECIFICATIONS	11

(This page intentionally left blank)

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

(This page intentionally left blank)

Chapter 2

Setting-up

Supplying Power to the Alnor AXD610/Airflow Instruments PVM610

The Alnor AXD610/Airflow Instruments PVM610 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 AXD610/Airflow Instruments PVM610 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.

(This page intentionally left blank)

Chapter 3

Operation

Keypad Functions

ON/OFF Key	Press to turn the Alnor AXD610/Airflow Instruments PVM610 on and off. During the power up sequence the display will show the following: Model Number, Serial Number, Software Revision and Last Date Calibrated.
ft/min / m/s Key	Pressing this key changes the display to read air velocity, converted from velocity pressure when connected to a pitot probe.
in H₂O / Pa / hPa / kPa / mm HG Key	Pressing this key changes the display to read differential pressure.
0 Key	Pressing the 0 key zeroes the pressure measurement.
Changing Units	To change units, first put the desired measurement (air velocity or pressure) on the display. Then press and hold the left, unlabelled key for five seconds. Finally, use the ▲▼ and ENTER key to select the units.

(This page intentionally left blank)

Chapter 4

Maintenance

The Alnor AXD610/Airflow Instruments PVM610 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 AXD610/Airflow Instruments PVM610 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 <http://service.tsi.com>.

U.S. & International	UK
TSI Incorporated Alnor Products 500 Cardigan Road Shoreview MN 55126-3996 Tel: (800) 874-2811 (651) 490-2811 Fax: (651) 490-3824	TSI Instruments Ltd. Stirling Road Cressex Business Park High Wycombe Bucks HP12 3ST United Kingdom Tel: +44 (0) 149 4 459200 Fax: +44 (0) 149 4 459700

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 AXD610/Airflow Instruments PVM610. If the enclosure of the Alnor AXD610/Airflow Instruments PVM610 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.

(This page intentionally left blank)

Chapter 5

Troubleshooting

Table 5-1 lists the symptoms, possible causes, and recommended solutions for common problems encountered with the Alnor AXD610/Airflow Instruments PVM610. If your symptom is not listed, or if none of the solutions solves your problem, please contact TSI.

Table 5-1: Troubleshooting the Alnor AXD610/Airflow Instruments PVM610

Symptom	Possible Causes	Corrective Action
No Display	Unit not turned on	Switch unit on.
	Low or dead batteries	Replace batteries.
	Dirty battery contacts	Clean the battery contacts.
Velocity reading fluctuates unstable	Fluctuating flow	Reposition probe in less-turbulent flow.
Instrument Error message appears	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!

(This page intentionally left blank)

Appendix A

Specifications

Specifications are subject to change without notice.

Static/Differential Pressure:

Range¹: -15 to +15 in. H₂O (-28.0 to +28.0 mm Hg, -3735 to +3735 Pa)

Accuracy: ±1% of reading ±0.005 in. H₂O (±0.01 mm Hg, ±1 Pa)

Resolution: 0.001 in. H₂O (0.1 Pa, 0.01 mm Hg)

Velocity From a Pitot Tube:

Range²: 250 to 15500 ft/min (1.27 to 78.7 m/s)

Accuracy³: ±1.5% at 2000 ft/min (10.16 m/s)

Resolution: 1 ft/min (0.1 m/s)

Instrument Temperature Range:

Operating (Electronics): 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

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)

¹ Overpressure range = 7 psi (190 in. H₂O, 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.



Distributed by:
Kenelec Scientific Pty Ltd
1300 73 22 33
sales@kenelec.com.au
www.kenelec.com.au



Alnor Products, TSI Incorporated
Visit our website www.alnor.com for more information.

USA Tel: +1 800 874 2811
India Tel: +91 80 67877200
China Tel: +86 10 8219 7688
Singapore Tel: +65 6595 6388



Airflow Instruments, TSI Instruments Ltd.
Visit our website at
www.airflowinstruments.co.uk for more information.

UK Tel: +44 149 4 459200
France Tel: +33 491 11 87 64
Germany Tel: +49 241 523030