

OWNER'S MANUAL

Velometer® Series 6000



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USING THE VELOMETER SAFELY

All necessary precautions must be observed when operating the Velometer in the vicinity of moving equipment such as motors and blowers. The user must exercise care to ensure that the probe or the instrument does not interfere with any moving equipment.



CAUTION

The maximum temperature at which the Velometer can be used is 250°F (120°C). The maximum pressure difference between the inside of the instrument housing and ambient is 4.2 psi. (8.6 gm/cm²). The Velometer is **not** designed for gas mixtures other than air.

Any use beyond the operational temperature or pressure limits, or on gases which are either combustible or may deteriorate materials in the Velometer, is not recommended and is at the user's risk.



WARNING

Opening or otherwise attempting to service your Alnor instrument will void the warranty. Please read the warranty statement carefully.

GENERAL DESCRIPTION

The Alnor Velometer is a direct reading instrument for measuring air velocities. It is designed to measure velocities inside heating and ventilating ducts, or in open areas such as at fume hoods, grilles, diffusers, slots on ventilated plating tanks, and so forth. It may also be used for measuring duct static pressures.

The Velometer set consists of the meter, velocity and static pressure Range Selectors, measuring probes and connecting hoses.

The Velometer is basically an air flow meter reading in feet per minute (or meters per second).

The Velometer is built with a taut band meter movement; it is carefully balanced so that you may hold the meter in any normal position and still get an accurate reading. All Velometers are uniformly calibrated to factory standards: optimum accuracy is attained when velometers are used with accessories of the same set, and with the meter in the horizontal position (scale window facing up).

Before using the Velometer, study the operational instructions and procedures to insure proper use of the instrument for accurate results.

Meter

The meter receives air through its sensing ports. A force against the vane causes a deflection of the needle which yields an indicated reading.

On the face of the meter there is a series of range scales (A) which enables you to read accurately the measured value. Since there are a number of ranges, it is important that the scale read on the meter face corresponds to the velocity or static pressure range that is set on the Range Selector.

On the back side of the meter there are two sensing ports (hose connections) (B) which are for interconnecting to one of the two Range Selectors with hoses. One port is marked positive (+) and the other negative (-).

Sensing port caps are provided and you should place them over the sensing ports when the meter is not in use.

Check to see that the pointer is at zero each time the meter is put into service. The zero adjustment screw (C) enables you to make an adjustment. With the caps still on the ports, use a screwdriver to bring the pointer to zero. It should continue to read zero whether the meter is lying flat, standing upright or is at any position in between, including the position where one end of the scale is lower than the other.

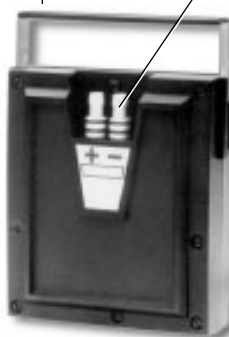


A Range Scales



C Zero Adjustment Screw

B Sensing Ports



Range Selector

The Range Selector (A) allows you to switch to one of two velocity ranges or a static pressure range by means of a switch plate (B).

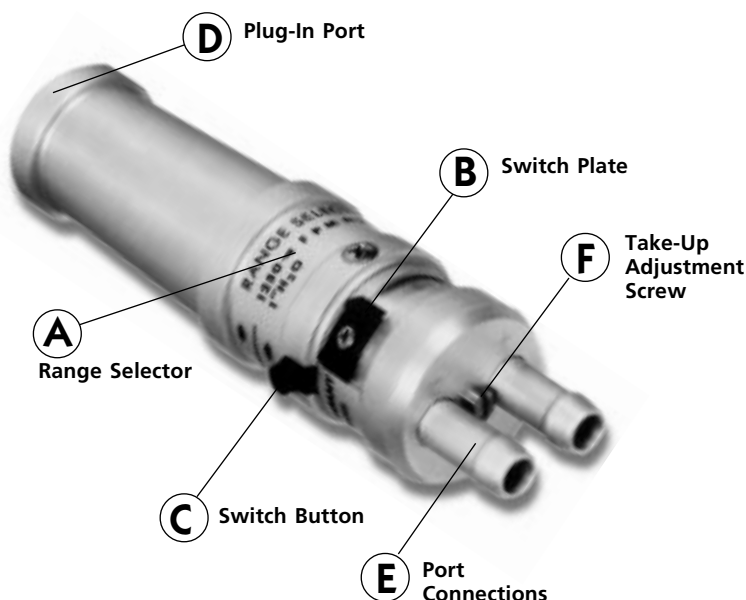
A switch button (C) is provided for changing the Velometer from use with a Pitot Probe to use with either a Diffuser Probe or a Static Pressure Probe.



CAUTION

When using the Pitot Probe, turn this button and allow it to spring out; when using either the Diffuser Probe or a Static Pressure Probe, push the button in and turn to lock it in position. In this position the switch button slot must be vertical (aligned with arrows on label) for proper instrument operation.

Do not block switch button during operation.



The Range Selector is provided with a plug-in port (D) which accepts the various probes and allows you to rotate them 360°. (+) and (-) ports (E) are provided for hose connections to the meter.

Depending on your model, your set will include one or two Range Selectors that are identified by red or black lettering. This color coding relates to the same colored scales on the meter.

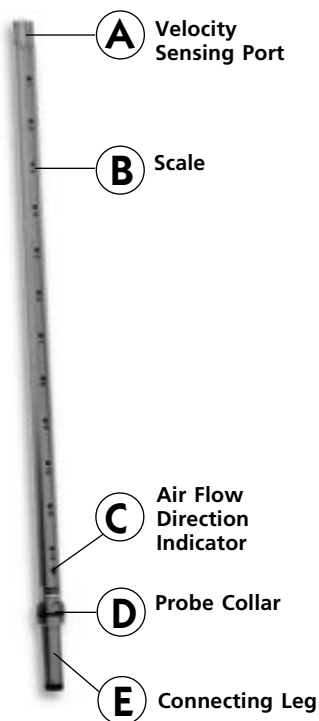
The Range Selector with the black lettering has the following ranges:

Velocity:	0 to 1250 feet per minute 0 to 2500 feet per minute
Static Pressure:	0 to 1 inches of water (6000AP set)

The Range Selector with red lettering has the following ranges:

Velocity:	0 to 5000 feet per minute 0 to 10,000 feet per minute
Static Pressure:	0 to 10 inches of water

A take-up adjustment screw **(F)** is provided for tightening the switch plate **(B)** which may work loose through normal wear. A noticeable effort to change the setting of the switch plate will indicate proper tightness.



Pitot Probe

The Pitot Probe is designed to measure the velocity of air in ducts and also in unrestricted areas such as air intakes at grinding/buffing wheels or ventilation slots at plating tanks. For the procedure to measure duct velocities see pages 13 and 14; for other applications see page 10.

The air intake (and discharge) for the probe is at **(A)**. The probe should be held at right angles to the air flow; an arrow at the base of the probe **(C)** should point in the direction of the air flow.

The probe is marked in one-inch increments **(B)** for convenience in positioning the probe inside ducts.

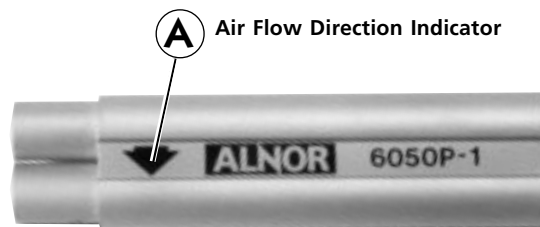
The probe collar **(D)** acts as a stop when inserting the probe into the Range Selector; an O-ring acts as a seal when the connecting leg is inserted into the Range Selector.

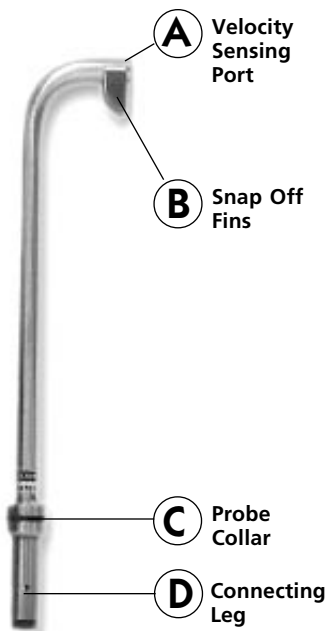
Lo-Flow Probe

The Lo-Flow Probe is designed for measuring velocities below 300 feet per minute in open spaces; it attaches directly to the meter without hoses.

An arrow **(A)** on the probe serves as a reminder of the direction you must orient the probe and the meter when taking measurements.

Refer to page 10 for the proper velocity measuring procedure.





Diffuser Probe

The Diffuser Probe is designed to measure the velocity at diffusers, registers and grilles. The *volume* of air being supplied or exhausted can be determined by multiplying the measured velocity times an air flow factor.* Refer to page 11 for proper diffuser, register and grille measuring procedures.

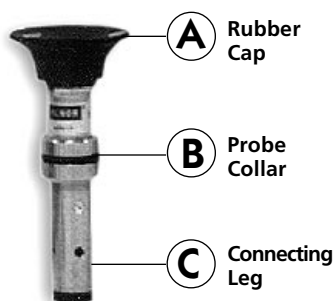
The velocity sensing port **(A)** senses the velocity at the diffuser, register, or grille.

The snap-off fins **(B)** allow you to accurately position the probe vertically, horizontally or radially.

The probe collar **(C)** acts as a stop when connecting the probe to the Range Selector, and the O-ring acts as a seal.

The connecting leg **(D)** is inserted into the Range Selector.

* Air flow factors, sometimes known as "K" factors, are generally available from the manufacturer of the grille or diffuser.



Static Pressure Probe

The Static Pressure Probe is designed for measuring duct static pressure.

The rubber cap **(A)** provides a seal around the 1/4" hole (in the duct) where measurements are to be taken.

The probe collar **(B)** acts as a stop when connecting the probe to the Range Selector; the O-ring acts as a seal.

The connecting leg **(C)** is inserted into the Range Selector.

Refer to page 8 for the proper static pressure measuring procedure.

PREPARATION FOR USE

Diffuser Probe

Step 1: Remove sensing port caps.

Step 2: Connect two hoses (C) to sensing ports (B).

Step 3: Select proper Range Selector (D).

Note: For velocities below 2500 feet per minute, use the Range Selector with black letters; for velocities above 2500 feet per minute, use the Range Selector with red letters.

Step 4: Connect Range Selector (D) to loose ends of hoses (C) that are already connected to the meter (A) as follows:

For Supply Measurements

Connect the plus (+) sensing port of the meter to the plus (+) sensing port of the Range Selector, and the minus (–) sensing port of the meter to the minus (–) sensing port of the Range Selector.

For Return and Exhaust Measurements

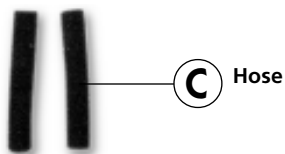
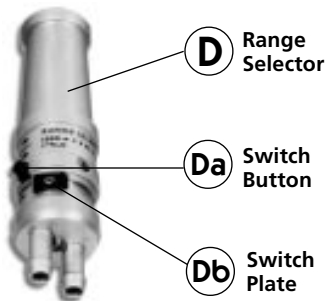
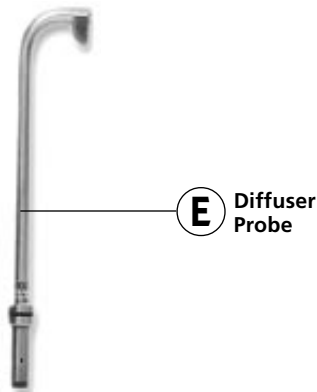
Connect the plus (+) sensing port of the meter to the minus (–) sensing port of the Range Selector, and the minus (–) sensing port of the meter to the plus (+) sensing port of the Range Selector.

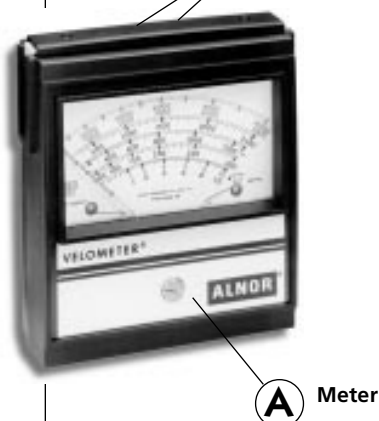
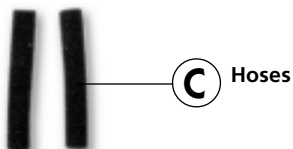
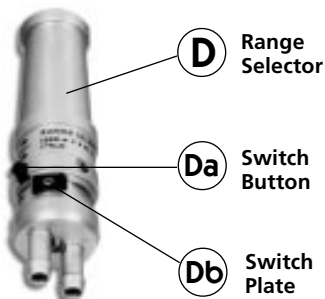
Step 5: Insert Diffuser Probe (E) into the Range Selector (D). Push the Diffuser Probe firmly down until the collar of the probe rests against the top of the Range Selector.

Step 6: Check position of switch button (Da) on Range Selector (D). It must be pushed in and turned to latch it in.

Step 7: Check position of switch plate (Db) on Range Selector (D). It must be positioned for the proper velocity range.

Step 8: Proceed to make necessary velocity measurements; see page 11 for procedures.





Static Pressure Probe

Step 1: Remove sensing port caps.

Step 2: Connect two hoses (C) to sensing ports (D).

Step 3: Select proper Range Selector (D).

Note: For 0–1" static pressures, use Range Selector with black letters; for 1–10" static pressures, use Range Selector with red letters.

Step 4: Connect the hoses to the Range Selector (D) as follows:

For Positive Pressure Measurements

Connect the plus (+) sensing port of the meter to the plus (+) sensing port of the Range Selector. Connect the minus (–) sensing port of the meter to the minus (–) sensing port of the Range Selector.

For Negative Pressure Measurements

Connect the plus (+) sensing port of the meter to the (–) sensing port of the Range Selector. Connect the minus (–) sensing port of the meter to the plus (+) sensing port of the Range Selector.

Step 5: Select the proper Static Pressure Probe (E)

Note: For 0–1" static pressures, use the Static Pressure Probe with black letters. For 1–10" static pressures, use the Static Pressure Probe with red letters.

Step 6: Insert the Static Pressure Probe (E) into the Range Selector (D). Push the probe firmly down until the collar of the probe rests against the top of the Range Selector.

Step 7: Check position of switch plate (Da) on the Range Selector (D). It must be pushed in and turned to lock it in position.

Step 8: Check position of switch plate (Db) on the Range Selector (D). It must be to the extreme left.

Step 9: Proceed to make duct static pressure measurements. See page 13 for proper procedure.



E Pitot Probe

Pitot Probe

Step 1: Remove sensing port caps.

Step 2: Connect two hoses **(C)** to sensing ports **(B)**.

Step 3: Select proper Range Selector **(D)**.

Note: For velocities below 2500 feet per minute, use the Range Selector with black letters; for velocities above 2500 feet per minute, use the Range Selector with red letters.

Step 4: Connect the hoses to the Range Selector **(D)** as follows: The plus (+) sensing port of the meter to the plus (+) sensing port of the Range Selector and the minus (–) sensing port of the meter to the minus (–) sensing port of the Range Selector.

Step 5: Insert the Pitot Probe **(E)** into the Range Selector **(D)**. Push the Pitot Probe firmly down until the collar of the probe rests against the top of the Range Selector.

Step 6: Check position of switch button **(Da)** on Range Selector **(D)**. It must be released and left in the out position.

Step 7: Check position of switch plate **(Db)** on Range Selector **(D)**. It must be positioned for the proper velocity range.

Step 8: Proceed to make necessary duct velocity measurements. See page 13 for proper procedures.



D Range Selector

Da Switch Button

Db Switch Plate



C Hoses

Lo-Flow Probe **F**



Lo-Flow Probe

Step 1: Remove sensing port caps.

Step 2: Connect the Lo-Flow Probe **(F)** directly to the meter **(A)** by placing it onto the sensing ports **(B)**; no hoses are required. It fits only one way onto the meter, with the arrow pointing to the left when viewing the meter from the front.

B Sensing Ports

Meter

A

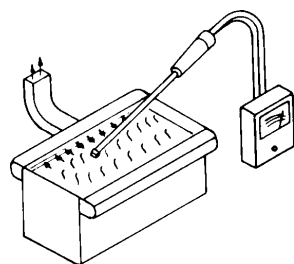
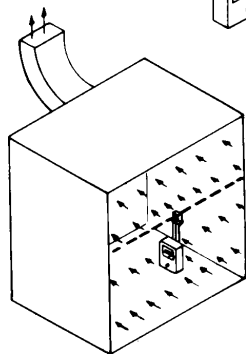
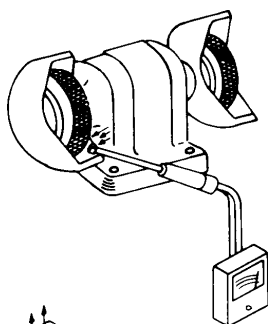


OPERATION

After assembling the correct probe to the Velometer as shown on pages 7–9 you are ready to take the necessary measurements. Below are some typical applications and cautions when using the various probes. When using the Velometer for measuring air velocity at conditions other than $.075 \text{ lbm/ft}^3$ refer to the correction chart on page 19 for maximum accuracy.

Procedure for Measuring Velocity with Lo-Flow Probe

1. Place the meter where you wish to measure the air flow. If you are holding it, keep it at arm's length and stand so you do not obstruct the flow of air past the meter.
2. Hold the meter so that the arrow on the probe points in the direction of air flow; if the direction is not known, turn the meter until you observe the maximum pointer deflection.
3. Read the air velocity on the 0 to 300 FPM scale.
4. Record the reading on an appropriate air balancing worksheet.



Velocities at Suction Openings—Except Diffusers or Grilles

At Grinding or Buffing Wheels:

When measuring velocities at grinding or buffing wheels, use the Pitot Probe or the Lo-Flow Probe. The head of the probe should be held in a plane defined by the outside edge of the hood.

At Spray Booths:

When measuring the velocity at spray booths, use the Lo-Flow Probe. The head of the probe should be placed in a plane defined by the outside edge of the spray booth.

Velocities at Plating Tanks:

To measure the velocity at plating tanks, use the Pitot Probe. The probe should be held close to the exhaust port of the tank, with the arrow on the probe pointing toward the exhaust port.

Procedure for Measuring Diffuser, Register and Grille Velocities with Diffuser Probe

To calculate the air *volume* passing through a diffuser, register or grille outlet, measure the velocity at the outlet, applying the air flow factor that is provided by the outlet manufacturer, and use the following equation:

$$Q = K \times V$$

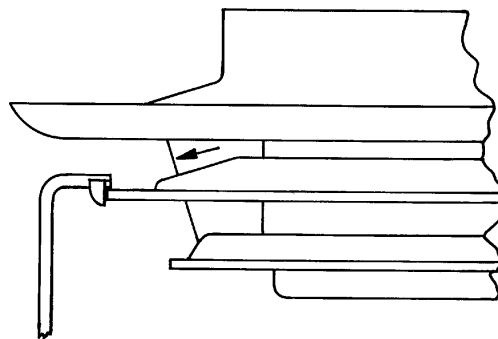
<u>Where</u>	<u>English Units</u>	<u>Metric Units</u>
Q = Volume flow rate	ft ³ /min	m ³ /s
K = Manufacturer's flow factor	—	—
V = Average measured velocity	ft/min	m/s

Instructions for positioning the Diffuser Probe at the outlet for measuring the velocity, as well as an appropriate flow factor, are available from the outlet manufacturer. Shown below is a typical example:

Typical Diffuser Air Flow Measuring Procedure

To determine the volume of air discharged, a Velometer with a Diffuser Probe may be used as shown below.

Note that the bottom of the positioning fins on the probe are level with (and touching) the bottom of the intermediate spinning of the diffuser. The probe is held vertically. The flow factors shown in the accompanying table are applied to an average of six velocity readings taken at equally spaced positions around the periphery of the diffuser.



Diffuser Size	Air Flow Factor
10	0.42
12	0.66
14	0.9
17	1.3
20	1.8
24	2.8
32	4.9
40	7.7

For maximum accuracy, observe the following precautions:

1. Use only the appropriate diffuser, register or grille manufacturer's measuring procedures.
2. Make a complete and accurate velocity reading.
3. Record the velocity measurements on a diffuser air balancing worksheet as shown.

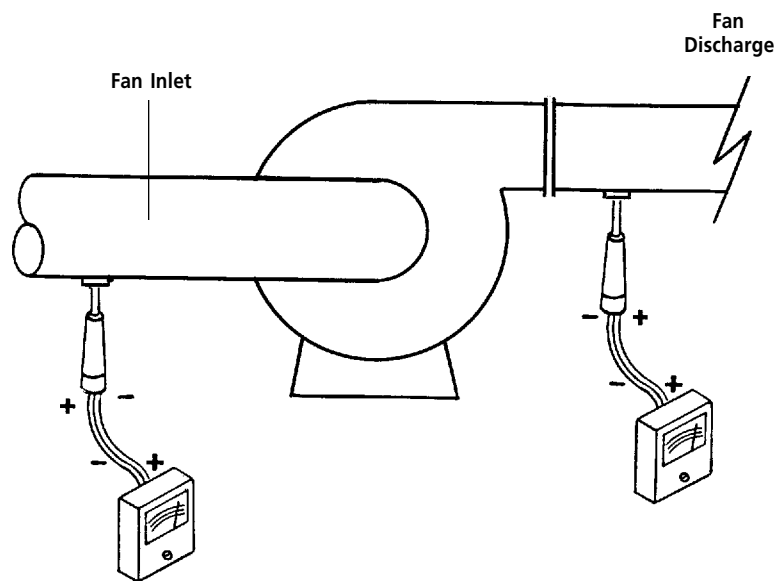
AIR BALANCING—DIFFUSER READINGS							
JOB NAME: THOREAU MFG. CO. SYSTEM: BLDG. 42							
1	2	3	4	5	6	7	8
ROOM LOCATION OR DIFFUSER NO.	SUPPLY OR RETURN MODEL SIZE	FLOW FACTORS OR NET CORE AREA Ft ²	DESIGN AIR FLOW CFM	DESIGN OUTLET VELOCITY FPM	MEASURED AVERAGE VELOCITY READING - FPM	MEASURED AIR FLOW CFM	REMARKS
	Grille						
A #18	12x8	.581	620	1067	1210	703	
A #19	14x12	.855	1100	1287	1350	1154	
A #20	12x8	.581	620	1067	1180	686	
A #21	12x8	.581	620	1067	1200	697	
A #22	14x12	.855	1100	1287	1340	1146	
A #23	12x8	.581	620	1067	1200	697	
B #24	12x10	.598	780	1304	1450	867	
B #25	12x10	.598	780	1304	1350	807	
A #26	12x8	.581	620	1067	1180	686	
A #27	14x12	.855	1100	1287	1300	1112	
A #28	12x8	.581	620	1067	1300	755	
A #29	12x8	.581	620	1067	1230	715	
A #30	14x12	.855	1100	1287	1380	1180	
A #31	12x8	.581	620	1067	1160	674	
B #32	12x10	.598	780	1304	1400	837	
B #33	12x10	.598	780	1304	1450	867	
	Sub-total		12480			13,583	

INSTRUMENT: ALNOR VELOMETER BY: FH

4. When the procedures instruct you to apply an average velocity reading, divide the opening into a number of equal areas and determine an average of single readings taken at the center of the equal areas.
5. When making a record of the measurements, include room location, outlet model, flow factor, design air volume if known, measured outlet velocity and calculated air volume.

Procedure for Measuring Static Pressure

1. Select the location for the static pressure reading and drill a 1/4" hole. You may wish to paint a circle around the hole and number it for future convenience.
2. Assemble the Velometer for positive (or negative) readings as described above.
3. Place the rubber cup of the probe firmly over the hole, and read the static pressure on the black or red "Inches of Water Gauge" scale.
4. Record the reading on an appropriate air balancing worksheet.



Procedure for Air Flow Measurement in Ducts

To calculate the air volume passing through a duct, measure the average velocity inside the duct, determine the cross-sectional area of the duct, and apply the following equation:

$$Q = A \times V$$

Where

Q = Volume flow rate

A = Cross-section area

V = Average duct velocity

English Units

ft³/min

ft²

ft/min

Metric Units

m³/s

m²

m/s

Determining Cross-Section Areas

The cross-section of the duct is based on the actual inside duct area through which air flows. If the duct is internally lined with insulation, the thickness of that insulation must be taken into consideration when calculating the duct area.

Example: 24" wide x 12" high duct with no internal insulation has a cross-section area of 2 square feet.

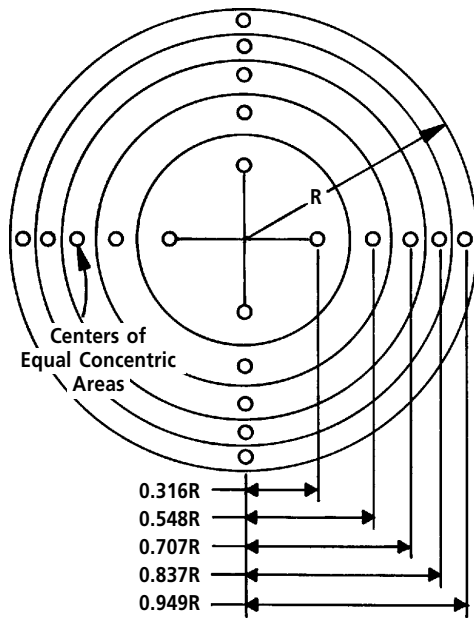
38" wide x 14" high duct with 1" internal insulation has a cross-section area of 3 square feet.

Measuring Duct Velocity

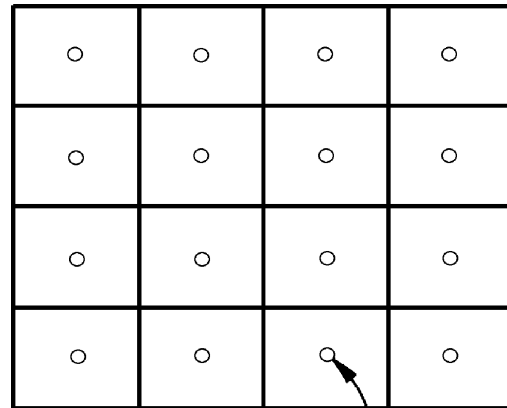
The velocity of an air stream in a duct is not uniform throughout the cross-section; air near the walls moves more slowly due to friction. Elbows, transitions and obstructions also cause variations in the velocity at any one cross-section.

To obtain the average velocity in ducts of 4" diameter or larger, drill a 1/2" diameter or larger hole in the duct and take a series of duct velocity readings (commonly referred to as a traverse) with the Pitot Probe at points of equal area across the duct. A formal pattern of sensing points is recommended and these points are referred to as traverse point readings. Shown are recommended velocity reading point locations for traversing round and square (or rectangular) ducts.

Note: Pitot Probe Stations Indicated By ○.



Round Duct Traverse Points



Square and Rectangular Duct Traverse Points

In round ducts, take velocity readings at the center of equal concentric areas; take at least 20 readings along two diameters. In square or rectangular ducts, take a minimum of 16 and a maximum of 64 readings at centers of equal areas. Calculate the average of all readings.

For maximum accuracy, observe the following precautions:

1. Perform the traverse in a section of the duct where the air stream is as uniform as practical. This is generally a location of eight or more duct diameters of straight duct upstream from the traverse location.
2. Do not take the traverse near a duct elbow, transition or obstruction.
3. Make a complete, careful and accurate traverse and record the results on a worksheet.

TROUBLESHOOTING AND MAINTENANCE

Troubleshooting Guide

Problem	Correction
Velometer not at zero (before use).	1. Velometer not adjusted. See zero adjustment method, page 3. 2. Assembled probe and meter accidentally reading pressure or airflow. Check adjustment with caps on sensing ports. 3. If Velometer does not remain at zero in all positions it should be returned to the factory for calibration.
Reading not the same from range to range.	1. Different probes being used. The same probe should be used on both ranges. 2. Wrong probe being used. See pages 7–9 for correct application. 3. Measurement technique is different. Hold probe in the same way, and at the same place in the air flow, on all ranges. 4. Different Range Selector in use. Be sure that both Range Selectors are in operating condition: O-rings not worn, filters clean. 5. Range Selector switch not in operating position. Switch plate must be at either extreme of its travel.
Readings are low.	1. Verify that the proper probe is being used. 2. Check for leaks in the O-rings on sensing ports, Range Selector and probe. Replace if necessary. 3. Filter in the Range Selector needs to be cleaned. 4. Wrong scale is being read, or Range Selector switch not set properly. 5. Hoses are not 24 in. long. Do not use hoses that are different (longer or shorter) than those originally provided with the Velometer.
No readings.	1. Air flow is being blocked by operator's hands. 2. Hand on the switch button of Range Selector. (See page 4.) 3. Hoses or probe not connected.
Negative readings.	1. Probe not being used properly. (See section of manual describing use of specific probes.) 2. Hose connections must be reversed, either at the Range Selector or at the meter.

Maintenance

General

Alnor Velometers require very little service except for replacement of O-ring gaskets and cleaning or replacing the filter elements in the Range Selectors. If any difficulties in the operation of the Velometer should develop, please contact Alnor Instrument Company. Do not return any instruments without written authorization from Alnor Instrument Company.

Cleaning of the Velometer

In case it is necessary to clean the exterior of the meter, use a damp cloth or a cloth moistened with alcohol and wipe the exterior carefully. Do not rub excessively. DO NOT USE CARBON TETRACHLORIDE.

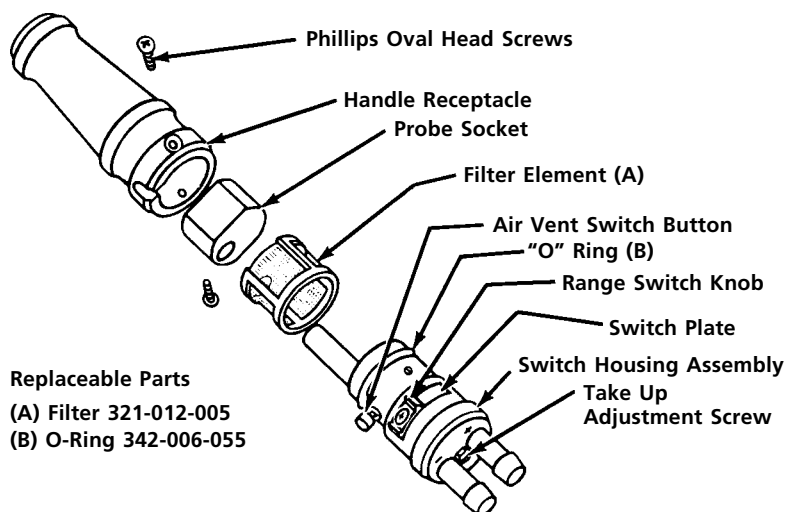
Replacement Parts and Accessories

In case additional parts are required to convert one Velometer set to another, or in case broken or damaged parts must be replaced, order the parts from the factory. All parts are interchangeable and no specific calibration of probes is required with any particular instrument; simply specify the Alnor number of the replacement part or accessory.

Replacement of Range Selector Filter

To replace the filter of the Range Selector, proceed as follows:

Remove the two Phillips Head screws on the collar above the Range Selector switch. Exert slight pressure to hold the upper and lower half of the Range Selector assembly together to permit easy withdrawal of the two screws. Carefully pull the upper and lower half of the Range Selector assembly apart.



Withdraw the filter Part Number 321-012-005. Carefully clean the filter element by means of a brush or vacuum cleaner, or wash it in luke-warm water with grit-free soap. In case the filter element is damaged, replace it. Before reassembling the Range Selector, carefully clean all parts.

To install the cleaned or replacement filter, slip the bore of the filter over the protruding nipple portion of the lower Range Selector part. Place the filter element onto the lower Range Selector part with the open end down. Then slip the probe socket over the protruding nipple portion. Carefully align all three outside diameters of the lower Range Selector part, the filter and the probe socket. Slip all three parts into the upper Range Selector housing so that the air vent switch button protruding from the lower Range Selector assembly aligns with the channel in the upper Range Selector assembly. Exert slight pressure when inserting the Phillips Head screw and lightly tighten both Phillips Head screws.

Replacement of O-Rings in Probes

To replace the O-ring in the probes remove the old O-ring by means of a hook-shaped tool, or by squeezing. Clean the O-ring groove before installing the new O-ring. Slip the new O-ring in place and apply a thin film of Silicone grease or lubricant on the outside of it. The O-ring Part Number 342-006-048 fits all Velometer probes.

Replacement of O-Rings on the Meter

Replace the O-rings of the meter connection ports first by removing the old O-rings using a hood or by squeezing; clean the grooves and then slip new O-rings Part Number 342-006-030 in place.

Calibration

Your Velometer should be returned to the factory for checking and/or calibration six months after first use, and thereafter at least once a year, depending on how it is used.

It should be carefully packed according to the return instructions on page 21.

Alnor Instrument Company
7555 N. Linder Avenue
Skokie, IL 60077
Attention: Service Department

SERVICE INFORMATION

Contact Alnor Instrument Company before returning your Alnor Instrument to the factory. See Instructions For Return. Follow the procedure carefully as it will expedite processing. Failure to follow the procedure will/may cause return of unit unrepaired. Send your instrument to the factory transportation prepaid. To assure fast turn-around time, fill out this form with as much detail as possible and attach it to the instrument.

Instrument Model _____

Serial Number _____

Date of Purchase _____

Where Purchased _____

Describe Malfunction _____

Describe Environment _____

Return Instrument to:

Name _____

(Your name or company)

Address _____

Telephone _____

Address Correspondence to:

Name _____

Address _____

Telephone _____

INSTRUCTIONS FOR RETURN

Damaged in Transit

All orders are carefully packed for shipment. On receipt, if the shipping container appears to have been damaged during shipment, the instrument should be thoroughly inspected. The delivering carrier's papers should be signed noting the apparent damage. **DO NOT DISCARD THE BOX.**

If the instrument itself has been damaged, a claim should be promptly filed against the carrier by the customer. The selling agent will assist the customer by supplying all pertinent shipping information; however, the claim must be filed by the insured.

If the instrument is damaged beyond use, a new order should be placed with Alnor while awaiting reimbursement from the carrier for the damaged instrument.

Call Alnor directly for assistance if necessary.

Service/Calibration

Contact the Service Department at Alnor if you require factory service of your Alnor instrument. The Service Department will provide you with the cost of service or calibration, Return Material Authorization (RMA) number, and shipping instructions.

Your service includes a Certificate of Traceability to National Institute of Standards and Technology (NIST, formerly NBS) with data (states instrument compared with factory standard traceable to NIST and lists of calibration data, i.e., "Standards reads..." and "This instrument reads...").

Obtain a Purchase Order from your Purchasing Department showing instrument model number and cost of service and/or calibration. Securely package your instrument in a strong container surrounded by at least two inches (5 cm) of suitable shock-absorbing material. Include the Purchase Order. Mark the outside of the shipping container with the RMA Control number.

Forward the instrument prepaid. See back cover for factory addresses.

Please note that instruments received improperly marked or without an accompanying Purchase Order may be returned at your expense. Please also note that if an RMA number has been assigned, it will be canceled if the instrument is not received by Alnor within 60 days.

OWNERSHIP/CALIBRATION LOG

Equipment Log

Date of Purchase _____

Calibration Record _____

1. _____ 2. _____ 3. _____

4. _____ 5. _____ 6. _____

7. _____ 8. _____ 9. _____

10. _____ 11. _____ 12. _____

Notes: _____

WARRANTY

Alnor Instrument Company (Alnor) warrants this product to be free of defects in material and workmanship for a period of two years from the date of original purchase. If the product should become defective during the warranty period, Alnor will repair it or elect to replace it free of charge under the following conditions:

1. Product is returned postpaid per the instructions for return, located in the owner's manual.
2. Owner submits proof of original date of purchase.
3. Alnor will inspect product for defects in material and workmanship. Alnor's decision as to existence of defect, and in the case of defect, to repair or replace will be final.

THIS WARRANTY IS EXCLUSIVE. THERE ARE NO OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED. SPECIFICALLY AND WITHOUT LIMITATION, THERE IS NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.

This warranty is void if product is misused, used contrary to procedures set forth in the owner's manual, or if product is serviced by anyone other than Alnor's authorized service. This warranty does not cover consumables such as light bulbs, paper, batteries, etc.

Alnor's liability for this product is limited to the above stated warranty and shall not in any event exceed the cost of the product. In no event will Alnor be liable for any direct or consequential damages, including but not limited to lost profits, loss of use, inaccuracies, loss of data, dismantling or reinstallation.