The Alnor Product Catalog

[2005–2006

indoor air measurement technology]

ALNOR®
TSI Incorporated

[Introduction

HVAC contractors, facility personnel, building engineers, safety officers, and industrial hygienists around the world use and trust Alnor® brand handheld instruments. Alnor Instrument Co. (originally called Illinois Testing Laboratories) began operation in 1919 in Chicago, Illinois, as a repair and service center for precision instrumentation.

Over the years, the Alnor product line has grown by responding to the need for key new products and technologies. Introduced in the 1930s and still widely used today, the Alnor Velometer® and the Velometer Jr.® began the long series of popular products. More recently introduced products, such as the Balometer® Capture Hoods, are standards of performance in HVAC testing and balancing. And in less than two decades the AirGard® series of alarms and monitors have become an industry leader in both new and retrofit lab hood monitor installations.

In 1995, the Alnor Instrument Company was acquired by TSI Incorporated. Today the long tradition of providing reliable, durable, affordable Alnor® brand instrumentation continues at the manufacturing, engineering, sales, and service facilities of TSI Incorporated in Shoreview, Minnesota.

TIME LINE

1919	Alnor launched in Chicago; Alnor Pyrometer marketed
1920	Crit Point Instrument acquired
1930	Price Instrument and Pyrometer Co. acquired
1934	Line of contraband detection products acquired
1936	Alnor Velometer introduced
1938	Velometer Jr. added
1940s	Dewpointer developed
1970	Company moves to Niles, IL; begins manufacturing electronic products
1978	Alnor acquired by Studsvik AB, Sweden
1980s	CompuFlow® Thermo-Anemometers introduced
1984	Balometer Capture Hood introduced
1985	Micromanometers developed
1987	AirGard Lab Hood Monitors launched
1990	Electronic Balometer marketed
1995	Alnor acquired by TSI Incorporated
1998	LoFlo Balometer added
1999	Hydronic Manometer developed; CompuFlow IAQ Meters introduced
2002	Micromanometer updated
2003	Electronic Balancing Tools EBT721/720
2004	Combustion Gas Analyzers introduced
2005	HM670/680 Hydronic Manometers

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[Capture Hoods

What is a capture hood?

A capture hood (flow measuring hood) is an instrument used to measure volumetric air flows from supply or exhaust diffusers and grilles. The Alnor version of the capture hood is called a Balometer. Most capture hoods include lightweight fabric hoods of sizes to match common terminals, a meter readout device mounted on a sturdy flow base, and a measuring manifold mounted in the base.

Capture hoods make fast, repeatable measurements. However, precision can be affected by HVAC system design. Factors to consider are the diffuser or register type, upstream disturbances (bends, vanes), resistance effects (reduction in duct area), physical properties of air, and the capture hood manifold.

Different sensing technologies have been used in capture hood design. These include thermo-anemometers, mechanical swinging vane anemometers, and differential pressure meters. Thermo-anemometers (LoFlo Balometer hoods) give excellent low-end sensitivity. Mechanical swinging vane anemometers (Alnor Standard Balometer and Balometer Jr. hoods) require no batteries or power source. Differential pressure meters provide excellent resolution (EBT721).

	LoFlo Balometer		Balometer JR.		Standard Balometer			EBT
Features	6200D	6200F	342	343	6461CFM	6463CFM	6465CFM	721
10-500 CFM (17-850 m^3/hr)	●	●						
0-1400 CFM (0-2400 m^3/hr)			●	●				
0-2000 CFM (0-3400 m^3/hr)					●	●	●	
25-2500 CFM (42-4250 m^3/hr)								●
Temperature (°F or °C)								●
Velocity, temperature or %RH probe								●
With 2' x 2' hood	●		●		●			●
With 2' x 2', 2' x 4', 1' x 4' hoods						●		●
With 2'x 2', 2' x 4', 1' x 4', 1' x 5', and 3' x 3' hoods							●	●
16" x 16" hood		●		●	●	●	●	
BSC Hood Kit								●
Deflecting vane anemometer (analog display)			●	●	●	●	●	
Pressure Sensor (manometer)								●
Thermo-anemometer sensor	●	●						
Inherently intrinsically safe			●	●	●	●	●	
Statistics (min., max., and avg.)								●
Data log (recall / download to a PC)								●
K-factor input or field calibration	●	●						●
Backlit LCD Display								●
Automatic Density Correction								●
Backpressure Compensation								●
Internal NiMH Battery Charging								●

● = Standard Feature
● = Optional accessory

2' x 2' (610 mm x 610 mm)
2' x 4' (610 mm x 1220 mm)
1' x 4' (305 mm x 1220 mm)
1' x 5' (305 mm x 1525 mm)

Standard Balometer® Capture Hood

By placing the Alnor Balometer Capture Hood over a diffuser or grille, you can measure air volume to balance buildings and verify air flow distribution. The easily observed trend values and fast meter response make the Standard Balometer hood the preferred instrument for test, balance, and commissioning firms.

model

	cfm	m³/h	l/s
model 6461	6461cfm	6461cmh	6461lps
model 6463	6463cfm	6463cmh	6463lps
model 6465	6465cfm	6465cmh	6465lps

Note: model 6461 includes 2 ft. x 2 ft. (610 mm x 610 mm) hood
model 6463 includes 6461 plus 2 ft. x 4 ft. (610 mm x 1220 mm) and 1 ft. x 4 ft. (305 mm x 1220 mm) hoods
model 6465 includes 6463 plus 3 ft. x 3 ft. (915 mm x 915 mm) and 1 ft. x 5 ft. (305 mm x 1525 mm) hoods

specifications

range		0–2000 cfm (0–3400 m³/h, 0–950 l/s)
resolution	VOLUME	5 cfm from 25–250 cfm (10 m³/h from 50–400 m³/h, 5 l/s from 10–120 l/s) 10 cfm from 100–500 cfm (10 m³/h from 200–400 m³/h, 5 l/s from 50–240 l/s) 20 cfm from 400–1000 cfm (25 m³/h from 700–1700 m³/h, 10 l/s from 200–475 l/s) 50 cfm from 800–2000 cfm (50 m³/h from 1400–3400 m³/h, 25 l/s from 400–950 l/s)
accuracy	SUPPLY	±3% of full scale, except ± 20 cfm on 250 cfm scale (± 35 cmh on 400 cmh scale) (± 10 l/s on 120 l/s scale)
	EXHAUST	±3% of full scale, except ± 20 cfm on 250 cfm scale (± 35 cmh on 400 cmh scale) (± 10 l/s on 120 l/s scale)
display		precision-balanced analog meter movement
instrument weight and height		9.8 lb (4.5 kg) with 2 ft x 2 ft (610 mm x 610 mm) hood attached, 40 in. (1017 mm) tall

LoFlo Balometer® Capture Hood

The LoFlo Balometer Capture Hood is the ideal way to measure very low volumetric flow. You can measure confidently and accurately from 10 to 500 cfm (17 to 850 m³/h). This lightweight instrument is great for residential or light commercial use.

2 ft. x 2 ft. (610 mm x 610 mm) hood is easy to use and is an industry standard

simulated analog display shows air trends and gives digital readings

model

6200D	6200F	6200E
with 2 ft x 2 ft (610 mm x 610 mm) hood	with 16 in. x 16 in. (406 mm x 406 mm) hood	base only metric

specifications

range		10–500 cfm (17–850 m³/h, 4.7–236 l/s)
resolution	VOLUME	1 cfm from 10–500 cfm (1 m³/h from 17–850 m³/h, 0.1 l/s from 4.7–9.9 l/s, 1 l/s from 10–236 l/s)
accuracy	SUPPLY EXHAUST	±3% of reading +5 cfm, or (+8.5 m³/h, +2.4 l/s) ±3% of reading +5 cfm, or (+8.5 m³/h, +2.4 l/s)
display		3-digit, 0.44 in. (11 mm) high, digital display with 26-segment simulated analog display
instrument weight and height		6.5 lb (3 kg) with 2 ft x 2 ft (610 mm x 610 mm) hood attached, 34.5 in. (876mm) tall
batteries		four C-size alkaline; minimum 10 hours continuous use

[Balometer® Jr. Capture Hood

The size of Alnor's Balometer Jr. Capture Hood is ideal for tight spaces, such as above office cubicles and in restrooms. This instrument stands only 21-in. (533-mm) high with the smaller hood. Moreover, it uses the same swinging vane technology as Alnor's Standard Balometer hood.

16 in. x 16 in. (460 mm x 460 mm) hood for use in confined spaces

model

	cfm	m³/h	l/s
with 2 ft x 2 ft (610 mm x 610 mm) hood	342	352	332
with 16 in. x 16 in. (406 mm x 406 mm) hood	343	353	333

specifications

range		0–1400 cfm (0–2400 m³/h, 0–660 l/s)
resolution	VOLUME	10 cfm from 0–200 cfm (20 m³/h from 0–340 m³/h, 5 l/s from 0–95 l/s) 20 cfm from 100–600 cfm (50 m³/h from 200–1000 m³/h, 10 l/s from 50–290 l/s) 50 cfm from 400–1400 cfm (100 m³/h from 800–2400 m³/h, 20 l/s from 200–660 l/s)
accuracy	SUPPLY EXHAUST	±5% of full scale ±5% of full scale
display		precision-balanced analog meter movement
instrument weight and height		6.9 lb (3.1 kg) with 2 ft x 2 ft (610 mm x 610 mm) hood attached, 34 in. (864mm) tall

Electronic Balancing Tool–EBT721

The EBT721 Balometer Electronic Balancing Tool features a detachable multipurpose digital manometer that can be used with a variety of common test and balance tools, such as pitot, air flow, temperature, relative humidity probes or a 16-point Velocity Matrix. It will become the tool of choice for contractors and facilities personnel because of its ergonomic design and extremely light weight.

CompuDat™ software to download data to PC

EBT721

detachable manometer can be used with optional probes

hood and base weigh only 7.5 lbs

model

model number	description
EBT721-A1	2 ft. x 2 ft. (610 mm x 610 mm) air capture hood/frame/base, manometer, 4-AA size rechargeable NiMH batteries, external battery charger, AC adaptor, 18-in. (457 mm) pitot probe, 2 static pressure probes, 16-ft. (4.9 m) Norprene® tubing, wheeled luggage style carrying case, NIST-traceable calibration certificate, CompuDat™ PC downloading software, and manual.
EBT721-X1	-A1 plus 16-point Velocity Matrix with telescoping handle
EBT721-O1	-X1 plus Temperature Probe
EBT721-Z1	-O1 plus Relative Humidity/Temperature probe, Air Flow Probe
Note:	For EBT720 or 721 with European AC adapter, change to –A2, -X2, -02, -Z2 For EBT720 or 721 with UK AC adapter, change to –A3, -X3, -03, -Z3 For EBT720 or 721 with Australian AC adapter, change to –A4, -X4, -04, -Z4

accessories

Alnor® EBT720 and EBT721

Velocity matrix	part # 801090	12 in. pitot probe	part # 634-634-000
Air flow probe	part # 800187	18 in. pitot probe	part # 634-634-001
Temperature probe	part # 800188	24 in. pitot probe	part # 634-634-002
Temp/Humidity probe	part # 800189	36 in. pitot probe	part # 634-634-003
		60 in. pitot probe	part # 634-634-005

Bio-Safety Cabinet Hood Kits

8-in. x 24-in. (203 mm x 610 mm) hood	part # 801050
10-in. x 24-in. (254 mm x 610 mm) hood	part # 801051

Electronic Balancing Tool–EBT720

The new Alnor EBT720 is one of the most advanced, versatile, and easy-to-use air balancing tools on the market today. With a variety of best-in-class probes, it will become the everyday tool of test and balance technicians.

model

model number	description
EBT720-A1	Manometer with carrying case, 4-AA size rechargeable NiMH batteries, external battery charger, AC adaptor, 18-in. (457 mm) pitot probe, 2 static pressure probes, 16-ft. (4.9 m) Norprene® tubing, CompuDat™ PC downloading software, NIST-traceable calibration certificate, and manual.
EBT720-X1	-A1 plus 16-point Velocity Matrix with telescoping handle
EBT720-O1	-X1 plus Temperature Probe
EBT720-Z1	-O1 plus Relative Humidity/Temperature probe, Air Flow Probe

Note: For EBT720 or 721 with European AC adapter, change to –A2, -X2, -02, -Z2
For EBT720 or 721 with UK AC adapter, change to –A3, -X3, -03, -Z3
For EBT720 or 721 with Australian AC adapter, change to –A4, -X4, -04, -Z4

Alnor® EBT720 and EBT721

specifications

range	DIFFERENTIAL PRESSURE	±15 in. H_2O, (3735 Pa) 150 in. H_2O maximum safe operating pressure
	ABSOLUTE PRESSURE	15–40 in. Hg (356 to 1016 Hg)
	VELOCITY	25–8,000 ft/min (0.125–40 m/s) pitot probes; 25–5,000 ft/min (0.125–25 m/s) air flow probe; 25–2,500 ft/min (0.125–12.5 m/s) velocity matrix;
	VOLUME	25–2,500 ft^3/m (42–4250 m^3/h) capture hood
	RH	0–95% RH (optional probe)
	TEMPERATURE	-40 to 250°F (-40–121°C) probe dependent
resolution	PRESSURE	0.00001 in. H_2O (0.001 Pa) Static & Differential Pressure 0.001 in. Hg (1 mm Hg) Absolute Pressure
	VELOCITY	0.1 ft/min (0.1 m/s)
	VOLUME	0.1 ft^3/min (0.1 m^3/h)
	RH	0.1% RH
	TEMPERATURE	0.1 °F (0.1°C)
accuracy	PRESSURE	±2% of reading ±0.001 in. H_2O, (0.025 mm H_2O; ±2% of reading ±0.001 in. Hg) Absolute
	VELOCITY	±3% of reading ±7 ft/min (0.04 m/s) 25–8,000 ft/min (all velocity probes) > 50 ft/min
	VOLUME	±3% of reading ±7 ft^3 /min 25–2,500 ft^3/min > 50 ft/min
	RH	±3% RH
	TEMPERATURE	±0.5°F (0.3°C) from 32–160°F (0–71°C) typically ±1.0°F (0.6°C) from -40–32°F (-40–0°C) and from 160 to 250°F (71–121°C)
units	PRESSURE	in. H_2O, Pa, mm Hg, in. Hg
	VELOCITY	ft/min, m/s, m/h
	VOLUME	ft^3/min, m^3/h, m^3/m, l/s
	TEMPERATURE	°F, °C

[Air Velocity Measurement Techniques from Alnor

Thermo-Anemometer—A heated element is placed in an air stream and as air velocity increases, the element loses heat. Circuitry compensates for this loss by applying more power to maintain the initial temperature. The power difference is translated into a velocity reading.

Rotating Vane Anemometer—Low friction bearings allow fan blades to rotate at speeds directly proportional to true air flow. Electronic models available.

Swinging Vane Anemometer—With this mechanical instrument, velocity pressure deflects a vane connected to a needle. Movement displays velocity or pressure readings on an analog scale. Calibration to a reference standard is achieved by regulating the air flow passing through the instrument.

Pitot Probe/Manometer—Pitot probe ports are connected across differential inputs of a manometer which measures pressure.

	CompuFlow Thermo-Anemometers (CF)				9800 Series Thermo-Anemometers		Rotating Vane Anemometers		Velometers (deflecting vane)	Velometer Jr.	Micromanometers		Electronic Balancing Tool	CompuFlow CO_2 Meters (CF)		CompuFlow Thermo-Hygrometers (CF)	
	8585	8586	8570	8571	9870	9880	RVA+	RVD	6000AP	8100 Series	AXD540	AXD560	EBT720	8610	8650	8612	8652
Static Pressure (air)									●		●	●	●				
Differential Pressure (air)											●	●	●				
Air Velocity	●	●	●	●	●	●	●	●	●	●	●*	●*	●				
Temperature (˚F or ˚C)	●	●	●	●	●		●	●					●		●	●	●
Flowrate (air volume)	●	●	●	●			●	●				●	●				
Relative Humidity	●	●											●		●	●	●
Carbon Dioxide														●	●		
Density Correction	●	●										●	●		●		●
Data Logging (download/recall)	●	●						●				●	●		●		●
Telescopic / Straight Probe		●		●	●												
Telescopic / Articulated Probe	●		●														
Variable Time Constant	●	●	●	●	●	●		●			●	●					
Field Calibration	●	●	●	●				●			●	●	●	●	●	●	●
Intrinsically Safe						●			●	●							
Output to Printer	●	●	●	●				●			●	●	●		●		●
Statistics (min, max, avg)	●	●	●	●			●	●			●	●	●	●	●	●	●
% of Outside Air Calculation															●		●

● = Standard Feature ●* = with optional pitot probe and hoses ● = Optional accessory

[CompuFlow® 8585 and 8586 Thermo-Anemometers

These advanced thermo-anemometers measure velocity, volume, temperature, humidity, dew point, and wet bulb. They store more than 1500 readings and log data at various intervals between two seconds and one hour. The model 8585 also can print in real-time to an Alnor MicroPrinter and download stored data to a computer using CompuDAT™ software (included). The model 8585 has a 42-in. (1070 mm) telescopic articulating probe and the Model 8586 has a 42-in. (1070 mm) telescopic straight probe.

8585

recall your minimum, maximum, and average readings

model

CF8585 CF8585M (metric)	CF8586 CF8586M (metric)
CompuFlow 8585 Articulated probe	CompuFlow 8586 Straight probe

specifications

range	VELOCITY	20–9999 fpm (0.1–50 m/s)
	VOLUME	actual range is a function of maximum velocity and duct size
	TEMPERATURE	0–140°F (-17.8–60°C)
	HUMIDITY	0–95% RH
resolution	VELOCITY	1 fpm (0.01 m/s), 5 fpm above 500 fpm (0.05 m/s above 5.00 m/s)
	TEMPERATURE	0.1°F (0.1°C)
	HUMIDITY	0.1% RH
accuracy	VELOCITY	±3% of reading or ±3 fpm (0.015 m/s), whichever is greater
	VOLUME	±3% of reading
	TEMPERATURE	±0.5°F (0.3°C)
	HUMIDITY	±3% RH
display		4-digit LCD with backlight
instrument weight		1.9 lb (0.86 kg)
batteries		four C-size; average 24 hours continuous use

[CompuFlow® 8570 and 8571 Thermo-Anemometers

An easy-to-use velocity, volume, and temperature instrument, the model 8570 takes readings quickly and can average them automatically. This versatile, accurate instrument comes with a standard 42-inch (1070-mm) articulated probe. The model 8571 has a 42-inch (1070-mm) telescopic straight probe.

8570

see your average readings with the push of a button

articulated 42-in. (1070-mm) probe allows easy velocity measurements

model

CF8570 CF8570M (metric)	CF8571 CF8571M (metric)
CompuFlow 8570 Articulated probe	CompuFlow 8571 Straight probe

specifications

range	VELOCITY VOLUME TEMPERATURE	20–9999 fpm (0.1–50 m/s) actual range is function of maximum velocity and duct size 0–200°F (-17.8–93.3°C)
resolution	VELOCITY TEMPERATURE	1 fpm (0.01 m/s), 5 fpm above 500 fpm (0.05 m/s above 5.00 m/s) 0.1°F (0.1°C)
accuracy	VELOCITY VOLUME TEMPERATURE	±3% of reading or ±3 fpm (0.015 m/s), whichever is greater ±3% of reading ±0.5°F (0.3°C)
display		4-digit LCD with backlight
instrument weight		1.9 lb (0.86 kg)
batteries		four C-size; average 24 hours continuous use

[Series 9800 Thermo-Anemometers

These pocket-sized meters require minimal training. Technicians will find them ideal instruments for face velocity measurements in fume hoods, spray booths, and ventilation systems or for IAQ checks. The model 9880 has a 3.1-inch (79-mm) retractable, 180-degree rotating probe and is UL-listed for intrinsic safety. The model 9870 incorporates a 37-inch (940-mm) attached telescoping probe.

9870

9880

model

U.S.	9870D	9880D
metric	9870E	9880E

specifications

		9870	9880
range	VELOCITY	0–4000 fpm (0–20 m/s)	0–2000 fpm (0–10 m/s)
	TEMPERATURE	0–200°F (-17.8–93.3°C)	NA
resolution	VELOCITY	1 fpm (0.01 m/s)	1 fpm (0.01 m/s)
	TEMPERATURE	1°F (1°C)	NA
accuracy	VELOCITY	±5% of reading or ±5 fpm (0.025 m/s), whichever is greater	±5% of reading or ±5 fpm (0.025 m/s), whichever is greater
	TEMPERATURE	±1°F (1°C)	NA
display		4-digit, 0.4 in. (10 mm) high LCD	4-digit, 0.4 in. (10 mm) high LCD
batteries		four AA-size alkaline; minimum 10 hr at 100 fpm (0.5 m/s)	four AA-size alkaline; minimum 10 hr at 100 fpm (0.5 m/s)

RVD and RVA+ Rotating Vane Anemometers

Rotating vane instruments measure true air velocity and do not require density correction factors to be applied to readings. RVA+ users can achieve area-averaged flow by pushing the single side button and "sweeping" or traversing the area being measured. The RVD provides extended reach, data logging, recall and downloading capabilities.

RVD

RVA+

model

RVD RVA+

specifications

		RVD*	RVA+
range	VELOCITY	50–6000 fpm (0.25–30 m/s)	50–6000 fpm (0.25–30 m/s)
	VOLUME	0–2600 x 1000 cfm (0–4360 x 1000 m^3/hr, 0–1230 x 1000 l/s)	4–5400 x 1000 cfm (6.8–9174 x 1000 m^3/hr, 1.9–2548 x 1000 l/s)
	AREA	0.007–434 ft^2 (0.0001–40 m^2)	0.08–900 ft^2 (0.007–83.6 m^2)
	TEMP.	32–140°F (0–60°C)	32–140°F (0–60°C)
resolution	VELOCITY	1 fpm (0.01 m/s)	1 fpm (0.001 m/s under 10.00 m/s, 0.01 m/s otherwise)
	TEMP.	0.1°F (0.1°C)	1°F (1°C)
accuracy	VELOCITY	±1% of reading or ±3 fpm (±0.015 m/s), whichever is greater	± 1% of reading +4 fpm (0.02 m/s)
	TEMP.	±1.0°F (±0.5°C)	±2°F (±1°C)
display		4-digit, 0.6 in. (15 mm) high LCD	4-digit, 0.45 in. (11 mm) high LCD with 2.5-digit, 0.15 in. (4 mm) high temperature indicator
instrument weight		1.5 lb (0.68 kg)	0.82 lb (0.37 kg)
batteries		four AA-size alkaline or optional AC adapter; approx. 24 hours continuous use	four AA-size alkaline or NiCd; approx. 24 hours continuous use

Velometer® 6000AP and Velometer Jr.® 8100 Series Anemometers

Contractors, balancers, plant engineers, and industrial hygienists have preferred Alnor Velometer instruments for decades. They are used for HVAC balancing, static pressure measurements, energy audits, and more. Using a swinging vane technique, these instruments do not require a power source or batteries.

6000AP

measures accurately in any position

includes accessories for diffusers, ducts and low flow readings

features seven different analog scales

Velometer Jr. 8100 Series

fits in the palm of your hand

model

U.S.	6000AP	8100-8 0–200, 0–800 fpm	8100A-16 0–400, 0–1600 fpm	8100B-25 0–500, 0–2500 fpm
metric	6000APM Velometer	8100C 0–1.0, 0–4.0 m/s Velometer Jr.	8100D 0–2.0, 0–8.0 m/s Velometer Jr.	8100E 0–2.5, 0–12.5 m/s Velometer Jr.

specifications

		Velometer 6000AP/APM	Velometer Jr.
range	VELOCITY	0–300, 1250, 2500, 5000, 10,000 fpm (0–1.5, 6.25, 12.5, 25, 50 m/s)	0–200, 800 fpm or 0–400, 1600 fpm or 0–500, 2500 fpm (0–1.0, 4.0 m/s or 0–2.0, 8.0 m/s or 0–2.5, 12.5 m/s)
	STATIC PRESSURE	0–1 in., 0–10 in. H_2O (0–25 mm, 0–250 mm H_2O)	NA
accuracy	VELOCITY	±2% of full scale, all ranges	±5% of full scale
	STATIC PRESSURE	±5% of full scale, all ranges	NA
instrument weight		1.75 lb (0.8 kg)	0.5 lb (0.24 kg)

[AXD560 and AXD540 Micromanometers

Alnor Micromanometers are rugged, compact, easy-to-use instruments. The AXD540 Micromanometer is useful for any contractor or facilities engineer needing to measure pressure or velocity in general industrial applications. The AXD560 can be used in multiple situations to measure static or differential pressure, volume, and velocity. It offers excellent resolution and stores up to 1000 pressure, volume, and velocity readings that can be downloaded to a computer.

AXD560

*meter shown with optional accessory probe and hoses

AXD540

model

AXD560	AXD540
AXD560M (metric)	AXD540M (metric)
AXD 560 meter only	AXD 540 meter only

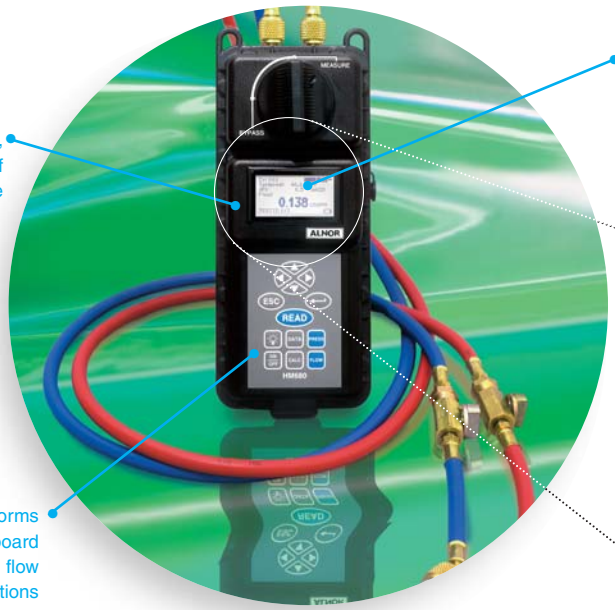
specifications

		AXD 560	AXD 540
range	PRESSURE	-5–15 in. H_2O (-1245–3735 Pa)	-5–15 in. H_2O (-1245–3735 Pa)
	VELOCITY	250–15,500 ft/min (1.27–78.7 m/s)	250–15,500 ft/min (1.27–78.7 m/s)
	VOLUME	up to 9,999,000 ft^3/m, m^3/h, l/s	NA
resolution		0.0005 in. H_2O (0.1 Pa)	0.001 in. H_2O (1 Pa)
accuracy	PRESSURE	±1% of reading ±0.005 in. H_2O (±1% of reading ±1 Pa)	±1% of reading ±0.005 in. H_2O (±1% of reading ±1 Pa)
	VELOCITY	±1.5% of reading at 2000 ft/min (10.16 m/s)	±1.5% of reading at 2000 ft/min (10.16 m/s)
	VOLUME	depends on velocity	NA
display		4 digits, 0.6 inches (15 mm) high	4 digits, 0.6 inches (15 mm) high
instrument weight		0.72 lb (0.33 kg)	0.72 lb (0.33 kg)
batteries		four AA-size alkaline cells 40 hours continuous use	four AA-size alkaline cells 40 hours continuous use

[HM670/680 Hydronic Manometers

The HM670 and HM680 are used to balance hydronic heating and cooling systems and to check pump performance. Both models can measure and display differential, high side, and low side pressures simultaneously without having to change hose connections or instrument valve settings. Both models feature a backlit display and operate on four alkaline or NiMH rechargeable batteries.

The HM680 can also display volumetric flow when a Cv (Kv) factor is programmed. Up to 100 Cv (Kv) factors can be entered. In addition, the HM680 can calculate brake power, heat flow, Cv (Kv) factors, and impeller sizing. Up to 1000 data points can be stored to memory for later recall or downloaded to a PC using this USB interface.



model

HM670	HM670M	HM680	HM680M	HMFIT
HM670 kit*	metric European and International Kit	HM680 kit**	metric European and International Kit	36 piece accessory kit

* HM670 kit: Includes hard carrying case, (2) 6.7-ft x ¼-inch (2-m x 6 mm) hoses with shut-off valves, (2) B&G readout probes, (2) P/T gauge adapter probes, and power cord.

**HM680 kit: Includes all items in the HM670 kit plus a temperature probe, downloading software, and USB interface cable.

specifications

	HM670/HM680
range	0–250 psi (0–1725 kPa)
resolution	0.001 psi from 0.000–9.999 psi (0.01 kPa from 0.00–99.99 kPa) 0.01 psi from 10.00–99.99 psi (0.1 kPa from 100.0–999.9 kPa) 0.1 psi from 100.0–250.0 psi (1 kPa from 1000–1725 kPa)
accuracy	±2% of reading
display	dot matrix LCD with backlight
instrument weight	2.65 lb (1.20 kg)
batteries	four AA-size alkaline or NiMH; minimum 12 hours continuous use

Alnor® Combustion Gas Analyzers (CGA)

These affordable, reliable tools supply real-time data for tuning and preventive maintenance monitoring of burners on furnaces, boilers and other heating appliances. Factory-calibrated sensors provide easy field replacement in just minutes.

Series CGA-810
Combustion Analyzers

CGA-823
Combustion Analyzer

CGA-801
Carbon Monoxide Analyzer

Also Available CGA-812-OH
Oil Heat Combustion Analyzer Kit with Soot Pump

- Models available to measure O_2, CO, NO, NOx, CO_2, efficiency, draft pressure, differential pressure and temperature (stack and ambient).
- Automatic O_2, baseline and auto zeroing of sensors.
- Factory-calibrated sensors are available for easy field replacement in just minutes. No calibration gas required on initial installation

	Model	Carbon Monoxide (CO)	Oxygen (O_2)	Nitric Oxide (NO)	NO_X	Carbon Dioxide* (CO_2)	Ambient and Stack Temperatures	Draft Pressure	Efficiency (Loss) (qA), Excess Air (λ)	CO/CO_2 Index & CO Air Free	Battery Life (hrs)	AC Power	Field Replaceable Sensors	Field Calibration	Water Trap with Rinseable Filter	Water-Stop Filter	Data Storage/Review/Print (Qty)	Factory-Default Fuels	User-Defined Fuels	Hard Case	Smoke Pump (1702076)
	CGA-801	●									12		●	●		●				●	
Series CGA-810	CGA-811	●						●			12	○	●	●	●		20			●	
Series CGA-810	CGA-812		●			●	●		●		12	○	●	●	●		20	7	1	●	
Series CGA-810	CGA-812-OH		●			●	●		●		12	○	●	●	●		20	7	1	●	●
Series CGA-810	CGA-813	●	●			●	●		●	●	12	○	●	●	●		20	7	1	●	
Series CGA-810	CGA-814	●	●			●	●	●	●	●	12	○	●	●	●		20	7	1	●	
	CGA-823**	H	●	●	●	●	●	●	●	●	24	●	●	●	●		100	7	1	●	

*=Calculated from fuel type and O_2 **H**=Hydrogen compensated ○=Optional
**Custom length probe/hose assemblies available.

specifications

Alnor® Combustion Gas Analyzers

		CGA-823	Series CGA-810	CGA-801
sensors				
Oxygen (O_2)*	RANGE	0–25%	0–25%	
	RESOLUTION	0.1% O_2	0.1% O_2	
Carbon Monoxide (CO)*	RANGE	0–5,000 ppm	0–2,000 ppm	0–2,000 ppm
	RESOLUTION	1 ppm	1 ppm	1 ppm
Nitric Oxide	RANGE	0–4,000 ppm		
	RESOLUTION	1 ppm		
Flue Gas Temperature Probe	RESOLUTION	1°F (1°C)	1°F (1°C)	
	CONTINUOUS	1,800°F (1,000°C)	1,800°F (1,000°C)	
general data	DIMENSIONS	6 x 10 x 2.5 in. (15 x 25.4 x 6.4 cm)	4.5 x 7.5 x 2.5 in. (11.4 x 19.1 x 6.4 cm)	4.5 x 7.5 x 2.5 in. (11.4 x 19.1 x 6.4 cm)
	WEIGHT	2.5 lbs/3.2 lbs with probe (1.12/1.44 kg)	1.2 lbs/1.4 lbs with probe (0.54/0/64 kg)	1.2 lbs/1.4 lbs with probe (0.54/0/64 kg)
	DISPLAY	LCD	LCD	LCD
	POWER	four C-size alkaline batteries	four AA-size alkaline batteries	four AA-size alkaline batteries
	BATTERY LIFE	>24 hours with pump on	>12 hours with pump on	>12 hours with pump on

*Electrochemical Sensors

[CompuFlow® 8652 and 8612 Thermo-Hygrometers

Alnor 8652 and 8612 Thermo-Hygrometers are ideal for measuring temperature, humidity, and dew point. Both include a probe with coiled cable to allow for measurements in hard-to-reach areas such as heating and cooling ducts. They are excellent tools for testing humidity and temperature factors in IAQ studies, manufacturing processes, and storage facilities. The model 8612 is a base model that displays average readings along with maximum and minimum values. The model 8652 offers data storage of up to 1000 readings, printing, and data downloading capabilities. The user can use temperature readings to calculate percent of outside air to determine the amount of fresh air entering the building. The model 8652 includes CompuDat™ software and interface cable for downloading to a PC.

8652

8612

model

CF8652 CF8652M (metric)	CF8612 CF8612M (metric)	2917026
CompuFlow 8652	CompuFlow 8612	surface temp. RTD probe

specifications

		8652	8612
range	HUMIDITY	5–95% RH	5–95% RH
	TEMPERATURE	32–140°F (0–60°C)	32–140°F (0–60°C)
	DEW POINT	5–120°F (-15–49°C)	5–120°F (-15–49°C)
	WET BULB	40–140°F (5–60°C)	NA
resolution	HUMIDITY	0.1% RH	0.1% RH
	TEMPERATURE, DEW POINT, WET BULB	0.1°F (0.1°C)	0.1°F (0.1°C)
accuracy	HUMIDITY	±2% RH	±2% RH
	TEMPERATURE	±1°F (1°C)	NA
display		2-line, 4-digit LCD	2-line, 4-digit LCD
instrument weight		1.16 lb (0.53 kg)	1.16 lb (0.53 kg)
batteries		four AA-size alkaline	four AA-size alkaline

[CompuFlow® 8650 and 8610 IAQ Meters

Indoor environments can be improved by measuring levels of CO_2, relative humidity, and temperature. Alnor IAQ meters help building owners, operators, HVAC contractors, and consultants solve problems in schools, offices, factories, and hospitals. The CompuFlow model 8610 measures CO_2 levels. The model 8650 adds humidity, temperature and an optional plug-in RTD temperature probe. It calculates dew point and wet bulb temperatures to help assess indoor comfort level and calculates outside make-up air ratio. The model 8650 also offers data averaging, and stores up to 1000 readings. The 8650 includes CompuDat software and interface cable for downloading to a PC.

8650

sensor is located in a long probe so the user can take readings in a room or in a duct

test for proper ventilation, thermal comfort, and humidity levels

8650 calculates percentage of outside air from CO_2 or temperature readings

8610

internal NDIR sensor to monitor CO_2 levels in a room

model

CF8650 CF8650M (metric)	CF8610 CF8610M (metric)	2917026
CompuFlow 8650	CompuFlow 8610	surface temp. RTD probe

specifications

		8650	8610
range	CO_2	0–5000 ppm	0–5000 ppm
	HUMIDITY	5–95% RH non-condensing	NA
	TEMPERATURE	32–140°F (0–60°C)	NA
	DEW POINT	5–120°F (-15–49°C)	NA
	WET BULB	40–140°F (4.4–60°C)	NA
resolution	CO_2	1 ppm	1 ppm
	HUMIDITY	0.1% RH	NA
	TEMPERATURE, DEW POINT, WET BULB	0.1°F (0.1°C)	NA
accuracy	CO_2	±3% of reading or ±50 ppm, whichever is greater	±3% of reading or ±50 ppm, whichever is greater
	HUMIDITY	±2% RH	NA
	TEMPERATURE	±1°F (1°C)	NA
display		2-line, 4-digit LCD	4-digit LCD
instrument weight		1.16 lb (0.53 kg)	1.16 lb (0.53 kg)
batteries		four AA-size alkaline	four AA-size alkaline

[AirGard® Lab Hood Monitors

Alnor AirGard Lab Hood Monitors provide an indication of safe levels of airflow in laboratory fume hoods and meet the requirements of ANSI 29.5-2003, NFPA 45-2000, SEFA 1.2-2002, and NSF 49-2002. The models 200/405 feature an audible and visual alarm with relay output in an easy-to-calibrate unit ideal for retrofitting existing hoods. The model 335 features a color analog LCD display to indicate face velocity; it may also be configured to display face velocity digitally.

315-BSC

easy to read jumbo LEDs

simple go/no go monitor

velocity readings taken by remote probe inserted in air flow stream

335

AirGard 335 gives you continuous viewing of face velocity

405

designed for easy retrofit to existing hoods

model

335 D	200 AG	405 D	410 HE*
AirGard 335 (flush mount)	AirGard 200* (flush mount)	AirGard 405 (surface mount)	AirGard 410 HE (explosion-proof)

specifications

		335-BSC	200/405	315-BSC	350-CEM
range	DISPLAY	50–250 fpm (0.25–1.27 m/s)	NA	NA	NA
	ALARM	50–250 fpm (0.25–1.27 m/s)	70–250 fpm (0.35–1.27 m/s)	25–2,000 fpm (0.13–10.2 m/s)	25–2,000 fpm (0.13–10.2 m/s)
accuracy		±10% of set point	±10% of set point	±5% of reading or 5 fpm whichever is greater	±5% of set point
display		analog bar graph; jumbo LEDs (green zone=normal, yellow zone=marginal, red zone=alarm), digital LCD can be enabled	jumbo green LED=normal jumbo red LED=alarm	bar graph (red, yellow, green): digital LCD can be enabled	jumbo LEDs (red, yellow, green)
weight		0.5 lb (0.23 kg)	0.5 lb (0.23 kg)	0.75 lb (0.34 kg)	0.75 lb (0.34 kg)
power required		9–30 VAC/DC	9–30 VAC/DC	9–30 VAC/DC	9–30 VAC/DC

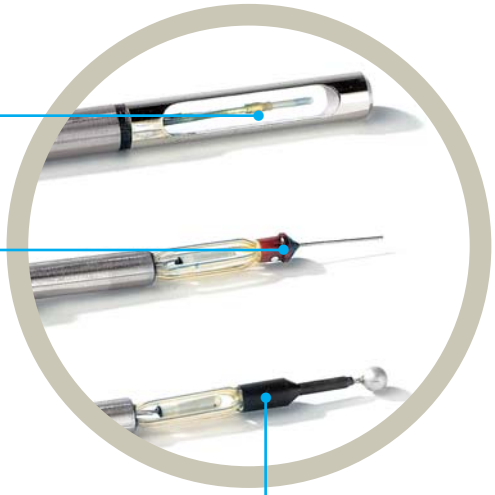
[AVT 55, 65, and 75 Air Velocity Transducers

Alnor models AVT55, 65, and 75 Air Velocity Transducers provide the flexibility needed for air velocity measurements in research and development labs, manufacturing processes, and other applications. They are ideal for both temporary and permanent installations. The three models each incorporate a different sensor configuration and all are available in four probe lengths. The full-scale range, signal output, and time constant are user-selectable and can be easily changed to meet the needs of your application.

AVT 55

general purpose AVT 55 has a protected probe tip and rugged ceramic sensor

windowless AVT 65 is ideal for confined spaces



user-selectable set-up features

omni-directional AVT 75 is accurate at very low velocities and ideal for use when flow direction is unknown

12 in. (305 mm) long probe*

model

AVT55-12* AVT55-300 (metric)** AVT55	AVT65-12* AVT65-300 (metric)** AVT65	AVT75-12* AVT75-300 (metric)** AVT75

specifications

	AVT55 and AVT65	AVT75
range	25–10,000 fpm (0.127–50.8 m/s), selectable	10-500 fpm (0.051–2.54 m/s), selectable
resolution	minimum 0.07% of selected full scale	minimum 0.07% of selected full scale
accuracy	± 2% of reading 64.4–82.4°F (18–28°C), + 0.5% of full scale of selected range	± 3% of reading 68–78.8°F (20–26°C), + 0.5% of full scale of selected range
outputs	0–5V, 0–10V, 1–5V, 2–10V 0–20mA, 4–20mA	0–5V, 0–10V, 1–5V, 2–10V 0–20mA, 4–20mA
cable length	6 ft (2 m)	6 ft (2 m)
weight	1.6 lbs (0.73 kg)	1.6 lbs (0.73 kg)
power required	11–30 VDC or 18–28 VAC, 350 mA max.	11–30 VDC or 18–28 VAC, 350 mA max.

*Change last two digits to -03 for 3-inch probe.
Change last two digits to -06 for 6-inch probe.
Change last two digits to -09 for 9-inch probe.

**Change last three digits to -076 for 7.5 cm probe.
Change last three digits to -150 for 15.25 cm probe.
Change last three digits to -225 for 23 cm probe.

[Measurement Technology

The following describes the advantages of various measurement methods.

capture hoods

technology	advantages	suggested product
general—supply or return air volume is captured by the hood and channeled across an averaging manifold	• reads air volume flow directly • quick measurements • various hood sizes available	
capture hoods using electronic manometers	• high resolution • multi-purpose meter • detachable manometer	• EBT721
capture hoods using swinging vane meters	• no batteries or power required • analog readout detects trends	• Balometer Jr. • Standard Balometer

hydronic manometers

technology	advantages	suggested product
general—pressure sensors designed for liquid media are used to measure hydronic system pressures	• more accurate than single sensor instruments • differential, high and low side pressures displayed simultaneously	• HM670/680

thermo-anemometers

technology	advantages	suggested product
general—air velocity is measured by the cooling effect of an airstream on a heated element	• sensors can measure very low velocity • small obstruction to stream • fast response to changes	
digital meter	• data storage and/or statistics • solid state, high reliability • easy-to-read LCDs • adjustable time constants	• CF8570/8571 • CF8585/8586

rotating vane anemometers

technology	advantages	suggested product
general—air movement causes a fan to rotate; velocity is determined by counting blade revolutions per unit time	• gives a good spatial average • may reduce the effect of turbulence • reads true air velocity	
mechanical with electronic sensing	• low cost • reading recall and average	• RVA+

swinging vane anemometers

technology

air impacts a low-mass vane which moves in a tunnel; needle is connected directly to a moving vane and velocity is read on a calibrated scale

advantages

- no batteries required
- no heated element—safe in explosive environments
- analog readout shows trends
- can be scaled by constricting flow

suggested product

- 6000AP Velometer
- 8100 series Velometer

micromanometers

technology

general—digital electronic manometer—usually a piezo-resistive sensor which generates a voltage based on diaphragm deflection

advantages

- position-insensitive
- fine resolution
- compact, lightweight
- measures positive and negative pressure with same hose hook-up
- uses standard pitot probes

suggested product

- EBT720
- AXD540
- AXD560

carbon dioxide meters

technology

general—a dual detector NDIR (non-dispersive infrared) sensor detects CO_2 concentration

advantages

- good resolution
- stable readings with low drift
- data storage and statistics
- easy-to-read LCDs

suggested product

- CF8650

combustion analyzers

technology

general—electrochemical gas sensor technology and thermistor stack temperature sensor used to monitor and service combustion systems to ensure safe, efficient operation of combustion systems

advantages

- real-time measurements
- measure O_2, CO, NO, NO_2, SO_2, draft pressure, temperature
- calculate efficiency, loss, excess air, air-fuel ratio, CO_2, NOx and emission rates.

suggested product

- CGA-801, series CGA-810, CGA-823

[Ordering Information

We welcome your application or product questions. Please call 800.424.7427 or 651.490.2811 for more information on any instrument in this catalog.

Each Alnor brand instrument is calibrated using standards that are traceable to the National Institute of Standards & Technology (NIST) within the limits of the Institute's calibration service. A calibration data sheet is included with all Alnor products.

Warranty

All mechanical or analog products carry a one-year limited warranty. All electronic instruments feature a two-year warranty except where noted. More information on each product's warranty can be found in the Owner's Manual.

[Calibration & Repair

To maintain the integrity of your instrument, we suggest that you calibrate it at least annually. This will ensure the accuracy of your measurements and guarantee compliance with industry standards. Our calibration service includes a NIST-traceable certificate with "as found" and "as left" data.

Before sending your instrument for calibration or repair, you should obtain a return material authorization (RMA) number. You can obtain an RMA number by calling Customer Service (toll-free 800.424.7427 or 651.490.2811), or if you prefer, via the Internet at our website www.alnor.com. You will get the cost of service or calibration, the RMA number and shipping instructions.

Please have the following information available when you request the RMA number:

- Owner's name, address and phone number
- Billing address, if different and applicable
- Instrument name and model
- Serial number
- Purchase order number or credit card information
- Any special requirements
- Method of return shipment

Then return your instrument with a signed purchase order to Service Center specified:

Alnor Products
Attn: Service Dept. (RMA # _____)
500 Cardigan Road
Shoreview, MN 55126 USA

or: TSI AB
Lindberghs gata 9,
195 61 Arlanda Stad, Sweden
Telnr: +46 8-595 132 30, Fax: +46 8-595 132 39
Email: tsiab@tsi.com

If you have any questions, please feel free to contact us via phone, fax, our website or e-mail to customerservice@alnor.com.

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