

# AD-1272 Advanced Thermal Dispersion Probe Airflow Measuring System Product Bulletin

LIT-12012550

2021-06-21

## Introduction

The AD-1272 Advanced Thermal Dispersion Airflow and Temperature Measuring System is a highly accurate airflow and temperature measurement product for new installations or retrofit applications.

The system supports air flow measurements up to 128 waterproof, flex sensors. The AD-1272 provides the most sensing points in the industry. The AD-1272 Advanced Thermal Dispersion Airflow and Temperature Measuring System is capable of measuring a velocity range from 0 ft (0 m) to 5,000 ft (1,524 m) a minute and displays the average flow and temperature. It is intended for commercial airflow measurement in any outside, return, exhaust, or supply air application.

Each surface-mount thermistor pair provides a measurement for both velocity and temperature and is protected from the elements through conformal coating. A number of sensing points on one or more probes establish a measurement array across the area of the duct or plenum to provide an averaged airflow and temperature output. Probe-sensing elements are factory tested and calibrated, at 20 points, from 0 ft (0 m) to 5,000 ft (1,524 m) a minute.

**Figure 1: AD-1272 Thermal Dispersion Probe Airflow Measuring System**



## Features and benefits

### BACnet® and analog output standard

Multiple methods to interface with building automation systems.

### Cutting-edge technology

Uses the lowest power consumption of any commercially available thermal dispersion device.

### Display with surface membrane buttons

Provides tool-free setup and configuration.

## Standard communication cabling

Does not require the use of proprietary cables.

## Airfoil shaped anodized aluminum sensing probes

Lower pressure drop and greater resistance to oxidation.

## Up to 128 sensing points

Provides accurate air flow measurements even in non-linear air flow.

## Remote display options

Wireless or remote displays with CFM and temperature read-outs on easy to use menus.

## Application

The AD-1272 Thermal Dispersion Probe Airflow Measuring System can be used in most standard HVAC applications of measuring airflow including minimum outside air verification, volume matching application, supply air measurements, and return air measurements.

When used to control minimum outside air the AD-1272 Thermal Dispersion Probe Airflow Measuring System contributes to earning required Indoor Environmental Quality (IEQ) and Energy and Atmosphere (EA) credits for U.S. Green Building Council® Leadership in Energy and Environmental Design (LEED) prerequisites for construction and operation.

## Operation

The AD-1272 probe uses thermal dispersion technology to measure the airflow in the most demanding applications. The mathematical relationship between heat transfer rate and airflow velocity makes it possible to accurately measure flow by measuring the energy required to maintain a heated thermistor at a reference temperature.

The airfoil shape of the probe, geometry of the sensor shroud, and placement of the sensors with regard to quantity and location are all based on results from computational fluid dynamics and extensive lab testing. This unique design provides a lower pressure drop and more accurate measurement of flow and temperature.

**Figure 2: Typical sensing point**



### Outputs

The LCD screen is a 16x2 alphanumeric character display showing actual velocity and temperature in either Imperial (I-P) or International System (SI) units. The AD-1272 Thermal Dispersion Airflow and Temperature Measuring System provides two 4 mA to 20 mA analog outputs - one for airflow velocity and one for air temperature - and BACnet outputs to provide input to any Building Automation System.

The AD-1272 Thermal Dispersion Airflow and Temperature Measuring System provides a linear 4 mA to 20 mA output signal proportional to the airflow. The probe automatically adjusts the airflow calculation based on the current air temperature. The linear output signal for airflow is repeatable and not affected by temperature changes. The analog outputs are scalable to provide the best resolution for the operating range of the system.

### Sample specifications

The AD-1272 Advanced Thermal Dispersion Airflow Measuring System is the basis of design. Furnish and install advanced electronic thermal dispersion type airflow and temperature measuring station at locations shown on the plans. The system is capable of monitoring and reporting the airflow and temperature at each measuring location with up to 16 measuring probes containing 1 to 8 sensor points per probe. The system includes a primary transmitter as part of a probe assembly or the transmitter can be installed up to 500 ft (152 m) from the sensor. The primary transmitter interfaces with the BAS interface using BACnet protocol or 4 mA to 20 mA analog outputs to report velocity and temperature measurements.

Probes are constructed of an airfoil shaped anodized aluminum extrusion. Each moisture resistant flexible polyimide sensor circuit consists of thermistors for reading temperatures and calculating velocity. Primary transmitter user interface features tool-free touch setup through surface membrane switches on a hinged enclosure lid with dust tight, weather resistant construction. Thermal dispersion sensors will be factory calibrated at 20 points between 0 ft (0 m) to 5,000 ft (1,524 m) a minute using NIST traceable calibration standards.

Complete assembly is in an ISO 9001 certified facility following strict ISO calibration test procedures. Acceptable manufacturers are members of the Air Movement and Control Association (AMCA). Communications are a

Twisted Shielded Pair 24 AWG low capacitance wire and power is a 18 AWG. The Primary Transmitter is capable of processing up to 128 (16 probes, 8 sensors or probe each) independent sensing points and operates on a Class 2 24 VAC low voltage supply. The transmitter features a 16 character x 2 line alphanumeric backlit LCD display, digital offset/ gain adjustment, continuous performing sensor/ transmitter diagnostics and a visual alarm to indicate malfunctions. The front panel display is field adjustable to display either I.P. or S.I. units. The primary transmitter is capable of providing flow, temperature readings and alarms through BACnet MS/TP communication to a BAS as well as providing field adjustable 4 mA to 20 mA outputs for flow and temperature values.

When installed in a duct in accordance with AMCA requirements, the accuracy of the airflow measuring system will be  $\pm 3$  of the reading. AFMS provides means for automated or manual field calibration when installed in less than ideal locations. Communication between primary probes, remote transmitters, and ancillary probes will utilize daisychain, RS-485 communications wiring. Johnson Controls® provides a standard limit warranty for a period of 5 years or 60 months from the date of delivery to the delivery location.

### Standard materials and construction

The probe is an airfoil shaped, 2 in. x 3/4 in. (51 mm x 19 mm) 6063T6 extruded aluminum with clear anodized, acid-etched finish. The mounting brackets are 0.080 in. aluminum with mill finish. Equal area or Log-Tchebycheff sensor distribution. Thermistor flow hood is UL 94 flame-rated, high-impact Acrylonitrile Butadiene Styrene (ABS) plastic. Sensor circuit (up to eight per probe assembly) is a water-resistant flex sensor circuit consisting of thermistors to measure temperature and calculate velocity.

### Dimensions

See Table 1 for minimum and maximum duct sizes for use with the AD-1272 System.

**Table 1: Duct dimensions**

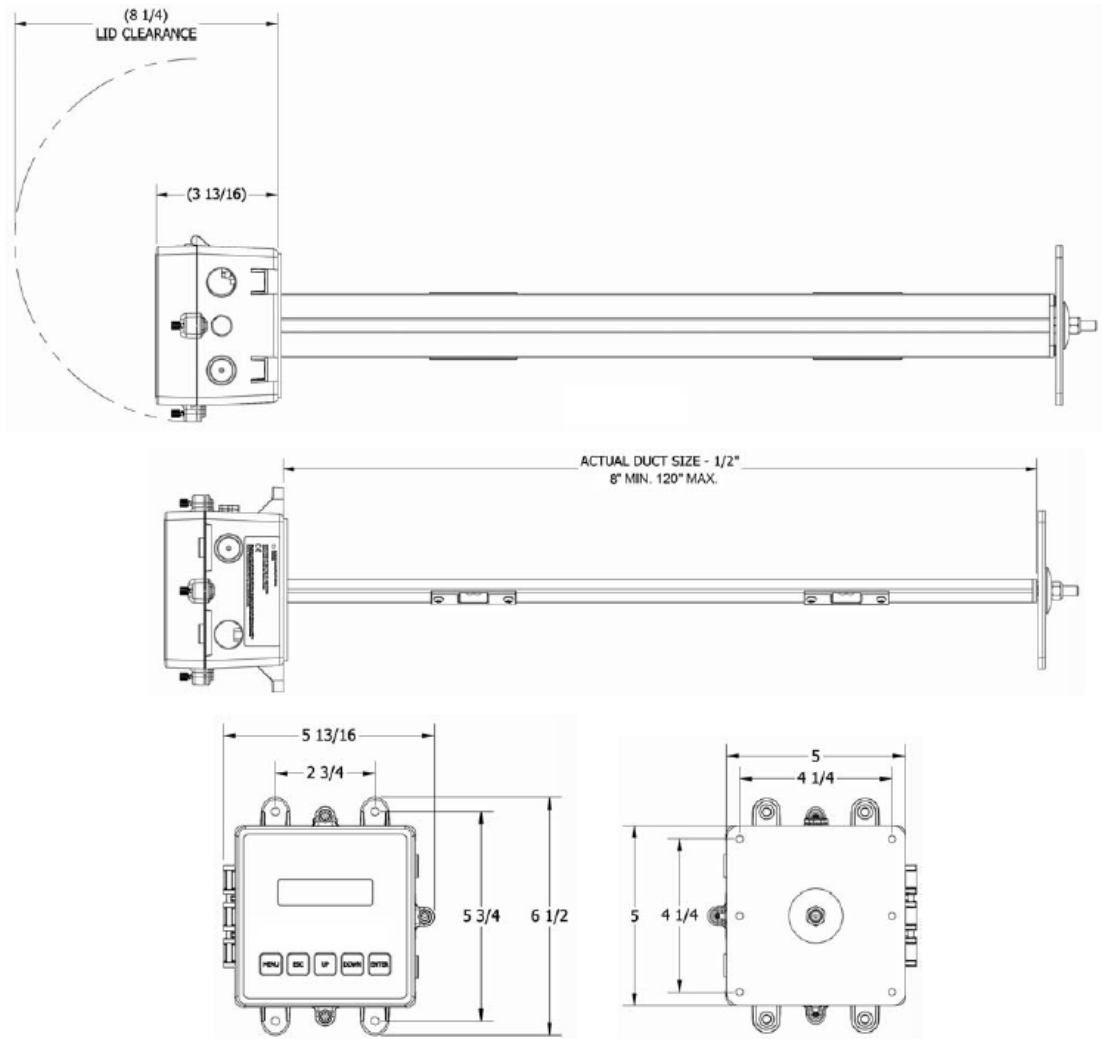
Size limits	Width x height
Minimum	8 in. x 8 in. (203 mm x 203 mm)
Maximum	120 in. x 120 in. (3,048 mm x 3,048 mm)

**Note:** Actual size is 1/4-inch less than nominal.

**Figure 3: AD-1272 System, installed view**



Figure 4: Thermal dispersion probe dimensions, in. (mm)



Rectangular duct mounting

Figure 5: Rectangular duct mounting, one and two probe configurations

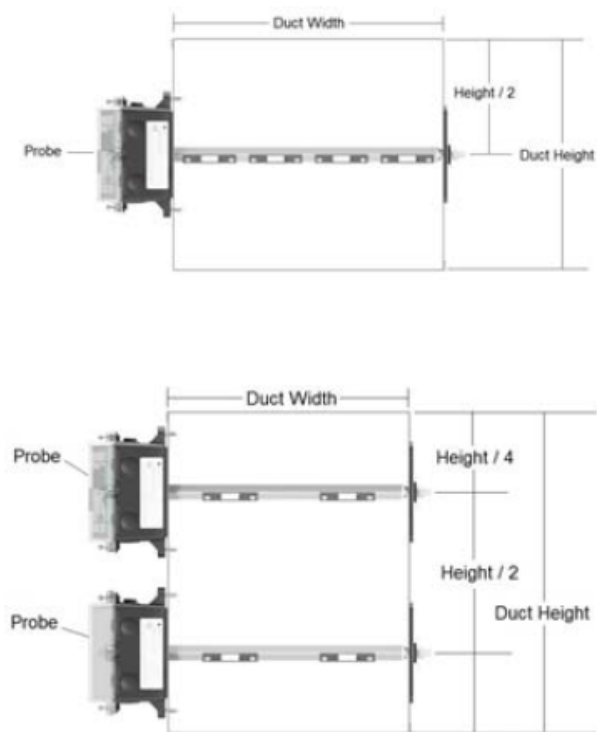
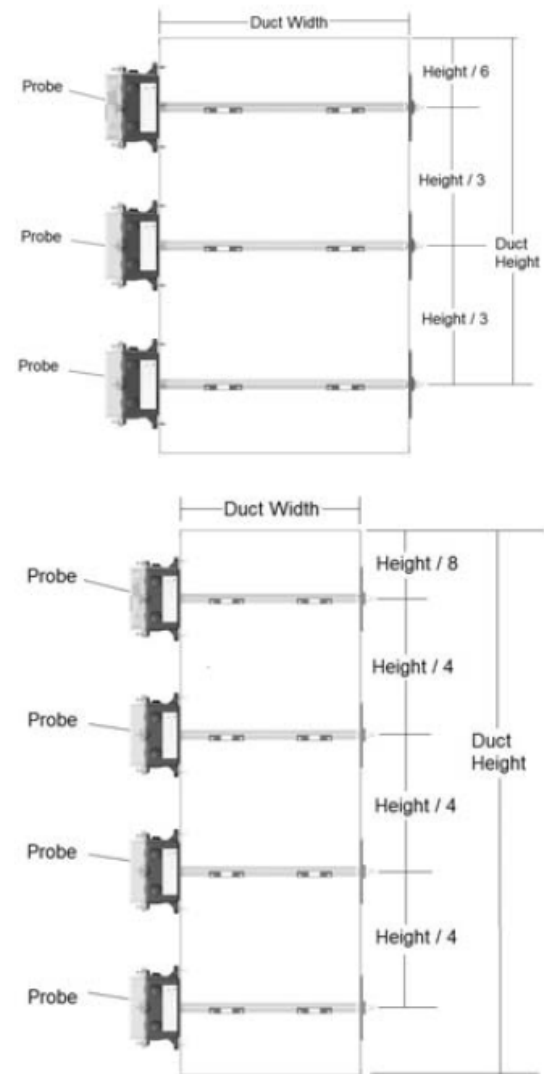


Figure 6: Rectangular duct mounting, three and four probe configurations



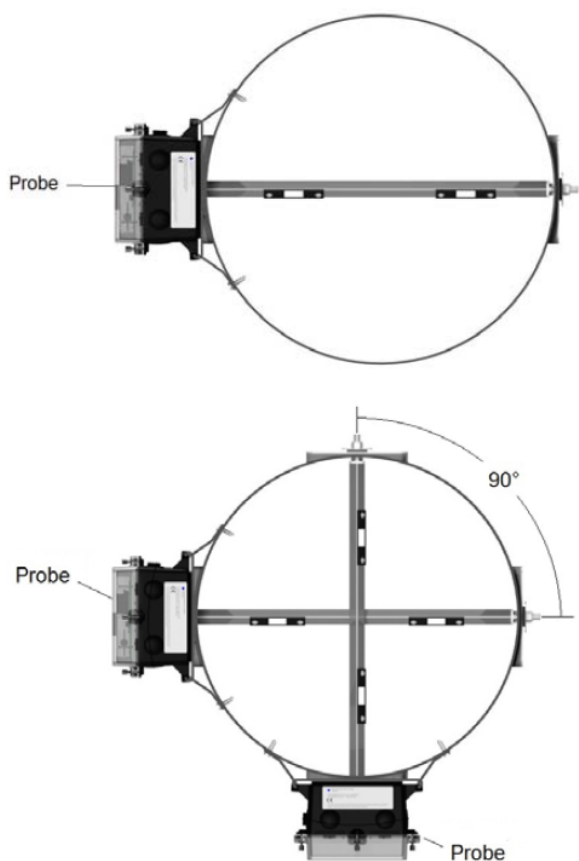
**Table 2: Number of probes or sensors for each probe for rectangular duct applications**

Rectangular duct width A = Probe length, in. (mm)																				
Duct height B, in. (mm)	8 (203)	12 (305)	14 (356)	16 (406)	18 (457)	20 (508)	22 (559)	24 (610)	30 (762)	36 (914)	42 (1,067)	48 (1,219)	54 (1,372)	60 (1,524)	66 (1,676)	72 (1,829)	84 (2,134)	96 (2,438)	108 (2,743)	120 (3,048)
8 (203)	1/2	1/2	1/3	1/3	1/4	1/4	1/4	1/4	1/6	1/6	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
12 (305)	1/2	1/2	1/3	1/3	1/4	1/4	1/4	1/4	1/6	1/6	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
14 (356)	1/2	1/3	1/3	1/3	1/4	1/4	1/6	1/6	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
16 (406)	2/2	2/2	2/2	2/2	2/2	2/3	2/3	2/3	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
18 (457)	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	1/6	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
20 (508)	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/4	1/8	1/8	1/8	1/8	2/6	2/6	2/6	2/6	2/7	2/8	2/8
22 (559)	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/4	1/8	1/8	1/8	2/6	2/6	2/6	2/6	2/7	2/8	2/8	2/8
24 (610)	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	1/8	1/8	2/6	2/6	2/6	2/6	2/7	2/8	2/8	2/8
30 (762)	3/2	3/2	3/2	3/2	3/2	2/4	2/4	2/4	2/4	2/4	2/6	2/6	2/6	2/7	2/7	2/8	2/8	2/8	2/8	2/8
36 (914)	3/2	3/2	3/2	3/2	3/3	3/3	3/3	2/4	2/4	2/6	2/6	2/6	2/7	2/8	2/8	2/8	2/8	2/8	2/8	2/8
42 (1,067)	3/2	3/2	3/3	3/3	3/3	3/3	3/3	3/3	2/6	2/6	2/7	2/7	2/8	2/8	2/8	2/8	2/8	2/8	2/8	2/8
48 (1,219)	3/2	3/2	4/2	4/2	4/2	4/2	4/2	4/2	3/4	2/6	2/7	2/8	2/8	2/8	2/8	2/8	2/8	2/8	2/8	2/8
54 (1,372)	4/2	4/2	4/2	4/2	4/2	4/2	3/4	3/4	3/4	2/7	2/8	2/8	2/8	2/8	2/8	4/4	2/8	2/8	2/8	2/8
60 (1,524)	4/2	4/2	4/2	4/2	4/2	3/4	3/4	3/4	4/4	4/4	2/8	2/8	2/8	4/4	4/4	4/4	4/4	2/8	2/8	2/8
66 (1,676)	4/2	4/2	4/2	4/2	4/3	3/4	3/4	3/4	4/4	4/4	4/4	2/8	2/8	4/4	4/4	4/4	4/4	4/4	2/8	2/8
72 (1,829)	4/2	4/2	4/2	4/2	4/3	3/4	3/4	3/4	4/4	4/4	4/4	2/8	4/4	4/4	4/4	4/4	4/4	4/4	4/4	2/8
84 (2,134)	4/2	4/2	4/2	4/2	4/3	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
96 (2,438)	4/2	4/2	4/2	4/2	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
108 (2,743)	4/2	4/2	4/2	4/2	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
120 (3,048)	4/2	4/2	4/2	4/2	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4

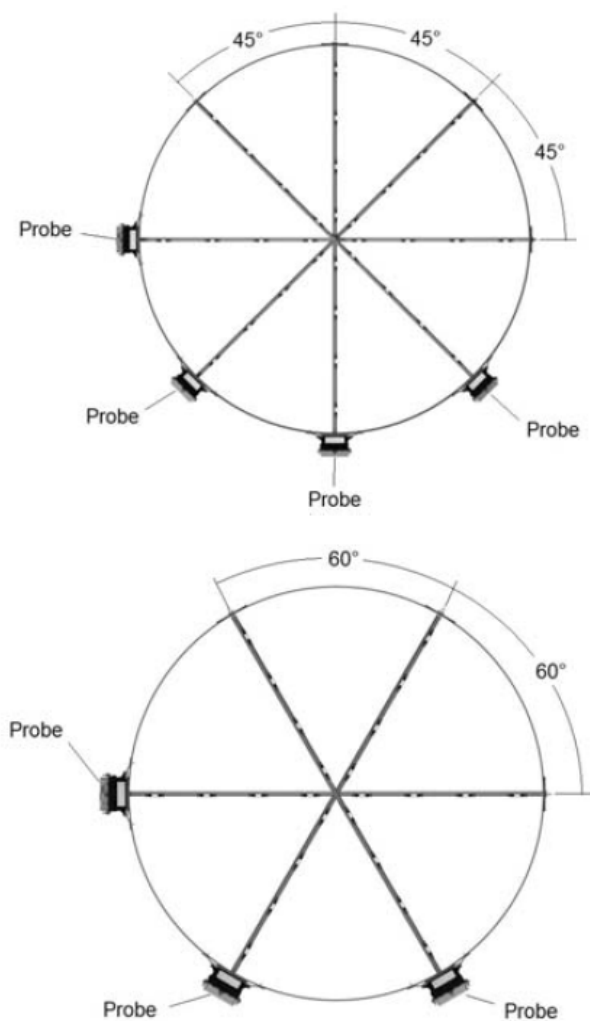
**Note:** The minimum size is 8 in. x 8 in. (203 mm x 203 mm) for rectangular duct applications. Smaller sizes can be special ordered.

## Round duct mounting

**Figure 7: Round duct mounting, one or two probe configurations**



**Figure 8: Round duct mounting, three or four probe configurations**

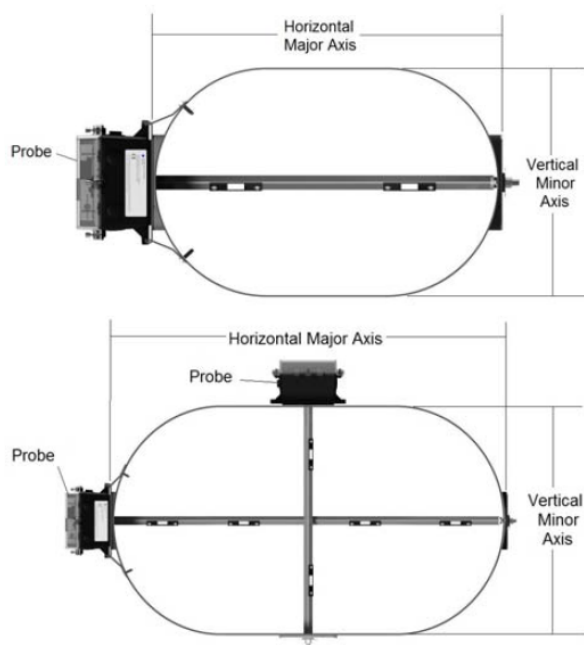


**Table 3: Number of probes or sensors per probe for round duct applications**

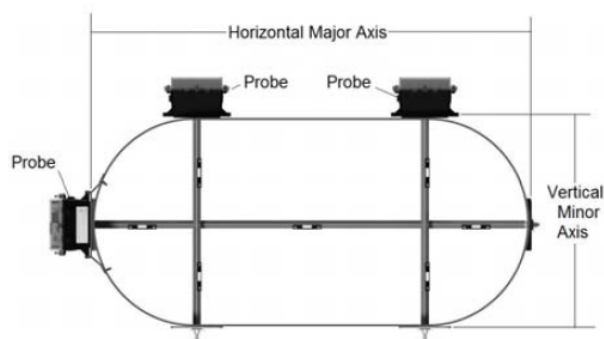
Duct diameter, in. (mm)	Number of probes or number of sensors per probe	Reference
Above 8 in. through 14 in. (203 mm through 356 mm)	1/2	See Figure 7
Above 14 in. through 20 in. (356 mm through 508 mm)	2/4	
Above 20 in. through 42 in. (508 mm through 1,067 mm)	2/6	
Above 42 in. through 60 in. (1,067 mm through 1,524 mm.)	2/8	
Above 60 in. through 120 in. (1,524 mm through 3,048 mm)	3/8	See Figure 8

## Oval duct mounting

**Figure 9: Rectangular duct mounting, one and two probe configurations**



**Figure 10: Rectangular duct mounting, three probe configurations**



**Table 4: Number of probes or sensors for each probe for oval duct applications—12 in. to 22 in. (305 mm to 559 mm)**

Horizontal major axis, in. (mm)	Vertical minor axis, in. (mm)											
	12 (305)			14 (356)			16 (406)			18 (457)		
	14 (356)	H 1/1		16 (406)	H 1/2		18 (457)	H 1/2		21 (533)	H 1/3	
		V			V			V			V	
	15 (381)	H 1/2		25 (635)	H 1/3		22 (559)	H 1/3		29 (737)	H 1/4	
		V			V			V			V	
	28 (712)	H 1/3		34 (864)	H 1/4		32 (813)	H 1/4		37 (940)	H 1/5	
		V			V			V			V	
	40 (1,016)	H 1/4		45 (1,143)	H 1/5		41 (1,041)	H 1/5		46 (1,168)	H 1/6	
		V			V			V			V	
	53 (1,346)	H 1/5		55 (1,397)	H 1/6		51 (1,295)	H 1/6		53 (1,346)	H 1/7	
		V			V			V			V	
	65 (1,651)	H 1/6		67 (1,702)	H 1/7		60 (1,524)	H 1/7		62 (1,575)	H 1/8	
		V			V			V			V	
	75 (1,905)	H 1/6		74 (1,880)	H 1/7		69 (1,753)	H 1/8		71 (1,803)	H 1/5	
		V			V			V			V 2/2	
							79 (2,007)	H 1/8		78 (1,981)	H 1/6	
								V			V 2/2	
										81 (2,057)	H 1/6	
											V 2/2	

① **Note:** See Figure 10 for probe configurations for the following values: 42 (1,067), 44 (1,118), 51 (1,295), 53 (1,346), 60 (1,524), 64 (1,626), 66 (1,676), 70 (1,778), 71 (1,803), 72 (1,829), 78 (1,981), 79 (2,007), 80 (2,032), 81 (2,057), and 85 (2,159). See Figure 9 for all other values.

## Ordering information

Use the following product code matrix to select the required product code number. For example, ANSSA-WWWXhhh--.

1. Determine the required number of air measurement stations from system drawings. Field verify the duct size and installation locations.
2. Enter the width of the duct as WWW to set the length of the probe.
3. Enter the height of the duct as hhh to set the number of probes.
4. Enter a maximum of two options.

**Table 5: Product matrix**

	Code number or character	Field														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Application	A = Air measuring station	A	N	S	S	A	-	W	W	W	X	h	h	h	-	-
Duct type	N = Rectangular															
	R = Round															
Sensor placement	S = Standard equal area distribution															
	T = Log-Tchebycheff Arrangement (Ruskin01 required)															
Mounting options	S = Insertion mount with stainless steel mounting hardware															
	T = Standoff mount with stainless steel mounting hardware															
	A = Standoff mount with aluminum hardware; not available or valid with round or oval duct															
UI options	A = Primary probe with display, no remote display															
	C = Remote primary with display; all probes to be ancillary probes															
	R = Primary probe with display and wired remote display															
	S = Primary probe without display and wired remote display															
	W = Primary probe with display and wireless remote display															
	Y = Primary probe without display and wireless remote display															
	N = Primary probe without display. UI not included.															
Length dimensions	8 in. to 120 in.; inch increments															
Height dimensions	8 in. to 120 in.; inch increments															
Options (Up to 2)	G = Cord grip; quantity 2; dust tight, waterproof cord entry and exit for probe enclosure when installed															
	N = NEMA 4 Weather Resistant Enclosure. See the following note for more information.															
	T = 24 VAC 40 VA transformer															

**Note:**

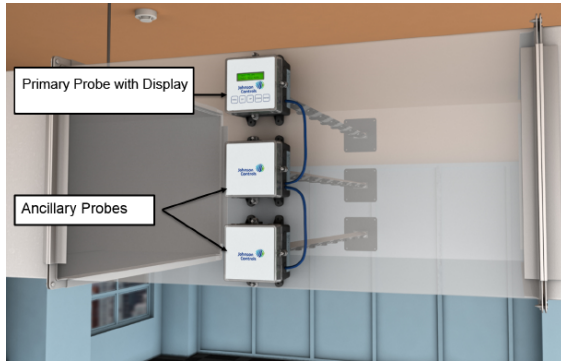
- The N option for a primary probe without a display does not include a UI. Field configuration and adjustments are not possible without a UI.
- The actual probe is 1/4 in. (6 mm) less than nominal.
- Contact Johnson Controls for round ducts greater than 48 in. (25 mm) and oval dampers.



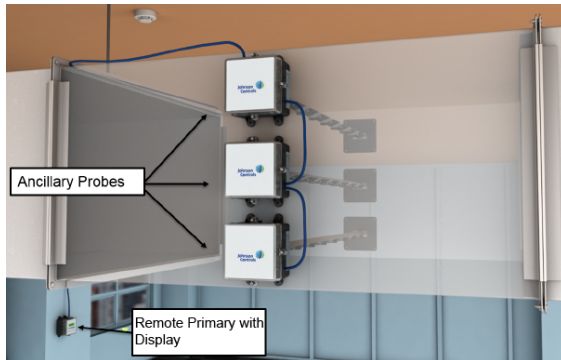
## Display options

See the following figures for optional display configurations:

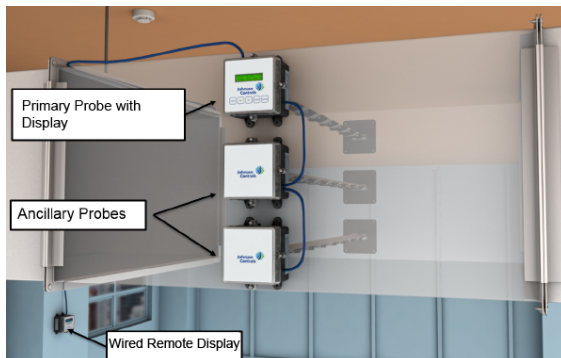
**Figure 11: Primary probe with display, no remote display: Ordering code A**



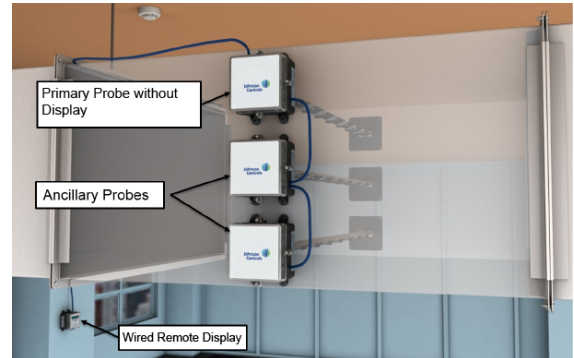
**Figure 12: Remote primary with display, all probes to be ancillary probes: Ordering code C**



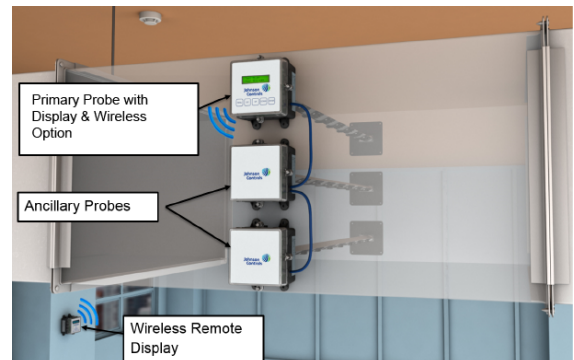
**Figure 13: Primary probe with display and wired remote display: Ordering code R**



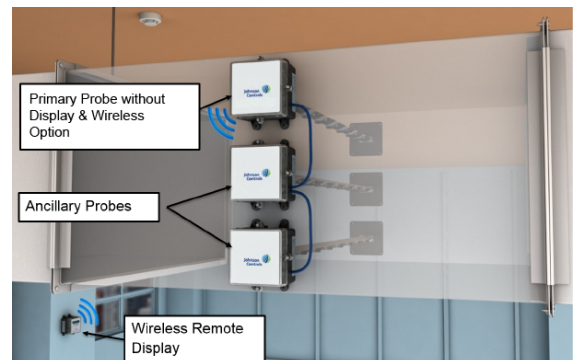
**Figure 14: Primary probe without display and wired remote display: Ordering code S**



**Figure 15: Primary Probe with Display and wireless remote display: Ordering code W**



**Figure 16: Primary probe without display and wireless remote display: Ordering code Y**



## Maintenance

The Johnson Controls AD-1272 Airflow Measuring Systems maintenance includes semi-annual verification of sensor readings and annual cleaning of the sensors. Reference the *AD-1272 Advanced Thermal Dispersion Probe Airflow Measuring System Installation Instructions (LIT-12012552)* for more information.

## Wiring

When using a single transformer for multiple devices ensure the transformer is rated with sufficient capacity for the total connected loads. Wiring multiple low-voltage

devices from a common transformer can result in lower-than-expected voltage at the device and higher-than-expected current draw when devices are connected a great distance from the power source.

## Return policy

All Johnson Controls AD-1272 Thermal Dispersion Probe Airflow Measuring Systems are built to order, just in time, and cannot be returned due to customer ordering errors. All AD-1272 System products are backed by a 5-year warranty which covers defects in materials or workmanship. Refer to terms and conditions of sale for specifics.

## Replacement parts

**Table 6: Replacement parts**

Code number	Description
DMPR-EAF-001	UI; Wired remote display

**Table 6: Replacement parts**

Code number	Description
DMPR-EAF-003	One set of NEMA 4 hole plugs for pre-drilled holes in the enclosure; 6 per set
DMPR-EAF-004	Cord grip and locking nut; dust tight, waterproof cord entry and exit for probe enclosure when installed
DMPR-EAF-005	One set of NEMA 1 nylon dust plugs for knockouts; 6 per set
DMPR-EAF-006	Replacement captive screw assembly for the lid
DMPR-EAF-007	Connect-Air W24182P-2306BL composite four-wire cable, 500 ft (152 m)

## AD-1272 Thermal Dispersion Probe Airflow Measuring System technical specifications

**Table 7: AD-1272 Thermal Dispersion Probe Airflow Measuring System technical specifications**

Specification	Description
Probe material	2 in. x 3/4 in. (51 mm x 19 mm) 6063T6 high-yield extruding aluminum with acid-etch, clear anodized finish
Communication bus	RS-485, BACnet MS/TP 2-wire FC Bus between the primary transmitter and field controllers
Thermistor	Thermistor pair in flexible polyimide membrane sensor
Size range	8 in. x 8 in. to 120 in. x 120 in. (20 cm x 20 cm to 305 cm x 305 cm)
Brackets	0.080 stainless steel
Sensor accuracy	Airflow: $\pm 2\%$ of reading and $\pm 0.25\%$ repeatability
Repeatability	$\pm 0.25\%$
Measurement units	Imperial (I.P.) or International System of Units (S.I.)
Sensor distribution	Equal area
Calibrated range	0 ft per min to 5,000 ft per min (0 m per min to 1,523 m per min)
Temperature sensor accuracy	$\pm 0.10^\circ\text{F}$ ( $0.06^\circ\text{C}$ )
Sensor temperature range	$-20^\circ\text{F}$ to $120^\circ\text{F}$ ( $-29^\circ\text{C}$ to $49^\circ\text{C}$ )
Probe temperature range	$-20^\circ\text{F}$ to $120^\circ\text{F}$ ( $-29^\circ\text{C}$ to $49^\circ\text{C}$ )
Humidity range	0% to 99% RH, non-condensing
Maximum number of sensors	128
Power requirement	24 VAC, 15 VA
Power consumption	<10 VA for 2 probes with 8 sensors per probe and LDC display on primary transmitter
Output signals	4 mA to 20 mA standard, 2 VDC to 10 VDC requires 500 ohm resistor across output terminals
Display	16 x 2 character LCD (airflow, temperature, setup, and diagnostics) and optional remote display
Velocity requirements	Minimum: 0 ft per min (0 m per min) Maximum: 5,000 ft per min (1,524 m per min)
Approximate shipping weight	12 lb (5.4 kg) for AD-1272 Airflow Measuring System with two probes

### **Note:**

- Standard LCDs can be difficult to read at low temperatures. If display operation at less than  $-5^\circ\text{F}$  ( $-20^\circ\text{C}$ ) is expected, consider remote display options.
- Measuring stations are tested at an AMCA Certified Laboratory using instrumentation and procedures in accordance with AMCA Standard No. 610, Airflow Station Performance.

*The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.*

## Product warranty

This product is covered by a limited warranty, details of which can be found at [www.johnsoncontrols.com/buildingswarranty](http://www.johnsoncontrols.com/buildingswarranty).

## Software terms

**Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source software information, and other terms set forth at [www.johnsoncontrols.com/techterms](http://www.johnsoncontrols.com/techterms).** Your use of this product constitutes an agreement to such terms.

## Single point of contact

APAC	Europe	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 CHINA	JOHNSON CONTROLS WESTENDHOF 3 45143 ESSEN GERMANY	JOHNSON CONTROLS 507 E MICHIGAN ST MILWAUKEE WI 53202 USA

## Contact information

Contact your local branch office:  
[www.johnsoncontrols.com/locations](http://www.johnsoncontrols.com/locations)

Contact Johnson Controls: [www.johnsoncontrols.com/contact-us](http://www.johnsoncontrols.com/contact-us)

## North American emissions compliance

### United States

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the users will be required to correct the interference at their own expense.

#### Warning (Part 15.21)

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### Canada

This Class (A) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (A) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

#### Industry Canada Statement(s)

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage, et
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

