

AD-1272 Advanced Thermal Dispersion Probe Airflow Measuring System

Installation Instructions

Code No. LIT-12012552
Issued November 2017

Refer to the [QuickLIT website](#) for the most up-to-date version of this document.

Applications

The AD-1272 Thermal Dispersion Probe Airflow Measuring System is an air-measurement device that uses thermal dispersion technology to measure the airflow velocity and temperature in duct applications.

The product may be used in rectangular, oval, or round applications when installed in accordance with this installation manual. This product is designed to be installed in almost any location that airflow needs to be measured. Accuracy may be compromised if the placement guidelines in this document are not followed or if the AD-1272 Airflow Measuring System is placed directly downstream of heating coils, cooling coils, or humidifiers.

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 is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

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.

Installation

IMPORTANT: For ease of installation, a composite four-wire cable similar to Connect-Air part number W24182P-2306BL with communications and power in one cable is recommended. Alternatively, use a twisted shielded pair 24 AWG low capacitance wire communications cable and an 18 AWG power cable.

IMPORTANT: In addition to these instructions, the installation contractor shall comply with all local and International codes and standards to ensure proper and safe installation.

Unpacking the AD-1272 Advanced Thermal Dispersion Probe Airflow Measuring System

Remove the thermal dispersion probes from the shipping containers and inspect the devices for damage before installation. The shipping box may contain more than one probe. The remote display may also be in same box if it is ordered with the air-measurement station.

Note: Ensure to keep the primary and ancillary probes for each system together if there are multiple systems of the same size. Communication issues may occur if ancillary probes are switched between systems and there are duplicate addresses on the probe network.

Installing the Thermal Dispersion Probes

The sensor density is based on extensive lab testing to optimize the accuracy of the AD-1272 Airflow Measuring System. When installing the thermal dispersion probes, use the [*Rectangular Duct Mounting*](#), [*Round Duct Mounting*](#) and [*Oval Duct Mounting*](#) sections to determine the proper spacing between each probe within the opening. Contact your local Johnson Controls® representative if you have questions regarding a particular application.

⚠ WARNING

Risk of Electric Shock.

Disconnect the power supply before making electrical connections. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

⚠ AVERTISSEMENT

Risque de décharge électrique.

Débrancher l'alimentation avant de réaliser tout branchement électrique. Tout contact avec des composants conducteurs de tensions dangereuses risque d'entraîner une décharge électrique et de provoquer des blessures graves, voire mortelles.

IMPORTANT: Only a qualified service technician should install this system. To avoid unsatisfactory operation or damage to the product, strictly follow the instructions provided and do not substitute parts. Damage to the product resulting from not following the instructions or using unauthorized parts may be excluded from the manufacturer's warranty coverage.

Wired Remote Primary

If the AD-1272 Airflow Measuring System was ordered with a wired remote primary as the display option, all the probes installed in the duct are ancillary probes and the controller can be installed up to 500 feet (152 meters) from the probes. All terminations of the probe network are the same as shown in this document.

Remote Display

The AD-1272 Measuring System can be ordered with a remote display. The display duplicates the functions of the primary. The primary is always the interface point in the building automation system. The remote display can be installed up to 500 ft (152 m) when wired, and up to 200 ft (61 m) when configured for wireless options. The remote display can be wired and connected as another ancillary device on the probe network.

Software Configuration

After installation is complete, refer to the *AD-1272 Advanced Thermal Dispersion Probe Airflow Measuring System Technical Bulletin (LIT-12012477)* for configuration information.

Probe Placement

Rectangular Duct Mounting

Figure 1: Rectangular Duct Mounting—One Probe Configuration

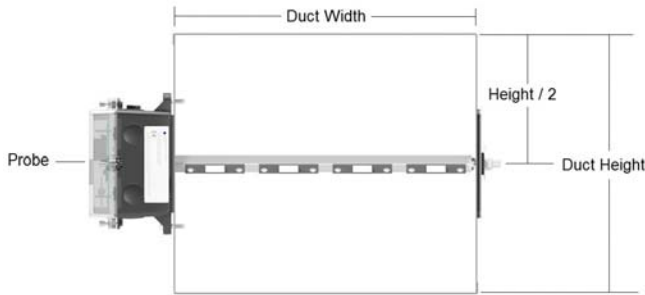
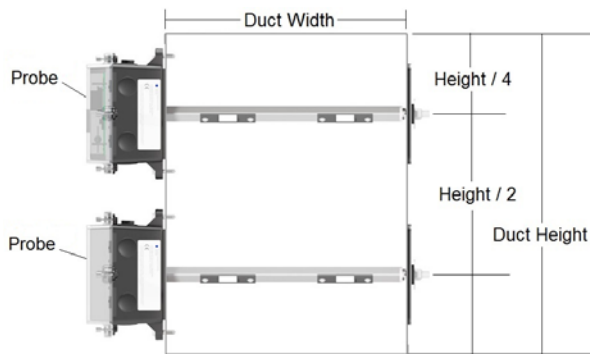


Figure 2: Rectangular Duct Mounting—Two Probe Configuration



Note: The primary probe should be installed in the most accessible location for the application.

Figure 3: Rectangular Duct Mounting—Three Probe Configurations

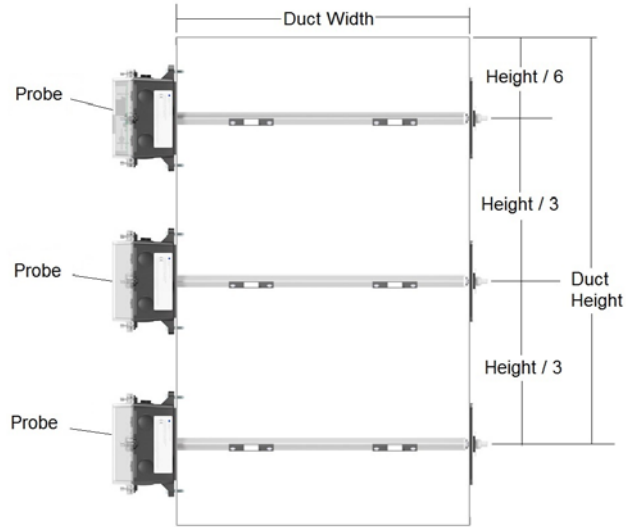


Figure 4: Rectangular Duct Mounting—Four Probe Configuration

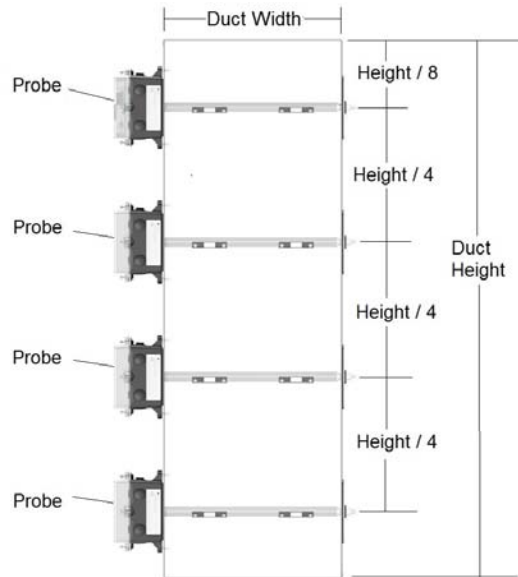


Table 1: Number of Probes/Sensors per Probe for Rectangular Duct Applications¹

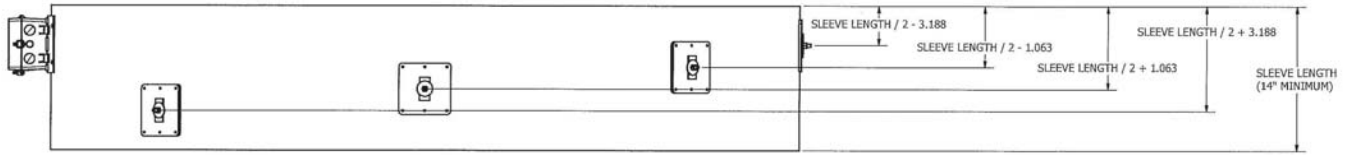
Duct Height in. (mm)	Duct Width, in. (mm)																			
	8 (203)	12 (305)	14 (356)	16 (406)	18 (457)	20 (508)	22 (559)	24 (610)	30 (762)	36 (914)	42 (1,067)	48 (1,219)	54 (1,372)	60 (1,524)	66 (1,676)	72 (1,829)	84 (2,134)	96 (2,438)	108 (2,743)	120 (3,048)
8 (203)	1/2	1/2	1/2	1/4	1/4	1/4	1/4	1/4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

1. The minimum size is 8 x 8 inches (203 x 203 mm) for rectangular duct applications. Smaller sizes can be special ordered.

Round Duct Mounting Offset

When mounting two or more probes in a round duct, they must be offset from each other by at least 2 1/8 in. in the direction of the air flow to avoid mechanical interference.

Figure 5: Offset Probes



Round Duct Mounting

Figure 6: Round Duct Mounting—One Probe Configuration

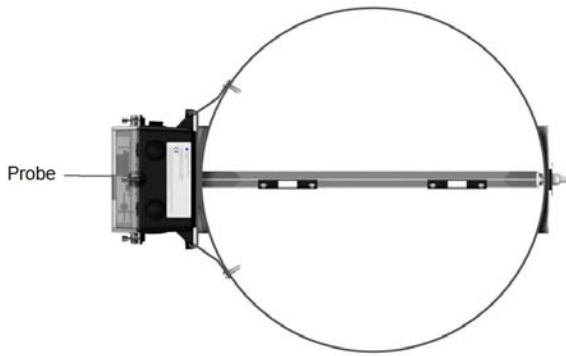


Figure 8: Round Duct Mounting—Three Probe Configuration

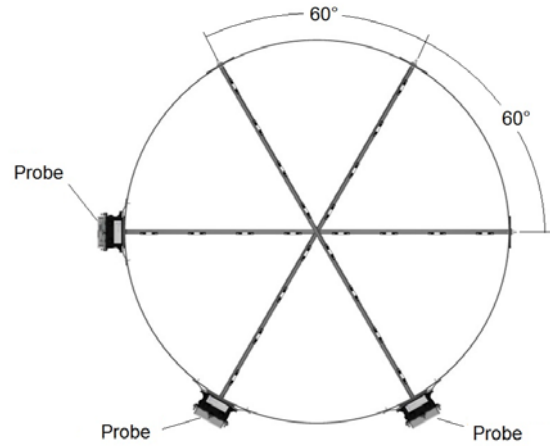


Figure 7: Round Duct Mounting—Two Probe Configuration

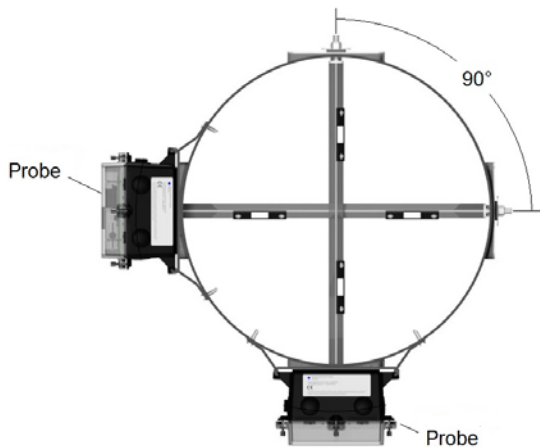
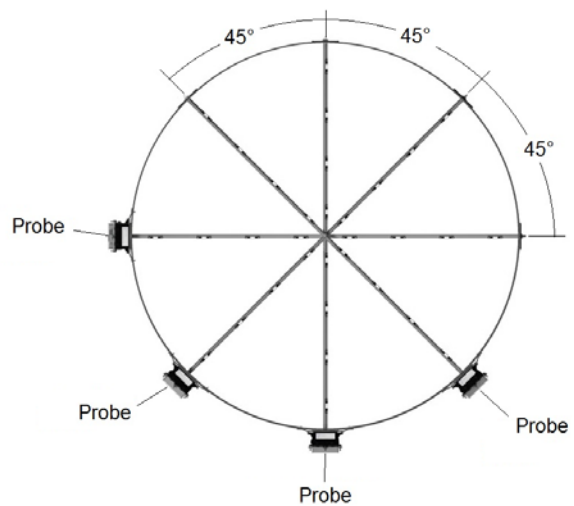


Figure 9: Round Duct Mounting—Four Probe Configuration



Note: The primary probe should be installed in the most accessible location for the application.

Table 2: Number of Probes/Sensors per Probe for Round Duct Applications

Duct Diameter, in. (mm)	No. of Probes/No. of Sensors per Probe	Figure Reference
8 (203)	1/2	Figure 6
12 (305)	1/2	Figure 6
14 (356)	2/2	Figure 7
20 (508)	2/4	Figure 7
42 (1,067)	2/6	Figure 7
48 (1,219)	2/8	Figure 7
60 (1,524)	3/8	Figure 8
72 (1,829)	4/8	Figure 9
120 (3,048)	4/8	Figure 9

Oval Duct Mounting

Figure 10: Oval Duct Mounting—One Probe Configuration

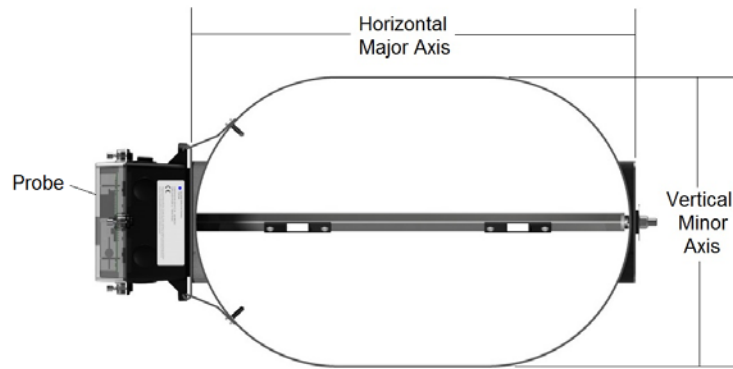


Figure 11: Oval Duct Mounting—Two Probe Configuration

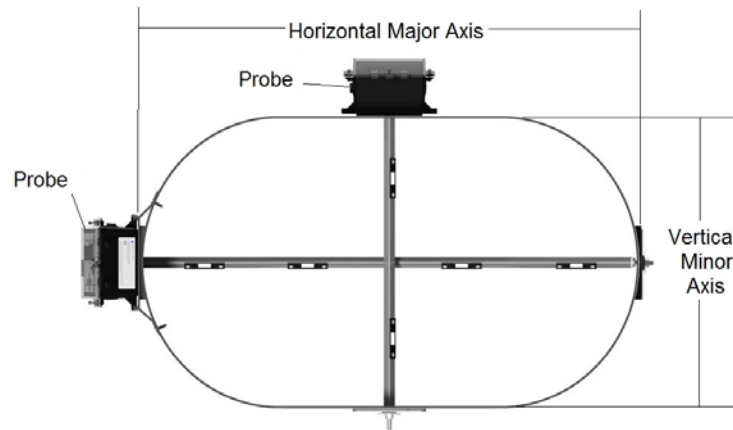
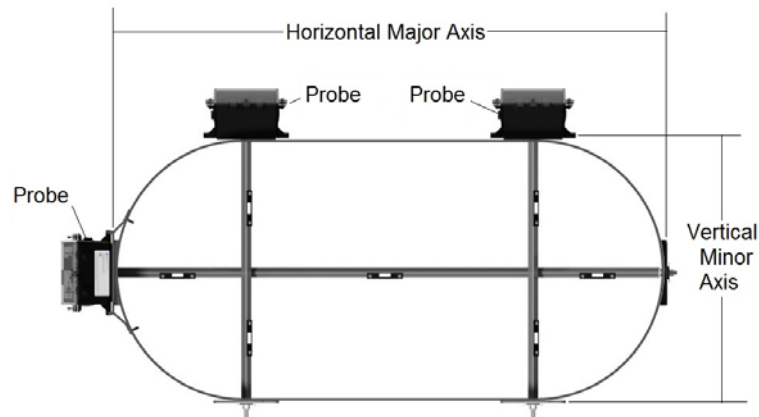


Figure 12: Oval Duct Mounting—Three Probe Configuration



Note: The primary probe is the longest probe for oval mounting. It should be installed in the most accessible location for the application.

Table 3: Number of Probes/Sensors per Probe for Oval Duct Applications—12 to 22 in. (305 to 559 mm)

		Vertical Minor Axis, in. (mm)																	
		12 (305)			14 (356)			16 (406)			18 (457)			20 (508)			22 (559)		
Horizontal Major Axis, in. (mm)	14 ¹ (356)	H	1/1	16 ¹ (406)	H	1/2	18 ¹ (457)	H	1/2	21 ¹ (533)	H	1/3	25 ² (635)	H	1/2	28 ² (711)	H	1/2	
		V			V			V			V			V			V		
	15 ¹ (381)	H	1/2	25 ¹ (635)	H	1/3	22 ¹ (559)	H	1/3	29 ¹ (737)	H	1/4	34 ² (864)	H	1/4	31 ² (787)	H	1/4	
		V			V			V			V			V			V		
	28 ¹ (712)	H	1/3	34 ¹ (864)	H	1/4	32 ¹ (813)	H	1/4	37 ¹ (940)	H	1/5	42 ³ (1,067)	H	1/3	44 ³ (1,118)	H	1/3	
		V			V			V			V			V	2/2		V	2/2	
	40 ¹ (1,016)	H	1/4	45 ¹ (1,143)	H	1/5	41 ¹ (1,041)	H	1/5	46 ¹ (1,168)	H	1/6	51 ³ (1,295)	H	1/4	53 ³ (1,346)	H	1/4	
		V			V			V			V			V	2/2		V	2/2	
	53 ¹ (1,346)	H	1/5	55 ¹ (1,397)	H	1/6	51 ¹ (1,295)	H	1/6	53 ¹ (1,346)	H	1/7	64 ³ (1,626)	H	1/5	60 ³ (1,524)	H	1/5	
		V			V			V			V			V	2/2		V	2/2	
	65 ¹ (1,651)	H	1/6	67 ¹ (1,702)	H	1/7	60 ¹ (1,524)	H	1/7	62 ¹ (1,575)	H	1/8	70 ³ (1,778)	H	1/6	66 ³ (1,676)	H	1/6	
		V			V			V			V			V	2/2		V	2/2	
	75 ¹ (1,905)	H	1/6	74 ¹ (1,880)	H	1/7	69 ¹ (1,753)	H	1/8	71 ³ (1,803)	H	1/5	80 ³ (2,032)	H	1/6	72 ³ (1,829)	H	1/7	
		V			V			V			V	2/2		V	2/2		V	2/2	
						79 ¹ (2,007)	H	1/8	78 ³ (1,981)	H	1/6					79 ³ (2,007)	H	1/8	
							V			V	2/2						V	2/2	
																81 ³ (2,057)	H	1/6	81 ³ (2,057)
V		V	2/2	V	2/4														

1. See Figure 10 for details.
2. See Figure 11 for details.
3. See Figure 12 for details.

Table 4: Number of Probes/Sensors per Probe for Oval Duct Applications—24 to 36 in. (610 to 914 mm)

		Vertical Minor Axis													
		24 (610)		26 (660)		28 (711)		30 (762)		32 (813)		34 (864)		36 (914)	
Horizontal Major Axis, in. (mm)	31 ² (787)	H 1/4 V 1/2	32 ¹ (813)	H 1/4 V 1/2	34 ¹ (864)	H 1/4 V 1/2	36 ¹ (914)	H 1/6 V 1/2	39 ¹ (991)	H 1/6 V 1/2	41 ¹ (1,041)	H 1/6 V 1/2	42 ¹ (1,067)	H 1/6 V 1/4	
	43 ² (1,092)	H 1/6 V 1/2	42 ¹ (1,067)	H 1/6 V 1/2	44 ¹ (1,118)	H 1/6 V 1/2	46 ¹ (1,168)	H 1/6 V 1/4	45 ¹ (1,143)	H 1/6 V 1/4	43 ¹ (1,092)	H 1/6 V 1/4	49 ¹ (1,245)	H 1/8 V 1/4	
	49 ³ (1,245)	H 1/4 V 2/2	51 ² (1,295)	H 1/5 V 2/2	50 ¹ (1,270)	H 1/6 V 1/4	55 ¹ (1,397)	H 1/8 V 1/4	54 ¹ (1,372)	H 1/8 V 1/4	53 ¹ (1,346)	H 1/8 V 1/4	58 ¹ (1,473)	H 1/8 V 1/6	
	55 ³ (1,397)	H 1/5 V 2/2	57 ² (1,448)	H 1/6 V 2/2	56 ² (1,422)	H 1/7 V 2/2	61 ² (1,549)	H 1/8 V 2/2	63 ² (1,600)	H 1/5 V 2/4	59 ¹ (1,499)	H 1/8 V 1/6	64 ¹ (1,626)	H 1/8 V 1/8	
	62 ³ (1,575)	H 1/6 V 2/2	64 ² (1,626)	H 1/4 V 2/4	59 ² (1,499)	H 1/8 V 2/2	65 ² (1,651)	H 1/5 V 2/4	67 ² (1,702)	H 1/7 V 2/4	69 ² (1,753)	H 1/7 V 2/4	71 ² (1,803)	H 1/8 V 2/4	
	68 ³ (1,727)	H 1/7 V 2/2	67 ² (1,702)	H 1/5 V 2/4	69 ² (1,753)	H 1/5 V 2/4	71 ² (1,803)	H 1/6 V 2/4	70 ² (1,778)	H 1/8 V 2/4	72 ² (1,829)	H 1/8 V 2/4	74 ² (1,880)	H 1/5 V 2/6	
	74 ³ (1,880)	H 1/8 V 2/2	79 ² (2,007)	H 1/6 V 2/4	75 ² (1,905)	H 1/6 V 2/4	77 ² (1,956)	H 1/7 V 2/4	79 ² (2,007)	H 1/4 V 2/6	78 ² (1,981)	H 1/5 V 2/6	77 ² (1,956)	H 1/7 V 2/6	
	81 ³ (2,057)	H 1/5 V 2/4	83 ² (2,108)	H 1/6 V 2/4	78 ² (1,981)	H 1/7 V 2/4	80 ² (2,032)	H 1/4 V 2/6							
	84 ³ (2,134)	H 1/5 V 2/4			81 ² (2,057)	H 1/7 V 2/4									

1. See Figure 11 for details.
2. See Figure 12 for details.

Location Considerations

IMPORTANT: The thermal dispersion probes may be installed in the vertical or horizontal plane of the duct. In vertical mount applications, mount where more accessible. Consider a remote mount primary transmitter when the installation location of the primary probe is not easily accessible or extreme temperatures are likely. In horizontal mount applications, mount the probes so that the sensor shrouds are on the bottom of the probe to minimize moisture accumulation in the extrusion. Moisture in the air stream affects the accuracy of the air measurement. Intended applications are up to 99% non-condensing environments. The minimum spacing between probes and filter banks is 6 inches (152 mm) in the direction of airflow. Probes should be upstream of filters. It is important that the probes or filters be positioned so the seams of the filters do not block or obstruct airflow through the sensors.

IMPORTANT: The probe enclosure cover is secured with three captive thumb screws. Take care when mounting the probes to ensure there is adequate clearance to open the cover and make electrical connections.

Minimum Mounting Distances

Figure 13 represents applications for which the AD-1272 Airflow Measuring System is most suitable. If your particular application is not shown or if you do not have the space to observe the minimum distance, more probes and sensing points are recommended; contact your local Johnson Controls representative for the best solution. The locations shown on these details represent the minimum clearance from most obstructions that create an airflow disturbance.

Note: Refer to the *AD-1272 Advanced Thermal Dispersion Probe Airflow Measuring System Placements for Minimum Installations Application Note (LIT-1901047)* for more information about additional applications.

Figure 13: Elbow Minimum Distances

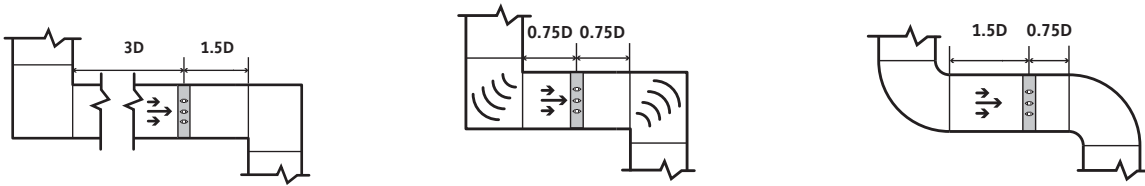


Figure 14: “T” Fitting Minimum Distances

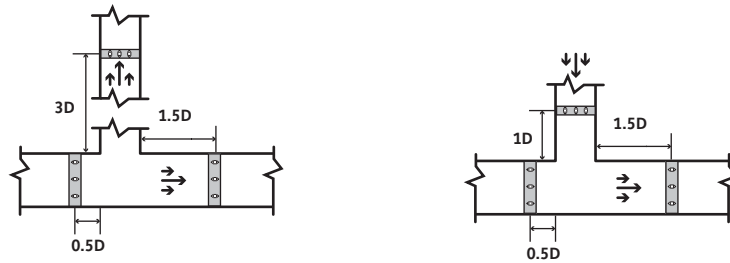


Figure 15: Transition Minimum Distances

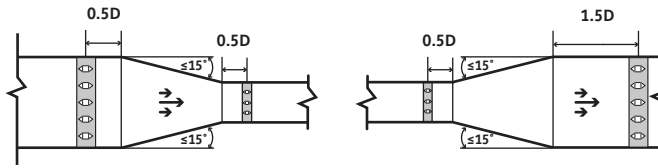
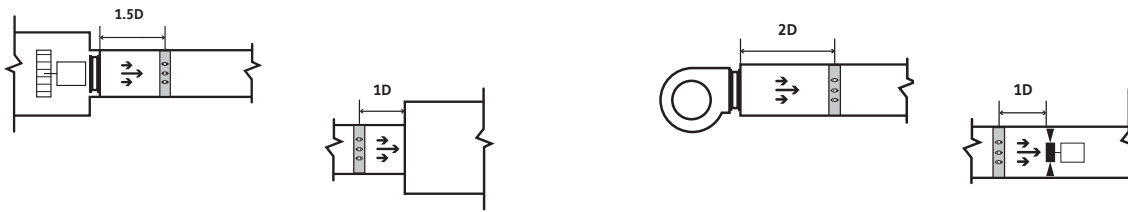


Figure 16: Fan Minimum Distances



Installing the Thermal Dispersion Probes with Insertion Mounting

1. Inspect the duct work and opening to ensure no obstructions or irregularities interfere with installation of the probes. See Figure 13 through Figure 16 for the appropriate probe mounting location, showing insertion and standoff mounting options.

Note: The duct work is measured by duct diameter.

Note: Ensure that adequate clearance exists at the installation site to permit installation and removal of the probes.

2. Determine where to mount the probes and mark the hole locations on the outside of the duct or the plenum.
 - a. Mark a 3 in. (76 mm) hole (round or square) for each probe insertion.
 - b. Mark a 2 in. (50 mm) hole on the opposite side of the duct or plenum from the insertion hole.
 - c. Double-check the hole locations before proceeding to the next step.

- On the side of the duct where the box will be, drill 3 in. (76 mm) holes at the correct heights to equally distribute the probes in the duct. Drill a 2 in. (50 mm) hole directly across from the 3 in. (76 mm) hole on the opposite side of the duct.

Note: For round and oval ducts, attach the metal flaps to the enclosure to secure the box to the duct.

Figure 17: Bracket Installation for Round Duct Mounting



- Remove the mounting plates on the mounting stud end of the probe. Keep the nuts and washers for next step.
- Holding the box end of the probe, insert the mounting stud end of each probe into the 3 in. (76 mm) holes until the probe mounting stud extends through the 2 in. (50 mm) holes in the opposite side of the duct.
- With the probes in place, go to the other side of the duct or plenum and install the mounting plates onto the studs. With the stud centered in the 2 in. (50 mm) hole, place the mounting plate over the stud, followed by the nut and washer. Tighten the nut and washer against the mounting plate. Do not overtighten.

Note: Do not place screws in the four corner holes of the mounting plates in this step.

- Verify the stud is located in the center of the 2 in. (50 mm) hole and secure the mounting plate with four self-drilling screws. Repeat this step for each probe in the duct or plenum.

IMPORTANT: When the probes are exposed to the outdoor environment, you must use the National Electrical Manufacturers' Association (NEMA) Type 4 weathershield option. Use appropriate moisture resistant conduit and connections. Use the three screws provided to secure the NEMA 4 connector.

- Moving back to the opposite side of the duct or plenum, measure from the top or bottom as in the previous step to center the probe on the correct dimension. The probe should be the same distance from the top of the duct or plenum as the center of the mounting stud on the opposite side (within 1/2 in. [12 mm]). Once the probe has been positioned, secure the electrical box enclosure with four self-drilling screws.

IMPORTANT: Install the probes with the mounting plates square and without twisting or bending.

Figure 18: Advanced Thermal Dispersion Probe (Side View)



Note: Stand-off mounting brackets are used for installation in open plenum areas where air enters the duct work through dampers. When using stand-off mounting brackets be sure to install in the airstream before the damper.

Figure 19: Probe with Damper Stand-off Mounting Bracket



Wiring

Note: Complete all the wiring steps in this section before applying power to the system.

Cable Specifications

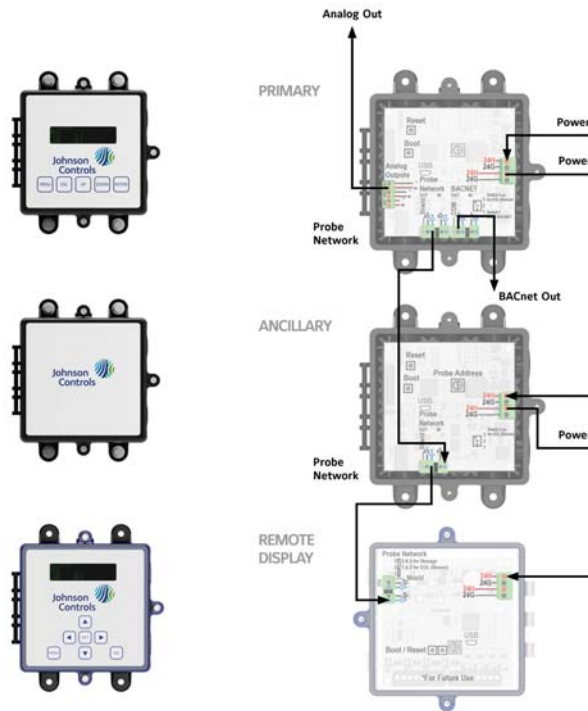
For ease of installation, a composite four-wire cable similar to Connect-Air part number W24182P-2306BL with communications and power in one cable is recommended. Alternatively, use a twisted shielded pair 24 AWG low capacitance wire communications cable and an 18 AWG power cable.

Note: Wires in an exposed or conduit installation must meet the wiring minimum bend radius of 3.5 in. (89 mm).

Wiring Connections

IMPORTANT: Do not run the probe wiring in the same conduit as other 24 AC power wiring or with wiring used to supply highly inductive loads, such as motors, contactors, and relays. Fluctuating, erratic, and inaccurate signal levels are possible when AC power wiring is present in the same conduit as the signal lines. Run the wiring away from variable frequency drives and broadcast antennas.

Figure 20: Wiring Connections



Primary Probe Wiring

IMPORTANT: The primary probe provides two 4 to 20 mA signals to building automation systems. Do not apply loop power to this probe. The system requires a two-wire power connection and separate two-wire connections for each analog output. Analog signal outputs are isolated from power.

Figure 21: Primary Transmitter Wiring

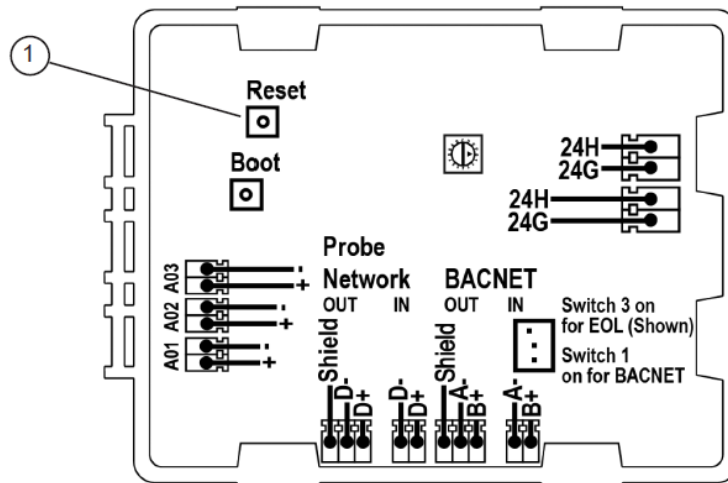


Table 5: Primary Transmitter Features

Callout	Feature	Description
1	Reset	Cycles power to the device without unplugging it

Analog Output

1. Carefully remove the top of the Phoenix Contact® screw terminal connector and insert the wires. Tighten the terminals and reconnect them to the controller board.
2. Connect the 4 to 20 mA analog flow output (A01: Pos and Com) and the 4 to 20 mA analog output factory default temperature (A02: Pos and Com) from the primary probe to a controller.

Note: The factory default flow output is A01. Either output A01 or A02 can be configured for temperature or flow, or both can be configured for temperature and/or flow. A03 is not used.

Probe Network

1. Carefully remove the top of the Phoenix Contact screw terminal connector and insert the wires. Tighten the terminals and reconnect them to the circuit board.
2. Connect the probe network terminal to the probe network In terminal on the primary transmitter probe(s).
 - a. The shield only connects on one end.
 - b. Connect the 24 AWG wire from the labeled Probe Network D- to the primary transmitter probe terminal labeled Probe Network D-.

Note: Use a 3 terminal connector for the Out connections and terminate the shield. For the In cable, use a 2 terminal connector and do not terminate the shield. Install on the center and outside posts, leaving a post between the 3 pin connector on the Out terminals and the 2 pin connector In terminals empty.

- c. Connect the 24 AWG wire labeled Network D+ to the primary transmitter probe terminal labeled Probe Network D+.
3. If this is not the End of Line (EOL) device for this probe network, connect additional devices in a daisy-chain series using the appropriate IN and OUT terminals.
4. For each airflow monitoring station, verify every device on the probe network has a unique address.

BACnet® MS/TP

1. Carefully remove the top of the Phoenix Contact screw terminal connector and insert the wires. Tighten the terminals and reconnect them to the controller board.
2. Connect the BACnet® output (A- and B+) from the primary probe to a BACnet MS/TP network.
3. If the probe is the last device on the BACnet network, set EOL 1 to on.

Note: For Metasys MS/TP BACnet, this device cannot be End of Line. A Metasys Field Controller or MS-BACEOL-0 should be used as the EOL device.

4. Connect the shield wire from the cable connected to the Out terminal to the Sh terminal.

Note: The Shield is connected on one end of each wire run and should never be connected on both ends of one wire.

Note: When connecting to a 3-wire BACnet MS/TP network, wire the COM wire to the COM wire and the Shield wire to the Shield wire. Do not wire the COM wire to the Shield wire.

Note: If this device is the end of the line of a Metasys FC bus, and the device switch cannot be used to set the probe, use the MS-BACEOL-0 for an externally powered end-of-the-line.

Power

1. Carefully remove the top of the Phoenix Contact® screw terminal connector and insert the wires. Tighten the terminals and reconnect them to the controller board.
2. Connect the 24 VAC power wires to the primary probe.

Note: A minimum of 15 VA power is recommended.

3. Connect the 24 VAC hot wire to the primary probe terminal labeled 24H.
4. Connect the 24 VAC common wire to the primary probe terminal labeled 24G.

Note: The two 24H connections are electrically identical, and the two 24G connections are also electrically identical.

Ancillary Probe Wiring

Figure 22: Ancillary Probe Wiring

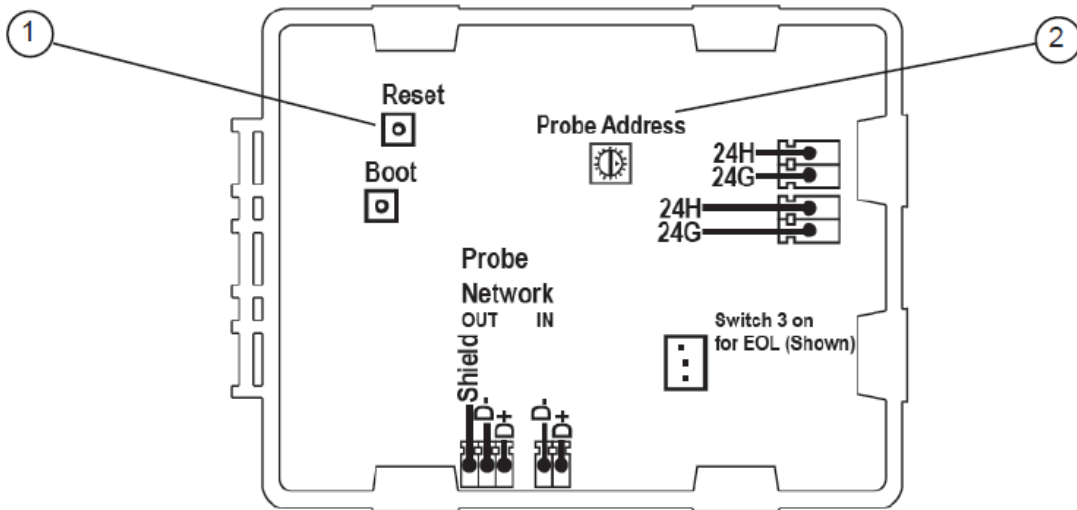


Table 6: Ancillary Probe Features

Callout	Feature	Description
1	Reset	Cycles power to the device without unplugging it
2	Probe Address Rotary Switch	Sets the address for each probe on probe network. The rotary switch is set to factory each system. Note: Duplicate addresses are not allowed on the probe network.

Probe Network

- Carefully remove the top of the Phoenix Contact screw terminal connector and insert the wires. Tighten the terminals and reconnect them to the circuit board.
- If this is not the first device in the probe network, connect the probe network terminal from the previous device to the probe network In terminal on the ancillary probe(s).
 - The shield only connects on one end.
 - Connect the 24 AWG wire from the previous device on the probe network labeled Probe Network D- to the ancillary probe terminal labeled Probe Network D-.

Note: Use a 3 terminal connector for the Out connections and terminate the shield. For the In cable, use a 2 terminal connector and do not terminate the shield. Install on the center and outside posts, leaving a post between the 3 pin connector on the Out terminals and the 2 pin connector In terminals empty.

- Connect the 24 AWG wire from the previous device on the probe network labeled Network D+ to the ancillary probe terminal labeled Probe Network D+.
- If this is not the End of Line (EOL) device for this probe network, connect additional devices in a daisy-chain series using the appropriate IN an OUT terminals.
 - For each airflow monitoring station, verify every device on the probe network has a unique address.

Power

Note: Each ancillary probe requires power and can be powered from the same transformer as the primary probe. Observe polarity to prevent a direct short. Two power connections are provided and are electrically the same. These connections can be used interchangeably to connect additional ancillary probes or the remote display.

- Carefully remove the top of the Phoenix Contact screw terminal connector and insert the wires. Tighten the screw terminals and reconnect them to the controller board.

2. Connect the 18 AWG copper wire from the primary probe terminal labeled 24H to the ancillary probe terminal labeled 24H. Observe the polarity to avoid a direct short.
3. Connect the 18 AWG copper wire from the primary probe terminal labeled 24G to the ancillary probe terminal labeled 24G.

Remote Display Wiring

Figure 23: Remote Display Wiring

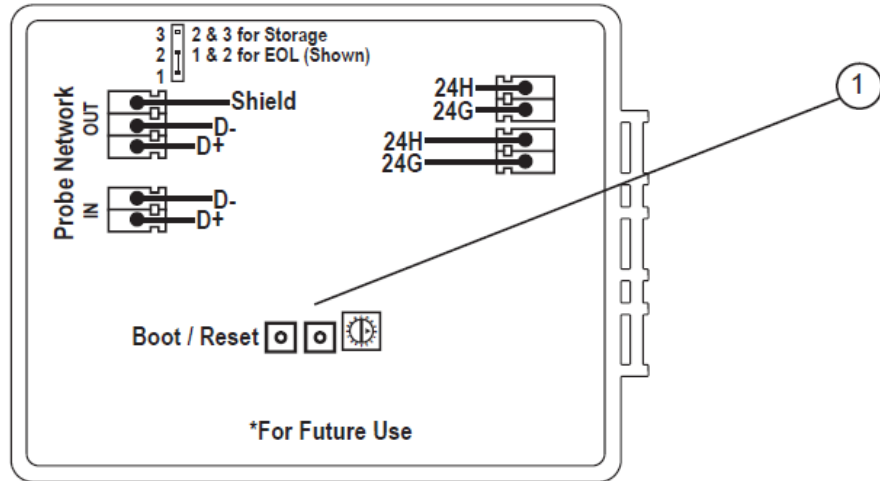


Table 7: Remote Display Features

Callout	Feature	Description
1	Reset	Cycles power to the device without unplugging it

Probe Network

Note: When the wireless option is used for communication between the primary probe and the remote display, no network connection is required.

1. Carefully remove the top of the Phoenix Contact screw terminal connector and insert the wires. Tighten the screw terminals and reconnect them to the controller board.
2. Connect the probe network out terminal from the primary transmitter to the probe network in terminal on the remote device.
 - a. The shield only connects on the one end.
 - b. Connect the 24 AWG wire from the primary transmitter terminal labeled Probe Network D- to the remote display terminal labeled Probe Network D-.

Note: Use a 3 terminal connector for the “In” connections and terminate the shield. For the “Out” cable, use a 2 terminal connector and do not terminate the shield. Install on the center and outside posts, leaving a post between the 3 terminal and 2 terminal connectors empty.

- c. Connect the 24 AWG wire from the primary transmitter terminal labeled Network D+ to the remote display terminal labeled Probe Network D+.
- d. If the remote display in each AD-1272 Airflow Measuring System is the end of line on the probe network, install a jumper across EOL pins 1 and 2. If the remote display is not the end of the line in the probe network, retain the jumper on pins 2 and 3 for storage.

Power

Note: The remote display can be powered from any 24 VAC source and does not need to be physically wired to the primary probe when the wireless option is selected. However, when wired to the probe network, it is typically more convenient to use the recommended wire and to power from the last ancillary probe or the primary probe, depending on the available connections.

1. Carefully remove the top of the Phoenix Contact screw terminal connector and insert the wires. Tighten the screw terminals and reconnect them to the controller board.
2. Connect the 18 AWG copper wire from the primary probe terminal labeled 24H to the remote display terminal labeled 24H. Observe the polarity when providing power to multiple probes connected to the same transformer to avoid a direct short. The remote display can be connected to any 24 VAC transformer when using the wireless options and no physical connection to the primary probe or probe network is required.
3. When power is supplied from the primary probe or an ancillary probe on the probe network, connect the 18 AWG copper wire from the primary probe terminal labeled 24G to the remote display terminal labeled Com In.

Note: The two 24H connections are electrically identical, and the two 24G connections are also electrically identical.

Completing the Wiring

When the wiring on all the probes and the remote display is complete, verify that all the probes and sensors are recognized on the system. This can be done by applying power to the system and verifying the correct number of probes and sensors is displayed during start-up. If it is incorrect, check all probe network wiring and probe address dial settings.

Confirm that no two ancillary probes are set for the same address. Each probe address must be unique on the probe network to work correctly. The primary probe and remote display are hard-coded addresses and do not need to be changed or addressed. Confirm the connections are made to the probe network and are not to the BACnet or analog output connections on the primary probe. After the device warms up, the temperature and flow readings display.

Refer to the *AD-1272 Advanced Thermal Dispersion Probe Airflow Measuring System Technical Bulletin (LIT-12012477)* for detailed configuration instructions.

Menu Structure

Refer to the *AD-1272 Advanced Thermal Dispersion Probe Airflow Measuring System Technical Bulletin (LIT-12012477)* for detailed configuration instructions.

Main Display (Normal Operation)

Line 1 displays the average temperature and line 2 displays the average velocity or volume.

Menu Button Selections

- Operator Menu
- Supervisor Menu

Operator Menu

The Operator Menu allows the user to view and change system parameters and variables.

Table 8: Operator Menu Options (Part 1 of 2)

Operator Menu Submenus (Actual Display Name)	Submenu Function	Submenu Selections
Enable Operator PIN (Enable Oper PIN)	Enables PIN protection for the Operator Menu.	N/A
Change Operator PIN (Change Oper PIN)	Allows the user to update the PIN.	N/A
Flow Configuration (Flow Config)	Allows system variable configuration.	Duct Shape Duct Width Duct Height Duct Diameter Duct Area Site Elevation Relative Humidity Flow Units Output Lockout
Display Configuration (Display Config)	Select parameters for displayed data.	Display Filter Display Units Display Flow Type Line 2 Parameters Line 2 Custom
Analog Output 1 Parameters (Output 1 Param)	Select Analog Output 1 parameters (flow, temperature, or none).	Analog Output 1 Parameters
Analog Output 2 Parameters (Output 2 Param)	Select Analog Output 2 parameters (flow, temperature, or none).	Analog Output 2 Parameters
Temperature Low Pass Filter (Temp LPF)	Selects amount of filtering applied to the analog output for temperature.	Temperature Low Pass Filter
Flow Low Pass Filter (Flow LPF)	Selects amount of filtering applied to the analog output for flow.	Flow Low Pass Filter
Analog Output Calibration (Output Cal Menu)	Spans the analog outputs for temperature and flow. Use the positive or negative offset if 4 mA output is not as expected.	Output 1 mA Offset Output 1 mA Low Span Output 1 mA High Span Output 2 mA Offset Output 2 mA Low Span Output 2 mA High Span Design Range Low Design Range High Temperature Range Low Temperature Range High

Table 8: Operator Menu Options (Part 2 of 2)

Operator Menu Submenus (Actual Display Name)	Submenu Function	Submenu Selections
Temperature Balance Menu (Temp Bal Config)	Selects an offset for the reported average temperature	Temperature Balance Enable Temperature Offset
K-Factor Configuration (KFactor Config)	Turns K-Factor on and off and allows configuration.	K-Factor Enable? Calculate K-Factor? K-Factor Gain ¹ K-Factor Offset ¹ Number of Data Points ² System at Point 1 ² Point 1 Velocity ² System at Point 2 ² Point 2 Velocity ² System at Point 3 ² Point 3 Velocity ² Calculate K-Factor
Menu Inactivity Timeout (Menu Timeout)	Selects a time the device returns to normal operation and front panel backlight when no menu activity is detected.	Menu Timeout
BACnet Configuration³ (Network Cfg)	Turns BACnet on and off and allows configuration.	BACnet On/Off BACnet Instance BACnet Address BACnet Max Mast BACnet Baud Rate
BACnet Flow Alarm Configuration (Flow Alarm Cfg)	Turns high and low alarms on and off, allows alarm configuration.	Alarm Low On/Off Alarm High On/Off Alarm Low Setpoint Alarm High Setpoint Alarm Deadband Alarm Delay
BACnet Temperature Alarm Configuration (Temp Alarm Cfg)	Turns high and low alarms on and off, allows alarm configuration.	Alarm Low On/Off Alarm High On/Off Alarm Low Setpoint Alarm High Setpoint Alarm Deadband Alarm Delay

1. This submenu selection only appears when Calculate K-Factor is set to No.
2. This submenu selection only appears when Calculate K-Factor is set to Yes.
3. When making changes to the BACnet configuration, toggle BACnet On/Off to ensure the changes take effect.

Supervisor Menu

The Supervisor Menu allows the user to enable or disable probes and/or individual sensors, scans all sensors for status updates, and performs diagnostics on alert conditions.

Table 9: Supervisor Menu Options

Supervisor Menu Submenus (Actual Display Name)	Submenu Function	Submenu Selections
Enable Supervisor PIN (Enable Supv PIN)	Enables PIN protection for the Supervisor Menu.	N/A
Change Supervisor PIN (Change Supv PIN)	Allows the user to update the PIN.	N/A
Sensor Management (Sensor Mgmt)	Allows the user to scan the probe network to detect the installed probes and sensors. Allows for enabling and disabling the diagnostic status condition of the sensors.	Display Active Sensor Scan for Sensor Display Sensor Status Scan for Sensor Enable Sensors Disable Sensors Display Probe Status Display Probe Data
Reset Sensors (Reset Sensors)	Select parameters for displayed data.	Reset Sensors
Factory Default (Factory Default)	Restores the device to the factory default settings.	Factory Default

Troubleshooting

Use Table 10 to troubleshoot problems with the AD-1272 Airflow Measuring System.

Table 10: AD-1272 System Troubleshooting (Part 1 of 2)

Problem	Possible Cause	Corrective Action
Airflow readings do not match what T&B is reporting	Turbulent or non-uniform airflow across the air-measurement station.	Use Automatic Kfactor Configuration and use 1 point calibration if only gain is required. If flow is non-linear, use two or three-point calibration feature.
		Install additional probes to provide more sensing points.
		Move probes to a better location in accordance with the minimum placement guide.
		Check for leaks in the duct.
No display	No power	Verify 24 VAC power at power terminal. Make sure the ribbon cable is fully seated in the board's socket.
		Visually check to make sure membrane is plugged in to the display board in lid.

Table 10: AD-1272 System Troubleshooting (Part 2 of 2)

Problem	Possible Cause	Corrective Action
Incorrect number of PROBES shown when the power is applied.	Probe network is not wired correctly or the plug is plugged into the wrong port.	Verify wiring using the probe network wiring information the above document. Look at the drawings and make sure the left and the right terminals are not swapped. AO, Probe Network and BACnet ports on the primary fit into any of the plugs so make sure connections are correct on the board.
	Duplicate addresses on Probe Network	Verify each ancillary probe has a unique address by checking the rotary dial position.
No BACnet communication with the BAS	Network wires terminated to the incorrect point or the wrong connector.	Verify wiring using the BACnet wiring information in the above document. Look at the drawings and make sure the left and right terminals are not swapped.
	The device is not configured properly.	Verify configuration parameters in the BACnet Network Configuration settings match what is required to communicate with the BAS.

Repair Information

If the AD-1272 Advanced Thermal Dispersion Probe Airflow Measuring System fails to operate within its specifications, contact technical support for troubleshooting assistance and further action. If you require a replacement AD-1272 Airflow Measuring System, contact the nearest Johnson Controls representative.

Maintenance

Twice a year, scroll through the velocity and temperature values using the UP and DOWN buttons. Inspect the thermal dispersion probes and clean the sensor nodes.

Annually inspect the thermal dispersion sensors installed in unfiltered outside air, return air, or exhaust air applications to ensure that the thermal dispersion sensors are free of excessive buildup of lint, dust, or other airborne particulates.

Only remove the probes if inspection is not possible any other way. It may be possible to clean the sensors as installed through other access.

Follow these steps if direct inspection through other means is not possible and the probes must be removed:

1. Before cleaning the sensors, make sure the power to the AD-1272 Airflow Measuring System is turned off or disconnected.
2. Remove the mounting screws from the mounting plates on both sides of the thermal dispersion probe.
3. Remove the lock nut and the washer from the mounting stud.
4. Slide the probe out of the duct from the side with the box.
5. Wipe down the probe with a damp cloth. Ensure that the sensor is on the bottom side of the probe during cleaning so any moisture encountered in the cleaning process will drain out of the probe and sensor.
6. Remove lint, dust, and other matter from the opening of the sensor shroud by blowing through the hole or using a soft brush. Do not use high pressure air at close range and avoid thermal shock. Care should be taken not to damage the thermistors while cleaning. Use distilled water if a solvent is necessary to remove dirt build-up on the sensors.
7. Replace the probe assembly in the duct by reversing Step 1 through Step 6.
8. When the sensors are dry, power on the unit.

Replacement Parts

See Table 11 for AD-1272 Advanced Thermal Dispersion Probe Airflow Measuring System replacement part information.

Table 11: Replacement Parts

Code Number	Description
DMPR-EAF-001	Remote display user interface
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 (152.4 m)

Technical Specifications

AD-1272 Thermal Dispersion Probe Airflow Measuring System

Probe Material	2 x 3/4 in. (51 x 19 mm) 6063T6 high-yield extruded aluminum with acid-etch, clear anodized finish
Communications Bus	RS-485, BACnet MS/TP 2-wire FC Bus between the primary probe and field controllers
Thermistor	Thermistor pair in flexible polyimide membrane sensor
Size Range	8 x 8 in. to 120 x 120 in. (20 x 20 cm to 305 x 305 cm)
Brackets	0.080 Aluminum
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, Log-Tchebycheff or EK Log for round duct applications
Calibrated Range	0 to 5,000 FPM (0 to 1,523 MPM)
Temperature Sensor Accuracy	$\pm 0.10^\circ\text{F}$ (0.06°C)
Sensor Temperature Range	-20 to 120°F (-29 to 49°C)
Probe Temperature Range	-20 to 120°F (-29 to 49°C) ¹
Humidity Range	0 to 99% RH, noncondensing
Maximum Number Sensors	128
Power Requirement	24 VAC (20 - 30 VAC), 15 VA
Power Consumption	<10 VA for 2 probes with 8 sensors per probe and LCD display on primary probe.
Output Signals	4 to 20 mA standard, 2 to 10 VDC requires 500 ohm resistor across output terminals.
Output Signal Adjustments	Field adjustable offset and span
Display	16x2 character LCD (airflow, temperature, setup, and diagnostics)
Velocity Requirements	Minimum: 0 FPM (0 MPM) Maximum: 5,000 FPM (1,524 MPM)
Pressure Drop	Four 48 in. (122 cm) long probes in 48 x 48 in. duct: < 0.1 in. w.g. at 1000 FPM
Approximate Shipping Weight	12 lb (5.4 kg) for AD-1272 Airflow Measuring System with two probes

1. Standard LCDs can be difficult to read at low temperatures. If display operation at less than -5°F (-20°F) is expected, consider alternative display options.

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.

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AD-1272 Advanced Thermal Dispersion Probe Airflow Measuring System Installation Instructions