

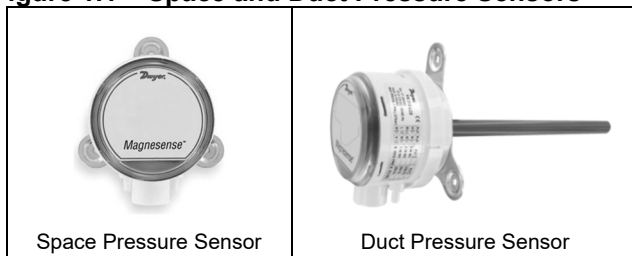
### INSTALLATION INSTRUCTIONS

#### Space & Duct Pressure Sensors

#### Packaged Ventilation/Dedicated Outside Air System (DOAS)

#### model DLV

Figure 1.1 – Space and Duct Pressure Sensors



**WARNING**

1. Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage.
2. All units must be wired strictly in accordance with wiring diagram furnished with the unit. Any wiring different from the wiring diagram could result in a hazard to persons and property.
3. All wiring must be done with a wiring material having a temperature rating of at least 105°C.

**CAUTION**

As with any mechanical equipment, personal injury can result from contact with sharp sheet metal edges. Be careful when you handle this equipment.

**IMPORTANT**

1. The use of this manual is specifically intended for a qualified installation and service agency. All installation and service of these kits must be performed by a qualified installation and service agency.
2. These instructions must also be used in conjunction with the Installation and Service Manual and Controls Manual originally shipped with the unit, in addition to any other accompanying component supplier literature.

### Application

The Dwyer pressure sensor can be used in conjunction with the Carel programmable microprocessor controller on all Packaged Ventilation/Dedicated Outside Air System (DOAS) units, model DLV.

The sensor, when equipped with the unit, is used with the control to maintain space or duct pressure. Typically, the purpose is to maintain a slightly positive pressure in the space to reduce infiltration or to maintain a duct pressure by varying air volume in the supply ductwork when used with VAV boxes serving multiple areas.

The sensor measures the difference between the indoor space pressure or duct pressure and the outdoor atmospheric pressure and provides an analog feedback signal to the unit controller.

### Specifications

<b>Model Number:</b>	MS-021 (Space), MS-112 (Duct)
<b>Sensing:</b>	Differential Pressure Transmitter
<b>Pressure Range: (+/- 2%)</b>	0.1, 0.25, & 0.5"W.C. (Space) 1.0, 2.0, & 5.0"W.C. (Duct)
<b>Input Power:</b>	10 to 35 VDC (2-wire), 40mA max
<b>Output Signals:</b>	Bi-Directional, 4-20 mA (Space) Positive Only, 4-20 mA (Duct)
<b>Casing Protection:</b>	IP66 (NEMA Type 4X)
<b>Electrical Entry:</b>	1/2" NPS Thread
<b>Ambient Temp:</b>	0 to 150°F (-18 to 66°C)
<b>Tubing Connection:</b>	3/16" (5 mm) ID, max 9 mm OD

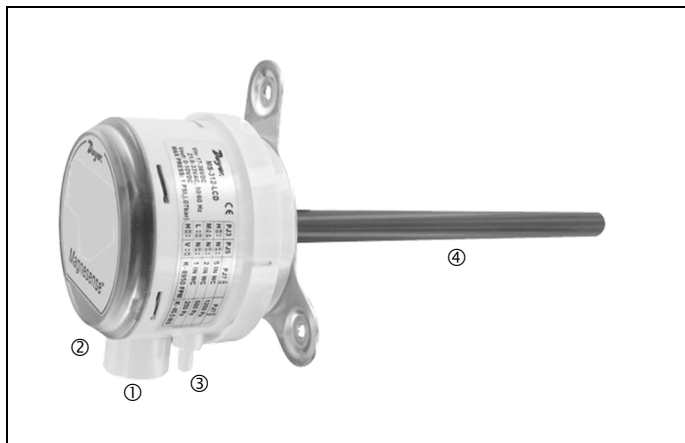
# INSTALLATION – Space or Duct Pressure Sensor

## Installation

### Space or Duct Pressure Sensor

1. Select a location that is free from vibration and allows the pressure sensor assembly to be securely mounted on a vertical surface with the connections directed down to prevent moisture from entering either the pressure ports or the electrical cable entry. The sensor must be vertical to minimize gravity effects on the internal diaphragm. Refer to Figure 2.1.
2. The transmitter should be mounted away from fans, corners, heating and cooling coils and other equipment that will affect the measurement of the pressure.
3. For Duct Pressure Sensing only (if installing a Space Pressure Sensor, skip to step 4):
  - a) Drill a 9/16" diameter hole in the duct.
  - b) Insert the sensor probe into the duct and mark the location of the three mounting holes on the duct using the mounting flange as template.
  - c) Remove the sensor and drill 1/8" holes at the three points marked.
  - d) Reinsert the sensor probe until the mounting flange is flush with the duct.
4. Mount the sensor using three (3) #8 x 1/2" pan head sheet metal screws in the mounting flanges, as shown in Figure 2.1. Do not over tighten.

**Figure 2.1 – Space or Duct Pressure Sensor**

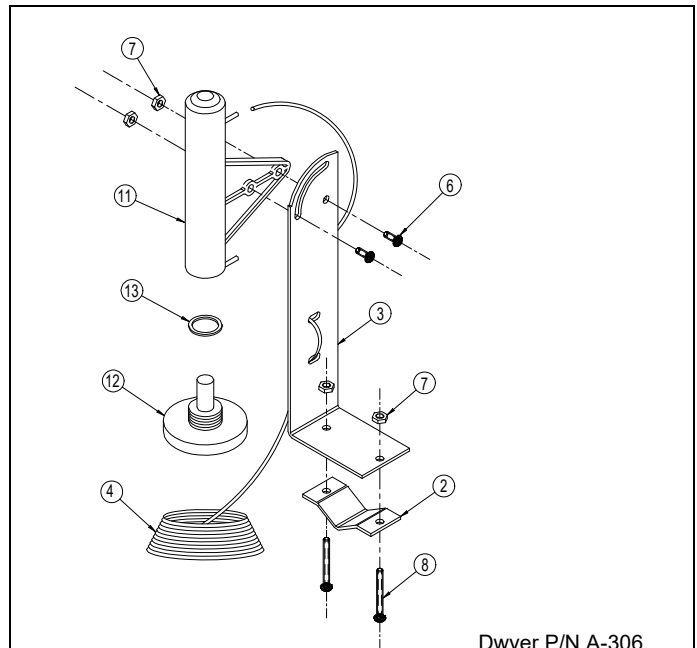


Item	Description
1	1/2" NPS Threaded Conduit Entry Connection
2	High Pressure Tap (hidden in view behind item ①)
3	Low Pressure Tap
4	Sensor Probe (applies only to Duct Pressure Sensor)

### Outdoor Static Pressure Sensor Mounting:

1. Select an outdoor location free from vibration and protected from the wind, ideally within 50 feet of the location of the space or duct pressure sensor assembly.
2. The outdoor static pressure sensor must be securely mounted in a vertical position as shown in Figure 2.3. The bracket allows for mounting on uneven surfaces or antenna posts. The static pressure plate (item #12) must face downward.
3. Attach one end of the 50' flexible tubing to the pressure tap located at the top of the outdoor static pressure sensor pick up body. Run the tubing to the indoor pressure sensor assembly and attach that end of the flexible tubing to the low pressure tap on the pressure sensor assembly. If less than 50' of tubing is required, do not cut the tubing. Neatly coil the excess and secure it to the wall being careful not to kink or pinch the tubing.
4. The flexible tubing must be securely fastened to the building structure along the distance between the outdoor static pressure sensor and the indoor pressure sensor assemblies to prevent false readings from vibration or movement of the tubing.

**Figure 2.2 – Outdoor Static Pressure Sensor**



Dwyer P/N A-306

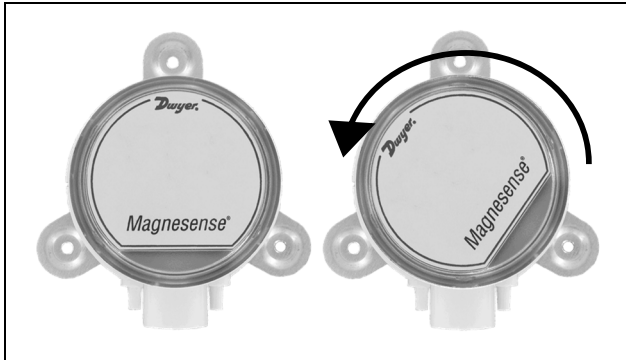
Item	Description
2	Antenna Clamp
3	Mounting Bracket
4	Flexible Tubing, 50 feet
5	Tube Clamps (not shown)
6	10-32 x 1/2" Machine Screw
7	10-32 Nut
8	10-32 x 1 3/4" Machine Screw
9	8 x 1 3/4" Self-Tapping Screw
10	Wind Pick Up Assembly (items 11, 12, 13)
11	Pick Up Body
12	Static Pressure Plate
13	O-Ring Seal

# INSTALLATION – Space or Duct Pressure Sensor

## Electrical Connections

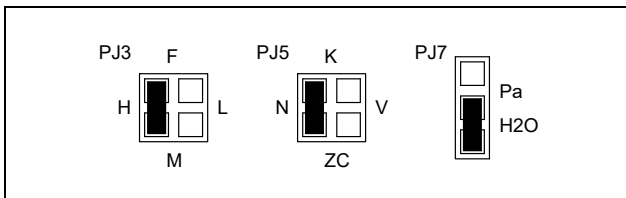
1. Remove the cover of the pressure sensor junction box by rotating the cover counterclockwise. See Figure 3.1.

**Figure 3.1 – Remove Sensor J-Box Cover**



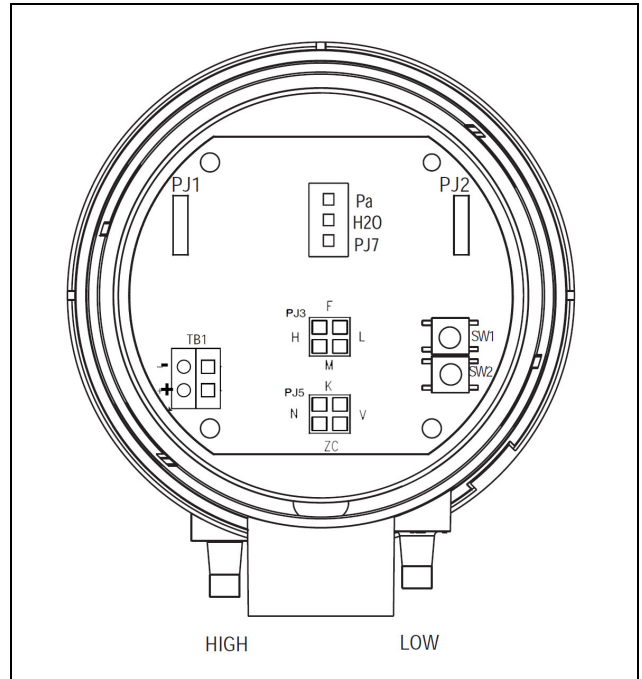
2. There are three jumpers that must be checked on the sensor to ensure proper operation with the main unit controls. The jumper settings are as follows (refer to Figure 3.2):
  - a) Jumper PJ3 is used to set the pressure range to be used. The standard setting is H for High.
  - b) Jumper PJ5 is used to set the control operating mode. The setting is to be N for Normal Mode.
  - c) Jumper PJ7 is used to set the units to be used. The setting is to be H2O for English (IP) units.

**Figure 3.2 – Pressure Sensor Jumper Settings**



3. Wiring between the sensor and the main unit controller is to be made using shielded two conductor cable. Minimum wire size is 22 gauge for lengths up to 100 feet.
4. The wiring connections to the sensor are made to terminals + and – on the terminal block TB1 located at the bottom left of the sensor printed circuit board (PCB). Polarity is indicated by + and – signs on the PCB. Refer to Figure 3.3.
5. Reinstall the sensor junction box cover by rotating it clockwise, opposite of what is shown in Figure 3.1.

**Figure 3.3 – Sensor Wiring Connections**



6. The wiring connections to the main unit low voltage terminal strip are made as shown in Table 3.1, depending on the type of sensor.

**Table 3.1 – Pressure Sensor to Unit Wiring**

Terminals on Sensor	Terminals on Model DLV Unit	
	Building Pressure Application	Duct Pressure Application
+	515	515
-	813	882

## Sensor Calibration

1. It is recommended to annually re-zero the sensor, which is performed as follows:
  - a. Remove the sensor cover as described in the previous section.
  - b. Remove the flexible tubing from the sensor so both high and low ports are open to the atmosphere.
  - c. Hold the “Zero” switch (SW1 in Figure 3.3) on the PCB for 5 seconds and release.
  - d. If no other adjustments are necessary, replace the flexible tubing to the low pressure tap and reinstall the sensor cover.
2. If recalibration of the sensor span is required, refer to Dwyer Bulletin #A-26 that shipped with the sensor

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## Typical Control Sequence

Depending on the unit configuration, the following are the typical control sequences available. All assume positive space or duct pressure control:

### Damper Control (space pressure control only)

- If the space pressure falls below the lower setpoint, the outside air dampers begin to open and the return air dampers begin to close, increasing the outside air volume.
- If the space pressure rises above the upper setpoint, the outside air dampers begin to close and the return air dampers begin to open, decreasing the outside air volume.

### Supply Blower Control (space or duct pressure control)

- If the space or duct pressure falls below the lower setpoint, the supply blower variable frequency drive (VFD) increases the blower speed to increase outside air volume.
- If the space or duct pressure rises above the upper setpoint, the supply blower VFD decreases the blower speed to decrease outside air volume.

### Exhaust Blower Control (space pressure control only)

- If the space pressure falls below the lower setpoint, the exhaust blower VFD decreases the blower speed to decrease the exhaust air volume.
- If the space pressure rises above the upper setpoint, the exhaust blower VFD increases the blower speed to increase the exhaust air volume.

Lennox Industries, Inc. has a continuous product improvement program, and therefore reserves the right to change design and specifications without notice.

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