AcuPRE DM™ Series

Duct Mount Differential Pressure Sensor Installation Guide

CE

ACCUENERGY

Please read this manual carefully before installation, operation, and maintenance of the AcuPRE DM Duct Mount Differential Pressure Sensor.

The information contained in this document is believed to be accurate at the time of publication, however, Accuenergy assumes no responsibility for any errors which may appear here and reserves the right to make changes without prior notice as part of continuing improvements. Please ask the local representative for the latest product specifications before ordering. The following symbols in this manual appear throughout this documentation, in addition to the electrical warning of danger or safety risk during the installation and operation of the sensors.

The following symbols in this manual appear throughout this documentation, in addition to the electrical warning of danger or safety risk during the installation and operation of the sensors.

	**Electrical Shock Hazard:** Contains information about procedures which must be followed to prevent the risk of electric shock and danger that can result in personal injury or death.
	**Safety Warning:** Contains information about circumstances which, if not considered, may result in personal injury or death.
NOTE	**NOTE:** An advance notice to provide additional information before an action is taken by the user.
ALERT	**ALERT:** Indicating the operation may lead to device malfunction or potential data loss.

Installation and maintenance of the AcuPRE DM Differential Pressure Sensor shall only be performed by qualified, competent professionals who have received training and have experience with high voltage and current devices.

Accuenergy shall not be responsible or liable for any damage caused by improper sensor installation and/or operation.

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Introduction

Overview

The AcuPRE DM differential pressure sensor utilizes MEMS sensors and digital technologies to measure positive, negative, and differential pressure. Designed for duct-mounted HVAC applications, it includes a static pressure probe for monitoring fans, blowers, and duct static pressure. The AcuPRE DM can be fastened directly to the ductwork but also includes an optional mounting flange, which enables adjustable probe insertion.

The DP sensor provides an analog output proportional to the measured difference in pressure and the selected pressure range. It can be used to monitor pressure in any application that has non-combustible and non-corrosive air.

The AcuPRE DM series features various base model numbers with different analog output options, including 0-5 VDC, 0-10 VDC, and 4-20 mA, with either unidirectional (up to 0 to 40 inWC) or bidirectional (up to -2.0 to 2.0 inWC) pressure range, depending on the model selection. The DP sensor features configurable settings, including zero calibration, pressure range, response time, and unit of measurement. AcuPRE DM comes standard with an LCD display, which helps with troubleshooting and installation.

ALERT: When using 24VAC to power the AcuPRE DM, it is strongly recommended to power the unit with an independent, dedicated, UL-listed class 2 transformer.

ALERT: If any DIP switch or jumper settings are changed, make sure to power off the unit first prior to making changes. Set the DIP switches to the correct position, then reapply power.

Dimensions

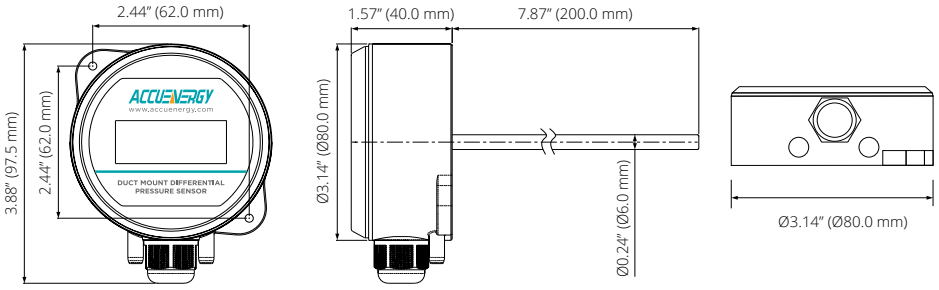

Figure 1 AcuPRE WM Front and Bottom Views

Installation

Step 1: Preparations

Make sure to prepare all necessary components and accessories before installing the AcuPRE DM sensor. Different accessories may be required depending on the application.

Table 1 Required Components and Accessories for AcuPRE DM

Items	Description	Type
AcuPRE DM Series	Duct Mount Differential Pressure Sensor	Sensor
PVC Tubing	Clear PVC tubing. Available in two different sizes.	Accessories*
Pressure Tip	Six different pressure tip models, available in ABS plastic or 304 stainless steel in various lengths and shapes.	Accessories*
Pickup Ports	Two models available.	Accessories*

* Accessories are sold separately.

The following diagram shows the internal schematics of the AcuPRE DM differential pressure sensor. The output ports, measurement unit selection DIP switches, response rate selection DIP switches, and pressure range selection jumpers are highlighted.

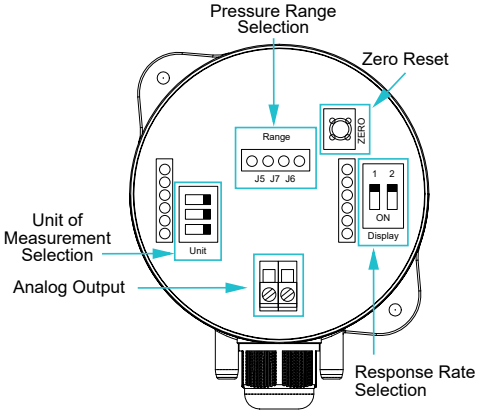

Figure 2 Internal Schematics of AcuPRE DM

Step 2: Mounting the DP Sensor

AcuPRE DM can either be mounted directly onto the ductwork or using a flange mount.

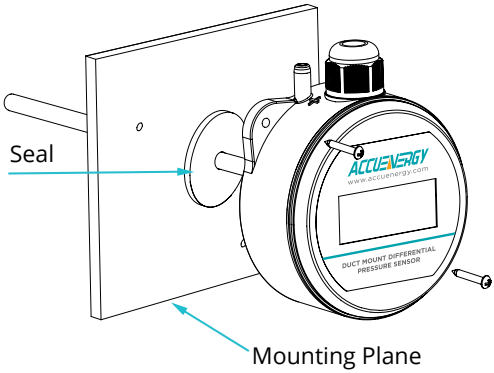

Figure 3 Direct Duct Mount for AcuPRE DM

For direct duct mount application, install the AcuPRE DM as shown in Figure 2. Drill a 9/32" (7mm) diameter hole in the duct, install the included seal over the drilled hole and insert the static pressure probe into it. Use the two mounting screws to secure the DP sensor on the duct.

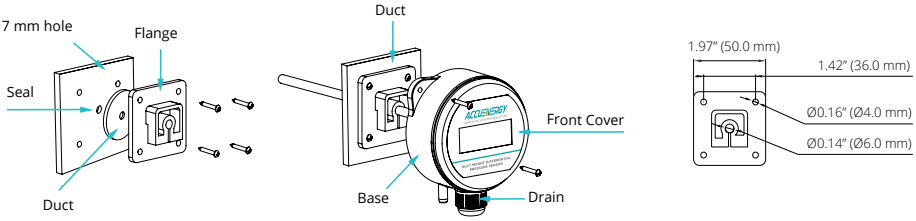

Figure 4 Duct Mount with Flange

Drill a 9/32" (7mm) diameter hole on the duct, then install the seal over the drilled hole, and place the mounting flange directly over the duct. Make sure the central opening of the mounting flange aligns with the prepared hole for the static pressure probe. Fasten the mounting flange to the ductwork, and then insert the static pressure probe of the DP sensor directly into the duct. Adjust the pressure probe to the required depth, tighten the flange clamping screw to secure probe. Refer to Figure 3 for details.

NOTE: Over-tightening screws may cause damage to mounting flanges so use caution when fastening.

Mount the DP sensor on a flat, vertical side of the ductwork. The diaphragm must be vertical to minimize gravity effects on the diaphragm. Do not mount the DP sensor on the top or bottom side of the ductwork.

NOTE: Avoid mounting the AcuPRE DM in close proximity to vibrating equipment or surfaces. Excessive vibration may cause accuracy issues with pressure readings.

Step 3: Duct Static Pressure Port Location

The AcuPRE DM features a static pressure probe with a length of 7.87" (200mm). If a shorter probe length is required, use the optional mounting flange that comes with the DP sensor. It is not recommended to cut the static pressure probe in the field.

Drill the opening for the static pressure probe in the midline of the ductwork. Mount the static pressure probe several duct diameters away from bends, take-offs, reducers, dampers, and coils to ensure the probe is located away from turbulent air. Ideally, the static pressure probe should be mounted near the end of a long duct run.

Step 4: Electrical Wiring

When using a shielded cable, ground the shield only at the controller end. Grounding both ends can cause a ground loop.

ALERT: When using 24VAC to power the AcuPRE DM, it is strongly recommended to power the unit with an independent dedicated UL-Listed class 2 transformer.

ALERT: If sharing a 24VAC transformer with other equipment such as controllers, transmitters or actuators, improper polarity will cause damage to the DP sensor.

ALERT: Do not mix half and full-wave rectified devices when powering with AC voltage. The AcuPRE DM is half-wave rectified.

ALERT: The sensor must be powered OFF during installing installation and wiring. Failure to do so may result in damage to the DP sensor.

ALERT: Watertight PG9 cordgrip Installed (5/8" knockout hole when PG9 removed).

The AcuPRE DM can be conveniently installed with the PG9 cordgrip facing upwards or downwards according to the project requirements, refer to Figure 4 for details. Rotate the

AcuPRE DM cover counterclockwise to open and reveal the internal components. The LCD can be removed and rotated 180° to meet the installation requirements. This provides the flexibility to run a wire through the top or the bottom of the AcuPRE DM enclosure. Once wiring connections are completed, reinstall and secure the cover by rotating it clockwise. To ensure the IP65 waterproof rating, please make sure that the upper cover sealing ring is properly installed and secured.

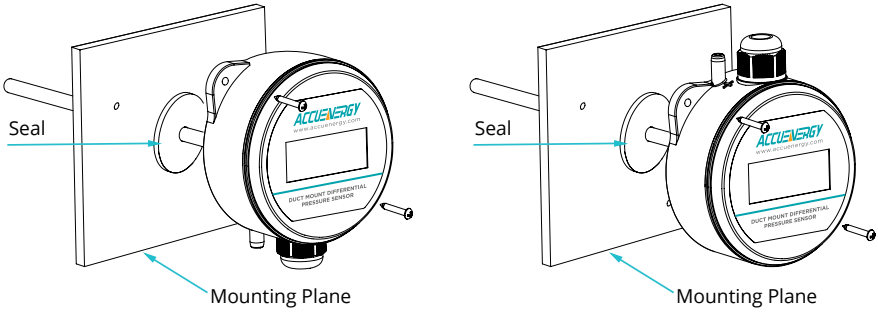

Figure 5 AcuPRE DM Installed with Cordgrip Facing Upward and Downward

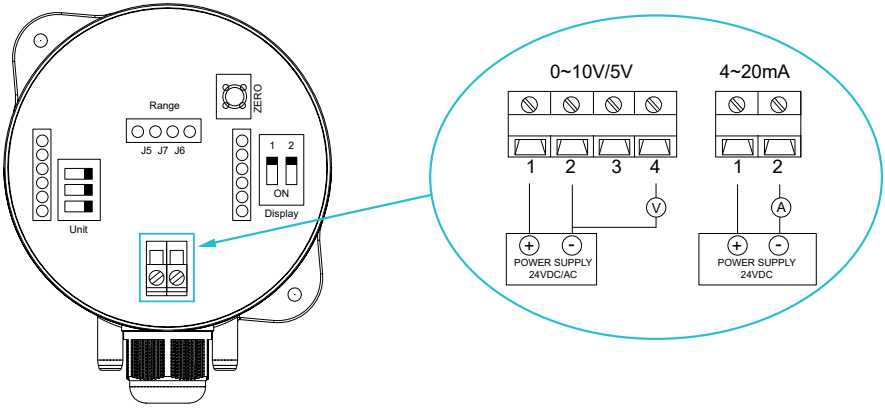

Figure 6 AcuPRE DM Wiring Terminals

Table 2 AcuPRE DM Wiring Terminals

AcuPRE DM Wiring Termination			
Analog Output Signal	**24V Power Terminal**	**GND Terminal**	**OUT Terminal**
4 to 20 mA (2-Wire)	18.5~35VDC	Not Applicable for This Model	Milliamp Signal To Controller Analog Input
0 to 5 VDC (3-Wire)	16~28VAC/ 16~35VDC	To Controller Ground	VDC Signal To Controller Analog Input
0 to 10 VDC (3-Wire)	16~28VAC/ 16~35VDC	To Controller Ground	VDC Signal To Controller Analog Input

NOTE: Accuenergy recommends 16 to 24 AWG twisted pair wires or shielded cable cables for all DP sensors. This applies to both supply power and analog output wiring.

NOTE: Not observing these recommendations may damage the product and void the warranty

Step 5: Selecting Pressure Range

ALERT: Do not switch the pressure range and output mode when the power is on. Make sure to power off the AcuPRE DM first, then set the jumpers to the correct positions and then power on the DP sensor.

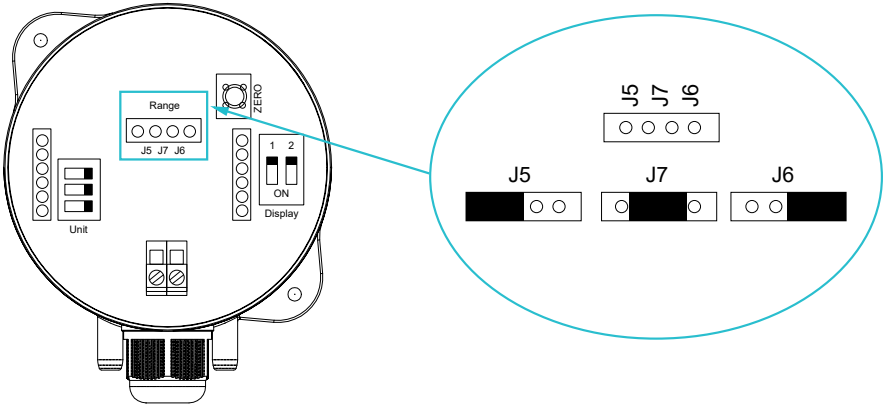

Figure 7 AcuPRE DM Pressure Range Selection Jumpers

Table 3 Pressure Range Jumper Placement Setting

Models	Jumper Placement			
	Range (inWC Default)	J5	J6	J7 (Default)
AcuPRE-DM-01 (Unidirectional)	0 to 0.1″			•
	0 to 0.25″	•		
	0 to 0.50″		•	
AcuPRE-DM-02 (Unidirectional)	0 to 1.0″			•
	0 to 2.0″	•		
	0 to 4.0″		•	
AcuPRE-DM-03 (Unidirectional)	0 to 10.0″			•
	0 to 20.0″	•		
	0 to 40.0″		•	
AcuPRE-DM-04 (Bidirectional)	-0.125″ to +0.125″	•		
	-0.25″ to +0.25″		•	
AcuPRE-DM-05 (Bidirectional)	-0.50″ to +0.50″			•
	-1.0″ to +1.0″	•		
	-2.0″ to +2.0″		•	

Step 6: Selecting Unit of Measurement

The AcuPRE DM offers field-selectable units of measurement for quick pressure conversion. The default measurement is inWC (inches of water column) but can be changed to pascals, kPa, mbar, and mmWC via on-board DIP switches. Refer to the following figure for switch settings.

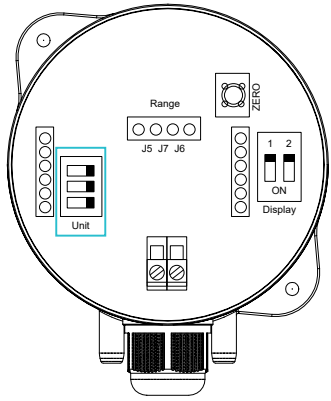

Figure 8 AcuPRE DM Unit Selection DIP Switches

Table 4 Unit of Measurement Conversion Table

Models	Unit, Range, and Display Resolution				
	inWC (Default)	Pascals	kPa	mmWC	mbar
	ON 1 2 3	ON 1 2 3	ON 1 2 3	ON 1 2 3	ON 1 2 3
AcuPRE-DM-01 (Unidirectional)	0.1	25	0.025	2.5	0.25
	0.25	60	0.06	6	0.6
	0.5	125	0.125	12	1.25
AcuPRE-DM-02 (Unidirectional)	1	250	0.25	25	2.5
	2	500	0.5	50	5
	4	1000	1	100	10
AcuPRE-DM-03 (Unidirectional)	10	2500	2.5	250	25
	20	5000	5	500	50
	40	10000	10	1000	100
AcuPRE-DM-04 (Bidirectional)	-0.125" to +0.125"	-30 to +30	-0.03 to +0.03	-3.05 to +3.05	-0.3 to +0.3
	-0.25" to +0.25"	-62.5 to +62.5	-0.062 to +0.062	-6.30 to +6.30	-0.625 to +0.625
AcuPRE-DM-05 (Bidirectional)	-0.50" to +0.50"	-125 to +125	-0.125 to +0.125	-12.5 to +12.5	-1.25 to +1.25
	-1.0" to +1.0"	-250 to +250	-0.250 to +0.250	-25.5 to +25.5	-2.50 to +2.50
	-2.0" to +2.0"	-500 to +500	-0.500 to +0.500	-50.5 to +50.5	-5.00 to +5.00

Step 7: Selecting Response Rate

The sensor has field-selectable response times of 0.5 (Default), 1, 2, and 5 seconds. Refer to the following figures for DIP switch location and settings.

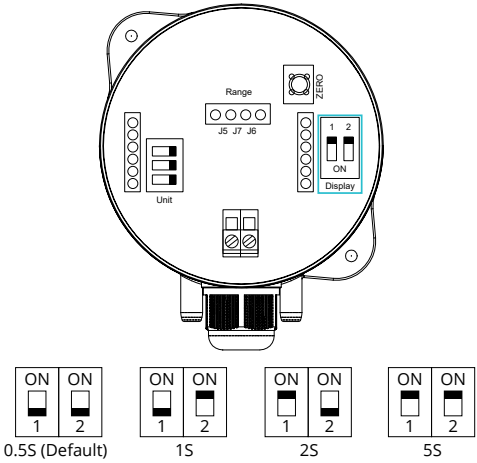

Figure 9 AcuPRE DM Response Time Selection DIP Switches

Step 8: Zero Reset and Calibration

Performing a zero reset calibration for AcuPRE DM prior to inserting the static pressure probe into the duct is recommended.

Different environments, shipping, and DP sensor characteristics may cause sensor drift. Perform the initial zero reset with power applied. Wait 15 to 20 minutes to allow the circuitry to warm up and stabilize before performing the zero reset calibration.

During the zero reset calibration, keep the HIGH (+) and LOW (-) pressure ports unconnected from the PVC tube in stable air. The zero reset process must be performed with NO pressure applied to the sensor.

Press the **ZERO** button located on the PCB for 5 seconds to perform the reset, release the button, and watch the LCD for pressure to stabilize.

The DP sensor should be periodically reset to zero every 6 to 12 months to offset any drifting that may have occurred.

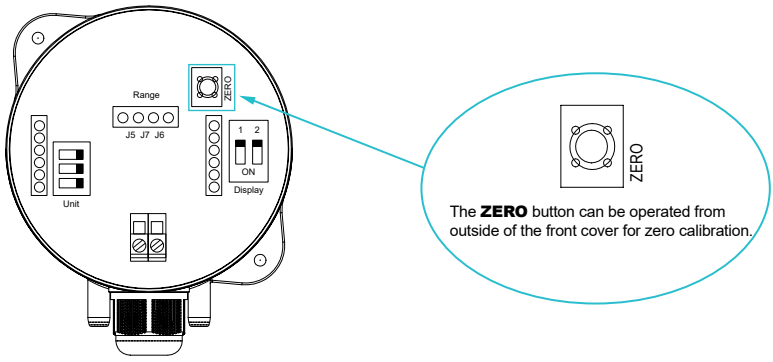

Figure 10 AcuPRE DM Zero Calibration Button

Technical Specifications

Electrical

Voltage Power	16~28VAC / 16~35VDC
Current Power	18.5~35VDC (RL=500Ω), 8.5~35VDC (RL=0Ω)
Output (Based on Select Models)	0~5VDC, 0~10VDC, 4~20mA (2 Wires)
Output Load	≤500Ω (Current), ≥2kΩ (Voltage)

Environmental

Medium	Non-Combustible, Non-Corrosive Air
Medium Temperature Range	0 to 60°C (32 to 140°F)
Operating Temperature Range	-20 to 70°C (-4 to 158°F)
Temperature Compensation	0 to 50°C (32 to 122°F)
Working Pressure	Overload 10xFS, Burst 15xFS

Mechanical

Mounting	2-Screw with Back Mount Pressure Probe, Duct Mount
Connection	5mm ID Tubing (0.19")
Weight	200g (0.44 lbs)
Display	5-Digit LCD, Size 44x18mm (1.73" x 0.70"), with Unit Indication

Performance

Accuracy	±1.0% FS (±2.0% FS@0.10inWC Range)
Stability	±0.5% FS/Year
Thermal Effect	<0.08% FS/°C (FS) (+/- 0.045% FS/°F)
Response Time	0.5/1/2/5s, Can be Set by DIP Switches

Certification/Warranty

Enclosure Material	ABS+PC (Housing) & PC (Cover), Fire Retardant UL94V-0
Protection	IP65
Agency Approvals	CE
Warranty	5 Years

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