

# AcuHUM™ DM Series

Duct Mount Relative Humidity and  
Temperature Sensor Installation Guide



**ACCUENERGY**

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Please read this manual carefully before installation, operation, and maintenance of the AcuHUM DM duct mount relative humidity and temperature 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 electrical warning of danger or safety risk during the installation and operation of the sensors.

	<b>Electrical Shock Hazard:</b> 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.
	<b>Safety Warning:</b> Contains information about circumstances which, if not considered, may result in personal injury or death.
<b>NOTE</b>	An advance notice to provide additional information before an action is taken by the user.
<b>ALERT</b>	Indicating the operation may lead to device malfunction or potential data loss.

Installation and maintenance of the AcuHUM DM duct mount relative humidity 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 AcuHUM DM series relative humidity (RH) and temperature sensor is designed to be mounted on ductwork to ensure the HVAC system operates efficiently, and to provide the building automation system with accurate measurements to maintain comfortable humidity and temperature levels for occupants. The AcuHUM DM utilizes digital polymer sensing technology to provide precise RH measurement, with long-term stability, fast response time, while being less sensitive to dust and condensation within ductwork. The sensing elements located at the tip of the probe are protected by a durable plastic guard and a PE polymer filter. The filter can be easily removed to clean it of dust or debris.

The RH sensor comes standard with an IP65 rated enclosure, four-quarter turn quick release screws, and gasketed cover proving superior moisture and dust protection, as well as a mounting flange enabling adjustable probe insertion. The AcuHUM DM provides either a 4-20mA or 0-10VDC RH signal with several different temperature output options via thermistor, RTD, or transmitter, based on model selection.

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

**ALERT:** When using RTD or thermistor for temperature output, it is recommended to separate signal wiring and 24/120/230 VAC line voltages. Failure to do so will result in unstable reading.

**ALERT:** AcuHUM DM cannot be mounted in a pool room or used for any application where corrosive chemicals are present.

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

## Dimensions

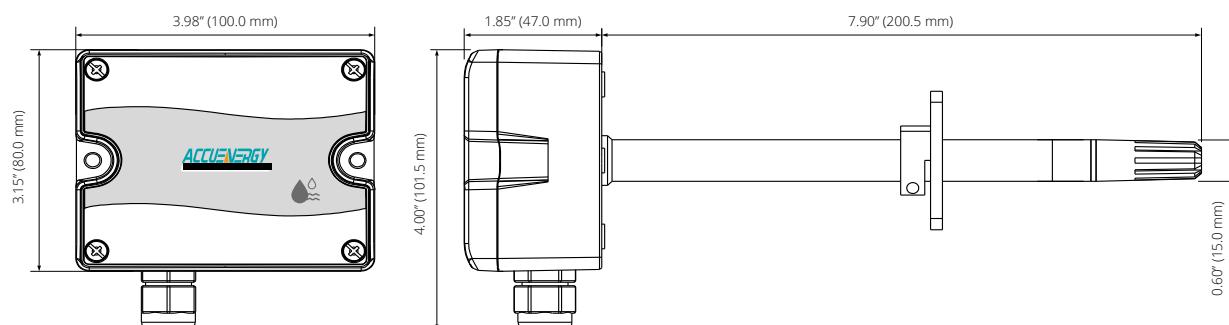


Figure 1 AcuHUM DM Front and Side Views

# Installation

## Step 1: Choose the Optimal Mounting Location

The sensor probe should be mounted at the center of the duct where the least amount of stratification is present.

1. Ensure the sensor is mounted away from any sources of air turbulence or obstructions such as filters, heating/cooling coils, dampers, and so on. Turbulent air will cause inaccurate RH readings.
2. The duct probe should be placed 3 to 5 duct diameters away from any potential obstructions or 90° duct bends.
3. Mount the sensor on the side or top of the ductwork to prevent potential condensation from entering the sensor and causing damage.

## Step 2: Separate Front Cover

1. To open the front cover of the AcuHUM DM, locate the four quick release spring screws on each corner of the enclosure and rotate counterclockwise.

**NOTE:** Use caution to avoid over-rotating the screws, as this may lead to damages to the enclosure. Refer to Figure 2 for details.

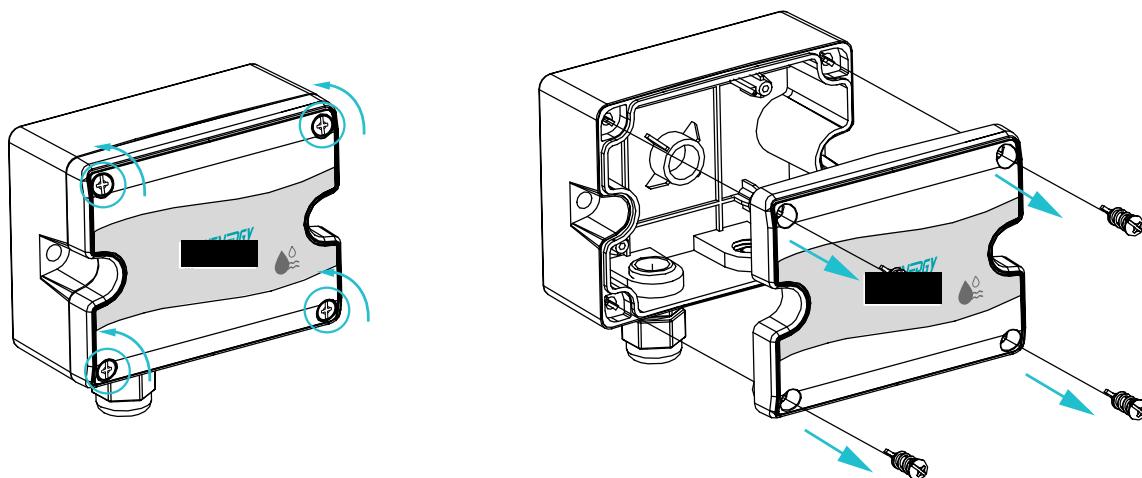


Figure 2 AcuHUM DM Removing Cover

2. Carefully remove the front cover to reveal the electrical terminals. Connect the wiring according to the instructions in Step 3.

## Step 3: Electrical Wiring

**ALERT:** When using 24VAC power source with the AcuHUM 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, or transmitters, an improper polarity will cause damage to the sensor.

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

**ALERT:** Do not run the temperature sensor wiring in any conduit with line voltage (24/120/230 VAC) if using RTD or thermistor for temperature monitoring. AC voltage will cause an unstable temperature reading.

**ALERT:** If using shielded cable, ground the shield only at the controller end. Grounding both ends can cause a ground loop.

**NOTE:** Accuenergy recommends using 20 to 18 AWG (0.52-0.82mm<sup>2</sup>) twisted pair wires or shielded cable for signal connections. This applies to both power supply and analog output wiring.

**NOTE:** If using 4-20mA output for RH/temperature signal the sensor must be powered with 18.5~35VDC (RL=500Ω). Ensure that the analog input common reference of the BAS controller, PLC, automation panel is connected to an DC power supply common to complete the circuit. Device will not work if common references are not connected. See Figure 6 below.

**NOTE:** If using 4-20mA output for temperature only the relative humidity circuit MUST be connected, otherwise transmitter will not work.

**NOTE:** Watertight PG9 cord grip installed (5/8" knockout hole when PG9 removed).

Not observing these recommendations may damage the product and void the warranty.

Once the front cover is removed, feed the power supply and signal wiring through the PG9 cable gland. The AcuPRE DM sensor features push-button terminal blocks, which utilize a spring clamp mechanism to secure wires.

1. To connect the wire, push in the button to open the corresponding spring.
2. Insert the wire into the terminal, and then release the button, allowing the spring to clamp the wire.
3. To remove the wire, push in the button to open the spring, allowing the wire to be pulled out.

Refer to Figure 3 for details.

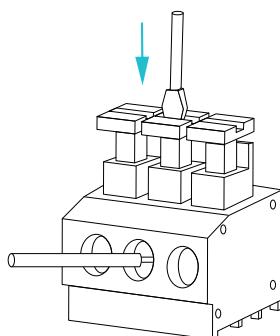


Figure 3 AcuHUM DM Push Button Terminal Block

The AcuHUM DM relative humidity output signal is available in 0-10VDC or 4-20mA output ratings, depending on model selection. The temperature signal can be 0-10VDC, 4-20mA, or RTD/thermistor resistive output. Locate the wiring terminals for the respective model and connect the AcuHUM DM as shown in the following figures.

AcuHUM DM model with respective relative humidity output:

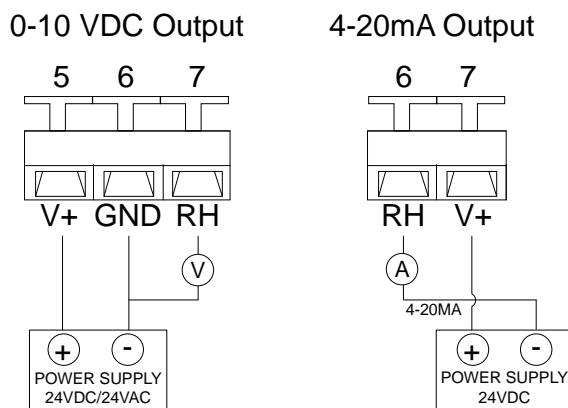


Figure 4 AcuHUM DM Wiring Diagram, RH Only

AcuHUM DM models with both relative humidity and analog temperature output:

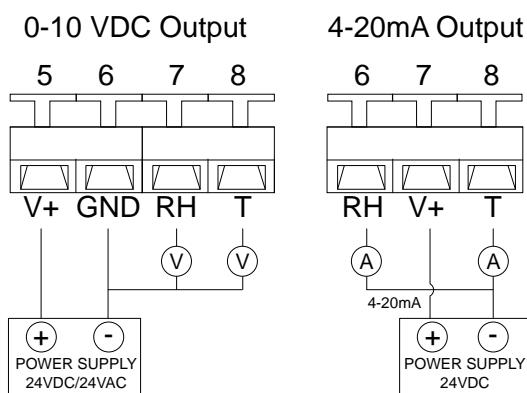


Figure 5 AcuHUM DM Wiring Diagram, RH and Analog Temperature Output

AcuHUM DM models with relative humidity and resistive thermistor/RTD temperature output:

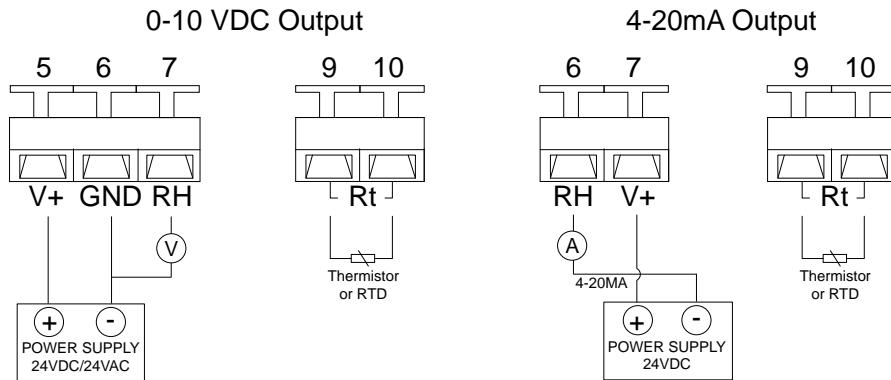


Figure 6 AcuHUM DM Wiring Diagram, RH and Resistive Temperature Output

## Step 4: Mount RH Sensor

Accuenergy recommends using the provided flange for the duct installation, as it enables adjustable probe insertion. The flange should be installed on the side or top of the duct. Once the mounting location is determined,

1. Drill a 5/8" (15.5mm) diameter hole in the duct for sensor probe insertion.
2. Align the central opening of the mounting flange with the prepared hole for the sensor probe.
3. Fasten the mounting flange with the four provided screws and then insert the sensor probe into the duct.
4. Adjust the AcuHUM DM probe to required depth, and use the remaining screw to tighten the flange clamp to secure probe. The duct connection should be air-tight after installation. Refer to Figure 7 for details.

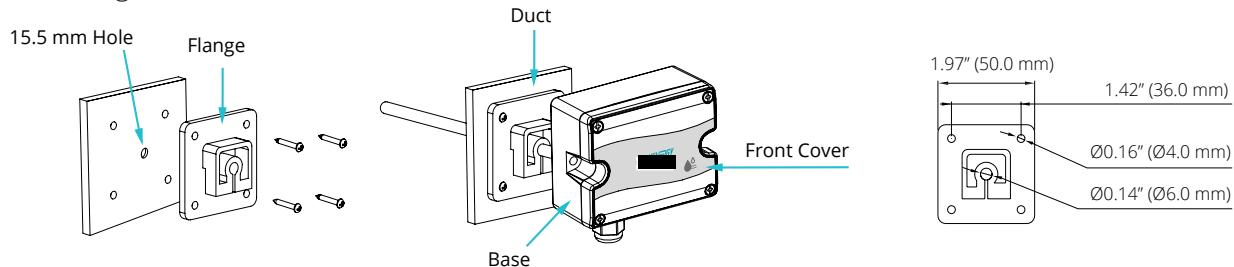


Figure 7 Duct Mount with Flange

**NOTE:** Over-tightening the screws may cause damage to mounting flange. Exercise caution when fastening.

1. Review the wiring installation, and make sure all terminals are connected properly.
2. To finish the installation, fasten the front cover back onto the enclosure by turning the spring screws clockwise.

# Technical Specifications

Relative Humidity Measurement	
<b>Electrical</b>	
Voltage Power	19.2~28.8 VAC or VDC
Current Power	19.2~28.8 VDC (RL=500Ω); 8.5~35 VDC (RL=0Ω)
Output	4~20mA (2 Wires) or 0~10VDC (3 Wires)
<b>Relative Humidity Performance</b>	
RH Sensor Type	Digital Polymer
Accuracy	+/-2% (25°C, 20~80%RH); +/-3% (0~95%RH)
Measurement RH Range	0~100%
Operating RH Range	0~95%RH (Non-Condensing)
Hysteresis	<±1%RH
Response Time	<10s (25°C, in Slow Air)
Drift	<±0.5%RH/Year
Temperature Measurement	
<b>Electrical</b>	
Transmitter Voltage Power	19.2~28.8 VAC or VDC
Transmitter Current Power	19.2~28.8 VDC (RL=500Ω); 8.5~35 VDC (RL=0Ω)
Transmitter Output	4~20mA (2 Wires) or 0~10VDC (3 Wires)
Output Load	≤500Ω (Current), ≥2KΩ (Voltage)
<b>Temperature Performance</b>	
Temperature Sensor Type	RTD or Thermistor, See Ordering Information
Transmitter Accuracy (If Applicable)	<±0.3°C @ 5~60°C (<±0.54°F @ 41~140°F)
Thermistor Accuracy (If Applicable)	10K Ω, Type III - ±0.3°C @ 25°C (0.54°F @ 77°F) 10K Ω, Type II - ±0.2°C @ 25°C (0.36°F @ 77°F) 20K Ω - ±0.2°C @ 25°C (0.36°F @ 77°F)
RTD Accuracy (If Applicable)	1K Ω Platinum - ±0.2°C @ 25°C (0.36°F @ 77°F) 100 Ω Platinum - ±0.2°C @ 25°C (0.36°F @ 77°F) 1KΩ Nickel - ±0.5°C @ 25°C (0.9°F @ 77°F)
Temperature Transmitter Measurement Range	0~50°C (32~122°F) or 0-100°C (32-212°F)
Response Time	<10s

**Environmental**

Operating Temperature Range	-20~70°C (-4~158°F)
Storage Temperature	-30~80°C (-22~176°F)

**Mechanical**

Mounting	4-Screw Duct Mount Flange with Adjustable Probe and Set Screw
Wiring Connection	Push Button Terminal Blocks
Weight	340g (0.75lbs)

**Certification/Warranty**

Enclosure Material	Fire Retardant Polycarbonate (UL94V-0)
Protection	IP65
Agency Approvals	CE
Warranty	5 Years

# ACCUENERGY

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ISO 9001, 14001  
& 45001 Certified



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Specs Subject To Change Without Notice.