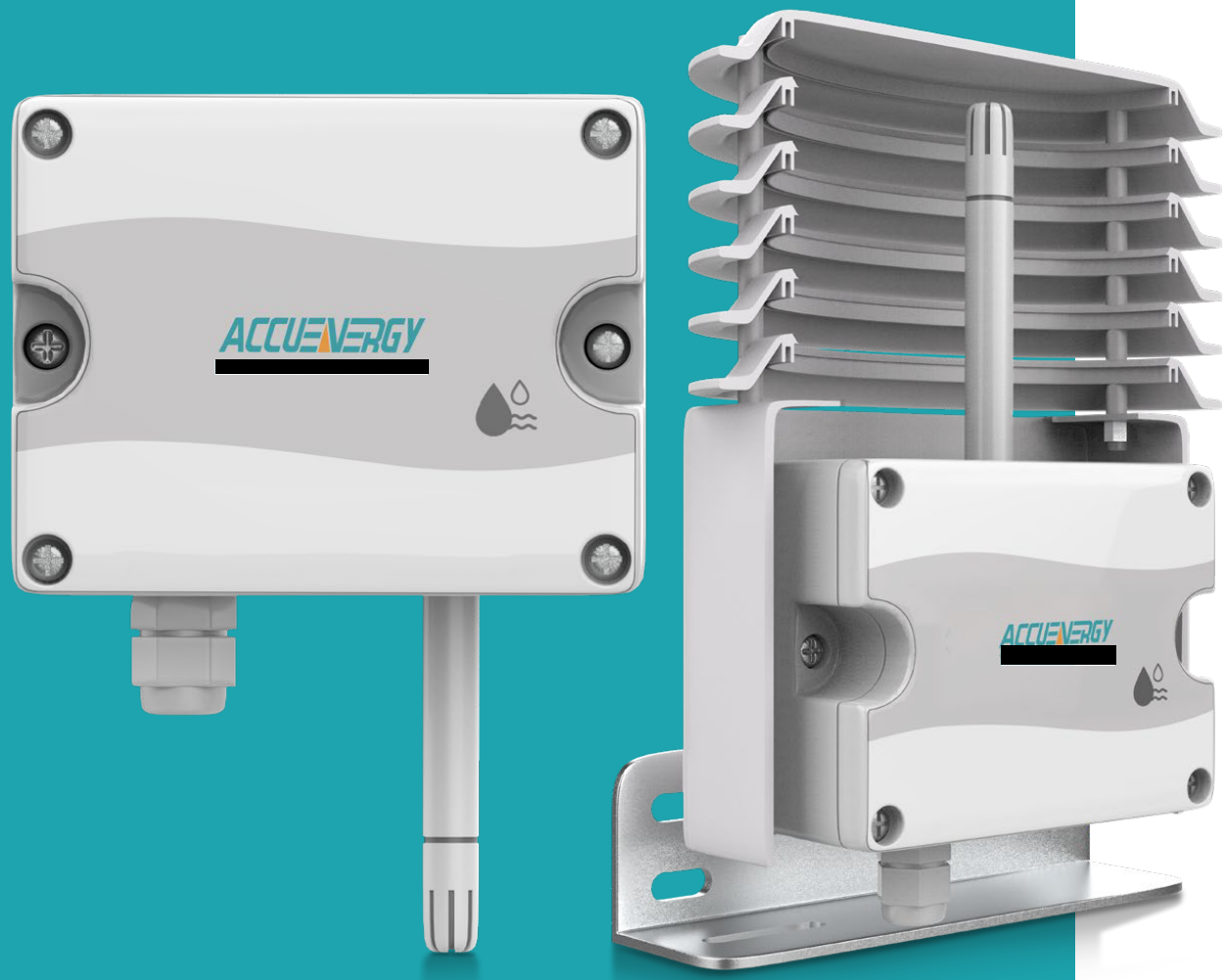
AcuHUM™
OA and OAW Series

Outside Air Relative Humidity and Temperature Sensor Installation Guide



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Please read this manual carefully before installation, operation, and maintenance of the AcuHUM OA/OAW outdoor air 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.

	**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	An advance notice to provide additional information before an action is taken by the user.
ALERT	Indicating the operation may lead to device malfunction or potential data loss.

Installation and maintenance of the AcuHUM OA/OAW outdoor air relative humidity and temperature 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 OA/OAW series relative humidity (RH) and temperature sensor utilizes digital polymer sensing technology to provide precise RH measurement, with long-term stability, fast response time, and the ability to recover from condensation. The AcuHUM OA/OAW enclosure is IP65 rated and is suitable for outdoor conditions when mounted on an exterior wall or any other vertical surface. 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 removed to clean it of dust or debris.
The AcuHUM OA/OAW sensors can provide either a 4-20mA or 0-10VDC RH signal with several different temperature output options via thermistor, RTD, or transmitter, based on sensor model selection.

The AcuHUM OAW also features a weather shield, making it a reliable option in harsher climates where the mounting location is exposed to the elements. The six-layer weather shield protects the RH sensor from solar UV radiation, dust, and rain, and it also comes with natural ventilation to reduce the thermal effect of direct sunlight, shorten the response time, and ensure accurate measurement under long-term sunlight exposure.

ALERT: When using 24VAC power source with the AcuHUM OA/OAW, 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 the signal wiring from 24/120/230 VAC line voltages. Failure to do so will result in unstable reading.

ALERT: AcuHUM OA/OAW cannot be mounted in a pool room, or used for any application where corrosive chemicals are present.

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

Dimensions

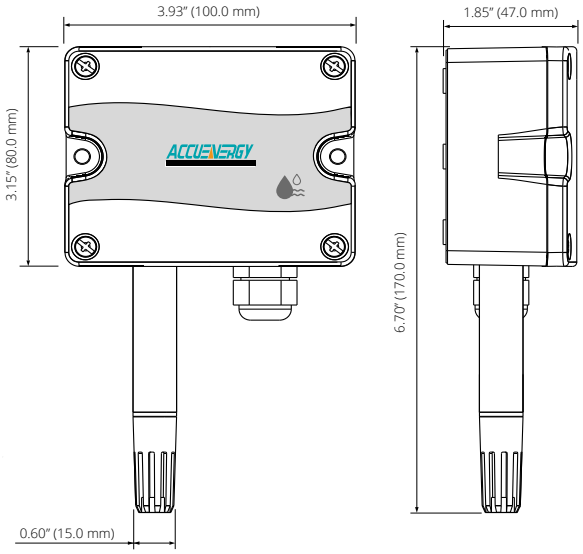

Figure 1 AcuHUM OA Front and Side Views

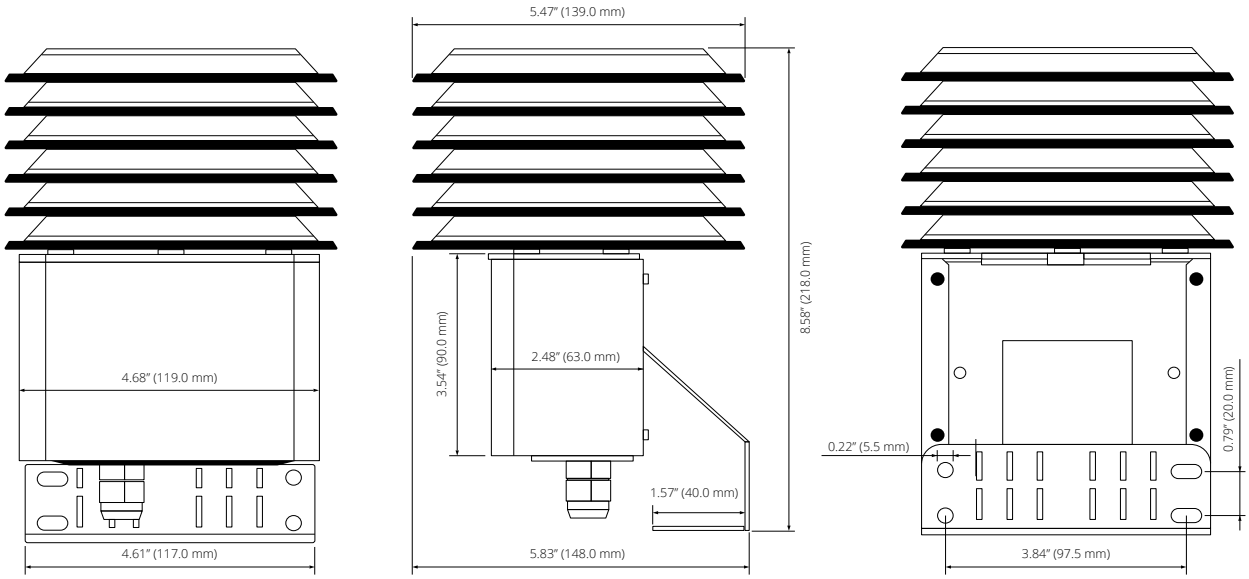

Figure 2 AcuHUM OAW Front, Side, and Rear Views

Installation

Step 1: Choose the Optimal Mounting Location

The AcuHUM OA sensor should be mounted in a location with shade, as direct sunlight will warm the sensor and affect the humidity and temperature readings. If a shaded location is not available, consider the AcuHUM OAW sensor which includes a six-layer weather shield.

1. The AcuHUM OA must be positioned so that the sensor probe points down towards the ground to prevent moisture from entering the sensor.
2. If the mounting location is adjacent to a building located in the northern hemisphere, the AcuHUM OA sensor should be mounted on the north side of the building to minimize direct sunlight exposure. If the building is located in the southern hemisphere, the RH sensor should be mounted on the south side of the building.
3. Mount the RH sensor at least 3.5'(1m) above ground to prevent thermal radiation from skewing the RH and temperature readings and avoid water splash.
4. Mount the RH sensor at least 2'(0.6m) below the cover or eave to prevent thermal radiation.
5. Ensure smooth airflow around the sensor and avoid mounting too close to any obstacles such as walls, fences, or any other barriers that could block airflow.
6. Avoid locations near any equipment that produces heating or cooling, such as building vents, fan exhaust, or dampers, as this equipment can affect accurate RH and temperature readings.

Step 2: Separate Front Cover

1. To open the front cover of the AcuHUM OA/OAW, turn the each quick release spring screws counterclockwise, located on each corner of the enclosure.
   NOTE: Exercise caution to not over-rotate the screws, which could damage the enclosure. Refer to Figure 3 for details.

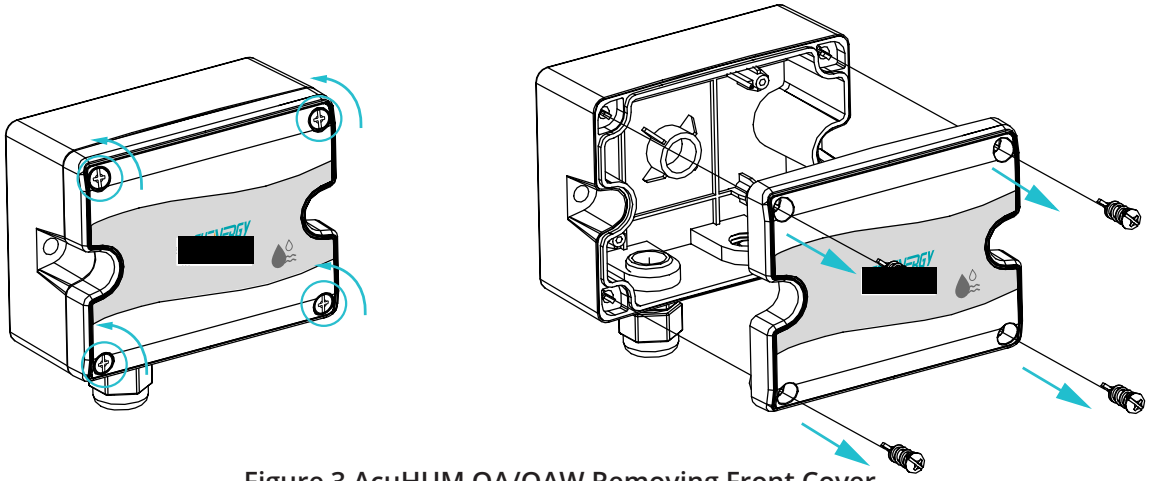

Figure 3 AcuHUM OA/OAW Removing Front Cover

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

Step 3: Electrical Wiring

ALERT: When using 24VAC power power source with the AcuHUM OA/OAW, 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 OA/OAW 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.

NOTE: Accuenergy recommends using 20 to 18 AWG (0.52-0.82mm²) 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/temp signal, the sensor must be powered with a 18.5~35VDC (RL=500Ω) power source. Ensure that the analog input common reference of the BAS controller, PLC, and Automation Panel is connected to the DC power supply common to complete the circuit. The device will not work if the common references are not connected. Refer to Figure 6 below for details.

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

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

Not observing these instructions 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 OA/OAW 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 4 for details.

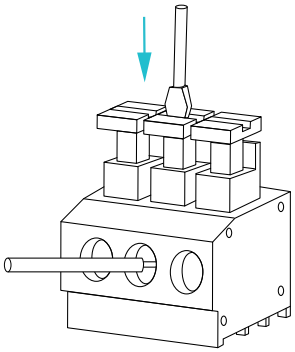

Figure 4 AcuHUM DM Push Button Terminal Block

The AcuHUM OA/OAW 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 OA/OAW as shown in the following figures.

AcuHUM OA/OAW model with respective relative humidity output:

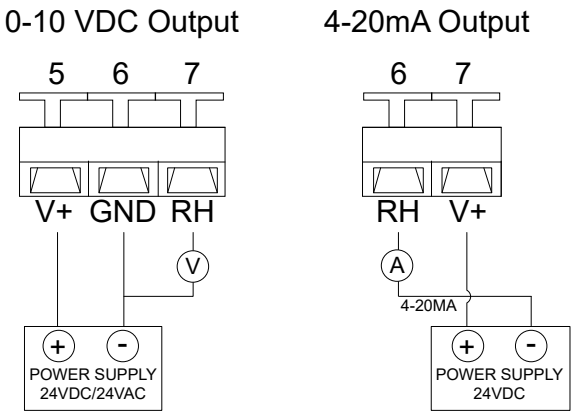

Figure 5 AcuHUM OA/OAW Wiring Diagram, RH Only

AcuHUM OA/OAW models with both relative humidity and analog temperature output:

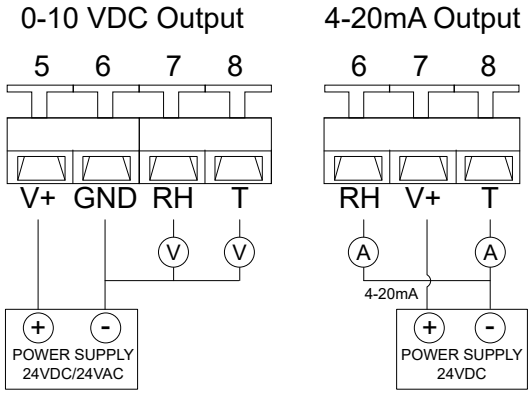

Figure 6 AcuHUM OA/OAW Wiring Diagram, RH and Analog Temperature Output

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

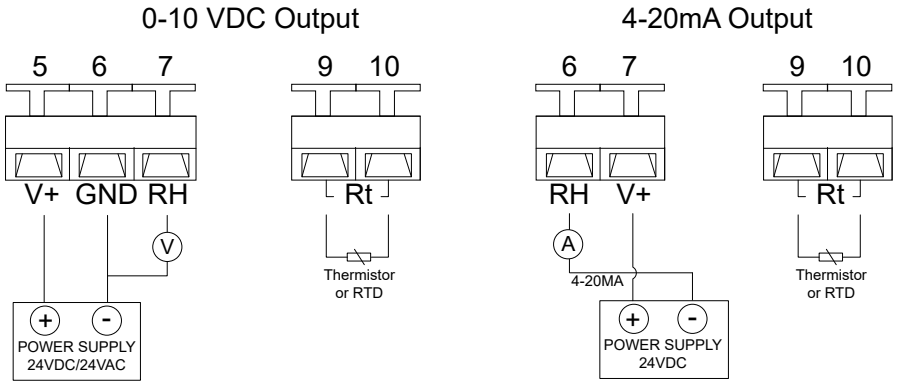

Figure 7 AcuHUM OA/OAW Wiring Diagram, RH and Resistive Temperature Output

Step 4: Mount the RH Sensor

The AcuHUM OA is designed to be mounted onto any vertical surface.

1. Drill two screw holes according to the locations shown in the Figure 8 below. Ensure the sensor is levelled and the sensor probe is pointed down and perpendicular to the ground.

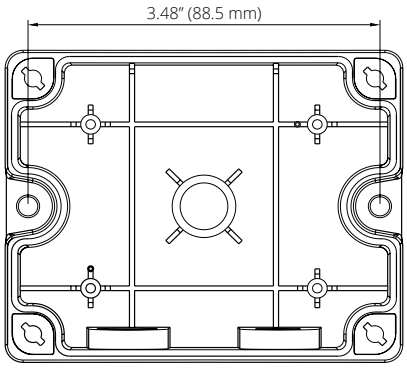

Figure 8 Mounting Hole Location for Surface Mount

2. Align the sensor enclosure over the drilled holes and secure the sensor by inserting and fastening two screws.
   NOTE: Proceed with caution as over-tightening the screws may cause damage to the enclosure.
3. Review the wiring installation, and make sure all terminals are connected properly.
4. To finish the installation, position the front cover directly over the backplate and fasten the spring screws clockwise to secure the cover.

Step 5: Mount the RH Sensor with Weather Shield

For the AcuHUM OAW sensor, first open the weather shield.

1. Remove the four screws located on the shield backplate and remove the shield cover as shown in Figure 9 below.

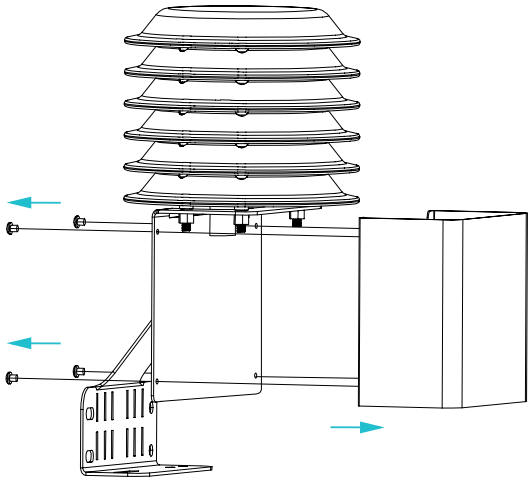

Figure 9 Removing Weather Shield Cover

2. Place the sensor inside the weather shield so that the sensor probe is protected by the shield, and the cord grip points downward towards the ground.
   NOTE: If there is a clear plastic cover on the AcuHUM OAW sensor probe, be sure to removed before installation.

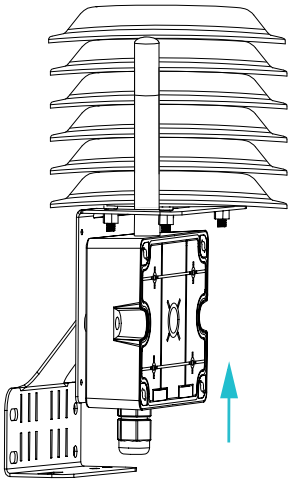

Figure 10 Placing Sensor Inside Weather Shield

3. Review the electrical wiring, and make sure all terminals are connected properly.
4. Position the sensor front cover directly over its backplate and fasten the spring screws clockwise to secure the installation.

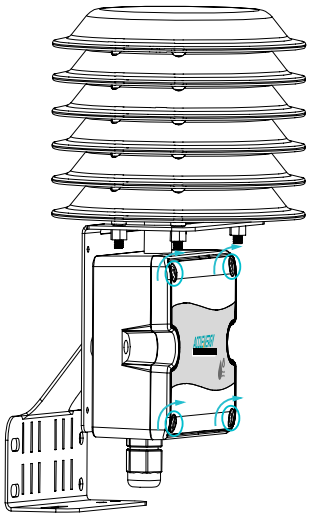

Figure 11 Installing AcuHUM OAW Front Cover

5. Close the weather shield by placing the shield cover over the backplate and reinstall the screws that were previously removed.

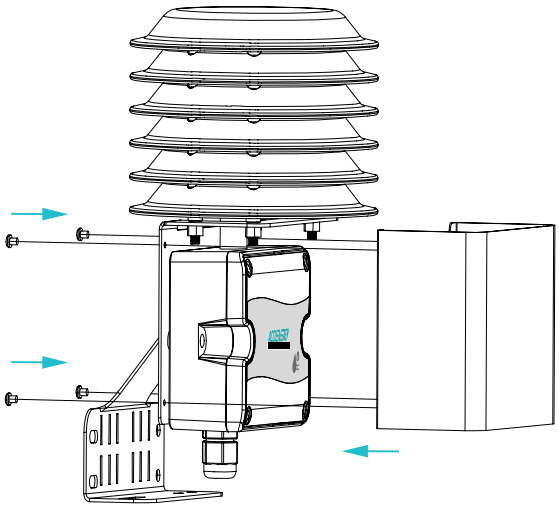

Figure 12 Installing AcuHUM OAW Weather Shield

6. Mount the entire installation by utilizing the mounting bracket on the back of the weather shield. The mounting bracket is designed to be mounted on a vertical/horizontal surface or onto a pole when paired with a gear clamp, as shown in Figure 13. The gear clamp is not provided by Accuenergy. Place the sensor inside the weather shield so that the sensor probe is protected by the shield, and the cordgrip points downward towards the ground.

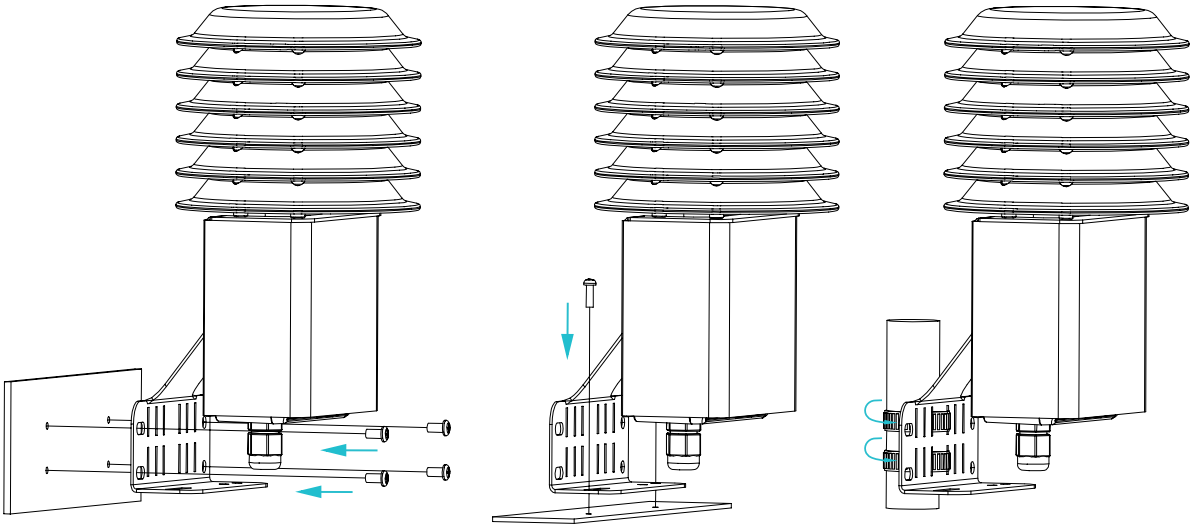

Figure 13 AcuHUM OAW Mounting Configurations

Technical Specifications

AcuHUM OA

Relative Humidity Measurement	
Electrical	
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)
Relative Humidity Performance	
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	
Electrical	
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)
Temperature Performance	
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) 1K Ni KΩ Nickel - ±0.5°C @ 25°C (0.9°F @ 77°F)

Temperature Transmitter Measurement Range	-40~60°C (-40~140°F)
Response Time	<10s

Environmental

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

Mechanical

Mounting	Screw Surface Mount
Wiring Connection	Push Button Terminal Blocks
Weight	240g (0.53 lbs)

Certification/Warranty

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

AcuHUM OAW

Relative Humidity Measurement	
Electrical	
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)
Relative Humidity Performance	
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	
Electrical	
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)
Temperature Performance	
Temperature Sensor Type	RTD or Thermistor, See Ordering Information
Transmitter Accuracy (If Applicable)	<±0.4°C @ 5~60°C (<±0.72°F @ 41~140°F)
Thermistor Accuracy (If Applicable)	10KΩ, Type III - ±0.3°C@25°C (0.54°F @ 77°F) 10KΩ, Type II - ±0.2°C @ 25°C (0.36°F @ 77°F) 20KΩ - ±0.2°C @ 25°C (0.36°F @ 77°F)
RTD Accuracy (If Applicable)	1KΩ Platinum - ±0.2°C @ 25°C (0.36°F @ 77°F) 100Ω 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	-40~60°C (-40~140°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 L-Shape bracket for surface installation on vertical wall, flat roof, or round column with worm gear clamps (gear clamps not provided).
Wiring Connection	Push Button Terminal Blocks
Weight	910g (2.00lbs)
Certification/Warranty	
Enclosure Material	6-layer anti-radiation weather shield: flame retardant, anti-ultraviolet, anti-oxidation PC+ABS UL94V-0
Protection	IP65
Agency Approvals	CE
Warranty	5 Years

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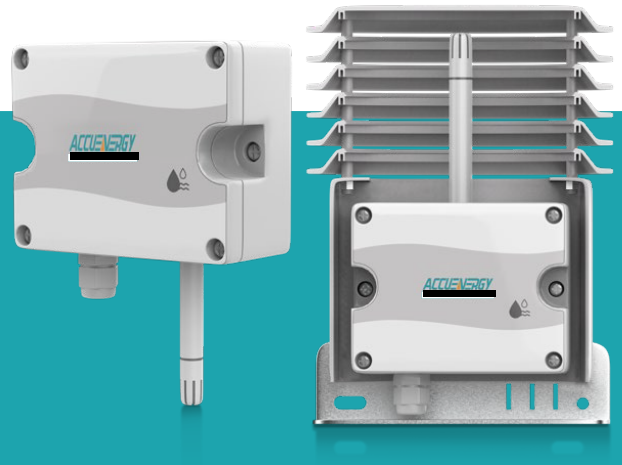

Revision Date: December 2025 Version: 1.0.2

Specs Subject To Change Without Notice.