AcuTEMS™ IM Series

Immersion Temperature Sensor Installation Guide

CE

ACCUENERGY

Please read this manual carefully before installation, operation, and maintenance of the AcuTEMS IM Immersion 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 AcuTEMS IM Immersion 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.

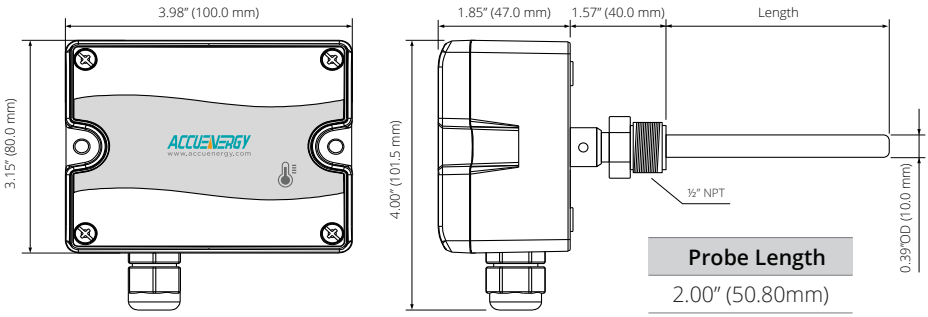
Table of Contents

Introduction

Overview

The AcuTEMS IM series immersion sensor can be used to monitor temperature in chilled water lines, boiler piping, storage tanks, and liquid in process lines. The immersion sensor comes in 2", 4", and 6" probe lengths with multiple RTD, thermistor, and transmitter output options. The AcuTEMS IM includes a 2-piece welded 304SS thermowell, with pre-applied heat transfer paste, that allows for accurate temperature measurement. The AcuTEMS IM series comes with an IP65 enclosure which prevents dust and moisture ingress.

Dimensions



Probe Length
2.00" (50.80mm)
4.00" (101.60mm)
6.00" (152.40mm)

Figure 1 AcuTEMS IM Front, Side, and Thermowell Dimensions

Installation

Step 1: Choose the Optimal Thermowell Mounting Location

- Confirm that the chemical medium being monitored is compatibility with the AcuTEMS IM 304SS thermowell to avoid corrosion.
- Avoid placement of the sensor in areas with high turbulence or excessive vibration.
- Install the sensor against the direction of flow at 45° or 90° to the pipe where the medium temperature is well mixed.
- Choose the appropriate thermowell insertion depth that will put the tip at or near the centerline of the pipe. Ensure the entire thermowell is immersed in the medium being monitored.
- If the sensor probe insertion depth is longer than the diameter of the pipe, the sensor should be installed in the pipe elbow or tee fitting against the flow.

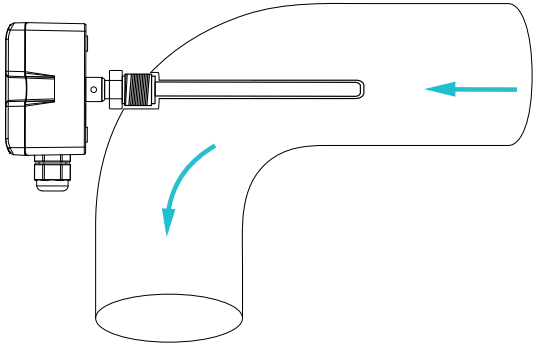


Figure 2 Thermowell Installation at Pipe Elbow

Step 2: Installing the Thermowell

The AcuTEMS IM thermowell is designed for monitoring water temperature in low flow velocity and low-pressure applications. Any application with excessive flow rates, high pressure, or high temperatures may require a different thermowell. AcuTEMS IM thermowells comply with PN25 pressure ratings and is designed to withstand a maximum pressure of 25 bar (362.5 psi). The following table lists the acceptable flow velocities for thermowells of different lengths.

Table 1 AcuTEMS IM MAX Velocity / Thermowell Length

Material	Media	2.00" (50.8mm)	4" (101.6mm)	6" (152.4mm)
304SS	Water	<115 f/s (35 m/s)	<40 f/s (12 m/s)	<23 f/s (7 m/s)

1. Drain the tank or pipe system prior to thermowell installation.
2. The AcuTEMS IM sensor thermowell is designed to be screwed into ½" FIP threaded connection. Drill an opening into the pipe and weld a ½" FIP threadolet onto the tapped location.
3. Insert the thermowell into the ½" FIP connection. Use a wrench to firmly tighten the thermowell to the ½" FIP fitting, and use proper thread sealants at the process threaded connection.
4. It is recommended to perform an air pressure test to ensure there are no leaks present prior to filling the system.

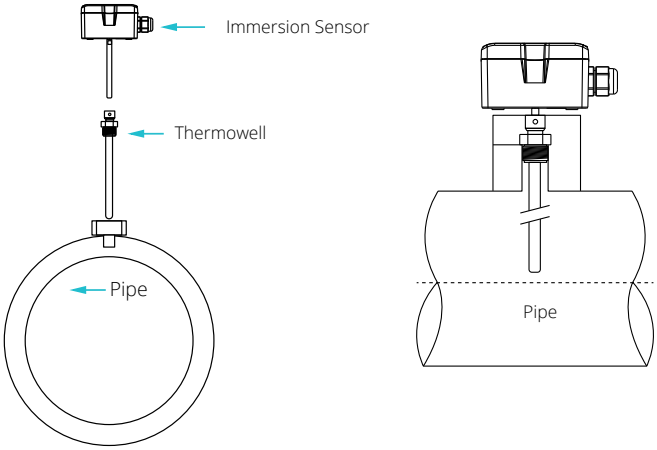


Figure 3 Mounting Thermowell to ½" FIP Process Connection

Step 3: Removing Sensor from Thermowell

The AcuTEMS IM is packaged with both the thermowell and sensor. In the event that the sensor needs replaced, it can be removed from the thermowell by loosening the set screw located on top of the process connection threads.

The thermowell has been pre-filled with thermal grease to improve heat transfer and response time.

NOTE: The sensor should not be removed from the thermowell except when diagnosing or replacing the sensor is necessary.

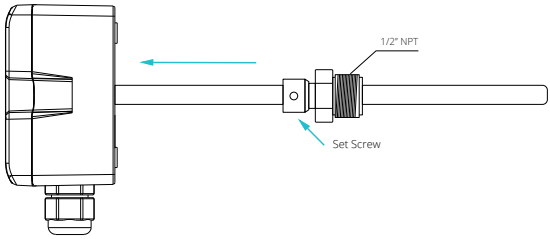


Figure 4 Removing Sensor Probe from Thermowell

Step 4: Separate Front Cover

1. To open the front cover of the AcuTEMS IM, turn the 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 5 for details.

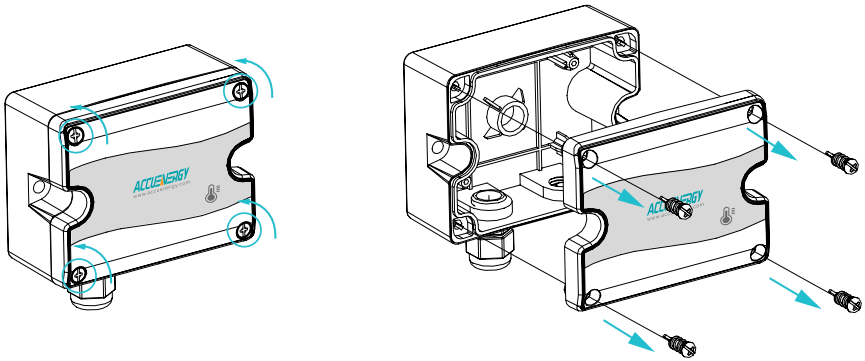


Figure 5 AcuTEMS IM Removing Front Cover

2. Carefully remove the front cover to reveal the electrical terminals. Connect the wiring according to the instructions specified in Step 5.

Step 5: Electrical Wiring

ALERT: The AcuTEMS IM sensor with a 0-10VDC output can be powered with both 24VAC and 24VDC power supply. The 4-20mA output option is compatible with 2-wire DC loop power only.

ALERT: When using 24VAC to power the AcuTEMS IM transmitter, it is strongly recommended to

power the unit with an independent, dedicated, UL Listed Class 2 transformer. The 24VAC power supply is only used for a 0-10VDC output signal.

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

ALERT: Do not mix half and full-wave rectified devices when powering with AC voltage. The AcuTEMS IM temperature transmitter is half-wave rectified.

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

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

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

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

Failure to follow 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 AcuTEMS IM 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 6 for details.

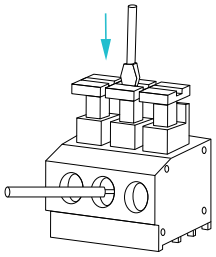


Figure 6 AcuTEMS IM Push Button terminal block.

The temperature signal can be 0-10VDC, 4-20mA, or RTD/Thermistor resistive output. The resistive outputs can be 2 or 3-wire depending on the application. Locate the wiring terminals and connect the AcuTEMS IM as shown in the following figures according to the sensor model selected.

NOTE: If using 4-20mA signal output, the sensor must be powered with 18.5~35VDC (RL=500Ω) power supply. 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. See Figure 7 below.

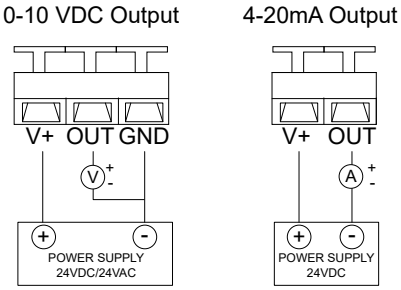


Figure 7 AcuTEMS IM Wiring Terminals for Temperature Transmitter

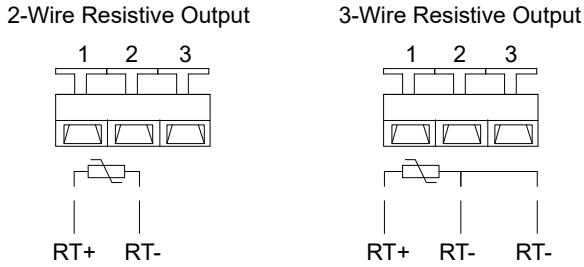


Figure 8 AcuTEMS IM Wiring Terminals for Resistive Output

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

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 @ 0~70°C (<±0.54°F @ 32~158°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	0-100°C (32-212°F)
Response Time	<10s
Environmental	
Sensor Operating Temperature Range	-40~70°C (-40~158°F) @ 0~95%RH (Non-Condensing)
Storage Temperature	-30~80°C (-22~176°F)
Thermowell MAX Line Pressure (DIN PN25)	362.5 PSI (25 Bar)
Mechanical	
Thermowell Connection	½" National Pipe Thread (NPT) for Process Connection
Thermowell Material	304SS (2-Piece Welded)
Sensor Mounting	Direct insert into thermowell and secured with set screw.
Wiring Connection	Push Button Terminal Blocks (2 or 3 wire)
Weight	510g (1.12lbs)
Certifications/Warranty	
Enclosure Material	Fire Retardant Polycarbonate (UL94V-0)
Protection	IP65
Agency Approvals	CE
Warranty	5 Years

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Specs Subject To Change Without Notice.