HANI™ Clamp Sensor - High Accuracy Non-Invasive Clamp Temperature Sensor

Hybrid temperature sensing on metal pipes integrated with Layer N connectivity

- Non-invasive temperature measurement
- Measure the fluid temperature inside of a metal pipe
- Accuracy for Metal Pipes:
  - Sanitary: ±0.5°C
  - Industrial: ±0.5 to ±1.0°C
- Response time¹ = 5 sec (t63) / 10 sec (t90)
- 4 to 20 mA loop powered analog output
- 0 to 100°C process temperature range
- Available for 1 to 4.0” pipe diameters
- Omega Smart Core enabled
  - Data logging
  - Plug and play device detection
- IP65 environmental rating
- Patent pending

Ease of Installation
Install your HANI™ Clamp Sensor in seconds
Omega’s innovative clamp-on design makes sensor installation easy. Unlike invasive sensors, HANI™ Clamp Sensors mounts to the outside of a metal pipe and measures the temperature of the process media inside the pipe.
  - No drilling
  - No welding
  - No downtime

Need to relocate the sensor? Un-clamp and go!

Non-Invasive & Non-Contact Operation
No penetration, no risk of contamination
The HANI™ Clamp Sensor never comes into contact with the process media flowing through the pipe. There is no risk of buildup, sensor wear or breakage from high flow rates, corrosive/abrasive liquids, wake frequency and water hammer.

High Accuracy & Fast Response Times
Performs like an invasive sensor
Omega’s patent pending Hybrid Temperature Sensing platform uses multiple sensors and a proprietary algorithm to achieve the same accuracy and fast response times as state-of-the-art invasive sensors without the cost and risk.

Quality control & ad-hoc sensing
Clamp-on the sensor in seconds and connect to your laptop or PC for readings anytime - anywhere.

Verify existing invasive sensors
With accuracies comparable to most state-of-the-art invasive sensors, the HANI™ Clamp Sensor can easily be placed next to an invasive sensor to verify the accuracy or determine the drift of measurements.

Common Applications
New and retrofitting existing systems
Lower the total cost of ownership and reduce contamination risk without sacrificing performance by upgrading to a HANI™ Clamp Sensor.

¹ t63 is the time constant or response time required to reach 63.2% of the final value after an instantaneous temperature change. t90 is the response time required to reach 90% of the final value after an instantaneous temperature change.
Specifications

Input Power
Voltage: 8 Vdc - 28 Vdc (loop powered)
Max Loop Resistance: Rmax (Ω) = (Vsupply - 8V)/0.024 A
Analog Output
Current: 4 to 20 mA

Process Parameters
Process Medium: Water, water- based fluids (others upon request)
Pipe
Materials: Metal pipes (others upon request)
Pipe Diameters:
Sanitary: 1.5", 2", 2.5", 3", 4"
Industrial: 1", 2", 2.5", 3", 4" nominal
(others upon request)
Process Temperature Range:
0 to 100°C liquid, user scalable analog output

Performance
Accuracy with fluid flowing:
Sanitary Metal Pipes: ±0.5°C
Industrial Metal Pipes ±1.0°C from factory and improved accuracy to ±0.5°C possible with in-situation 1 or 2-point calibration

Response Time (t63): 5 seconds
Response Time (t90): 10 seconds

Environmental
Ambient Operating Temperature:
0 to 40°C (32 to 104°F)
Rating: IP65 when mated

Mechanical
Dimensions:
60.3 W x 64.31 L x 51.54 mm H
(2.38 W x 2.53 L x 2.03" H)
Materials: PA12, silicone rubber, nickel-plated brass, stainless steel

General
Agency Approvals: CE

Smart Core Enabled
Smart Core is integral to all Layer N integrated Smart Sensing devices. In addition to allowing for modular integration using any Layer N Smart Interface, this powerful suite of advanced features enables alarms and notifications, data assurance, data logging, storage, wireless connectivity and SYNC configuration.

Frequently Asked Questions

How can I improve the accuracy of ±1.0°C with my industrial pipe application?

Industrial pipes have a wide variety of tolerances, surface finishes, and coatings which can affect the accuracy. An in-situation user calibration can be done to improve the accuracy for your specific application. Use the free Omega Sync software to do a 1 or 2-point calibration with the HANI™ Clamp Sensor and an in place immersion sensor. See the user manual for additional details.

How should the sensor be oriented on the pipe?
The sensor can be mounted on any straight pipe at least 2.5" long. It is suggested to mount the sensing surface on the bottom half of the pipe for best results.

Are other pipe diameters / sizes available?
Yes, other diameters / sizes are available. Please contact us to discuss your specific application.

How can I improve the accuracy of my industrial pipe application?

Other than water-based process mediums, can other liquids and viscosities be measured?
Yes, please contact us to discuss your specific application.
M12 8-Pin Wiring

<table>
<thead>
<tr>
<th>Pin</th>
<th>Name</th>
<th>Function</th>
<th>Wiring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>Loop -</td>
<td>4 to 20 mA Return</td>
<td>4 to 20 mA</td>
</tr>
<tr>
<td>Pin 2</td>
<td>INTR</td>
<td>Interrupt Signal</td>
<td>Layer N</td>
</tr>
<tr>
<td>Pin 3</td>
<td>SCL</td>
<td>I2C Clock Signal</td>
<td>Layer N</td>
</tr>
<tr>
<td>Pin 4</td>
<td>SDA</td>
<td>I2C Data Signal</td>
<td>Layer N</td>
</tr>
<tr>
<td>Pin 5</td>
<td>Shield</td>
<td>Shield Ground</td>
<td>Layer N</td>
</tr>
<tr>
<td>Pin 6</td>
<td>Loop +</td>
<td>4 to 20 mA Source</td>
<td>4 to 20 mA</td>
</tr>
<tr>
<td>Pin 7</td>
<td>GND</td>
<td>Power Ground</td>
<td>Layer N</td>
</tr>
<tr>
<td>Pin 8</td>
<td>3.3VDD</td>
<td>Power Supply</td>
<td>Layer N</td>
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HANI™ Clamp Temperature Sensor

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>HANI-C-1.5S-M-MA</td>
<td>4 to 20 mA output, 0 to 100°C, 1.5” sanitary metal pipe</td>
</tr>
<tr>
<td>HANI-C-2.0S-M-MA</td>
<td>4 to 20 mA output, 0 to 100°C, 2.0” sanitary metal pipe</td>
</tr>
<tr>
<td>HANI-C-1.0I-M-MA</td>
<td>4 to 20 mA output, 0 to 100°C, 1.0” industrial metal pipe</td>
</tr>
<tr>
<td>HANI-C-2.0I-M-MA</td>
<td>4 to 20 mA output, 0 to 100°C, 2.0” industrial metal pipe</td>
</tr>
<tr>
<td>HANI-C-1.5S-M-MA-CAL-3</td>
<td>4 to 20 mA output, 0 to 100°C, 1.5” sanitary metal pipe, Cal Cert</td>
</tr>
<tr>
<td>HANI-C-2.0S-M-MA-CAL-3</td>
<td>4 to 20 mA output, 0 to 100°C, 2.0” sanitary metal pipe, Cal Cert</td>
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<tr>
<td>HANI-C-1.0I-M-MA-CAL-3</td>
<td>4 to 20 mA output, 0 to 100°C, 1.0” industrial metal pipe, Cal Cert</td>
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<tr>
<td>HANI-C-2.0I-M-MA-CAL-3</td>
<td>4 to 20 mA output, 0 to 100°C, 2.0” industrial metal pipe, Cal Cert</td>
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CAL-3 option is a 3 point calibration at 10°, 50° and 90° C. CAL-4 option is a user selected number and value of temperature points, please contact us for a quote.

Layer N Smart Interface

Layer N Smart Sensing devices require a Layer N Smart Interface to operate and connect to your Layer N Ecosystem. There are both wired and wireless options. Omega Sync software is free and enables you to read the fluid temperature digitally in just a few seconds.

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<tr>
<td>IF-001</td>
<td>USB Smart Interface</td>
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<tr>
<td>IF-002</td>
<td>RS485/Modbus Smart Interface</td>
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<tr>
<td>IF-006-1-NA</td>
<td>Wireless Interface 915 MHZ (for North America)</td>
</tr>
<tr>
<td>IF-006-1-EU</td>
<td>Wireless Interface 868 MHZ (for Europe)</td>
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</tbody>
</table>

Accessories

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<tbody>
<tr>
<td>M12.8-T-SPLIT</td>
<td>Smart Probe M12-8 pin shielded T-splitter — enables access to I/O pins</td>
</tr>
<tr>
<td>M12.8-S-F-FM</td>
<td>M12-8 pin female straight plug field install connector with screw terminals</td>
</tr>
<tr>
<td>DM12CAB-8-1-RA</td>
<td>1m (3.3’) cable dual M12-8 connector, right angle terminator</td>
</tr>
<tr>
<td>DM12CAB-8-3-RA</td>
<td>3m (9.8’) cable dual M12-8 connector, right angle terminator</td>
</tr>
<tr>
<td>DM12CAB-8-5-RA</td>
<td>5m (16.4’) cable dual M12-8 connector, right angle terminator</td>
</tr>
<tr>
<td>DM12CAB-8-1</td>
<td>1m (3.3’) cable dual M12-8 straight connector</td>
</tr>
<tr>
<td>DM12CAB-8-3</td>
<td>3m (9.8’) cable dual M12-8 straight connector</td>
</tr>
<tr>
<td>DM12CAB-8-5</td>
<td>5m (16.4’) cable dual M12-8 straight connector</td>
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