

8000XHT Series

Extreme-Temperature Liquid Flow Meters



Innovative technology and design, for use with liquid temperatures from -60 to 200 °C

- » Standard fluid temperatures from -40 to 200 °C [-40 to 392 °F]; customized versions from -60 to 160 °C [-76 to 320 °F].
- » Magnetic-field-, EMI-, and vibration/shock-resistant stainless steel construction
- » Flow ranges from 0.95 to 60 LPM (0.25 to 16 GPM)
- » Accuracy of 3% of flow range
- » Optional temperature measurement capability with Pt1000 RTD sensor
- » Compatible with many advanced heat-transfer fluids
- » Enhanced accuracy and stability from digital signal processing
- » Standard 0–10 VDC or 0–5 VDC, and 4–20 mA outputs
- » Specialized calibration available to account for viscosity effects of fluid and operating temperature
- » Bright tricolor LED provides clear visual indication of flow status
- » NEMA 4X / IP66 packaging ensures reliable performance in wet environments

8000XHT Series flow meters provide accurate, reliable, and cost-effective measurement of heat transfer fluids and other liquids to from -60 to 200 °C. The wide-temperature capability is enhanced by Proteus' world-class calibration expertise, to deliver superior precision and reliability in flow and temperature measurement for critical heat-sensitive processes.

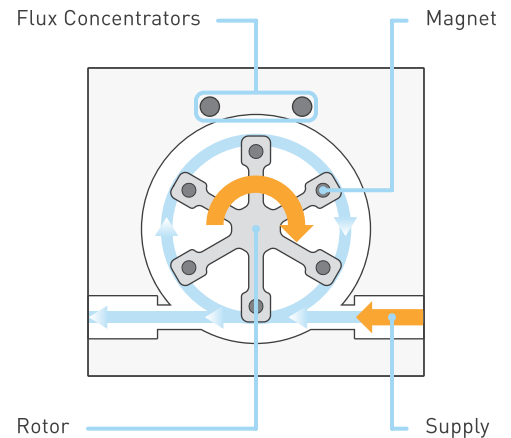
AT A GLANCE

Flow Ranges	0.95 to 60 LPM 0.25 to 16 GPM
Fluid Temperatures – Standard	-40 to 200 °C -40 to 392 °F
Fluid Temperatures – Custom	-60 to 160 °C -76 to 320 °F
Operating Pressure Limit	1724 kPa 250 psi
Flow Output Formats	0–10 VDC or 0–5 VDC 4–20 mA
Temperature Measurement	Optional Pt1000 RTD

How It Works

As liquid flows through the flow sensor cavity, it causes the rotor to spin. Alternating north and south magnets embedded in the rotor transfer pulses through two flux concentrators to switch two Hall-Effect sensors mounted on the main electronics board. The rotational frequency of the rotor is measured by a microcomputer, and scaling factors entered into flash memory allow the volumetric flow rate to be calculated. Flow rate information is output as 0–10 or 0–5 VDC and 4–20 mA.

A built-in relay is programmed to change state when the measured flow rate falls below a preset alarm value, and a bright tricolor LED indicates the flow status. The alarm trip point value is factory-set to ensure accuracy and prevent unwanted tampering. The default value is 25% of the upper flow limit; a customized trip point setting may be requested at the time of order.



Uniquely Designed for Extreme Temperatures

Reliable performance in extreme-temperature applications requires proper protection of the sensitive electronic components inside the flow meter.

» High-Temperature Applications

The thermal isolation of the electronics module from the flow path enables convective cooling by ambient air. The maximum fluid temperature that can be sustained without damage to the electronics is dependent on the air temperature. Example maximum temperatures (in °C): 75° fluid / 65° air; 120° fluid / 60° air; 200° fluid / 44° air.

Note: The flow body is not insulated. It is recommended that a safety screen be placed around the meter to protect against burn injuries.

» Low-Temperature Applications

For applications involving fluid temperatures below 10° C (50 °F), precautions such as an inert environment or foam protection must be taken to avoid condensation, which can damage the internal electronics. Please contact Proteus Applications Support for more information.



Cost-Effective Temperature Measurement

8000XHT Series flow meters offer the capability to measure the liquid flow rate and temperature with a single instrument, requiring only one connection point in your line. An optional Pt1000 resistance temperature detector (RTD) probe mounted in the sensor body provides direct measurement of liquid temperatures from -60 to 200 °C / -76 to 392 °F, with temperature information transmitted as a resistance signal.

Certified Calibrations Help You Control Your Most Critical Processes

A heat-transfer fluid's viscosity is highly dependent on its temperature: as temperature increases, viscosity decreases inversely. The response of a flow meter varies with the kinematic viscosity of a fluid at its targeted operating temperature.

Proteus' expert calibration capabilities allow us to deliver instruments with fluid- and temperature-specific calibrations to ensure accuracy in your most critical processes. Contact our flow experts for assistance in identifying the optimum solution for your most demanding applications!

Flow Ranges, Connections, and Model Numbers

FLOW RANGE*		CONNECTIONS	STANDARD MODEL NUMBERS	
LPM	GPM		FLOW ONLY	FLOW & TEMPERATURE
0.95 – 9.5	0.25 – 2.5	9/16-18 SAE	08006XHTSA2	08006XHTSA2-T
1.1 – 17	0.3 – 4.5	9/16-18 SAE	08006XHTSA4	08006XHTSA4-T
1.5 – 23	0.4 – 6.0	3/4-16 SAE	08008XHTSA6	08008XHTSA6-T
3.0 – 38	0.8 – 10	3/4-16 SAE	08008XHTSA10	08008XHTSA10-T
4.5 – 60	1.2 – 16	1 1/16-12 SAE	08012XHTSA16	08012XHTSA16-T

*Listed flow ranges are for water at 25 °C / 77 °F.

When selecting a flow meter for your application, your nominal flow rate should be around 50–60% of the upper flow limit of the meter. Customization is available to achieve flow ranges beyond those shown above. For assistance in identifying the 8000XHT Series product that is best suited to your process, please contact Proteus Applications Support.

Flow Sensor Specifications

Output Formats	Voltage: 0–10 VDC (default) or 0–5 VDC • Current: 4–20 mA		
Fluid Temperatures – Standard*	-40 to 200 °C / -40 to 392 °F (requires FKM (Viton®) O-ring)		
Fluid Temperatures – Custom*	-60 to 160 °C / -76 to 320 °F (requires Fluorosilicone O-ring)		
Ambient Temperature	-40 to 75 °C / -40 to 167 °F		
Operating Pressure Limit	1724 kPa / 250 psi		
Burst Pressure (5:1)	8618 kPa / 1250 psi		
Pressure Drop	Less than 21 kPa / 3 psi at maximum flow rate		
Accuracy – Standard	± 3% of flow range with standard validation		
Accuracy – Validated	± 2% of calibration value		
Linearity	± 1.5% of flow range from 0.1 to 1.0 × flow range		
Repeatability	± 1% of flow range from 0.1 to 1.0 × flow range		
Hysteresis	5% of flow range		
Input Power Voltage	+24 VDC ± 10%		
Input Power Consumption	< 1 W		
Relay Contacts Maximum Current	1 A at 48 VDC		
Voltage Output Maximum Sourcing Current	15 mA at 2 VDC output		
Maximum Loop Resistance	900 Ω at 24 VDC		
Wetted Materials	Flow body: Cast 316 stainless steel	O-ring (standard): FKM (Viton®)	
	Rotor: PPS	O-ring (custom): Fluorosilicone	
	Rotor shaft: 316 stainless steel		
Enclosure Protection	NEMA 4X • IP66		
Cable Connection	M12 male 8-pin connector		

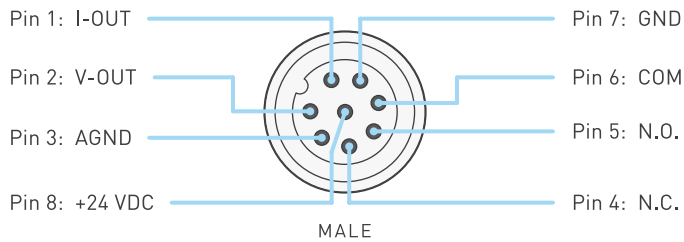
*For low-temperature applications, precautions must be taken to avoid condensation, which can damage the internal electronics. Please contact Proteus Applications Support for applications involving fluid temperatures below 10 °C / 50 °F.

Temperature Sensor Specifications

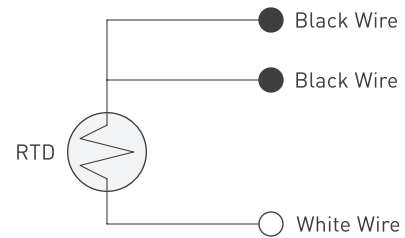
Sensor Type	Pt1000 RTD probe (DIN EN 60751 Class A)
Measurement Range	-60 to 200 °C / -76 to 392 °F
Output Format	Resistance
Output Value	0 °C = 1000.0 Ω • 10 °C = 1039.0 Ω • 125 °C = 1758.6 Ω
Accuracy	± 0.15 °C at T = 0 °C
Wetted Materials	Probe housing: 316 stainless steel
Lead Wires	3-wire • 30 AWG • PTFE insulation • Length: 3.0 m / 118.5 in

Wiring

» Flow Meter



» Temperature Sensor

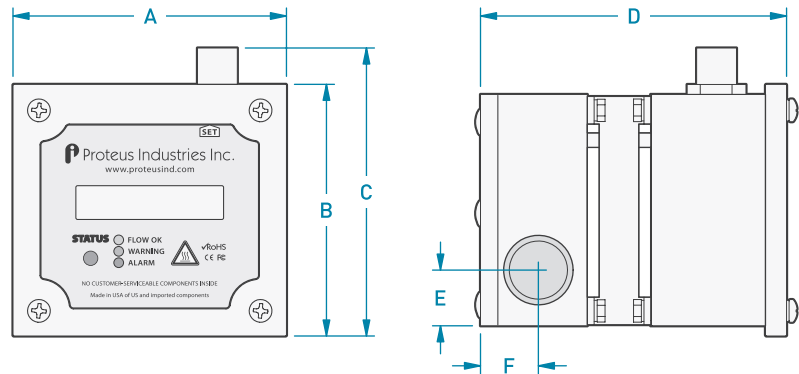


Dimensions and Drawings

Dimensions for standard 8000XHT Series products are shown in the table below.

Outline and 3D drawings are accessible on the Proteus Industries website at www.proteusind.com/8000XHT.

Solid models are available upon request; please contact Proteus Applications Support.



STANDARD MODEL NUMBER		A	B	C	D	E	F
08006XHTSA2	08006XHTSA4	81.8 mm	75.2 mm	86.4 mm	89.4 mm	16.5 mm	15.7 mm
08006XHTSA2-T	08006XHTSA4-T	3.22 in	2.96 in	3.40 in	3.52 in	0.65 in	0.62 in
08008XHTSA6	08008XHTSA10	81.8 mm	75.2 mm	86.4 mm	91.9 mm	16.5 mm	17.5 mm
08008XHTSA6-T	08008XHTSA10-T	3.22 in	2.96 in	3.40 in	3.62 in	0.65 in	0.69 in
08012XHTSA16		81.8 mm	75.2 mm	86.4 mm	99.3 mm	16.8 mm	22.4 mm
08012XHTSA16-T		3.22 in	2.96 in	3.40 in	3.91 in	0.66 in	0.88 in

Compliance and Certifications

» Applicable Directives

2004/108/EC (EMC) (as amended)
2011/65/EU (RoHS) (as amended)
2012/19/EU (WEEE)
1907/2006/EC (REACH)

» Product Safety

EN 61010-1:2010 (Electrical Safety)
(Operated at 40°C ambient with 200°C liquid & 75°C ambient with 75°C liquid)

» Electromagnetic Compatibility

EN 61326-1: 2013 (Electrical Equipment)
EN 61000-4-3 Radiated RF Immunity testing to 10 GHz @ 10 V/m
EN 61000-4-8 Power Frequency Magnetic Fields testing at 50/60 Hz @ 400 A/m
FCC Part 15 Subpart B Class A
ICES-003 Class A
VCCI V-3 (2015-04) Class A
AS/NZS CISPR 11:2011

» Vibration and Shock

MIL-STD-810G Test Method 514.5
MIL-STD-810G Test Method 514.6

Proteus: Customization Experts

Bring us your specifications and let us create a flow management solution to meet your exact requirements. Materials can be modified or improved for compatibility with your fluid; flow ranges can be matched to large connections; adaptations can be implemented for high and low temperatures; and multiple devices can be integrated in cost-effective manifold assemblies for liquid distribution, measurement, and control.

When your new product goes to production, fittings will be properly positioned, entire units and sub-assemblies will be certified leak-tight, all electrical connections will be tested end-to-end, and the system's calibration will be certified to the specified accuracy. Our lean manufacturing processes and ISO 9001-certified procedures will ensure that your instruments will arrive at your location ready for use, the first time and every time.

Let us put our knowledge base to work on solving your most demanding flow measurement challenges! Contact Proteus Applications Support to discuss your requirements for a customized solution.

Need More Information?

- » **Visit our website** An 8000XHT Series setup guide containing installation and operating instructions is accessible at www.proteusind.com/8000XHT.

- » **Contact us** Our flow management experts will be pleased to answer your questions! Email us at tech@proteusind.com or call us at (650) 964-4163.



Proteus Industries Inc.
340 Pioneer Way, Mountain View, CA 94041
Tel: (650) 964-4163 Fax: (650) 965-0304
www.proteusind.com sales@proteusind.com

Information in this document was correct at the time of printing; however, specifications are subject to change as Proteus Industries' continuous improvement processes establish new capabilities.

© Proteus Industries Inc. All rights reserved. All other company and product names may be trademarks of their respective companies.

8000XHTDS Rev 004 11/2021