FL SERIES
FLOW SENSOR

Sensata's FL Series Flow Sensors utilize ultrasonic technology to deliver best in class accuracy, non-invasive, leak free performance, and highly reliable flow monitoring. These sensors are engineered to continuously monitor liquid flow to help ensure safe cooling operations in data centers and other mission critical thermal management applications.

The FL Series Flow Sensors are suitable for both primary cooling loops and secondary / Technology Cooling System (TCS) loops in data centers including coolant distribution unit (CDU) applications and cold plates. Their low pressure drop and high measurement accuracy of ≤ 1.0% of full scale enables tighter control of coolant flow, improving overall cooling efficiency and helping data centers reduce their Power Usage Effectiveness (PUE).

To support a wide range of system architectures, the FL Series is available in multiple housing materials, sizes, media mix, and communication protocols, with optional integrated temperature sensing.

Features

- High accuracy of ≤ 1.0% full scale -> Higher efficiency & lower Power Usage Effectiveness (PUE)
- Very low pressure drop -> Higher efficiency & lower Power Usage Effectiveness (PUE)
- Leak proof design -> Reliable & peace of mind
- No moving parts -> No mechanical wear & maintenance-free operation
- Non-intrusiveness -> Immunity to scaling & downtime
- Optional integrated temperature sensor -> Enables real time cooling monitoring & smaller footprint
- Bubble robustness -> Maintain stable and reliable flow monitoring

Applications

- Data center CDUs & cold plates
- Chillers
- HVAC & Refrigeration
- Industrial

COMPETITIVE BENCHMARKING

	Sensata FL Series	Competitor 1	Competitor 2	Competitor 3
Technology	Ultra Sonic	Vortex	Mechanical	Magnetic
Flow accuracy	High	Low	Low	High
Pressure drop	Very Low	High	Very High	Low
Non-Intrusive	Yes	No	No	No
Optional Integrated Temperature Sensor	Yes	Yes	No	Yes
Reliability	High	Low	Very Low	Moderate
Low Flow rate operation	Yes	No	Yes	Yes
Sensitivity to coolant chemistry & conditions	Stable	Stable	Unstable	Unstable
Size	Compact	Compact	Compact	Large
Robustness through bubbles	Yes	Limited	No	Limited

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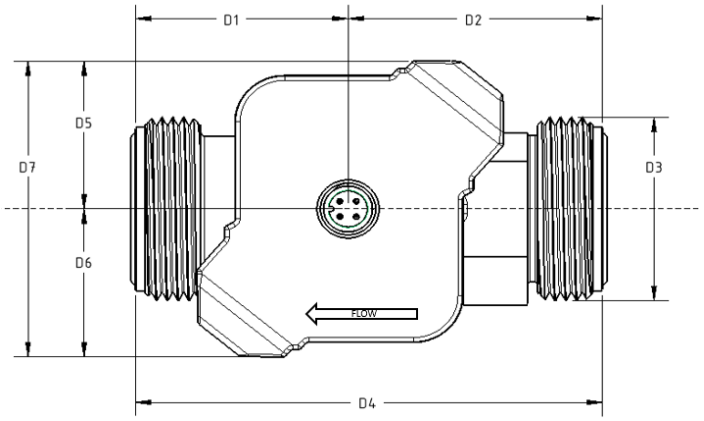
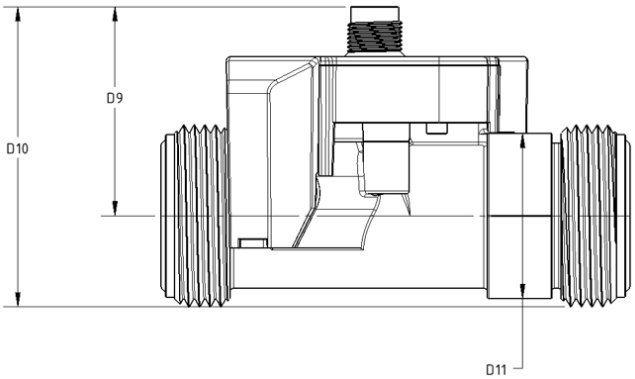
SPECIFICATIONS

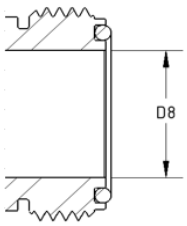
Technology	Ultrasonic
Flow Range	Up to 400 l/min
Diameter (pipe size)	DN8 (1/4") to DN40 (1 1/2")
Body Material	SS 316 & SS 304
Connections	G & Tri Clamp
Target Media	Deionized Water + up to 50% Glycol
Temperature of Medium	-20° C to 90° C (non-freezing)
Ambient Temperature	-20° C to 80° C
Storage Temperature	-40° C to 80° C
Working Humidity	0 to 100% Non-Condensing
Media Pressure	Up to 16 bar (232 psi)
Accuracy	≤ 1.0% full scale
Flow Sensor refresh time	250 ms
Pressure drop	< 50 mbar @ 40 l/min
Communication Interface	4-20 mA, 0-10V & Modbus
Electrical connection	M12
Supply Voltage	13-33 V DC & 5 V DC
Optional Integrated temperature sensor	<2 seconds response time with +/-0.3K accuracy
Certifications/Standards	IP65 & UL60730

DIMENSIONS

Threaded Flow Sensors											
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11
DN20	45.5	54.5	33.3	100.0	33.8	33.8	67.7	20	43.7	60.3	HEX 28
DN25	45.5	54.5	41.9	100.0	33.8	33.8	67.7	25	48.2	69.2	HEX 38
DN32	64.8	65.2	47.8	130.0	43.4	43.4	86.9	32	48	71.9	HEX 46
DN40	64.8	65.2	59.6	130.0	48.2	48.2	96.5	40	50.6	80.4	HEX 50







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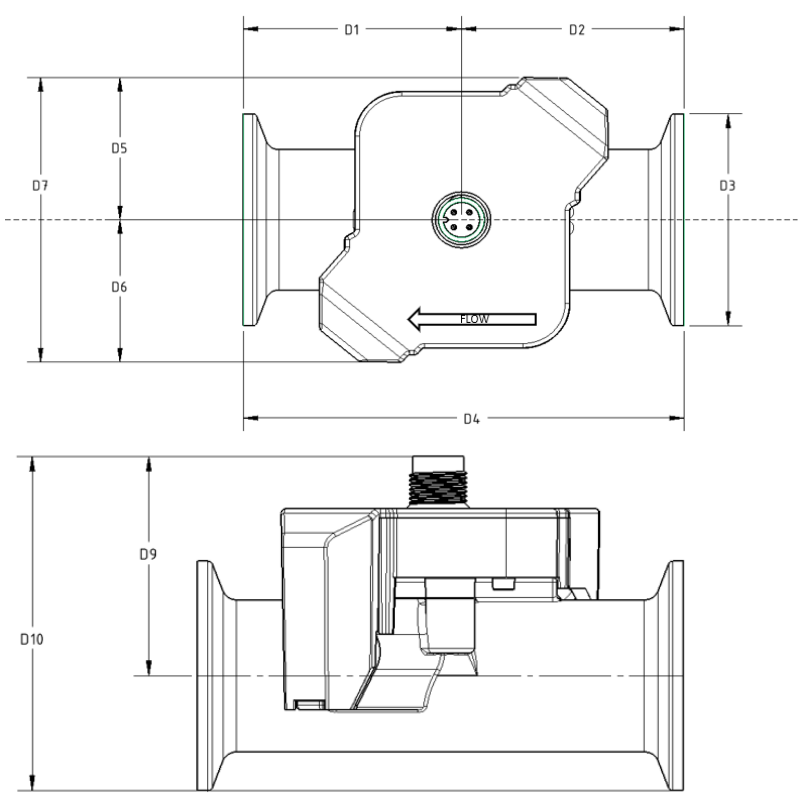
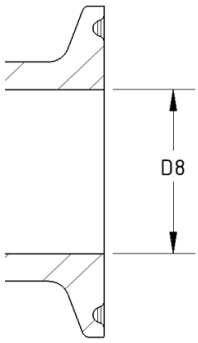
Tri-Clamp Flow Sensors										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
DN20	43.5	56.5	34	100.0	33.8	33.8	67.7	20	43.7	60.7
DN25	49.5	50.5	50.4	100.0	33.8	33.8	67.7	25	48.2	73.4
DN32	64.8	65.2	64	130.0	43.4	43.4	86.9	32	48	80
DN40	64.8	65.2	64	130.0	48.2	48.2	96.5	40	50.6	82.6





VIN	**Voltage In**
F_OUT	**Flow Output**
GND	**Ground**
NC	**Not Connected**

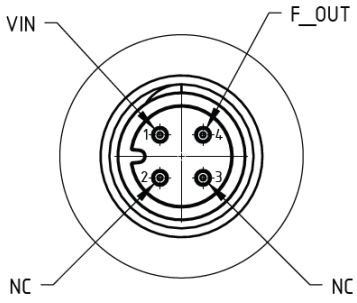


Figure1 Current Output Pinout

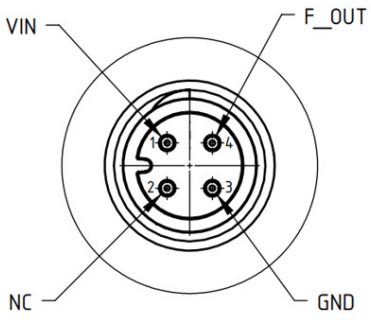


Figure2 Voltage Output Pinout

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ORDERING OPTIONS

Example : FL-S5G5-0C2H

1	Dash	2	3	4	5	Dash	6	7	8	9	10
Sensor Type	-	**Body**				-	**Temp**	**Electrical**			**Others**
Product Series		**Material**	**DN Size**	**Connection type**	**Nominal Thread size**		**Temp Sensor**	**Output Signal**	**Connector**	**Input Voltage**	
FL = Flow Sensor		S: 316 SS	1: DN8	G: G Thread	1: DN8 - G 1/2"		0: No	C: 4-20 mA	2: M12 - 2 wires	H: 11-33 V DC	
		R: 304 SS	2: DN10	T: Tri-Clamp	2: DN10 - G 1/2"		1: Yes - PT1000	M: Modbus		L: 5 V DC	
			3: DN15		3: DN15 - G 3/4"			V: 0-10V			
			4: DN20		4: DN20 - G 1"						
			5: DN25		5: DN25 - G 1 1/4"						
			6: DN32		6: DN32 - G 1 1/2"						
			7: DN40		7: DN40 - G 2"						
					8: DIN 32676 standard						
					9: 3A Sanitary standard						
					0: Others						

RISK OF MATERIAL DAMAGE AND HOT ENCLOSURE

- The product may be hot, allow the product to cool before touching
- Follow proper mounting instructions including torque values

Failure to follow these instructions can result in serious injury, or equipment damage.

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power before installing or working with this equipment
- Verify all connections and replace all covers before turning on power

Failure to follow these instructions will result in death or serious injury.

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