



Flosense; the new affordable, flexible flow monitoring system designed for accurate measuring and monitoring of flow, temperature and pressure variations in cooling circuits

Flosense is designed to be installed in various locations within the cooling circuit including the main water supply, the mould heater, critical cooling channels or distribution manifolds.

Quick to install and easy to set-up, Flosense is a critical component in any injection moulding configuration and should form part of any setup where cost control and quality are key considerations.

Using these values, Flosense provides an indication of the stability of the process and checks the efficiency, identifying wasted energy and variations in pressure which could indicate leaks or blocked waterways.

Flosense is designed to be installed in various locations within the cooling circuit including the main water supply, the mould heater, critical cooling channels or distribution manifolds.





Pressure loss is caused by hoses, fittings and valves and will affect the productivity.

Difference between inlet pressure and return pressure is measured as Delta P.

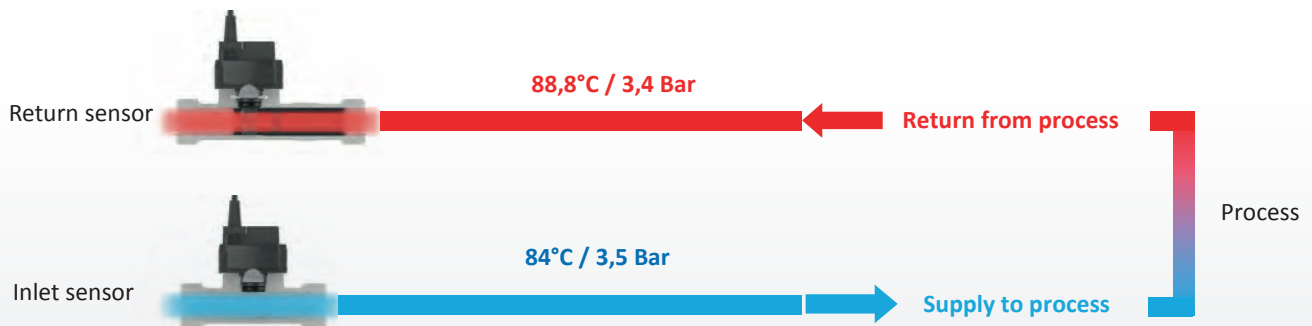
Variation in Delta P could indicate pump failure, blocked waterway, leaks etc.



As the cooling water passes through the mould it transfers heat from the steel into the cooling water. The more turbulent the flow the more efficient this process of cooling.

Difference between inlet temperature and return temperature is measured as Delta T.

Sudden variation in Delta T may be caused by a faulty heater/cooler, blocked channel, scale build up etc.



Flosense, provides visibility of key cooling circuit metrics, improves efficiency, enhances productivity and profitability.

Flosense, provides features and interfaces to monitor, analyse and verify data, essential for your productivity and quality.



Energy Transfer Indicator

Heat is transferred from the mould through the water channels, Flosense calculates the heat transfer as energy units BTU or kWh. This feature illustrates the efficiency of the process.



Alarm Output

With programmable alarm limits on flow, temperature and pressure any variation in the values being monitored will trigger an on-screen alarm. An external alarm output signal can be connected to auxiliary equipment which could be a visual or audible beacon, the mould heater or the injection moulding machine.



Turbulent Flow Indicator

Often regarded as a key indicator in the efficiency of a mould cooling circuit, Flosense is fitted with a turbulent flow indicator. The unit will indicate laminar, transitional and turbulent flow as well as monitoring the Reynolds number, based on flow diameter and percentage glycol in the system.

Even in a 'hose burst' situation the unit will identify a sudden loss of pressure and the unit can either be connected to an alarm or could be used to automatically shut down the mould heater.

Improving the flow from laminar to turbulent can increase the heat transfer efficiency by up to 500%.



DATA RECORDING

Data is recorded and stored in the internal memory enough to display data for the previous 30 days.

Flow, Temperature and Pressure are logged and may be viewed in the graphing screen.



The last 30 days of data is recorded and stored on the internal memory.



Data Export

It is also possible to download the data to a laptop using the integrated USB port for further analysis.

The data is stored as text file and can be analysed using excel or other analysing software.

Flow Sensor Kit - 1 or 2 Circuits

NEW: 2 flow circuits from same control



1 Sensor Kit	2 Sensors Kit	Flow capacity l/m	A	Connection B	C	D	Max Temp.
FSE-0510-K	FSE-0510-K-D	0,5-10	100	G 1/2"	58,8	1/4"	120°C
FSE-0510-K-HT	FSE-0510-K-HT-D	0,5-10	100	G 1/2"	58,8	1/4"	160°C
FSE-120-K	FSE-120-K-D	1-20	100	G 1/2"	58,8	1/4"	120°C
FSE-120-K-HT	FSE-120-K-HT-D	1-20	100	G 1/2"	58,8	1/4"	160°C
FSE-240-K	FSE-240-K-D	2-40	100	G 1/2"	58,8	1/4"	120°C
FSE-240-K-HT	FSE-240-K-HT-D	2-40	100	G 1/2"	58,8	1/4"	160°C

- Touch Screen
- Power Supply
- Sensor(s) (flow + temp)
- Cable(s) (1,2 m.)
- USB Cable

Multi Sensor Kit - 1 or 2 Circuits

NEW: 2 flow circuits from same control



1 Sensor Kit	2 Sensors Kit	Flow capacity l/m	A	Connection B	C	Max Temp.	Pressure Range
FS-115-K	FS-115-K-D	2-20	110	G 3/4"	58,8	120°C	0-10 Bar
FS-240-K	FS-240-K-D	4-40	110	G 3/4"	58,8	120°C	0-10 Bar
FS-5100-K	FS-5100-K-D	10-100	129	G 1"	66,5	120°C	0-10 Bar
FS-10200-K	FS-10200-K-D	20-200	137,5	G 1-1/4"	74,1	120°C	0-10 Bar
FS-20400-K*	FS-20400-K-D*	20-200	180	G 1-1/2"	85	120°C	0-10 Bar

- Touch Screen
- Power Supply
- Sensor(s) (flow + temp + pressure)
- Cable(s) (1,2 m.)
- USB Cable
- * Composite (PPS, PA66)

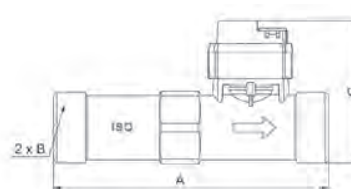
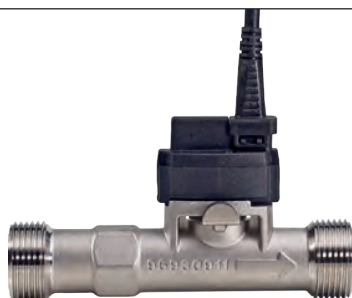
Delta Multi Sensor Kit - 1 Circuit



Inlet/outlet Sensor Kit	Flow capacity l/m	A	Connection B	C	Max Temp.	Pressure Range
FS-115-10-K	2-20	110	G 3/4"	58,8	120°C	0-10 Bar
FS-240-10-K	4-40	110	G 3/4"	58,8	120°C	0-10 Bar
FS-5100-10-K	10-100	129	G 1"	66,5	120°C	0-10 Bar
FS-10200-10-K	20-200	137,5	G 1-1/4"	74,1	120°C	0-10 Bar
FS-20400-10-K*	40-400	180	G 1-1/2"	85	120°C	0-10 Bar

- Touch Screen
- Power Supply
- Sensor (flow + temp + pressure)
- Inlet Sensor (Temp + pressure)
- 2 x Cables (1,2 m.)
- USB Cable
- * Composite (PPS, PA66)

Multi Sensor Unit



Part No.	Flow capacity l/m	A	B	C	Max temperature	Hosetail Ref.
FS-115	2-20	110	G 3/4"	58,8	120°C	CFR3/4-13
FS-240	4-40	110	G 3/4"	58,8	120°C	HT-316-2 / CFR3/4-19
FS-5100	10-100	129	G 1"	66,5	120°C	CFR1-25 / CFR1-25
FS-10200	20-200	137,5	G 1-1/4"	74,1	120°C	HT-316-4 / CFR1.1/4-32
FS-20400	40-400	180	G1-1/2"	80,1	120°C	1.1/2" / 38 mm. (Included)

Includes Flow Pipe and Multi Sensor (cable not included).

Optional (not included in the Kit) AISI 316

Swivel Hosetail Fittings

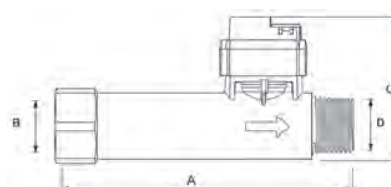
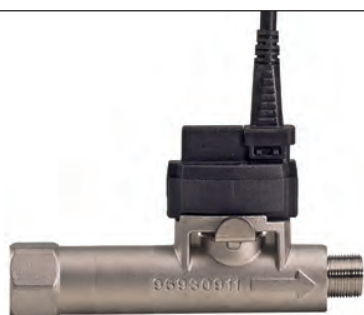


Gaskets



Stainless Steel Part No.	Brass Part No.	A1 x D1	Sensor Ref.	Part No.
HT-316-2	CFR3/4-13	3/4" X 13	FS-115	GK34
HT-316-3	CFR3/4-19	3/4" X 19	FS-240	GK34
	CFR1-25	1" x 25	FS-5100	GK1
	CFR1.1/4-32	1.1/4 x 32	FS-10200	GK114
	CFR1.1/2-38	1.1/2 x 38	FS-20400	GK112

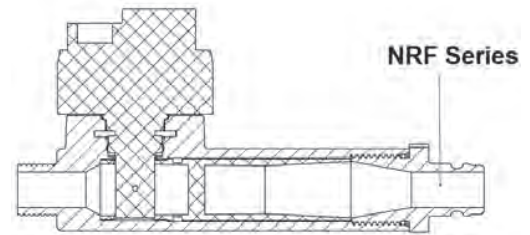
Flow Sensor Unit



Part No.	Flow capacity l/m	A	B	C	D	Max temperature	B Connection ref.
FSE-0510	0,5-10	100	G 1/2"	58,8	1/4"	120°C	xxNRF
FSE-0510-HT	0,5-10	100	G 1/2"	58,8	1/4"	160°C	xxNRF
FSE-120	1-20	100	G 1/2"	58,8	1/4"	120°C	xxNRF
FSE-120-HT	1-20	100	G 1/2"	58,8	1/4"	160°C	xxNRF
FSE-240	2-40	100	G 1/2"	58,8	1/4"	120°C	xxNRF
FSE-240-HT	2-40	100	G 1/2"	58,8	1/4"	160°C	xxNRF

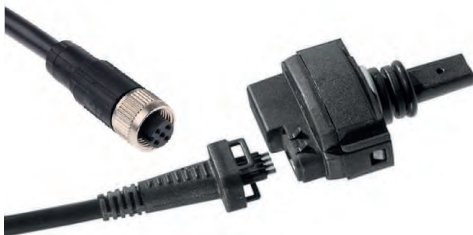
Includes Flow Pipe and Flow Sensor (cable not included)

Port Connector Plugs



Part No.	Connection	Size/series		
09NRF	G 1/2"	09 EURO Style		
13NRF	G 1/2"	13 EURO Style		
20NRF	G 1/2"	20 Int. Style		
30NRF	G 1/2"	30 Int. Style		
08NRF	G 1/2"	French Type		
F9NRF	G 1/2"	French Matic		
06NRF	G 1/2"	06 Scandinavian Style		
10MF	G 1/2"	10 mm Hosetail		
13MF	G 1/2"	13 mm Hosetail		

Sensor Cable



Part No.	Connection	Length (mm)
FS-SC1200	M8/Molex	1200
FS-SC2900	M8/Molex	2900
FS-SC1200-GND	M8/Molex	1200
FS-SC2900-GND	M8/Molex	2900

GND Type includes Earth Wire and Sensor Clip Connector

Extension Cable 4 pin



Part No.	Connection	Length (mm)
FS-4P-EC1000	M8/M8	1000
FS-4P-EC2000	M8/M8	2000
FS-4P-EC5000	M8/M8	5000

MULTI ZONE MONITORING

Upgrade your moulding machine with a new digital flow monitor to improve your productivity

Digital flow monitors will give you many advantages such as:

- Digital monitoring of Flow, Temperature and Pressure
- Alarm Output
- Higher flow capacity
- Higher temperature range
- Data storage and export
- Faster Mould changeovers
- OPC-UA / Euromap interface



Flosense 2.0

Manifolds - Retrofit Style



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Flosense 3.0

All in One Flow Regulator Style
Integrated Control Screen



Page 97

Flosense 4.0

Compact Dual Line Manifolds
Integrated Sensors and Valves



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Touch Screen

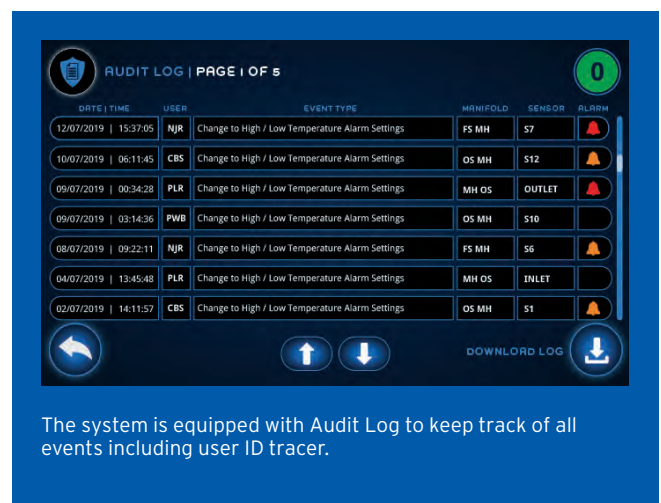
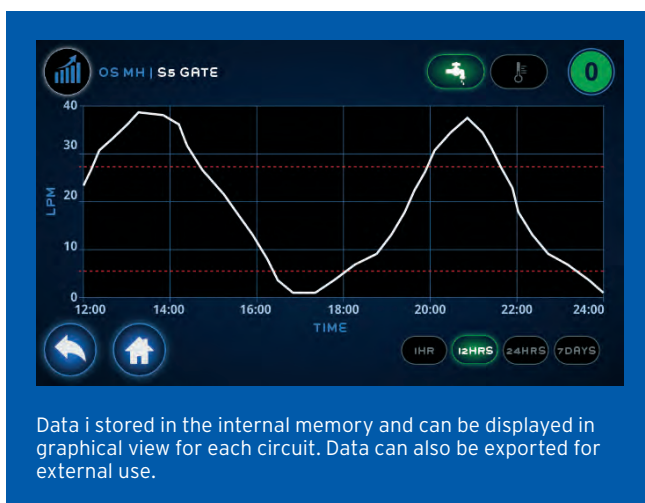
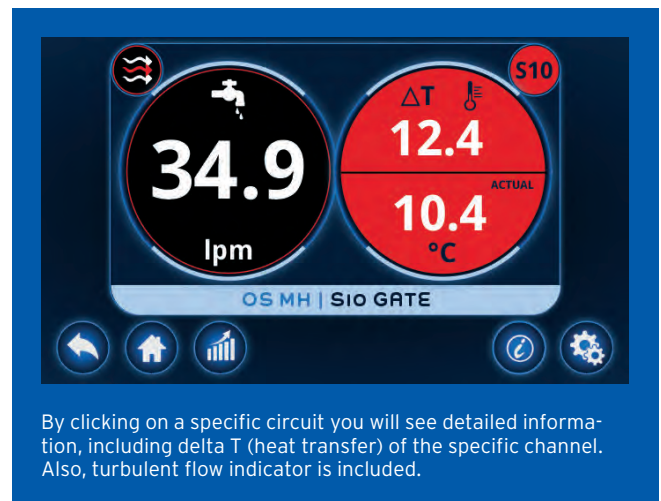


Touch Screen mounted to the Manifolds.

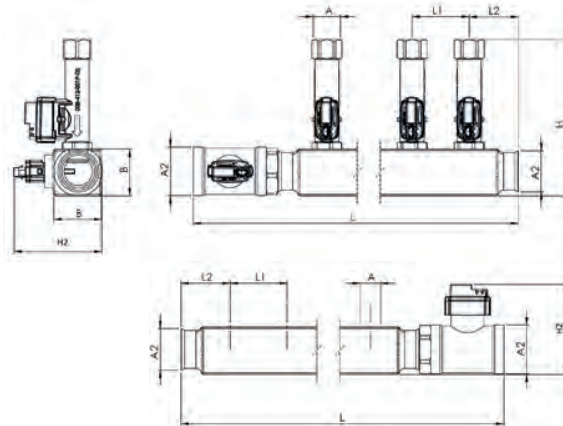
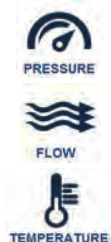
Equipped with power, alarm, USB and Ethernet connections.

Display	
Type	Touch
Size	7,1"
Voltage	12-24 Volt.
Data	USB + Ethernet
Communications	OPC UA
Internal memory	Up to 30 days data (FIFO)

Part No.	Size	Manifold Inputs	Power Connection	Alarm Output	Interface
FS-7100	7.1"	4	12V	Yes	OPC-UA



Flosense 2.0 Manifold



1" Manifold	Flow sensor range option (l/m)			Ports	A	A2	B	L	L1	L2	H	H2	Temp.
Part No.	0.5-10	1-20	2-40										
F2M4-x-xx	•	•	•	4	G 1/2"	G 1"	40	315	50	45	140	66,5	120°C
F2M4HT-x-xx	•	•	•	4	G 1/2"	G 1"	40	315	50	45	140	66,5	160°C
F2M6-x-xx	•	•	•	6	G 1/2"	G 1"	40	415	50	45	140	66,5	120°C
F2M6HT-x-xx	•	•	•	6	G 1/2"	G 1"	40	415	50	45	140	66,5	160°C
F2M8-x-xx	•	•	•	8	G 1/2"	G 1"	40	515	50	45	140	66,5	120°C
F2M8HT-x-xx	•	•	•	8	G 1/2"	G 1"	40	515	50	45	140	66,5	160°C
F2M10-x-xx	•	•	•	10	G 1/2"	G 1"	40	615	50	45	140	66,5	120°C
F2M10HT-x-xx	•	•	•	10	G 1/2"	G 1"	40	615	50	45	140	66,5	160°C
F2M12-x-xx	•	•	•	12	G 1/2"	G 1"	40	715	50	45	140	66,5	120°C
F2M12HT-x-xx	•	•	•	12	G 1/2"	G 1"	40	715	50	45	140	66,5	160°C

1.1/4" Manifold	Flow sensor range option (l/m)			Ports	A	A2	B	L	L1	L2	H	H2	Temp.
Part No.	0.5-10	1-20	2-40										
F2M4-L-x-xx	•	•	•	4	G 1/2"	G 1.1/4"	50	315	50	45	150	74,1	120°C
F2M4HT-L-x-xx	•	•	•	4	G 1/2"	G 1.1/4"	50	315	50	45	150	74,1	160°C
F2M6-L-x-xx	•	•	•	6	G 1/2"	G 1.1/4"	50	415	50	45	150	74,1	120°C
F2M6HT-L-x-xx	•	•	•	6	G 1/2"	G 1.1/4"	50	415	50	45	150	74,1	160°C
F2M8-L-x-xx	•	•	•	8	G 1/2"	G 1.1/4"	50	515	50	45	150	74,1	120°C
F2M8HT-L-x-xx	•	•	•	8	G 1/2"	G 1.1/4"	50	515	50	45	150	74,1	160°C
F2M10-L-x-xx	•	•	•	10	G 1/2"	G 1.1/4"	50	615	50	45	150	74,1	120°C
F2M10HT-L-x-xx	•	•	•	10	G 1/2"	G 1.1/4"	50	615	50	45	150	74,1	160°C
F2M12-L-x-xx	•	•	•	12	G 1/2"	G 1.1/4"	50	715	50	45	150	74,1	120°C
F2M12HT-L-x-xx	•	•	•	12	G 1/2"	G 1.1/4"	50	715	50	45	150	74,1	160°C

1.1/2" Manifold	Flow sensor range option (l/m)			Ports	A	A2	B	L	L1	L2	H	H2	Temp.
Part No.	0.5-10	1-20	2-40										
F2M4-XL-x-xx	•	•	•	4	G 1/2"	G 1.1/2"	50	365	50	70	161,5	85	120°C
F2M4HT-XL-x-xx	•	•	•	4	G 1/2"	G 1.1/2"	50	365	50	70	161,5	85	160°C
F2M8-XL-x-xx	•	•	•	8	G 1/2"	G 1.1/2"	50	565	50	70	161,5	85	120°C
F2M8HT-XL-x-xx	•	•	•	8	G 1/2"	G 1.1/2"	50	565	50	70	161,5	85	160°C
F2M12-XL-x-xx	•	•	•	12	G 1/2"	G 1.1/2"	50	765	50	70	161,5	85	120°C
F2M12HT-XL-x-xx	•	•	•	12	G 1/2"	G 1.1/2"	50	765	50	70	161,5	85	160°C

Comes in pairs of 2 manifolds

- One feed Manifold with Pressure and Temperature Sensor
- One return Manifold with Flow, Temperature and Pressure Sensor

Supplied without connector nipples (see page 93)

Ordering Example: Part No. + Flow sensor range (F2M4-1-20)

HT = High Temperature.

Complete unit with Pressure sensor installed on main inlet / return. Connect up to 4 manifolds to the touch screen in order to monitor up to 48 separate cooling circuits.

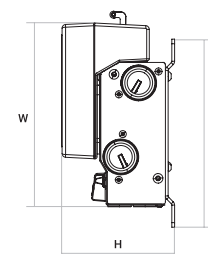
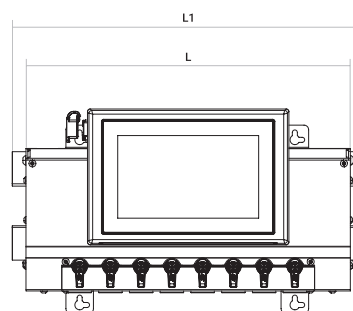
Use the alarm limits (and output) on flow and temperature to control the process stability and part quality.

Material:

Stainless Steel

Digital Flow Regulator

Replace analogue water flow regulators with the new digital industry 4.0 ready monitors



Part No.	Ports	Length mm	Length 1 mm	Width mm	Height mm	B mm	Flow	Temp.
FFRM4-0.5-10	4	220	250	200	123	205	0,5-10 l/m	120°C
FFRM4-1-20	4	220	250	200	123	205	1-20 l/m	120°C
FFRM4-2-40	4	220	250	200	123	205	2-40 l/m	120°C
FFRM6-0.5-10	6	287	317	200	123	205	0,5-10 l/m	120°C
FFRM6-1-20	6	287	317	200	123	205	1-20 l/m	120°C
FFRM6-2-40	6	287	317	200	123	205	2-40 l/m	120°C
FFRM8-0.5-10	8	354	384	200	123	205	0,5-10 l/m	120°C
FFRM8-1-20	8	354	384	200	123	205	1-20 l/m	120°C
FFRM8-2-40	8	354	384	200	123	205	2-40 l/m	120°C
FFRM10-0.5-10	10	421	451	200	123	205	0,5-10 l/m	120°C
FFRM10-1-20	10	421	451	200	123	205	1-20 l/m	120°C
FFRM10-2-40	10	421	451	200	123	205	2-40 l/m	120°C
FFRM12-0.5-10	12	488	518	200	123	205	0,5-10 l/m	120°C
FFRM12-1-20	12	488	518	200	123	205	1-20 l/m	120°C
FFRM12-2-40	12	488	518	200	123	205	2-40 l/m	120°C

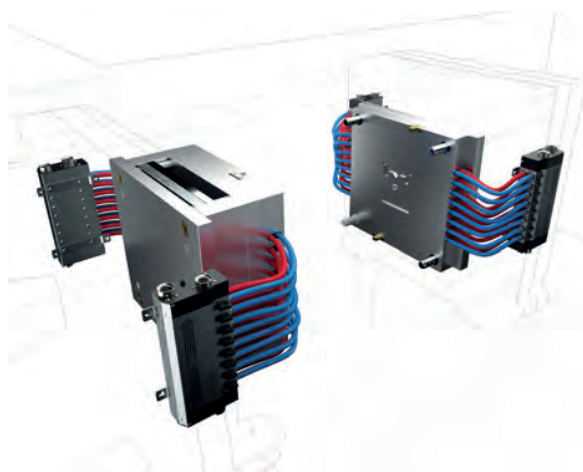
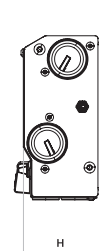
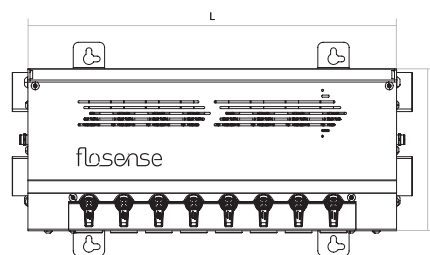
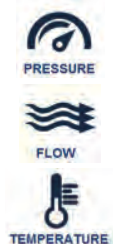
Complete unit with Pressure sensor installed on main inlet. Retrofit your existing flow regulators with FloSense today.

Material:

Flow modules: DZR Brass / nickel plated / Cover: stainless steel.

Flow	Standard Sensor	
Measuring range	0.5-10 l/min (0.13-2.64 gpm)	
	1-20 l/min (0,27-5,2 gpm)	
	2-40 l/min (0,53-10,4 gpm)	
Accuracy	(± 1 o) in water, ± 1% FS	
Temperature	Standard Sensor	
Measuring range	0-120°C (32-248°F)	
Accuracy	15-90°C (59-194°F) ± 0.5 K	
	0-120°C(32-248°F) ± 1 K	
Pressure	Standard Sensor	
Measuring range	0-10 bar (0-145 psi)	
Accuracy	± 2.5% FS	

Flosense 4.0 Manifold



Part No.	Flow sensor range option (l/m)			Ports	L	W	H	Temp.
	0.5-10	1-20	2-40					
F4M4-x-xx	•	•	•	4	220	155	72	120°C
F4M4HT-x-xx	•	•	•	4	220	155	72	160°C
F4M6-x-xx	•	•	•	6	287	155	72	120°C
F4M6HT-x-xx	•	•	•	6	287	155	72	160°C
F4M8-x-xx	•	•	•	8	354	155	72	120°C
F4M8HT-x-xx	•	•	•	8	354	155	72	160°C
F4M10-x-xx	•	•	•	10	421	155	72	120°C
F4M10HT-x-xx	•	•	•	10	421	155	72	160°C
F4M12-x-xx	•	•	•	12	488	155	72	120°C
F4M12HT-x-xx	•	•	•	12	488	155	72	160°C

Ordering Example: Part No. + Flow sensor range (F4M4-1-20)

HT = High Temperature.

Complete unit with Pressure sensor installed on main inlet / return. Connect up to 4 manifolds to the touch screen in order to monitor up to 48 separate cooling circuits.

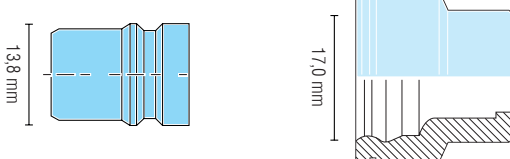
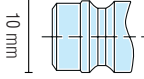
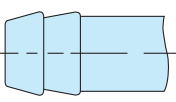
Use the alarm limits (and output) on flow and temperature to control the process stability and part quality.

Material:

Flow modules: DZR Brass / nickel plated / Cover: stainless steel.

Flow		Standard Sensor	HT Sensor	 FLOW
Measuring range	0.5-10 l/min (0.13-2.64 gpm)		0.5-10 l/min (0.13-2.64 gpm)	
	1-20 l/min (0,27-5,2 gpm)		1-20 l/min (0,27-5,2 gpm)	
	2-40 l/min (0,53-10,4 gpm)		2-40 l/min (0,53-10,4 gpm)	
Accuracy	(± 1 o) in water, ± 1% FS		(± 1 o) in water, ± 1% FS	
Temperature		Standard Sensor	HT Sensor	 TEMPERATURE
Measuring range	0-120°C (32-248°F)		0-160°C (32-320°F)	
Accuracy	15-90°C (59-194°F) ± 0.5 K		15-90°C (59-194°F) ± 0.5 K	
	0-120°C(32-248°F) ± 1 K		0-120°C (32-248°F) ± 1 K	
			120-160°C (248-320°F) ± 2 K	
Pressure		Standard Sensor	HT Sensor	 PRESSURE
Measuring range	0-10 bar (0-145 psi)			
Accuracy	± 2.5% FS			

Port Connector Plugs

Part No.	Connection	Size/series		
09NRF	G 1/2"	09 EURO Style		
13NRF	G 1/2"	13 EURO Style		
20NRF	G 1/2"	20 Int. Style		
30NRF	G 1/2"	30 Int. Style		
08NRF	G 1/2"	French Type		
F9NRF	G 1/2"	French Matic		
06NRF	G 1/2"	06 Scandinavian Style		
10MF	G 1/2"	10 mm Hosetail		
13MF	G 1/2"	13 mm Hosetail		
19MF	G 1"	19 mm Hosetail		
25MF	G 1"	25 mm Hosetail		
38MF	G 1"	38 mm Hosetail		

Extension Cable



Part No.	Connection	Length (mm)
FS-3P-EC1000	M8/M8/3P	1000
FS-3P-EC2000	M8/M8/3P	2000
FS-3P-EC5000	M8/M8/3P	5000
FS-3P-EC10000	M8/M8/3P	10000

Blanking Plug



Part No.	Connection	Seal
SSEC1	G 1"	FKM
SSEC1-1/4	G 1/4"	FKM
DR1-1/2	G 1/2"	FKM

IQ CONCEPT

- 1 Monitoring Flow/Temp/Pressure
- 2 Pump / Temp. control OPC-UA
- 3 Pressure/ Flow control
- 4 Manuel Flow rate control



Mould



Flosense IQ Manifold
(up to 4 units)



IQ Temperature Control
(up to 4 units)



flow



temperature



pressure

FLOSENSE IQ

The Flosense IQ software continuously adjusts the speed of the pump in the temperature control units (TCU) to be aligned with the demand to reach optimal thermal properties. The ideal benchmark is the Delta-T (Temp out – Temp in) and if the Delta-T is too high or low, then the flow rate will be changed (pump speed) to optimize the heat transfer rate.

ENERGY REDUCTION

Trials show that energy consumption can be reduced by up to **85%** by using IQ controls in connection with TCU's with variable speed pump instead of using standard TCU's without pump control.

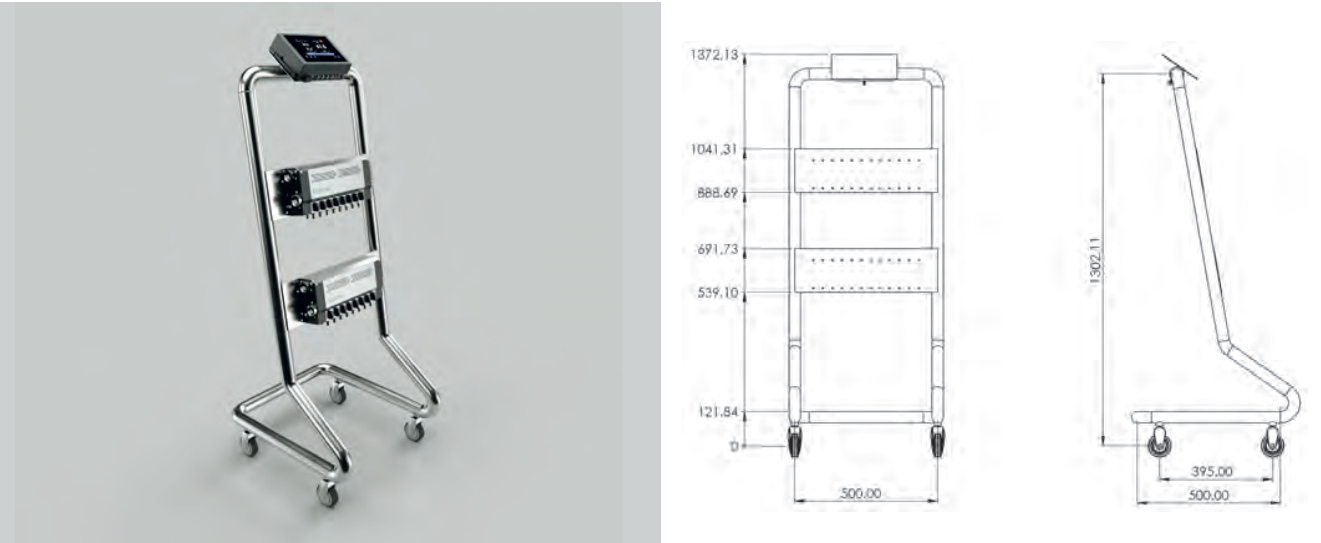
HOW IT WORKS

Flosense IQ monitor (1) the temperature and flow rates in each single circuit (up to 48) of the manifolds and calculates the demand for cooling water. This information is transferred to the temperature control unit (2), which adjust the pump speed to the required demand (3).

FINE REGULATION

Individual fine regulating valves (4) on the manifold allow the operator to adjust the individual flowrate on each circuit. This is typically required if Delta-T or flow rate vary significantly between circuits on same distribution manifold. The result is a perfectly balanced thermal process with minimum use of energy.

Flosense Cart



Part No.	# Manifolds	# Zones	Height (mm)	Width (mm)
FS-C-100	2	24	1400	500

Description
Flosense Cart ideal for flexible thermal diagnostics. Equipped with wheels for easy mobility.
Material: Stainless Steel.

Note: The Cart is supplied without Flosense manifolds or Touch Screen.

