

## Integrated Temperature sensor Standard, ITS1

### General data



Fig. 1 ITS1 sensor

TM06 1286 2214  
TM07 6783 2620

### Technical overview

ITS is a temperature sensor from Grundfos Direct Sensors™.

The ITS sensor is fully compatible with wet, aqueous media. The sensor is based on MEMS sensing technology in combination with the corrosion-resistant Silicoat® coating technology on the sensor chip.

### Applications

- Pump control
- HVAC systems
- temperature control and chiller systems
- renewable energies such as heat pumps, solar thermals, fresh water and micro-CHP systems
- monitoring and control systems
- water treatment plants
- water utility and distribution systems
- HPC and IT cooling systems.

### Features and benefits

- MEMS technology
- direct contact with the aqueous media resulting in a fast response time
- plug and play for quick setup
- smart system solution with Grundfos pump controls
- compact and robust design
- compatible with aqueous media
- suitable for a wide temperature range
- suitable for a wide range of applications.

### Temperature range

-10 to +120 °C (14-248 °F)

### Certificates



CE



C US  
C, CSA, US

### Electrical connections

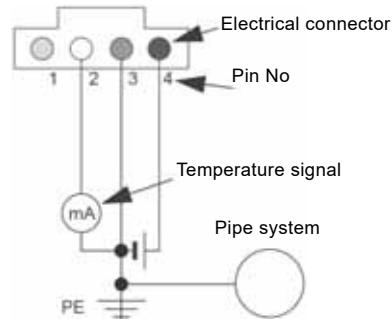


Fig. 2 Electrical connections

TM07 5637 5119

Pin	Description - Analog signal	Colour
1	Do not connect	Yellow
2	Temperature signal 4-20 mA	White
3	GND, 0 V PELV	Green
4	12-30 V supply voltage	Brown

### Power supply requirements

- VDC 12-30 V PELV.
- The sensor must be separated from hazardous live circuitry by double or reinforced insulation.
- Grounding of sensor supply is required.

### Options



Fig. 3 Different options are available. Cables must be purchased separately.

TM06 6670 2016  
TM06 6671 2016

Description	1/2" nipple, stainless steel (316L)
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### Directives

Grundfos temperature sensors are in conformity with these council directives on the approximation of the laws of the EC member states:

- Low Voltage Directive (2014/35/EU)
  - Standard used: EN 61010-1:2010
- EMC Directive (2014/30/EU)
  - Standards used: EN 61326-1:2013 and EN 61326-2-3:2013

Grundfos Direct Sensors™ are exempted from the Pressure Equipment Directive (PED) according to Article 4, paragraph 3 in the PED 2014/68/EU.

## ITS1 M10-120



Fig. 4 ITS1 sensor

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## Dimensions

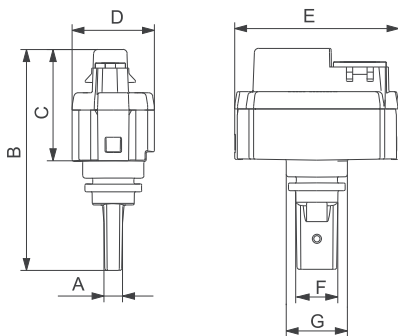


Fig. 5 Dimensions, RPS

TM05 4669 2512

	A	B	C	D	E	F	G
mm	4.5	53.7	27	20	39.9	10.2	14.8
in	3.23	2.11	1.06	0.79	1.57	0.40	0.58

## Output signals

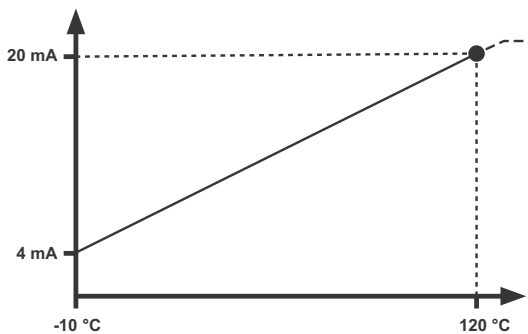


Fig. 6 Temperature response

TM07 5723 5019

## Specifications

Temperature	
Measuring range	-10 to +120 °C (14-248 °F)
Accuracy ( $\pm 1 \sigma$ ), in water 15-90 °C (59-194 °F), 4 bar	$\pm 0.5$ K
Accuracy ( $\pm 1 \sigma$ ), in water -10 to +120 °C (14-248 °F), 4 bar	$\pm 1.5$ K
Response time (63.2 %)	< 0.5 s
Resolution	0.3 $\pm$ 0.1 InL K
System conditions and environment	
Liquid types	Aqueous media compatible with wetted materials.
Liquid temperature, operation	0-100 °C (32-212 °F)
Liquid temperature, peak	-10 to +120 °C (14-248 °F), non-freezing
Ambient temperature, operation	-25 to +60 °C (-13 to +140 °F)
Ambient temperature, peak	-55 to +90 °C (-67 to +194 °F)
Humidity, relative	0-95 %, non-condensing
Maximum system pressure	24 bar (348 psi)
Burst pressure	30 bar (435 psi)
Electrical data	
Power supply	12-30 VDC, PELV Grounding of sensor supply required
Analog output signals - Temperature	4-20 mA (-10 °C at 4 mA and 120 °C at 20 mA)
Power consumption at -10 °C (14 °F), $V_{CC} = 24$ V and $R_L = 147 \Omega$	255 mW
Power consumption at 120 °C (248 °F), $V_{CC} = 24$ V and $R_L = 147 \Omega$	655 mW
Load impedance	See fig. 7
Maximum cable length	3 m (9.1 ft)
Materials	
Sensing element	Silicon-based MEMS
Sealing	EPDM O-rings, FKM O-rings or EPDM sealing cap with FKM O-rings
Housing	Composite, PPS
Wetted materials	Corrosion-resistant coating, PPS, EPDM or FKM Adapter ISO 7/1 - R1/2" and NPT 1/2", EN 1.4408 (AISI 316)
Environmental standards	
Enclosure class	IP44
Temperature cycling	IEC 68-2-14
Vibration, non-destructive	20-2000 Hz, 10 G, 4 h
Electromagnetic compatibility	EN 61326-1

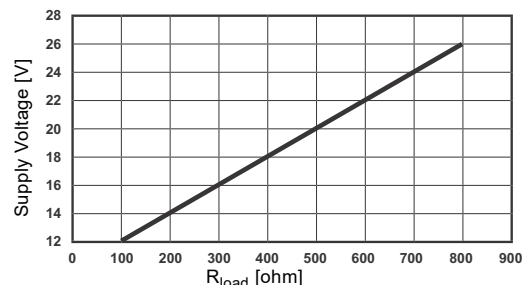


Fig. 7 Minimum supply voltage for a given load resistor

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ECM: 1293880