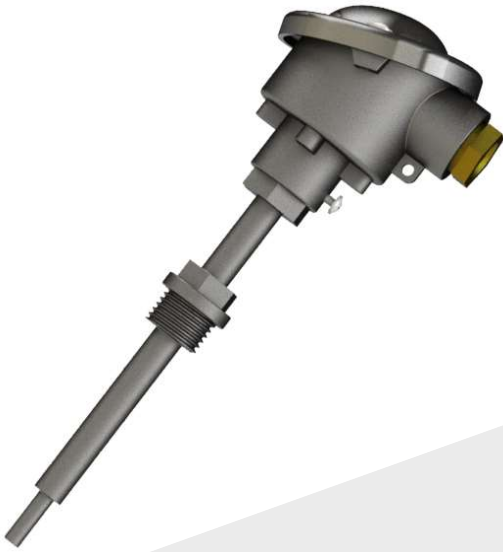


Temperature sensors

Type FF12-2, FF12 - 4 -20mA and FF15-2, FF15-2 -4-20mA for electronic temperature regulation

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TECHNICAL DATA

DATA FOR POCKETS

According to PN-EN 60751

Material X10CrNiMoTi1810 W. No. 1.4571
corresponding to AISI 316 Ti

Connection thread G:	½" BSP, ½" NPT
Permissible torque moment:	50 Nm
Permissible flow velocities:	
-Air:	25 m/s
-Hot steam:	25 m/s
-Water:	3 m/s
Reaction times at liquid velocity:	
-0.4 m/sec:	t 1/2: 7,5s t 9/10: 21s t = total temperature step
Max. pressure:	50 bar
Max. temperature:	260°C
Weight incl. insert:	1 kg

DATA FOR MEASURING INSERT

According to PN-EN 60751

Measuring range:	-50°C to + 260°C
Measuring resistance:	1 x Pt 100 Ω or 2 x Pt 100 Ω
Max. temperature:	260°C

Insulation resistance between measuring resistance and insert tube is over 1000 MΩ at room temperature. The insert is made of stainless steel.

Spring travel:	8 mm
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Two-core coupling
Resistance of inner cables for supply and return line of the measuring insert: < 0.07 Ω/m

Weight of loose insert:	0.06 kg
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DATA FOR CONNECTION HEAD

According to PN-EN 60751, form B	
Material:	Light-alloy metal
Seal:	IP 65
Ambient temperature:	max. 100°C
Cable Gland:	M20x1,5

APPLICATIONS

The temperature sensors are used for registration of temperatures in tubes, tanks and piping. The output signal of the sensor is used as reference for our ER2000 and ER3000 regulators.

The FF12-2 and FF15-2 with 4-20mA is equipped with a built-in 2-wire transmitter with 4-20 mA output signals.

Due to small installation dimensions and internationally widespread measuring element the sensor is especially fitted for marine purposes, just as the applications on land are innumerable.

DESIGN

The sensor consists of a pocket, a connection head and a measuring insert. The pocket is constructed of acid proof steel and can stand temperature/pressure as stated in the diagram. The connection head is made of light-alloy metal and complies with IP 65. The measuring insert contains one or two measuring windings and are exchangeable. The supply lines of the measuring insert are insulated from each other and from the insert tube with a ceramic insulator. Exchangeable measuring insert is mounted in the connection head by means of two spring loaded screws. This means that the measuring insert is always pressed towards the bottom of the pocket, and vibrations from the surroundings will not be transferred to the measuring insert, just like different heat evolutions of pocket and measuring insert are adjusted. Our standard types are shown in the below diagram.

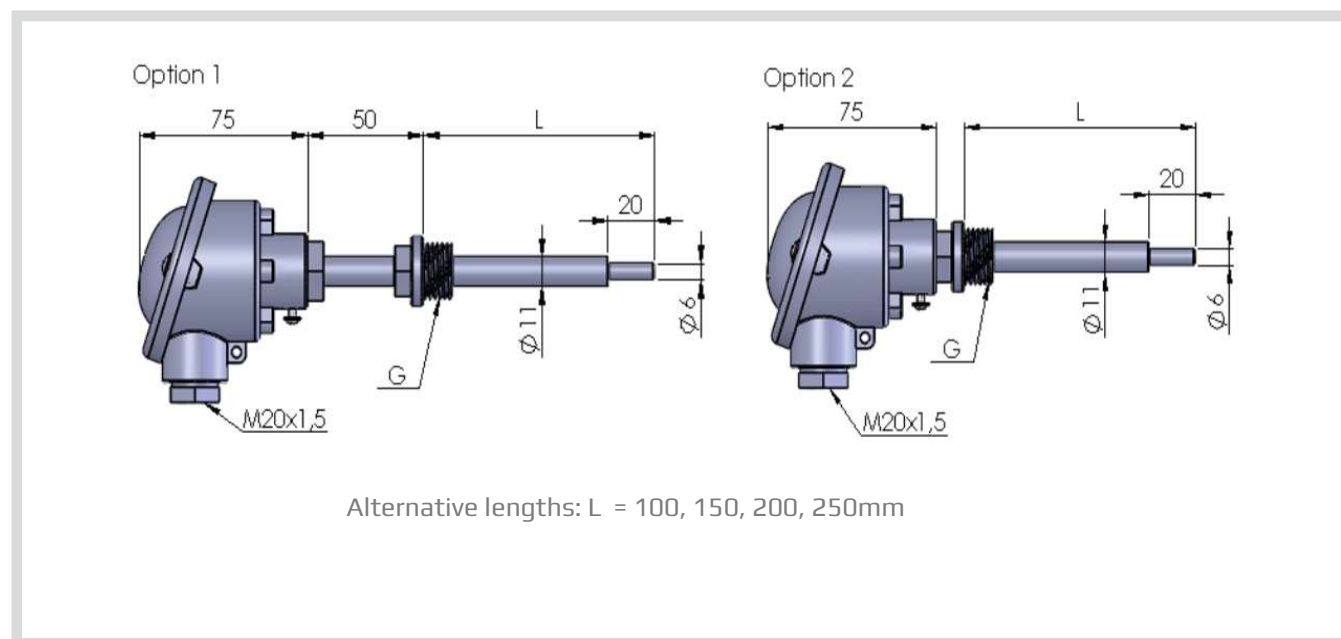
FEATURES

- Resistance sensor Pt 100 Ω/0°C.
 - Standardized design according to PN-EN 60751
 - Robust and reliable sensor for use in gaseous and liquid media,
 - For medium temperature up to 260°C.
 - For pressures up to 50 bar.
 - Internationally recognized for marine purposes
 - To be used together with ER regulators type ER2000
- See data sheet no. 0.4.6.01

STANDARD TYPES

Type	Measuring	Comments
FF12-2	1 x Pt100	With exchangeable measuring insert
FF12-R		Measuring inser for FF 12-2
FF15-2	2 x PT100	With exchangeable measuring insert
FF15-R		Measuring inser for FF 12-2
FF 12-2, 4-20mA	4-20mA	With exchangeable measuring insert

DIMENSION SKETCH

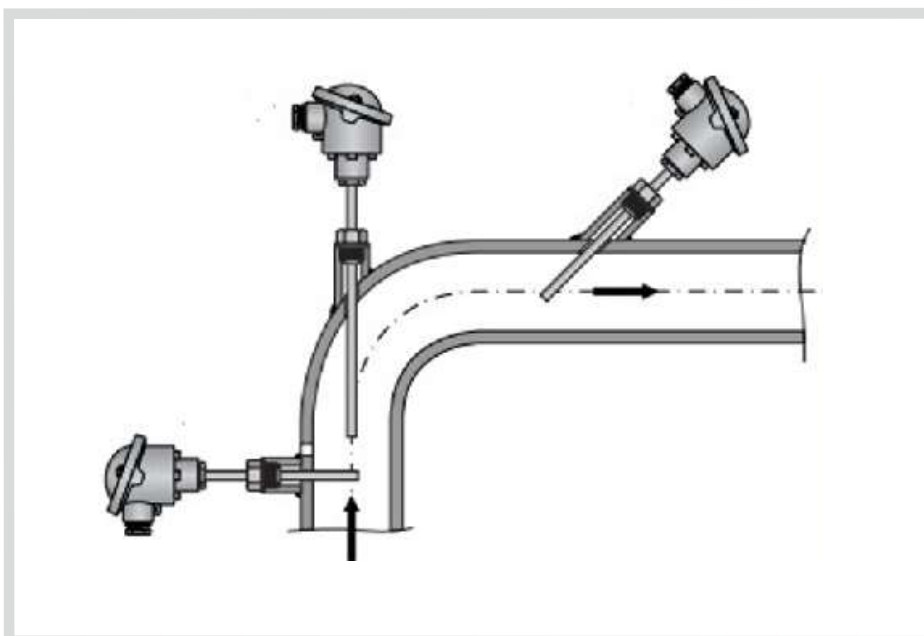


RECOMMENDATIONS REGARDING INSTALLATION OF TEMPERATURE SENSORS IN WATER SYSTEMS

We recommend that the temperature sensors should be installed after a straight pipe. Pipe length should be 3 to 5 times the pipe diameter, especially after pump installation.

When installing the Temperatures sensors please always follow the instruction given in the Clorius installation instruction no. 99.209.01.

EXAMPLES OF MOUNTING POSITIONS



Temperature sensors

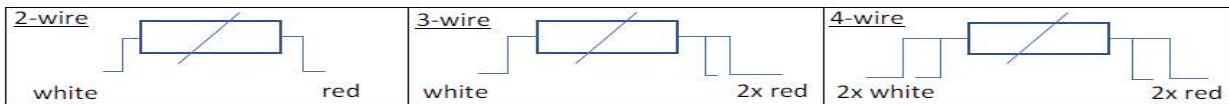
Type FF12-2, FF12 - 4 -20mA and FF15-2, FF15-2 -4-20mA for electronic temperature regulation

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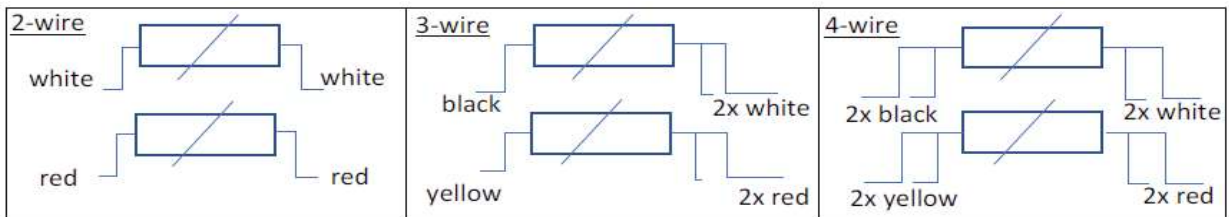
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PT100 - WIRING DIAGRAM

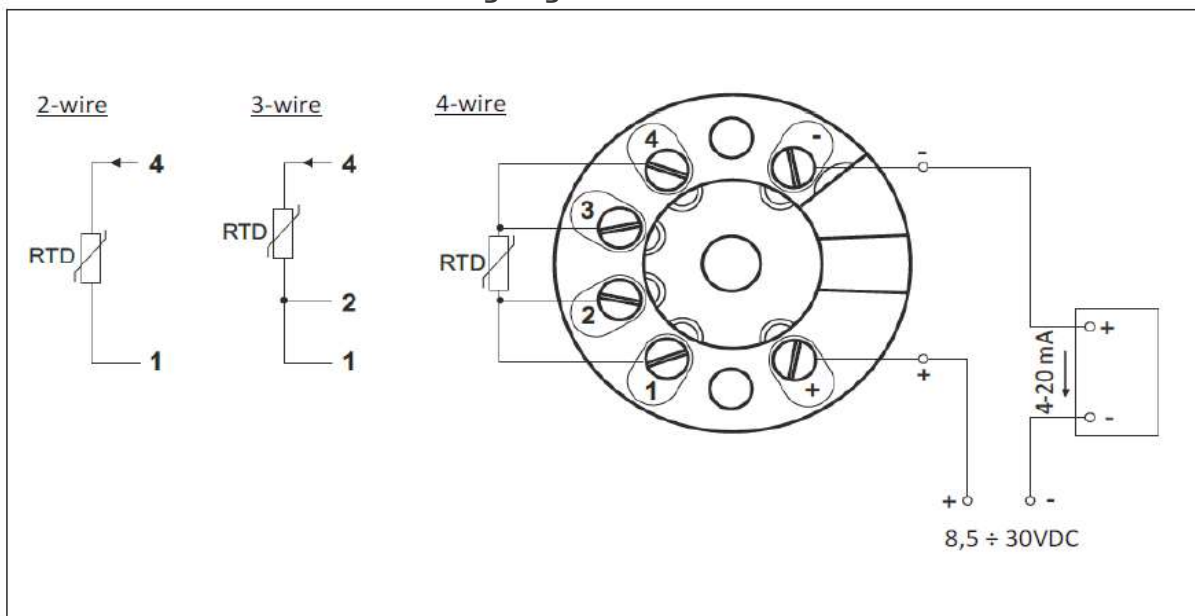
1 x PT100



2 x PT100



PT100 with transmitter 4-20mA - wiring diagram



Subject to change without notice.