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Newsteo LGR range Temperature
Product Specification

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Revisions

Revision	Issue Date	Author	Comments
2.0	October 25th, 2018	AC	
3.0	July 22th, 2019		
3.1	Sept. 29th 2020	AC	PFPN-STE32-001: correction on the cable

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1 Introduction

Object:
Define the products specifications in term of technical characteristics, physical dimensions, aperture, accessories and casing.

Products: LGR temperature range

	References	Interface
	PFPN-LGR30-001	For PT100
	PFPN-LGR31-001	For NTC thermistor
	PFPN-LGR33-001	For PT1000
	PFPN-LGR36-001	For Newsteo digital Temperature probe
	PFPN-LGR37-001	For Thermocouple
	PFPN-LGR46-001	For Newsteo Double external probe of Temperature.

Figure 1: Example of a LGR data logger connected with an external probe

2 Summary of the product functioning

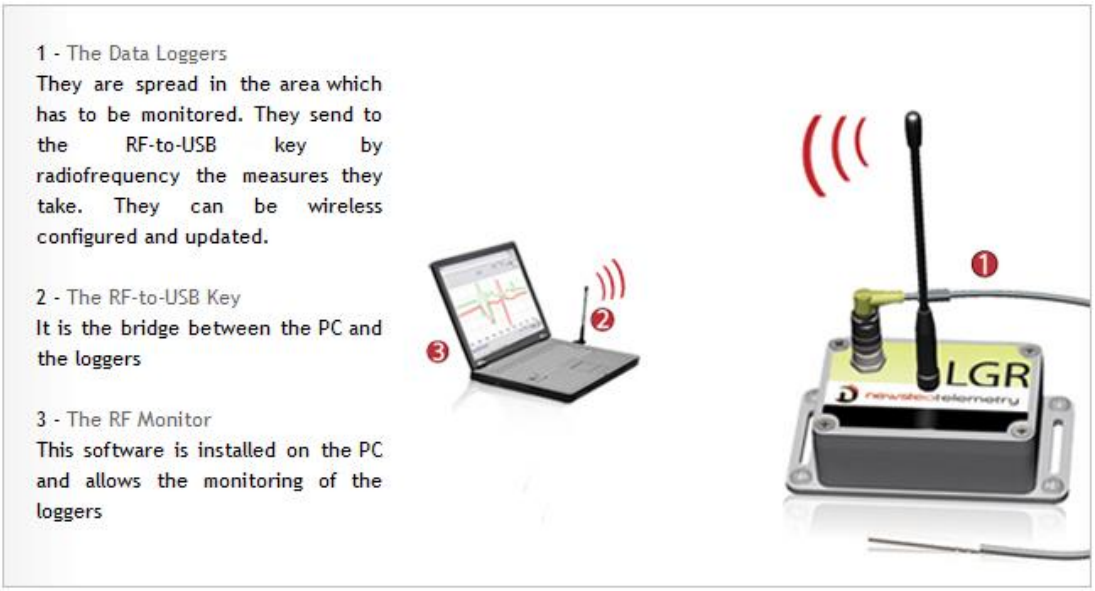


Figure 2: Functioning

The loggers can be used in two different modes:

- **Monitoring** (real time monitoring applications): the logger sends in real time its measurements to the PC. If a measurement is not received by the PC, it stores it inside its internal memory and sends it to the PC on the next communication channel
- **Record / Restitution** (a posteriori monitoring): the logger records in its embedded memory the measurements it takes. The user can download on the PC all the stored measurements when he wants.

3 Newsteo LGR logger

3.1 Technical characteristics

Preliminary specification – Subjected to change without prior notification.
TBC : To be confirmed
TBD : To be defined
NA: Not applicable

3.1.1 Measurement accuracy / interface

The connexion to the external probe is done through an external connector available on the top of the casing.

Reference	Type	Measurement range	Accuracy	Resolution
LGR30	For PT100 Compliant with 2 wire, 3 wire & 4 wire (recommended)	-250 … +850°C (max. range)	± 0.24°C * (to be added to the probe accuracy)	0.08°C
LGR31	For Newsteo NTC thermistor probe	-40° … +80°C	± 0.3°C	< 0.1 °C TBC
LGR33	For PT1000 Compliant with 2 wire, 3 wire & 4 wire (recommended)	-250 … +850°C (max. range)	± 0.24°C * (to be added to the probe accuracy)	0.08°C
LGR36	For Newsteo digital Temperature probe	-40°C ... +100°C (max. range)	± 0.3°C	0.1 °C
LGR37	For Thermocouple	Depends on the thermocouple. See above table.		
LGR46	For Newsteo Double external probe of Temperature.	-40°C ... +100°C (max. range)	± 0.3°C	0.1 °C

* The probe inaccuracy has to be added to the Logger one. The accuracy is given for a cable correctly screwed on the Logger.

LGR37 thermocouple compatibility:

Type	*T min*	*T max*	*resolution °C*	*Accuracy +/-°C* ***(to be added to the probe accuracy)***
Thermo_cpl type K	-273	1372	0,04	0,1
Thermo_cpl type T	-273	400	0,03	0,1

3.1.2 Electronic board temperature

The electronic board temperature is measured by a temperature sensor integrated on the electronic board.

The cold junction temperature, for the LGR37, is measured with this internal sensor. For optimum accuracy, the case should not be subjected to gradient temperature.

3.1.3 Casing

Characteristics	Newsteo LGR range
Temperature range of use of the Logger	-40 °C to + 85°C
IP Level of the Logger and the connector	IP65 The level of tightness of the product is valid only if the probe and antenna are properly tightened (seals crushed).

3.1.4 Power supply / Autonomy

Characteristics	Newsteo LGR range
Battery	AA Lithium Thionyl (included) with plug-in connector
Autonomy @ 25°C	Up to 3 years At 25°C with a frequency measures of 10 minutes. Average value which can slightly vary depending on the use. It is given with the product working in non alert mode.

3.1.5 Other characteristics

Characteristics	Newsteo LGR range
Antenna RF Connector	SMA connector
Antenna	1/2 wave antenna (included)
RF range in free land	100m to 1Km, depending on the antenna used on the reception side
Memory Capacity	32 256 measurements with date and time
Time resolution	1s
Time deviation	+/- 2 min/month @ 25°C
Data memory retention	100 years
ILS	ILS integrated for several functions: - wakeup of the product in hibernate mode - take of a measure outside of the frequency measure set

3.2 Casing specification

Figure 3: LGR casing

Characteristics	Newsteo
Features	Aluminium casing (4mm)
Fixation	Fixation support provided screwed in the casing for screwing in 4 points or strapping through 2 holes
Colour	Grey (aluminium)
Dimensions (w/o antenna)	Length : 98 mm Depth : 64 mm Height: 34 mm
Weight	About 280 g
Stickers	2 stickers on the product : - 1 sticker on the top face, giving the product range - 1 sticker on the side, giving the complete product reference and its serial number

3.3 Starting of the logger

The product is delivered with a battery inserted, in hibernate mode.
The user has to pass a magnet on the product to wake up it and to set it.
The time is set in production.

3.4 Certification

Products certified for radio use in Europe, on the frequency of 868 MHz (ISM band). For use in another area, check with local authorities.

On order, Newsteo can provide COFRAC certification for the products with probes.

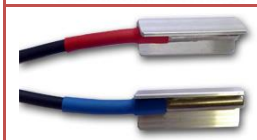
4 Newsteo probes

Newsteo can provide connector, cable and integrated probes to connect to the loggers.

Assembly:
When installation is required, the customer is responsible for the proper assembly of the sensors and good connection of the probe on the Logger. **The probe male connector must be completely screwed by hand to the Logger socket. A bad connection can reduce system accuracy or waterproof level.**
Do not use tool for screwing. In case of difficult screwing, a silicon grease can be added on the connection pins and the screw itself.

4.1 Summary of the probe references

Different types of accessories can be connected to the LGR product range. According to the product reference, the following probes can be connected.

	Reference	For	Sensor	Temp range
	PFPN-STE32-001	LGR30	PT100	-50°C ... +250°C
	PFPN-SNT51-002	LGR31	NTC	-40°C ... +80°C
	PFPN-STE33-001	LGR33	PT1000	-50°C ... 180°C
	PFPN-STE33-002	LGR33	PT1000	-196°C ... 150°C *For liquid nitrogen*
	PFPN-STE33-003	LGR33	PT1000	-50°C ... + 250 °C *For food*
	PFPN-STE51-002	LGR36	Digital Temp.	-40°C ... +80°C
	PFPN-STE51-003	LGR36	Digital Temp.	-40°C ... +80°C Up to +100°C (temporary)
	PFPN-STE51-004	LGR36	Digital Temp.	-40°C ... +80°C
	PFPN-STE51-005	LGR36	Digital Temp.	-40°C ... +80°C Up to +100°C (temporary)
	PFPN-STT51-002	LGR46	Digital Temp.	-40°C ... +80°C Up to +100°C (temporary)
	PFPN-STT51-003	LGR46	Digital Temp.	-40°C ... +80°C Up to +100°C (temporary)
	PFPN-STC01-002	LGR37	Thermocouple K	-100°C ... 1100°C
	PFPN-STC01-003	LGR37	Thermocouple K	-75°C ... +250°C

	PFPN-STC32-001	LGR37	Thermocouple T	-185°C ... +200°C

	References	For	Type	
	PFPN-CON05-001	All LGR	Connector	Can be used on the whole LGR range. Mandatory to connect a thermocouple (LGR37)
	PFPN-SES55-001	Any LGR except LGR37	Cable	5 meters cable – Provided with fast contactor

4.2 Cables and connectors

Cables and connectors can be ordered to connect customer's sensor on Newsteo LGR logger.

4.2.1 PFPN-SES55-001

Figure 4: PFPN-SES55-001 (cables and quick connectors)

	Characteristics
Type	Cable - M12 connector for direct connection to the LGR - Wires to connect the sensor (for each LGR reference, 2 wires are used. The connection instructions are provided).
Length of cable	5 meters (can be shortened by the customer if necessary)
External cable diameter	5.9 mm ± 0.2 mm
IP level	IP68 (male connector, cable and quick connectors)
Ambient temperature (operation)	Cable : -40 °C ... 80 °C (cable, fixed installation) -5 °C ... 80 °C (cable, flexible installation) Connector (plugged on the logger): -25 °C ... 90 °C

This cable can be used on the following products: Cf *4.1 Summary of the probe references*.

4.2.2 Connector PFPN-CON05-001

Figure 5: PFPN-CON05-001

	Characteristics
Type	M12 connector with 5 positions
IP	IP67 (depending on the quality of the assembly made by the customer)
External cable diameter	4 mm ... 6 mm
Conductor cross section stranded min. / max	0,25 mm² / 0,75 mm² If the cable is thin, it is recommended to thicken it by using a shrink sleeve to ensure a good seal
Installation	See provided installation instructions
Ambient temperature (operation)	-40 °C à 85 °C

This connector can be used on the following products: Cf *4.1 Summary of the probe references*.

4.3 PT100 for LGR30

4.3.1 PFPN-STE32-001

Figure 6: PFPN-STE32-001 PT100 probe

	Characteristics
Type	PT100 temperature probe - M12 connector for direct connection to the LGR
Length	Probe: length : 100 mm, diameter : 4 mm Cable with connector: length : 2900mm, diameter : 4.5 mm
Material	Probe: inox 316L tube Cable: Shielded Teflon
IP Level	Probe: IP68 (within 1 meter of water) Cable: IP68 (within 1 meter of water)
Temperature range of measure	-50° … +250°C
Ambient temperature (operation)	-50° … +180°C (cable)
Accuracy	4 wire PT100 probe Class A
Use	The probe can be used in static water or air. The probe must not be manipulated or moving during use

4.4 NTC for LGR31

4.4.1 PFPN-SNT51-002

Figure 7: PFPN-SNT51-002 NTC probe

	Characteristics
Type	NTC temperature probe - M12 connector for direct connection to the LGR31
Temperature range of measure	-40° … +80°C
Accuracy	± 0.3°C
Length	NTC sensor (protected in a small body) : 3 mm Cable with connector: length : 2000 mm
IP level	IP68
Ambient temperature (operation)	NTC sensor: -40 °C ... 80 °C Cable : -40 °C ... 80 °C (cable, fixed installation) -5 °C ... 80 °C (cable, flexible installation) Connector (plugged on the logger): -25 °C ... 90 °C
Response time (in oil)	≈ 2.5 s
Newsteo Data Logger	Compliant with PFPN-LGR31-001

4.5 PT1000 probe for LGR33

4.5.1 PFPN-STE33-001

Figure 8: PFPN-STE33-001 PT1000 probe

	Characteristics
Type	PT1000 temperature probe - M12 connector for direct connection to the LGR
Length	Probe : length : 100 mm, diameter : 6 mm Cable with connector: length : 2900mm, diameter : 4.5 mm
Material	Probe: inox 316L tube Cable: silicone
IP Level	Probe: IP68 (within 1 meter of water) Cable: IP68 (within 1 meter of water)
Temperature range of measure	-50° … +180°C For use in a liquid, at a temperature higher than 100°C, consult us.
Ambient temperature (operation)	-50° … +180°C (cable and probe)
Accuracy	4 wire PT1000 probe Accuracy level given for 1 year The probe inaccuracy has to be added to the Logger inaccuracy. Temperature °C / Accuracy -100 / ±0,8 0 / ±0,3 100 / ±0,8 200 / ±1,3
Use	The probe can be used in static water or air. The probe must not be manipulated or moving during use
Response time	Less than 1 minute

4.5.2 PFPN-STE33-002

Figure 9: PFPN-STE33-002 PT1000 probe

<table>
<tr><th></th><th>Characteristics</th></tr>
<tr><td>Type</td><td>PT1000 temperature probe
- M12 connector for direct connection to the LGR</td></tr>
<tr><td>Length</td><td>Probe : length : 60 mm, diameter : 4 mm
Cable with connector: length : 3000mm</td></tr>
<tr><td>Material</td><td>Probe: inox 316L tube
Cable: Shielded Teflon</td></tr>
<tr><td>IP Level</td><td></td></tr>
<tr><td>Temperature range of measure</td><td>-196°C … +150°C</td></tr>
<tr><td>Ambient temperature (operation)</td><td>-196°C … +150°C</td></tr>
<tr><td>Accuracy</td><td>4 wire PT1000 probe
Accuracy level given for 1 year
The probe inaccuracy has to be added to the Logger inaccuracy.

<table>
<tr><td>Temperature °C</td><td>Accuracy</td></tr>
<tr><td>-100</td><td>±0,8</td></tr>
<tr><td>0</td><td>±0,3</td></tr>
<tr><td>100</td><td>±0,8</td></tr>
<tr><td>200</td><td>±1,3</td></tr>
</table>
</td></tr>
<tr><td>Use</td><td>For use into liquid nitrogen</td></tr>
<tr><td>Response time</td><td>Less than 1 minute</td></tr>
</table>

4.5.3 PFPN-STE33-003

Figure 10: PFPN-STE33-003 PT1000 probe

	Characteristics
Type	PT1000 Food penetration probe - M12 connector for direct connection to the LGR
Length	Probe : length : 150 mm, diameter : 4 mm, Handle : length: 100 mm, diameter : 10mm Cable with connector: length : 3000mm
Material	Probe & Handle: inox 316L Cable: Shielded Teflon
IP Level	
Temperature range of measure	-50 … + 250 °C
Ambient temperature (operation)	-50 … + 250 °C
Accuracy	4 wire PT1000 probe Accuracy level given for 1 year The probe inaccuracy has to be added to the Logger inaccuracy.

Temperature °C	Accuracy
-100	±0,8
0	±0,3
100	±0,8
200	±1,3

Use	For use into food
Response time	Less than 1 minute

4.6 Digital temperature probe for LGR36

4.6.1 PFPN-STE51-002

Figure 11: PFPN-STE51-002 probe

	Characteristics
Type	Digital temperature probe - M12 connector for direct connection to the LGR
Probe Length	5 meters
Eyelet size	Total width : 17.6 mm Total length : 43.2 mm Diameter of the central hole : 10.4 mm
IP	IP68 (within 4 meters of water) Recommended for use in clear and neutral water, for 1 hour session.
Temperature range of measure	- 40° … + 100° C
Ambient temperature (operation)	Temperature sensor : - 40° … + 80° C Cable : -40 °C ... 80 °C (cable, fixed installation) -5 °C ... 80 °C (cable, flexible installation) Connector (plugged on the logger): -25 °C ... 90 °C
Accuracy	+/-0.3°C from - 30° C ⋯ +70° C +/- 1°C from - 40°C … -30°C and +70°C…+80°C
Response time	9 minutes (air), 3 minutes (water)
Calibration	The integrated sensor is a digital sensor. The level of accuracy of the sensor is factory certified by the sensor manufacturer. No calibration needed for a 4 years period use.
Sensor drift	Excellent long-term stability

4.6.2 PFPN-STE51-003

Figure 12: PFPN-STE51-003 (probe part only)

	Characteristics
Type	Digital temperature probe - M12 connector for direct connection to the LGR
Size	Cable length : 5 meters, diameter : 4.8 mm
IP level	IP68
Temperature range of measure	-40 °C… + 105°C
Ambient temperature (operation)	- Probe : -40 °C… + 100 °C - Cable : -40 °C ... 80 °C (cable, fixed installation) Compliant with temporary temperature peaks up to 100 °C in fixed installation. -5 °C ... 80 °C (cable, flexible installation) - Connector (plugged on the logger): -25 °C ... 90 °C
Accuracy	+/-0.3°C from - 30°C … +70°C +/- 1°C from - 40°C … -30°C and +70°C…+105°C
Response time	9 minutes (air), 3 minutes (water)
Calibration	The integrated sensor is a digital sensor. The level of accuracy of the sensor is factory certified by the sensor manufacturer. No calibration needed for a 4 years period use.
Sensor drift	Excellent long-term stability

4.6.3 PFPN-STE51-004

Figure 13: PFPN-STE51-004

	Characteristics
Type	Digital temperature probe - M12 connector for direct connection to the LGR
Size	The probe is made of several parts: - External cable: length : 2000 mm, diameter : 6 mm - Ribbon cable (to be put under the door seal) : length : 400 mm, thickness : 0.5 mm (the ribbon cable is an extension of the external cable) - Plastic housing including temperature sensor: 35 mm x 35 mm x 20 mm
IP level	IP65
Ambient temperature (operation)	- Sensor : -40 °C… + 80 °C - Cable : -40 °C ... 80 °C (cable, fixed installation) -5 °C ... 80 °C (cable, flexible installation) - Connector (plugged on the logger): -25 °C ... 90 °C
Temperature range of measure	-40 °C… + 80°C
Accuracy	+/-0.3°C from -30°C … +70°C +/- 1°C from -40°C … -30°C and +70°C…+80°C
Response time	9 minutes (air)
Calibration	The integrated sensor is a digital sensor. The level of accuracy of the sensor is factory certified by the sensor manufacturer. No calibration needed for a 4 years period use.
Sensor drift	Excellent long-term stability
Fixation	The cable is delivered with double face adhesive tape, for fixation. For fixing to be effective, the wall must be degreased and dry (no frost). When mounting at negative temperature, you might warm the wall before placing the double face adhesive (put your hand 15 seconds).

4.6.4 PFPN-STE51-005

Figure 14: PFPN-STE51-005

	Characteristics
Type	Digital temperature probe - M12 connector for direct connection to the LGR
Size	Cable length : 5 meters, diameter : 4.8 mm
Tip	Cylindrical stainless steel tip, protected by an aluminium hood, for: - Mechanical protection - Homogenization of the temperature around the sensor element sheathed in stainless steel. - Guide for aligning it with the pipe
IP	IP68
Temperature range of measure	- 40° … +105° C
Ambient temperature (operation)	Temperature sensor : - 40° … + 100° C Cable : -40 °C ... 80 °C (cable, fixed installation) Compliant with temporary temperature peaks up to 100 °C in fixed installation. -5 °C ... 80 °C (cable, flexible installation) Connector (plugged on the logger): -25 °C ... 90 °C
Accuracy	+/-0.3°C from - 30°C … +70°C +/- 1°C from - 40°C … -30°C and +70°C…+105°C
Response time	9 minutes (air), 3 minutes (water)
Calibration	The integrated sensor is a digital sensor. The level of accuracy of the sensor is factory certified by the sensor manufacturer. No calibration needed for a 4 years period use.
Sensor drift	Excellent long-term stability
Applications	**Temperature monitoring of water pipe**
Installation	See *Recommendations of installation for temperature measurement of a liquid flowing in a pipe* Available on http://support.newsteo.com/

4.7 Dual digital temperature probe for LGR46

4.7.1 PFPN-STT51-002

Figure 15: PFPN-STT51-002 probe

	Characteristics
Type	Digital temperature probe - M12 connector for direct connection to the LGR
Length	5 meters The cable split up after 0.20 meter. (Both probes are independent from each other upon 4.80 meters) Diameter : 4.8 mm
IP	IP68 (within 4 meters of water) Recommended for use in clear and neutral water, for 1 hour session.
Temperature range of measure	- 40° … +105° C
Ambient temperature (operation)	Temperature sensor : - 40° … + 100° C Cable : -40 °C ... 80 °C (cable, fixed installation) Compliant with temporary temperature peaks up to 100 °C in fixed installation. -5 °C ... 80 °C (cable, flexible installation) Connector (plugged on the logger): -25 °C ... 90 °C
Accuracy	+/-0.3°C from - 30°C … +70°C +/- 1°C from - 40°C … -30°C and +70°C…+105°C
Response time	9 minutes (air), 3 minutes (water)
Calibration	The integrated sensor is a digital sensor. The level of accuracy of the sensor is factory certified by the sensor manufacturer. No calibration needed for a 4 years period use.
Sensor drift	Excellent long-term stability

4.7.2 PFPN-STT51-003

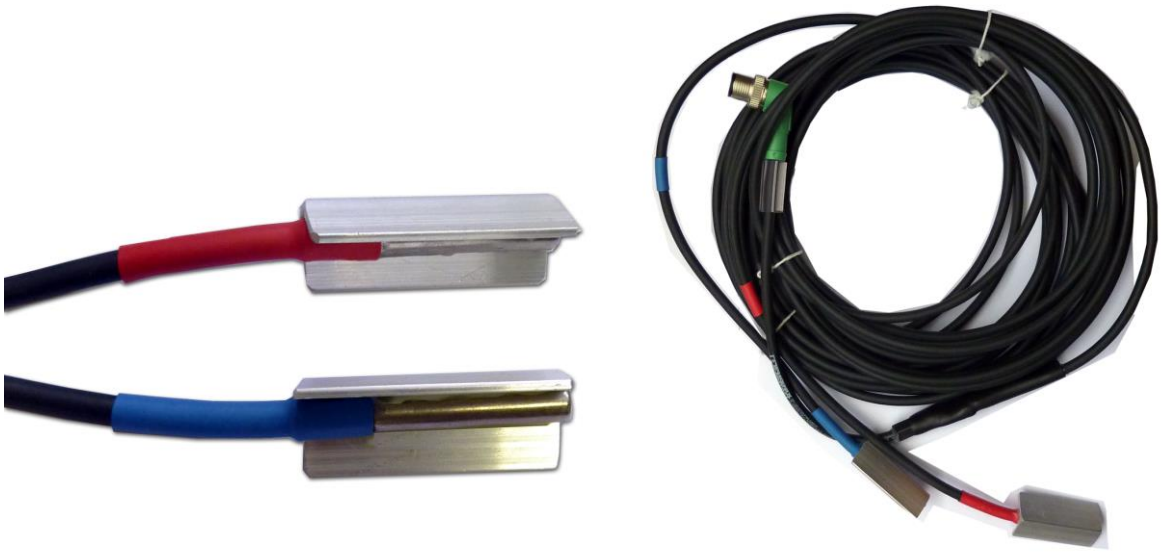
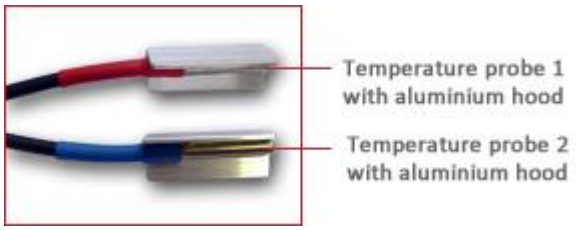


Figure 16: PFPN-STT51-003 probe

	Characteristics
Type	Digital temperature probe - M12 connector for direct connection to the LGR
Length	5 meters The cable split up after 0.20 meter. (Both probes are independent from each other upon 4.80 meters) Diameter : 4.8 mm
Tip	Cylindrical stainless steel tip, protected by an aluminium hood, for: - Mechanical protection - Homogenization of the temperature around the sensor element sheathed in stainless steel. - Guide for aligning it with the pipe
IP	IP68
Temperature range of measure	- 40° … +105° C
Ambient temperature (operation)	Temperature sensor : - 40° … + 100° C Cable : -40 °C ... 80 °C (cable, fixed installation) Compliant with temporary temperature peaks up to 100 °C in fixed installation. -5 °C ... 80 °C (cable, flexible installation) Connector (plugged on the logger): -25 °C ... 90 °C
Accuracy	+/-0.3°C from - 30°C … +70°C +/- 1°C from - 40°C … -30°C and +70°C…+105°C
Response time	9 minutes (air), 3 minutes (water)
Calibration	The integrated sensor is a digital sensor. The level of accuracy of the sensor is factory certified by the sensor manufacturer.

	No calibration needed for a 4 years period use.
Sensor drift	Excellent long-term stability
Applications	Temperature monitoring of water pipe
Installation	See *Recommendations of installation for temperature measurement of a liquid flowing in a pipe* Available on http://support.newsteo.com/



4.8 Thermocouple probes for LGR37

4.8.1 PFPN-STC01-002

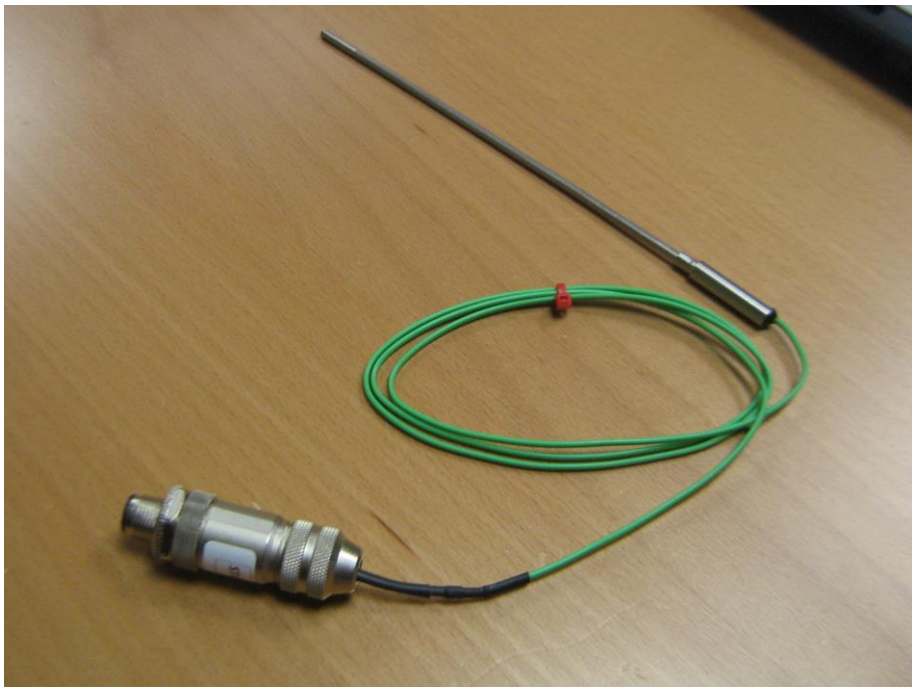


Figure 17: STC01-002 probe (delivered with a connector)

	Characteristics
Type	Thermocouple K temperature probe - M12 connector for direct connection to the LGR (PFPN-CON05-001)
Length	Probe : length : 250 mm, diameter : 1 mm Cable with connector: length : 1 meter
Material	310 Stainless Steel
IP Level	Probe : IP68 Cable: IP64
Temperature range of measure	-100°C … +1100°C
Ambient temperature (operation)	-100°C … +1100°C
Accuracy	Class A ± 0.004*temperature or ± 1.5 °C (take the biggest inaccuracy at the considered temperature). To be added to the LGR37 inaccuracy. Accuracy level given for 1 year
Response time	Less than 1 minute

4.8.2 PFPN-STC01-003

Figure 18: STC01-003 probe (delivered with a connector)

	Characteristics
Type	Thermocouple K temperature probe **- delivered with M12 connector for direct connection to the LGR (PFPN-CON05-001)**
Length	Cable length : 5 meters Wire diameter : 0.2mm each
Material	PFA, twin twist insulated wires with bare wire tails
IP Level	
Temperature range of measure	-75°C à + 250 °C
Ambient temperature (operation)	-75°C à + 250 °C
Accuracy	Class 1 ± 0.004*temperature or ± 1.5 °C (take the biggest inaccuracy at the considered temperature). To be added to the LGR37 inaccuracy. Accuracy level given for 1 year
Response time	Less than 1 minute

4.8.3 PFPN-STC32-001

Figure 19: PFPN-STC32-001

	Characteristics
Type	Thermocouple T temperature probe **-** Supplied with the connector allowing to connect it to the Newsteo LGR37, the connector cannot be taken apart
Length	Probe : length : 200 mm, diameter : 6 mm Cable with connector: length : 3 meters
Material	Probe : 316L
IP Level	
Temperature range of measure	-185°C à + 200°C
Ambient temperature (operation)	-185°C à + 200°C
Accuracy	Class 1 ± 0.004*temperature or ± 1.5 °C (take the biggest inaccuracy at the considered temperature). To be added to the LGR37 inaccuracy. Accuracy level given for 1 year
Response time	Less than 1 minute

5 How to order?

You need to order a data logger with a thermocouple probe. You order for example:

- 1 PFPN-LGR37-001 (battery and antenna included)
- 1 PFPN-STC32-001 (thermocouple probe to plug directly on the LGR37)