



DeepWave is the complete solution for real-time monitoring in rooms, warehouses, fridges, cold rooms, ultra freezers. It consists of a series of radio data loggers with long distance transmission (Lo.Ra. protocol with transmission in the open field even for a few kilometers) available in numerous versions, and of a receiver connected to the TSLog 21 software, validatable in the pharmaceutical, cosmetic, healthcare and medical fields. The system is widely versatile and scalable and allows you to extend the network at any time, being able to add sensors and radio modules wherever and whenever you want. Radio data loggers use Smart Sensors, always supplied with a calibration certificate, which allow quick and easy recalibration of the entire system.

The system consists of the following devices and software:

- Lo.Ra. radio modules, available in different models for every type of installation and need
- Lo.Ra. receiver Helios. Typically, only one receiver is required for a single installation, it can also cover multiple floors (N.B. : the transmission signal strength depends on the environmental obstacles and the construction material of the building)
- TSLog 21 software compatible with FDA 21 CFR Part 11, Annex 11, GAMP 5

The Lo.Ra. radio module (Lo.Ra. node)

The Lo.Ra (Long Range) radio module, also called Lo.Ra. node, accepts up to two Smart Sensors among those listed in the following section (p. 58), both for temperature only, for temperature and humidity, for differential pressure, for light (On/Off detector). There are numerous versions of the module and you can find a summary on p. 57. All have a 4-buttons keyboard for display management, configuration and diagnostics. The transmission frequency is 868 MHz, settable on other frequencies in other countries.

Each version of the modules is in turn available in two different versions for 2 different frequencies (868 MHz, 915 MHz) to be coupled with your Helios Gateway (p. 61) depending on the geographical area of use and the reference legislation for the radio devices.

Note: the versions for 915 MHz will soon be available in the catalog but you can already request them from Tecnosoft together with the Helios 915 MHz.

The available options are:

- internal temperature sensor or 2 Smart Sensor (available separately)
- buzzer for acoustic alarm
- small OLED display or large ePaper
- external power supply (batteries always present)
- internal or external antenna
- relay output

Juno – DeepWave Node with internal temperature sensor and OLED display.



Dimensions	146.6 X 88 X 33 (mm)
Display	OLED 0.91" (22.4 x 5.7 mm) (128 x 32 pixel)
Temperature range	-20 °C ÷ +50 °C
Temperature resolution	0,02 °C
Temperature accuracy	± 1 °C without calibration ± 0.25 °C with calibration
Memory	16.383
Acquisition/transmission rate	From 1 every minute up
Antenna	Internal
Battery	3 AA 1,5 V batteries user replaceable
Battery life	18 months with 15 minutes transmission step

Venus – DeepWave Node with internal temperature sensor, buzzer for acoustic alarm and ePaper display.



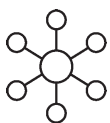
Dimensions	146.6 X 88 X 33 (mm)
Display	ePaper 2.9" (67.6 x 29.3 mm) (296 x 128 pixel)
Temperature range	-20 °C ÷ +50 °C
Temperature resolution	0,02 °C
Temperature accuracy	± 1 °C without calibration ± 0.25 °C with calibration
Memory	16.383
Acquisition/transmission rate	From 1 every minute up
Alarms	Local acoustic and on display
Antenna	Internal
Battery	3 AA 1,5 V batteries user replaceable
Battery life	18 months with 15 minutes transmission step

Mars – DeepWave Node with internal temperature sensor, buzzer for acoustic alarm, ePaper display and buzzer for acoustic alarms.



Dimensions	151,6 X 88 x 33 (mm)
Display	ePaper 2,9" (67,6 x 29,3 mm) (296 x 128 pixel)
Temperature range	-20 °C ÷ +50 °C
Temperature resolution	0,02 °C
Temperature accuracy	± 1 °C without calibration ± 0.25 °C with calibration
Memory	16.383
Acquisition/transmission rate	From 1 every minute up
Alarms	Local acoustic and on display
Antenna	External (included)
Battery	3 AA 1,5 V batteries user replaceable
Battery life	18 months with 15 minutes transmission step

Deimos – DeepWave Node that accepts up to two Smart Sensors (not included), buzzer for acoustic alarm and OLED display.



Dimensions	151,6 X 88 x 33 (mm)
Display	OLED 0,91" (22,4 x 5,7 mm) (128 x 32 pixel)
Operative temperature range	-20 °C ÷ +50 °C
Memory	16.383
Acquisition/transmission rate	From 1 every minute up
Alarms	Local acoustic and on display
Antenna	Internal
Battery	3 AA 1,5 V batteries user replaceable
Battery life	12 months with 15 minutes transmission step with two Smart Sensors connected

Fobos – DeepWave Node that accepts up to two Smart Sensors (not included), buzzer for acoustic alarm, OLED display and external antenna included.



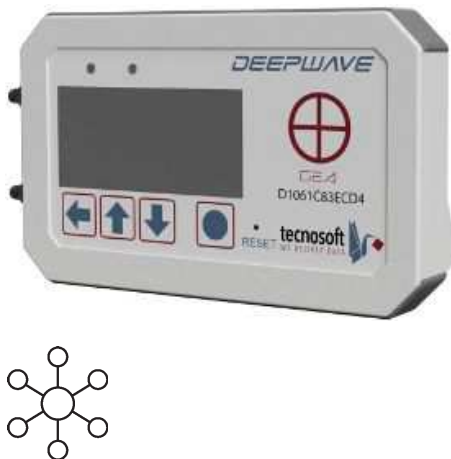
Dimensions	159,6 X 88 x 33 (mm)
Display	OLED 0,91" (22,4 x 5,7 mm) (128 x 32 pixel)
Operative temperature range	-20 °C ÷ +50 °C
Memory	16.383
Acquisition/transmission rate	From 1 every minute up
Alarms	Local acoustic and on display
Antenna	External (included)
Battery	3 AA 1,5 V batteries user replaceable
Battery life	12 months with 15 minutes transmission step with two Smart Sensors connected

Moon – DeepWave Node that accepts up to two Smart Sensors (not included), buzzer for acoustic alarm, OLED display, external antenna included and external power (adapter not included).



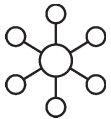
Dimensions	159,6 X 88 x 33 (mm)
Display	OLED 0,91" (22,4 x 5,7 mm) (128 x 32 pixel)
Operative temperature range	-20 °C ÷ +50 °C
Memory	16.383
Acquisition/transmission rate	From 1 every minute up
Alarms	Local acoustic and on display
Antenna	External (included)
Battery	3 AA 1,5 V batteries user replaceable
Battery life	12 months with 15 minutes transmission step with two Smart Sensors connected
External power	6-26 V (power adapter not included)

Gea – DeepWave Node that accepts up to two Smart Sensors (not included), buzzer for acoustic alarm and ePaper display.



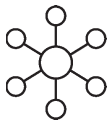
Dimensions	151,6 X 88 x 33 (mm)
Display	ePaper 2,9" (67,6 x 29,3 mm) (296 x 128 pixel)
Operative temperature range	-20 °C ÷ +50 °C
Memory	16.383
Acquisition/transmission rate	From 1 every minute up
Alarms	Local acoustic and on display
Antenna	Internal
Battery	3 AA 1,5 V batteries user replaceable
Battery life	12 months with 15 minutes transmission step with two Smart Sensors connected

Mercury – DeepWave Node that accepts up to two Smart Sensors (not included), buzzer for acoustic alarm, ePaper display and external antenna included.



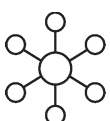
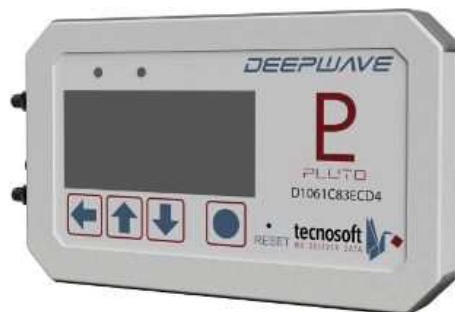
Dimensions	159,6 X 88 x 33 (mm)
Display	ePaper 2,9" (67,6 x 29,3 mm) (296 x 128 pixel)
Operative temperature range	-20 °C ÷ +50 °C
Memory	16.383
Acquisition/transmission rate	From 1 every minute up
Alarms	Local acoustic and on display
Antenna	External (included)
Battery	3 AA 1,5 V batteries user replaceable
Battery life	12 months with 15 minutes transmission step with two Smart Sensors connected

Jupiter – DeepWave Node that accepts up to two Smart Sensors (not included), buzzer for acoustic alarm, ePaper display, external antenna included and external power (adapter not included).



Dimensions	159,6 X 88 x 33 (mm)
Display	ePaper 2,9" (67,6 x 29,3 mm) (296 x 128 pixel)
Operative temperature range	-20 °C ÷ +50 °C
Memory	16.383
Acquisition/transmission rate	From 1 every minute up
Alarms	Local acoustic and on display
Antenna	External (included)
Battery	3 AA 1,5 V batteries user replaceable
Battery life	12 months with 15 minutes transmission step with two Smart Sensors connected
External power	6-26 V (power adapter not included)

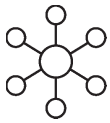
Pluto – DeepWave Node that accepts up to two Smart Sensors (not included), buzzer for acoustic alarm, ePaper display and external power (adapter not included).



Dimensions	151,6 X 88 x 33 (mm)
Display	ePaper 2,9" (67,6 x 29,3 mm) (296 x 128 pixel)
Operative temperature range	-20 °C ÷ +50 °C
Memory	16.383
Acquisition/transmission rate	From 1 every minute up
Alarms	Local acoustic and on display
Antenna	Internal
Battery	3 AA 1,5 V batteries user replaceable
Battery life	12 months with 15 minutes transmission step with two Smart Sensors connected
External power	6-26 V (power adapter not included)

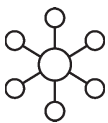
TS12DWN10	PLUTO - DEEPWAVE NODE	317,00 €
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Neptune – DeepWave Node that accepts up to two Smart Sensors (not included), buzzer for acoustic alarm, OLED display, external antenna included, external power (adapter not included) and relay output.



Dimensions	159,6 X 88 x 33 (mm)
Display	OLED 0.91" (22.4 x 5.7 mm) (128 x 32 pixel)
Operative temperature range	-20 °C ÷ +50 °C
Memory	16.383
Acquisition/transmission rate	From 1 every minute up
Alarms	Local acoustic and on display
Antenna	External (included)
Battery	3 AA 1,5 V batteries user replaceable
Battery life	12 months with 15 minutes transmission step with two Smart Sensors connected
External power	6-26 V (power adapter not included)
Relay Output	Present

Saturn – DeepWave Node that accepts up to two Smart Sensors (not included), buzzer for acoustic alarm, ePaper display, external antenna included, external power (adapter not included) and relay output.



Dimensions	159,6 X 88 x 33 (mm)
Display	ePaper 2,9" (67,6 x 29,3 mm) (296 x 128 pixel)
Operative temperature range	-20 °C ÷ +50 °C
Memory	16.383
Acquisition/transmission rate	From 1 every minute up
Alarms	Local acoustic and on display
Antenna	External (included)
Battery	3 AA 1,5 V batteries user replaceable
Battery life	12 months with 15 minutes transmission step with two Smart Sensors connected
External power	6-26 V (power adapter not included)
Relay Output	Present

Lo.Ra. nodes version summary

Nodes	Buzzer	Display		Power		Sensor		Antenna		Relay Output
		OLED	ePaper	Batteries	External	Internal	2 Smart S.	Internal	External	
JUNO	●	●	●	●	●	●	●	●	●	●
VENUS	●	●	●	●	●	●	●	●	●	●
MARS	●	●	●	●	●	●	●	●	●	●
DEIMOS	●	●	●	●	●	●	●	●	●	●
FOBOS	●	●	●	●	●	●	●	●	●	●
MOON	●	●	●	●	●	●	●	●	●	●
GEA	●	●	●	●	●	●	●	●	●	●
MERCURY	●	●	●	●	●	●	●	●	●	●
JUPITER	●	●	●	●	●	●	●	●	●	●
PLUTO	●	●	●	●	●	●	●	●	●	●
NEPTUNE	●	●	●	●	●	●	●	●	●	●
SATURN	●	●	●	●	●	●	●	●	●	●

Guide to choosing the DeepWave node

How to choose which node is best for your needs?

Given that in a DeepWave system nodes of different versions can coexist, let's see what the various options are and the advantages of each.

Buzzer – the node emits an audible alarm when an alarm event occurs

OLED display – small display, useful for diagnostics and initial configuration, very clear and backlit. Not suitable to be always on because it drains more batteries. If you want a display that is always on, choose the ePaper or take the node with external power supply.

ePaper display – large display and very clear and sharp. Extremely low consumption, it can always remain on (if the batteries run out it shows the last screen viewed).

External power supply – the batteries are always present and if the external power supply is installed, these act as a backup in case the power should go out. External power is useful if the transmission rate is high, if you want the OLED display to always be on or if you do not want to periodically replace the batteries. The power supply is sold separately

Internal sensor – useful for room monitoring. It has a higher response time and cannot take advantage of the fast recalibration of the Smart Sensor

2 Smart Sensors – 2 inputs for any of the Smart Sensors, it is possible to monitor two points with a single node thanks to the extensions. Quick and easy recalibration with Smart Sensor. Smart Sensors and extensions are sold separately.

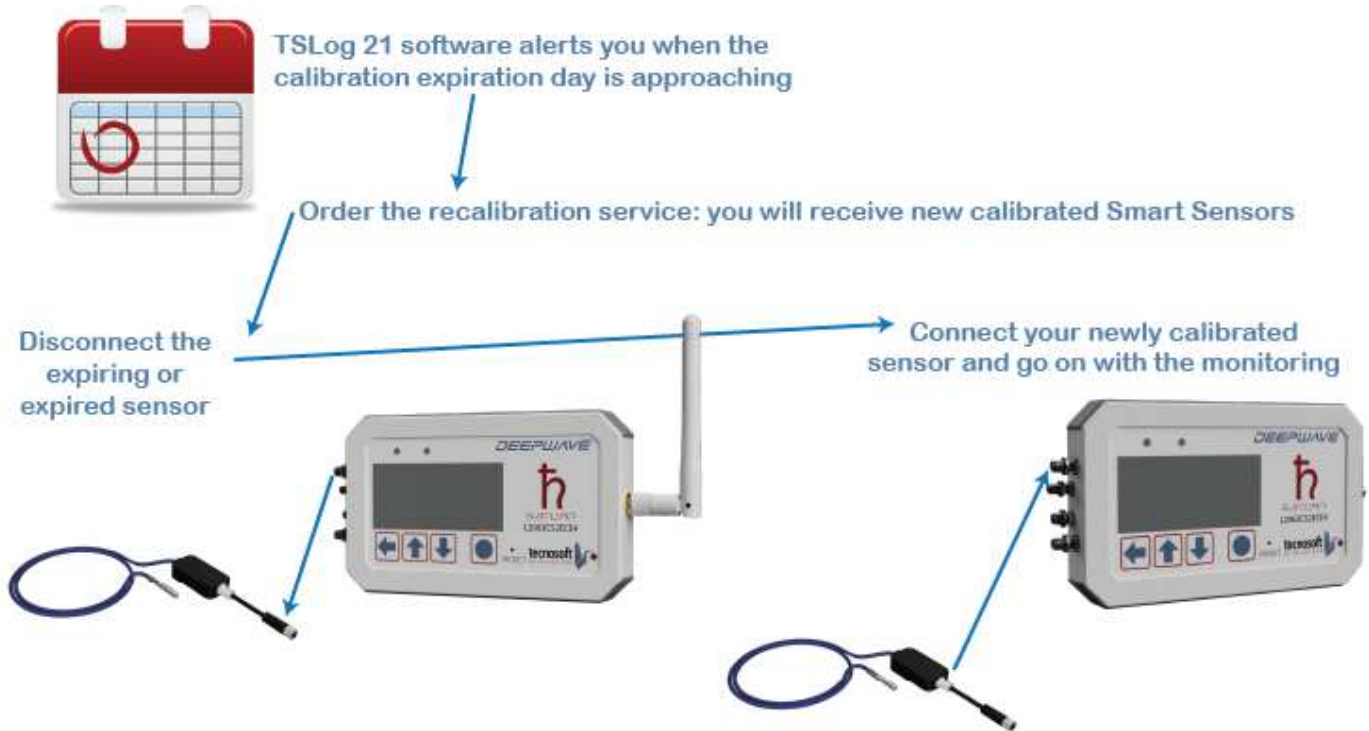
Internal antenna – the transmission antenna is located inside the node. In most installations it is sufficient.

External antenna – the external antenna improves the radio signal by an average of 50% compared to the radio signal by an average of 50% compared to the internal one. Useful for installations in places with many obstacles or to increase the transmission distance. The external antenna is included.

Relay output – any automatic device activated when an alarm event occurs can be connected to this output. For example, flashing lights, sirens, telephone dialer etc. can be connected.

Smart Sensor

The characteristic of the Smart Sensors, used in the DeepWave system and connected to the Lo.Ra. nodes, is the recalibration procedure: easy, fast and cheap. You won't have to remove the knots from their seats. You do not have to return the sensors to Tecnosoft and remain without monitoring. Before the deadline, request the Smart Sensor recalibration service. You will receive new sensors to replace those that are about to expire and you will have to send them back to Tecnosoft only after the replacement is complete.



Below are the prices for new Smart Sensors to be added to the nodes. **Accredia traceable calibration certificate is included.**

Temperature Smart Sensor with internal sensor – Temperature Smart Sensor with internal sensor, 50 cm long cable from the DeepWave node, for longer cable lengths, purchase the extensions for the DeepWave node.



Sensor dimensions	Cable 500 l X 3 Ø (mm)
Sensor temperature range	-20 °C ÷ +50 °C
Temperature resolution	0,01 °C
Temperature accuracy	± 0,2 °C (valid in the calibration range)

Temperature Smart Sensor – Temperature Smart Sensor, 50 cm cable, of standard cable length 50 cm, different probes available, cannot be switched; for longer cable length purchase the extensions for the DeepWave node.



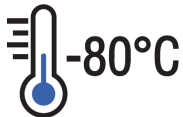
Sensor dimensions	Cable 500 l X 3,6 Ø (mm) Probe 30 o 80 l X 4 Ø (mm) pointed or rounded
Sensor temperature range	-40 °C ÷ +80 °C
Temperature resolution	0,01 °C
Temperature accuracy	± 0,1 °C (valid in the calibration range)

Temperature Smart Sensor with thin cable – Temperature Smart Sensor, 50 cm thin cable, of standard cable length 50 cm, different probes available, cannot be switched; for longer cable length purchase the extensions for the DeepWave node.



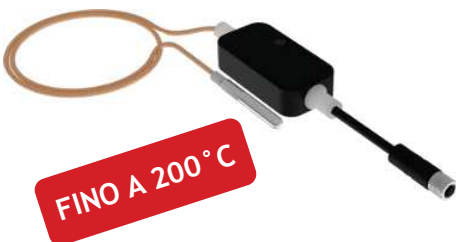
Sensor dimensions	Cable 500 l X 2 Ø (mm) Probe 30 o 80 l X 4 Ø (mm) pointed or rounded
Sensor temperature range	-40 °C ÷ +80 °C
Temperature resolution	0,01 °C
Temperature accuracy	± 0,1 °C (valid in the calibration range)

Temperature Smart Sensor -80 – Temperature Smart Sensor for -80°C, 50 cm thin cable, of standard cable length 50 cm, different probes available, cannot be switched; for longer cable length purchase the extensions for the DeepWave node.



Sensor dimensions	Cable 500 l X 2 Ø (mm) Probe 30 o 80 l X 4 Ø (mm) pointed or rounded
Sensor temperature range	-40 °C ÷ +80 °C
Temperature resolution	0,01 °C
Temperature accuracy	± 0,2 °C -80 °C ÷ -40 °C ± 0,1 °C -40 °C ÷ +20 °C





Temperature Smart Sensor -80 – Temperature Smart Sensor up to 200°C, 50 cm thin cable, of standard cable length 50 cm, different probes available, cannot be switched; for longer cable length purchase the extensions for the DeepWave node.



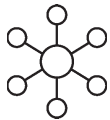
Sensor dimensions	Cable 500 l X 2 Ø (mm) Probe 30 o 80 l X 4 Ø (mm) pointed or rounded
Sensor temperature range	-40 °C ÷ +80 °C
Temperature resolution	0,01 °C
Accuratezza temperatura	± 0,2 °C (valid in the calibration range)

Probes

The Temperature Smart Sensor can be supplied with different types of steel ferrules: short (3 cm) or long (8 cm), penetration (pointed) or immersion (rounded), identified by a numerical code. The Smart Sensor cable has a standard length of 50 cm. For longer lengths it is necessary to purchase DeepWave knot extensions.

	03	3 cm, submersion
	04	8 cm, submersion
	05	3 cm, penetration
	06	8 cm, penetration

Temperature and Humidity Smart Sensor – Smart Sensor for temperature and humidity, for longer cable length purchase the extensions for the DeepWave node.



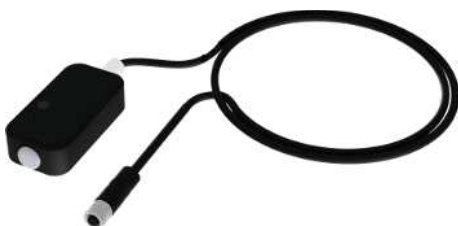
Sensor dimensions	65 l X 16,5 Ø (mm)
Sensor temperature range	-40 °C ÷ +80 °C
Temperature resolution	0,03 °C
Temperature accuracy	± 0,25 °C (valid in the calibration range)
Humidity range	0% ÷ 100% (non condensing)
Humidity resolution	0,1% RH
Humidity accuracy	± 3% RH da 10% a 90% ± 4% RH da 0% a 100%

Differential pressure Smart Sensor – Smart Sensor for differential pressure, for longer cable length purchase the extensions for the DeepWave node.



Sensor dimensions	43 X 22 X 11 (mm)
Temperature operative range	-20 °C ÷ +50 °C
Pressure operative range	25 bar absolute max.
Delta P range	-1 mbar ÷ +1 mbar
Delta P resolution	0,0001 mbar
Delta P accuracy	± 0,02 mbar (±2% typical a 25 °C; ±2,5% max.)
Temperature range	0 °C ÷ +50 °C
Temperature resolution	0,01 °C
Temperature accuracy	TBD

Light Smart Sensor – Smart Sensor for On/Off light indication, for longer cable length purchase the extensions for the DeepWave node.



Sensor dimensions	43 X 22 X 11 (mm)
Sensor temperature range	-20 °C ÷ +50 °C
Light range	0 ÷ 120 klx
Light resolution	0,0036 lx

Receive data and display them on the DeepWave system

The DeepWave radio nodes send data to the Helios receiver (usually only one is necessary) connected to the local network and this manages the data and every type of alarm. Data are displayed on the TSLog 21 software that can be installed on more than one PC in the same network as data are shared.

Helios – DeepWave system gateway. Manages data, saves them in a shared database in its internal memory, makes it available for the TSLog 21 software, manages out of limits, battery and timeout communication alarms. There are 2 different versions according to the communication frequency, suitable for the various regulations of the different countries.



DeepWave accessories

In the package	Power adapter, network cable
Alarms	Email and SMS (Internet connection required)