

ISURLOG-LR

On-the-cloud self-powered LoRa datalogger



ISURLOG-LR IIoT data logger is based on the cutting-edge SP-IIoT-SAP (Self Powered Industrial Internet of Things Sensor Access Point) technology, offering the next outstanding features:

- Integrates as a **node of a LoRa network** into the Internet of Things environment.
- Provides constant information on sensor parameters and connected device statuses.
- Allows **remote configuration**, from either local Wi-Fi or internet, of the device's operating parameters.
- *Email* and *Telegram* real time messaging of **alarms and diagnostics**.
- **On-the-cloud data logging** up and downloading, thus allowing the user the analysis and optimizations of the controlled infrastructure.
- **User friendly interface to third party devices**, (PLCs, controllers etc) by means of **Modbus RTU** protocol.
 - **Embedded atmospheric and air quality sensor** as an option.

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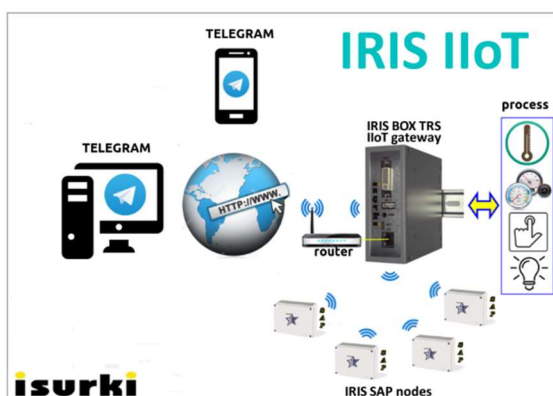
✉ Gabiria 2, 1-L E-20.305 Irun SPAIN ☎ (34)943-635437
✉ irisboxpc@isurki.com 🌐 <https://isurki.com/indexE.html>

ISURLOG-LR is based on **SP-IIoT-SAP** (Self Powered Industrial Internet of Things Sensor Access Point), therefore standing out for:

- Using Energy Harvesting / rechargeable batteries for the supply of the unit.
- Allowing the data monitoring and device management from/to any smart device.
- Wireless access point to any 4/20 mA sensor.
- Cloud based uploading of the logged data.
- The use of BlueTooth, Wi-Fi and LoRa connectivity.



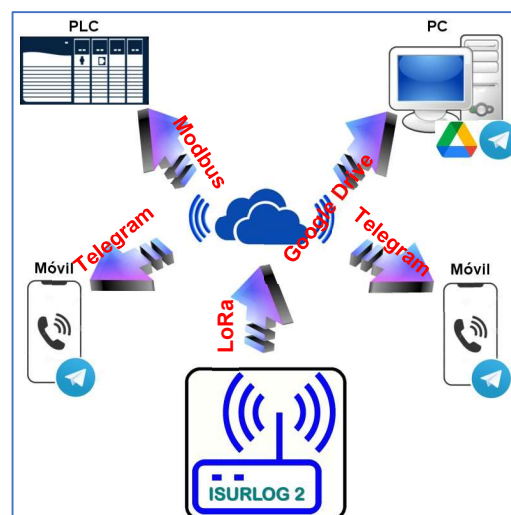
ISURLOG-LR deployed unit remotely monitoring flow and temperature on a hot water distribution network with LoRa comms.



ISURLOG-LR may be deployed as either stand-alone units or as a decentralized distributed periphery of the **IRIS-IIoT** ecosystem (i.e., as a wireless sensor access point of the IRIS BOX RTU neural network controller and gateway, providing remote access to a wide geographical area), featuring an unlimited programming capability.

ISURLOG-LR uploads logged data files to the cloud on a user-configurable interval, ranging from 5 up to 1440 minutes.

Logged data files are Google Drive accessible in a .csv format, thus providing direct importation from any datasheet application.



ISURLOG-LR features user-friendly configurable Modbus RTU links to third-party industrial automation devices, such as PLCs, PCs, controllers etc, automatically transmitting data strings containing the last acquired parameters' values. Thus, **ISURLOG-LR** can act as a centralized *wireless sensor access point* for any Modbus RTU field device.

DashBoard (IsurCloud app)

The units update on the cloud, according to the latency time configured by the user, the readings of the process parameters, the odometer reading of the counter and the battery



level, showing the last readings as well as the historical evolution of the field parameters. The access is performed in a secure way to a web server protected with a user's credentials login ⇒.

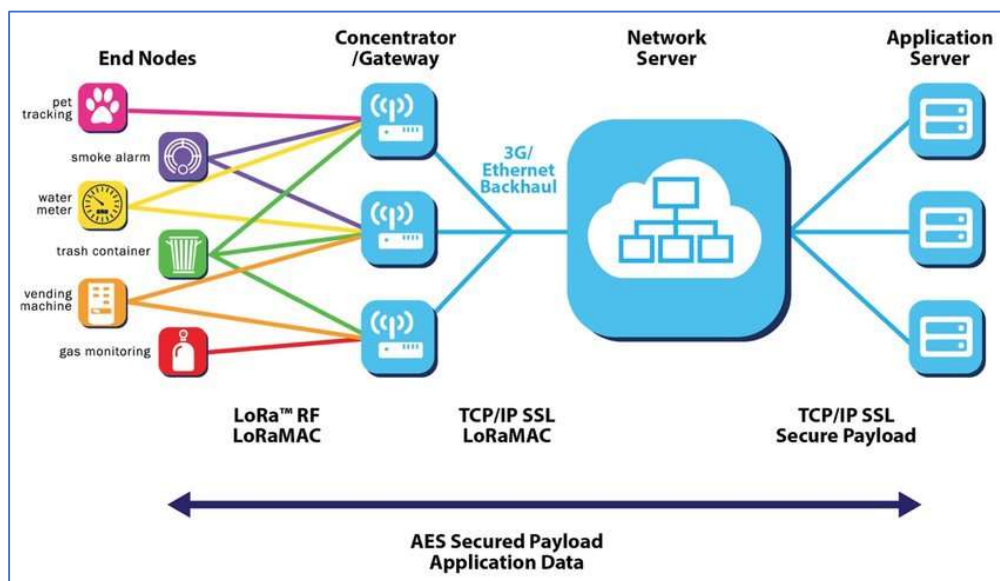


LoRa

LoRa is a long-range licence-free radio communications infrastructure that entirely fits the requirements of the IIoT ecosystem, featuring:

- ✓ **Ultra-low power consumption.**
- ✓ **Long range.**
- ✓ **Licence and access free.**
- ✓ **Low cost.**
- ✓ **Easy to deploy.**
- ✓ **High data security.**

Any Lora module/node requires a LoRa gateway for access to the internet, in the way that a traditional personal computer needs a gateway as an interface between the local area network and the internet. Both the node and the gateway must be registered in one of the currently existing network servers such as [The Things Network](#), [Helium](#) or [ChirpStack](#). These servers channel the data traffic towards a cloud base data host like Google Drive, Azure, AWS... from where the user can either directly download the logged data by the **ISURLOG-LR** registered unit or run other related apps (see ↓). The basic execution of the **ISURLOG-LR** requires the optional LoRa module to be attached to become a LoRa node.



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Beyond the on-the-shelf ready-to-use standard product, ISURKI provides the user with excellence-based technical support for the customization of any particular application in the case the standard the **IsurCloud** software does not fulfil the customer's requirements, including tailored software solutions and on-site commissioning, thus delivering turn-key projects seizing our engineering skills.

For these locations in which a LoRa link is unavailable, the **ISURLOG-LR** unit can be supplied with NB-IoT communications based on the 4G/LTE mobile network. Both LoRa and NB based units can coexist within the same **IRIS-IIoT** ecosystem.

LoRa CONNECTIVITY RANGE

One of the most outstanding features of the LoRa connectivity lies on its long-distance range, even in urban environments.

Although there are documented success cases of links up to 200 km under exceptional propagation conditions, the most common guaranteed peer-to-peer links are in the 20 km range.

According to our experiments through currently running LoRa connected systems deployed in the areas nearby our location, success links of up to 15 km have been achieved, even under unfavourable conditions due to hilly orography and intermediate urban and industrial settlements.

The attached pictures illustrate one such case.

⇒ ↓



Embedded solar panel powered Isurlog LoRa outstation at the Urgull mountain in San Sebastian (Spain), linked to ISURKI's headquarters based LoRaWAN gateway through 13 km of hilly terrain. ↑ ↓



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AREAS OF APPLICATION



- ✓ Environment and climate change.
- ✓ Green energies.
- ✓ Instrumentation and sensors.
- ✓ Smart cities.
- ✓ Smart buildings.
- ✓ Industrial control.
- ✓ Sustainable agriculture.
- ✓ Health care.
- ✓ Weather.
- ✓ Road and transport networks.

SMART WATER

SPECIFIC FUNCTIONS FOR WATER NETWORKS

- ✓ Radar and ultrasonic level sensors: specific configuration parameters for calculation of the net effective level.
- ✓ Submersible level sensors: positive offset configuration to consider the vertical distance between the zero of the sensor and the origin of the level measurement (tank floor, channel, etc.).
- ✓ Storm tanks: increase the frequency of data updating (latency time) by

automatically detecting the overflow level.

- ✓ Compatible with the intelligent **WISE** platform, software focused on assisting in operational decision-making in the technical management of drinking water distribution networks.

WISE
Water Infrastructures'
Software based Efficiency



TECHNICAL ESPECIFICACIONES

BASIC EXECUTION

- Main processor: Xtensa dual-core 32-bit LX6 with 8 MB Flash 8 MB PSRAM.
- Secondary processor: ULP FSM con 8 KB of SRAM.
- 4 x 4/20mA (active/passive) 16 bits analogue input, including resettable protection fuses.
- 1 x Pt100/Pt1000 temperature input.
- Adjustable 6-24Vdc managed power supply for sensors.
- 1 x voltage-free digital inputs (status/counter, ≥ 50 mS pulse).
- 1 x RS485 comms port with Modbus RTU protocol.
- 1 x solid state relay digital output (2 amps).
- **Wi-Fi** and **Bluetooth** comms. Wi-Fi Access Point created by a virtual app pushbutton.
- Reset pushbutton.
- The virtual pushbutton + UART port allow direct upload of user's code to the ESP32.
- RTC: Maxim Integrated DS3231M +5ppm plus CR1220 battery included.
- Ultra-low consumption: 15 μ A in sleep mode.
- 5 x NRC18650 rechargeable batteries featuring a total capacity of 8500mAH.
- NRC18650 embedded battery charger with LED-based charge indicator. Compatible charging sources: USB type C or photovoltaic solar panel of up to 6V of output voltage.
- Compact sized PCB: 106x91.5 mm (4.17x3.60").



AIR QUALITY SENSORS (OPTIONAL):

- BME680. Temp, humidity, atm. pressure and air quality index digital sensor according to ISO16000-29 for indoor use.



TEMPERATURE SENSORS (OPTIONAL):

- SPI bus for the connection of up to 2 x Pt100/Pt1000 temperature sensors.
- 1 or 2 x Pt100 class A temperature sensor, -50...200 °C, cube probe 8x8 mm, 2 m cable



ADDITIONAL COMMUNICATIONS (OPTIONAL):

- LoRa/LoRawan chip (RFM95W).
- Embedded UFL connector for embedded or external LoRa antenna.
- Embedded flexible 1.8 dBi or external 3 dbi LoRa antenna, 35 cm (13.78"), fiber glass.





ADDITIONAL EXTERNAL POWER SUPPLY OPTIONS:

- 0,6W 80x55mm solar panel. No direct exposition to sunlight required. Embedded.
- USB 230Vac charger with 2 m cable.
- “Energy harvesting” version providing automatic recharge of batteries (TBD).



WATERPROOF PLASTIC CASE EXECUTIONS (OPTIONAL)

- polycarbonate basic box IP67/IK08, 122(width)x120(height)x86(depth)mm/4.80”(width)x4.72”(height)x3.39”(depth). UV protection, self-extinguishable, flammability UL94 V-2. -50 to +100 °C temperature range. IP67 cable glands for cables inlet ↓.
- Double PVC plastic box added to the basic box, IP66, 300(height)x265(width)x165(depth)mm /11.81”(height)x10.43”(width)x6.50”(depth), -25 a 60 °C. UV protection. IP67 cable glands for cables inlet. Allows external solar panel ↓.



SOFTWARE OPTIONS

- Arduino IDE or MicroPython environment programmable.
- Arduino IDE free code for different applications: 4-20 mA input reading, digital input reading, LoRa/LoRaWAN data transmission, low power management, RTC, battery voltage reading).
- **IsurCloud** software. Free online user utility providing the next features:
 - Configuration of the unit's operating parameters, enabling automatic data transmission, and uploading of logged data to the cloud:
 - Analog / temp. inputs: range, Hi & Lo alarms thresholds, engineering units, latency time.
 - Digital input: selection among “status mode” (with alarm) or “counter mode”.
 - Air quality sensor: enabling.
 - On-the-cloud data logging: Logging interval (from 1 up to 1.440 minutes).
 - Parameters historical evolution automatic to-the-cloud upload, through csv files.

HOW TO DEPLOY A NETWORK OF ISURLOG-LR OUTSTATIONS

Before starting a deployment of LoRa stations in a specific geographical area or infrastructure, it is advisable to check if that area is provided with a reliable and robust coverage from an existing Gateway, an indispensable element that acts as an interface between the local LoRa links and the internet.

Check the existence of current coverage.

There are different LoRa networks with a degree of implementation that will depend on the target area of our project. The different operators mentioned above as examples have georeferenced web tools that show the number of Gateways available in the area of the map consulted by the interested party.

ISURLOG-LR outstations from ISURKI are supplied by default with the credentials corresponding to the Helium network, whose gateway deployment can be found [here](#). However, if the user wishes to opt for a different network, he should inform ISURKI what it is, so that the stations are factory configured with the corresponding credentials. In any case, ISURKI can provide his customers with the **Locket** handheld terminal, which allows them to check in the field the degree of coverage of a specific LoRa network and determine its suitability for

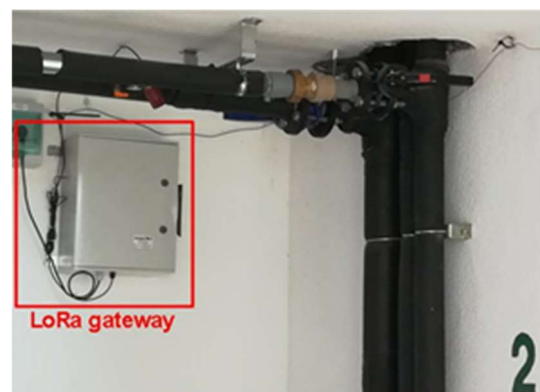
their project. ↓



What if no coverage in my deployment area?

In that case it is necessary to install our own Gateway, which can be supplied in a plug & play execution by ISURKI, offering the following features and options:

1. Execution for outdoor or indoor mounting, in IP66 cabinet of 425x325x180mm.
2. Power supply from the electricity grid or through solar panels.
3. Internet connection: by embedded 4G/LTE router or through existing router with Ethernet and/or WiFi.
4. High gain antennas for LoRa signal enhancement.
5. Options: power failure alarm and remote reset.



Gateway LoRa covering the entire building of the Maternal-Child Hospital of Donostia (Spain)

Monetization

In the case of opting for the Helium operator, the owner of the Gateway can benefit financially from its implementation through the coverage tests of other nearby Gateways (*proof of coverage*) as well as its use by other users to upload data to the third-party cloud.

The greater the scope of the surface covered by our Gateway, the greater the possibilities of monetization of our investment through [cumulative data credits](#) in our Helium account.



TECHNICAL SUPPORT



+34-943-63.54.37



tecnica@isurki.com













https://www.isurki.com/isurlog_LRE.html

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ORDER CODING		
Item	Description	Reference
	<p>Data logger IIoT, basic execution.</p> <ul style="list-style-type: none"> Delivered format: PCB (no housing). 4 x 4-20 mA 16bits analogue inputs, active or passive current loop. 1 x voltage free digital input (counters/on-off state). 1 x 2amps solid state relay digital output. 1 x Pt100/Pt1000(optional), 2-3-4 wires. 1 x RS485 Modbus RTU comms port. 1 x Air quality and atmospheric sensor BMA680. WiFi & Bluetooth connectivity. RTC. Without LoRa chip. Local datalogging. 1 x 2 ion-lithium rechargeable battery pack included. External 6-24 Vdc power supply. Includes micro photovoltaic solar panel integrated into the PCB. Requires basic box with transparent lid. 	ISURLOG-LR
	<p>Second ion-lithium rechargeable battery pack (3 x NCR18650).</p> <ul style="list-style-type: none"> x (0,1) <ul style="list-style-type: none"> x = 0: without 2nd battery pack. x = 1: with 2nd battery pack. 	- BPx
<p>x = 2 x = 3</p> 	<p>RFM95W-chip-based LoraWAN communications (optional):</p> <ul style="list-style-type: none"> x (0,1,2,3) <ul style="list-style-type: none"> x = 0: no additional comms. x = 1: with internal flexible antenna, 2.5 dBi gain. x = 2: elbowed external antenna, 196 mm long, mounted on the plastic case, 2.5 dBi x = 3: external vertical antenna, 35 cm long, wall mounting kit, glass fiber, 3m cable w/ SMA connector, 3 dBi 	- COMx
	<p>1 x Pt100/Pt1000 temperature sensor, IP67, with SPI bus connection of.</p> <ul style="list-style-type: none"> x (0,1) <ul style="list-style-type: none"> x = 0: without temperature sensor. x = 1: with SPI bus + 1 x Pt100 sensor, 8x8x35mm probe, -50...200°C, 2 m cable. x = 2: with SPI bus + 1 x Pt100 sensor, 8x8x35mm probe, -50...200°C, 5 m cable. 	- SPIx
	<p>External additional power supply for basic enclosure (optional):</p> <ul style="list-style-type: none"> x (0,1,2,3) <ul style="list-style-type: none"> x = 0: no additional external power supply. x = 1: embedded solar panel on PCB + plastic case with clear lid. x = 2: 230Vac to 5Vdc USB charger with 2 m cable. x = 3: energy harvesting (no batteries, super capacitor powered by Peltier cell). TBD. 	- EPSx
<p>x = 2</p> 	<p>Basic enclosure:</p> <ul style="list-style-type: none"> x (0,1,2) <ul style="list-style-type: none"> x = 0: without enclosure. x = 1: complete unit mounted in an <u>indoor box</u>, 122 (width) x 120 (height) x 86 (depth), in mm, all accessories included. Material: PLA. Not for outdoor installation. x = 2: complete unit mounted in an <u>outdoor IP67 box</u>, 122 (width) x 120 (height) x 86 (depth), in mm, all accessories included. Material: ABS. 	- 1PCx
<p>x = 2</p> 	<p>Double waterproof plastic housing for outdoor installation, IP66, 300 (height) x 265 (width) x 165 (deep), in mm:</p> <ul style="list-style-type: none"> x (0,1,2,3) <ul style="list-style-type: none"> x = 0: without. 	- 2PCx

	<ul style="list-style-type: none"> ○ x = 1: full unit, all options and accessories included and assembled in the plastic case. It contains the basic enclosure (1PC1 option) inside. ○ x = 2: adds one external solar panel (6W, 211x175x15 mm, orientable mounting holder, 4m cable, IP65) supply to the 2PC1 option. ⇐ ○ x = 3: adds 230Vca input power supply to the 2PC1 option. 	
	<p>x (0,1,2,3) = Gauge pressure sensor, available ranges: 0-6 (1), 0-10 (2) and 0-16 (3) bar, 4/20 mA 2 wire output signal, 8-30Vdc power supply, AISI316L case, 0.6 m cable for connection with ISURLOG included, IP67, 1/4" M process connection.</p>	- PSx
	<p>IsurCloud: cloud data connectivity</p> <ul style="list-style-type: none"> • x (0,1,2) <ul style="list-style-type: none"> ○ x = 0: Only local WiFi data download. ○ x = 1: IsurCloud Basic: Cloud data upload latency ≥ 15', Google Drive accessible in both tabular and graphical format. Telegram and email alarms messaging. Last 365 days back up. 	- ICSx

ACCESORIES AND SPARE PARTS

Item	Description	Reference
	Handheld LoRaWAN coverage tester terminal. Embedded USB charger with led indication.	Locket
	Pack of three additional ion-lithium rechargeable batteries.	BatPack

ENVIRONMENTALLY FRIENDLY

Since our beginnings in 1992, ISURKI has been involved in the application of cutting-edge technologies to provide products and solutions that help preserve the environment and natural surroundings.

As a result of this business approach, we are committed to reducing as much as possible the impact that the production and marketing of our products can have on the environment.

All our devices and spare parts provides traceability that allows us to know the fleet of operational units deployed in the field.

Likewise, both the devices and the batteries used in them have been declared and registered within the European Recycling Platform, which guarantees the correct recycling of these at the end of their useful life.

Finally, we apply environmental criteria in the design of our products, especially in terms of compliance with applicable regulations (RoHS), materials, type of energy sources (Energy harvesting, rechargeable batteries only, ...) as well as in the implementation of operational management routines that reduce the consumption of each unit as much as possible and maximise the autonomy time of the batteries.

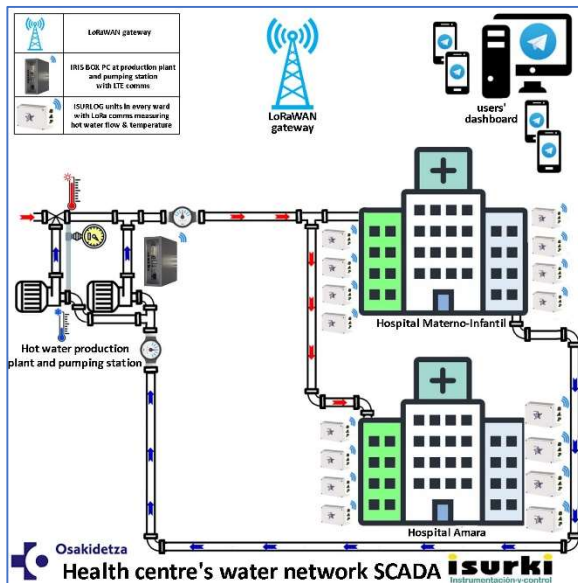


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A BIT OF HISTORY

ISURKI was founded in 1992 with the aim of providing the most advanced electronic, computing & communications technologies to the industry and the resources and facilities management companies to improve the supervision and control of their processes and infrastructures.



Sanitary hot water control system based on **IRIS IIoT** ecosystem at the Hospital Universitario Donostia (Spain).

ISURLOG-LR is the result of applying all this expertise to the hardware and software design of this industrial device, focused on its use within the **IRIS IIoT** Industrial Internet of Things ecosystem. This background and mastery of the aforementioned technologies allow us to design tailor-made solutions adapted to the requirements of each application, offering an extremely competitive final product in terms of price and performance. Last but not least, an excellence-based technical assistance and hotline service during the pre-sales and after-sales stages, together with the support of our matrix suppliers, guarantee the best results for the **ISURLOG-LR** unit in your application.



Company headquarters in Irun, Basque Country, Spain.

DISCLAIMER

Information contained in this data sheet is up-to-date and correct as of the date of issue. The constant evolution of our products can lead to differences between the features of the currently available product and those stated in this document. Please, contact us to get the last updated information.

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