WLRE

User Manual

WineCap™ LoRa® Enhancer (repeater and router)

General warnings.

- The following information must be read and understood before proceeding with the installation, commissioning and maintenance of the devices described in this document.
- **ATTENTION!** Any omission or failure to follow these instructions scrupulously can cause danger.
- **ATTENTION!** Explosion hazard. In case of batteries substitution, make sure that the type is compatible and complies with the specifications indicated by the manufacturer.
- In case of batteries substitution, **DO NOT** disconnect the flat cable which connect the electronic boards without removing batteries before
- ALWAYS substitute all the batteries, also in case of one single battery exhausted.
- If the device is powered by a fixed network, make sure you have disconnected the power supply before carrying out any type of intervention. Failure to comply with this indication can cause damage to people and/or property.
- Follow the manufacturer's suggested warm‐up time (*time required to obtain a reliable measurement*) of the transducer.
- Follow the manufacturer's suggested electric wiring of the transducer to measure (*ground shields at a single point, cable length and section*); voltage measures on distances exceed 15/20 meters are subjected to electromagnetic disturbances. 0÷25mA inputs have a superior electromagnetic compatibility (*EMC*).
- Avoid passage in cavities with power or high voltage cables.
- The protection and safety measures and the warranty provided by the Manufacturer with the equipment may be compromised if it's used in a manner that does not comply with this user manual.
- This equipment complies with CE regulations.
- Modifications or tampering not expressly approved by the Manufacturer could void the user's authorization to operate the equipment.
- This equipment must be installed by qualified personnel and in accordance with national regulations and/or related local requirements.
- Make sure that the object is properly fixed to supports/infrastructures capable of withstanding this load. Make sure proper methods and materials are used when fixing the equipment to a wall.
- Only personnel expressly authorized by the manufacturer can open the container. There are no user serviceable parts inside.

1. Description.

The **WLRE** device is a radio signal repeater used to improve link distance between probes/dataloggers and the data gathering central unit (*gateway*).
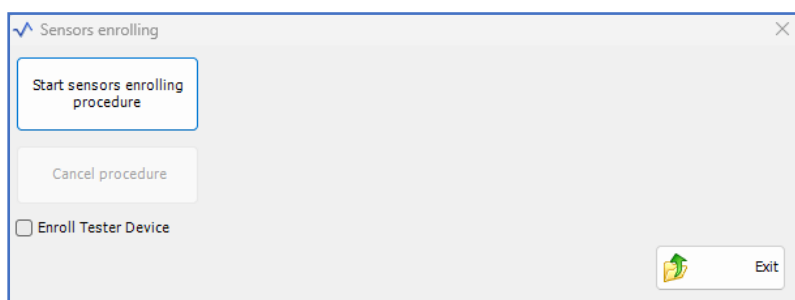
2. Enrol the enhancer.

Not necessary if performed in factory before delivery.

In case the device is already enrolled but in STANDBY status, a TEST command must be issued.

If the enhancer is in "FACTORY RESET" status, it's necessary to enrol it to the wireless network issuing a "3 – ENROL" command using the *WineCapKey* and the *WineCapManager* software previously installed on a Windows™ PC, connected to the acquisition gateway (refer to the "*WineCap System - User Manual R31*").

From the *Gateway* drop-down menu, open the window "*Sensors enrolling*".

Picture 1 - Product image

Picture 2 - Datalogger/Probe/Router enrolling window

- *Start sensors enrolling procedure*: A new device (**enhancer/datalogger/probe**) enrolling procedure starts. The enrol operation for a **WLRE enhancer** allows to use its full features, in addition to extend the radio signal coverage, supplies diagnostic information and the recording of status values as radio signal quality and battery life.

  Enhancer can be named with a label and historical data will be available as a common datalogger.

  <u>ATTENTION</u>: the **WLRE** enhancer works as a datalogger, so it uses a data recording position in the gateway's memory.

- *Enrol Tester Device*: this option allows to link to the system a **WLR-TST** tester probe, that become part of the wireless network without occupying data storing positions inside the gateway.

  The difference consists in the fact that, in this case, data acquired by the tester probe (battery status, radio signal quality, etc.) <u>WILL NOT</u> be monitored and <u>WILL NOT</u> be traced in the gateway's memory or in the Service Centre in case of remote connection.

  The **WLR-TST** tester probe however will send status data at programmable intervals, but these data will be available only in *WineCapManager* and for few seconds, where the device will be showed as a grey icon, because <u>NOT</u> configured in the system.

3. Reported measures.

Measures performed by **WLRE enhancer** are diagnostic values:

Picture 3 - Diagnostic values displayed

- *Nodes*: amount of dataloggers or enhancers linked with **WLRE**. This value shows how many objects in the network sends data using a path including the **WLRE** in subject.

- *Packets*: number of transmissions managed by enhancer during the last measure interval.
  This value depends by quantity of nodes and by transmission period they use, so is most significant than the activity performed by the enhancer itself.

4. Wireless device user interface.

The user interface consists of a "virtual" button that can be activated using the *WineCapKey* and of a two‑colours led.

To give a command, user must approach the *WineCapKey* to the device's sensible area and keep it in that position.; the following picture (*Picture 4 - WineCapKey positioning*) shows device's sensible points.
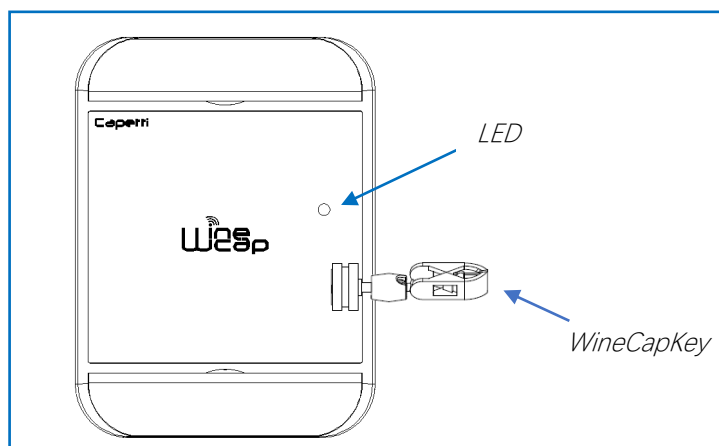
Picture 4 - WineCapKey positioning

The following COMMAND table describes the available commands:

WIRELESS DEVICES USER INTERFACE

Flash count	Command	Description
1 flash	STATUS	Shows the device **STATUS**. As answer the led perform a flash sequence as reported in the **STATUS** table. If the device is performing the **TEST** (*refer to TEST command*) this command stops it.
2 flashes	TEST	Enter in **TEST** mode and transmits status and measurements every 5 seconds. If the device is in **STANDBY** mode or it is out of radio range, this command forces the connection procedure to the WSN and the return to the operative mode. The **TEST** stops after 120 seconds. During **TEST**, the led continuously shows the **STATUS** to monitor the received radio signal quality. <ins>CAUTION: Measures acquired during TEST phase are NOT saved.</ins>
3 flashes	ENROL	Association to the network: must be used when the device has not yet been included in a network, starts the entry and association procedure to the gateway (*refer to "WineCap System - User Manual R31"*).
4 flashes + 4 flashes	STANDBY	Temporary device deactivation: the device is stopped. The sampling process and the radio are/is. turned off losing the connection to the network. To reactivate, a **TEST** command is necessary. The **STANDBY** command must be given twice to confirm it: at the first sequence the led flashes alternating RED and GREEN lights, waiting for the second confirm sequence within 15 seconds. At the command execution the led flashes as the **STANDBY** status (*refer to "Picture 6 - Status table – Wireless mode"*).
5 flashes + 5 flashes	FACTORY RESET	The device performs the memory deleting procedure and goes in STOP status. All samples, configuration and wireless network data associated are LOST. To reactivate the device a new association and configuration procedure is necessary (*ENROL command*). Also in this case, the **FACTORY RESET** command must be given twice to confirm it. At the command execution the led flashes as the "PROBE/DATALOGGER NOT ASSOCIATED" status (*refer to "Picture 6 - Status table – Wireless mode"*).

Picture 5 – Wireless devices user interface

5. Device enrolment.

Not necessary if performed in factory before delivery.

Enrol the device to the wireless network referring to the *"WineCap System - User Manual R31"*. In case the device is already enrolled but in **STANDBY** status, a **TEST** command must be issued (refer to *Picture 5 – – Wireless devices user interface*).

6. Installation procedure.

After installing the gateway in appropriate place in charge, (*refer to "WineCap System - User Manual R31"*), be sure that the device is enrolled to the gateway and activated.

Head for the installation point. On the way, to check the quality of the radio coverage, use the "Field Measurer" function.

This function is activated issuing the **TEST** *(refer to Picture 5 –)* command: position the *WineCapKey* in the spot indicated in *Picture 4 - WineCapKey positioning* and wait for two AMBER flashes, then remove the *WineCapKey* from device. The "Field Measurer" function lasts enabled for two minutes.
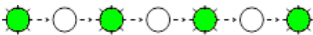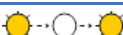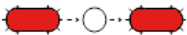
To issue commands to the device, place the *WineCapKey* where indicated.

Once the *WineCapKey*, is detected, the led periodically emits AMBER flashes with a 2 second cadence.

For each flash, a different command is associated; to confirm the command the *WineCapKey* must be removed from the sensible area immediately after the number of flashes corresponding at the desired command. The **TEST** corresponds to the second pulse and activate the "Field Measurer" function.

The device will give back the radio signal quality through led flashes:

WIRELESS MODE STATUS Table

FLASH COUNT – WIRELESS MODE		STATUS/RADIO SIGNAL QUALITY
	5 green flashes	ACTIVE – Radio signal: Excellent
	4 green flashes	ACTIVE – Radio signal: Good
	3 green flashes	ACTIVE – Radio signal: Fair
	2 amber flashes	ACTIVE – Radio signal: Sufficient
	1 red flash	ACTIVE – Radio signal: Insufficient
	1 red flash 2" long	OUT OF RANGE Network searching
	2 red flashes 2" long	STANDBY Radio off – No Logging
	Short-long-short red flashes series	FACTORY RESET Device not enrolled – No logging

Picture 6 - Status table – Wireless mode

Optimize reception selecting the best position: small movements can help.
If the signal is absent or insufficient at the install point, a *repeater WR12* should be put between (*refer to "WineCap System - User Manual R31"*). The *repeater WR12* itself must be in a position where the signal level is at least sufficient.

The network will reconfigure itself automatically; the signal will be good again when the device synchronizes with the *repeater WR12*.

The wireless communication will not be reconfigured until completely lost by the device. Because of this, in some cases it could be necessary to force the operation. In such cases, put the device in **STANDBY** mode, then run the **TEST** again (*refer to "WineCap System - User Manual R31"*).

NOTE: The display equipped datalogger *(WLR-TST)* is recommended, to verify the signal quality during devices installation.

7. Shutting off/Reactivating the device.

If the device is shut off and left unused for a long time, you can issue the **STANDBY** command *(refer to Picture 5 – – Wireless devices user interface)*. It corresponds to the command number 4 and must be issued twice to confirm the operation.

Position the *WineCapKey* in the spot indicated in (*Picture 4 - WineCapKey positioning*), and wait for four AMBER flashes, then remove the *WineCapKey* from device. Verify that the device asks for confirmation of **STANDBY** command with alternate GREEN/RED flashing, then position

again the *WineCapKey* and wait for four flashes again. The device will confirm the **STANDBY** status lighting the RED led for 2 seconds twice. To reactivate the device the **TEST** command must be issued.

8. Technical Information.

Power supply	19Ah - 3,6V type "D" lithium internal battery (*BAT3*)
Battery life (*)	Up to 7 years *(samples every 10 minutes and radio signal quality at least sufficient)*
Working temperature	• Operative: -30°C ÷ +60°C • Warehousing: -40°C ÷ +70°C
Radio frequency	ISM 868MHz
Radio coverage	Up to 6Km in line of sight *(can be extended using WLRE battery powered enhancers)*
Sealing	IP65
Dimensions	90x120x50mm
Weight	350g
Case material	ABS
Mounting	Fix on 4 points
Connections	Up to 50 probes/dataloggers and/or up to 32 enhancers (maximum 16 for each path)

* battery life may be influenced by fieldwork conditions, sampling/measuring interval and system configuration.
** radio coverage can be extended using up to 32 WR12 repeaters (maximum 16 for each path) between the device and the gateway.

9. Mechanical dimensions.
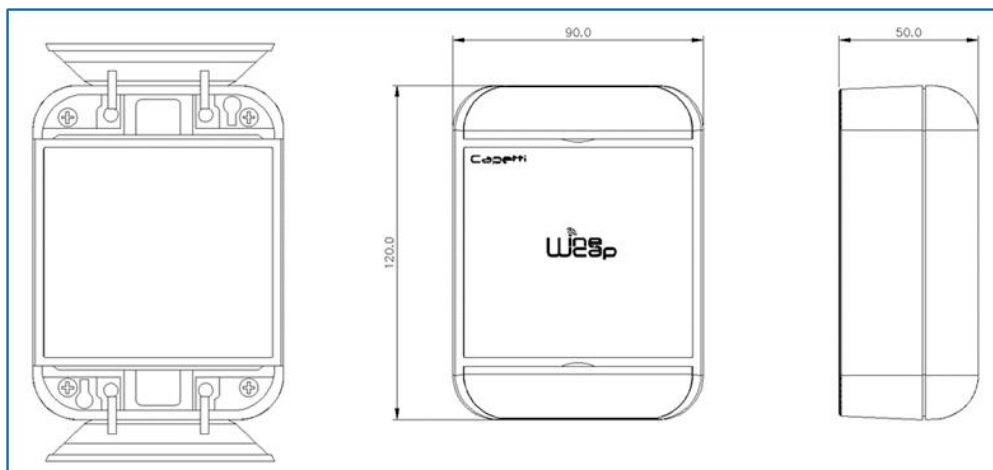
Picture 7 - Mechanical dimensions

10. Disclaimer.

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- The product is not intended for use in applications where safety is critical, such as life-security systems or medical-related applications.

- If a channel is saturated or disrupted "Frequency hopping" transmitting method allows data integrity and security, but correct functioning of the product in environments with high radio activity is not guaranteed.

11. Reference standards.

EN 61010 -1

For electromagnetic compatibility

EN 61000 - 3 - 2
EN 61000 - 3 - 3
EN 300 220 -2
EN 301 489 - 03
EN 61000 - 6 -1

This symbol indicates that this product is compliant with the European Directive 2011/65/CE that restricts the use of substances in the manufacturing of electronic devices.

RoHs 2011/65/CE

The "WEEE" logo on the label indicates that this product is compliant with the "WEEE" EC Directive. This symbol (valid only in the European Union countries) indicates that the product it is applied to, MUST NOT be discarded with ordinary household or industrial waste, but must be sent to an authorized reception point. The end user should contact the device provider, either the manufacturer or the reseller, to agree a collection and disposal process, after having checked the terms and conditions of sale.

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