TX-2CH-LORA is a long-range radio transceiver with variable code encoding. In combination with the **RX-2CH-LORA**, it can manage two relay outputs in bistable, monostable, or timer mode and receive the activation status of the relays and the radio link quality level. It has three operating modes:

- **Continuous mode:** Controls the relays of the RX-2CH-LORA based on the status of inputs A and B of the TX-2CH-LORA.
- **Remote control mode:** Allows the control of relays A and B, using relay programming options such as monostable, bistable, and timer modes.
- **State change mode:** Similar to Continuous mode, but transmission and acknowledgment cycles are only active when there is a state change of inputs A and B and at predefined intervals, ensuring RF bandwidth occupation within the limits imposed by the EN 300 220-2 standard.

It is housed in a plastic enclosure with wall-mounting capability. Two programming buttons and two RGB LEDs are accessible for displaying the operating status, programming, and acknowledgment of relays A and B from the RX-2CH-LORA. A red LED indicates the power status within the range of 8-24Vac or 10-33Vdc. The connections are detachable with a 3.81mm pitch terminal block for cables up to 1.5mm².

Connections

| No.	Name	Description
1	Power Positive	Connect to 8-24Vac or +10÷33Vdc power supply
2	Power Negative	Connect to the negative pole of the power supply or GND
3	Input +Opto B	Positive input for channel B activation. Activated with +5÷30Vdc
4	Input -Opto B	Negative input for channel B activation. Connect to GND or negative
5	Input +Opto A	Positive input for channel A activation. Activated with +5÷30Vdc
6	Input -Opto A	Negative input for channel A activation. Connect to GND

		or negative
7	Antenna Ground	Connect to the 50Ω coaxial cable shield or GND
8	Antenna	Connect to a 50Ω single-pole antenna or the central pole of a coaxial

Electrical Diagram for Inputs A and B
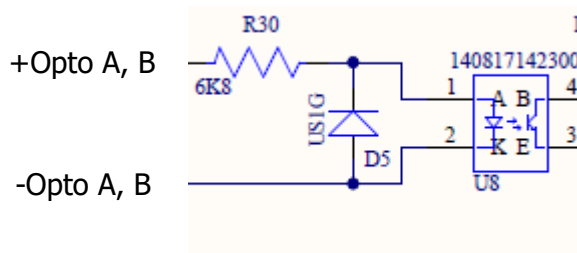
Buttons and LEDs
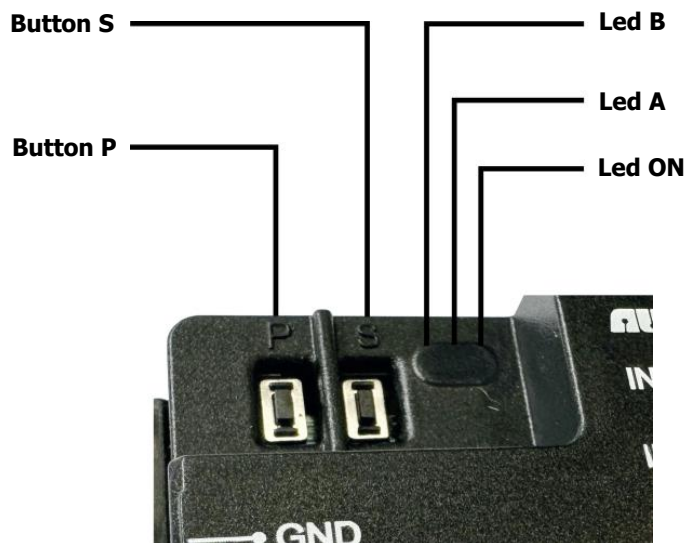
In the upper-left corner of the enclosure, a cavity holds two buttons labelled Button S and Button P, accessible with a fingertip or an insulated tool.
To the right, a transparent section shows three LEDs.

Name	Description
LED ON	Red LED: blinks for 1 second at power-up, then every 2 seconds to indicate the board is on
LED A	RGB LED: indicates the operating status of the associated relay RX output.
LED B	RGB LED: same as LED A for relay B.
Button P	Configures operating mode. Details are explained in later sections.
Button S	Indicates radio link status, also used for exiting the menu.

Power-up Procedure

When the board is powered, all three LEDs flash for 1 second: **A** and **B** in white and **ON** in red. If the board is functioning properly, LEDs **A** and **B** remain off while **LED ON** blinks every 2 seconds.

First Power-up Functionality

Normally, the TX-2CH-LORA is in standby with an average consumption of 7mA at 12V, with the radio part turned off until one of the two inputs, Opto A or Opto B, is activated. If the TX-2CH-LORA has not been associated with any RX-2CH-LORA receiver, applying power to the input terminals +Opto and -Opto of inputs A or B will start transmission, and the corresponding LED (LED A for Opto A and LED B for Opto B) will light up red during the input activation, intermittently flashing due to the lack of response from a paired receiver.

Operating Mode Configuration

The board can operate in three different modes. To access the mode selection menu, press **Button S** for 5 seconds, then **LED ON** flashes according to the following table. The number of flashes indicates the selected mode:
- 1 flash = **Continuous Mode**
- 2 flashes = **Remote Control Mode**
- 3 flashes = **State Change Mode**

Press **Button S** again to select one of the available modes. Each press cycles the flashing sequence from 1 to 3. Once the desired mode is selected, press **Button P** to exit the menu. The default configuration is **Continuous Mode**. The selected mode is passed to the decoder during the learning phase.

Continuous Mode

When one or both inputs (Opto A or Opto B) are activated, transmission starts and keeps the corresponding relay A and B of the RX-2CH-LORA active for the duration of the transmission. If other inputs activate during transmission, these are reported to activate their respective outputs. Each status LED A and B blinks cyan rapidly after about 200ms if the command is received, or red if it is not received. In this mode, learning one input of the TX-2CH-LORA automatically assigns

both inputs A and B of the TX-2CH-LORA to the corresponding relays A and B of the RX-2CH-LORA.

Remote Control Mode

In this mode, the TX-2CH-LORA acts as a remote control, and the relay settings of the RX-2CH-LORA are displayed on LEDs A and B on the TX-2CH-LORA. The following are the LED indications:

- **Impulsive output:** LED blinks blue rapidly after about 200ms if the command is received, or red if not.
- **Bistable output:** LED is solid blue (2 seconds) if the output is active, or solid red (2 seconds) if inactive. Fast blinking occurs if no ACK is received from the decoder.

In **Remote Control Mode**, automatic association is not provided as in Continuous Mode, and any input of the TX-2CH-LORA can be associated with any output of the RX-2CH-LORA. However, it is not possible to activate both relays A and B with one input of the TX-2CH-LORA, nor to activate both Opto inputs A and B simultaneously.

State Change Mode

At each state change of one of the Opto inputs of the TX-2CH-LORA, a packet containing the update with the status of the two inputs is sent. If no state change occurs, the TX-2CH-LORA sends an update at predefined intervals of 30 seconds. The output status LEDs are updated each time an ACK is received from the RX-2CH-LORA as follows:

- Solid green LED = Output ACTIVE
- Solid red LED = Output Off
- Fast-blinking red LED = Feedback not received

Unlike the previous modes, LEDs A and B on the TX-2CH-LORA remain always on to continuously indicate the status of the relay outputs A and B of the RX-2CH-LORA.

Note: Use Remote Control Mode to associate multiple TX-2CH-LORA devices with a single RX-2CH-LORA. In **Continuous Mode** and **State Change Mode**, the system operates with a single pair of TX-2CH-LORA and RX-2CH-LORA. In the case of multiple TX-2CH-LORA devices associated with the same RX-2CH-LORA, the settings of the last TX-2CH-LORA in the learning phase apply.

Radio Link Test

By pressing **Button P** for 5 seconds, a test procedure for the radio link quality starts (a TX-2CH-LORA can only be associated with one RX-2CH-LORA). During this phase, the two status LEDs flash alternately red, and a series of packets are sent. Based on the number of feedbacks received, the link quality is measured as follows:

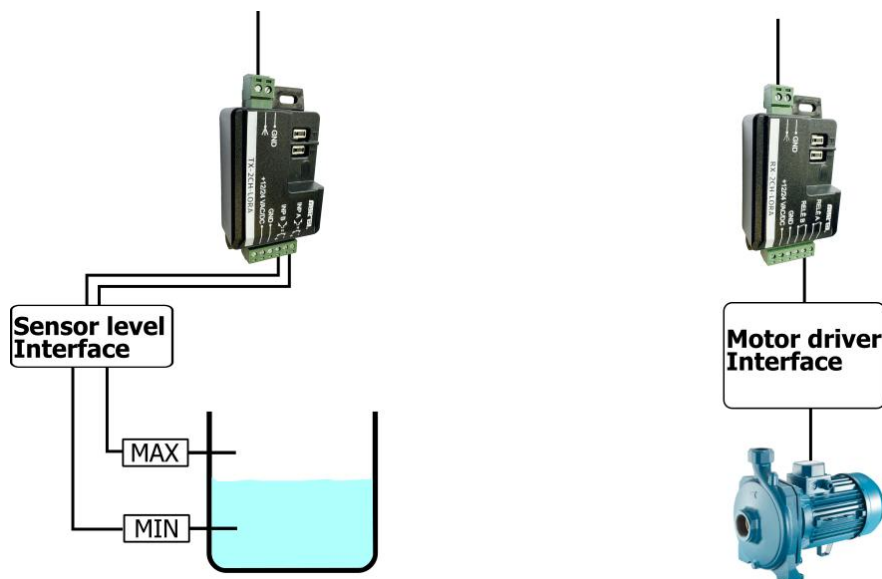Le caratteristiche tecniche possono subire variazioni senza preavviso. AUR°EL S.p.A. non si assume la responsabilità di danni causati dall'uso improprio del dispositivo.

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- Two solid green LEDs = EXCELLENT quality
- Two solid yellow LEDs = FAIR quality
- Two solid red LEDs = POOR quality
- Two flashing red LEDs = NO LINK

Technical Specifications

	Min.	Typ.	Max.	Unit
Voltage Supply AC/DC				
Voltage DC	10	12	33	V
Voltage AC	9		24	V
Idle current consumption input A and B open (+Vs 12V)		7,5		mA
Current consumption during RF transmission with one or both active inputs (+Vs 12V)	22		30	mA
Vdc voltage between inputs +Opto and −Opto (A, B)	4		35	V
Current consumption input A or B between +Opto and −Opto (+Vs 12Vdc)		1,6		mA
Frequency		869,525		MHz
RF Power	19		22	dBm
RF Modulation		LORA™		
Receiver sensitivity		-127		dBm
Operating temperature	-20		+70	°C
Stock temperature	-40		+100	°C
Size with connectors		77x42x18		mm

Application Example for State Change Mode: The following diagram illustrates an application using the state change mode. The activation of a wireless pump requires knowledge of the status of certain level sensors to determine when to start and stop the motor.

Application Example for Remote Control Mode: The following diagram shows the possibility of installing an RX-2CH-LORA on an existing gate opener system, using power and a start contact for the automation board activation. Up to 100 devices, including remote controls and TX-2CHLORA units, can be associated, operating in parallel with the radio system integrated into the automation.
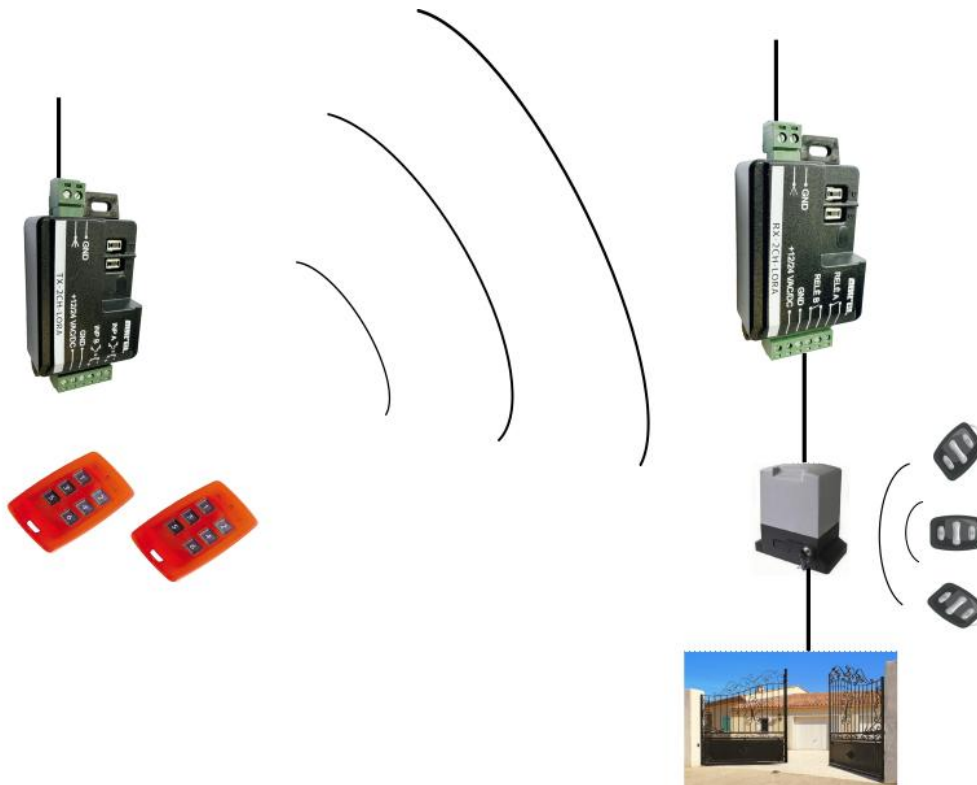
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Regulatory Standards

The device complies with the harmonized standards:
- EN 62479
- EN 62368-1
- EN 301 489-3
- EN 300 220-2 Receiver class: **2**

Regarding the electrical safety standard EN 62368-1, the device is considered a subassembly. It is under the responsibility of the assembler to incorporate the device as a component to ensure that the entire equipment is safe. The device is intended to be electrically connected to external circuits classified as ES1 and must be powered by an energy source (battery or power supply) classified as ES1 (Class 1 electrical energy source) in accordance with EN 62368-1 and equipped with protection against short circuits. The protection must be tested throughout the equipment.
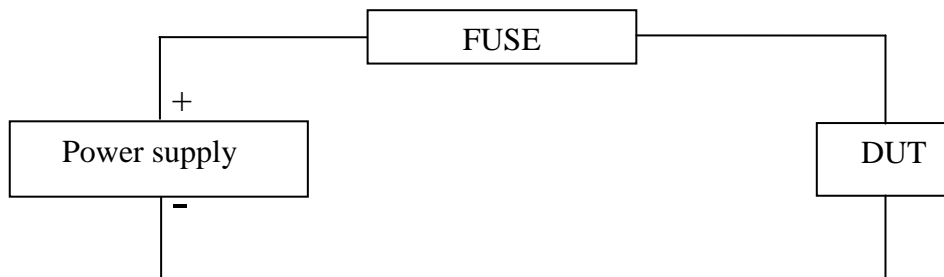
Example of short-circuit protection

Furthermore, EN 62368-1 requires that sealed secondary portable cells and batteries (other than button cells) containing alkaline or other non-acidic electrolytes must comply with IEC 62133.

Manufacturer's Declaration of Conformity EU

Hereby, Aurel S.p.A. declares that the radio equipment type TX-2CH-LORA is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address:
http://www.aurelwireless.com/declaration-of-conformity/

The device operates at 869.525MHz (ISM frequency band 869.4 - 869.6 MHz) with maximum radiated power of 20dBm.

The device is a "Class 1" radio equipment as defined in article 1(1) of European Commission Decision No. 2000/299/EC of 06/04/2000. Class 1 radio equipments can be placed on the market and be put into service without restrictions on all EU member states.
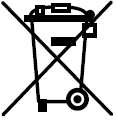
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Recommendation CEPT 70-03

The device operates in a harmonized frequency band and therefore, in order to comply with current regulations, the device must be used on the time scale with a maximum duty-cycle time of 10% (equivalent to 6 minutes usage on 60).

WEEE Marking

	Once the product life-span has expired, the product must be disposed of in a different way from other wastes. The user must to put the equipment at the collection points for electronic and electrical waste. Illegal disposing of this product, is punishable by law and will be dealt with according to the laws of the individual member nation of EU.

Release	Main changed	Date
1.0	First edition	31/10/2024
1.1	Replace apllication draw pag.5	17/07/2024
1.2	Change color led ack	24/07/2024

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