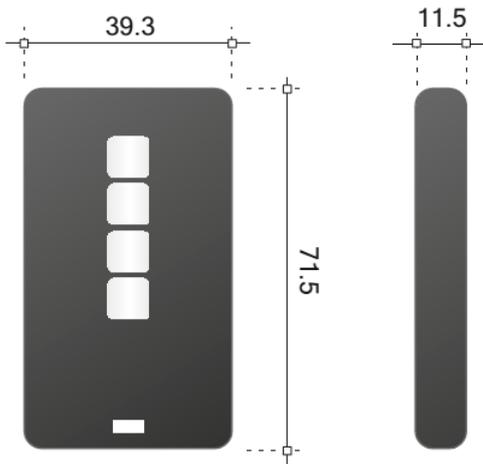# KEYFOB XTR-8LR-4ZN

Figure 1

Figure 2

Keyfob based on LoRa^{TM} modulation able to guarantee very long range communication, high interference immunity , very high sensitivity and very low current consumption.

XTR-8LR-4ZN, to be paired with Aurel receiver XTR-8LR-DEC, allows to activate remote loads connected to the receiver. It embeds a secure encrypted RF communication.

It's ideal when it has to activate and control loads at very long distance like, for example, in irrigation or alarms systems applications.

The bidirectional communication allows to know if the XTR-8LR-DEC output has been activated and his status.

Operation of the device

XTR-8LR-4ZN has a unique serial number therefore it always needs to be paired with Aurel XTR-8LR-DEC (decoder) module by means of learning procedure described in decoder user manual.

The device is always in power down mode and it has 2uA maximum current consumption.
When at least one button is pressed the device transmits, with an encrypted rolling code packet, the buttons status, the unique serial number, the battery level and an incremental counter.
The RF transmission carries on if at least one button is pressed.
The auto-shutoff function automatically stops the device from transmitting if a button inadvertently gets pressed for a long period of time. This will prevent the device from draining the battery if a button gets pressed while the transmitter is in a pocket or purse. Time-out period is approximately 5 seconds.

As described above the keyfob transmits the buttons status, the unique serial number, the battery level and the incremental counter.
The buttons status field in the RF packet is updated every time there is a change in buttons pressure.
The counter field in the RF packet is increased only before the first RF packet transmission after device wake up from power down mode.
We suppose, for example, that button 1 is pressed: the device sends RF packets with this button status information and a with counter of value "n". If, for example, button 2 is pressed too, the keyfob sends RF packets with information of button 1 and button 2 pressed and a counter with value "n".
See the XTR-8LR-DEC user manual for information about decoder outputs activation in case of more buttons pressed on keyfob.

When all buttons are released the RF transmission ends and the device goes in reception mode waiting for ACK packet from decoder. Then the device goes in power down mode.
If the XTR-8LR-DEC has received a valid data packet it sends an acknowledgment packet (ACK) to the keyfob indicating that the output of the decoder has been activated and his status.

The RGB led on the keyfob blinks during the RF packet transmission:
- if the battery level is ok (V>2.4V) the GREEN led blinks;
- if the battery level is low (V<2.4V) the RED led blinks.

If the keyfob receives the ACK packet from the decoder, the led blinks in a different way depending on the activated output status:
- if the output is MONOSTABLE the GREEN led will be ON for 600msec;
- if the output is BISTABLE and it has been DEACTIVATED the GREEN led blinks 3 times;
- if the output is BISTABLE and it has been ACTIVATED the RED led blinks 3 times;

If the last packet received from decoder has button status field with two or more buttons pressed, the decoder sends an ACK packet with a "warning information". In this case on the keyfob the RED led will be on for 600 msec.

During the ACK led blink the buttons pressures aren't handled. It is therefore necessary waiting for the end of ACK blinks before pressing again a button and restart the RF transmission.

Replacing the battery

The user should apply the following procedure:

1. Using the Phillips screwdriver, remove the accessible screw on the lower housing of the radio remote control.

2. Lift up the top cover of the remote control and then split the two half housing.

3. Pull out the transmitter circuit from the lower housing.

4. Pull out the battery.

5. Insert the new battery, taking care to check model (type CR2032) and polarity. The positive pole should be facing up as shown in Figures 3.

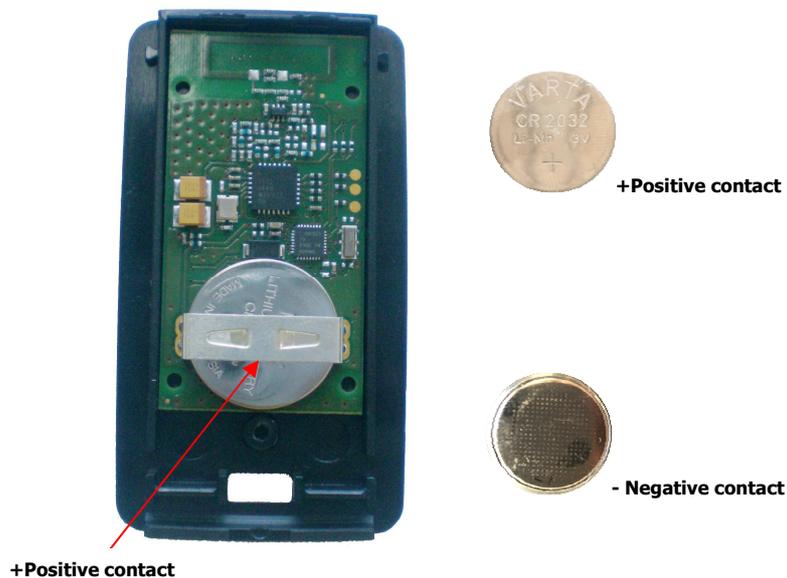**6.** Close the transmitter by repeating steps 1-2-3 in reverse way.

+Positive contact

- Negative contact

+Positive contact

Figure 3

Technical characteristics

DESCRIPTION	TYP	UNIT
Supply voltage	2,0 - 3,3	V
Supply current (PWDN mode)	< 2	uA
Supply current (TX mode)	45	mA
Supply current (RX mode)	16	mA
Modulation	LoRa^{TM}	
Receiver sensitivity	-126	dBm
ERP power	7	dBm
Line of sight coverage	8	Km
RF carrier frequency	868.30	MHz
European ISM band	868-868.6	MHz
Lithium 3V battery model	CR2032	
Operating temperature range	-20 +70	°C

Manufacturer's Declaration of Conformity EU

Hereby, Aurel S.p.A. declares that the radio equipment type XTR-8LR-4ZN 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 radio remote control operates at 868.3MHz (ISM frequency band 868 - 868.6 MHz) with maximum radiated power of 7dBm.
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.

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 1% (equivalent to 36 seconds usage on 60 minutes). Therefore, maximum 7 transmissions of 5 seconds per hour are allowed.

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.

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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Firmware version summary

Release date	Firmware version	Changes from the previous version
10/01/2017	0.4	First stable version
03/02/2017	0.5	Minor bugs fixed
10/04/2017	0.7	Minor bugs fixed
31/01/2018	1.0	Modified led blinks during transmission and added led blinks as feedback of the activated output status on the decoder.

User manual revision summary:

Release date	Revision user manual	Changes from the previous revision
26/01/2017	1.0	Preliminary
02/05/2017	2.0	First release
31/01/2018	3.0	Modified led blinks description in accordance with firmware version 1.0