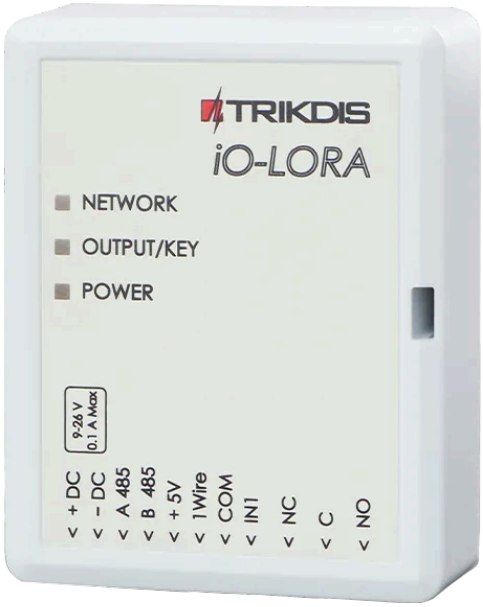
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iO-LORA wireless expander – installation and setup manual

Installation and setup manual for the Trikdis iO-LORA wireless expander: wiring the input, the relay output, the temperature sensor and the iButton reader, adding it to the FLEXi SP3 in TrikdisConfig, use with the GATOR gate controller, indicator lights, frequently asked questions.



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Always up-to-date web version: https://mobilamb.eu/io-lora-manual

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1. Overview

The **iO-LORA** wireless expander module was designed primarily for control tasks (opening garage doors, gates and barriers, starting pumps). Use it when something has to be controlled at a remote point and there is no cable run to that point from the FLEXi SP3 control panel.

This manual describes the **4F** (433 MHz) version; it does not cover the 8F (868 MHz) versions.

Together with the **RF-LORA** transceiver, the iO-LORA increases the number of inputs and outputs of the **FLEXi SP3** alarm control panel over a two-way radio link: it adds one input, whose type can be NC or NO, and one relay output (PGM), which can be switched on and off remotely and can therefore control various electrical devices. A temperature sensor and a touch key ("iButton") reader can be connected to its "1-Wire" bus. With a clear line of sight, the range is up to **5000 metres**.

The "up to … m" distances are theoretical maximums achievable under ideal conditions. In practice, the quality and routing of the cable, sources of interference and, for radio links, walls and terrain give a considerably shorter range. Plan with a margin, and on long runs check the connection during commissioning.

Looking for a standalone gate opener?

The **GV17 GATOR** gate controller works over GSM and mobile data, the **WP17 GATOR WiFi** over a WiFi network – both without an alarm control panel. iO-LORA expanders can be connected to both of them (section 4).

1.1 What does it work with?

The iO-LORA is compatible with the **FLEXi SP3** alarm control panel and with the **GATOR** (GV17, mobile network) and **GATOR WiFi** (WP17) gate and door controllers. It always connects through the **RF-LORA** transceiver: the RF-LORA is wired to the control panel or the gate controller over the RS485 bus, and it reaches the expander by radio.

How many iO-LORA modules can be connected:

- **FLEXi SP3:** up to **8 iO-LORA**. The 8 is the combined number of LoRa modules (iO-LORA, iO8-LORA, PB-LORA).
- **GV17 GATOR:** up to **8 iO-LORA**, with GATOR firmware version 2.13 or later.
- **WP17 GATOR WiFi:** up to **8 iO-LORA**, with WP17 firmware version 1.21 or later.

Wiring and setting up the RF-LORA is described in the RF-LORA manual. The transceiver in the shop:

Trikdis RF-LORA wireless expander module

1.2 Technical data

Property	Value
Frequency	433.3–434.7 MHz (4F version)
Modulation	LoRa
Supply voltage	9–26 V DC

Property	Value
Current consumption	up to 50 mA in standby · up to 100 mA briefly, while transmitting
Message encryption	yes
Range in open space	up to 5000 m
Input	1, selectable type: NC, NO
Output	1 relay, 250 V AC, 4 A
Temperature sensor	1, Maxim®/Dallas® DS18S20 or DS18B20
Operating environment	−20 °C … +50 °C, relative humidity up to 80% (at +20 °C)
Dimensions	62 × 77 × 25 mm
Weight	80 g

The product comes with a standard antenna that is suitable for most applications. If a good-quality link is needed over the greatest possible distance, use a higher-gain antenna (**AX-ANT-KIT**). It is also available in the shop:

RF-LORA large Antenna Meteor 433MHz

1.3 Parts

The indicator lights, controls and terminals of the iO-LORA on the enclosure and on the printed circuit board:



Figure 1. Parts of the iO-LORA – on the left the closed enclosure, on the right the printed circuit board without the cover.

- 1 indicator lights (**NETWORK**, **OUTPUT**, **POWER**)
- 2 opening slot of the cover
- 3 terminal block for the external connections
- 4 **SW2** button – pairing the expander and checking the link
- 5 **SW1** DIP switch

The two switches of the **SW1** DIP switch:

- **Switch 1 – radio channel:** OFF = RF1, ON = RF2. Change it if the current channel is heavily loaded.
- **Switch 2 – modulation:** OFF = fast, ON = slow. In the ON position the range roughly doubles, depending on the environment, but the system reacts more slowly; if the link is also good in the OFF position, use that.

The switch positions must match

The **SW1** DIP switch of the iO-LORA and the **SW** DIP switch of the RF-LORA must be in the same position, otherwise there is no radio link.

1.4 Terminals

Terminal	Function
+DC	power supply, positive (9–26 V DC)
–DC	power supply, negative
D0, **D1**	not used with the FLEXi SP3 (a Wiegand reader does not work with the FLEXi SP3); with the GATOR gate controller, the data wires of the Wiegand reader are connected here (section 4)
+5V	5 V supply output for the devices connected to the "1-Wire" bus (up to 0.2 A)
1Wire / OUT wgd	"1-Wire" data bus ("OUT wgd" is not used)
COM	common negative terminal
IN1	input, selectable type: NO or NC (NO by default)
NC	normally closed contact of the relay
C	common contact of the relay
NO	normally open contact of the relay

1.5 Indicator lights

Indicator	State	Meaning
NETWORK	off	no radio signal
NETWORK	flashing green	the radio signal level (0–10); level 4 is already sufficient
OUTPUT/KEY	steady green	the relay output is on
OUTPUT/KEY	steady yellow	Dallas touch key ("iButton") activated
POWER	off	no power supply
POWER	flashing green	normal supply voltage
POWER	flashing yellow	low supply voltage (up to 11.5 V)

2. Mounting and wiring

Figyelem!

Tilos a vezetékezést feszültség alatt álló eszközön elvégezni. A munka előtt a megfelelő áramtalanításról és érintésvédelemről (beleértve a szünetmentes működést biztosító akkumulátorokat) gondoskodni kell.

2.1 Mounting

1. Remove the cover.
2. Take out the printed circuit board.
3. Fix the bottom of the enclosure in the desired place with screws.
4. Put the circuit board back.
5. Close the cover.

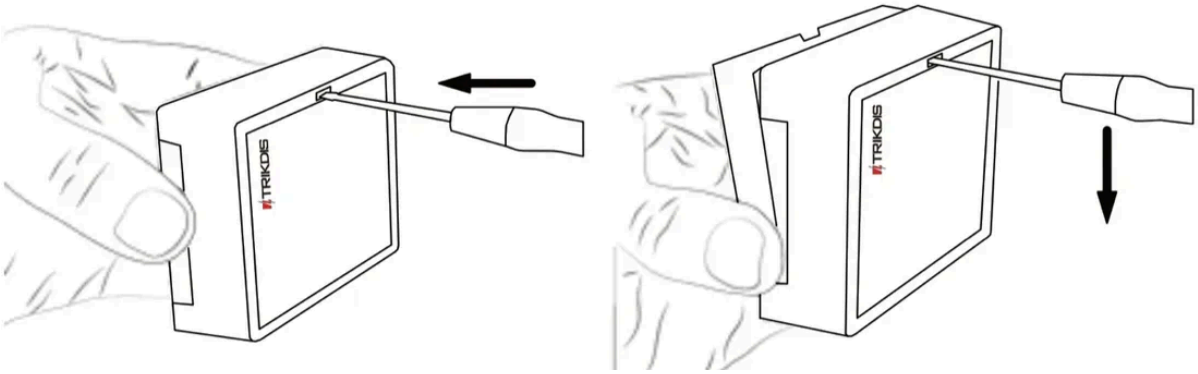


Figure 2. Removing the cover: insert the screwdriver into the slot on the side of the enclosure (left), then push its handle down to snap the cover off (right).

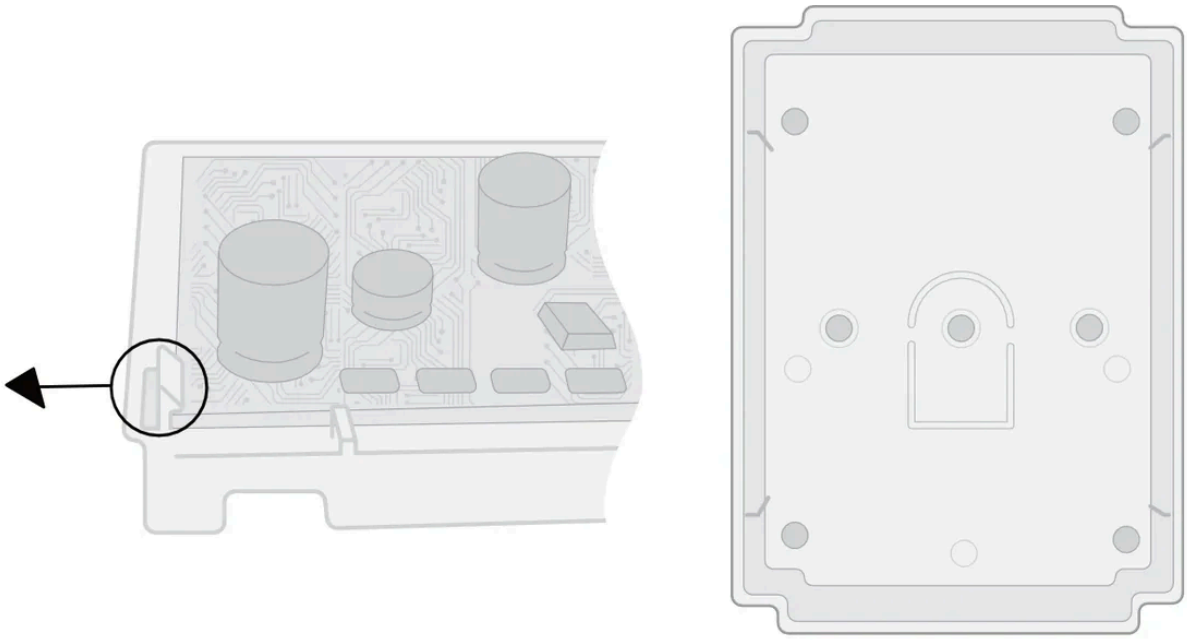


Figure 3. Left: the circuit board is held by a retaining tab at the edge of the enclosure – bending it in the direction of the arrow releases the board. Right: the bottom of the enclosure with the holes for the fixing screws.

2.2 Power supply

The iO-LORA is powered at its own location from a separate power supply (9–26 V DC): connect the **+** pole of the power supply to the **+DC** terminal and its **0 V** pole to the **–DC** terminal. The drawing shows a 12 V power supply.

2.3 Wiring the input

The type of the single input (**IN1**) of the iO-LORA can be NC or NO (NO by default). Connect the contact of the detector or the switch between the **IN1** and **COM** terminals.



Figure 4. Left a normally open (**NO**, "Normally open") contact, right a normally closed (**NC**, "Normally closed") contact between the **IN** and **COM** terminals.

2.4 Wiring a temperature sensor

One Maxim®/Dallas® **DS18S20** or **DS18B20** temperature sensor can be connected to the iO-LORA, as shown in the drawing below. If you connect the sensor with a wire longer than 0.5 m, use twisted-pair cable (UTP4x2x0.5 or STP4x2x0.5). The **+5V** terminal of the board supplies 5 V DC to the devices connected to the "1-Wire" data bus.

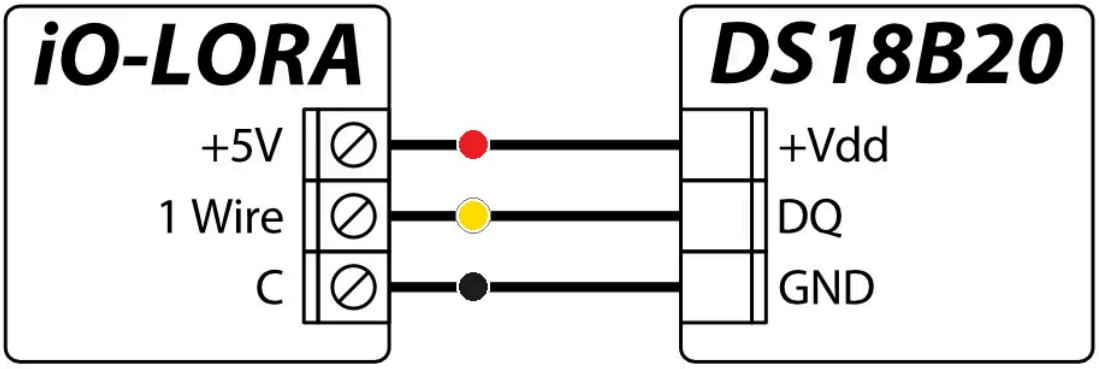


Figure 5. Wiring the DS18B20 temperature sensor ("Temperature sensor"): red wire ("Red") **+5V** → **+Vdd**, yellow ("Yellow") **1 Wire** → **DQ**, black ("Black") → **GND**. The terminal of the black wire is marked "C" on the drawing; according to the drawing in 2.6 and the terminal table (1.4), this is **COM**, the common negative terminal.

- red wire ("Red")
- yellow wire ("Yellow")
- black wire ("Black")

The **+5V** output supplies up to 0.2 A and is protected against overload: if the load exceeds the permitted value, the output switches off automatically. The FLEXi SP3 automatically detects and assigns the connected temperature sensor (section 3, **Sensors**).

The sensor available in the shop:

DS18B20 temperature sensor with 1m wire

2.5 Wiring the CZ-Dallas reader

The **CZ-Dallas** iButton key reader connects to the iO-LORA over the "1-Wire" data bus. The wires connected to the data bus may be up to 30 m long.

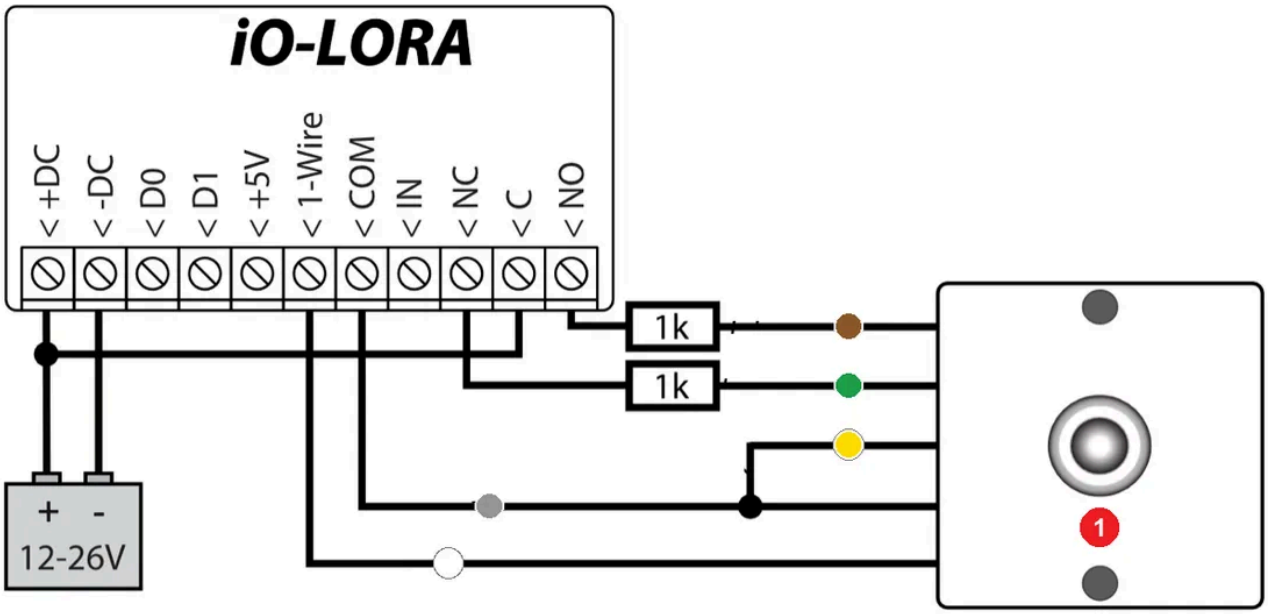


Figure 6. Wiring the CZ-Dallas reader ("CZ-Dallas reader"): power supply (12–26 V) **+** pole → **+DC**, **–** pole → **–DC**; white wire ("White wire") → **1-Wire**, up to 30 m ("1-Wire connection up to 30 m"); gray wire ("Gray wire") and the yellow one ("Yellow wire", **LED–**) → **COM**; the **C** terminal of the relay connected to **+DC**; **NO** → 1 kΩ → brown wire ("Brown wire", **RED LED+**), **NC** → 1 kΩ → green wire ("Green wire", **Green LED+**). The xOUT output must be set to the **System State** type ("The output xOUT must be set to the »System State« type.") – with the alarm armed, the light of the iButton reader is red ("Security alarm is on - the iButton reader light is red."), with the alarm disarmed it is green ("The security alarm is off - the iButton reader light is green.").

- 1 CZ-Dallas iButton reader ("CZ-Dallas reader")
- brown wire, RED LED+ ("Brown wire", "RED LED+") – the red light
- green wire, Green LED+ ("Green wire", "Green LED+") – the green light
- yellow wire, LED– ("Yellow wire", "LED-")
- gray wire ("Gray wire")
- white wire ("White wire")

The "up to … m" distances are theoretical maximums achievable under ideal conditions. In practice, the quality and routing of the cable, sources of interference and, for radio links, walls and terrain give a considerably shorter range. Plan with a margin, and on long runs check the connection during commissioning.

The reader and key available in the shop:

Trikdis iButton electronic key reader | **iButton Key Tag DS1990A**

2.6 The iO-LORA expanders in the system

The iO-LORA expanders connect to the control panel by radio, through the RF-LORA transceiver connected to the FLEXi SP3:

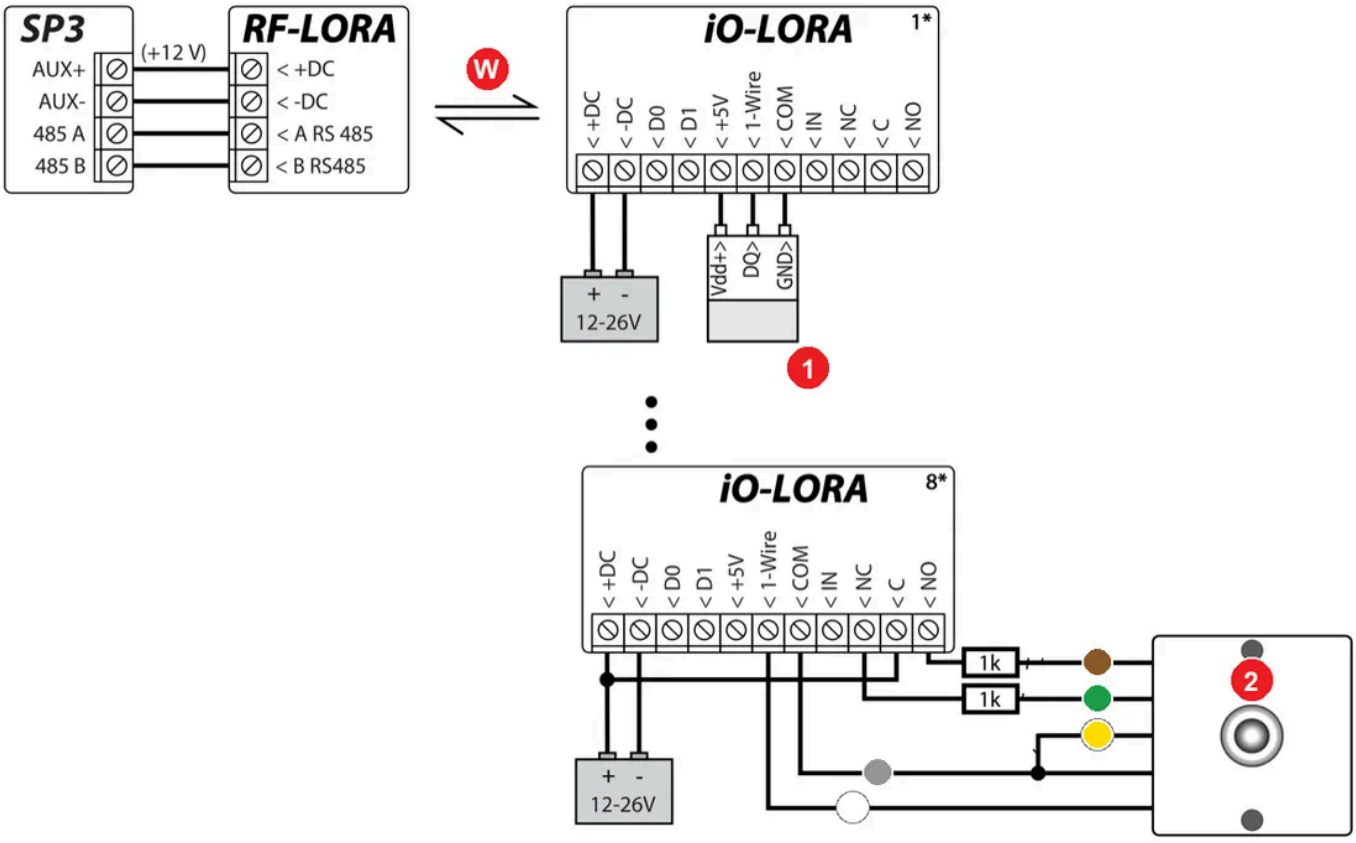


Figure 7. FLEXi SP3 – RF-LORA – iO-LORA expanders. SP3 **AUX+** (+12 V) → RF-LORA **+DC**, **AUX–** → **–DC**, **485 A** → **A RS 485**, **485 B** → **B RS485**. The RF-LORA reaches the iO-LORA expanders (1* … 8*) by radio ("Wireless connection", up to 5000 m); each of them gets its own 12–26 V supply on its **+DC** and **–DC** terminals. On expander 1 a temperature sensor ("Temperature sensor: DS18B20 or DS18S20"): **+5V** → Vdd+, **1-Wire** → DQ, **COM** → GND. On expander 8 a CZ-Dallas reader, as in the drawing in 2.5: the xOUT output must be set to the **System State** type ("The output xOUT must be set to the »System State« type.") – with the alarm armed, the light of the iButton reader is red ("Security alarm is on - the iButton reader light is red."), with the alarm disarmed it is green ("The security alarm is off - the iButton reader light is green."); the 1-Wire connection is up to 30 m ("1-Wire connection up to 30 m").

- 1 temperature sensor, DS18B20 or DS18S20 ("Temperature sensor: DS18B20 or DS18S20")
- W wireless connection ("Wireless connection"), up to 5000 m ("up to 5000 m")
- 2 CZ-Dallas iButton reader ("CZ-Dallas reader")
- brown wire, RED LED+ ("Brown wire", "RED LED+") – the red light
- green wire, Green LED+ ("Green wire", "Green LED+") – the green light
- yellow wire, LED– ("Yellow wire", "LED-")
- gray wire ("Gray wire")
- white wire ("White wire")

The “up to … m” distances are theoretical maximums achievable under ideal conditions. In practice, the quality and routing of the cable, sources of interference and, for radio links, walls and terrain give a considerably shorter range. Plan with a margin, and on long runs check the connection during commissioning.

Note

- An RF-LORA transceiver must be connected to the FLEXi SP3 first; after that, up to 8 iO-LORA expanders can be connected to it.
- It is recommended to connect the temperature sensor with twisted-pair cable (UTP4x2x0.5 or STP4x2x0.5).
- The CZ-Dallas iButton key reader and the temperature sensor must be connected to the "1-Wire" bus.

3. Setup with the FLEXi SP3

You add and set up the iO-LORA expander in the TrikdisConfig settings of the FLEXi SP3.

Az összes Trikdis eszköz egy közös szoftverrel programozható. A program neve TrikdisConfig és a gyártó honlapjáról letölthető.

TrikdisConfig Letöltés a trikdis.com oldalról.

Letöltést követően telepítsd a programot. Ha bármikor a TrikdisConfig indításakor a program azt jelzi, hogy új verzió jelent meg, töltsd le az ajánlott frissítést és telepítsd!

1. The RF-LORA transceiver must be connected to the FLEXi SP3 (2.6).
2. Switch on the power supply of the FLEXi SP3.
3. Switch on the power of the iO-LORA expander.
4. Start TrikdisConfig.
5. Connect the FLEXi SP3 to the computer with a USB Mini-B cable, or connect to it remotely.
6. Press the **Read [F4]** button: the program reads the settings of the control panel. If the program asks for it, enter the six-character administrator code.
7. In the **Modules** list, select the **iO-LORA expander** item.
8. Enter the serial number of the iO-LORA in the **Serial No.** field.

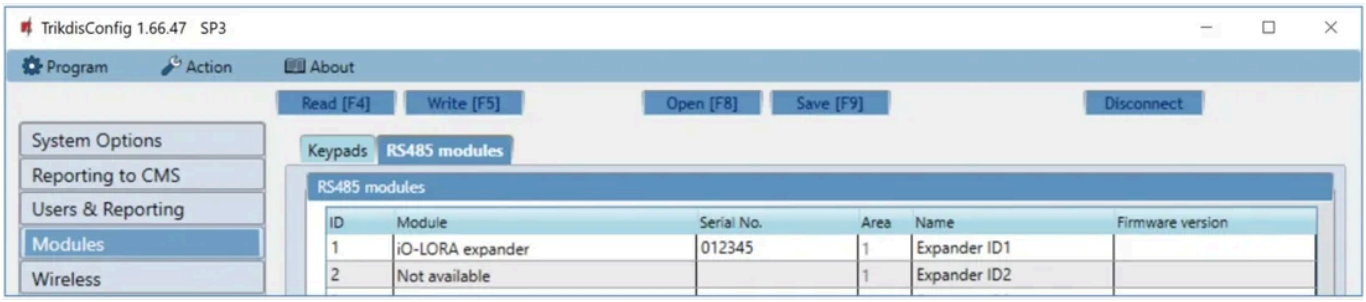


Figure 8. TrikdisConfig – FLEXi SP3, **Modules** → **RS485 modules**: in row 1 the **iO-LORA expander** with its serial number (**Serial No.**), partition (**Area**) and name (**Name**: Expander ID1).

9. On the **Zones** page, set up the input of the expander: in the **Input** list of the zone it appears as **RS485 Expander ID1, IN1**.

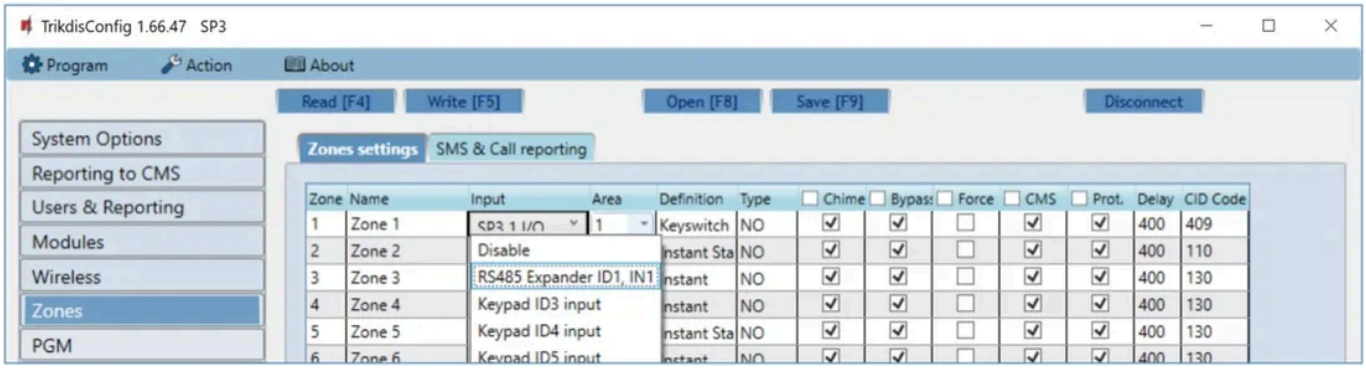


Figure 9. Zones → **Zones settings**: in the **Input** list of the zone the **RS485 Expander ID1, IN1** – the input of the iO-LORA; in the row the partition (**Area**), the zone function (**Definition**), the type (**Type**) and the reporting settings.

10. On the **PGM** page, set up the output of the expander: in the **PGM output** list it appears as **RS485 Expander ID1, OUT1**.

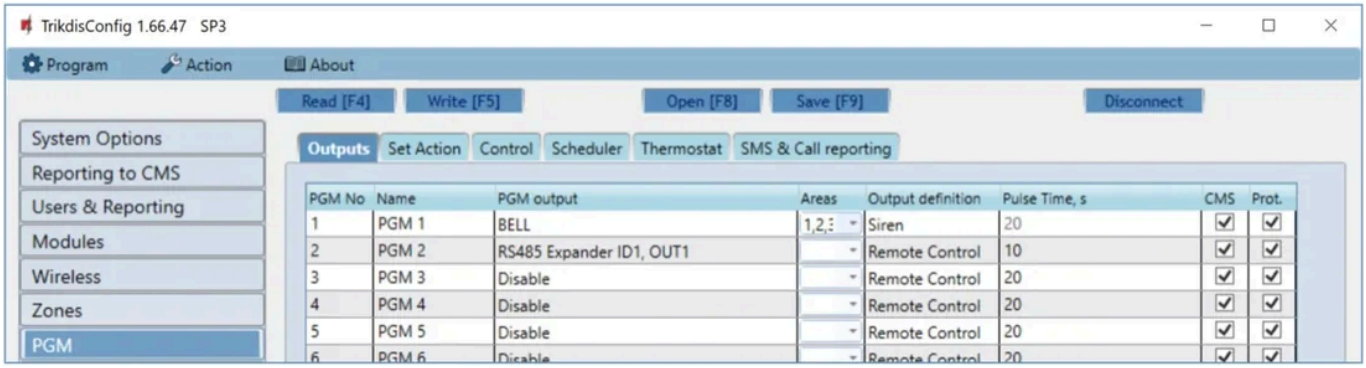


Figure 10. PGM → Outputs: the output of PGM 2 is **RS485 Expander ID1, OUT1** (the relay of the iO-LORA), with the **Remote Control** output function (**Output definition**) and a pulse time of 10 s (**Pulse Time**).

11. If you connected a temperature sensor to the expander, it appears in the **Sensors** list.

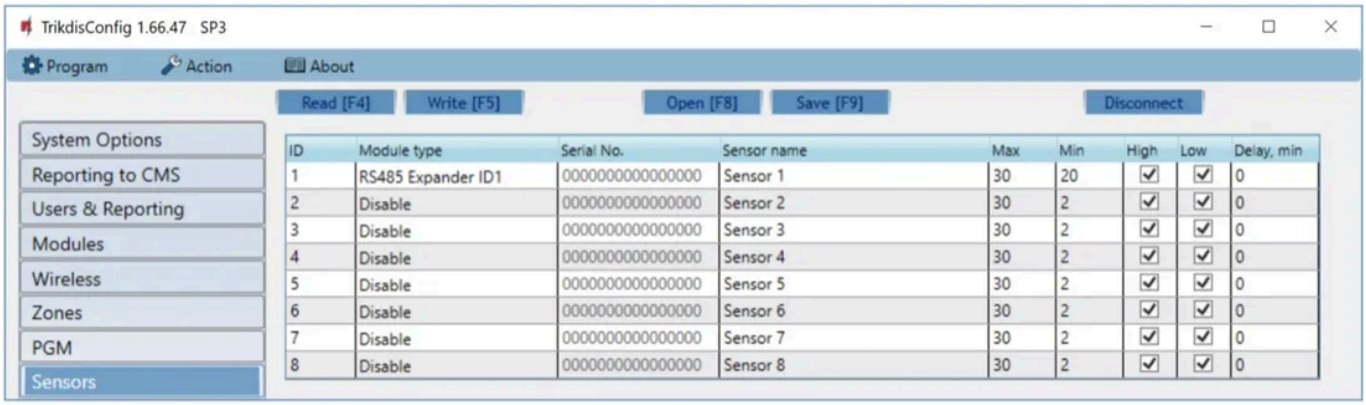


Figure 11. Sensors: the module (**Module type**) of sensor 1 is **RS485 Expander ID1**; next to it the serial number (**Serial No.**), the name (**Sensor name**), the upper and lower limit (**Max**, **Min**: above or below this temperature an event is generated, if **High** or **Low** is ticked) and the delay in minutes (**Delay, min**). In the example Max 30, Min 20, High and Low ticked, delay 0.

The fields of the **Sensors** window are described in section 6.9 of the "FLEXi" SP3 alarm control panel – installation and programming manual.

12. At the end of the setup, press the **Write [F5]** button.
13. Wait until writing is finished.
14. Press the **Disconnect** button and unplug the USB cable.

Warning

While the device is connected to a computer via USB cable, it is in programming mode: its normal operation stops, it does not monitor, does not report, cannot be controlled, is powered from USB, and restarts once the cable is unplugged. Therefore the device must not be freely accessible: keep it in a closed metal enclosure with tamper protection or with a motion detector covering the enclosure. More in the FAQ

4. Use with the GATOR gate controller

Up to **8 iO-LORA** expanders can be connected through the RF-LORA transceiver to the **GV17 GATOR** (from firmware 2.13) and the **WP17 GATOR WiFi** (from firmware 1.21) gate controllers. Each iO-LORA adds one input and one relay output to the gate controller, and its own Wiegand 26/34 RFID reader can be connected to it: the reader switches **only the relay output of its own expander**, not a remote output. This way several

gates or barriers far apart from each other can be controlled with one gate controller, each with its own card reader and exit button – the details of the solution: Flexible wireless access control with the GATOR RF-LoRa system.

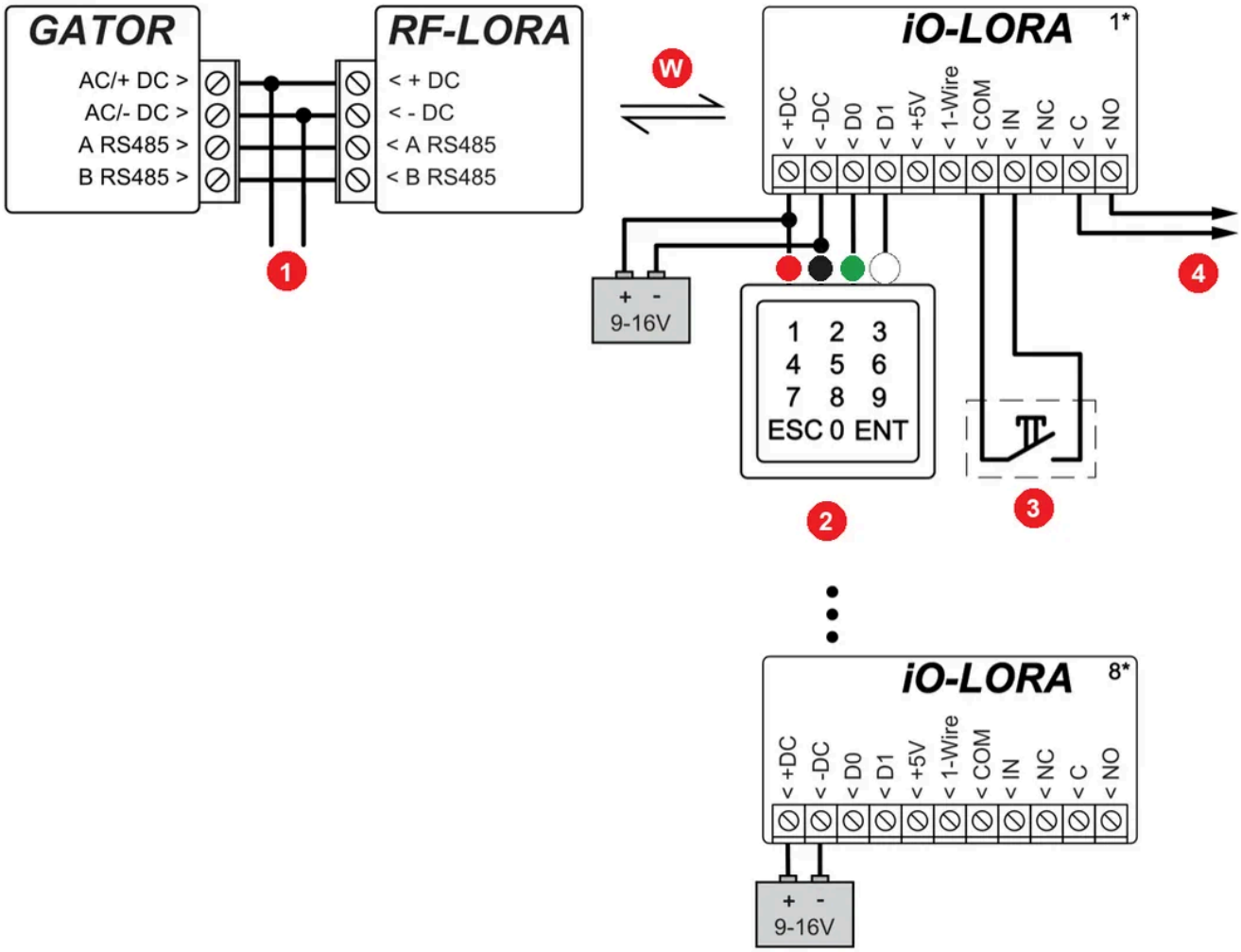


Figure 12. RF-LORA transceiver on the GATOR and iO-LORA expanders with an RFID reader (GV17 drawing; the same applies to the WP17): a shared 9–16 V DC, 0.5 A supply for the GATOR and the RF-LORA (AC/+DC – +DC, AC/−DC – −DC); RS485: A–A, B–B; radio link between the RF-LORA and the iO-LORA 1…8 expanders, up to 5000 m; each iO-LORA gets its own 9–16 V supply; the reader on the iO-LORA: red (+U) to the **+DC**, black (GND) to the **–DC**, green to the **D0**, white to the **D1** terminal; exit push button between the **COM** and **IN** terminals of the iO-LORA; the gate opener on the **C** and **NO** contacts of the iO-LORA relay (2 A / 230 V AC).

- 1 DC power supply ("DC power supply"), 9–16 V, 0.5 A
- W wireless connection ("Wireless connection"), up to 5000 m ("up to 5000 m")
- 2 RFID reader with keypad, Wiegand 26/34 ("RFID reader with keypad (Wiegand 26/34)")
- 3 exit push button ("»Exit« button")
- 4 gate control ("Gate control") – the control input of the gate opener; the load capacity of the iO-LORA relay is 2 A / 230 V AC
- red wire, +U ("R - red (+U)")
- black wire, GND ("B - black (GND)")
- green wire, D0 ("G - green (D0)")
- white wire, D1 ("W - white (D1)")

The "up to … m" distances are theoretical maximums achievable under ideal conditions. In practice, the quality and routing of the cable, sources of interference and, for radio links, walls and terrain give a considerably shorter range. Plan with a margin, and on long runs check the connection during commissioning.

The essence of the setup in TrikdisConfig:

1. On the **Modules** page of the gate controller, select the **iO-LORA controller** item from the list, and enter the six-digit serial number of the expander (on the expander's label) in the **Serial No.** field. The RF-LORA does not have to be added separately.
2. For each added iO-LORA expander, one input and one output appear in the list on the **IN/OUT** page. Set the function of the input to **Exit button** (the exit button connected to the IN and COM terminals of the expander): when it is pressed, the relay of the expander switches on for the set pulse time. The type of the output is **Pulse**, with the pulse time suited to the gate opener.
3. On the **User list** page, add the users with the number of their RFID card (with a code reader, with the code), and mark which output they may control.

The steps are described with screenshots in section 3.9 of the GV17 manual and section 3.7 of the WP17 manual; on the WP17, the **Wiegand reader mode** checkbox on the **IN/OUT** page must also be ticked.

5. Frequently asked questions

There is no radio link with the RF-LORA – what should I check?

1. Whether both switches of the **SW1** DIP switch of the iO-LORA and of the **SW** DIP switch of the RF-LORA are in the same position (1.3) – if the positions differ, there is no radio link.
2. Whether the expander is powered (the **POWER** light flashes green), and whether its serial number is correct in the **Modules** list (sections 3 and 4).
3. The radio signal level is shown by the green flashing of the **NETWORK** light (0–10); level 4 is already sufficient.
4. With a weak signal, set switch 2 to ON (slow modulation) on the RF-LORA and on all LoRa modules, or use a higher-gain antenna (1.2).

The POWER light flashes yellow

The supply voltage is low (up to 11.5 V): check the power supply – the iO-LORA works from 9–26 V DC.

How many temperature sensors can be connected to one iO-LORA?

One Maxim®/Dallas® DS18S20 or DS18B20 sensor, on the "1-Wire" bus (2.4). For a wire longer than 0.5 m use twisted-pair cable; the FLEXi SP3 detects the sensor automatically, and it appears in the **Sensors** list (section 3).

What is the SW2 button for?

For pairing the expander and checking the link. To the FLEXi SP3 and to the GATOR, you add the iO-LORA with its serial number in the **Modules** list of TrikdisConfig (sections 3 and 4).

Which switch position should I choose?

By default, fast modulation (switch 2 OFF). If there is no reliable link because of the distance, slow modulation (ON) roughly doubles the range, depending on the environment, but the system reacts more slowly. Change the channel (switch 1) if the current channel is heavily loaded. Whichever one you change, set it the same way on the RF-LORA and on every LoRa module.

6. Safety instructions

Figyelem!

Az elektromosság veszélyes! Személyi sérülést vagy HALÁLT, valamint anyagi kárt okozhat!

A telepítés során elektromos berendezéssel történik munkavégzés, amit az érvényes erős- és gyengeáramú rendelkezések betartásával kell kivitelezni!

A garancia (jótállás) érvényesítésének is feltétele, hogy az eszközt szakképzett személy telepítse az elektromos berendezések telepítésére vonatkozó előírások betartásával és az elektromos berendezések biztonságos üzemeltetésére vonatkozó hatályos előírásokat követve.

- The iO-LORA expander may only be installed and maintained by a qualified person.
- Before installation, read this manual carefully to avoid mistakes that can lead to malfunction or even damage to the equipment.
- Disconnect the power supply before making any connection.
- Changes, modifications or repairs not authorized by the manufacturer void the warranty.
- Do not throw the device and its parts in household waste: follow the local waste sorting regulations.

See also

- RF-LORA wireless transceiver – installation and setup manual – wiring, DIP switch and indicator lights of the transceiver.
- "FLEXi" SP3 alarm control panel – installation and programming manual – wiring and setting up the control panel, including the temperature sensors (**Sensors**, 6.9).
- GV17 GATOR gate controller – installation and programming manual (3.9) and WP17 GATOR WiFi gate controller – installation and programming manual (3.7) – the iO-LORA expanders with an RFID reader, step by step.
- Flexible wireless access control with the GATOR RF-LoRa system – several gates wirelessly with one GATOR.
- Trikdis documentation: docs.trikdis.com – iO-LORA Wireless Expander.

Related products

Trikdis IO-LORA wireless expander module **Trikdis RF-LORA wireless expander module**
RF-LORA large Antenna Meteor 433MHz **DS18B20 temperature sensor with 1m wire**
Trikdis iButton electronic key reader **iButton Key Tag DS1990A**

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