

RY-FL Wireless Input / Output Module

RYFL is a wireless locally powered 230 Vac transmitter using 868.30 MHz frequency and FSK modulation. It is for providing building automation measurements and controls wirelessly.

RYFL can control two inputs and outputs. Individual input is possible to set 0-10 V or potential free. For instance 0-10 V transmitter can be used with 24 Vac auxiliary supply.

Individual output can be selected between 0-10 V (and PWM) or 230 Vac relay. There is a two-way communication between transmitters and the base station. RYFL transmits the signals to the FLTA every 6 s.

Each wireless transmitter, repeater and base station needs to have a unique address. Each transmitter address consists of two parts; SID (sensor ID) and MID (master / base station ID). These addresses will be configured wirelessly by using FLSER service tool.

The transmission area can be extended by using FLREP repeaters between transmitters and the FLTA base station.



Model Type	Model	Description
	RY-FL	Wireless Input / Output Module, 230Vac Power Supply
	RY-FL-24	Wireless Input / Output Module, 24Vac Power Supply
Technical Data	Power Supply	230Vac 12VA
	Frequency	868.30 Mhz
	Modulation	FSK
	Range	Line of sight: Up to 500m In buildings up to 20..100m depending on wall structures Range can be extended up to 2 times with FLREP repeaters
	Transmission Power	+8 dBm
	Reception Sensitivity	-109 dBm
	Addressing	Via FLSER Service Tool
	Inputs (2 configurable)	Analogue, 0..10Vdc Digital, Potential Free
	Outputs (2 configurable)	Relay, 250Vac, 10A Analogue, 0..10Vdc Auxiliary Supply, 24Vac Triac (PWM), 24Vac, 1A, seq., 20 s.
	Input / Output Accuracy	+/- 0.5 %
	Ambient Temperature	-40 .. + 50 degC
	Ambient Humidity	0..100% rH Non-Condensing
	Enclosure	IP20 ABS Plastics
	Dimensions	W150 x H210 x D110mm
		NOTE: RY-FL requires FLTA version 2.2 or later and FLSER service tool version 2.2 or later.

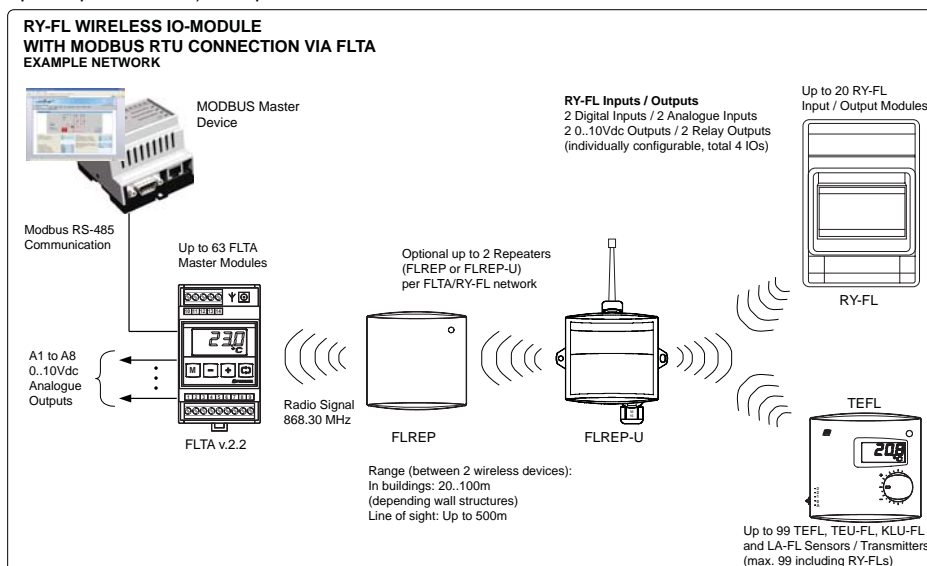
RY-FL Communication

As the communication is bi-directional all the time, is also the transmitter aware of the function of the network. The wireless devices are able to inform about the problems in the network and about the needed service to the FLTA network masters. For example the RY-FL is alarming when the signal has been lost over an hour, and the device turns its outputs off. Output voltage is set 0 V and PWM is 0 V.

RY-FL Network / Wireless System Overview

The diagram below illustrates the typical wireless network when RY-FL input / output devices are used in the system. RY-FL I/O-modules is continuously communicating over the wireless network to the FLTA master (version 2.2 or later) and the FLTA is sending the output commands to the RY-FL input/output module.

When FLTA receivers are used with any wireless sensor or transmitter (e.g. TEFL, TEU-FL, LA-FL and KLU-FL), each FLTA network can have up to 99 sensors/transmitters and up to 8 FL-REP repeaters/signal boosters. In the RY-FL network due to extended network messaging the maximum number of FL-REP repeaters is limited to 2 and the maximum number of RY-FL input / output modules to 20 per network. The system can still have up to 99 sensors / transmitters (including RY-FL input/output modules) as a part of the solution.



MAXIMUM WIRELESS SYSTEM SIZE PER NETWORK (WITH RY-FL I/O MODULES)

- No. of Devices Up to 99 (including TEFL, KLU-FL, TEU-FL and LA-FL)
- No of RY-FL Modules Max. 20
- No. of Repelaters Max 2 when RY-FL modules are used (otherwise 8)

Maximum number of FLTA networks is 63. Therefore in a larger installation it is possible to have maximum of 20 x 63 = 1,260 RY-FL wireless I/O modules.

NOTE: RY-FL requires FLTA version 2.2 or later and FLSER service tool version 2.2 or later.

RY-FL Modbus Communication

The RY-FL wireless input/output modules communicate via 868 Mhz radio signal to the FLTA network master. A FLTA network master has 8 x 0..10Vdc outputs that can be used to represent the RY-FL measurements. The FLTA network masters have also built-in Modbus RTU communication that provides the intelligent interface to read the wireless measurements and to control the RY-FL output signals.

Example. The table below illustrates typical Modbus parameters available via FLTA for RY-FL with device address 1 (RY-FL address set to 1 a t the commissioning).

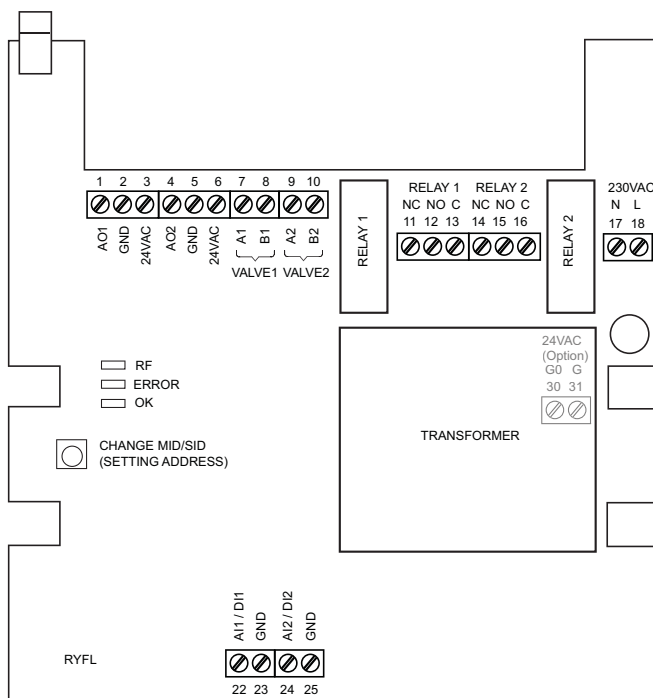
Register	Parameter Description	Modbus Function Code	Data Type	Range
10301	Device 1 Digital Input 1 (DI1) Status	02 - Read Discrete Inputs	Bit	On - Off
10401	Device 1 Digital Input 2 (DI2) Status	02 - Read Discrete Inputs	Bit	On - Off
30248	Device 1 Analogue Input 1	04 - Read Input Registers	Signed 16	0..100%
30249	Device 1 Analogue Input 2	04 - Read Input Registers	Signed 16	0..100%
1	Device 1 Digital Output 1 (DO1) - See Note	05 - Write Single Coil	Bit0	On - Off
2	Device 1 Digital Output 2 (DO2) - See Note	05 - Write Single Coil	Bit1	On - Off
40050	Device 1 Analogue Output 1 (AO1) - See Note	06 - Write Holding Registers	Signed 16	0..100%
40051	Device 1 Analogue Output 2 (AO2) - See Note	06 - Write Holding Registers	Signed 16	0..100%

Note: If Digital Output register is enabled (ON), then the corresponding channel analogue output is disabled (it is only possible use digital output or analogue output on a RY-FL channel, not both).

For full listing of the available FLTA Modbus commands please consult the FLTA Modbus Communication User Guide.

RY-FL Wiring

The diagram below illustrates the wiring details for the RY-FL device. Each RY-FL can be configured to receive 2 input signals and control two output signals. The selection / configuration is done using FLSER (ver 2.2 or later) service tool.



An example configuration (configurable via FLSER ver 2.2 or later):-

Input 1:Used as AI1 0..10Vdc to measure CO2 content

Input 2:Used as DI2 signal to monitor the window contacts

Output 1: Used as Relay 1 to drive the window open.

Output 2: Used as AO2 0..10Vdc control signal to drive a damper actuator.

NOTE: Both inputs and outputs are individually configurable for the required operation. Output configuration is done automatically via Modbus messaging.

RY-FL Addressing

Each wireless I/O-module, transmitter, repeater and F LTA control module/receiver (ver. 2.2 or later) needs to have unique address. Wireless transmitter address consists of two parts; SID (Sensor ID) and MID (Master ID). The I/O-module address is configured using FLSER service tool. MID is the address of FLTA control module/receiver. Typically MID is set to one in a single FLTA network.

Example (single network, two devices):

Device 1: RY-FL IO-Module Address: SID (RYFL ID) = 1, MID = 1

Device 2: TEU-FL Address: SID = 2, MID =1

Master 1: FLTA Address: MID = 1

RY-FL and TEU-FL have MID address 1. This means that they are transmitting measurements/receiving output commands to FLTA that has been addressed with the same MID.

Example (two networks, two devices):

Device 1: RY-FL Address: SID (RYFL ID) = 1, MID =1

Device 2: RY-FL Address: SID (RYFL ID) = 1, MID =2

Master 1: FLTA Address: MID = 1

Master 2: FLTA Address: MID = 2

Device 1 transmits the measurements/receives commands to/from Master 1 (FLTA), and Device 2 transmits the measurements/receives commands to/from to Master 2. Although the both devices have the same SID this will not cause problems as MID is different.

RY-FL Commissioning

RY-FL input/output module operates at 868.30Mhz frequency providing wireless communication module to automation systems. The device uses the latest RF technology for efficient data transmission. Each RY-FL has two inputs that can be configured with the FLSER (ver 2.2 or later) service to operate as a digital input or analogue 0..10Vdc input.

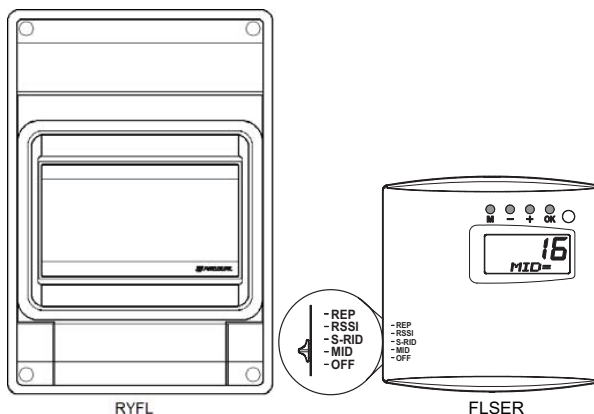
With RY-FL module controls also two outputs, that can be 0..10Vdc (and PWM) or 230Vac relay outputs (individually configurable). RY-FL has two 0..10Vdc analogue outputs that operate in parallel with 24Vac PWM outputs for thermic actuators.

RY-FL devices are configured using FLSER service tool (ver 2.2 or later) .

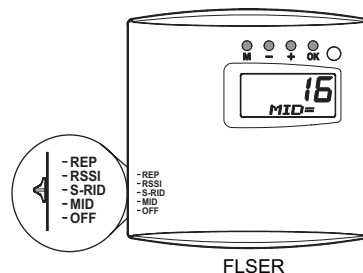
CONFIGURING RY-FL

1. Select MID position on the FLSER service tool. Select using +/- buttons the required Master ID (MID 1..63).

Note: Typically the master ID is set as 1 if only one wireless TEFL/Ry-FL network exists in the building.



2. Please select S-RID on the FLSER service tool switch.



3. Press M button on the FLSER service tool once to display RYFL on the screen. This screen is used to configure the RY-FL address and the inputs of the RY-FL.

- Select RY-FL address by pressing + and - buttons.

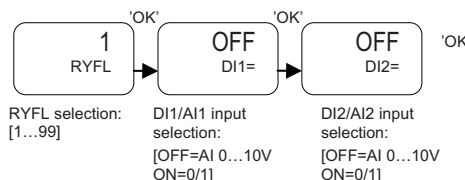
- Press OK to configure the first input

(DI1 = ON --> First wireless channel is configured to be used s digital input)

(DI1 = OFF --> First wireless channel is configured to be used as analogue output 0..10Vdc)

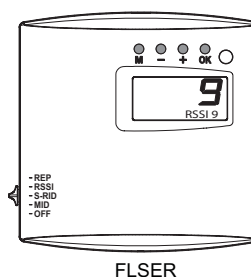
- Press OK to configure the second input as the first input.

- Finally press OK button after which the "WAIT" text starts to flash for 30 seconds on the FLSER service tool. Bring the FLSER service tool close to the RY-FL.



4. The RY-FL is configured to the network by pressing the SETTING ADDRESS button on the printed circuit board during the time when the FLSER flashed "WAIT". Once the RY-FL has been succesfully addressed the LEDs on the RY-FL and FLSER flash in sequence for 5 times, and the FLSER display shows OK. The RY-FL is now operational.

5. The FLSER service tool now shows the signal strength from the RY-FL to the service tool and back. Signal strength RSSI 1-2 = low signal quality, RSSI 3-5 = acceptable, RSSI 6-9 = good signal strength. The large number illustrates the FLSER service tool signal strength and the small number the RY-FL signal strength.



6. Finally switch the FLSER switch to OFF position. Now the RY-FL returns to normal mode and starts to communicate to the FLTA receiver.

LED Operation

RY-FL has three LED on its printed circuit board to indicate the operation of the device.

LED	Description
RF	Flashes when the device receives / transmits signals
ERROR	On when the IO-module is in error.
OK	ON when the module is in normal operation

Accessories

Model	Description
FLSER	Wireless Service Tool for Addressing, Signal Strength Testing and Repeater Emulation
FLTA	Wireless Control Module / Receiver Unit with Modbus and 8 Analogue Outputs
FLAN	Antennae for FLTA
FLREP	Wireless Repeater to Extend Transmission Distance
FLREP-U	Wireless Outdoor / High Power Repeater