

Manual

433 MHz Agrònic Radio Link (EAR) + SATEL 1W Radio Modem

CODES 06580089



Controller used for the activation of electric valves and the remote reading of sensors and meters on a free band of 433 MHz.

The Agrònic Radio Link (EAR) is charged with managing the information that flows from the controller/PC to the Agrònic Radio Modules (MARs) and vice versa.

Up to 60 MARs of different models may be connected to a single EAR, which communicates with them every 1 minute. The final MAR may be used at a distance of 2.4 km (conditions permitting).

Communication between the EAR and the controller/PC occurs through a radio modem using the ModBus protocol.

The MAR base has LED lights that indicate whether there is communication between the MAR modules and the PC. The radio modem also has several LED lights that indicate working and communication status.

The set is powered at 12 VCC and has a range of 99 channels to communicate with the MARs.

The controller is installed inside an impermeable box with an opaque front cover. In order for the box to remain sealed, the cover must remain closed, with the compression glands fully tightened.

Technical features

Power

Input voltage	+12 VCC -10% +25%	The power source must be able to withstand peak currents of up to 1.6 amps.
Average consumption	460 mA	
Fuse	1.6 A	
Isolation	RS485 port galvanic isolation of 500 volts	

Radio frequencies

EAR

SATEL radio modem

Working frequency	433 MHz	403 - 473 MHz
Available channels	99	Depends on channel spacing
Output power	10 mW	1W
Authentication	No	Yes

Environment

Temperature	-10°C to +65°C
Humidity	< 85 %
Altitude	2000 m
Pollution	Grade II

Weight and dimensions

Height	254 mm
Width	360 mm
Depth	110 mm
Weight	2.2 kg

Declaration of conformity

The system is in compliance with the following standards and other regulatory documents:



Electrical security	UNE EN 60950-1:2007 + CORR:2007 + A11:2009	Information technology equipment. Safety. Part 1: General requirements Safety requirements for radio transmitting equipment
	UNE EN 60215:1995 + A2:1995	
EMC	ETSI EN 301 489-3 V1.4.1 (2002-08), based on ETSI EN 301 489-1 v1.7.1 Electromagnetic compatibility and radio spectrum matters (ERM), Electromagnetic compatibility (EMC) standard for radio equipment and services Part 3: Specific conditions for short-range devices (SRDs) operating on frequencies between 9kHz and 40 GHz	
	<ul style="list-style-type: none"> • UNE-EN 55016-2-3:2007 • UNE-EN 61000-4-2:1995 + A1:1999 + A2:2001 • UNE-EN 61000-4-3:2007 + A1:2008 • UNE-EN 61000-4-4:2005 • UNE-EN 61000-4-5:2005 • UNE-EN 61000-4-6:2008 	
Protection of radio spectrum	ETSI EN 300 220-1 v2.3.1 ETSI EN 300 220-3 v1.1.1	

Operation

The Agrónic Radio 433 MHz + Radio Modem system is comprised of an Agrónic Radio Link (EAR) and a 1W Radio modem.

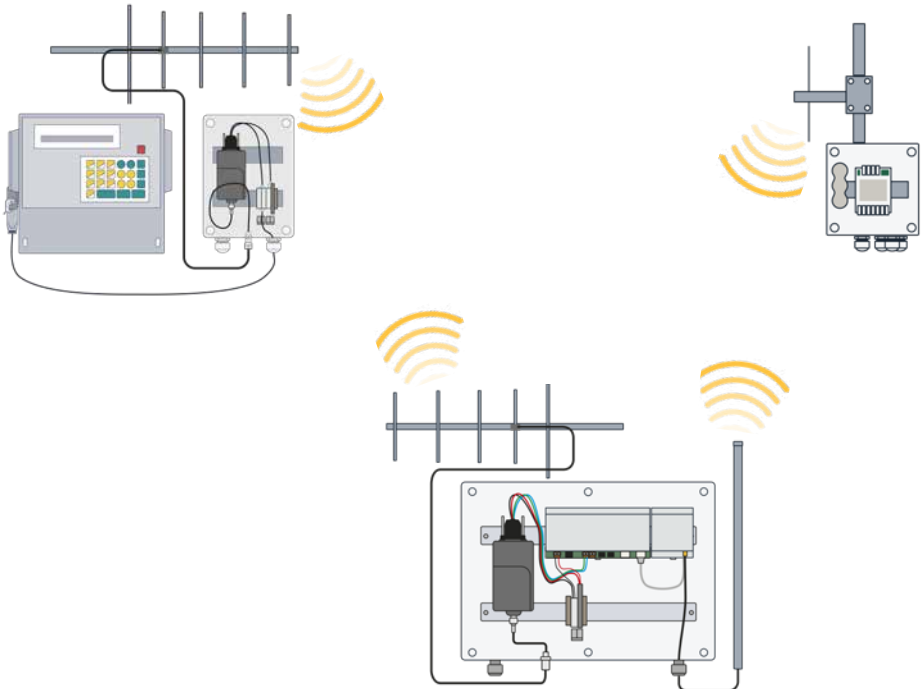
The EAR communicates periodically via radio with the Agrónic Radio Modules (MARS), exchanging the information that is necessary for it to operate.

The communication between the EAR and the MARS (via radio) is completely independent from the communication between the controller/PC and the EAR (via radio). That is, the EAR can continue to communicate with the MARS even when it is not connected to the controller/PC.

Valves, sensors and meters are connected to the MARS:

- The valves will be activated or deactivated within a maximum of 1 minute after the PC sends the order to the EAR and the EAR sends the order to the MARS.
- The status of the digital inputs is sent every 1 minute.
- Readings of the totals are sent to the PC every 2 minutes.
- Readings of the analog inputs are sent each time the module powers the sensor (time may be configured starting at 1 minute).

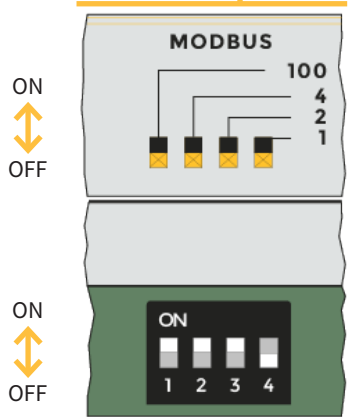
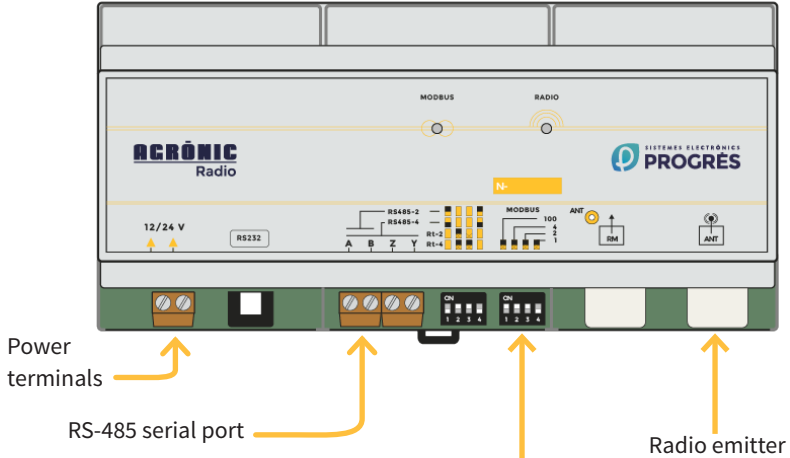
The radio modem connects to the RS-485 serial port on the EAR (and, optionally, to the RS-232 as well) using the ModBus protocol and sends the information to the controller/PC via radio.



Configuration

CONFIGURATION OF THE EAR

It is important to configure a ModBus address on the EAR to allow it to communicate with the PC. This address should be the same on both ends and may be configured using switches found on the EAR base. The possible addresses may be:



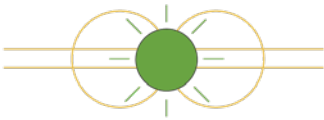
Modbus switch	1	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON
	2	OFF	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON
	3	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON	ON
	4	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
Address	000	001	002	003	004	005	006	007	100	101	102	103	104	105	106	107	

↑ Invalid address

The panel on the EAR base has 2 green LED lights indicating the communication between the PC and the MAR modules. The speed of the flashing lights conveys one meaning or another.

ModBus LED light:

MODBUS



- If the light is blinking rapidly and consistently, this indicates that it is communicating properly with the Agrónic.
- If the light is blinking slowly and irregularly, this indicates that a problem has occurred in communicating with the Agrónic.

Radio LED light:

RADIO



- If the light is blinking every 1 second, this indicates that it is communicating properly with the MAR modules.
- If the LED light is illuminated without blinking or is not illuminated, this indicates that the internal emitter is not working properly.

INFORMATION REGARDING THE RADIO MODEM

Radio modems come pre-configured from the manufacturer and are prepared to connect with each other.

Set forth below is a description of the different parts of a radio modem:

Power and data connector



On the front of the radio modem, there are 5 LED lights that provide information regarding the status of the serial port and the radio interface:

- **RTS:** This is a safety feature that enables receipt to confirm that the data received from the other radio modem is correct.
- **CTS:** This is activated when the radio modem is ready to accept data for a new transmission.
- **TD:** This indicates that the radio modem is receiving data through the serial port.
- **RD:** This indicates that the radio modem is sending data through the serial port.
- **CD:** This is activated when a signal exceeds the level required for the receipt of data, whether it is a true signal or interference.

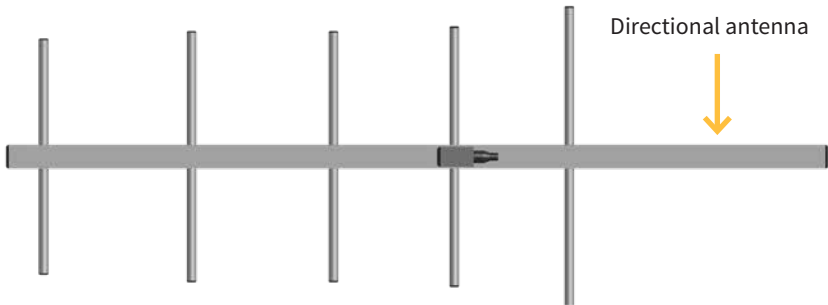
In addition, the colour of the illuminated LED light conveys one meaning or another. This is described in the following table:

LED	Indicator	LED off	Red LED	Orange LED	Green LED
RTS	RTS status	Inactive	Active		
CTS	CTS status	Inactive	Active		
TD	TD status	No data	Data flowing		Successful transmission
RD	RD status	No data	Data flowing		
CD	Radio status	No signal	Transmission	Noise	Receipt

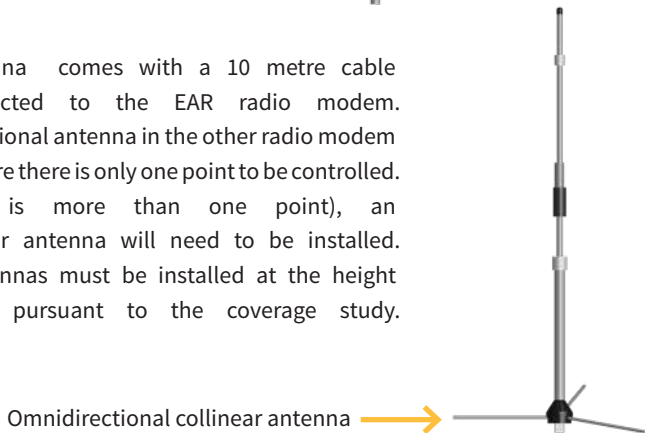
Installation of antennas

The controller comes with 2 cable antennas, one of which is directional, to communicate with the controller/PC (connected to the SATEL radio modem), and one of which is omnidirectional, to communicate with the MAR modules (connected to the EAR).

RADIO MODEM ANTENNA



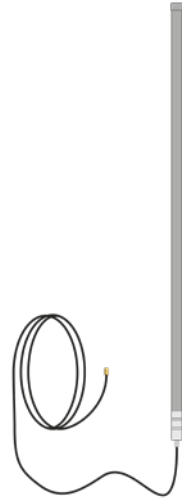
This directional antenna comes with a 10 metre cable and must be connected to the EAR radio modem. There will also be a directional antenna in the other radio modem for the controller/PC where there is only one point to be controlled. Otherwise (if there is more than one point), an omnidirectional collinear antenna will need to be installed. In both cases, the antennas must be installed at the height indicated by Progres pursuant to the coverage study.



RADIO ANTENNA

This antenna comes with a 10 metre (or, optionally, 15 metre) cable and must be installed together with the EAR and on a mast or flat surface. In the event it is installed on a mast, the mast must be a maximum of 50 mm in diameter.

The antenna must be positioned at a maximum height of 6 metres above the ground and have direct visibility to the MAR antennas with which it will communicate. The minimum coverage level required is 40%; in the event of a lower level, raise the antenna.



NOTE

The EAR + radio modem set should only be powered at 12 VCC when all antennas are connected to avoid damaging the circuit.