IRRIMATION

Real-time irrigation remote control system

Based on concentrating and remote units, the IRRIMATION system allows the complete control and management of the agricultural operation, from the capture and emission of signals to the visualization and extraction of data, including the multiple necessary programmings. Being an open system makes it easier to integrate other systems (pumps, filters, tanks, etc.) into the joint solution for irrigators. With own or third-party SCADA solution, on local server or cloud.

KEY CONCEPTS

Global Synchro Narrow Band (GSNB Radio)
Available in VHF and UHF bands with license or in free band. Without dependence on mobile coverage or network operators.

Minimum consumption
The IRU remote units can be powered by a Li battery with more than 8 years of autonomy, including all functions and the power of analog sensors. Without external photovoltaic elements or batteries. Without dependence on sunshine. No maintenance.

Reliable and robust
Storm immune system. Permanent communication with all units every minute. Simultaneous supervision and control of the irrigation network and the communications network itself.

Remote adaptation and update
Remotely expandable and upgradeable units.

Durability
Equipment manufactured with professional electronics for work in hostile environments. Up to 15 years warranty.

Easy installation and configuration
Extremely simple installation and commissioning. Integrated link and test quality measures. Configuration and local monitoring of units via Bluetooth and mobile.

No obsolescence
GSNB radio technology not subject to the periodic obsolescence of mobile phone-based systems. No dependency on third-party modules. Compatibility and availability of units for future expansions.

Low cost communications
Extremely low or zero cost of communications.

Demonstrated experience
Extensively experienced system. Tens of thousands of units in operation to full satisfaction.

Open system
ModBus protocol; SQL database; Standard UNE 318002-3.

APPLICATIONS

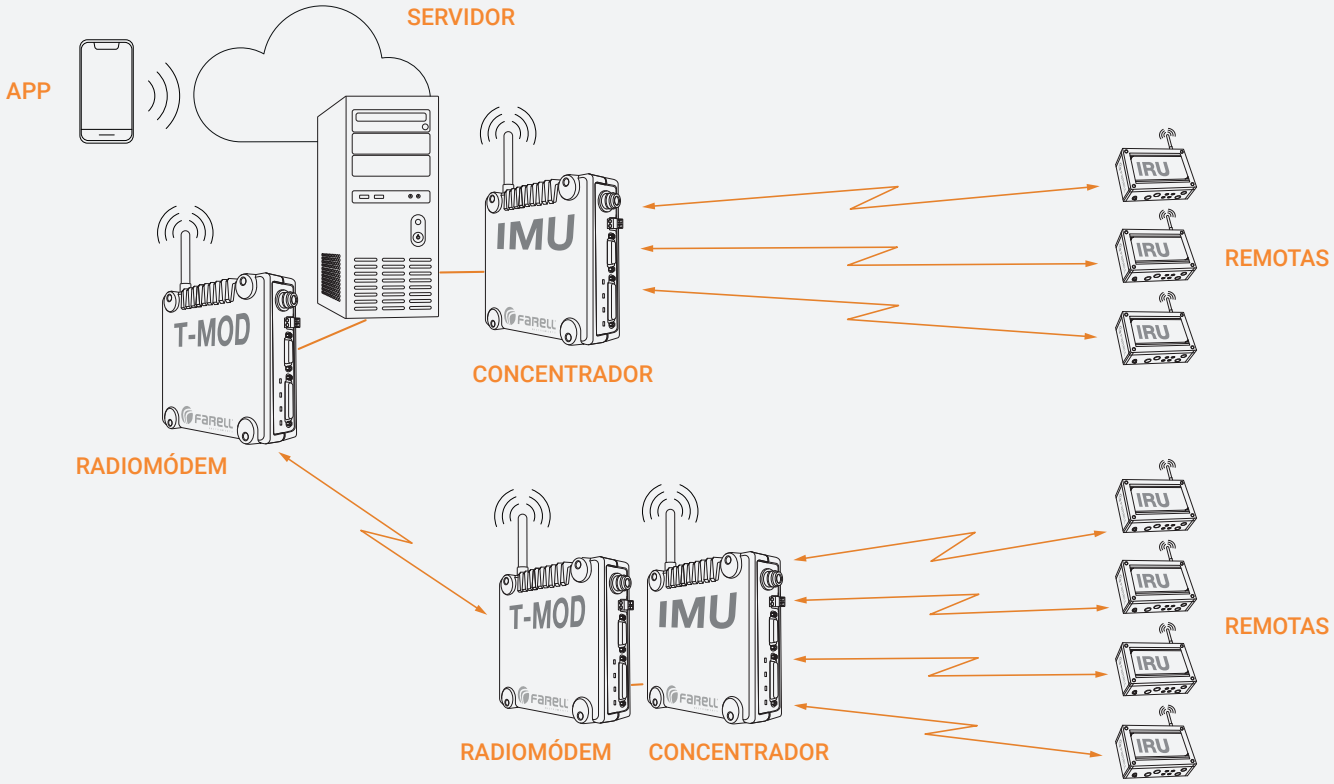
- Irrigation communities.
- Gardens and parks.
- Drinking water sectorization.
- Urban sectorization.
- Remote reading of meters.
- Irrigation control.
- Leak control.
- Pressure control.
- Flow control.
- Irrigation programming.
- Industrial automations.

CHARACTERISTICS

- GSNB, VHF and UHF bands, with or without license.
- Long range concentrator (IMU) - remote (IRU).
- Up to 256 IRU / IMU.
- Modbus / Modbus-TCP/IP protocol.
- IP-67 box. Polycarbonate (IRU).
- Up to 16 digital inputs (12 counters) (IRU).
- Up to 16 digital outputs (solenoids/valves) (IRU).
- Up to 4 analog inputs (IRU).
- Power provided to analog sensors (IRU).
- Programmer function (IRU).
- Datalogger function (IRU).
- Battery powered (autonomy > 8 years) or solar panel (IRU).
- Optional RS-485 Modbus port.
- Immune system to electric shocks or storms.
- Intuitive configuration via mobile application.
- Calculation of instantaneous flows.
- Real time. Update every minute.

GENERAL PROPERTIES OF THE SYSTEM

- Based on remote units (IRU), concentrating units (IMU) and control software on physical server or cloud server.
- Communication through its own GSNB Radio network. Valid for all types of irrigated areas. You do not need mobile phone coverage.
- Not subject to possible network outages, hackers, etc.
- Supervision and control in real time (every minute). It provides continuous knowledge of the status of the irrigation network and allows control actions to be carried out at any time (close/open valves, detect leaks, etc.). Simultaneously, it supervises in real time the operation of the telecontrol system itself.
- More than 20 years in the market. Tens of thousands of units installed and working to full satisfaction.
- Very simple installation, immediate start-up and minimal maintenance.
- Secured long-term investment. The current units remain compatible with the initial ones installed. No problems for future expansions or spare parts.
- Without dependence on continuous technological changes associated with other communication systems.
- Power supply for remote units using a low-cost, long-lasting battery (more than 8 years). Maximum simplicity. High reliability. Without dependence on sunshine. No maintenance.
- Guarantee of up to 15 years.
- Suitable for installations of a few dozen remote units (IRU) up to thousands of them.
- Remotely upgradeable IRU and IMU units: new features, etc.



REMOTE UNITS (IRU)

- Smart remote units:
  - Direct communication with concentrating unit (IMU) via long-range radio link (more than 6 km). You don't need intermediate links. Does not require vision between units. Also suitable for non-flat terrain. Assigned frequency or free band.
  - Incorporate a clock/calendar automatically synchronized with the central unit.
  - Support the loading and execution of sophisticated irrigation programs.
  - Can automatically close irrigation due to overflows and overpressures.
  - Make a historical record (datalogger) of each of the actions: Opening/closing of valves; analog recording (pressures, humidity, etc.); communication states; supply voltages; hourly values of totalizers; etc If necessary, these historical records can be downloaded locally or remotely from the Control Center.
  - From counting pulses (compatible with mechanical or electronical transmitters) they perform:
  - Counting of totalizer values (8 digits) coinciding with those of the counter.
  - Instantaneous flow measurements.
  - Hourly totalizer values (at each exact hour) to allow billing according to consumption hours.
  - Intrusion detection.
  - Measurement of unit temperature and battery status.
  - Up to 16 digital inputs (contact). 12 counters.
  - Up to 4 isolated analog inputs for pressure, humidity, etc. measurements. Power supply to the analog sensors by the unit itself. Supports standard 4-20 mA and other sensors.
  - Up to 16 solenoid control outputs. Supports bistable (latch) type solenoids:
    - 2 wires or 3 common positive or negative wires.
    - High output capacity. Protected against short circuit.
- Auxiliary COM port available for connection of other equipment (user irrigation programmers, etc.) with the Control Center using the same communication channel as the IRU unit.
- Universal IRU. You pay what you use. Expandable in the field through code.
- Local configuration and testing via mobile phone application and Bluetooth.
- Wide operating temperature range.
- Immune to thunderstorms.

MASTER UNIT (IMU)

- Communicates continuously and autonomously with the remote IRU units.
- Communicates with the Central unit (server) through radio, Ethernet, fiber, etc.
- Communicates with the server using Modbus RTU or Modbus TCP/IP protocol.
- Communications encryption. Immune to external attacks.
- Very low consumption. It can be powered by the grid or by a small power photovoltaic panel.
- Very simple configuration. Independent of the number of linked IRU units.

CENTRAL UNIT

- Operating on local PC based server or cloud server.
- SCADA (supervision software): Open system. Complete protocol and/or database documentation can be supplied.
- FARELL SCADA open and adaptable to the user's needs. Mobile phone application for end user. Configurable for single access to your plots.
- SCADA tailored to your own or third parties.
- Allows monitoring and requesting irrigation, loading irrigation programs, billing, receiving alarms, etc.

SCADA FARELL

- Operation on local server or cloud.
- Windows operating system.
- Graphic interface.
- Connection from mobile device.
- Management of parcels and hydraulic network through GIS.
- Programming and cancellation of irrigation.
- Risk analysis and review.
- Remote control and incident management.
- Optimization of the irrigation network and readjustment of flows.
- Billing of consumption and other concepts.
- Data downloads from weather stations.
- Reports and messaging.

GENERIC SCADA

Varias posibilidades de interface con las unidades:

- Mediante protocolo Modbus.
- A través de base de datos SQL Server.
- A través de driver según norma UNE 318002-3.

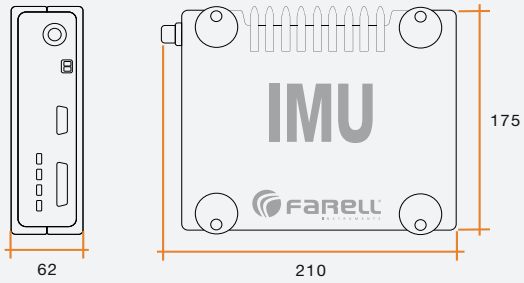
MAINTENANCE

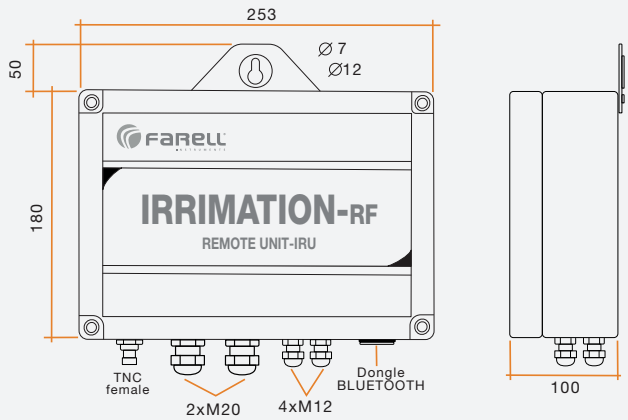
- IRU Units: Maintenance free. Battery change notice months in advance.
- IMU units: Maintenance free.
- The system continuously monitors the status of all units and the quality of communications. Provides warning if there is deterioration of any parameter before a failure can occur.
- Immediate detection of alarms with automatic identification of the affected unit.
- Replacement of the affected unit and configuration of the new unit by loading the original configuration file of the replaced unit.
- Universal IRU unit valid for replacement of any model.

TRAINING

- Training course for system maintenance for client. Requires minimal technical training.

DIMENSIONS (mm)





IRU (REMOTE UNIT)

DIGITALS INPUTS	IRU	Up to 16 (up to 12 with counter function - totals and flows)	
METERS	Weight pulse counter	Configurable: 1 L; 10 L; 100 L; 1 m^3	
	Maximum pulse frequency	8 pulses/second	
	Integrated pulse filter	Yes	
	Integrated instantaneous flow measurement	Yes (includes overflow closing function)	
	Totalizer	8 digits	
		In real time:	Yes
		Schedules (exact time for billing):	Yes
VALVE CONTROL OUTPUTS	Up to 16	Supports 2 and 3 wire solenoids: Yes	
		Through capacitor discharge: 4700 uF	
		Configurable solenoid pulse voltage: Yes (9 V; 12 V; 16 V; 18 V)	
		Configurable pulse duration: Yes	
		Pulse current: Up to 8 amps	
		Protected against short circuit: Yes	
		Simultaneous maneuvers: Yes	
ANALOG INPUTS	Up to 4, type 0/4-20 mA	Precision: 12 bits	
		The IRU can power analog sensors: Yes	
		Sensor supply voltage configurable: Yes (9 V; 12 V; 16 V; 18 V)	
		Sensor power output protected against short circuit: Yes	
		Galvanic isolation of analog inputs: Yes	
POWER		Integrated battery voltage and temperature measurement	
UNIT POWER		Li battery with autonomy of more than 8 years	
		Optionally, it can be supplied with a power module for a 300 mW photovoltaic panel compatible with a battery	
CHARACTERISTICS	Data logger	Integrated. Up to last 900 events (output changes, totalizers, overflows, etc.)	
	Control	Calendar clock synchronized with Control Center: Yes	
	Integrated irrigation programmer	40 programs (time; volume; volume-time; weekly; periodic, etc.), programmable locally and/or from the Control Center	
	Integrated hydraulic filter control functions	Cleaning cycles and times	
	Subjection	Polycarbonate enclosure with wall hanger and cable gland entries. IP-Connections by pluggable connectors with screw tightening	
	IP67 Grade (IRU)	Measurements: 180 x 253 x 102 mm	
ENVIRONMENTAL CHARACTERISTICS	Temperature range	-30 °C a +60°C	
	Humidity	Tropicalized circuitry against humidity	
CONFIGURATION AND TEST	Through APP	IRRIMATION for mobile device and Bluetooth Local or remote, simultaneous firmware update of all units on the network: Yes	
WARRANTY	15 years		

IMU (MASTER UNIT)

REMOTE UNITS		Concentrate up to 256 IRU remote units
REAL TIME		Communicate every minute with all units via GSNB Radio
FOR CONTROL AND READING OF IRU REMOTE UNITS		Input states
		Totalizers
		Flows
		Valve states
		Analog inputs
		Irrigation programs
		Overflow alarms, intrusion, etc.
		Quality of radio links
		Battery status, etc.
MODBUS NATIVE PROTOCOL	Isolated serial ports	RS-232; RS-485
	Port	TCP-IP
	Encryption	Yes
REMOTE LOCATIONS		Allows fully unattended operation in remote locations
POWER SUPPLY	Voltage	12 Vdc (10.2 Vdc to 14.5 Vdc)
	Average consumption	180 mA (2.15 W) (allows power via small photovoltaic panel and battery)
ENVIRONMENTAL CHARACTERISTICS	Temperature range	-30 ºC a +60 ºC
	Subjection	Injected aluminum enclosure, for panel or din rail mounting IP-67 (200 x 175 x 58 mm)
	Humidity	Tropicalized circuitry against humidity
CONFIGURATION AND TEST	Through APP	THROUGH IRRIMATION APP Local or remote, simultaneous firmware update of all units on the network: Yes
WARRANTY	15 years	

RADIO LINKS: IRU-IMU

INFORMATION IN REAL TIME		IRU - IMU communication every minute
RADIO COMMUNICATION		Global Synchro Narrow Band (GSNB Radio)
BANDS	VHF, UHF, 815 MHz y 900 MHz	With professional radio. Frequencies of free or legalizable use
AVAILABLE BANDS	12.5 KHz Channeling	915 MHz (25 KHz channeling)
		869 - 870 MHz (25 KHz channeling)
		450 - 470 MHz
		430 - 450 MHz
		406.1 - 430 MHz
		160 - 175 MHz
		146 - 162 MHz
		138 - 150 MHz
	Output power	500 mW ó 2 W
	Antenna impedance	50 Ω
	RX data sensitivity	≥ -107 dBm para BER = 1 x 10^{-6}
	Frequency stability	± 1 ppm (de - 30 °C a + 60 °C)
	Aging	≤ 1 ppm the first year (lower in subsequent years)
	Modulation	GMSK BT = 0,5
GREAT DISTANCE COVERAGE	More than 5 km	Visual link not needed
REGULATIONS	Radio	ETS EN 300 113-2
	EMC	ETS EN 301 489-5
	Electrical safety	UNE-EN 60950