Industrial Telemetry IIoT with Cellular Comunication

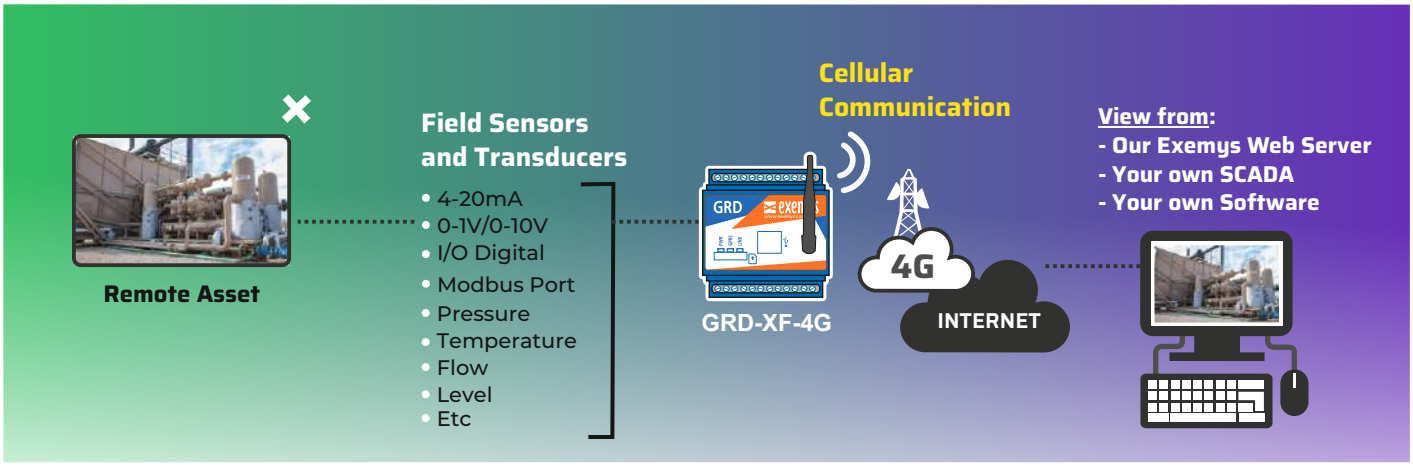
(Optional with Satellite modem)

exemys

GRD-XF-4G Product Family

With the GRD-XF-4G product series with 4G cellular communication, you can remotely monitor and control sensors, transducers, or devices located in remote and dispersed locations.

The information can be viewed using:
- Your own SCADA system.
- Your own monitoring software.
- Through our Web Server, with an intuitive graphical visualization interface."



TECHNICAL FEATURES

- 4G Cellular Communication
- Latin American and Global Bands
- 4-20mA and 0-10V Inputs
- Digital Inputs and Outputs
- Pulse Counting Inputs
- RS232/485 Serial Ports

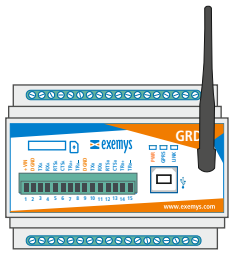
Exemys Web Server

GENERAL FEATURES

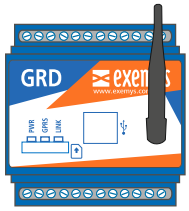
- Modbus Master Protocol on RS232/485 port
- Remote Serial Port (Modbus or Transparent)
- I/O Expansion via MODBUS port
- Modbus Slave Protocol for local I/O access
- Programming logic via text SCRIPTS
- Data publishing in WITS Protocol (via Script)
- Alarms and Control via SMS messages
- Event Logging: Online and Offline
- Automatic reconnection in case of link failure
- Over-the-air Firmware Update
- Visualization of acquired information:
  - Your own SCADA Software
  - Your own monitoring software
  - Our Web Server for Telemetry applications

ORDERING INFORMATION

MODEL	SERIAL PORTS	ANALOG INPUTS	DIGITAL INPUTS	DIGITAL OUTPUTS	FREQUENCY
GRD1620-XF-4GA	1 RS232 / 1 RS485	---	---	---	Latin America and Australia
GRD1620-XF-4GM	1 RS232 / 1 RS485	---	---	---	Global
GRD3625-XF-4GA	1 RS232 / 1 RS485	4 0-1V/0-10V/4-20mA Configurable by Software	6 (6 pulse up to 45Hz) Configurable by Software		Latin America and Australia
GRD3625-XF-4GM	1 RS232 / 1 RS485	4 0-1V/0-10V/4-20mA Configurable by Software	6 (6 pulse up to 45Hz) Configurable by Software		Global
GRD3534-XF-4GA	2 RS232 / RS485	8 Configurable 0-1V/0-10V/4-20mA	16 (8 pulse up to 1KHz)	8	Latin America and Australia
GRD3534-XF-4GM	2 RS232 / RS485	8 Configurable 0-1V/0-10V/4-20mA	16 (8 pulse up to 1KHz)	8	Global
GRD3534-XF-4GA/4GM-POT	2 RS232 / RS485	7 Configurable 0-1V/0-10V/4-20mA 1 Potentiometer 1K Ohm	16 (8 pulse up to 1KHz)	7	Global / Latin America and Australia
GRD3534-XF-4GA/4GM-2POT	2 RS232 / RS485	6 Configurable 0-1V/0-10V/4-20mA 2 Potentiometer 1K Ohm	16 (8 pulse up to 1KHz)	6	Global / Latin America and Australia



Models GRD-3534



Models GRD-1620 GRD-3625

IRAM-ISO 9001:2015

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SATELLITE TELEMETRY WITH GLOBAL COVERAGE

The GRD-XF-4G series products are compatible with the Iridium SBD (Short Burst Data) satellite modem, specifically designed for the efficient transmission of small data packets. This feature makes them ideal for telemetry applications that need to send information such as sensor measurements and system status.

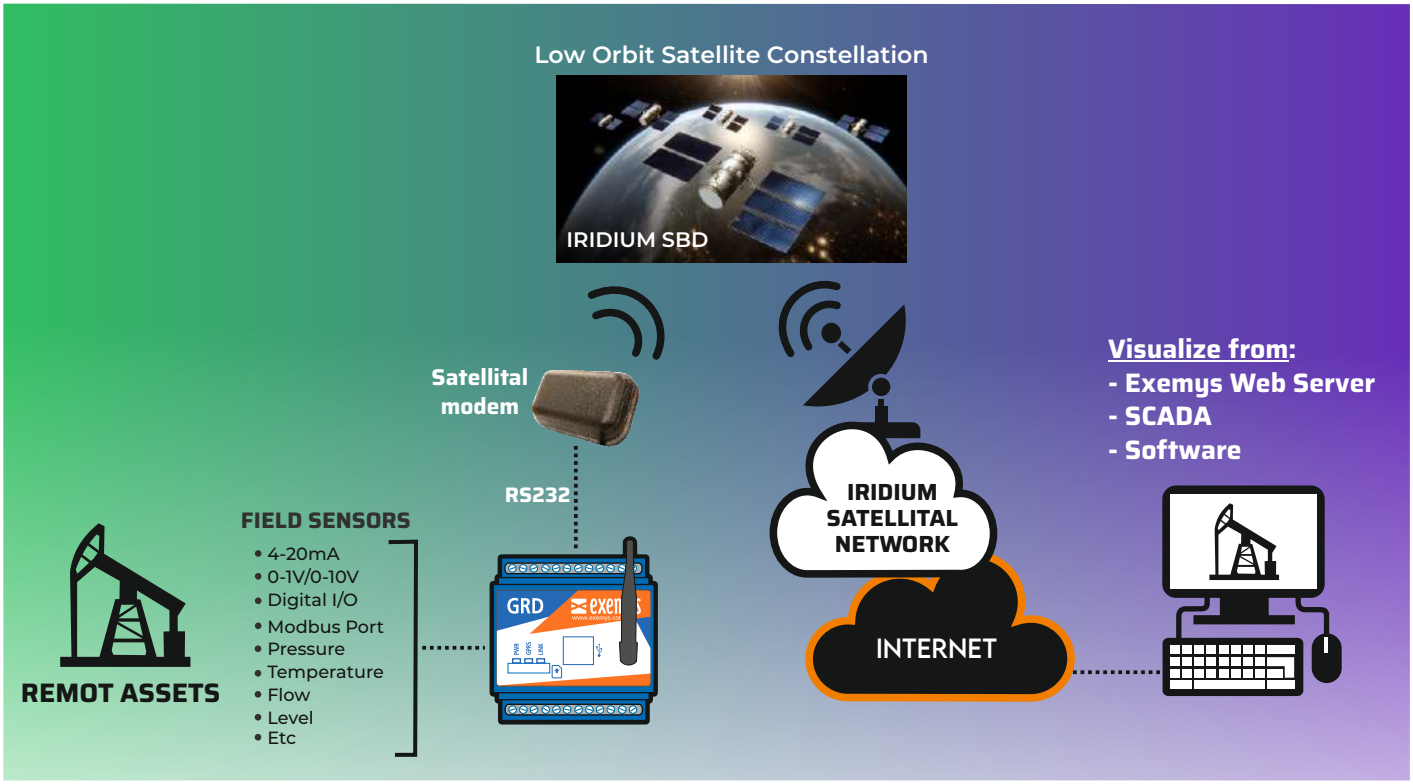
The Iridium network offers multiple advantages for device communication, especially valuable in applications that demand global coverage and high reliability. The main advantages include:

Global coverage: Iridium leverages its constellation of low Earth orbit satellites to provide nearly universal coverage, including oceans, polar regions, and remote mountainous areas where other networks are inaccessible.

Low latency: Thanks to its operation in low Earth orbit, the Iridium network offers significantly shorter transmission times compared to geostationary satellites. This is essential for telemetry applications that rely on quick responses.

Reliability: The structure of the constellation and the architecture of the Iridium network ensure continuous and reliable communication, even under adverse conditions or in scenarios where other networks might be insufficient.

These features position the Iridium SBD network as an optimal solution for operations in remote areas and other challenging environments.



GRD-XF-4G + IRIDIUM SBD MODEM = **Satellite Telemetry for Small Data Packets**

exemys GRD-XF

TECHNICAL FEATURES

General Features
- Leds: GSM / GPRS / Data Link
- Enclosure: Industrial DIN Rail mount
- Dimensions:
  24 terminals model:
  Width:70mm - Height:90mm - Depth:65mm
  36 terminals model:
  Width:105mm - Height:90mm - Depth:65mm
- Operating temperature: -20°C a +65°C
- Warranty: 1 año
- Power:
  Power Input: +10Vdc min. a +30 Vdc max.
  Current: 150mA@12Vdc, 100mA@24Vdc

Cellular Frequencies
- 4GA Model (Latin America and Australia)
  - GPRS: B2/B5 eGPRS: B3/B8
  - 3G: B1/B2/B5/B8
  - LTE Cat 1:B1/B2/B3/B4/B5/B7/B8/B28/B40
- 4GM Model (Global):
  - GPRS: B2/B5, eGPRS: B3/B8
  - 3G: B1/B2/B4/B5/B6/B8/B19
  - LTE Cat 1:B1/B2/B3/B4/B5/B7/B8/B12 B13/B18/B19/B20/B25/B26/B28/B40
- MICRO SIM chip: Supports all providers
- Antenna: OdBi, Conector SMA

Protocols and Ports
- Protocols: Modbus Master/Slave, NMEA, and others through script programming.
- USB Port: 1 Port only for configuration
- Local configuration through USB port
- Remote configuration, through Air
- Data Encription: Propietary
- Serial Ports: 1 x RS232, 1 x RS485, 2 x RS232/485

Inputs and Outputs
- Analog Inputs: 0-1V, 0-10V, o 4-20mA (Configurable)
  - Analog Inputs: 0-1Vdc: Precision 0,1mV
  - Analog Inputs: 0-10Vdc: Precision 1mV
  - Analog Inputs: 4-20mA: Precision 1uA
  - Input protection against voltage spikes
- Digital I/O:
  - Inputs: Up to 16 Transistor inputs
  - Outputs: Up to 8 Transistor Open collector outputs

Counting and Recording of Events
- Count Inputs:
  - Input frequency: 45 Hz / 1 KHz (depending on model)
  - Entry pulse: 10 ms min. / 0.5ms min. (depending on model)
- Event Log: In non-volatile memory of 100 thousand events. With real time clock. You can register without a cellular signal

INTERNAL LOGIC PROGRAMMABLE THROUGH SCRIPTS

GRDs incorporate logic programming and calculation, through loading a simple text SCRIPT.

Programmable Logic | GRD | GRD with Scripts

Operations that can be performed with text SCRIPTS

- Mathematical Operations and Binary Logic
- Date and Time Operations
- Operations with Timers
- Reading and recording of analog variables
- Turning on and off digital I/O pins
- Sending and receiving SMS messages
- Serial port data interpretation
- Sending data through the serial port

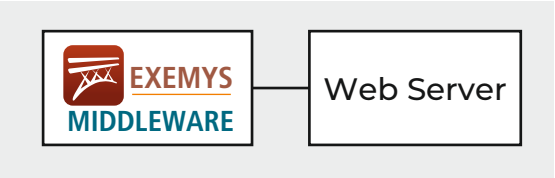
SYSTEM OPERATION - VIEWING REMOTE DATA

1) Via Web Page using our Web Server for Telemetry

In this mode of use, the client easily accesses a predefined web page using a username and password. From there, you can easily review all pertinent information on your devices GRD remotes.
This web page is hosted on a Telemetry Server created by Exemys and is available to all users of GRD.
The display of information is done through of an intuitive graphical interface designed with tools that are very simple to use by the end user.

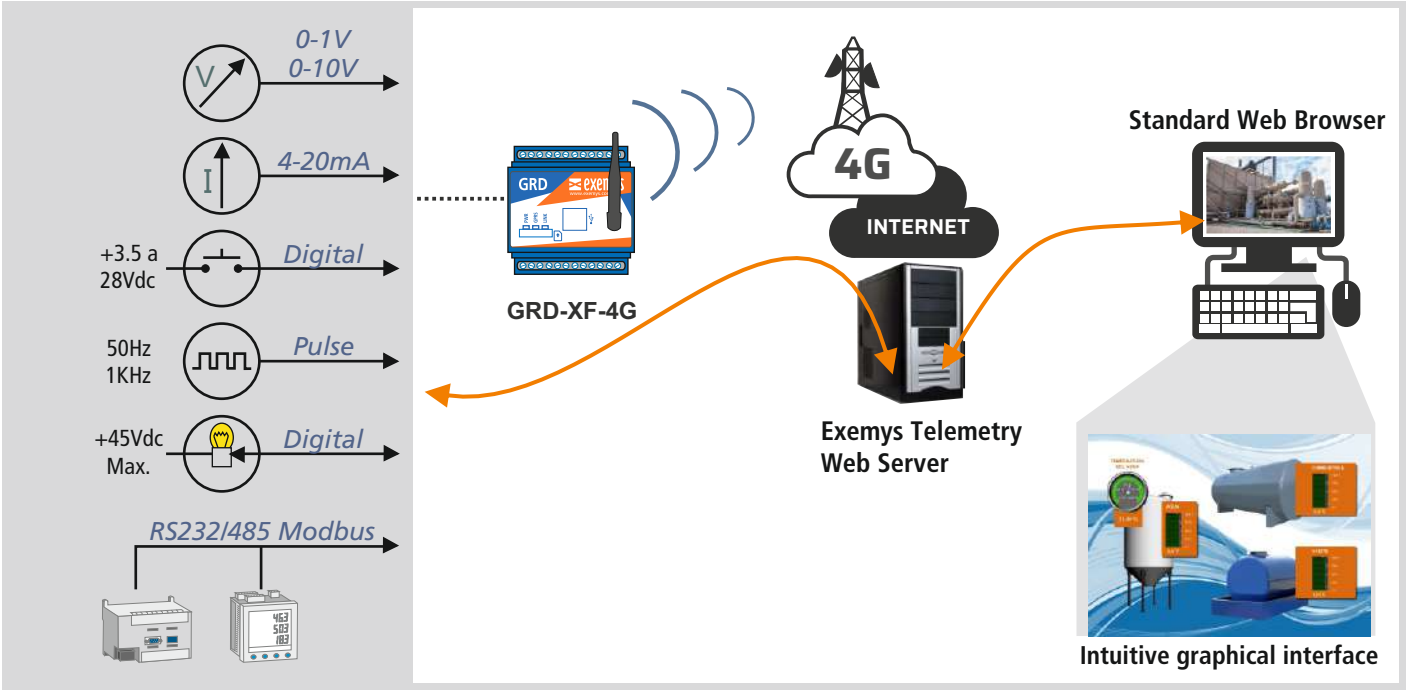
How it Works

Two software applications are installed on the Telemetry Server:



1) Middleware: It is the software in charge of communicating with all GRD remote devices.

2) Web Server: It is the software in charge of taking the Middleware data and publishing it on a web page, which users can access by entering a username and password.



2) Using Propietary Software

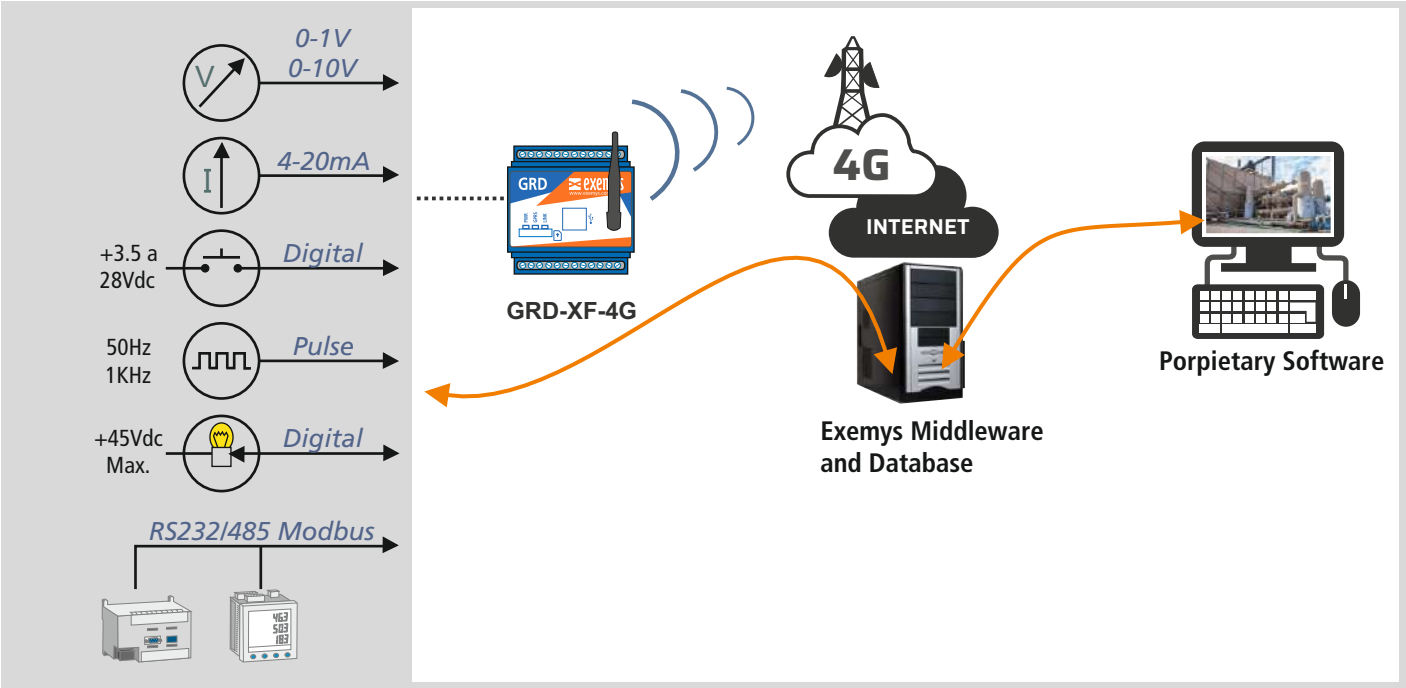
In this topology, all the information obtained by the GRD devices is stored in a Database of type MySQL. This database can be consulted by any proprietary or canned software.

How it works

Two very simple software applications are installed on the Server:

1) **Middleware**: It is the software responsible for communicating with all GRD remote devices.

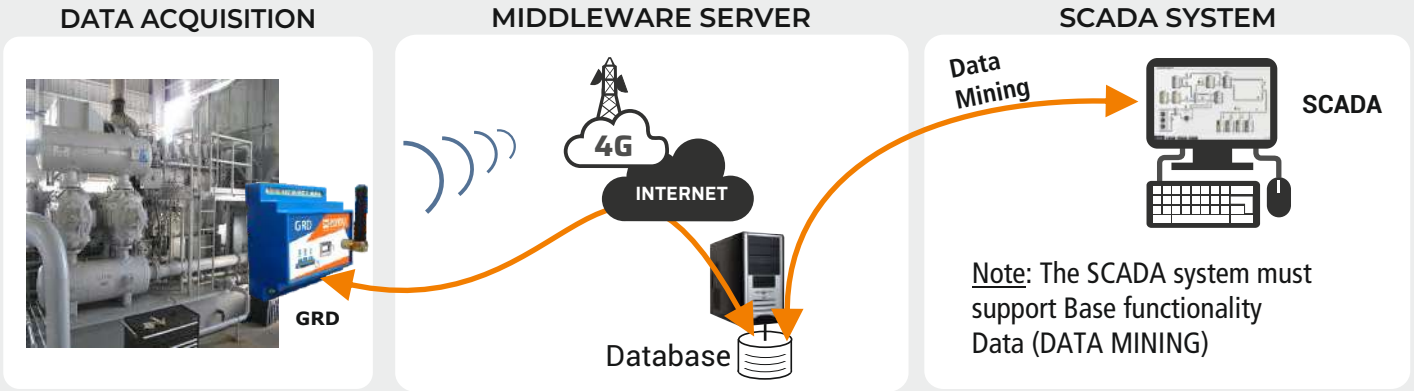
2) **Database**: In this database the Middleware deposits all the DRG information. The different software applications, resort to this base to obtain information.



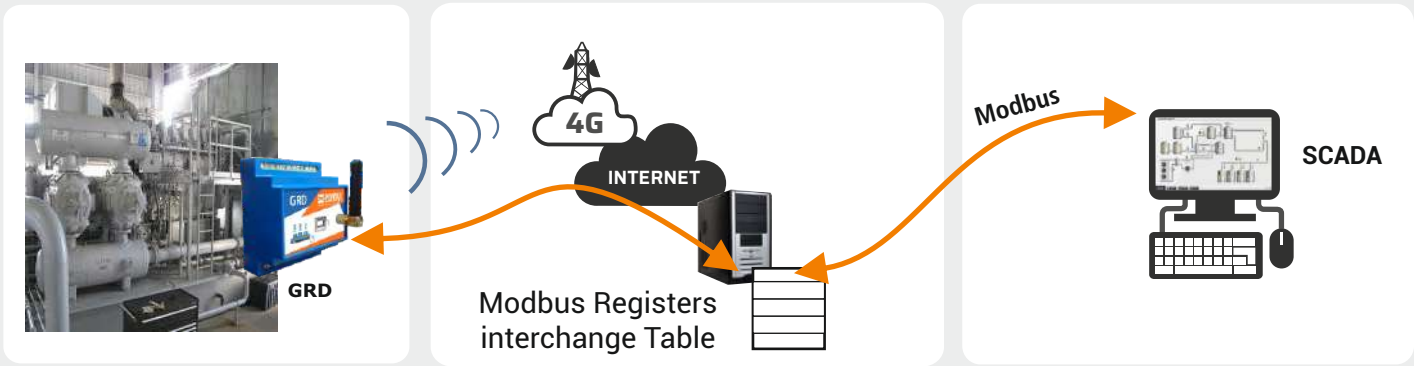
3) Using a SCADA System

The Exemys Cellular Telemetry system has been developed to be compatible with any SCADA system and under different modes of use. The SCADA system accesses information from remote GRD devices, from any in the following ways:

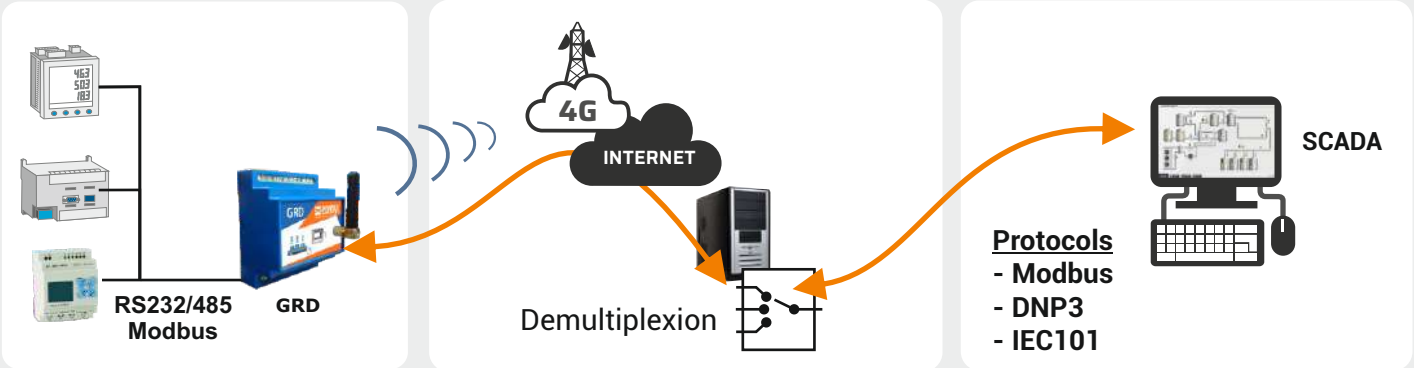
SCADA Database: Obtaining data from a Database, on which remote GRD devices
They download your information. Scada systems must have DATA MINING functionality.



SCADA I/O: The SCADA System makes queries in the Modbus protocol, directly to the device registers remote GRD, consulting about the status of the inputs and outputs.



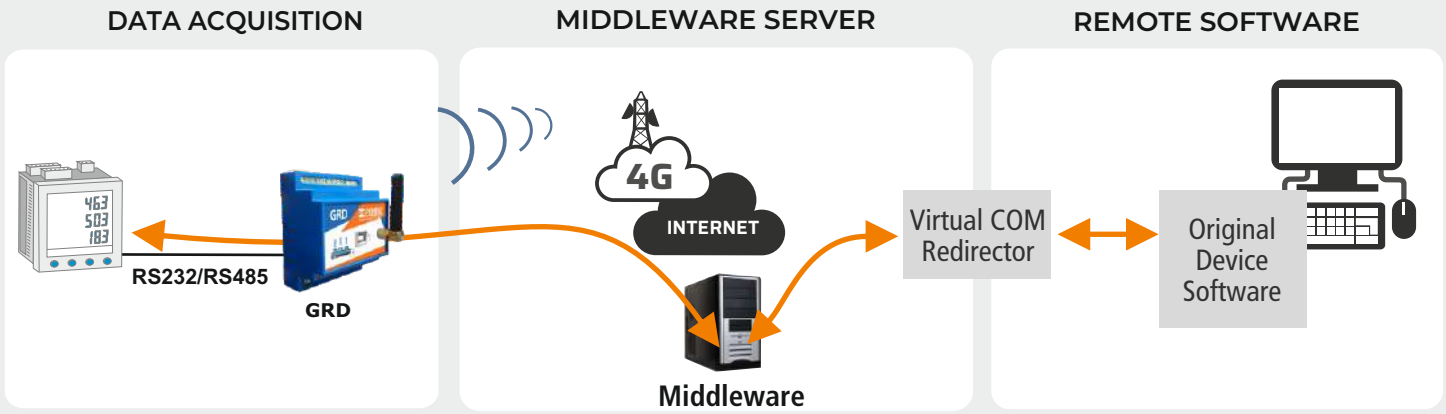
SCADA Serial Port: Through queries in Modbus, DNP3 or IEC101 protocol, to the devices connected to the GRD serial port. In this mode the Demultiplexing feature is used.



4) Remote Serial Port

In this mode, any software application that uses a serial port to communicate with a device locally, it can be adapted to communicate with several remote devices, using GRDs as a means of communication to reach them. A communication channel is established completely transparent, through which the data circulates until it reaches the serial port of the GRD and through it, to the device remote in question.

Virtual COM Mode: On the computer where the Remote device software is hosted, it is also hosts a Virtual Redirector of COM ports to TCP/IP ports. In this way, all the information that previously It circulated through a serial port, thanks to the redirector it now circulates encapsulated within a data packet TCP/IP. This packet is the one that processes the Middleware and sends it to the corresponding GRD device, which It is responsible for decompressing and passing it back to a serial communication frame.



exemys GRD-XF

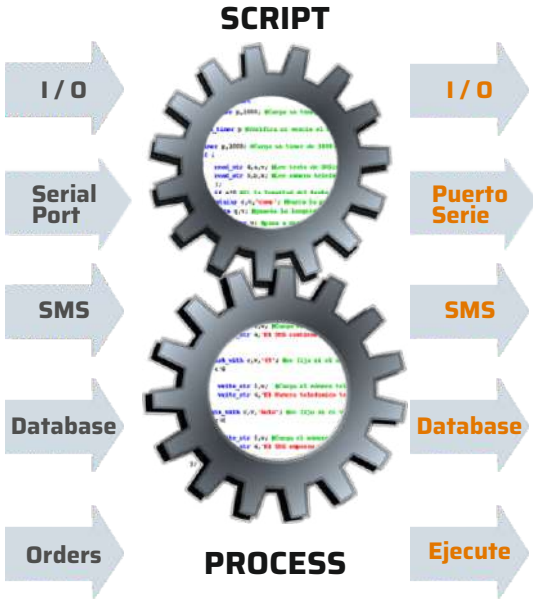
PROGRAMMING LOGIC USING TEXT SCRIPTS

What is a SCRIPT?

A Script is a command file that, once loaded into the GRD is interpreted and executed.

Operations performed by a Script:
Within the Script, the operations that must be performed are described. run the device, such as:

- Mathematical Operations
- Logical and Binary Operations
- Operations with Timers
- Reading of analog variables
- Variable Registers
- Digital I/O pin control
- Sending and receiving SMS
- Serial port data interpretation



SCRIPT EXAMPLE

Below is a simple example, which allows the power on and turning off a digital output for a certain time:

```
start
{    b=0;
     timer a,10000;
};
check_timer a
{    timer a,10000;
     neg b,b;
     write_io 1,1,b;
};
end;
```

How are the scripts loaded?

The script is programmed with a simple software, which allows you to write in form ordered, the commands to be executed within the GRD.

The scripts are loaded into the GRD, for through its USB port or in the form remotely, through the Middleware.

Once the scripts are loaded, the GRD is ready to execute the logic of the themselves.

Application Examples

Flow Calculation: Calculate the flow by measuring the differential pressure

Alternation of 2 Bombs: Alternate the use of 2 pumps using a timer

Includes Publication data in **WITS Protocol** serial through a Script

Dispenser fault detection: Stops the dispenser through one of its digital outputs based on the measurement of two temperatures and a digital signal.

Remote Start/Stop: By means of an SMS message or the press of a button on the telemetry server web page, the will activate the GRD outputs on a timed basis to control a start/stop system

Automatic Start/Stop: Using timed logic, the start and stop of a system is carried out

ALARMS AND ALERTS BY SMS

GRD devices can operate under the SMS text messaging mode

OUTGOING SMS

The GRD can be configured to issue text messages at default values of:

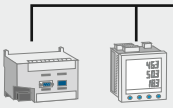
Analog and Digital Inputs

Results of operations mathematics and logic Script

Script

```
start
{   b=0;
    timer a,10000;
};
check_timer a
{   timer a,10000;
    neg b,b;
    write_io 1,1,b;
};
end;
```

Modbus Registers Values

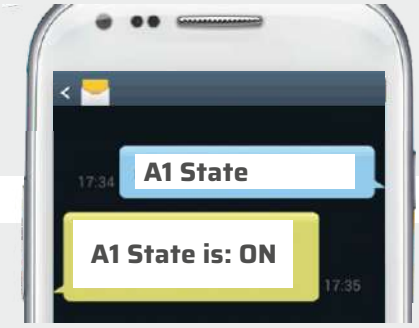


Modbus

INCOMING SMS

The GRD can receive text messages and report values of its Modbus registers or statuses of its inputs and Departures. At the same time, it can trigger the process and operations of a Script and activate digital outputs.

Values of:
- Modbus Registers
- Inputs and Outputs



exemys GRD-XF

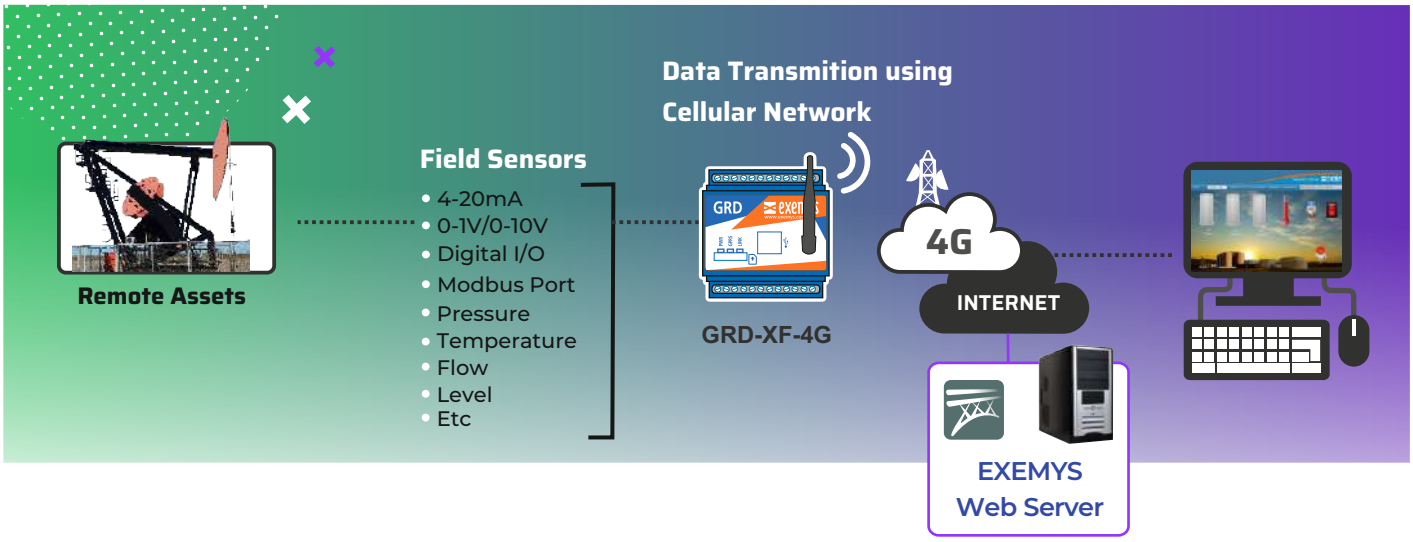
TELEMETRY WEB SERVER

The Web Server for Telemetry applications offers a service accessible to all users of the GRD-XF-4G family devices. Allows you to View, Graph and Record quickly and easily all the information from remote sites

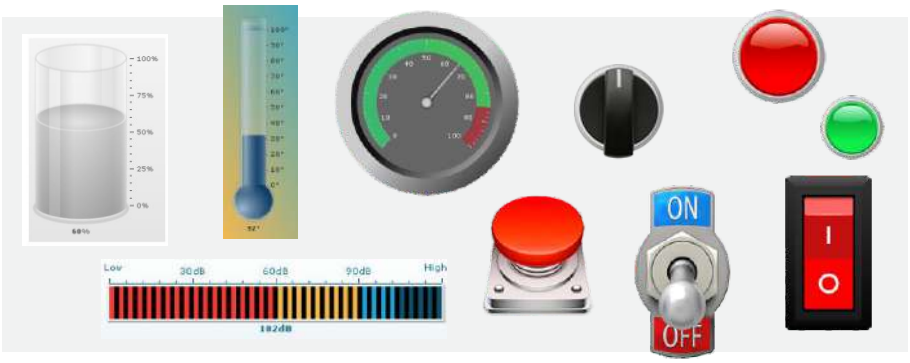
How it Works?

GRD remote devices are designed to collect data from sensors and other devices that monitor and control in remote locations. Once collected, the information is transmitted to through a cellular connection. This information is stored in the Telemetry Server database.

Subsequently, the data can be viewed on a web page, which is customizable by the user. For Therefore, various graphic tools are offered such as clocks, progress bars and indicators, thus facilitating the interpretation and management of information.



GRAPHICAL TOOLS



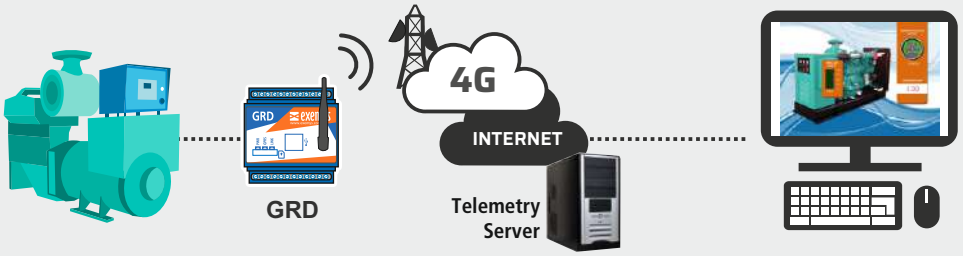
ADVANTAGES

- Immediate implementation of Telemetry applications.
- Cost reduction by avoiding the hiring of our own Servers.
- Access through a simple web page to all your field devices.
- Reliability of a Datacenter 24/7/365.

APPLICATIONS EXAMPLES

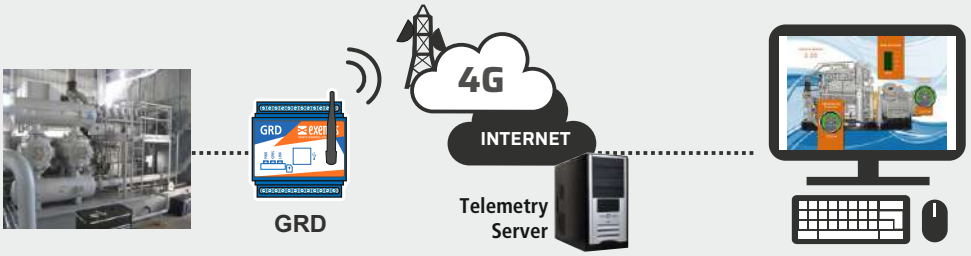
Energy Generatos

- Horas of use
- Fuel Level
- Engine Temperature
- Battery Voltage



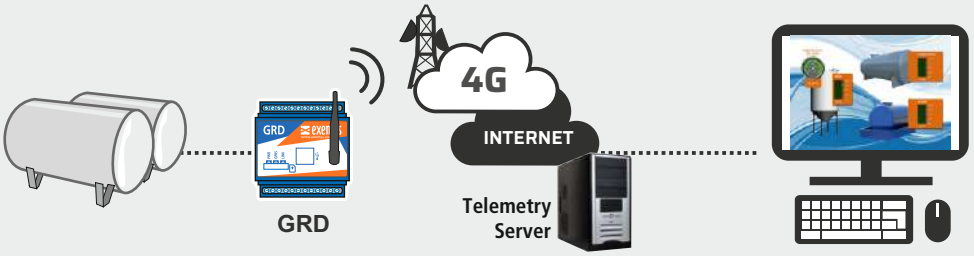
Gas Compressors

- Water Pressure
- Gas Pressure
- Oil Pressure
- Fuel level



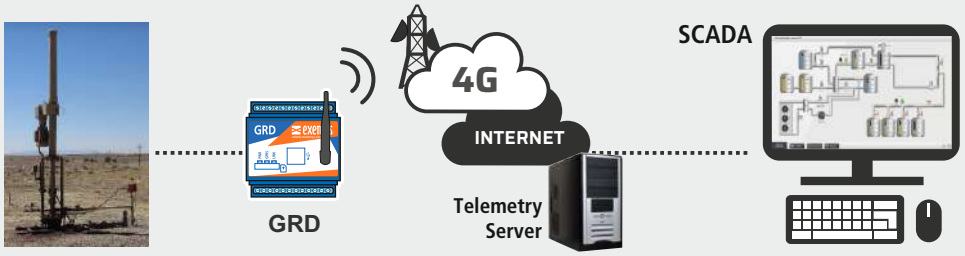
Tank Levels

- Tank Level
- Pump activation
- Temperatures



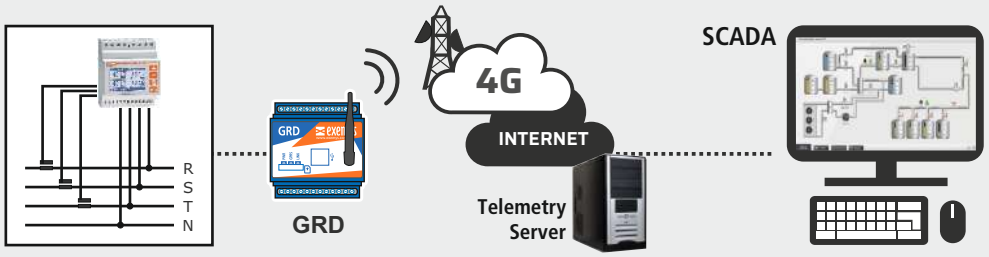
Oil Extraction

- Well Controller Data



Power Meters

- Power Meter Data



DIFFERENCES OF A GRD WITH A STANDARD CELLULAR MODEM

What is a Cellular Modem?

A Cellular Modem is a point-to-point communication device that uses cellular telephony as a means of data transport.

What are the differences between the GRD and a simple Cellular Modem?

The GRD is part of a complete Cellular Telemetry system, whose differences with a GSM modem, are detailed below:

GRD	Standard Cellular Modem
✓ Point to Multipoint Links	✗ Only Point to Point Links
✓ All GRD devices are online	✗ You must "dial" each Modem at a time
✓ It has its own entrances and exits (Digital and Analog)	✗ It does not have entrances and exits
✓ Acts as Modbus Master	✗ It does not have its own protocol
✓ Communicates with other devices intelligent, through the Modbus protocol	✗ It does not have its own protocol
✓ Acts as a Registrar, storing data in a database	✗ Does not act as a Registrar
✓ Use the GPRS data channel (Pay for Data)	✗ Use the CSD channel (you pay per time connection, even without using data)
✓ In the event of loss of cellular signal, it stores data in its memory buffer and then transmits them	✗ If you lose signal, you lose data
✓ Issue Alarms and Alerts through SMS messages	✗ Does not have SMS messages

IRAM GESTION DE LA CALIDAD RI-9000-6174 Acreditado por OAA

IQNET RECOGNIZED CERTIFICATION

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