REGESTA 1

Installation and Configuration Manual

Legal Notice

Warranty

This publication is subject to change.

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I Important Information

Caution

The manufacturer reserves the right to make changes and improvements to the appropriate features in both the software and hardware of this product, modifying the specifications of this manual without prior notice.

The images presented on the front and back panels of the devices are provided as information guideline only. Some small modifications may exist in the actual device.

Warning

The equipment is intended to be installed by Service Personnel and only handled by qualified personnel. If not, the device may be damaged and malfunction.

This device contains elements that are sensitive to electrostatic surges and shocks. Therefore, it is essential when handling the equipment that an antistatic wriststrap is connected to the device chassis and that this is placed on an antistatic mat. Furthermore, it is crucial to avoid any kind of contact between the device components and necklaces, bracelets, rings, ties, etc.

Chapter 1 Description

1.1 Introduction

The **REGESTA 1** is a router especially designed for industrial telecontrol and telemeasurement tasks in SCADA environments.

It enables the user to access IP networks containing traditional telemanagement and telemeasurement devices, which only have a serial interface.

Due to its ruggedized mechanics and its special characteristics to support extreme temperatures, the **REGESTA 1** is ideally suited for: automotive applications, industrial environments, industrial telecontrol, distribution installations for electricity, gas, water, etc.

The main characteristic of this router family lies in the possibility in accessing data networks through cellular or mobile telephony technologies. The **REGESTA 1** family is compatible with GSM and GPRS technologies.

This manual will show you how to install, connect and configure these devices.

Fig. 1: **Teldat Regesta1: External aspect**

1.2 SCADA Systems

SCADA stands for “Supervisory Control And Data Acquisition”. I.e. a system that carries out centralized measurements and control over industrial processes. A SCADA system consists of an Central Host or MASTER (normally known as Master Terminal Unit or MTU); one or more data gathering devices or remote controls (normally known as Remote Terminal Units or RTUs); and a set of software and/or hardware tools used to monitor and control remotely located devices.

A SCADA system gathers the necessary information in order to perceive the status of the system it is controlling at all times, drawing attention to abnormal situations, generating analysis and executing possible control functions. SCADA determines which situations may be critical, presenting a logical and organized report. A SCADA system may be simple or extremely complex.

Normally, a distributed SCADA, where the information sources (RTUs) are distanced from the control center, use protocols over leased lines or PSTN for interconnection. Examples of SCADA protocols are MODBUS and IEC 64870-5-101 (henceforth known as IEC-101).

Generally, the connection of two remote devices or RTU's with SCADA applications is done using serial connections such as RS-232 or TCP/IP. The **REGESTA 1** allows you to configure various types of communication protocols for its SCADA interfaces as well as different operating modes for each of them.

As an example, MODBUS uses RTUs to communicate with the central part, in devices that must be monitored. These RTUs generally use an RS-232 compatible serial Interface, which can be connected directly or through a MODEM.

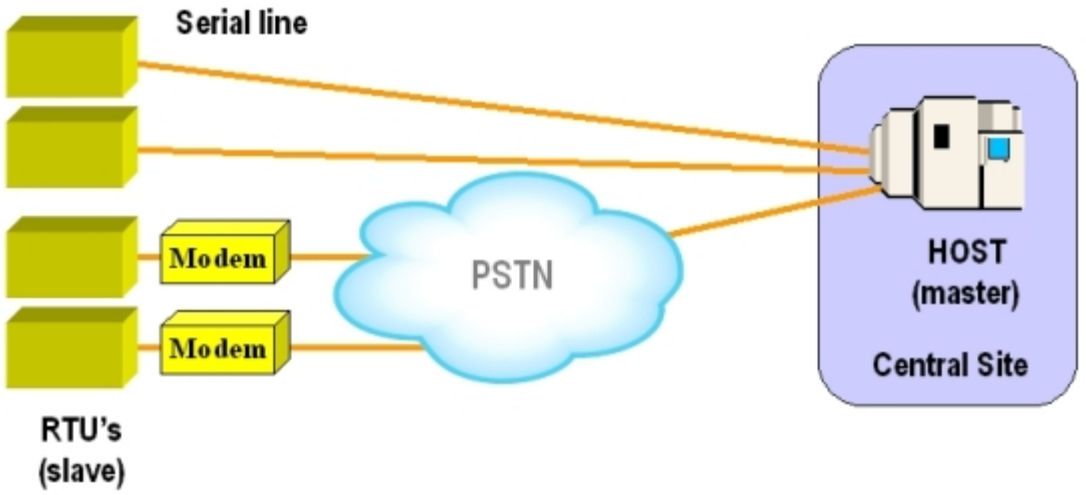


Fig. 2: **SCADA Systems**

MODBUS is a MASTER-SLAVE asynchronous protocol whose "MASTER" (central Host) queries the "SLAVE" remote unit, identifying it with an 8-bit addressing field. The remote unit responds to each petition with the corresponding answer. MODBUS defines a series specific 'petitions', known as functions, with the aim of acquiring data, controlling and diagnosing the remote units which shape the system.

The **REGESTA 1** is capable of sending information generated on SCADA interfaces over cellular telephony, encapsulating it in TCP/IP complying with the used protocol standard.

The following figure displays an example of SCADA connectivity (MODBUS) over a GPRS network.

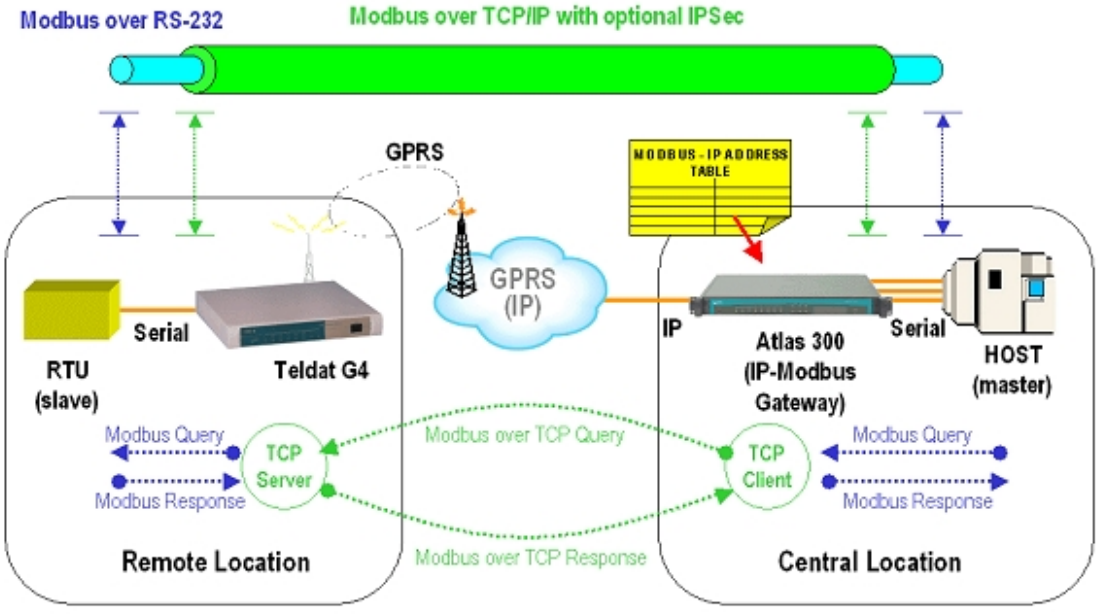


Fig. 3: **SCADA connectivity over a GPRS network**

In IEC-101 mode, the **REGESTA 1** behaves transparently, so that the traffic between both ends is monitored. However, this does not implement any standard protocol over TCP/IP between the two routers.

Although normally the user scenario is similar to that indicated in the above figure, other types of environments can exist where there is only one router with SCADA interface at one of the two ends, the other device being able to directly access via the SCADA TCP/IP format for the protocol being used.

In certain types of communication networks, it might be necessary to limit the time in which the TCP sessions are kept active. For example, in situations where GRPS is used as the TCP/IP transport method, depending on how the telephony carrier bills, it might be more economical to not maintain the TCP sessions active. To do this, the SCADA interface allows you to configure the time in which the router will maintain the TCP session after exchanging the last message.

Some basic examples of connectivity have been given below. Scenarios can be created where some of the aforementioned scenarios are given simultaneously.

(1) Basic Connection. A central Host connects to a Teldat router with SCADA interface. The remote end consists of a serial RTU connected to a Teldat router with SCADA interface. In this case, the **REGESTA 1** can be installed as a router connected to the RTU.

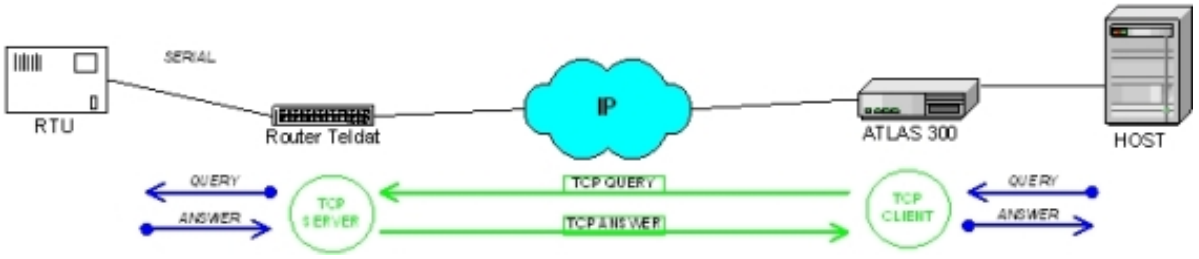


Fig. 4: **Basic Connection**

(2) HOST permitting TCP/IP connection. A central Host connects directly to an IP network supporting SCADA TCP/IP CLIENT. The remote end consists of a serial RTU connected to a router with SCADA interface. In this case the **REGESTA 1** can be installed as a router connected to the RTU.

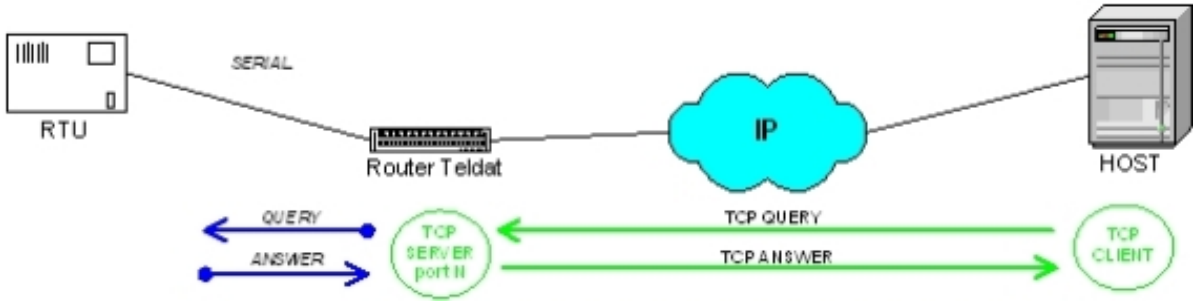


Fig. 5: **HOST permitting TCP/IP connection**

(3) Remote device with a SLIP interface. A central Host directly connects to an IP network in TCP/IP CLIENT mode. The other end consists of a Remote Terminal with a SLIP serial interface connected to a router. In this case, the **REGESTA 1** can be installed as a router connected to the RTU.

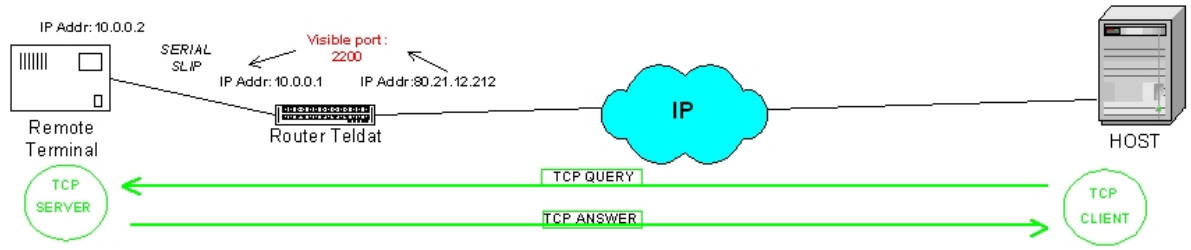


Fig. 6: **Remote device with a SLIP interface**

1.2.1 SLIP Protocol

The **SLIP** protocol (Serial Line Internet Protocol) is an IP datagram transmission standard for serial lines. It was designed to work over serial ports and modem connections. The specification for this can be found in RFC 1055.

SLIP is the predecessor of the more commonly used and extended PPP (Point-to-Point Protocol). However, with micro-controllers, SLIP encapsulation for IP packets continues to be used as it has a very small overhead.

SLIP needs its IP address to be configured before being established.

So that SLIP runs correctly, its serial port configuration needs to be 8 data bits with no parity. One version of SLIP with header compression is **CSLIP** (Compressed SLIP). This was developed by *Van Jacobson* and its role was to reduce the typical 40 byte header to 3 or 5 bytes helped by the fact that many of the header fields do not vary during a connection.

SLIP modifies each IP datagram adding a special character C0 or “SLIP END” so it can differentiate between different datagrams. To prevent line noise it usually sends one at the beginning as well and consequently assumes that any previous erroneous connection has terminated.

If the C0 character is present in the datagram content, it uses the two byte sequence DB, DC. The DB character is the SLIP escape character. If the escape character is presented within the content, it is replaced by the DB, DD sequence.

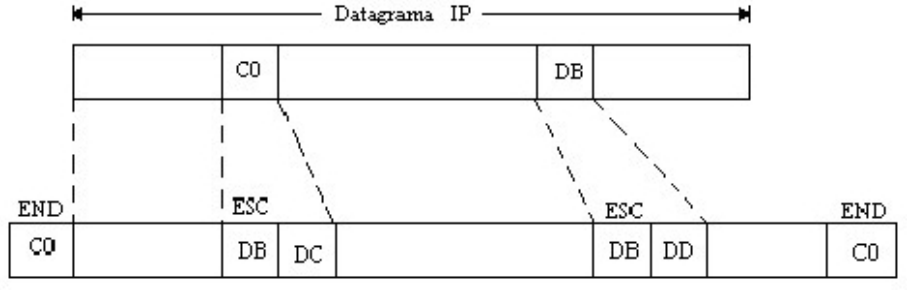


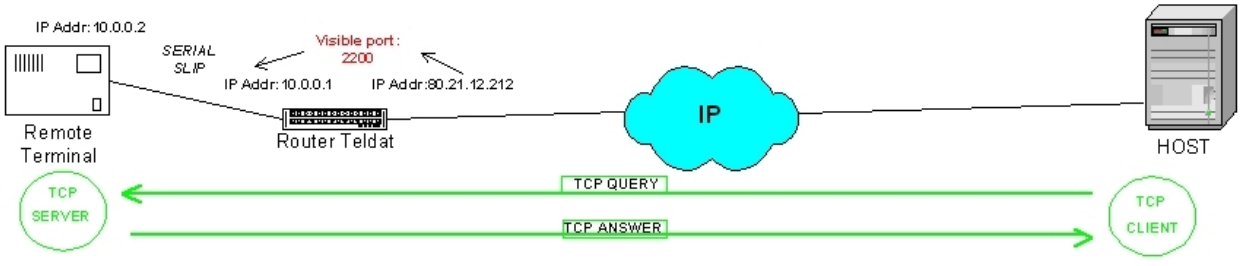
Fig. 7: **SLIP Protocol**

In the **REGESTA 1** router, SLIP is configured so that the protocol knows, beforehand, the local IP address and the IP address of its remote pair. I.e. there is no dynamic addressing so the two connected devices must know their respective IP addresses. Both addresses must pertain to the same network.

You must also program the type of SLIP to use. It’s very important that both devices are configured with the same mode (slip, cslip, slip6, cslip6).

The mode which the **REGESTA 1** router uses to route the IP datagrams, which come through the GPRS interface, is based on the creation of visible ports. This routing mode DNAT (Destination-NAT) is valid to create the visible port.

When the device is configured in SLIP mode, all IP datagrams with source in the GPRS network and that have the port configured in visible port as destination TCP port, are sent through the SLIP serial port to the remote terminal. All the IP datagrams with source in the remote terminal, which are sent through the SLIP serial port, are sent to the GPRS network.



1.3 SCADA characteristics

The features supported by the SCADA Interface are as follows:

- Type of serial Interface supported:

  RS-232 (presents DCE configuration)

- Protocols over asynchronous serial line:

MODBUS-RTU

MODBUD-ASCII

IEC 60870-5-101 UNBALANCED

IEC 60870-5-101 BALANCED

IEC 60870-5-102 UNBALANCED

IEC 60870-5-102 BALANCED

- Supported character format:

start + 8 data + parity + 1 stop. For MODBUS-RTU and IEC 60870-5-101

start + 7 data + parity + 1 stop. For MODBUS-ASCII

- Types of supported parity:

EVEN

ODD

- TCP/IP Modes:

CLIENT

SERVER

- Timers to control the TCP station time:

Maximum TCP session time without data traffic, inactivity.

Chapter 2 Installation

2.1 Connections

Caution

Before connecting the router, please read the following instructions carefully.

Workplace Conditions. Main Characteristics

- Avoid humid and or dusty locations.
- Direct exposure to sunlight should be avoided as well as other heat sources. The device should not be placed amongst papers, magazines or other elements that could hinder natural air circulation.
- The device should not be placed very close to strong electromagnetic fields such as speakers, engines, etc.
- Knocks and/or strong vibrations should be avoided during transport, operation and storage.

Warning

The electric current in power cables, telephone lines and communication cables is dangerous. To prevent electric shocks, before installing, handling or opening the equipment covers, connect and disconnect the cables as follows:

To Connect	To Disconnect
Make sure that the power supply cable is not connected to the device.	Disconnect the power supply cable from the device
Connect all data cables	Disconnect the data cables
Connect the power supply cable to the device	

2.1.1 Power Source Connection

The **REGESTA 1** router family is powered with an external AC source.

To avoid electric shocks, residual current circulation and other unwanted effects, also affecting communications, the following is recommended:

Warning

All interconnected communication devices should be plugged to THE SAME GROUNDED POWER OUTLET, which should at the same time be of good quality (lower than 10 ohms).

Whether the workplace is provided with an uninterrupted power supply system (UPS), regulated supply or it is independent from the rest (such as lighting, etc.); it is highly recommended that all data devices should be connected to the same power source. This will avoid operating and premature aging problems of drivers and other components.

The following picture shows where the power connector is located.

The following image shows where the connector is located on the front panel of the device:

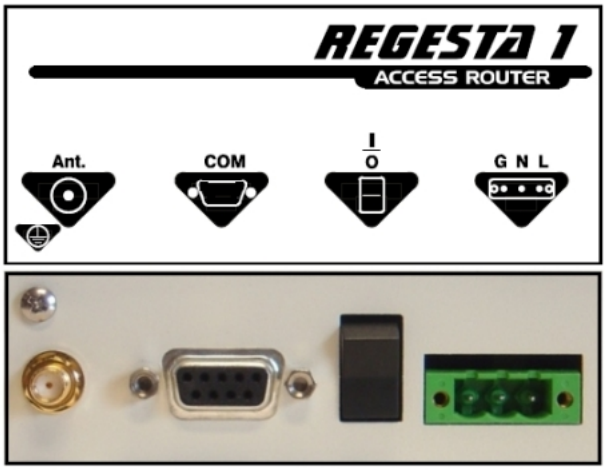


Fig. 8: **Power supply connection**

To connect the power source to the device, follow the steps listed in the earlier table: find the GNL connector, located on the front panel of the device and insert the power cable.

It's not necessary for the N and L power terminals to be connected maintaining their nomenclature. I.e. although N means "neutral", it's not essential that the "neutral", if it exists, is connected to this terminal. However it is essential that the power is always connected in the N and L terminals. The G terminal must be connected to the ground.

The device has a terminal  to connect to the installation's security ground circuit. You must make sure that the device is always connected to the installation ground and always in this terminal. In cases where the security ground circuit is not installed, the device must be connected to a ground equipotential bar for all the different metal parts. This operation must always be carried out before connecting the power conductors to the device

2.1.2 Connecting to the WWAN antenna

The **REGESTA 1** router has a connector in order to connect a WWAN antenna. To assemble and dismantle the antenna, simply screw it to the connectors labeled WWAN, which are located on the front of the device.

Antenna installation is essential in the **REGESTA 1** routers in order to improve the quality of the signal received and transmitted by the Wireless WAN module (GSM/GPRS).

Note

To obtain optimum performance, the router should always have the WWAN antenna installed.

The following picture shows where the antenna connector is located.

The following image shows where the connector is located on the front panel of the device:

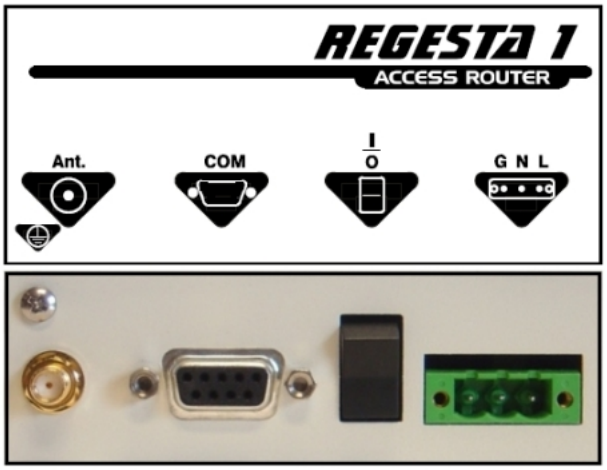


Fig. 9: **Antenna connector for Wireless WAN**

In order to achieve optimum features, the installed radio frequency accessories (antennas and cables) should be those recommended by Teldat.

Teldat has a series of accessories (90º mount antennas, exterior antennas, ceiling antennas, extension cables, etc.) which means that the **REGESTA 1** routers can be installed in different locations.

2.1.2.1 Positioning the antenna

The antenna orientation (i.e., its location with respect to other wireless devices and radiation devices such as communication devices, personal computers, etc.) can significantly influence device performance.

The antennas transmit and receive radio signals. Performance is also affected by environmental factors such as the distance between the device and the base station, physical obstacles and other interferences due to radio frequencies (RF).

In order to achieve the best coverage, carry out the following instructions:

- Whenever possible, place the antenna where there are no physical obstacles. Obstacles between the antenna and the base station degrade the wireless signal. Place the antenna above ground level and ensure that it is suitably orientated towards the nearest base station.
- Density of materials also affects the antennas. Place them away from any type of wall, metal screens, mirrors, etc.
- Do not place the antenna near columns that can produce shadow areas and reduce the coverage zone.
- Keep the antenna away from metal pipes such as canals, air-conditioning, etc.
- Please bear in mind that other wireless devices, such as telephones, microwaves, etc., can temporarily interfere with the quality of the wireless signal.
- We do not recommend that you install the antennas near or between racks containing communication devices, computers, etc. Use an extension cable and place the antenna outside.

The following recommendations are applicable to all wireless devices:

- Do not touch or move the antenna while the device is transmitting or receiving.
- Do not touch any equipment that contains devices which radiate where the antenna is very close to or touching any exposed part of the body, particularly the face and eyes, when it is transmitting.
- Do not install the device in areas where the atmosphere is potentially explosive.
- Wireless devices can cause interference in other devices. Do not use the device in areas where medical equipment is installed.
- In order to ensure that you are complying with the R&TTE 1999/5/EC norm, the device must be at least 15 cm away from any person when operating.

2.1.3 Serial Line Connection (COM)

The **REGESTA 1** router has a DB9 female connector on the front panel referred to as "**COM.**" which provides access to the device serial port.

This port has a double function where you can configure the device through AT commands as well as transfer data from the terminal connected to this.

The following picture displays where the serial port connector is located.

The following image shows where the connector is located on the front panel of the device:

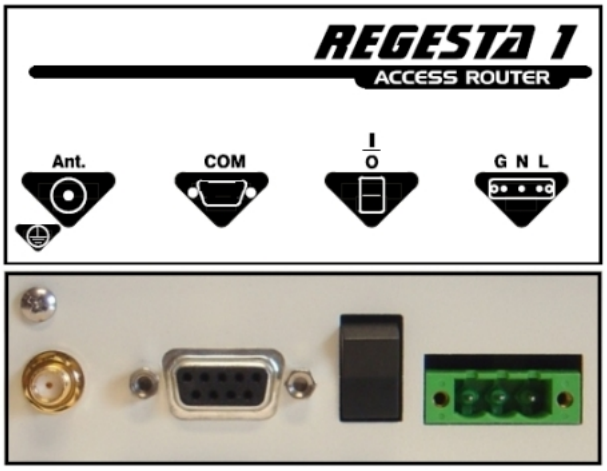


Fig. 10: **REGESTA 1 configuration connector**

Note

The default configuration for the COM port is as follows:

- Speed: 9600 bps.
- Eight data bits.
- One stop bit.
- EVEN parity.
- No type of flow control.

The speed and parity type can be modified through AT commands.

Connection to the configuration port can be carried out connecting a DB9 Male to a DB9 Female. In cases where the terminal has DB25 connectors, you will need to use an additional adapter.

2.2 Installing the SIM card

The **REGESTA 1** has a Wireless WAN interface which in order to operate requires a SIM card inserted in the device.

Warning

Never install the SIM card when the device is switched on.

When inserting the SIM card, please protect yourself against electrostatic discharges (ESD).

Do not touch the SIM card connectors.

2.2.1 Installing the SIM

The SIM tray is situated in the rear end of the device. The following figure shows where to find the external tray:

Procedure:

- Extract the tray. To extract it, press the yellow button located on the right of the slot with the help of a pointed object, such as a ballpoint, as shown in the following figure:

Fig. 11: **Extracting the external SIM**

- In order to insert the SIM card, first place it in the tray.
- If the tray already has a SIM card, you need to extract it by pushing it using the hole on the underside of the tray.
- Subsequently, you need to place the SIM on the tray so that its connectors can be seen; these are normally a gold color. In addition, you must make sure that the tray notch coincides with the SIM notch.
- Then insert the tray in the slot using the guides so the SIM card remains on the tray.

Chapter 3 Meaning of the LEDs

The following figure shows the positions of the LEDs on the front panel of the device:

Fig. 12: **REGESTA 1: Upper case panel**

ON	General powering for the device: **OFF:** Device without power. **ON:** Device correctly powered.
COM	Serial port activity. **OFF:** Serial port inactive. This is always off in SLIP mode. **ON:** Serial port active
NET	Indicates the Wireless WAN (GSM) interface coverage level (Rxlevel). **OFF:** No coverage. **ON:** GREEN: > **- 77** *dBm (Optimum level)* YELLOW: # - 77 dBm, # - 89 dBm (Acceptable level) RED: # - 89 dBm (Poor level)
SIM	SIM status **OFF:** No SIM inserted **ON:** SIM inserted correctly
GPRS	GPRS context status.

	OFF: GPRS Context (PDP) isn't established **ON:** GPRS Context (PDP) established

Chapter 4 Configuration

4.1 Introduction

The **REGESTA 1** router configuration is carried out through AT commands.

The **REGESTA 1** router can be configured through transmission in two ways:

- Through the local COM port. For this you need to have a device (PC) with a terminal emulator program (Hyperterminal in Windows or similar) and a serial cable for RS232 connection.
- Through a TCP session.

4.2 Through the COM serial port

Configuring the device through the COM serial port is carried out through a device that allows you to use a program which controls the serial port.

This is normally a serial port in a PC and a standard communications program (such as Hyperterminal or Teraterm).

The configuration is carried out through AT commands.

Depending on the configuration of the devices, behavior (from the AT commands point of view) can be different. E.g. in SLIP mode, the device on start up directly enters the commands mode. This occurs in the configuration from the serial port, not from configuration through the remote TCP session (socket 2). Below, you can see the methods to configure the devices for NO SLIP and SLIP modes.

4.2.1 NO SLIP Mode

When the device boots, it boots in DATA mode by default. This is indicated in the boot message:

```
  Teldat REGESTA 1 (c)2009
  GSM/GPRS ROUTER  Rev: 1.0
  SCADA IEC-101/102 gateway


Start DATA mode, enter: + + + ; to switch COMMAND mode .....
```

To pass to the AT commands mode, as shown in the welcome message, you need to enter the escape sequence: "+ + +".

The characters should be entered slowly; there must be a minimum time of 200 msgs between each one. However, this time cannot surpass 2 seconds.

Once you've entered the escape sequence, the following message appears:

```
OK

  Teldat REGESTA 1 (c)2009
  GSM/GPRS ROUTER  Rev: 1.0
  SCADA IEC-101/102 gateway
```

From this point on, the device is in AT commands mode. You can configure or monitor the device in this mode.

```
at*zstat
   SOCKETS STATUS
Socket 1 - DATA:.....DISCONNECTED
Socket 2 - CONFIG:...LISTEN
```

```
Socket 3 - COM spy:..DISCONNECTED
Socket 4 - GPRS spy:.DISCONNECTED
Socket 5 - :.........CLOSED

   COM STATUS
State:.....OPEN
Mode:......COMMAND
TX bytes:..0
RX bytes:..15

   SNMP STATUS
State:.....STOP

   GSM/GPRS STATUS
IMEI: 357251010290987
IMSI: 214072530000435
GSM FW rel.: 07.03.940
Current mode: GPRS
State: GSM/GPRS module connected
APN: movistar.es
IP Address: 88.28.155.131
Connection uptime: 24 secs
#MONI: Cell  BSIC  LAC  CellId  ARFCN    Power  C1  C2  TA  RxQual  PLMN
#MONI:  S    52  0B05   082C      15   -56dbm  46  46   0     0    MOVISTAR
#MONI: N1    52  0B05   0123      52   -62dbm  40  32
#MONI: N2    60  0B05   082F     523   -64dbm  38  30
#MONI: N3    52  0B05   082B      48   -70dbm  32  24
#MONI: N4    60  0B05   0000     517   -73dbm  29  37
#MONI: N5    60  0B05   0000     528   -79dbm  23  15
#MONI: N6    60  0B05   0000     512   -81dbm  21  13


OK
```

To exit enter the ATO or the AT*ZEXIT command:

```
ato
OK
```

Caution

Executing the ATO or AT*ZEXIT command can force the device to restore a GPRS or DATA connection. This happens when a parameter has been modified in the commands phase and this process needs to be executed to activate the new configuration.

4.2.2 SLIP Mode

When the device starts up in SLIP mode, the behavior is different to starting up in IEC or TRANSPARENT modes. In SIP mode, the device immediately starts up in the AT commands and remains in commands mode for 120 seconds or until the ATO command is entered. Each time you enter a valid AT command (the device must return an OK) the counter for 120 seconds restarts.

```
Teldat REGESTA 1 (c)2009
GSM/GPRS ROUTER Release 1.2
SCADA IEC-101/102 gateway
```

```
Enter in COMMAND mode.
Type ATO or wait 120 secons, to switch DATA mode .....
AT+CGMR
APP: 1.2 GSM: 07.03.940

OK
ATO
Serial port switch to SLIP mode
```

As soon as the device switches to SLIP mode the serial port operates in this mode and cannot be accessed in AT mode.

SLIP doesn't support the AT escape sequence (+++) detection. You can access the device, while it's operating in SLIP mode, through the remote configuration TCP session (socket 2).

Caution

Executing the ATO or AT*ZEXIT command can force the device to restore a GPRS or DATA connection. This happens when a parameter has been modified in the commands phase and this process needs to be executed to activate the new configuration.

4.3 Through remote TCP connection

Configuring the device through a remote TCP session is done by means of a device that allows you to use a program which carries out transparent TCP connections. To do this, this device must have IP access to the device to be configured.

This is normally done using a PC and a standard communications program such as Teraterm.

The configuration is carried out through AT commands.

On establishing the remote TCP session, the device responds with a welcome message:

```
  Teldat REGESTA 1 (c)2009
  GSM/GPRS ROUTER  Rev: 1.0
  SCADA IEC-101/102 gateway


Remote AT console start.....
```

From this point on, the device is in AT commands mode. You can configure or monitor the device in this mode.

```
at*zstat
   SOCKETS STATUS
Socket 1 - DATA:.....DISCONNECTED
Socket 2 - CONFIG:...LISTEN
Socket 3 - COM spy:..DISCONNECTED
Socket 4 - GPRS spy:.DISCONNECTED
Socket 5 - :.........CLOSED

   COM STATUS
State:.....OPEN
Mode:......COMMAND
TX bytes:..0
RX bytes:..15

   SNMP STATUS
State:.....STOP
```

```
   GSM/GPRS STATUS
IMEI: 357251010290987
IMSI: 214072530000435
GSM FW rel.: 07.03.940
Current mode: GPRS
State: GSM/GPRS module connected
APN: movistar.es
IP Address: 88.28.155.131
Connection uptime: 24 secs
#MONI: Cell  BSIC  LAC  CellId  ARFCN    Power  C1  C2  TA  RxQual  PLMN
#MONI:  S    52  0B05   082C      15   -56dbm  46  46   0     0    MOVISTAR
#MONI: N1    52  0B05   0123      52   -62dbm  40  32
#MONI: N2    60  0B05   082F     523   -64dbm  38  30
#MONI: N3    52  0B05   082B      48   -70dbm  32  24
#MONI: N4    60  0B05   0000     517   -73dbm  29  37
#MONI: N5    60  0B05   0000     528   -79dbm  23  15
#MONI: N6    60  0B05   0000     512   -81dbm  21  13


OK
```

To exit enter the ATO or the AT*ZEXIT command which will close the TCP session:

```
ato
OK
```

Caution

Executing the ATO or AT*ZEXIT command can force the device to restore a GPRS or DATA connection. This happens when a parameter has been modified in the commands phase and this process needs to be executed to activate the new configuration.

4.4 AT Commands

The REGESTA 1 implements a series of AT commands, both standard and proprietor, which permit it to cover all the functionalities for this.

The following AT commands descriptions don't have examples of all the modes in which a command can be executed. This is particularly interesting to bear in mind when dealing with the commands that admit a format which includes the "=" character. With this, you can highlight the commands that include this character so they can be executed as well using: "=?" for help and "?" to view the actual configured value.

Example 1. "=?" -> help:

```
AT*Z1=?
 *Z1: Provider APN

OK
```

Example 2. "=" -> configuration:

```
AT*Z1="netmovile.com"
OK
```

Example 3. "?" -> query:

```
AT*Z1?
*Z1: "netmovile.com"
```

```
OK
```

4.4.1 Standard Commands

Here we are going to summarize the standard AT commands that the **REGESTA 1** supports.

4.4.1.1 Serial Port Configuration

Syntax	**AT+IPR**=<bps>
Description	Configures the serial port speed. <bps> transfer speed in bits per seconds. The permitted speeds are: • 1200 • 4800 • 9600 • 19200 • 57600 • 115200
Example	**AT+IPR=115200** **OK**
Syntax	**AT+IFC=<dce-dte>,<dtedce>**
Description	Permits you to Activate/Deactivate the flow control The permitted speeds for the <dce-dte> and <dtedce> fields are: • 1,1 SW flow control (XON/XOFF) • 2,2 HW flow control • 0, 0 Without flow control
Example	**AT+IFC=2,2** **OK**
Syntax	**AT+ICF=<config>,<par>**
Description	Permits you to establish the number of data bits, parity and stop bits. The permitted values for the config> and <port> fields are: • 3,4 (8N1) Without parity. • 2,0 (8O1) Odd. • 2,1 (8E1) Even.
Example	**AT+IFC=3,4** **OK**

4.4.1.2 SIM PIN Configuration

Syntax	**AT+CPIN**=<pin>
Description	Allows you to configure the PIN code to activate the carrier's SIM. This command is different from the standard because, in this device, you only need to enter it once (unlike in the standard, where you have to enter it every time you boot the device). The PIN corresponds to a 4 digit numerical value.
Example	**AT+CPIN=0439** **OK**

4.4.1.3 Call Control

Syntax	**ATS0**=<n_rings>
Description	Permits you to configure the number of RINGS the device should receive in an incoming call before automatically hooking off. This parameter is used to respond to incoming CSD calls. <n_rings> can take values between 0 and 100. A 0 value disables automatic answering. This command has the same functionality as AT*ZS0.
Example	**ATS0=2** **OK**

4.4.1.4 Monitoring and handling of configurations

Syntax	**AT+CSQ**
Description	Permits you to obtain the coverage information at the radio layer of the device. Returns the RSSI and BER value: +CSQ:<rssi>,<ber> The values the <rssi> can take, and their relation in dBm, are as follows: 0 -113 dBm or less 1 -111 dBm 2..30 -109... -53 dBm (= -113 + RSSI*2) 31 -51 dBm or greater 99 Unknown and not detectable The values the <ber> can take, and their relation in dBm, are as follows: 0..7 RXQUAL according to the GSM 05.08 table, section 8.2.4. 99 Unknown and not detectable
Example	**AT+CSQ** +**CSQ: 20,0** **OK**
Syntax	**AT&V**
Description	Permits you to obtain the device's standard AT commands configuration.
Example	**AT&V** Q:0 V:1 S0:003 S2:043 S3:013 S4:010 S5:008 +CR:0 +CRC:1 +CMEE:1 +CBST:0,0,1 +SPEAKER:0 +ECHO:0,1 &C:1 &D:2 %C:0 +IPR:9600 +ICF:2,1 +IFC:0,0 **OK**
Syntax	**AT+CGMR**
Description	Displays the FW version for the router application and for the GES/GPRS module.
Example	**AT+CGMR** **APP: 1.2 GSM: 07.03.940** **OK**
Syntax	**ATI**
Description	Displays information on the device type and model.

Example	**ATI** Teldat **REGESTA 1** (c)2009 **GSM/GPRS ROUTER Release 1.2** **SCADA IEC-101/102 gateway** **OK**
Syntax	**AT&F**
Description	Loads the factory default configuration in the device. <n> This is an optional value which allows you to select between the various default configurations. The 0 value is equivalent to not entering any number. This can take the values 0 and 1. **Caution** Executing this command means the active configuration is destroyed.
Example	**AT&F** **OK**
Syntax	**AT&W**
Description	The aim of this command is to make certain devices compatible. Although the function of this command is to save the active configuration, in this device no action is executed. All the commands are automatically saved as they are entered.
Example	**AT&W** **OK**
Syntax	**ATO**
Description	This command is used to exit the "AT commands" mode in the device and pass to the "DATA" mode, when this is executed from the serial port (COM). When this is executed from a remote configuration session (socket 2), the said session is then closed. The command function is the same as the AT*ZEXIT command. **Caution** Executing this command can force the device to restore a GPRS or DATA connection. This happens when a parameter has been modified in the commands phase and this process needs to be executed to activate the new configuration.
Example	**ATO** **OK**

4.4.2 Proprietary Commands

To execute the functionalities described in previous sections, the **REGESTA 1** needs to configure various parameters for which there aren't any standard AT commands. To do this, you have to incorporate a series of proprietor commands that allow you to configure and monitor the described functionalities.

The following can be indicated among these functions:

- APN subscription, User and Password data.
- To configure TCP/UDP connection parameters, in order to interchange data between a terminal connected to the modem's serial port and a control center.
- The configuration parameters for the SCADA protocol used.
- TCP connection parameters for the remote AT management console.
- Watchdog mechanisms.
- Other actions in general related to controlling and monitoring devices:

  Start a determined socket.

  Close a determined socket.

  Indicate the modem state, IP address and state of the sockets
- SNMP management. Configure trap sending.
- To configure a Serial Line IP session (SLIP) in the COM port.

All the proprietary commands begin with the following characters: "AT*Z".

Below you can see a list with the description of the specific AT*Z commands.

4.4.2.1 GPRS Parameters

Syntax	**AT*Z1="<apn>"**
Description	Allows you to configure the APN assigned by the SIM carrier to connect with the central server. <apn> consists of a string of characters with a maximum of 40 characters.
Example	**AT*Z1="netoperator.com"** **OK**
Syntax	**AT*Z2="<user>"**
Description	Allows you to configure the user name associated to the APN, assigned by the SIM carrier, to connect to the central server. <user> consists of a string of characters with a maximum of 19 characters.
Example	**AT*Z2="myoperator"** **OK**
Syntax	**AT*Z3="<pass>"**
Description	Allows you to configure the password associated to the APN, assigned by the SIM carrier, to connect to the central server. <pass> consists of a string of characters with a maximum of 19 characters.
Example	**AT*Z3="myoperator"**

	OK

4.4.2.2 Identification Parameters

Syntax	**AT*Z4=”<id>”**
Description	Allows you to configure a string of characters to identify the modem. <id> consists of a string of characters with a maximum of 19 characters.
Example	**AT*Z4=”mydevice11”** **OK**

4.4.2.3 Generic Parameters

Syntax	**AT*Z5=<time>**
Description	Allows you to configure the time value, in milliseconds, that the Terminal waits to receive the data and complete the serial port frames IEC-101/102. <time> admits values between 0 and 32,769 msg. A 0 value means no wait time is executed. This parameter is only logical when the device is configured to operate in IEC-101/102 (AT*Z18=1) mode.
Example	**AT*Z5=200** **OK**
Syntax	**AT*Z6=<notif>**
Description	Allows you to configure if the device should send its IP address, together with its name (*Z4), to a determined server, defined by its IP address (*Z11). The values this can take <notif> are as follows: 0: Does not notify the IP address. 1: Notifies the server (*Z11) without confirmation and with socket 1 passive. 2: Notifies the server (*Z11) with ACK confirmation and socket 1 is passive. 3: Does not notify the IP address assigned by the network and socket 1 is active.
Example	**AT*Z6=0** **OK**
Syntax	**AT*Z7=<time>**
Description	Allows you to configure the idle time (in seconds) that the device waits before deciding the DATA (socket 1) TCP/UDP connection has finished. <time> admits values between 0 and 32,769 secs. A 0 value disables the idle time functionality.
Example	**AT*Z7=300** **OK**

Syntax	**AT*Z8=<time>**
Description	Allows you to configure a time, in minutes, at the end of which, once a critical event has been detected, the device reboots. <time> admits values between 0 and 120 mins. The critical events can be: • Didn't manage to activate a context, didn't get an IP address. • Didn't manage to open the active socket. • Has notified a server of its name and IP address, but hasn't received an ACK in the defined time. A 0 value disables this functionality.
Example	**AT*Z8=10** **OK**
Syntax	**AT*Z9=<time>**
Description	Allows you to configure the idle time for data GSM calls (CSD). <time> admits values between 0 and 32760 secs. A 0 value disables the idle time functionality.
Example	**AT*Z9=300** **OK**
Syntax	**AT*ZKEEPALIVE="<ip>",<time>,<n_ping>,"<action>"**
Description	This allows you to configure PING packet transmission to a determined IP address. Its function is to verify that the data link remains active. In cases where the programmed PING sequences fail, the configured "action" is executed (reconnection or device restart). The parameters have the following means and can take the following values: <ip>: the IP address the PING process is launched to. <time>: time between sending ping bursts 0-60 minutes. <n_ping>: number of pings per burst 0-10 packets. <Action>: Indicate the action to execute in cases where pings fail: "NONE" no action. "REBOOT" reboot the device. "RECONNECT" reestablish context. A 0 value in <time> disables the idle time functionality.
Example	**AT*ZKEEPALIVE= "192.2.0.22",20,3,"NONE"** **OK**
Syntax	**AT*ZRESET=<time>**
Description	This command has a double function.

	Firstly, when it's entered without the additional <time> parameter (AT*ZRESET), then the device software is reset. Secondly, when this is entered with the <time> parameter (AT*ZRESET=24), this permits you to configure a periodic programmed reset. The aim of this option is to debug the device against possible network failures or failures in the device itself. <time> This is an optional value where you can configure a programmed reset. This value indicates the number of hours between the reset process. This can take values between 0 and 720. A 0 value disables the programmed reset functionality.
Example	**AT*ZRESET=12** **OK** **AT*ZRESET?** ***ZRESET: 12** **OK** **AT*ZRESET** **OK**
Syntax	**AT*ZSTAT**
Description	Allows you to get information on the state of the device. Within the information you can get with this command you'll find: the current state of the TCP sockets, the state of the serial interface (COM), the SNMP control process and the GSM/GPRS connection general parameters. Depending on the state of the GSM/GPRS connection, it's possible that the information presented can vary.
Example	**AT*ZSTAT** SOCKETS STATUS Socket 1 - DATA:.....DISCONNECTED Socket 2 - CONFIG:...LISTEN Socket 3 - COM spy:..DISCONNECTED Socket 4 - GPRS spy:.DISCONNECTED Socket 5 - :.....CLOSED COM STATUS State:.....OPEN Mode:.....COMMAND TX bytes:..0 RX bytes:..15 SNMP STATUS State:.....STOP

	GSM/GPRS STATUS IMEI: 357251010290987 IMSI: 214072530000435 GSM FW rel.: 07.03.940 Current mode: GPRS State: GSM/GPRS module connected APN: netstar.es IP Address: 88.28.155.131 Connection uptime: 24 secs #MONI: Cell BSIC LAC CellId ARFCN Power C1 C2 TA RxQual PLMN #MONI: S 52 0B05 082C 15 -56dbm 46 46 0 0 NETSTAR #MONI: N1 52 0B05 0123 52 -62dbm 40 32 #MONI: N2 60 0B05 082F 523 -64dbm 38 30 #MONI: N3 52 0B05 082B 48 -70dbm 32 24 #MONI: N4 60 0B05 0000 517 -73dbm 29 37 #MONI: N5 60 0B05 0000 528 -79dbm 23 15 #MONI: N6 60 0B05 0000 512 -81dbm 21 13 **OK**
Syntax	**AT*Z**
Description	Allows you to obtain the configuration of the device's AT*Z commands.
Example	AT*Z at*z *Z1: "netstar.es" *Z2: "NETSTAT" *Z3: "INTERNET" *Z4: "Regesta1" *Z5: 2000 *Z6: 0 *Z7: 300 *Z8: 0 *Z9: 120 *Z10: 30001 *Z11: "0.0.0.0" *Z12: "255.255.255.255"

	*Z13: 0 *Z14: 80 *Z15: 2 *Z16: 20 *Z17: 0 *Z18: 2 *Z22: "255.255.255.255" *Z24: 23 *Z32: "255.255.255.255" *Z34: 3100 *Z42: "255.255.255.255" *Z44: 3200 *ZS0: 3 *ZSNMPIP: "0.0.0.0" *ZSNMPPORT: 162 *ZGROUP: "Regesta1" *ZCLT: 8,11 *ZKEEPALIVE: "",20,3,"NONE" *ZRESET: 0 *ZSLIP: "10.0.0.1","10.0.0.2",2200,"slip" **OK**
Syntax	**AT*ZEXIT**
Description	This command is used to exit the "AT commands" mode in the device and pass to the "DATA" mode when executed from a serial port (COM). When this is executed from a remote configuration session (socket 2), the session is closed. The function of this command is the same as the ATO command.  **Caution** Executing this command can force the device to restore a GPRS or DATA connection. This happens when a parameter has been modified in the commands phase and this process needs to be executed to activate the new configuration.
Example	**AT*ZEXIT** **OK**
Syntax	**AT*ZSERIAL**
Description	Permits you to VIEW the information on the modem serial number.

Example	**AT*ZSERIAL** **S/N: 725/000100** **OK**
Syntax	**AT*ZOPEN=<n_socket>**
Description	Permits you to open the indicated socket in the <n_socket> parameters. <n_socket> can take the following values: • 1 socket1 • 2 socket2 • 3 socket3 • 4 socket4 • 5 socket5 This command is only operative for sockets 1, 3 and 4. The rest are maintained for compatibility. The main function is to activate the “spy” sockets.
Example	**AT*ZOPEN= 2** **OK**
Syntax	**AT*ZCLOSE=<n_socket>**
Description	Permits you to finalize the socket indicated in the <n_socket> parameter. <n_socket> can take the following values: • 1 socket1 • 2 socket2 • 3 socket3 • 4 socket4 • 5 socket5 This command is only operative for sockets 1, 3 and 4. The rest are maintained for compatibility. The main function is to activate the “spy” sockets.
Example	**AT*ZCLOSE= 2** **OK**
Syntax	**AT*ZS0**=<n_rings>
Description	Allows you to configure the number of RINGs that the device should receive, in an incoming call, before the call automatically hooks off. This parameter is used to attend incoming CSD calls. <n_rings> can take values between 1 and 100. A 0 value disables the automatic answering machine. This command has the same function as ATS0
Example	**AT*ZS0=2** **OK**

4.4.2.4 Socket 1: Data connection

The purpose of this socket is to establish a data connection between the device serial terminal (COM) and a remote device through a TCP/IP session. During this process the asynchronous characters received through the serial port are sent to the other end through the TCP/IP socket. In the same way, data received from the remote end, through the TCP/IP socket, are sent in asynchronous characters through the serial port.

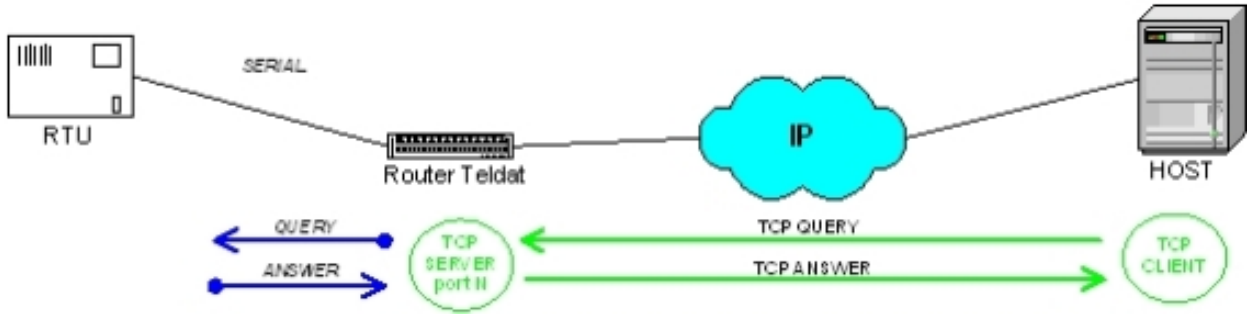


Fig. 13: **Data connection**

This socket is inactive when the device is configured to operate in Serial Line IP (SLIP) using the AT*Z18=2 command. In this mode the connection TCP socket with a remote device doesn't exist, the IP packets are directly routed to the serial ports and encapsulated with SLIP.

Syntax	**AT*Z17=<sck_type>**
Description	Allows you to configure the socket behavior from the point of view of client or server. <sck_type> this can take the following values: 0 configured as server. 1 configured as client.
Example	**AT*Z17= 0** **OK**
Syntax	**AT*Z10=<port>**
Description	This command allows you to configure the TCP/IP port number where the data connection is established. This command is only valid if the "*Z17=1" command indicates client mode. <port> this can take values between 1 and 65535.
Example	**AT*Z10=2134** **OK**
Syntax	**AT*Z11="<ip>"**
Description	This command allows you to configure the IP address where the data connection is established. This command is only valid if the "AT*Z17=1" command indicates client mode.
Example	**AT*Z11="192.3.4.5"** **OK**
Syntax	**AT*Z12="<mask>"**

Description	This command allows you to configure the mask to limit the IP addresses that may establish a data connection with the device. This command is only valid if the "AT*Z17=0" command indicates server mode. This command format is similar to an IP address. In this case the IP address for the incoming TCP/IP session is "filtered" with this mask and if it doesn't pass the filter, the connection is dropped.
Example	**AT*Z12="255.255.255.255"** **OK**
Syntax	**AT*Z13=<prot_type>**
Description	Allows you to configure the type of protocol to use in the data connections. <prot_type> can take the following values: 0 TCP connection. 1 UDP connection.
Example	**AT*Z13=0** **OK**
Syntax	**AT*Z14=<port >**
Description	This command allows you to configure the number of the port that listens to the TCP/UDP connection petitions, over which the data connection is established. This command is only valid if the "AT*Z17=0" command indicates server mode. <port> this can take values between 1 and 65535.
Example	**AT*Z14=4500** **OK**
Syntax	**AT*Z15=<num >**
Description	This command allows you to configure the number of connection retries. This command is only valid if the "AT*Z17=1" command indicates client mode. <num> this can take values between 0 and 10.
Example	**AT*Z15=2** **OK**
Syntax	**AT*Z16=<time >**
Description	This command allows you to configure the time between connection retries. This command is only valid if the "AT*Z17=1" command indicates client mode. <num> this can take values between 3 and 500 seconds.
Example	**AT*Z16=2** **OK**

Syntax	**AT*Z18=<value >**
Description	This command allows you to configure if encapsulation/decapsulation is to be executed over the messages received from the socket. The protocol needs to correctly interpret the frames so to meet with certain message transfer requirements (e.g. the timeout defined in the AT*Z5 register). SLIP (Serial Line IP) is used to route IP packets towards the terminal connected to the device serial port (COM). <value> this can take the following values: 0: Doesn't contemplate 101/102 1: Contemplates the 101/102 IEC protocols 2: SLIP Protocols
Example	**AT*Z18=2** **OK**

4.4.2.5 Socket 2 : Remote configuration connection

The purpose of this socket is to allow device configuration to be remotely accessed through a TCP session.

To establish this connection, you need an application that allows you to establish transparent TCP connections, i.e. without using Telnet or SSH. To do this, this device must have IP access to the device that is going to be configured.

The most common way to do this is by using a PC and a standard communications program (such as Teraterm).

This connection offers a set of AT commands similar to those offered through the COM port.

Syntax	**AT*Z22="<mask>"**
Description	This command allows you to configure the mask to limit the IP addresses that may establish a remote configuration connection with the device. This command format is similar to an IP address. In this case the IP address for the incoming TCP/IP session is "filtered" with this mask and if it doesn't pass the filter, the connection is dropped.
Example	**AT*Z22="255.255.255.255"** **OK**
Syntax	**AT*Z24=<port>**
Description	This command allows you to configure the number of the port that listens to the TCP/IP connection petitions, over which the remote configuration connection is established. <port> can take values between 1 and 65535.
Example	**AT*Z24=4434** **OK**

4.4.2.6 Socket 3: COM spy socket connection

The purpose of this socket is to allow remote access to the data sequence received from the COM port in "spy" mode. I.e. this socket sends all the data received from the serial port (COM) to the central side in ASCII hexadecimal format. This function is to debug the connection and for investigating breakdowns.

To establish this connection, you need an application that allows you to establish transparent TCP connections, i.e. without using Telnet or SSH. To do this, this device must have IP access to the device that is going to be monitored.

The most common way to do this is by using a PC and a standard communications program (such as Teraterm).

Syntax	**AT*Z32=”<mask>”**
Description	This command allows you to configure the mask to limit the IP addresses that may establish a COM port spy connection with the device. This command format is similar to an IP address. In this case, the IP address for the incoming TCP/IP session is “filtered” with this mask and if it doesn’t pass the filter, the connection is dropped.
Example	**AT*Z32=”255.255.255.255”** **OK**
Syntax	**AT*Z34=<port>**
Description	This command allows you to configure the number of the port that listens to the TCP/IP connection petitions, over which the COM port spy connection is established. <port> can take values between 1 and 65535.
Example	**AT*Z34=5555** **OK**

4.4.2.7 Socket 4: GPRS spy socket connection

The purpose of this socket is to allow remote access to the data sequence that is received by the COM port in spy mode through GPRS. I.e. this socket sends all the data received from the DATA Socket 1 to the central side in ASCII hexadecimal format. This function is to debug the connection and for investigating breakdowns.

To establish this connection you need an application that allows you to establish transparent TCP connections, i.e. without using Telnet or SSH. To do this, this device must have IP access to the device that is going to be monitored.

The most common way to do this is by using a PC and a standard communications program (such as Teraterm).

Syntax	**AT*Z42=”<mask>”**
Description	This command allows you to configure the mask to limit the IP addresses that may establish a GPRS spy connection with the device. This command format is similar to an IP address. In this case, the IP address for the incoming TCP/IP session is “filtered” with this mask and if it doesn’t pass the filter, the connection is dropped.
Example	**AT*Z42=”255.255.255.255”** **OK**
Syntax	**AT*Z44=<port>**
Description	This command allows you to configure the number of the port that listens to the TCP/IP connection petitions, over which the GPRS spy connection is established. <port> can take values between 1 and 65535.
Example	**AT*Z44=5555**

	OK

4.4.2.8 SNMP TRAPS

The device can send some SNMP traps. The purpose of this set of traps is to provide information on certain critical events that can arise in the GSM/GPRS network state.

The device must be permanently registered in GPRS to activate this feature.

There is a list of implemented SNMP traps in ANNEX A.

The traps are sent complying with the SNMP V.1 format.

Syntax	**AT*ZSNMPIP=”<ip>”**
Description	Indicates the Host IP address where the SNMP traps must be sent.
Example	*AT*ZSNMPIP=”192.23.44.56”* *OK*
Syntax	**AT*ZSNMPPORT=<port>**
Description	Indicates the Host UDP port where the SNMP traps must be sent. <port> can take values between 1 and 65535.
Example	*AT*ZSNMPORT=162* *OK*
Syntax	**AT*ZGROUP=”<group>”**
Description	Allows you to configure the group identifier used in the trap register. The maximum size of the group identifier must be 19 characters or less.
Example	*AT*ZGROUP=”TELEGES323”* *OK*
Syntax	**AT*ZCLT=<min>,<max>**
Description	Allows you to configure the RSSI threshold values, minimum and maximum, in order to send the low and normal coverage level traps. <min> Represents the RSSI value under which a LOW coverage level trap must be sent. This can take values between 0 and 20. <max> Represents the RSSI value above which a NORMAL coverage level trap must be sent. This can take values between 0 and 20. The change of trap level is only sent once when a RSSI change is produced and generates a transition from one of the thresholds.
Example	*AT*ZCLT=8,11* *OK*

4.4.2.9 Serial Line IP (SLIP)

The **SLIP** protocol (Serial Line Internet Protocol) is an IP datagram transmission standard for serial lines. It was designed to work over serial ports and modem connections. The specification for this can be found in RFC 1055.

SLIP is the predecessor of the more commonly used and extended PPP (Point-to-Point Protocol). However, with micro-controllers, SLIP encapsulation for IP packets continues to be used as it has a very small overhead.

SLIP needs its IP address to be configured before being established.

So that SLIP runs correctly, its serial port configuration needs to be 8 data bits with no parity. One version of SLIP with header compression is **CSLIP** (Compressed SLIP). This was developed through *Van Jacobson* and its role was to reduce the typical 40 byte header to 3 or 5 bytes helped by the fact that many of the header fields do not vary during a connection.

In the **REGESTA 1** router, SLIP is configured so that the protocol knows the local IP address and the IP address of its remote pair beforehand. I.e. there is no dynamic addressing so the two connected devices must know their respective IP addresses. Both addresses must pertain to the same network.

You must also program the type of SLIP to use. It's very important that both devices are configured with the same mode (slip, cslip, slip6, cslip6).

The mode that the **REGESTA 1** router uses to route the IP datagrams, which come through the GPRS interface, is based on the creation of visible ports. This routing mode DNAT (Destination-NAT) is valid to create the visible port.

When the device is configured in SLIP mode, all IP datagrams with source in the GPRS network that have the port configured in visible port as destination TCP port, are sent through the SLIP serial port to the remote terminal. All the IP datagrams with source in the remote terminal, which are sent through the SLIP serial port, are sent to the GPRS network.

The following image shows a typical user scenario for the SLIP protocol in a SCADA environment:

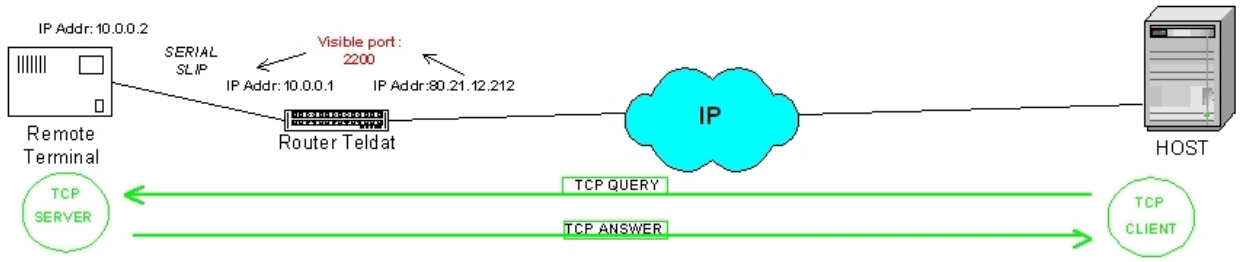


Fig. 14: **Serial Line IP (SLIP)**

For the SLIP protocol to be operative, you need to configure the SLIP mode through the AT*Z18=2 command. When you change the configuration from IEC or TRANSPARENT to SLIP, you need to reset the device so the configuration activates.

When the device starts up in SLIP mode, its behavior is different than in IEC or TRANSPARENT modes. In this mode, the device immediately starts up in the AT commands and remains in command mode for 120 seconds or until the ATO command is entered. Each time you enter a valid AT command (the device must return an OK) the counter for 120 seconds restarts.

```
  Teldat REGESTA 1 (c)2009
  GSM/GPRS ROUTER Release 1.2
  SCADA IEC-101/102 gateway


Enter in COMMAND mode.
Type ATO or wait 120 secons, to switch DATA mode .....
AT+CGMR
APP: 1.2 GSM: 07.03.940

OK
```

```
ATO
Serial port switch to SLIP mode
```

If the device switches to SLIP mode, the serial port operates in this mode and cannot be accessed in AT mode.

SLIP doesn't support the AT escape sequence (+++) detection.

You can access the device, while it's operating in SLIP mode, through the remote configuration TCP session (socket 2).

Syntax	**AT*ZSLIP**="<loc_ip>,"<rem_ip>", <visible_port>,"<slip_mode>"
Description	Configures the parameters needed to establish a connection with SLIP protocol through the COM serial port. <loc_ip> Configures the IP address assigned to the SLIP protocol local interface. <rem_ip> Configures the IP address assigned to the remote device connected to the serial port (COM) through SLIP. <visible_ port> Visible TCP/IP port to route to the remote device. <slip_mode> SLIP mode. This allows the following modes: • slip • cslip • slip6 • cslip6 You must configure the SLIP mode through the AT*Z18=2 command to activate SLIP.
Example	*AT*ZSNMPIP="192.23.44.56"* *OK*

Chapter 5 Loading the default configuration

The **REGESTA 1** routers have a jumper that allows you to load the default configuration.

This jumper must never be handled by the user other than to establish the default configuration.

Note

To ensure the device functions correctly, the P1 jumper must always be off.

5.1 Procedure

The following steps must be carried out when you have to reject the whole configuration of the device (for instance, if you cannot remember the password).

- Disconnect the device from the main electricity power.
- Using a screwdriver dismantle the device casing.
- Insert a jumper in the P1 connection.
- Reattach the device casing.
- Reconnect the device to the main electricity power.
- Turn the device on with the ON/OFF switch.
- Wait until the boot up message appears in the COM port:

```
Teldat REGESTA 1 (c)2009
GSM/GPRS MODEM  Rev: 1.0
SCADA IEC-101 gateway
```

- Disconnect the device from the main electricity power again.
- Dismantle the device casing again.
- Remove the jumper from the P1 connection.
- Reattach the device casing.

The next time you restart the device and reach this point, the saved configuration shall be respected.

Appendix A Technical Information

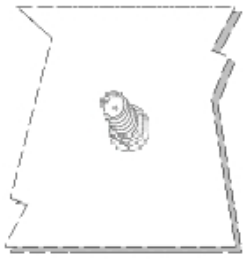
A.1 Troubleshooting

Below you will find a table that will help you solve problems during the installation of the device. If you cannot solve the problem, please ask your distributor for further information.

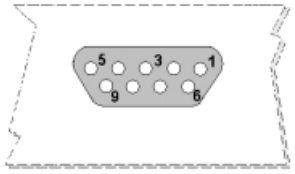
Problem	Solution
None of the LEDs lights up on the device.	Check the power supply to the device (power supply cable, main power outlet).
The SIM LED never lights up.	Check that the SIM card is both inserted in the corresponding tray and inserted correctly.
The NET LED lights up in red.	Check that the antenna is properly installed (screwed in), Or Check that the device's GSM antenna is placed so it receives optimum service.

A.2 Connectors

A.2.1 WWAN Connector

	PIN	ANT
	**Internal** **External**	RF in/out GND

A.2.2 Serial Port Connector

DB9 COM PORT	DB9 PIN	
	**1** **2** **3** **4** **5** **6** **7** **8** **9**	-- RxD TxD -- GND -- -- -- --

A.3 SNMP TRAPS

The device supports the following SNMP TRAPS:

Name:	**gprINICIO_REGISTRO**
Description:	This is sent every time the modem starts up or is newly registered, when the GPRS module resets.
Enterprise	1.3.6.1.4.1.2007
Generic	6
Specific	101
Arguments	• IMSI Octetstring(0..32) • IP NetworkAddressName Octetstring(0..32) • LAC Octetstring(0..32) • Octetstring Cell (0..32) • Octetstring Group (0..32)
Severity	
Message	Device $1requesting register.
Name	**gprCOBERTURA_BAJA**
Description	The device reports that the coverage is below a threshold.
Enterprise	1.3.6.1.4.1.2007
Generic	6
Specific	121
Arguments	Maximum Integer Threshold
Severity	
Message	The device's coverage is below the maximum threshold
Message	If the parameters don't follow a pattern: DEVICE $1 REGISTERED
Name	**gprCOBERTURA_NORMAL**
Description	The device reports that the coverage has been restored to above a threshold.
Enterprise	1.3.6.1.4.1.2007
Generic	6
Specific	122
Arguments	Minimum Integer Threshold
Severity	

Message	The device's coverage is above the minimum threshold
Message	If the parameters don't follow a pattern: DEVICE $1 REGISTERED

A.4 Technical Specifications

Hardware Architecture

PROCESSORS	AT91SAM9260 (ARM9)
MEMORY	64 Mbytes in SDRAM
STORAGE UNIT	FLASH Memory (4/16Mbytes)

Wireless WAN Interface

STANDARDS	GSM, GPRS
SPEED	GSM Circuit switched dada (CSD) transmission: Asynchronous transparent CSD up to 14400 bps Asynchronous non-transparent CSD up to 9600 bps V.110 GPRS: GPRS class 10, Mobile station class B Coding scheme 1 to 4 PBCCH support
CONNECTOR	RF SMA Female
ANTENNA	Please see the antennas catalog for Cellular interfaces.

Serial COM Interface

LOCAL TERMINAL	RS232 V.24 9.600-8-PAR-1- without flow control.
CONNECTOR	DB9 female, on the front panel of the device.

Power Supply

INPUT VOLTAGE	220 V CA ±10 %, 50/60 Hz
INPUT CURRENT	0,03 A@220Vac
MAXIMUM POWER	6 W

Dimensions and Weight

TYPE	Ruggedized casing with multiple support positions.
LENGTH x WIDTH x HEIGHT	122 x 156 x 34 mm
WEIGHT	0,9 kg

Environmental Specifications

AMBIENT TEMPERATURE	ON: -20 °C to 70 °C; OFF: -30 °C to 85 °C
RELATIVE HUMIDITY	ON: 8 % to 85 %; OFF: 5 % to 90 %

Appendix B Safety information

B.1 Recycling and the Environment

Please do not, under any circumstances, throw away the **REGESTA 1** with normal domestic waste. Ask your local town hall for information on how to correctly dispose of them in order to protect the environment against e-waste. Always respect the current laws regarding waste material. Anyone found violating the environmental laws will be subject to fines and any additional steps established by law.

All the packing materials i.e. the cardboard box, plastic and any other packaging, together with the pieces making up the **REGESTA 1**, must be recycled complying with the current active laws regarding recycling materials.

The below symbol with a cross over the rubbish container can be seen on the device. This means that, when a device reaches the end of its life, it must be taken to the official recycling/disposal centers where it must be disposed of in an environmentally responsible manner and separately from normal domestic waste.

B.2 Translated Safety Warnings

	The equipment is intended to be installed by Service Personnel and only handled by qualified personnel. If not, the device may be damaged and malfunction.
	El equipo está diseñado para ser instalado por personal del servicio técnico y su manejo debe realizarlo personal cualificado. De lo contrario, el equipo puede resultar dañado y quedar inservible.
	This device contains elements that are sensitive to electrostatic surges and shocks. Therefore, it is essential when handling the equipment that an antistatic wriststrap is connected to the device chassis and that this is placed on an antistatic mat. Furthermore, it is crucial to avoid any kind of contact between the device components and necklaces, bracelets, rings, ties, etc.
	Este equipo contiene componentes sensibles a las sobrecargas y descargas electroestáticas. Por eso, durante la manipulación del equipo, utilice una pulsera antiestática conectada al chasis del equipo y colóquelo sobre una esterilla antiestática. Evite también el contacto de colgantes, pulseras, anillos, corbatas, etc.con cualquier componente del equipo.
	The electric current in power cables, telephone lines and communication cables is dangerous. To prevent electric shocks, before installing, handling or opening the equipment covers, connect and disconnect the cables following the steps set forth in *Connections* on page 7.
	La tensión eléctrica de los cables de alimentación, de los cables de la línea telefónica y de los cables de comunicación es peligrosa. Para evitar descargas, antes de instalar, mover o abrir las cubiertas de este equipo, conecte y desconecte los cables siguiendo el orden que se detalla en el apartado "Conexiones".
	All interconnected communication devices should be plugged to THE SAME GROUNDED POWER OUTLET, which should at the same time be of good quality (lower than 10 ohms). Whether the workplace is provided with an uninterrupted power supply system (UPS), regulated supply or it is independent from the rest (such as lighting, etc.); it is highly recommended that all data devices should be connected to the same power source. This will avoid operating and premature aging problems of drivers and other components.
	Todos los equipos de comunicaciones interconectados deberán estar unidos a UNA MISMA TOMA DE TIERRA, a ser posible de buena calidad (inferior a 10 ohmios). Si la instalación está dotada de un Sistema de Alimentación Ininterrumpida (SAI), alimentación estabilizada, o bien es independiente del resto (alumbrado, etc.), conecte todos los equipos de comunicaciones a la misma fuente de alimentación. Así, se ahorrará problemas de funcionamiento y envejecimiento prematuro de drivers y demás componentes.
	Never install the SIM card when the device is switched on. When inserting the SIM card, please protect yourself against electrostatic discharges (ESD). Do not touch the SIM card connectors.
	No instale nunca la tarjeta SIM con el equipo encendido. Al insertar la tarjeta SIM, protéjase contra descargas electroestáticas (ESD).

	No toque los conectores de la tarjeta SIM.