TRMC-19
GSM/GPRS DATALOGGER

The TRMC-19 is a datalogger/dataconcentrator of measures GSM/GPRS radio or wire. This device fulfills the most demanding requirements and will help you to create an effective, affordable and open remote metering network. Thanks to experience and products developed previously by Tetraedre, the TRMC-19 is the most successful product in our range. It is programmable according to your wishes, the measures and information sent are accurate and punctual. The TRMC-19 has an important advantage : it is flexible according to your needs and it is battery operated.

Applications

- ✔ Meter statement (water, gas, electricity)
- ✔ Remote control and monitoring of facilites
- ✔ Automated billing
- ✔ Consumption management
- ✔ Leak detection
- ✔ « Live » network monitoring
- ✔ Detailed review of customer consumption
- ✔ Big consumer's meter reading
- ✔ Building's meter's reading

Product description

TRMC-19 datalogger have been developed by Tetraedre to fulfill the requirements expressed by energy distributors (water, gas, electricity).
The main function is to store and transmit index and load profile. Data can be transmitted either by GSM CSD (data) or by GPRS. Index values and load profiles are read by the TRMC either through its radio receiver or by direct wire connections.
The device is fully autonomous. Thanks to its extremely low power consumption, it can work for

years with battery (which is integrated in the device). The device is available either with Lithium battery for the highest possible autonomy or with Li-Ion accumulators for reduced maintenance costs.
The integrated non-volatile memory can store up to several months of measurements. The TRMC stores data at regular time interval and then transmits them to the server. Thanks to several security mechanisms, the communication with the server is very reliable. The data arrive directly on the server.
Tetraedre provides several software tools, including an infrastructure manager and export interfaces to other software (like SAP, EDM,...).
As it works in GSM, the TRMC is usable everywhere in Europe and in many foreign countries.
It is compatible with water and gas meters (timers) GWF Coder and XEMTEC Comet. The TRMC-19 can communicate with meters GWF Coder and XEMTEC Comet by cable and by radio (via the module RCM-PI for meters GWF).
The TRMC-19 has also two inputs for impulse meters.
The TRMC-19 is highly modular: it is composed with two connectors which allow to add existing or future extensions. The firmware is also modular, allowing to add new features.
These devices are delivered in enclosures Polyester IP66.

GSM/GPRS COMMUNICATION

The TRMC is equipped with a multiband modem GSM / GPRS.

GSM Data (CSD)

The TRMC is able to communicate with a PC via the GSM CSD protocol (also named DATA). The transmission speed is not so high, but it is extremely reliable and available everywhere where the GSM network exists.

To use the DATA mode , we can call the module from a PC with a modem. We dial the phone number of the SIM card of the TRMC. Then the connection is a connection "point-to-point " between the PC and the TRMC. The data do not go through internet.

We can make exactly the same operations (download, configuration) in GSM data as in direct cable connection.

By default, when the GSM of the TRMC is switched on, this one waits for receiving a

DATA call. Then, to be able to communicate with the module, it is necessary to transmit an access code. This protects the module against calls of non-authorized persons.
Once the communication is finished, the PC can send an order of extinction of the GSM that allows to save the battery.

Automatic call
The TRMC can be configured to call the server just after the GSM power-on. This functionality reduces power consumption.

GPRS

The TRMC-19 can also download data by using the GPRS protocol. In this case, the data go through Internet.
If the GPRS mode is activated, the TRMC will open an HTTP connection with the server and transmit the last data as well as a status of the device (battery voltage,....). The web server is a dynamic site, enabling to store the data in a database and can send order to the module. but also to send configurations back to the TRMC device. During establishment of the connection, the TRMC sends several authentification informations to the server (username, password,...) to protect the server.
In mode GPRS, the TRMC tries to establish two consecutive connections that improves more the reliability.

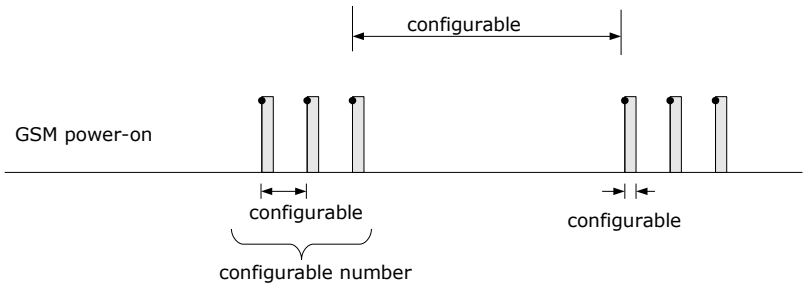
If the HTTP server did not send order of extinction of the GSM, the TRMC switches then in mode DATA and is ready to receive DATA calls. This allows to improve the reliability and to call the module if the connection GPRS did not work
Thanks to an arrangement with your telephone operator, it is possible to integrate SIM cards into your network VPN (CNA). In that case, the exchanged data are secured and your server GPRS is also protected.

Power management

The GSM modem consumes most of the energy of the TRMC, so it is switched off most of the time. Several configuration parameters define the power control of the GSM. This gives a maximum flexibility.

We can settle also, the duration of the ignition and the interval between two ignitions. And we can define a number of grouped ignitions, with another interval.

We can configure for example the device so that it switches on the GSM twice a day. For example, the morning at 10 am, then in the afternoon at 3 pm and this every day.



We can also, for example, configure it to switch on the GSM from Monday to Friday at 6:45 am. And this every week (that avoids ignitions Saturday and Sunday, that reduces the consumption (+40% of autonomy).

But we can also, for example, choose to use these ignition's opportunities to implement a security system of communication. We can settle adjust the system so that it switches on the GSM for example on June 1st at 03:00 am, 05:00 am, 07:00 am. And this every 30 days. Also by configuring the server GPRS (see section GPRS), it is possible to make so that if the communication did not work at 3 am, the module is going to re-try at 5 am, then at 7 am. So it retries several times.

SMS

The TRMC can send alarm messages by SMS. Three types of messages are possible:

- ✔ We can receive a SMS in case of tension of battery too low.
- ✔ We can receive a SMS while a measure exceeds a threshold (see acquisitions)
- ✔ We can receive a SMS in case of event on the digital input (see Interface paragraph)

The module can send SMS to two addresses.

The SMS text is freely definable (within certain limits)

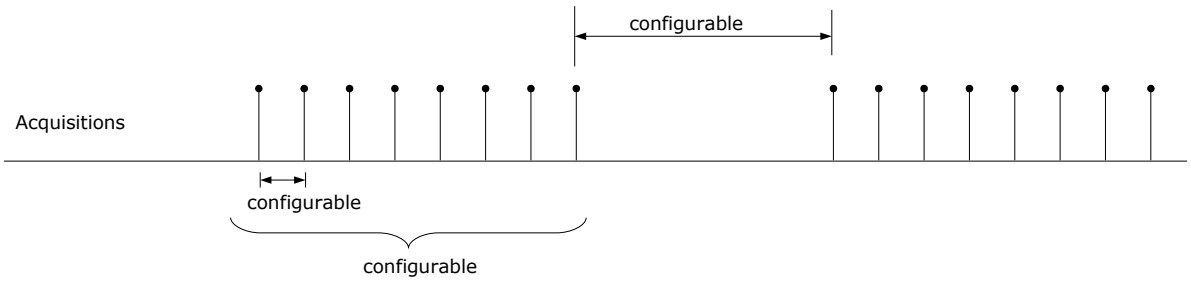
Once the SMS is sent, the GSM can be switched on certain time. This allows to call the module to know what happens. This allows also, if necessary, to reconfigure the module, to change the state of certain signals, etc.

SIM Card

The TRMC device must be equipped with the appropriate SIM card subscription (GPRS, data,...).
The SIM card's PIN code is stored inside the TRMC configuration memory and is transmitted from the TRMC to the GSM modem after it has been powered on. This increases security in case of theft (the SIM card is protected).

ACQUISITIONS-MEASURES

The TRMC can measure different parameters in a very advanced manner. It is a versatile and opened system. To perform its sequence of acquisition, the TRMC executes a kind of small program (script) stored in the device configuration. This script is very flexible.
The sequence of acquisition is started at a regular time interval (see drawing hereafter).



We can configure for example the TRMC so that it makes a measure every hours, at 1 am, 2 am, 3 am... Additional it will make another measure every day at midnight. We can use it for example to read a meter GWF Coder every hour to make a profile, and that we want to read the profile of the XEMTEC Comet every day at midnight (because Comet makes itself the profile).

We can also configure the TRMC so that it makes one measure, for example, every 6 hours, or so that it makes a measure at 10 am, 2 pm, 6 pm, then the next day at 10 am, 2 pm,...

Real time clock

The TRMC has a internal clock GTM. All measurements are timestamped. When data are downloaded, we know exactly when they were made.
Usually the clock of the TRMC is up-to-date in each connection GPRS, so deleting any drift.
The progress of all the operations of the TRMC are synchronized by the internal clock. This clock works with a quartz that makes it very accurate.

Thresholds

During measure on certain channels, we can define a threshold (rising or descending). When the measure crosses this threshold, we can either to change the state of digital input and/or to send a SMS.

INTERFACES

Digital inputs/outputs

Digital outputs
The TRMC-19 has two digital outputs. One output is a static CMOS and the other one is an open-collector output (to control a relay for example). These outputs can be remotely monitored (from the HTTP server and/or a PC) or modified by the acquisitions sequence.

Digital input, Alarm
The TRMC-19 possesses two digital inputs. These outputs are "readable" as a channel of measure. For example, to know the state of an external signal. But these inputs can also serve as entrance of alarm. In that case we can generate an alarm (SMS) according to the state.

Pulse inputs
The TRMC-19 possesses two impulse inputs. These inputs are connected to meters of internal impulses. These impulses are counted in a meter 32- bits reset to 0 in every reading.

Wire-GWF Coder

The TRMC can read the index and the serial number of meters (timers) GWF Coder. We can connect four meters GWF Coder (more optional) to the TRMC-19. The TRMC can read the value of the index, the serial number of the meter, the position of the decimal point. Furthermore it stores a « reliable » information which indicates if there was an error during the reading of the index. It is also possible to store the complete answer.

Wire-XEMTEC Comet (optical reader)

The TRMC can communicate with two devices XEMTEC Comet (more inputs are available in optional on the TRMC-19).

The TRMC can either make an immediate conversion (OCR) and stores its value, or then it can read the profile stored in Comet. In this case, it reads the values in memory, the date and the hour of the last value, the step of measure, the serial number of Comet and the serial number of the meter (stored in Comet)

Wire-CS loop

The TRMC possesses interfaces current loop which allow to communicate with numerous devices.

In particular, it is possible to read the index and the profile of electricity meters Landis & Gyr ZMD410. But this involves to modify the firmware of the TRMC. Check with Tetraedre.
The TRMC-19 is also able to read the IEC1107 state of meters Landis&Gyr, Kamstrup and ISKRA. To read the other electricity meters, please inquire with Tetraedre

Wire-RS-232, RS-485,RS-422

The TRMC has serial interfaces which allow to communicate with many devices.
Two interfaces RS-232 are already existing on the module.

Additional interfaces can be added on the TRMC-19 thanks to interface card available at Tetraedre. But this involves to modify the firmware of the TRMC. Please check with Tetraedre.

Tetraedre proposes interfaces to read the following devices:

- ✔ Albillia's FL-24 and FL-30 fluorimeters
- ✔ Modbus sonde transmitter of pressure STS PTM with interface RS-485
- ✔ Extension 48 CS

Radio-GWF Coder

The TRMC has a radio interface 868 MHz capable of receiving the information transmitted by modules RCM-PI, RCM-PI2 and RCM-PI3 for meters (timer) GWF Coder.

The TRMC gets and saves the index value, the serial number of the meter, the position of the decimal point.

The TRMC is also able to receive and to record the "historic" values supplied by the module RCM-PI3 of GWF. It is also compatible wireless M-Bus.
We can configure a software filter to receive only some meters (max 16 meters)

Radio network

The TRMC has a radio receiver Wireless M-Bus which allows to receive data of several meters or different sensors. Tetraedre has also developped, number of radio sensors (sensors of temperature, humidity, sensor of force, meter of impulses).
The TRMC can be then used as a data concentrator. It receives the data of the various sensors and transmits them later by GPRS.

The TRMC is the heart of a radio local area network. This configuration opens many possibilities (monitoring of cliffs, measure in factories, network of piezometers).

Radio-XEMTEC Comet

The TRMC has a radio interface 868 MHz able to receive the information transmitted by the radio modules XEMTEC Comet.

The TRMC gets and records the profile stored in Comet. In that case, it reads the values in memory, the date and the hour of the last value of the historic, the step of measure, the serial number of Comet and the serial number of the meter (stored in Comet). It also stores a « reliable » information which indicates if there was an error during the reading of the index.

The configuration of the TRMC contains the list of Comet to read. We can define until 12 Comet.

SOFTWARE

The TRMC-19 is delivered with the software Axiom BASIC and Light Axiom. A management platform of the network of TRMC, named TDS is also available. Please consult the specific brochure of the software.

POWER SUPPLY, BATTERIES

The TRMC is powered by internal batteries. The autonomy depends on the frequency of use of the GSM. According to the configuration, we can reach many years of autonomy.
The TRMC has an external power input which allows to save batteries if an external power is present.

The TRMC measures the battery voltage automatically a few seconds after the turning on of the GSM. This allows to measure the tension in load, what is more representative. This measure is transmitted with the status of the device.

USB COMMUNICATION

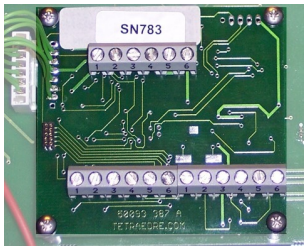
The TRMC is equipped with a connector which allows to connect to a computer (port RS-323 or USB). With this connection we can configure the device, get back the measures, test the connection GSM,....

To use this interface, it is necessary to have a cable adaptater available at Tetraedre.

EXTENSIONS

The TRMC-19 has a connector of extension for "smart" probes. These are small cards that are screwed on the TRMC-19. They are smart cards because they have a microprocessor which makes a specific treatment to the probe.
The use of the cards of extension does not require any modification of the firmware of the TRMC. This allows to add, in the future, extensions to interface with new devices.

Currently Tetraedre provides majors extensions boards:



- ✔ Analog measurement board (input 0-5V, 4-20mA,...)
- ✔ Interface card for pressure probe STS PTM
- ✔ Interface card for Keller pressure sensor serie 45
- ✔ GWF code interface card (4 inputs Coder)
- ✔ Interface card Corrector EK260 Elster
- ✔ Interface card Correcteur Actaris Corus
- ✔ Interface card Correcteur Tritschler VC2
- ✔ Interface card for WTW conductimeter Cond340i
- ✔ Extension 48 CS
- ✔ Extension 4 CS
- ✔ Extension Modbus
- ✔ Extension M-Bus

ORDER INFORMATION

Designation	*Description*
TRMC-19-CA	- 3.9V, 16Ah, lithium battery - no external power supply input - nominal operation at 3.9V
TRMC-19-CC	- 3.7V, 4.8Ah, Li-Ion accumulator - no external power supply input - nominal operation at 3.7V
TRMC-19-CD	- 3.7V, 4.8Ah, Li-Ion accumulator - external power supply input (max.15V) regulated at 4.0V (Li-Ion accumulator charger) - nominal operation at 3.7V
TRMC-19-CK	- no battery - external power supply input (max.15v) regulated at 13.5V (lead accumulator charger) - nominal operation at 12V

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