POLON-ALFA

GSM Service Transmitter
TSG-60

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Installation and Maintenance Manual
IK-E405-001-GB

Edition 1

POLON-ALFA

The GSM Service Transmitter, which is the subject of this Manual (IMM), meets the essential requirements of the following regulations of the European Parliament and of the Council (EU) and European Union directives:

LVD   Directive 2014/35/EU on electrical equipment intended for use within certain voltage limits;

EMC   Directive 2014/30/EU (EMC) on electromagnetic compatibility.

Before starting installation and operation, read the contents of this manual.

Failure to follow the instructions given in this manual may prove dangerous or result in a violation of applicable regulations.

The manufacturer POLON-ALFA is not responsible for damage caused as a result of use inconsistent with these instructions.

NOTE ! POLON-ALFA reserves the right to make changes to this manual.

A worn-out product, unfit for further use, should be handed over to one of the points dealing with the collection of waste electrical and electronic equipment.	

Table of contents

1. Purpose

The TSG-60 service transmitter is a device that enables to send information in the form of SMS messages about events recorded by the POLON 6000 control panel. The transmitter uses two types of GSM networks: LTE-M1 and NB-IoT. These are two technologies for communication targeted at *the Internet of Things* (IoT) and devices with low power consumption.

LTE-M1 (LTE-M) and NB-IoT (Narrowband IoT) represent certain advantages in places where standard LTE networks may face strains. Here are some examples of special conditions in which these technologies are more effective:

- **Areas with an increased risk of radio interference:** in locations where high level of radio interference - such as industrial electromagnetic interference - LTE-M and NB-IoT networks may better perform due to their interference handling ability.

- **Underground garages and basements:** These locations are often identified by their poor mobile network coverage. LTE-M and NB-IoT have the ability to penetrate buildings and underground spaces, allowing to maintain a connection in such places,

- **Rural and remote locations:** In areas where standard base stations may be infrequently deployed, LTE-M and NB-IoT can provide longer communication coverage and support devices in remote locations, such as farmland or forest areas.

- **Thick-walled buildings:** In thick-walled buildings which may block the LTE signal, LTE-M and NB-IoT technologies are more effective at penetrating these obstacles.

The network offer should be acqquainted when choosing a given operator in order to verify whether the above-mentioned GSM networks are offered.

Communication with the addressable POLON 6000 control panel is performed by serial port in the RS-232 standard.

The TSG-60 is configured via the PSO-60 operator panel. It enables to declare the type of events to be sent, specify the number of recipients and their phone numbers.

The device uses a LANTRONIX M113F00FS modem with software configured by POLON-ALFA.

2. Technical Parameters

GSM frequencies used	LTE CAT M1 / NB1 MODULE, PASMA LTE 2, 3, 4, 5, 8, 12, 13, 20, 25, 28
Antenna connection	SMA
SIM card voltage	1.8/3 V
Power supply	8 ÷ 32 VDC
Maximum current consumption	125 mA
Connection with addressable panels	RS232

TSG-60 communication protocol with POLON 6000 control panels	AT commands
PC Connection	USB (USB-RS232 adapter)
Dimensions	74.3 mm x 60 mm x 21.7 mm (89.3 mm x 60 mm x 21.7 mm - including attached antenna)
Mass	Not exceeding 100 g
Operating Temperature	(-40 ÷ +85) °C

3. Device composition

− TSG-60 transmitter, fig. 4.1-4.3;
− Swivel splitted-rotating antenna (Swivel type); SMA connector, fig. 4.4;
− RS232 cable, for transmitter connection with the POLON 6000 control panel , fig. 4.5;
− USB-RS232 cable – to check the module's connection to the GSM network using the m-center software, Fig. 4.6;
− TSG-60-ZAS cable – a harness allowing to connect power supply, e.g. from the control panel, fig. 4.7;
− AC adapter, Fig. 4.8;
− metal DIN rail clip with screw set, fig. 4.9;
− Installation and Maintenance Manual IK-E405-001-GB.

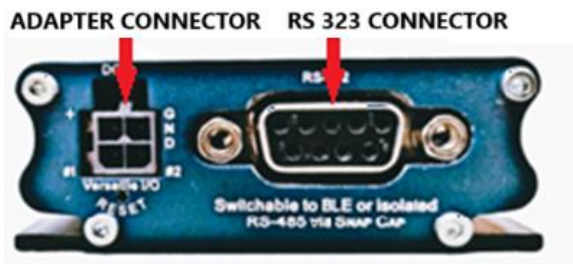## 4. Description of the device

Fig. 4.1 Modem - top view

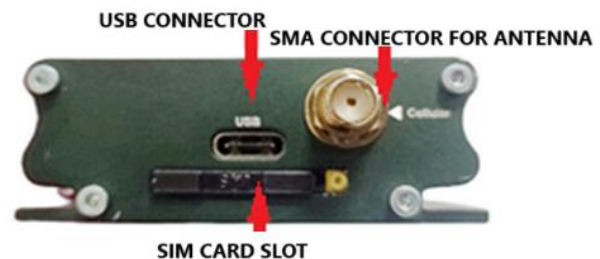**Fig. 4.1 Connectors - bottom side of the transmitter**   **Fig. 4.2 Connectors - top side of the transmitter**

Characteristic. 4.3 GSM antenna (Swivel type)

Fig. 4.4 Male-to-Female RS232 Serial Cable

Rys. 4.6 USB-RS232 Cable adapter

Rys. 4.7 TSG-60-ZAS Cable
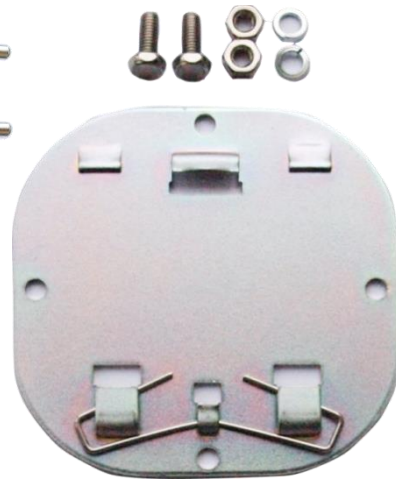
Fig. 4.8 Power Supply   **Fig. 4.9 Mounting clip for DIN rail**

5. Device activation

5.1   SIM Card Installation

⚠ **NOTE! TURN OFF TRANSMITTER'S POWER SUPPLY BEFORE SIM CARD INSTALLATION!**

A mini-SIM size SIM card (2FF, 25×15 mm) is required. Depending on the operator's requirements, the procedures for activating the card or subscription are recommended before placing the SIM-card in the device.
To place the SIM card in the transmitter, the tray located between the antenna and GPS connectors below the USB connector must be removed. The pocket latch is unlocked by pressing the yellow button on the edge of the slot.

The SIM card should be placed in the cutout of the tray; Only one card arrangement is possible (Fig. 5.1). The pocket should be inserted into the socket in the transmitter until the locking mechanism clicks. It is not possible to place the pocket in the socket in a position other than the required one. To remove the card from the pocket, it must be pushed out through the round hole on the bottom.

Fig. 5.1 SIM card – installation

5.2   Activation of the TSG-60 transmitter

The device should be powered by direct current with a voltage of 8 to 32 VDC. The current capacity of the power supply should be at least 150 mA.
It is recommended to power the device with a buffered power supply, equipped with batteries, maintaining the continuity of operation of the device in the event of a power outage from the 230 V power grid.

Correct power connection will cause the yellow and green LEDs on the upper part of the transmitter to light up for 2 seconds. After this time, the yellow LED goes out and the transmitter signals the initialization phase of the device by flashing the green LED. Then the device goes into standby mode, signalling it with a permanent yellow and green LED.

The transmitter is equipped with two power supply variants:
   − The power adapter (Fig. 4.8) that needs to be connected to the TSG-60 adapter as shown in Fig. 5.2.
   − Dedicated power supply cable, e.g. from the control panel, i.e. shown in Fig. 4.7.

In order to set the transmitter for operation, the red protective cap (Fig. 4.3m) must be removed and included antenna must be screwed to the `Cellular connector` (Fig. 4). Than connect the RS232 cable, the adapter cable to the transmitter and the power supply included in the set (or the TSG-60-ZAS cable).
Fig. 5.3 shows an example cable connection with the TSG-60 transmitter.

⚠   **NOTE! Short-circuiting the input line to an electrical potential other than the transmitter supply voltage may cause permanent damage to the device!**

Fig. 5.2 Connection to the power supply

Fig. 5.3 TSG-60 transmitter connecting example

5.3   Connecting the transmitter to the POLON 6000 control panel

The TSG-60 transmitter is factory-adapted to work with POLON 6000 control panels via RS-232 serial interface. The device should be connected with the included RS232 cable to the RS232 port in the PSO-60 Operator Panel (Fig. 5.4).
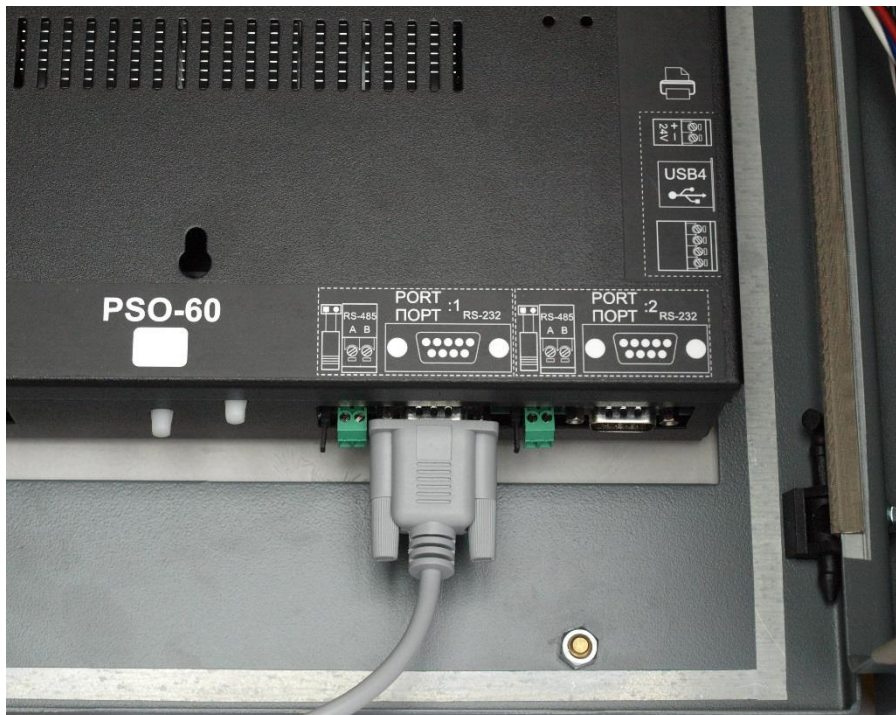

Fig. 5.4 Example of connecting the transmitter to the POLON 6000 (PSO-60) control panel

It is recommended to mount the transmitter outside the housings of the control panel components.

After connecting the TSG-60 transmitter should be configured in *the Monitoring configuration* window of the POLON 6000 control panel. Fig. 5.5 shows the configuration window of the transmitter.

In order to declare transmitter in the system, the following is required:

- Select the `Monitoring configuration` from the main menu and enter the `GSM` tab,
- Select the TSG `Support box`,
- set the configuration of the selected serial port: speed: 115200, 8 data bits, no parity bit, 1 stop bit, hardware flow control; open the desired port.

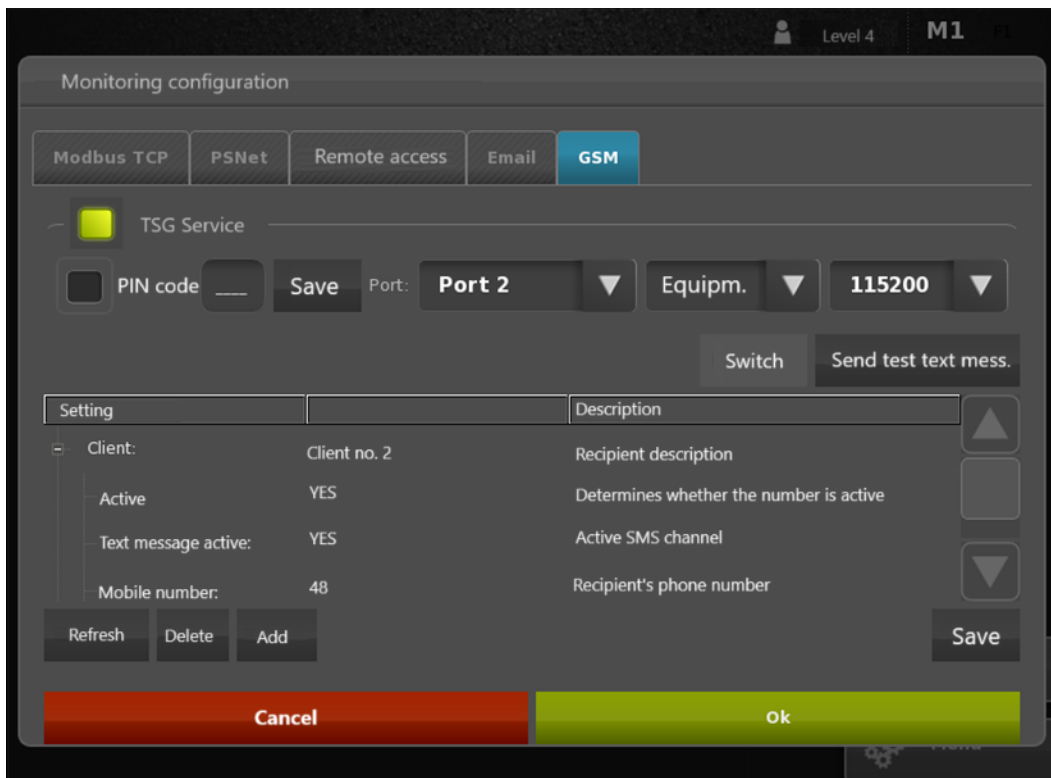The transmitter is ready to work with the POLON 6000 control panel.

Fig. 5.5 TSG-60 Configuration - Main Window

Each addressee (in this system called the Client) has its own name, which is visible in the *Monitoring/GSM configuration window*. When expanded, the following fields are displayed:

- `Active` – general activation or disabling of a given user profile,
- `Text message active` – SMS messages will be sent to a given user,
- `Email active` – SMS messages will be sent to the user if the email client has been correctly configured in the Email tab. Not applicable to transmitter support,
- `Description` – the name of the event recipient,
- `Filters` – a node that stores information about which events are filtered before generating an SMS message for the user.

Events from the system are divided into the following types:
1. fire alarm,
2. damage
3. testing
4. Blocking
5. damaged devices,
6. service
7. test alarms.

It is possible to specify the number of events that the transmitter can send in a given time interval for each of above given types.
To do this, following parameters must be defined:

- `Number of events` – Number of event data that will be sent to the recipient,
- `Time window` – Number of time units after which events will be resent (the event counter is restarted, counting from the appearance of the first event).

General configuration parameters are available at the top of the window. The following settings can be distinguished:

- `TSG transmitter support` – active field means the control panel starts sending data to the transmitter,
- `PIN code` – the active field means the PIN code for the SIM card will be saved in the device. It will be used if authorization required.

The bottom menu enables to manage the event audience. The following buttons are available:

- `Refresh` – read the information stored in the configuration. Temporary settings will be deleted,
- `Delete` – removal of the selected user from the system,
- `Add` – adding a new user from the system,
- `Save` – save the changes made.

5.4   Program for testing the m-center transmitter

The software for testing the Lantronix GSM modem TSG-60 transmitter can be found at https://www.lantronix.com/products/m110-series-modems/ in the Resources ->Firmware Downloads tab.

The transmitter is connected to the computer via the USB port, using the cable with a USB RS-232 plug included (Fig. 4.6).

After launching the m-center application, "Set port" button must be selected followed by "Prolific USB-to-Serial Comm Port" port number to which the device is connected (Fig. 5.6). The port may not be listed due to the required drivers missing, installed incorrectly, or not physically connected to the TSG-60 transmitter.
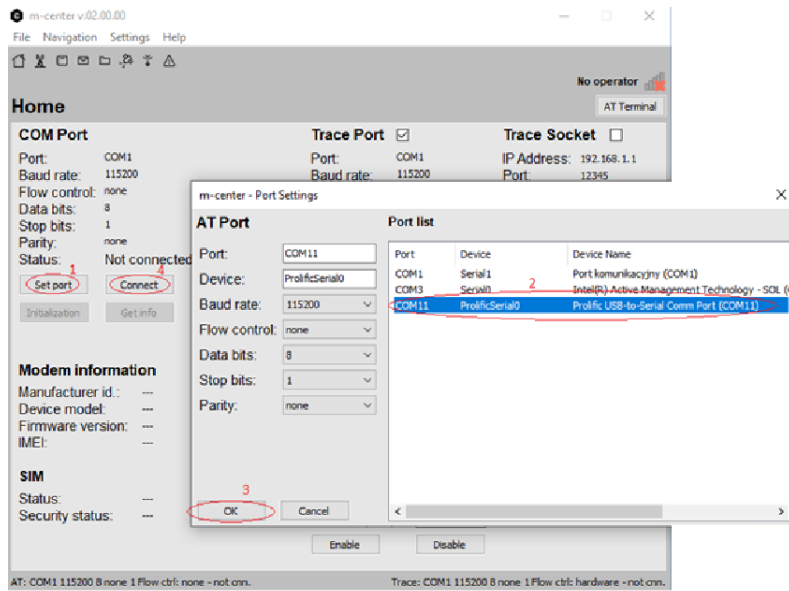
Fig. 5.6 Port selection window

Once the port is selected, the selection must be confirmed with the "OK" button and connection performed using the "Connect" button.

When the 'Get Info' button is used, the program window will than upload the data downloaded from the device, including: network operator type, network range, device model, software version, information about the status of the sim card and time zone. It is also possible to set the time zone, enable the saving mode, or set a PIN code, i.e. access to the SIM card in this window By clicking on the 'Network' tab and then on 'Refresh Info' information about the operator, whether the card is registered or not in the network, the strength of the RSSI signal level, etc can be obtained. The window also enables to manually connect to a selected operator from among the available GSM networks of various operators (Fig. 5.7).
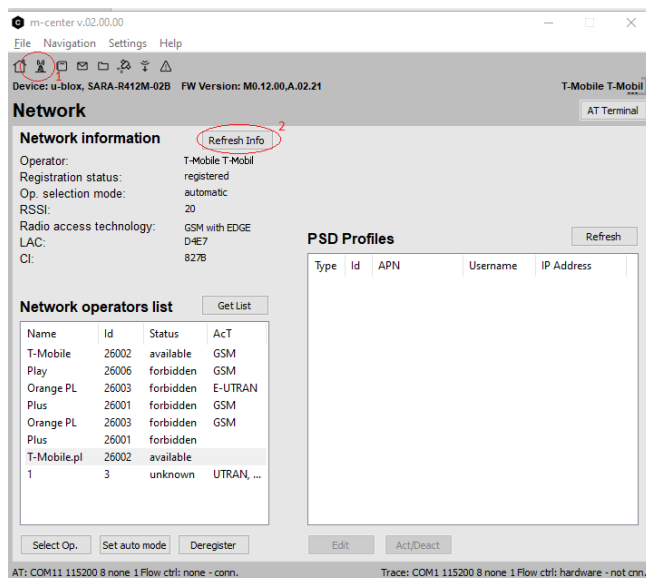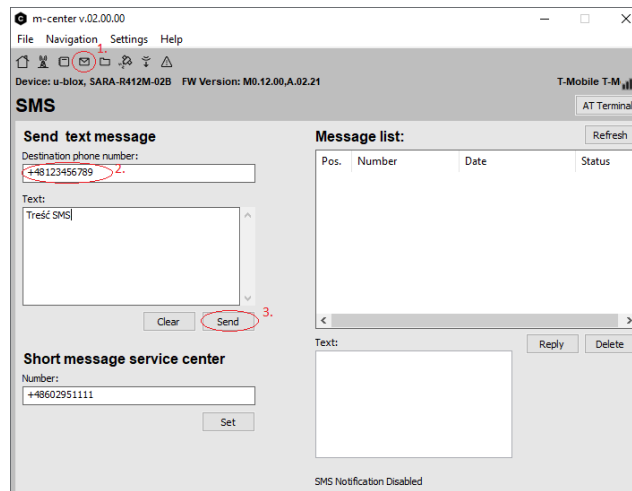

Fig. 5.7 GSM network operator selection window.

By selecting the 'SMS' tab, a window with the possibility of entering a text message and the phone number to which the message is to be sent appears. It provides the opportunity to test

the cooperation of the TSG-60 transmitter with the inserted card of the previously selected network operator.

To send a short text message, press 'Send' button (Fig. 5.8).