



Calibrator of digital streams  
**MarsGen-61850**

USER MANUAL

MC2.211.502 UM

Manufacturer: OOO “NPP Mars-Energo”

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**Table of contents**

**1 DESIGN AND OPERATION ..... 3**

**2 PREPARING FOR OPERATION ..... 5**

    2.1 OPERATING RESTRICTIONS ..... 5

    2.2 UNPACKING ..... 5

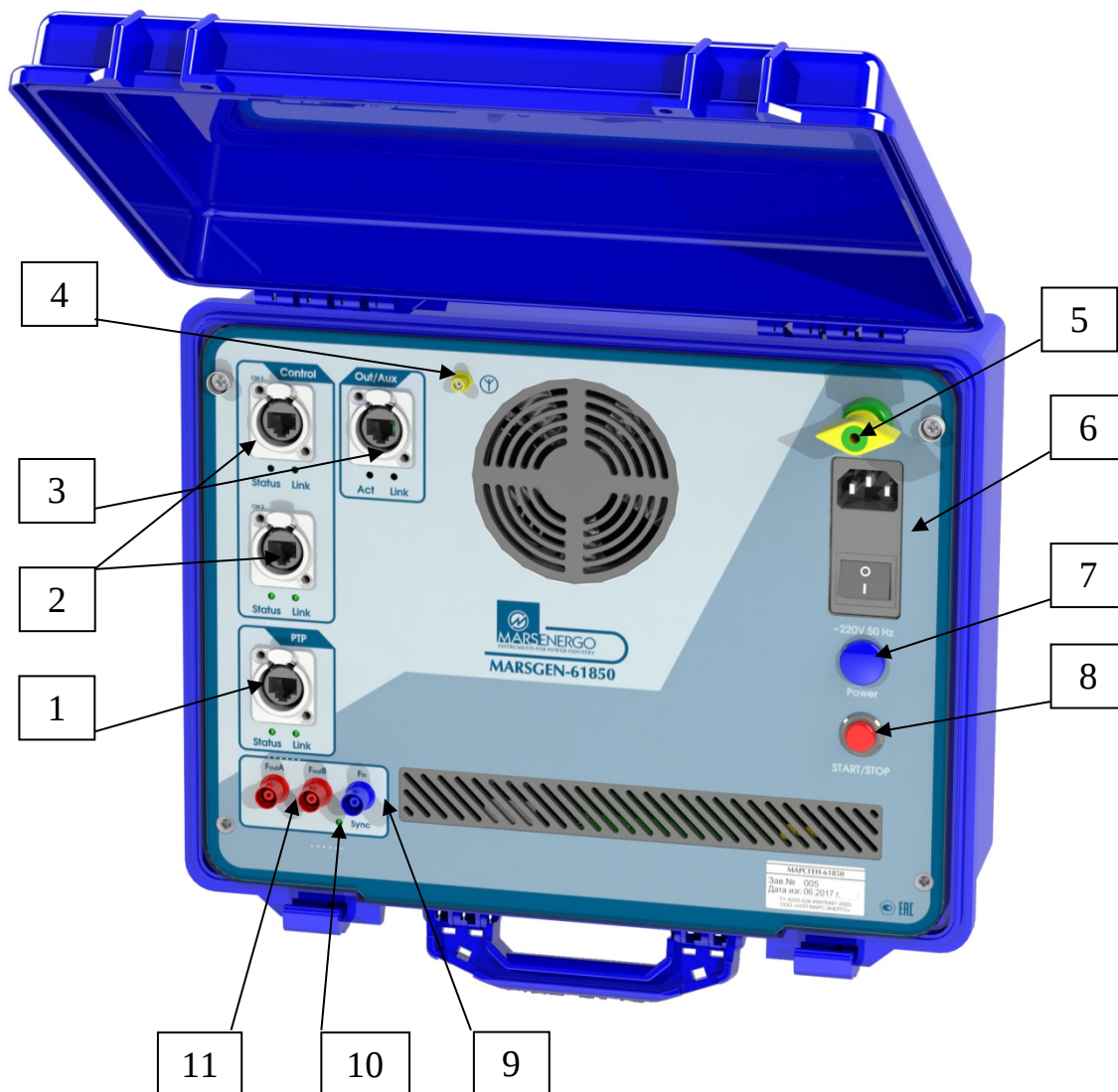
    2.3 TURNING ON ..... 5

**3 OPERATION..... 5**

This User Manual gives full information on how to use the Calibrator of digital streams MarsGen-61850 (the Calibrator below).

## 1 Design and operation

1.1 The Calibrator is designed housed in a portable case with a handle (Fig 1.1).



- 1 – Port "PTP" used to accept/produce PTP synchronization signal
- 2 – "CONTROL" ports (2 pcs) for connecting Control Terminal (personal computer) and Control Input of the Device under test (DUT) via Ethernet
- 3 – Port "Out/AUX" for connecting sources of digital streams (Sampled Values 9-2 LE) to the "SV" input of the DUT
- 4 – Antenna connector
- 5 – grounding clamp
- 6 – Power supply connector, switch and fuses
- 7 – "Power" indicator
- 8 – "Start/Stop" button
- 9 – connector "Fin" (synchronization input)
- 10 – PPS signal indicator
- 11 – BNC connectors "Fout" used to input/output synchronization signals (A and B)

Fig. 1.1 MarsGen-61850

1.2. The Calibrator is a source of digital (sampled) signals, produced by the dedicated software on the basis of predefined current and voltage settings, which are then processed and reproduced as SV (Sampled Values) data streams compliant with IEC 61850-9-2LE.

The Calibrator consists of hardware and software (SW) components. The hardware part consists of 2 modules: synchronization module and digital stream synthesizer.

The front panel of the Calibrator bears:

- Ethernet ports for connection to the Control Terminal (PC) and to the “Control” input of the DUT
- Connector RJ-45 linked to the data stream source of the Calibrator
- BNC (frequency) connectors used to output synchronization signals (A and B) and to input external synchronization sources
- Start/Stop button.

On pressing and holding the Start/Stop button for 15 sec, the network settings (IP address and communications port) will be set to the default values specified on the front panel of the Calibrator.

If the model name of the Calibrator ends with “-01”, it is equipped with a GLONASS/GPS receiver and antenna. The receiver is used to synchronize the internal clock of the Calibrator with UTC and to receive PTP timing signals (ANSI/IEEE 1588-2002\*Approved 2008-09-10).

The software component means external SW which interacts with the hardware via digital interface.

The SW includes:

- Firmware (FW) that controls the hardware of the Calibrator
- High-level software “Synthesizer of Electrical Energy Signals for MarsGen-61850” (Signal Editor)

The FW produces 4 output signals (4 voltages and 4 currents) with predefined output signal settings.

The software Signal Editor:

- Calculates digital (sampled) values on the basis of predefined output signal settings
- Saves the output signal settings
- Controls the whole system including Calibrator and external devices
- Is responsible for data representation.

The FW and SW affect the accuracy of the system, thus they are metrologically significant components.

## 2 Preparing for operation

### 2.1 Operating restrictions

3.1.1 If the Calibrator is going to be operated at a temperature above 0°C after it has been moved from a cold environment (with an ambient temperature below 0°C), it must be left to stand for at least 8 hours in operating conditions and with its cover open.

**Warning!** The Calibrator must not be used under the ingress of moisture inside its body.

### 2.2 Unpacking

Check that the delivery package contains all parts specified in the Packing list. Check to see if the manufacturer's seals are intact. Should anything in the package be found damaged, contact the supplier immediately

### 2.3 Turning on

Turn on the Calibrator in the following order:

- Connect the Calibrator to the tested equipment
- Apply power to the tested device
- Apply power to the Calibrator.

As it is powered up, the Calibrator performs self-test and initialization procedures that should be completed in 30 s (these procedures are performed at each power up). At the conclusion, the display of the Control Terminal shows manufacturer's name and logo, device name, firmware version and communications status.

The Calibrator is considered set for stable operation in 5 min after applying power. Its specifications are as declared from this point

## 3 Operation

3.1 To control the Comparator from a Control Terminal, you must install software "Synthesizer of Electrical Energy Signals for MarsGen-61850" (the Program or Signal Editor below) on the Control Terminal as described in the User Manual for Signal Editor. The Program works under MS Windows 7 (32- and 64-bit architecture), or higher.

System requirements:

- Processor: Intel Core i5 at 3.2 GHz, or higher
- SVGA HD Graphics
- At least 4GB RAM
- Hard disk 0.5Tb HDD SATA-III, or better
- Monitor 1920x1080
- Operating system: Microsoft Windows 10.

3.2 The Calibrator can be connected to the Control Terminal directly or via LAN. As the Calibrator is connected to the Control Terminal and the Program is started, the Calibrator automatically goes to the PC-controlled mode.

3.3 The Start/Stop button allows the user to stop and restart generation of digital streams, if necessary. On pressing and holding the Start/Stop button for 15 sec, the network settings (IP address and communications port) will be set to the default values specified on the front panel of the Calibrator.

3.4 For how to work with the Program, see the “Synthesizer of Electrical Energy Signals for MarsGen-61850” User Manual.

3.5 For how to test digital measuring instruments, see the descriptions of corresponding test procedures.

3.6 If the model name of the Calibrator ends with “-01”, it is equipped with a GLONASS/GPS receiver and antenna. The receiver is used to synchronize the internal clock of the Calibrator with UTC and to receive PTP timing signals. In this case, the antenna should be located in open space.

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