Monitor MEg46DIN

DESCRIPTION MEg46DIN

The MEg46DIN monitor is designed for measuring in industrial energy operations on the LV level. It is characterised by the flexibility of its functions and expectations of integration into measuring systems.

For 3 voltages and 3 currents:

- For voltage, it calculates voltage quality parameters (RMS, harmonics, inter-harmonics, symmetry, flicker, THD), and performs their aggregations. For current, it calculates true RMS, harmonics and inter-harmonics to the 25th order and distortion.
- It measures and evaluates the electric power and electrical work in each phase, also summarily. The device measures four quadrant energy with type resolution and direction of the reactive power flow in each phase separately, evaluates ¼ h maximum.
- Records voltage events as well as events caused by overcurrent. Records their timing ($U_{RMS1/2}$, $I_{RMS1/2}$) or the waveform in 0.2 sec time frames in the area of start/termination events with the possibility of pre-trigger.
- Registers a peak value of the surge in the level above 1 kV (instantaneous value), including the time of occurrence with phase resolution, up to 9 kV.

▶

- Receives and decodes the ripple control messages, measures the size of start and stop signals in V for all 3 phases. Records ripple control signal, ripple control oscilloscopic telegrams also possible.
- Optional is also an oscilloscope mode that stores instantaneous voltage and current sample values in the selected interval.

The unit has two inputs for resistance sensors (contact, thermometer Pt100, etc.) and passive binary input.

Recording of measured and calculated data is stored internally, which consists of temporary memory (256 MB), and further via high-capacity memory consisting of an 8 GB – 32 GB SD card. Transfer from temporary memory into high-capacity happens automatically at the selected time.

The range of measured data depends on connection and measurement parametrisation. The measured data is divided into immediate data (0.2 sec interval), aggregated data, event data, energy data (electrical meter) and data logger. Category S quality parameters.

The device is physically equipped with a two-wire RS485 interface with galvanic isolation interface (RJ45) Ethernet 10/100M (802.3u), USB 2.0 and one-bit binary interface formed by relay contact. Other available protocols are MODBUS RTU, MODBUS TCP, SNTP, DHCP, ICMP, SNMP, TFTP and HTTP. Unused protocols may be switched off. e.g. during local access, a USB-only interface may be used to access the data store (MEg46 acts as a mass storage device) and also as its control (such as a Data Communication Device), which allows device parametrisation as well as via MODBUS RTU and RS485.

The files in the data storage are directly accessible via USB, e.g. can be transferred from a PC with MODBUS functions or TFTP protocol. It is not necessary to transfer complete files, it is possible to search for the desired record. Measured values are available from www pages which are user-defined (html files in the data store). Data files are (according to setting) either binary or csv text (other than oscilloscope data). Another advantage is the access to the settings and measured parameters and functions without special software. Data can be directly processed and also by spreadsheet program.

A firmware upgrade can be performed remotely. Key configuration parameters are password protected.

The user interface consists of 4 LEDs and two buttons. On the screen is a trio of permanently-lit yellow LEDs, U1, U2, U3, which indicate the presence of input voltage in the pre-set tolerances. The green RUN LED blinks to indicate device operation.

An advantage of the device is low power consumption (0.7 VA). The MEg46DIN monitor is powered by $12\,V_{DC}$ from MEg101.4 or MEg101.5 uninterruptible power supplies. It will be available the version MEg46DIN directly powered $230\,V_{AC}$ in category CAT IV / 300 V.

An important property of the monitor is that the measured values may, based on the device user's script, calculate other user-defined parameters or also generate messages sent to the interfaces. The script consists of a text file that is stored in the user-created data store on the device. The use of external monitor MEg46DIN is anticipated in corporate or commercial applications and in the design of measuring systems with remote communications regardless of the monitor's manufacturer.

Scripts are executed either periodically at a set interval, at a set time of day, based on conditions, derived from the unit's status, by push button or the size of the primary measured variables. The script cannot directly access the quality measurement algorithms, but can dynamically change the measurement parameters.

The aforementioned scripts allow MODBUS Holding Registers modification.

The registers are accessible via MODBUS protocol, but also over HTTP or in XML format (e.g. to generate dynamic pages using AJAX), possibly via SNMP.

MEASURED DATA

Real-time and aggregated data (aggregation interval 1 – 20 minutes):

- Time data
- Voltage unbalance
- Frequency
- Voltages – maximum and minimum
- Flicker P_{st} and P_{lt}
- THD_U
- Direct current component, fundamental up to 50 harmonic of voltage
- Centred inter-harmonic groups
- Signal voltage level (ripple control), adjustable frequency oscilloscope-recorded telegram also for different frequencies
- Marking of flagged values
- Current and power - maximum and minimum
- Thermal currents
- Basic up to 25 harmonic currents
- Centred subgroups of interharmonic I up to the 25th order
- Power and energy, ¼ h maximum of 30 seconds period

Data during one-time events for voltage and current, with external signal, script, and button:

- Time of event
- Event duration
- Minimum and maximum values of voltage and current
- Voltage curves $U_{RMS1/2}$ and currents $I_{RMS1/2}$
- Oscillogram of voltage and current curves during start / finish of event

Recorder data (write interval from 1 second according to measuring parametrisation):

- Recorder data apply to voltages U1 to U3 and currents I1 to I3.

DESIGN AND BASIC CONNECTION

The MEg46DIN unit is housed in a polycarbonate, self-extinguishing housing of dimensions $108 \times 90 \times 63$ mm. It installs on TC35 DIN rail. The monitor is installed under the switchgear box cover with a possibility of sealing to restrict access to the terminals. The instrument panel itself may also be sealed. The input terminals for measured voltages and currents, the power supply, RS485 communication interface, GPS, two-state input and output contact are screw terminals for a wire diameter up to 4 mm². The device is HBUS equipped, which allows expansion of the inputs / outputs or connection to an external source without cabling installation. The computing and measurement component is formed by an ARM M4 processor and the real-time operating system is derived from RTOS.