MEg70 compact monitor

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PURPOSE AND DESCRIPTION

The MEg70 compact monitor is intended for measuring of voltage, current, power and energy of one phase. It records events on the voltage and evaluates these events by methods of the class S with the voltage quality standard EN 50160 Ed. 3. Also overcurrents are evaluated and recorded as well as an event.

The MEg70 compact monitor performs the following measurement functions:

- on-line measurement,
- record of time course of measured quantities,
- evaluation of the daily current charts,
- recording of voltage and current events,
- measurement of electric energy in six registers.

The MEg70 Compact monitor is characterized by mechanically associated measurement of voltage, current, measuring and evaluating circuits including a serial interface to the unit which is mounted in a suitable location on the measured phase wire. A contact mechanism with a replaceable tip is used as the contact with the measured voltage even of insulated wire. For measuring of phase wire current flexible current sensor can be used. For power supply and communication, the MEg70 monitor is equipped with a pair of interconnected four-pole spring terminal bocks, allowing chaining of multiple MEg70 monitors and their connection to the common power supply and to the superior communication system.

Secure socket, which can alternatively be used to safely connect the measured voltage by measuring cord, serves for finding the right contact with the measured wire without breaking the insulation of the measured wire.

Due to the place of installation, the compact monitor is not equipped with any indication and any display, which is conveniently and inexpensively implemented in the superior information system. This design is resistant to environmental influences. Via galvanically separated RS485 interface the monitor communicates with this superior system. In this way, the MEg70 monitor is ready for implementation into already implemented information systems. For new separate installations the measuring technological system consisting of the required number of MEg70 compact monitors, power supply, a converter RS485/USB, or a directly evaluating industrial PC can be supplied.

The MEg70 compact monitor gives you the advantage of measuring without current measuring instrument transformers and other components. This fact significantly reduces installation costs and enables the implementation of additional precise measurements according to the applicable standards.

The compact monitor Meg70 is manufactured in the version Meg70.H with the voltage input dimensioned for the DC and impulse voltage up to 8 kV used for localization of failures of LV cables and in the version Meg70.L with the maximum voltage 2.5 kV.

TECHNICAL SPECIFICATIONS

Reference conditions

U_{supply} = 12 V_{DC}, environment temperature = 23 °C ± 2 °C, relative humidity = 30 % - 70 %
The measured voltage and current are sinusoidal with a frequency consistent with the frequency of the network.

Measured quantities

Voltage U, measuring category IV, direct measuring

U_{nom}:	230 V_{AC}
Error of voltage measuring:	0.1 % from measured value ± 0.05 % U_{nom}
Range of voltage measurement:	5 % to 120 % U_{nom}
Maximum overload of voltage input:	MEg70.L – 2.5 kV, MEg70.H – 8 kV
The change of measured voltage with temperature:	0.1 % from measured value / 10 °C for the range from -25 °C to +60 °C
The change of measured voltage with frequency:	0.1 % from measured value / 1 Hz for the range from 48 Hz to 52 Hz

Current I, measuring category IV, direct measuring

I_{nom}: 30 A_{AC}, 100 A_{AC}, 300 A_{AC}, 1000 A_{AC} (optionally according to order)

Error of current measuring:	0.2 % from measured value ± 0.3 % I_{nom} [1)]
Range of current measurement:	5 % to 120 % I_{nom}
Maximum overload of current input:	10 kA
The change of measured I with temperature:	0.1 % from measured value / 10 °C
The change of measured I with frequency:	0.05 % from measured value / 1 Hz

Note: [1)] Wire with measured current is mounted on the hook, see Fig. 8.

Active power P

Error of P measuring: 0.5 % from measured value ± 0.2 % P_{nom} [1)]

Range of P measurement: from 5 % to 120 % of nom. value, $\cos\varphi \geq 0.27$

The change of measured P with temperature: 0.1 % from measured value / 10 °C

The change of measured P with frequency: 0.1 % from measured value / 1 Hz

Reactive power Q

Error of Q measuring: 0.5 % from measured value ± 0.2 % Q_{nom} [1)]

Range of Q measurement: U, I = from 5 % to 120 % of nom. value, $\cos\varphi \leq 0.87$

The change of measured Q with temperature: 0.1 % from measured value / 10 °C

The change of measured Qwith frequency: 0.1 % from measured value / 1 Hz

Active energy A_{act}

Error of active energy measuring: in compliance with class A according to TPM 2440-08, ČMI (EN 50470) [1)]

Reactive energy A_{react}

Error of reactive energy measuring: in compliance with accuracy class 2 according to TPM 2440-08, ČMI (EN 62053-23) [1)]

Voltage events, deviations

Class S according to EN 61000-4-30, Edition 2

Note: [1)] Wire with measured current is mounted on the hook, see Fig. 8.

Working conditions

Operating temperature:	-25 °C to + 60 °C
Relative humidity:	10 % to 90 % at 40 °C
Frequency of measured quantities:	47.4 Hz to 52.9 Hz
Power supply voltage:	9 V_{DC} to 16 V_{DC}
Max. voltage ripple:	50 $mV_{peak\ to\ peak}$
Supply current:	35 mA_{DC} at measuring / 45 mA_{DC} at measuring and communication
Ingress protection rating:	IP20 except the measuring point

Construction details

Dimensions:	97.5 × 44 × 50.5 mm
Dimensions of hook:	46.5 × 43 × 24 mm
Weight:	0.135 kg

Heights of replaceable tips: 3 mm, 4 mm
(tip 3 mm up to the cross-section of the measured wire 35 mm^2,
tip 4 mm for larger cross-sections; wire only with insulation, no covering)

Diameter of measured wire max/min: 28 mm / 7 mm

Max. crosscut of triangular profile of measured wire: 240 mm^2

Inner diameter of the sensor flexible loop: 55 mm

Diameter of terminal block wires: 0.8 mm to 1.0 mm

Maximum length of power and communication wires: 30 m

Type of internal time LI battery: CR2032/1HFE

General specifications

Resistance of voltage input: MEg70.L – 1.68 MΩ
MEg70.H – 16.24 MΩ

Max. voltage on live parts of measured wire:
MEg70.L – 2.5 kV
MEg70.H – 8.0 kV ⎓ or imp. / 1 min

The input voltage component was tested by means of the impulse power supply for finding faults in cable LV networks. MEg70 need not to be uninstalled for the fault finding by means of the impulse power supply in cable LV networks.

Data memory: 4 MB – flash

Data memory organization: linear or circular

Serial interface: RS485

Speed of serial communication: 115.2 kBit/s

El. strength of galvanic insulation of serial communication: 2 kV

EMC

Resistance to a group of fast impulses	EN 61000-4-4
Resistance to voltage surges	EN 61000-4-5
Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6
Radiated emissions in the frequency band 30 MHz – 1 GHz	EN 55011 Art. 6.2.1
Interference voltages on supply terminals	EN 55011 Art. 6.2.2
Electric discharges (ESD)	EN 61000-4-2
Radiated radio-frequency electromagnetic field	EN 61000-4-3
Voltage dips, short interruptions and voltage variations	EN 61000-4-11

DESCRIPTION OF FUNCTION

The MEg70 compact monitor measures, evaluates and records voltage including deviations and events, current, output power and energy of phase wire of low voltage network in flash memory. It passes measured data through electrically isolated RS485 serial interface to display and evaluation units of local technological measuring network or to communication unit of remote information system. For connection to a PC without the RS485 interface, it is necessary to use interface converter RS485/USB or a set consisting of power supply unit MEg101.4 or MEg101.5 and a RS485/USB converter or unit MEg70/KZ.

The MEg70 monitor is designed for easy installation on low voltage wire with minimum space requirements, the voltage and current is measured directly on the live parts too.

The MEg70 monitor is powered by 12 V_{DC}. When evaluating events on voltage, the power supply in accordance with IEC 61000-4-30, edition 2 must be backed up. Negative pole of DC source connected to a common wire of the monitor ⊥, must be connected to the neutral wire of measured low voltage network. Positive pole of DC source is applied to the 12 V terminal of the monitor. MEg70 is protected against reverse polarity of power supply.

The signals A and B of RS485 serial interface are used for communication. Serial interface scans measured data, programmes measuring mode and performs calibration including changes in FW.

Provided with a pair of four-pole spring terminal blocks the monitors are able to be chained with four-wire bus.

The measured voltage from the measuring point associated with the secure socket is brought at the input of an A/D converter through a resistive divider. After treatment, voltage of the flexible current sensor is applied to another switched input A/D converter controlled by microprocessor. The measured signals are sampled 128 times for one period; the sampling frequency is controlled by the PLL (Phase Locked Loop). At low measured or no voltage, the phase locked loop is set to 50.00 Hz. The microprocessor continuously without delay evaluates true RMS of voltage, current and active power for every 10 cycles. From these values, the apparent power and reactive power including power for waveform deformation is calculated. Furthermore, according to its direction and character, calculated active and reactive energies are stored to the six registers.

E_{P+}
active energy consumption

E_{P-}
active energy at the supply,

$E_{QL/P+}$
inductive reactive energy at the consumption

$E_{QL/P-}$
inductive reactive power at the supply

$E_{QC/P+}$
capacitive reactive energy at the consumption

$E_{QC/P-}$
capacitive reactive power at the supply

Graphic display of energy according to standard IEC 62053-23 is shown in Fig. 6.

Calculated from ten periods average values of *U*, *I* and *P* are recorded in the non-destructive data memory for the specified interval of record. In addition, from ten periods determined the highest and the smallest value measured during the recording interval and also last value of ten periods in the measurement interval can be recorded in the memory according to specification. The average reactive power and average power factor is calculated from average values of *U*, *I* and *P* in the interval of records.

At the request for registration of events that can be elicited from exceeding four specified levels of voltage or exceeding two levels of current, the values of voltage and current are evaluated for one period. Calculation of RMS value of voltage and current for comparison with the specified levels is out of synchronization with the first pass of quantity through zero value. Also calculation of the RMS value of voltage and current repeated after a period is performed continuously without gaps.

The first three levels of voltage are intended for registration of drops and interruption, voltage levels can be adjusted from 90 % to 5 % U_{nom}. The fourth voltage level is intended for the registration of overvoltage and can be adjusted from 110 % to 150 % U_{nom}. Also both levels of current are intended for registration of exceeding of specified level.

At the registration of drop or interruption calculated in elapsed period the RMS value of voltage is compared with the set level, and in the case if this value falls below the set level, the time is recorded with a resolution better than 10 ms. Furthermore, the cumulative time for which the calculated RMS values of voltage are below the set level is measured. At increase of voltage above the level increased by specified hysteresis the measurement of the decrease time ends.

When the levels of voltage drop are chosen e.g. 90 %, 80 % and 5 %, this method of registration allows the evaluation of voltage drop both in accordance with the voltage quality standard EN 50160, ed. 3 and the evaluating according to the actual relevancy of drop for consumers, see Fig. 7.

Start time of overvoltage and overcurrent is evaluated in the moment when periodical voltage or current value exceeds the specified level. These values are measured until the period value of measured quantity falls below a specified level minus hysteresis. At the registration of events the largest (maximum) and minimum (residual) value of voltage and current measured during the event is also recorded.

The compact monitor MEg70 is able to discriminate interruption of the measured voltage, when the measured voltage fells below 5 % of U_{nom} and interruption of measuring when the U_{supply} falls below 9 V_{DC}. When the U_{supply} is not backed up and is produced from measured V_{AC}, at drop of U_{supply} below 9 V all processed data are saved in flash data memory and the monitor does not measure. The time of interruption of measuring is recorded with a resolution of 1 s; this time is derived from internal time.

At the request of oscillographic course measuring the four periods of voltage and current are sampled and are sent to the superior system through RS485 interface. After the sample sending the four other periods are sampled.

This compact monitor allows these types of start of measurement:

- start immediately after programming,
- start after achieving the specified time on any day,
- start after achieving the specified time and specified day.

Recording interval is a multiple of ten-period (0.2 sec) intervals. The minimum record interval has the length of 1 sec.

In order to prevent filling of data memory with data arising from events with insignificant information value, it is possible to record pre-set maximum number of events in one data block in a given time. Other records of events are allowed after expiry of the specified time when due to long-term trends the conditions in the network are changed and the voltage is not located in vicinity of the pre-set level of events.

At long-time measurements, the internal time of individual monitors can be different; this effect can be minimized by synchronizing the internal clock with the network frequency or by transmitting control jumps

The MEg70 monitor is equipped with data flash memory of 4 MB for recording of measured data. Measured data can be recorded in the memory in a linear mode (stop recording when memory is filled) or in a circular mode.

In the circular mode, after filling the data memory, the oldest data memory data are after the data pages gradually deleted and in their place the newly recorded measured and calculated data are recorded.

In the linear mode and at the measuring interval of 1 min, at recording of average values of *U* and *I*, of the minimum value of *U* and maximum values for *U* and *I*, and at allowed recording of 50 events in 8 hours the capacity of data memory for recording is enough for more than 6 months. When no readout of the measured data during this time is performed, the new measured data and calculated data are not recorded in the memory at linear mode.

DESCRIPTION OF CONSTRUCTION

The MEg70 compact monitor includes measuring instrument with flash data memory, galvanically separate communication, contact mechanism and flexible sensor for direct measuring of current. Design and basic dimensions of the compact monitor are shown in Fig. 8. Body of the monitor includes electronic part ending with interconnected left and right four-pole spring terminal blocks located in the front of the monitor and the screw of pressure part and secure socket. Linked contacts of both terminals blocks are identically labelled +12 V, ⊥, A and B.

At the rear of the monitor body is placed a hook. The pressure part with contact point is pushed out against this hook by the screw of pressure part. Contact point is connected with a secure socket as well. The contact tip can be screwed out using the supplied wrench (Fig. 1). Two tips in various lengths (3 mm and 4 mm) are available. It is recommended to use the tip with the height 3 mm for wires up to the cross-section 35 mm^2 and the tip with the height 4 mm for wires more than the cross-section 35 mm^2.

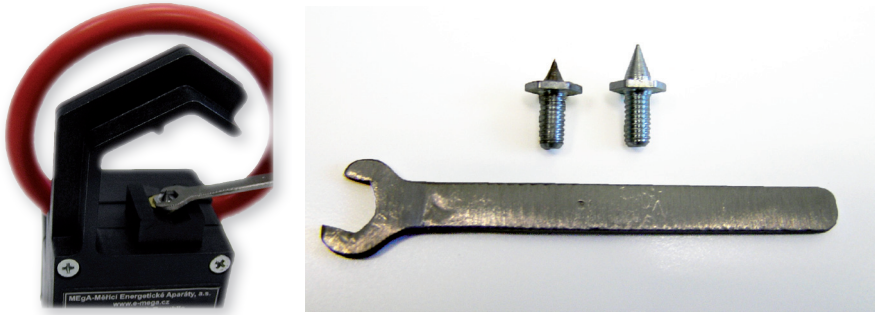

Fig. 1: Contact tip replacement

Above the contact mechanism is located the flexible current sensor; in measuring arrangement it is inserted into a socket and is secured against pulling by a latch in the socket. The flexible sensor latch can be opened using a flat screwdriver

Labelling of this monitor, serial number, nominal value of the measured current and other specified technical data are on the label on the bottom of the body. The arrow indicating the direction of the measured current is marked on the front of the compact monitor body.

The basic version of the compact monitor MEg70.L with the resistance to the overvoltage 2,5 kV has labels with black background and white text. The version MEg70.H is dimensioned for the DC or impulse voltage up to 8.0 kV in the duration up to 1 minute used for localization of failures of LV cables. The version MEg70.H has black text on yellow background.

Warning! Replacement of the monitor MEg70.H with the monitor MEg70.L can result in its failure during localization of a LV cable failure. It is necessary to disconnect the compact monitor MEg70.L before the localization using an increased voltage.

When a triple of monitors MEg70 is delivered, the arrow on each of the monitors has a different colour according to the measured phase. The arrow on the monitor for measurement on the phase L1 is black, the arrow on the monitor for measurement on the phase L2 is brown and the arrow on the monitor for measurement on the phase L3 is grey. When an unspecified installation is ordered, the arrow is white.

INSTALLATION

Before installing the MEg70 compact monitor it is necessary to make a decision on power supply and on superior communication system. The communication and power supply unit MEg70/KZ can be used advantageously here. The unit includes an interruptible power supply 12 V_{DC} and a converter RS485/USB for connecting to a standard computer with USB interface. The unit MEg70/KZ is also provided with terminals to connect other instruments (MEg202.2, MEg201) using the RS 485 interface; the power supply 12 V_{DC} is also prepared for this device. (Fig. 2). The output current of the power supply unit is 500 mA, so it is possible to connect up to 9 monitors MEg70 and one connected communication device (MEg202.2, MEg201).

The unit MEg70/KZ is placed in a small box that can be installed on the DIN rail TC35. The unit has terminals to connect a plug with a protective pin. The terminal to connect the PE protective pin is galvanically connected to the common wire of the monitor ⊥ and makes common earth of the measured LV network.

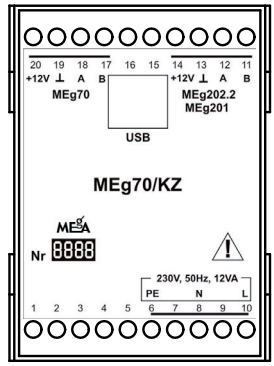

Fig. 2: Front panel of the unit MEg70/KZ

When the unit MEg70/KZ is not used, then for connecting to a standard PC which is not equipped with RS485 interface the converter RS485/USB is used. For evaluating of the measured data it is possible to use also the BEGA 220 mini-PC, which is equipped with the RS485 interface.

The monitor should be supplied with DC power supply 12 V_{DC}. It is possible to use a standard power supply without securing, in a socket or DIN rail design (recommended power supply – LAMBDA DSP30-12 with the output current up to 2.1 A). At the need of voltage and voltage interruption measuring according to voltage quality standard EN 61000-4-30 Edition 2 the DC uninterruptible power supply e.g. MEg106 is used.

The minimum value of power current I_{min}[A] of the power supply is determined according to the number of powered compact monitors MEg70. When the communication unit MEg 202.2 or MEg201 is used:

I_{min}[A] = number of MEg70 × 0.035 A + 0.2 A

Examples of calculations:
for 3 pcs of monitors MEg70 is I_{min} = 0,305 A, for 9 pcs of monitors MEg70 is I_{min} = 0.515 A

The communication system may be implemented throughout a local PC, e.g. mini-PC BEGA 220 A3 or throughout a remote communication system implemented e.g. throughout GPRS communication unit MEg202.2.

When Mini PC BEGA 220 A3 is used whose current requirement is 500 mA:

I_{min}[A] = number of MEg70 × 0.035 A + 0.5 A

Installation of the instrument on the measured wire

The compact monitor (see Fig. 8) is installed on insulated or non-insulated phase wires of low voltage switchboard in the state **without power** using the following procedure. Before the installation, select the contact tip of a correct length according to the thickness of the wire insulation (see chapter Description of construction).

1. To open the flexible current sensor, loosen its latch on the monitor. The flexible sensor latch can be opened using a flat screwdriver. The procedure is shown in Fig. 3. Put the side edge of the screwdriver under the latch and turn the screwdriver in direction of the arrow to wedge it in the groove on the sensor closure and take out slightly the sensor closure. Then take out the closure, until you hit against the other groove on the sensor. Wedge the screwdriver edge in the second groove and take out the flexible sensor from the latch in direction of the arrow.

Fig. 3: Opening the flexible sensor latch

2. Connect the ohmmeter which is set for indication of „circuit connection“ with one end to the secure socket of the monitor and with the other end is connected to the measured wire.
3. Select a suitable place for installation of the monitor with the possibility to insert the hook on the wire, with enough space for placing the monitor body and with access to the screw of pressure part shall be on low voltage wire.
4. In a selected place plug the hook of the monitor on the measured wire so that the arrow on the monitor body shows the direction of the measured current. With turning of the pressure part screw, the pressure part with point is pushed out, the measured wire is gripped and through further turning the insulation of wire is pierced by the point. The moment of connection of the monitor point with the measured wire is signalized by ohmmeter. Next, make one more turn of the pressure part screw (pitch of 1.5 mm). Finally, disconnect the ohmmeter.
5. Wrap the free end of the flexible sensor around the measured wire and insert it into the empty slot with a latch.

Instrument and SW interconnection

When the supply unit MEg101.4 or MEg101.5 is available, make the connection according to Fig. 4. For interconnecting the instruments, it is recommended to use the shielded four-wire cable designed for installation in LV cases (e.g. TBVFS 4 × 0.56 C) with wires with the diameter from 0.8 mm to 1.0 mm, i.e. the cross-section from 0.5 mm² to 0.8 mm². The length of the interconnecting wires does not exceed 30 m. The shielding shall be connected with the bonding conductor ⊥. The individual conductors represent signals of the power supply (+12 V and ground conductor ⊥) and communication RS485 (A and B). Similarly, contacts of the four-pole spring terminal block of the monitors MEg70 and terminals MEg101.4 or MEg101.5 are identified. For connecting PC through USB, the cable USB 2.0 A-B is recommended.

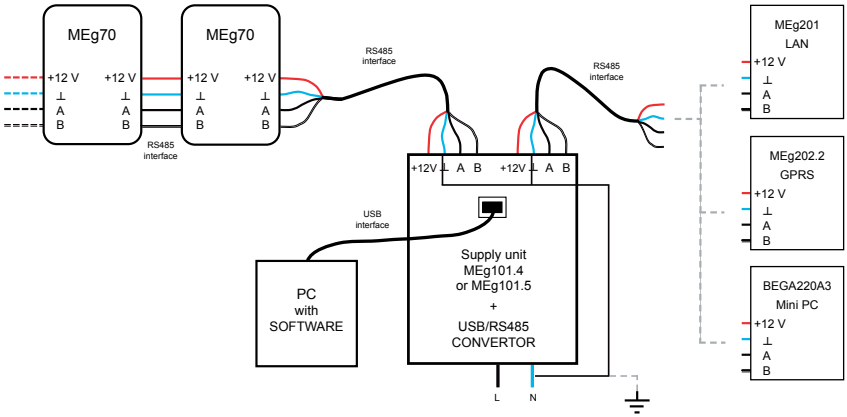

Fig. 4: Wiring diagram with DC supply unit MEg101.4 or MEg101.5

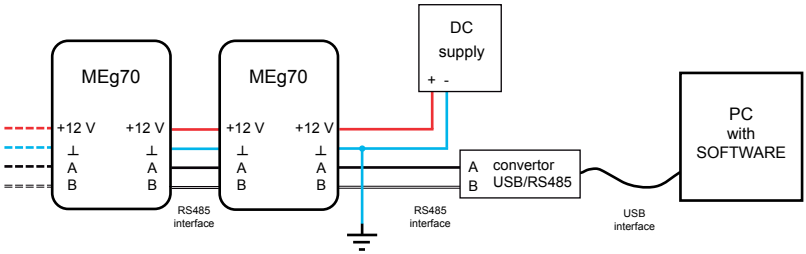

Fig. 5: General wiring diagram of instruments

When connecting the cables, the measured and power supply voltages must be off. Before turning on the voltage, check that the power supply terminals ⊥ of all installed monitors MEg70 are safely interconnected with the earthing system. Then connect the power supply voltage and check the communication of PC and SW. For more information about the program see the User specification of SW of the compact monitor MEg70.

When the supply unit MEg101.4 or MEg101.5 is not used, make the wiring according to Fig. 5. Proceed as follows:

1. Perform mechanical installation of DC power supply and connect the power supply to the network supply.
2. At switched out power supply connect its negative terminal safely with earthing system of a station which is connected with neutral wire of low voltage network.
3. Using a four-wire cable intended for installation in low-voltage boxes (e.g. TBVFS 4 × 0,56 C) with wires of diameter 0.8 mm to 1.0 mm, i.e. cross section of 0.5 mm^2 to 0.8 mm^2, connect the four-pole spring terminal blocks of MEg70 monitors to contacts +12 V, ⊥, A, B. If the cable is shielded, connect the shielding to the earthed pole of the DC supply, that is contact ⊥. Length of connecting cable does not exceed 30 m.
4. Connect the power wires +12 V and ⊥ of the MEg70 monitor to the „+“ and „-“ output terminals of DC power supply..
5. Connect the communication wires A and B of the MEg70 monitor to the RS485 interface of a superior computer or system.
6. Check secure connection of power supply terminals ⊥ of all installed monitors MEg70 with earthing system.
7. If the low power supply voltage is equal to low measured voltage, switched on the measured voltage.

   When an uninterruptible power supply is used, first switch on the DC power supply voltage. Connect the measured voltage to each compact monitors after the verification of communication according to the following point:
8. Depending on superior communication system (local / long-distance communication) verify the local technological communication through RS485 interface with individual MEg70 compact monitors. More information about the program can be found in the User specification SW MERCI of the compact monitor MEg70.

OPERATION

Operation of the MEg70 compact monitor consists of programming of measurement and reading of data. Measurements can be performed periodically or upon request. Directly measured data or data stored in flash memory can be read. Reading of data from memory can be performed without interruption of the measurement and evaluation or with interruption. Reading of data with interruption is faster, but there is discontinuity in the record of the measured data. Establishing of communication and its management is described in MEg70 Software Guide.

INSTRUCTIONS FOR MAINTENANCE AND SERVICE

The MEg70 compact monitor requires no mechanical maintenance during operation when adhering to specified operating conditions.

For its long-term functioning within the defined technical parameters it is necessary to prevent contact of water and chemicals with the monitor, which could cause mechanical damage.

The CR2032 lithium battery, which under normal operating temperatures ensures its operation for at least 5 years, is used in the monitor is MEg70 for backup of power supply of internal clock signal. After this time it is necessary to check its condition or replace it.

According to the importance of measurements of the installed MEg70 monitor, its user specifies the measurement accuracy check period. This check can be performed on the site of installation.

Checking of measurement accuracy or recalibration can be ordered from the manufacturer.

Repairs of MEg70 compact monitors are provided by the manufacturer or by a service organization authorized by the manufacturer.

During transport to the service an order with description of the defect must be delivered with the properly wrapped monitor.

⚠ **Warning!**
Before localization of a LV cable failure by means of a DC or impulse voltage, it is necessary to disconnect the monitor in the version MEg70.L from the tested cable. The compact monitor in the version MEg70.H is resistant to the DC or impulse voltage up to 8.0 kV in duration of 1 minute max.

At the determination of mechanical damage, even of the upper layer of insulation of flexible current sensors, which shows contrasting colour change of the sensor surface, or damage of other parts of the MEg70 compact monitor, the monitor must be removed or repaired immediately.

When using the MEg70 compact monitor in a manner for which it is not intended by the manufacturer, the protection provided by the MEg70 monitor can be impaired.

CONTENT AND METHOD OF DELIVERY

Delivery of MEg70.L or MEg70.H compact monitor includes:

- 1 pc of MEg70.L or MEg70.H compact monitor with the ordered I_{nom}
- 2 pcs of contact tips (length 3 mm and 4 mm)
- 1 pc wrench to replace the contact tip
- 1 pc of calibration certificate and warranty sheet
- 1 pc of CD with the programme, with User description of the monitor and programme

Optional:

- Communication and power supply unit MEg70/KZ
- Power supply 12 V in a socket or DIN rail design (recommended power supply unit LAMBDA DSP30-12)
- MEg106 Secure power supply
- RS485/USB Interface converter
- BEGA 220 Mini PC.

The place of handover, unless otherwise specified, is the place of manufacturer residence. MEg70 Compact Monitor with CD, calibration certificate, warranty sheet and delivery note is delivered in the packaging of a multilayer cardboard.

WARRANTY

24-month warranty is provided for the MEg70 compact monitor from the date of purchase, but no later than 30 months after dispatch from the manufacturer. Faults incurred in this period clearly caused by defective construction, faulty design or inappropriate material will be repaired free of charge by the manufacturer or its service organization.

Warranty expires during the warranty period, if the user performs illegal modifications or changes on the compact monitor, involves the device incorrectly, in the case of incorrect or rough handling or operation contrary to mentioned technical terms.

Faults on the MEg70 compact monitor and accessories arising during the warranty period have to be claimed by the user at the manufacturer or its authorized service organization. Claim without enclosed certificate of warranty is not recognized.

ORDERING

An order shall contain the number of triples or pieces of MEg70.L or MEg70.H compact monitors with a nominal value of the measured current I_{nom}. Monitors are manufactured with I_{nom} = 30 A, 100 A, 300 A, 1 000 A.

You can order the communication and power supply unit MEg70/KZ from the manufacturer; it combines functions of a power supply unit and a converter RS485/USB, and allow you to connect other devices.

The DC power supply LAMBDA DSP30-12 or DC uninterruptible power supply MEg106 can be ordered from the manufacturer for a specified number of the MEg70 monitors.

An RS485/USB interface converter and BEGA 220 Mini-PC, which is equipped with RS485 interface, can also be ordered.

The ordered assembly consisting of DC uninterruptible power supply and a required number of MEg70.L or MEg70.H compact monitors, is assembled and its correct function is checked by the manufacturer.

For installation of more complex arrangements, you can order the wiring or the wiring check from the manufacturer, including parameterization of operations of the individual monitors and explanations of measured results.

MANUFACTURER

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Fig. 6: Definition of quadrants of active and reactive energy according to IEC 62053-23

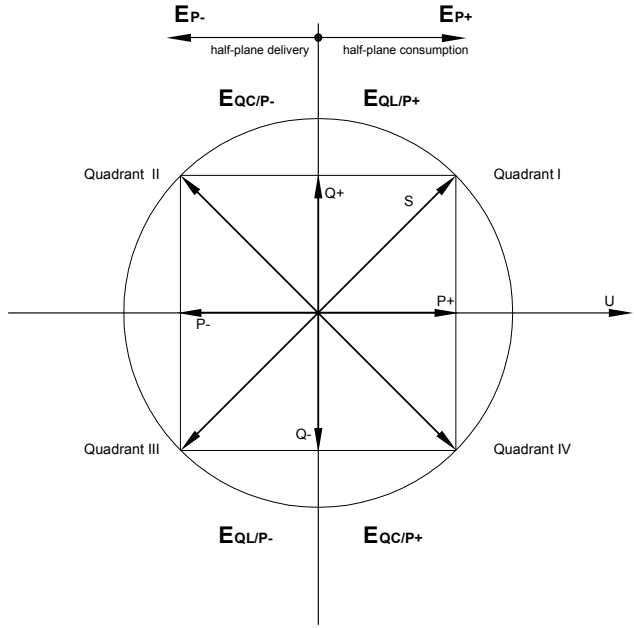


Fig. 7: Record of voltage drop with a distribution in two bands

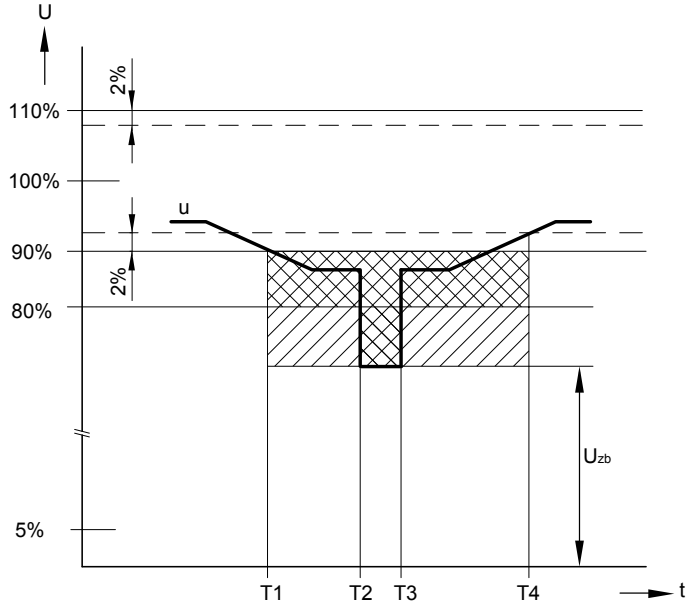
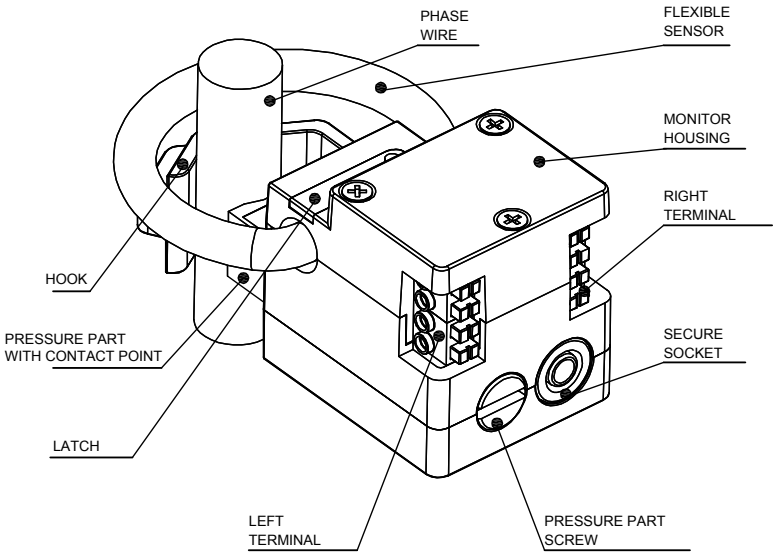
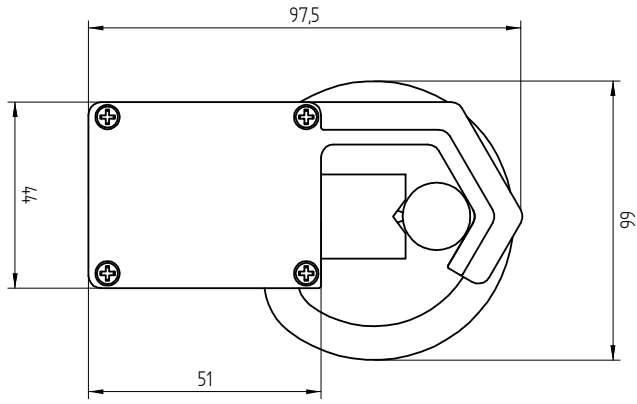
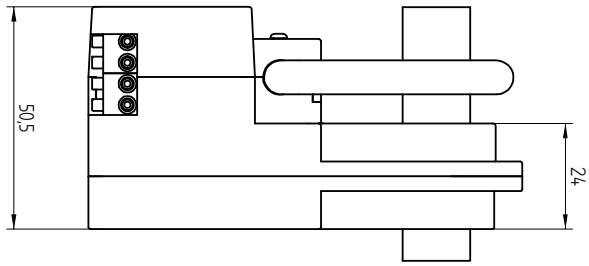


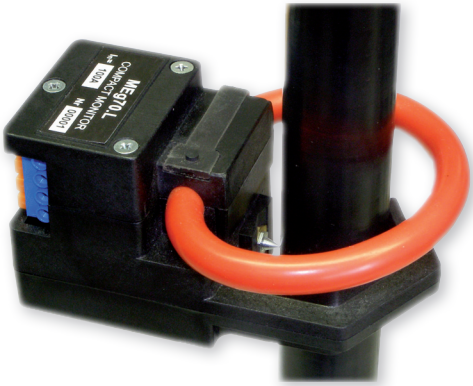
Fig. 8: Construction of compact monitor MEg70







MEg70 compact monitor



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