

Data Sheet no. 5.56/6

AC/DC Peak Voltmeter MU17 and 18



Survey of measurements and features	
Peak + ; Peak -	min. and max. peak
Peak average	average of both peak values
Peak / $\sqrt{2}$ + ; Peak / $\sqrt{2}$ -	min. and max. peak / $\sqrt{2}$
Average	arithmetic mean
RMS	real r.m.s.
Peak factor / $\sqrt{2}$	peak related to r.m.s. / $\sqrt{2}$
Ripple	ripple amplitude
Frequency	Frequency
graphic representation of the waveform	
measurement storage before disruptive discharge	
Interfaces	V.24 (RS232)
	PROFIBUS-DP (RS485)

Application

The AC/DC Peak Voltmeters MU17 and MU18 are used for all measurements of AC and DC voltages especially in HVAC and HVDC test systems in connection with HV dividers. The measurements meet all requirements of the related international standard IEC 60060-2. Measurements are displayed or instantaneously processed.

The voltmeter MU17 directly displays the measured value under consideration of the scale factor of the external voltage divider. AC and DC voltages with peak values up to 1000 V can be measured without any voltage divider. Furthermore the voltage wave-

form can be represented graphically. A special advantage for practical measurements is the storage of values occurring during a disruptive discharge at the test object. An internal testing procedure enables a rapid check of the device. Two serial interfaces provide the possibility of connection to automatic control and evaluation systems: A PROFIBUS-DP interface for time-critical communication (especially with HIGHVOLT control systems) and a V.24 interface for conventional connections are available.

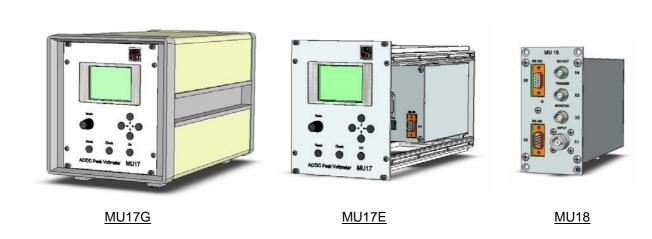
Design

Type MU17

is designed as $^{1}/_{3}$ plug-in unit in the 19" system, it can be supplied either as stand-alone (MU17G) or plug-in device (MU17E). Communication via the two serial interfaces is also possible.

Type MU18

is the metal-encapsulated measuring device for rail mounting, without display and operating panel, but connection by one of the two interfaces to the operator device or a controlling industrial PC for measuring and handling data and display.



Operation

The operation is explained by the circuit diagram below. The voltage to be measured is transferred from the INPUT via the internal divider, input amplifier and the programmable amplifier to the analog-digital converter (ADC).

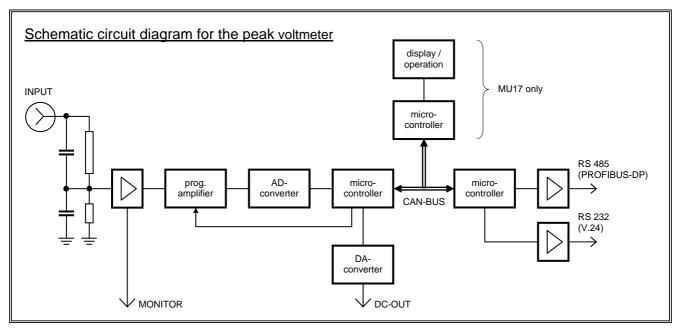
The converter scans the input signal with a high frequency. The digital values gained by the ADC are immediately evaluated by a microcontroller related to the measurement.

All measured values are internally stored temporarily and therefore available after a disruptive discharge.

For special controlling modes, a DC voltage that is proportional to the peak value is available at DC-OUT and a voltage proportional to the INPUT is provided at MONITOR.

Another microcontroller controls the entire data exchange across the PROFIBUS-DP or V.24 interfaces. With the device MU18, operation and data output is only possible across these interfaces.

The communication between the microcontrollers is realized by CAN-Bus.



Technical data

Values of connection

Input voltage (peak value) 0...±1000 V

Frequency range DC and 10 ... 500 Hz Input impedance $R \geq 10 \ M\Omega, \ C \leq 50 \ pF$

Input Connector coaxial, Type N

Measurement quantities

- Peak value, peak value $\sqrt{2}$; each in both polarities
- Peak average: $\frac{|\max. value| + |\min. value|}{2}$; at DC with the correct algebraic sign
- Arithmetic mean value
- RMS (root mean square)
- Peak factor $\sqrt{2}$: $\frac{\text{peak average}}{\text{RMS} \cdot \sqrt{2}}$
- Ripple amplitude: max. value min. value
- Frequency

With voltage measurement at the measuring input, the divider (or transformation) ratio of the externally connected divider is considered with the displayed output value:

Divider ratio typical 1 ... 20 000; possible 1 ... 9.999·10⁹

The display shows the voltage value with the appropriate unit V, kV or MV automatically.

In the case of a disruptive discharge, the measured values are stored until they are erased either manually or by an external control command or until a new voltage is applied to the measuring input. The storage can also be started by an external impulse (TTL; connector type BNC).

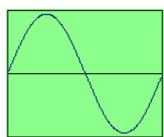
Measurement uncertainty

The measurement uncertainty is related to the measured value in the range of $\pm (10 \dots 1000)$ V, under reference conditions and at DC as well as in the frequency range $(10 \dots 500)$ Hz.

Peak values, mean values, true RMS value $max. \pm 0.5\%$

Visualisation

The waveform is shown on the graphic display for one period and normalised on the maximum peak value.



Data input and output

Input of divider ratio 4 digits with exponent

Output of measured values 4 digits with unit of measurement

Interfaces V.24 and PROFIBUS-DP

Analog output voltages 0 ... +10 V (DC-OUT) and 0 ... ±12 V (MONITOR) ; connectors type BNC

Testing mode

Internal test voltage

+5.000 V (DC)

The evaluation is effected according to the principal mode of operation. The divider ratio is set to 1.

Mains supply

MU17 230 V (±10%) 50/60 Hz approx. 20 VA MU18 24 V (12 V ... 32 V) DC approx. 300 mA

Dimensions and weight

MU17G stand-alone device ($w \times h \times d$)

MU17E plug-in device ($w \times h \times d$)

MU18 ($w \times h \times d$)

 $186 \times 205 \times 330 \text{ mm} / \text{approx. } 5.5 \text{ kg}$

 $142(=28TE) \times 173(=4HE) \times 300 \text{ mm} / \text{approx. 3 kg}$

 $65 \times 126 \times 160$ mm / approx. 1 kg

Conditions for application

Reference operating conditions

Normal conditions

Application

Conditions for storage/transportation

ambient temperature 23°C ±5 K

relative humidity 10 ... 65% ambient temp. +5 ... +40°C

relative humidity 10 ... 80% indoor

ambient temp. -40 ... +70°C

relative humidity ≤ 95% (with max. 30°C)

Scope of delivery

MU17G stand-alone device

19" casing

plug-in unit MU17

power supply cable, 1.5 m

 $\begin{array}{l} \text{adapter N} \leftrightarrow \text{BNC} \\ \text{set of fuses} \end{array}$

set of plugs

MU17E plug-in device

plug-in unit MU17

power supply cable, 1.5 m

 $\text{adapter N} \leftrightarrow \text{BNC}$

set of fuses set of plugs

MU18 measuring module

metal-encapsulated measuring device without display

MU17/18 fulfils all requirements of IEC 60060-2.

For further information please contact:

or our local representative:

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