Universal Measuring Device

UMG 503

Digital Measurement In Perfection

Janitza electronics






Universal Measuring Device

Application

The UMG 503 is a universal measuring device, which is suitable for measurement, storage and supervision of electrical quantities in low and medium voltage networks. The measurement is designed for 1 and 3 phase systems with or without neutral conductor. One of its main features is the high accuracy class, compact design and the measurement of the harmonic voltages and currents in each outer conductor. In order to reach all the features, about 13 other devices such as amperemeter, voltmeter, voltmeter changeover, power meter (kW, kVA, kvar cos-phi), real and reactive energy for four tariffs (consumption/supply), harmonic analyzer and measurement transformer, clock etc. are necessary. Therefore the costs for the project, installation, wiring and storage are much lower, compared to analogue instruments.
Possible applications are:

- Supervision and control of electrical quantities in energy distributions.
- Measured value transducer for PLC.

General operation

The three phase electronic measuring system measures and digitizes the effective values of voltages and currents in a 50/60 Hz network. Two random tests are carried out each second. From those scanned values, the inserted microprocessor calculates the electrical quantities. Maximum values, lowest values and programming data are saved in the battery buffered memory. Selected measured values and net breakdown or return are saved in the ring buffer with date and time.

Memory

For the saving of the selected mean values, a ring buffer for 80.000 or 320.000 measured values is at your disposal. In the factory's presettings, the mean values of U1, U2, U3, I1, I2, I3, P1, P2, and P3 are saved with an averaging time of 15 minutes for about 1 year in the devices with 512 k RAM and about 3 months in devices with 128 k RAM.

Six windows can be programmed for saving measured values. An upper and lower threshold can be selected, and data are saved within or out of these thresholds.

Versions of the UMG 503

Type UMG 503	L	LG	LS	S	OV	V
Memory 512k RAM	○	●	○	○	●	●
Memory 128k RAM	●	○	●	●	○	○
Auxiliary voltage:						
85 .. 250V AC, 80 .. 350V DC	●	●	●	●	●	●
40 .. 115V AC, 55 .. 165V DC	◑	◑	◑	◑	◑	◑
15 .. 55V, 20 .. 80V DC	◑	◑	◑	◑	◑	◑
Relay outputs, internal	○	○	○	○	◑	●
Relay outputs, external	◑	◑	◑	◑	◑	◑
Pulse output	○	○	○	○	◑	●
Analogue output 0 (4) - 20mA, internal	○	○	○	○	◑	●
Analogue output 0 (4) - 20mA, external	◑	◑	◑	◑	◑	◑
RS 232 interface	●	●	○	○	●	●
RS 485 interface	○	○	●	●	●	●
Auxiliary input, internal	○	○	○	○	◑	●
Auxiliary input, external	◑	◑	◑	◑	◑	◑
Three wire measurement (Aron)	◑	◑	◑	◑	◑	●
Profibus DP V0 / V1	○	○	○	◑	◑	◑
Software PSW basic	●	●	●	●	●	●
Software PSW professional	◑	◑	◑	◑	◑	◑

●= existing ○= not possible ◑ = optional

Measured values

Quantity to be measured	Indication	Measuring range at scale factor 1+	L1	L2	L3	Sum	Lowest value	Mean value *1	Peak value	Date / Time	Measuring accuracy
Current .. /5A	0,000 .. 9999 A	0,005 .. 5 A	●	●	●		●	●	●	●	+-0,2 % Mr
Current .. /1A	0,000 .. 9999 A	0,005 .. 1 A	●	●	●		●	●	●	●	+-0,2 % Mr
Current, N	0,000 .. 9999 A	0,060 .. 15 A				●	●	●		●	+-0,6 % Mr
Voltage L-N	0,0 .. 999,9 MV	50 .. 500 V	●	●	●		●	●	●	●	+-0,2 % Mr
Voltage L-L	0,0 .. 999,9 MV	80 .. 870 V	●	●	●		●	●	●	●	+-0,2 % Mr
Frequency (U)	45,00 .. 65,00 Hz	45,00 .. 65,00 Hz						●		●	+-0,2 % Mv
Real power +/-	0,00 W .. 9999 MW	0,05 W .. 2,5 kW	●	●	●	●	●	●	●	●	+-0,5 % Mr
Apparent power	0,00 VA .. 9999 MVA	0,05 VA .. 2,5 kVA	●	●	●	●	●	●	●	●	+-0,5 % Mr
Reactive power	0,00 kvar .. 999 MVAr	0,05 var .. 2,5 kvar	●	●	●	●	cap.	●	ind.	●	+-0,5 % Mr
Power factor	0,00 cap. .. 1,00 .. 0,00 ind.	0,00 cap. .. 1,00 .. 0,00 ind.	●	●	●	●	cap.	●	ind.	●	+-0,5 % Mr
Real energy +	0,0 Wh .. 9999 GWh	0,05 Wh .. 9999 GWh*2				●		●		t_1/t_2	*3
Real energy –	-0,0 Wh .. -9999 GWh	-0,05 Wh .. -9999 GWh*2									
Reactive energy +/-	0,0 .. 9999 Gvarh	0,05vars .. 9999 Mvarh*2				●		●		t_1/t_2	*3
Harmonic content THD U, I	0,0 .. 100 %	0,0 .. 100 %	●	●	●		●	●	●	●	+-0,5 % Mr
Harmonic content	0,000 A .. 9999 A	0,005 A .. 5A (1 A)	●	●	●		●	●	●	●	+-0,5 % Mr
HDF U, I 2-20	0,0 V .. 99,99 kV	0,000 V .. 9999 V	●	●	●		●	●	●	●	+-0,5 % Mr

Mr: of measuring range, Mv: of measured value, t_1: Starting time, t_2: record time, + consumption, - supply

*1 Integration over time: 5, 10, 15, 30 seconds, 1, 5, 10, 15, 30, 60 minutes *2 Saving period 60 minutes. *3 The measuring accuracy of energy depends on the corresponding accuracy or power

Indications

Measured value indication/rotation

The well readable LCD data field in combination with the function keys informs about the selected measured values (actual- / lowest- / highest- / mean values). With the UMG 503 you can indicate 3 measured values in the display and create 140 data fields individually via the software PSWbasic. For the measured value rotation a cycle of 1-9999 seconds can be set and measured values can be selected.

Auxiliary input*4

The auxiliary input can be programmed for one of the following functions:

OFF = Auxiliary input not used
1 = Reset of the 15 minutes power mean value
2 = Tariff changeover
3 = Synchronization of the internal clock

Pulse output*4

The pulse output delivers current pulses of the assigned real or reactive energy. The minimum pulse duration is 50 ms.

Relay outputs*4

The relay outputs K1 and K2 can be used for supervision of certain thresholds. Each relay output can be linked with a measured value, and be saved with date and time and activated in case of exceedings. In order to avoid too frequent switchings, a minimum time can be programmed for each relay output.

*4: see versions

Universal Measuring Device

Decentral I/O system

The UMG 503 can operate 6 external analogue outputs, 6 digital outputs and 3 digital inputs via a bus coupling and functional clamps with Modbus RTU Master - Protocol. The connection between UMG 503 and bus coupling is carried out via interface RS232 or RS485 by choice.

Bimetallic function

The bimetallic function is build for the three currents in the outer conductors. These values can be integrated over the times marked on page 3 and be saved as highest mean values.

Summer / Wintertime changeover

The following possibilities are at your disposal:

a) Off
b) Select changeover time of summer/wintertime
c) Automatic changeover according to the middle European conventions.

Event memory

The following events can be saved within the event buffer:

Deletion of event buffer.
Relay outputs on/off.
Breakdown and return of auxiliary voltage.
Breakdown and return of measuring voltage.

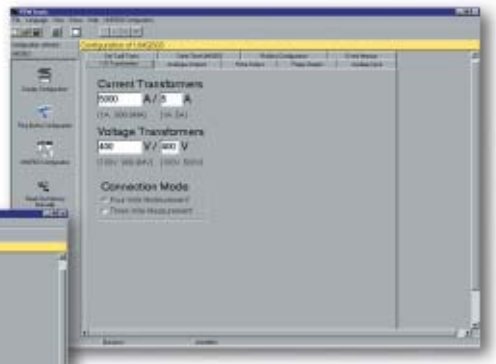
Software

The programming and evaluation software PSWbasic is included in the contents of delivery. For online measured value collection the comfortable visualization and evaluation software PSWprofessional is available separately.

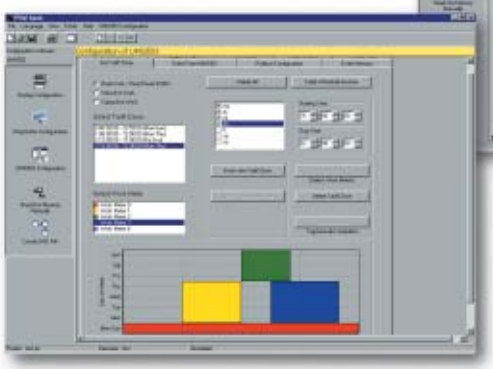
Password

With a four digit user password, the user can protect the programming and configuration from unintended changes.

Programming-/Reading out software PSWbasic



Configuration of current and voltage transformers and connection method



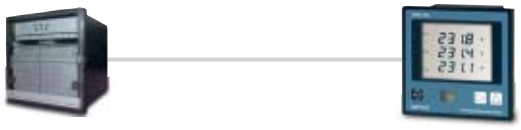
Configuration of the tariff times of energy measurement with weekly switching clock

Decentral I/O System

Up to six analogue and six digital outputs as well as three digital inputs can be connected to the interfaces RS232 or RS485 via a WAGO-bus coupling.

Example analogue output 0(4)-20 mA

All measured values except real and reactive energy can be transmitted via an internal analogue output. Furthermore, six additional external analogue outputs can be programmed via the decentral I/O system.



Example modem communication .. 31 devices per modem at maximum

Example PLC communication .. 31devices, can be expanded to 255 devices by a starrepeater

Example PC communication .. 31devices, can be expanded to 255 devices by a starrepeater

Example Com Server (TCP/IP) .. 31 devices per ComServer for local Network

Note: The ComServer is only suitable for a local network. Please mention, if windows 2000 or ME is used. The UMG503LS is not suitable for this application.

Example fiber optic cable communication .. 31 devices per line

Note: The UMG503LS is not suitable for this application.

Portable universal measuring device

The portable universal measuring device MRG 503LG is suitable for measurement and storage of electrical quantities in low voltage mains.

Up to 320.000 measured values can be saved and read out via the interface RS232. The measurement is designed for one and three phase systems and a voltage of L-N 50-500 V,AC, L-L 90-870V (Auxiliary voltage 85-265V, AC).

This device is suitable for flexible current transformers with a voltage output of 3,0V AC.

The dimensions of the aluminium case is W480xD395xH195mm.

The measuring wires, voltage grips as well as the configuration and reading out software PSWbasic belong to the contents of delivery.

The flexible c/ts do not belong to the contents of delivery.

Technical Data

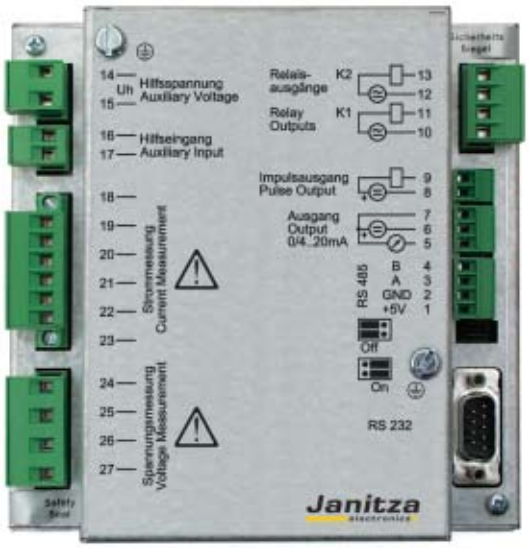
Technical data of the flexible c/t	
Type	ACF-3AK and RR3030
Measuring range	30A / 300A / 3000A
Output	100mV / 10mV / 1mV
Phase voltage max.	600V
Frequency range	10Hz up to 20kHz
Accuracy	+-1% of measuring range
Cable diameter	14,3mm
Inner-Δ	178mm
Length open	610mm
Batteries:	
ACF-3AK	2x9V-Battery
RR3030	2xMignon (AA)
Battery life expectance:	
ACF-3AK	>100h
RR3030	400h

For long term measurement, the type RR3030 is available with a net supply optionally.

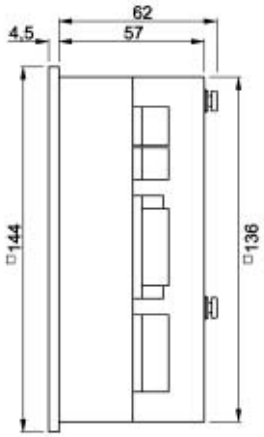
RR 3030

ACF-3AK

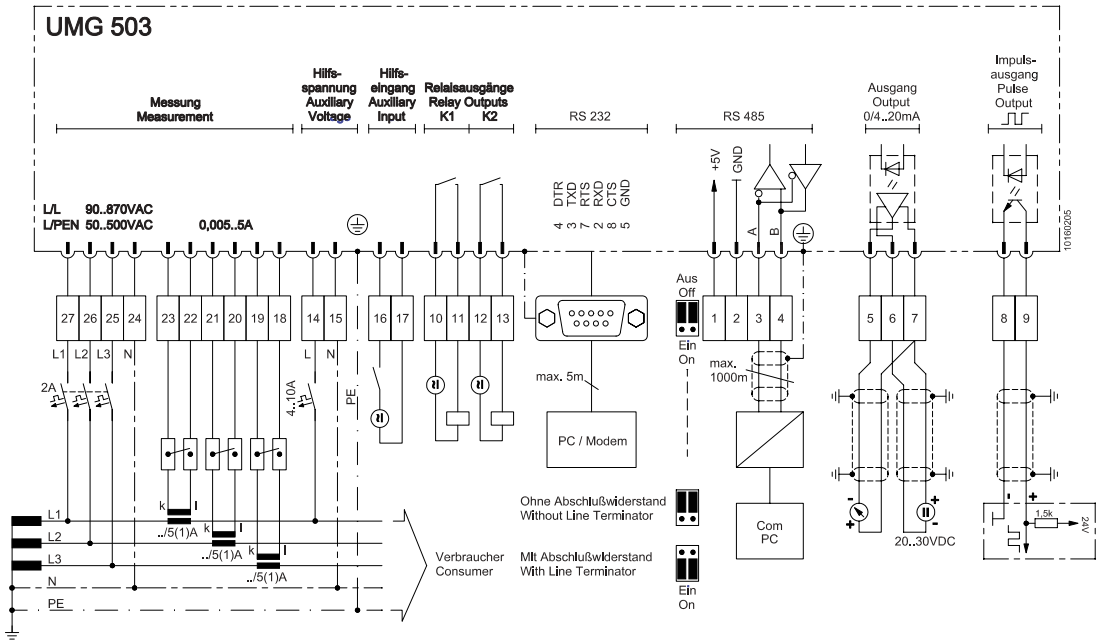
Technical Data



Protection class:	III
Pollution degree:	2
Ambient temperature:	-10 °C .. +55°C
Storage temperature:	-20°C .. +60°C
Mounting position:	any
Protection class:	1=Device with protective wire
Auxiliary voltage:	(see versions)
Voltage measurement:	L-N 50 .. 500V 50/60 Hz
	L-L 80 .. 870V 50/60 Hz
Current measurement:	.. /5A (1A)
Power consumption:	ca. 0,2 VA
Minimum working current:	5mA
Protection class:	Front IP 65 according to IEC 529
	Back IP 20 according to IEC 529



The UMG 503 can be used in IT-networks with outer conductor voltage up to 500V AC. The impedance is 2MΩ in each outer conductor against Housing (PE)



Janitza electronics GmbH

Vor dem Polstück 1 • D-35633 Lahnau

+49 (0) 64 41/96 42-0 • +49 (0) 64 41/96 42-30

e-mail: info@janitza.de • Internet: http://www.janitza.de

Representative