UMG 505

Network Analysis
And
Maximum Demand Control

Janitza electronics

LON

Universal
Measuring Device

Application

The UMG 505 is a universal measuring device, which is suitable for measurement, storage and supervision of electrical quantities in low and medium voltage switchgear. The measurement has been laid out for one and three phase systems with or without neutral conductor. The main features are the high accuracy, compact design and the measurement of harmonic currents and voltage in each outer conductor. With the Emax program, it is possible to reduce the real power maximum by a short term disconnection of consumers or the connection of generators. Furthermore, the system allows a time based switching of consumers by the integrated weekly time controller.

To achieve the functionality of the universal measuring device, about 15 other devices, such as amperemeter, voltmeter, voltmeter changeover, power meter (KW, kVA, kvar cos-phi), real and reactive energy meter in two tariffs (consumption/supply), harmonic analyzer, maximum demand controller, switching clock etc. are required. Therefore, the costs for the project, installation and storage are reduced significantely.

Possible applications are:

- Supervision and control of electrical quantities in energy distributions
- Transducer for PLC

Principle

The three phase electronic measurement system measures and digitizes the effective values of voltage and currents in a 50 / 60Hz network. Two random tests per second are carried out. From these scanned values, the inserted microprocessor calculates the electrical quantities. Peak values, lowest values and programmed data are saved in a battery buffered memory. Selected values as well as net breakdown and return are saved with date and time within the ring buffer.

Memory

The memory of UMG505 is divided into three areas. The event memory, the maximum and minimum storage and the ring buffer. All Emax monthly peak values are saved for each months for all tariffs.

Event memory

In the event memory, the following events can be saved with date and time:
- Deletion of the event   - Limit violations
- Changing of the digital inputs   - Breakdown and return of the auxiliary voltage
- Changing of the digital Emax outputs   - Breakdown and return of the measuring voltage

Up to 9999 events can be saved. The reading out is possible with the programming and reading out software PSW505 and a PC only.

Summer-/Winter time change over

The following possibilities are at your disposal:
- off - No change over
- on- Own change over times
- EU-listed change over, based on the procedure of the European community

Ring buffer

For the storage in the ring buffer, the following values can be selected
- Mean values of the measuring values   - The fixed energy meters
- Reset of Emax measuring period

The possible storage time for saving the mean values of U1, U2, U3, I1, I2, I3, P1, P2, P3 over an averaging time of 15 minutes is about 1 year.

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 UMG 505

Type UMG 505 Auxiliary voltage:	MOD RS232	MOD RS485	LON
85 .. 250V AC, 80 .. 350V DC	●	●	●
40 .. 115V AC, 55 .. 165V DC	◑	◑	◑
15 .. 55V, 20 .. 80V DC	◑	◑	◑
RS232 interface	●	○	●
RS485 interface	○	●	○
LON interface	○	○	●
Software PSW505	●	●	●
Software PSWprofessional	◑	◑	○

● = existing   ○ = not possible   ◑ = optional

Measured value indication / rotation

The exellent LCD display in combination with the function keys informs about the selected measured values (actual-, lowest-, peak-, and mean values). With the UMG 505 up to three measured values can be indicated simultaneously, and up to 140 data fields can be created individually by the software PSW505. For the measured value rotation, a changing time of 1 .. 9999 seconds can be set along with a selection of the measured values.

Application

Ausführungsvarianten

Measured values

Quantity	Indication range	Measuring range at scale factor 1	L1	L2	L3	Sum	Lowest value	Mean value[1]	Peak value	Date / Time	Accuracy
Current .. /5A	0,000 .. 9999 A	0,005 .. 5 A	●	●	●		●	●	●	●	+-0,2 % omr
Current .. /1A	0,000 .. 9999 A	0,005 .. 1 A	●	●	●		●	●	●	●	+-0,2 % omr
Current, N	0,000 .. 9999 A	0,060 .. 15 A				●	●	●	●	●	+-0,6 % omr
Voltage L-N	0,0 .. 999,9 MV	50 .. 500 V	●	●	●		●	●	●	●	+-0,2 % omr
Voltage L-L	0,0 .. 999,9 MV	80 .. 870 V	●	●	●		●	●	●	●	+-0,2 % omr
Frequency (U)	45,00 .. 65,00 Hz	45,00 .. 65,00 Hz	●	●	●		●	●	●	●	+-0,2 % omv
Real power +/-	0,00 W .. 9999 MW	0,05 W .. 2,5 kW	●	●	●	●	●	●	●	●	+-0,5 % omr
Apparent power	0,00 VA .. 9999 MVA	0,05 VA .. 2,5 kVA	●	●	●	●	●	●	●	●	+-0,5 % omr
Reactive power	0,00 kvar .. 999 MVAr	0,05 var .. 2,5 kvar	●	●	●	●	cap.	●	ind.	●	+-0,5 % omr
Power factor	0,00 cap. .. 1,00 .. 0.00 ind.	0,00 cap. .. 1,00 .. 0,00 ind.	●	●	●	●	cap.	●	ind.	●	+-0,5 % omr
Real energy +	0,0 Wh .. 9999 GWh	0,05 Wh .. 9999 MWh[2]				●		●		t_1/t_2	*3
Real energy -	-0,0 Wh .. -9999 GWh	-0,05 Wh .. -9999 MWh[2]				●		●		t_1/t_2	*3
React. energy +/-	0,0 .. 9999 Gvarh	0,05vars .. 9999 Mvarh[2]				●		●		t_1/t_2	*3
Total harmonic content THD U, I	0,0 .. 100 %	0,0 .. 100 %	●	●	●		●	●	●	●	+-0,5 % omr
Part. harmonic cont.	0,000 A .. 9999 A	0,005 A .. 5A (1 A)	●	●	●		●	●	●	●	+-0,5 % omr
HDF U, I 2-20	0,0 V .. 99.99 kV	0,000 V .. 9999 V	●	●	●		●	●	●	●	+-0,5 % omr

omr: of measuring range, omv: of measured value, t1: Starting time, t2: Running time, + Consumption, - Supply
*1 Integration over time: 1, 5, 10, 15, 30 seconds, 1, 5, 10, 15, 30, 60 minutes
*2 Storage time 60 minutes.
*3 The accuracy of energy depends on the corresponding accuracy of power.

Digital Inputs

The 4 optical inputs are assigned to the internal inputs 1 .. 4, and all in all, the UMG505 has 20 internal inputs. To the internal inputs 5 .. 12, the 8 inputs of the LONbus interface (option) are assigned, and to the internal inputs 13 .. 20, the 8 inputs of the Modbus interface (option) are assigned. The condition of the digital inputs 1 .. 4 can be read via the serial interface.

Each of the 20 internal inputs can be assigned to one of the 5 input channels. Each of the input channels can change over an energy meter, reset the Emax time, synchronize the internal clock or select another target value for the Emax program.

Two of the digital inputs can be combined by AND, and the result can be assigned to an input channel. To each of the digital inputs 1 .. 4, an event counter is assigned. If a function, except pulse valency, is assigned to a digital input 1 .. 4, all changes at the input are saved with date and time.
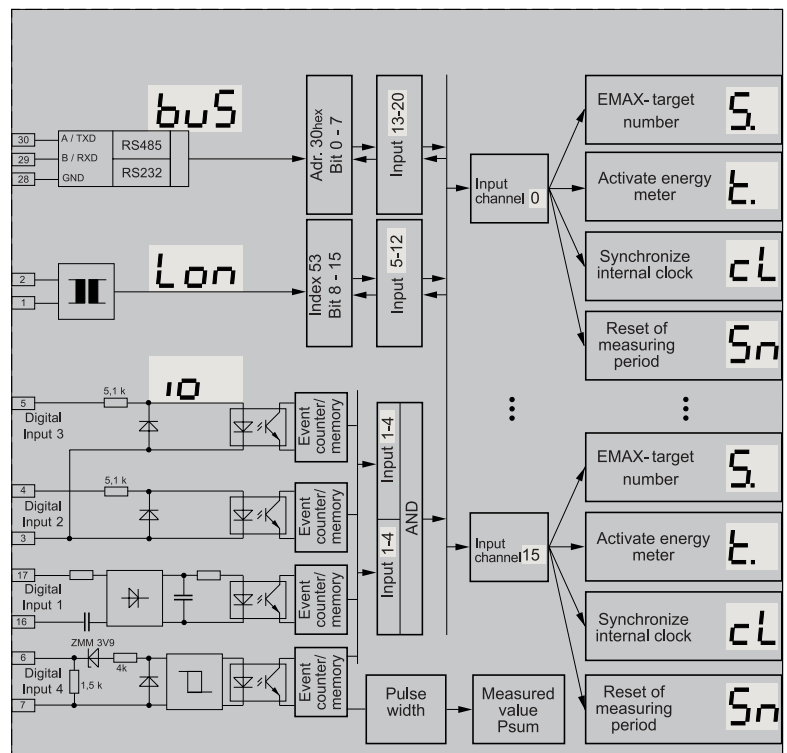
Digital inputs

The digital input 4 can be used as pulse input for real energy measurement (max. 10 Hz).

EMAX target value

For the Emax program, up to 5 target values are programmable. A target number is assigned to each target (1-5). Via the target number, the change over is carried out. The target number can be selected via the internal switching clock or via the digital inputs of the UMG 505.

Digital outputs

Digital outputs

The UMG505 has 5 digital transistor outputs. These outputs are depicted on display with out1 up to out5 .
Each of the ouputs can be assigned to a data source. 6 different data sources are at disposal:

- Limit - outputs,
- Time controlled ouputs,
- Emax digital outputs,
- LON-Bus (Option)
- MODBUS (Option),
- Energy meter

Each data source can be assigned to one output only. If an output is assigned to an energy meter, the output works as a pulse sender. The signals of all data sources, except energy meters, can also be inverted.
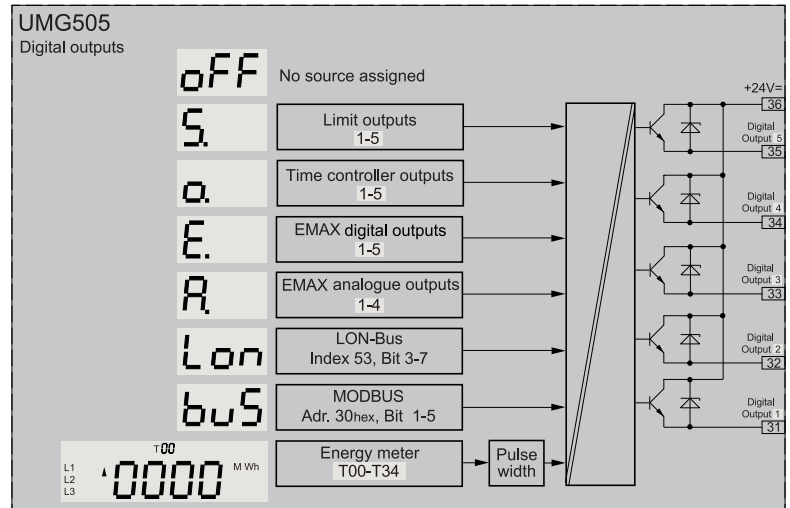
Supervision of limits

For the supervision of limits, 5 threshold outputs can be programmed. To each threshold output, up to three comparators (A, B, C) can be assigned. For each comparator
- 2 limits and 2 measured values or
- 2 limits and 1 measured value or
- 1 limit and minimum disconnection time

can be programmed.

Threshold violations are saved in the event memory with date and time, and can be given out at a digital output by choice.

Pulse outputs

The five digital outputs in the UMG505 can be used as pulse outputs. The minimum pulse width is 50ms and maximum frequency is 10Hz.

Weekly time controller

The time controller of the UMG505 has 100 time channels. Each time channel depicts a period of time. The time channel is depicted by a connection and a disconnection time. The connection and disconnection time is described by day, hour and minute.

Each time control channel can control a time control output, an Emax target and an energy meter simultaneously.

In the programming of the digital outputs, a time control output can be assigned to a digital output.

Emax digital outputs

The Emax program controls up to 5 Emax digital outputs. A priority 0...9 can be assigned to each Emax digital output.

Parameters

|	
Priority:	0 .. 9 (0 = Off)
Emax digital outputs:	1 .. 5
Connection power:	0W .. 9999MW
Minimum connection time:	20 .. 9999seconds
Minimum disconnection time:	20 .. 9999seconds

Analogue outputs

Analogue outputs

The UMG505 has 4 analogue outputs. The analogue outputs have a common ground and are separated galvanically against the other in- and outputs of the UMG505. For the operation of the analogue outputs an external auxiliary voltage of 20V up to 30V DC is needed.

As sources for the analogue outputs, the following entities can serve:

- Measured values
- The internal Emax analogue outputs 1 .. 4 and
- Values, which are given over Modbus interface to the UMG 505.
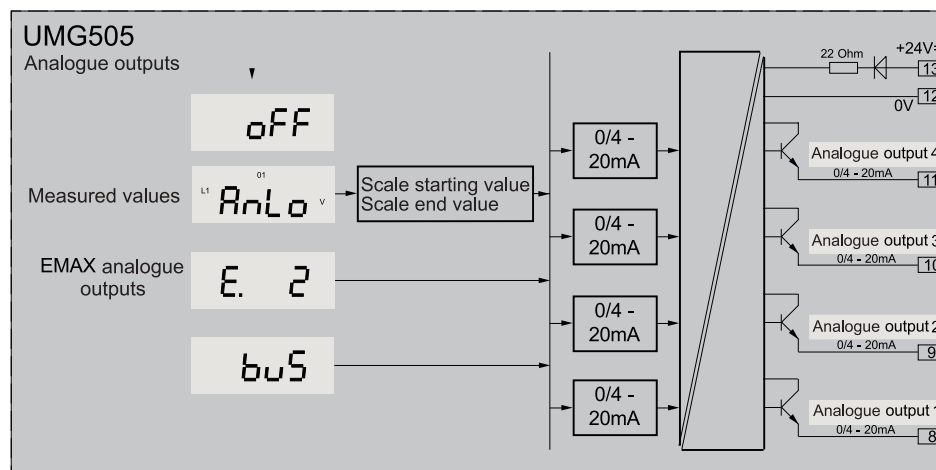
EMAX analogue outputs

The UMG505 has got 5 digital and 4 Emax outputs internally. Each of the internal Emax analogue outputs can be assigned to an external analogue output. If a generator should be controlled by an Emax analogue output, the internal Emax analogue output cannot be assigned to an "analogue output" only, but also to a "digital output". The "digital output" is active, whenever the calculated current of the controlling Emax analogue output is bigger than 0mA. Therefore the "digital output" can be used as starting signal for generator control.

For the Emax analogue outputs, the following parameters can be set:

Description	Setting range
Priority:	0 .. 9 (0 = Off)
EMAX analogue output:	1 .. 4
Maximum connection power:	0W .. 9999MW
Minimum connection power:	0W .. 9999MW
Consumers	
Max-Spare power:	0W .. 9999MW
Run up time:	10 .. 9999Sec.
Generator	
Minimum run time:	0 .. 9999minutes
Handling time:	0 .. 99seconds

LON ➤ **Example LON-BUS**

With the LON technology FTT10A, the UMG505 can be connected in line, star or ring structure.

LON ————————

Example analogue output 0(4)-20mA

All measured values, except real or reactive energy, can be given out via 4 analogue outputs.

Example Modem communication .. up to 31 devices per modem

Software

RS232   RS485

Example PLC communication .. 31 devices (expandable up to 255 devices by a star repeater)

Modbus

RS485

**Example PC communication** .. 31 devices (expandable up to 255 devices by a star repeater)

Software

RS232   RS485

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

Max. 57600 Baud

Software

RS485

Ethernet
(TCP/IP)
100
BaseT

RS485

Note: The ComServer is suitable for a local network. Please mention, if Windows 2000 or ME is used.

**Example fibre optical connection** .. 31 devices per line

Software

RS232   RS485   RS485

LWL
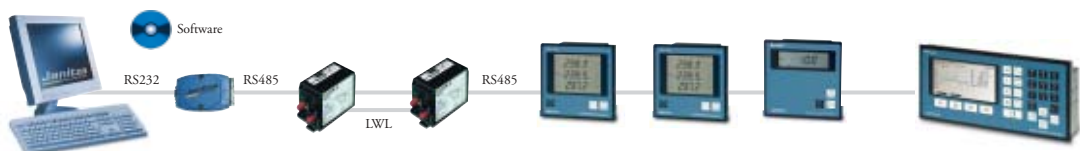
Technical Data

Overvoltage 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:	Front IP 50 according to IEC 529
	Back side IP 20 according to IEC 529
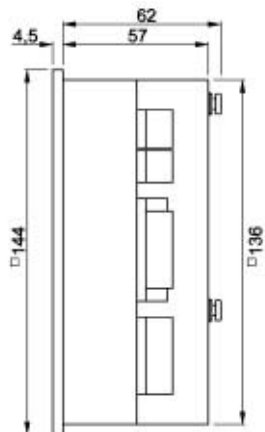
The UMG505 can be used in IT networks with outer conductor voltage up to 500V AC. The Impedance is 2MΩ per outer conductor against ground (PE)
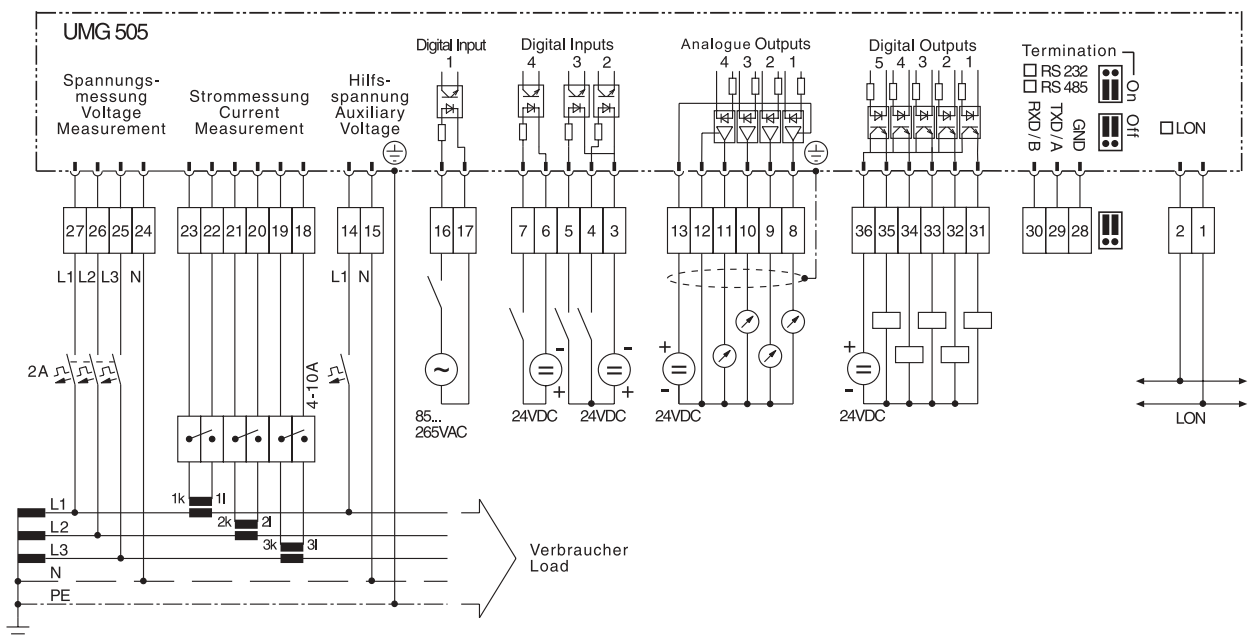
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