UMG 96S

The little
field bus giant

Universal flush-mounting measuring instruments of the UMG 96S product family are mainly designed for use in low and medium voltage distribution systems. Due to the large number of available measurement values in an extremely compact measuring unit, a number of analogue measurement instruments can be replaced. Additional functions such as the measurement of harmonics, the recording of minimum and maximum values, digital and analogue I/Os, the operating hour meter, the bi-metallic strip function, password protection and many more offer an effective tool for fault analysis and for monitoring power quality. The interface and field bus features (Modbus, Profibus, M-bus) enable communication of the measurement data and incorporation into extensive energy management systems.

Areas of application

- Display and control of electrical parameters in energy distribution systems
- Cost centre data collection
- Limit value monitoring (e. g. over voltage, energy consumption)
- Monitoring of harmonics
- Measurement value generator for central building control systems or PLC

Universal measurement instruments

UMG 96S with interface and field bus

Entry level in intelligent energy management systems

The use of energy measurement technology in energy distribution has moved dynamically towards digital universal measuring instruments in the past few years. The advantages are obvious: lower equipment costs for more information and functionality.

In addition, digital measuring technology is more accurate even all along the entire lifespan. Clear cost advantages also result from the construction of the cabinet which results in lower installation costs and less wiring efforts in comparison to analogue measuring technology.

Universal measuring instruments of the UMG 96S product family are mainly designed for use in low and medium voltage distribution systems. In addition to the large quantity of electrical measurement values, this series also offers a number of additional functions such as the recording of minimum and maximum values, the operating hour meter, the bi-metallic strip function, password protection and lots more. The possibility for communication through various field buses enables incorporation in more complex energy management systems as well as the connection to PLC controls or central building control systems. Integrated harmonics analysis becomes more significant with increasing network pollution (increasing THD-U values).

Main features

- RS232, RS485 interface
- Field buses: Modbus, Profibus, M-bus
- Harmonics display
- Digital I/O and analogue outputs
- Integrated logic for alarm signals
- High reliability and long lifespan

Applications

The UMG 96S is a measurement instrument which is suitable for measuring, recording and monitoring electrical parameters (True-RMS) in low and medium voltage networks.

The measurement is suitable for 1 and 3-phase systems with a neutral conductor in low and medium voltage networks. One of the characteristics of this measurement instrument is the compact construction (96x96 mm) and the measurement of harmonic currents and voltages in each conductor.

In order to achieve functional diversity of the universal measurement instrument, you would need around 15 analogue units such as an ampere meter, volt meter, volt meter switch, power meter (kW, kVA, kvar, cos φ), an effective and reactive energy meter (kWh/kvarh), a harmonic analyser and a measurement converter. This means that the planning, installation, wiring and storage costs are significantly reduced for the UMG 96S in comparison to analogue measuring instruments.

Data storage / memory

Up to 160,000 measurement values or events can be stored in the onboard memory (option). Four predefined profiles can be used for the storage of measurement values and events. Each of these profiles can be selected individually or together with other profiles.
The basic UMG 96S without memory and clock only stores the consumption (overall) and minimum/maximum values (without time stamp).

Measurement value displays and automatic display rotation

The measurement values are calculated once per second and can be called up in the measurement value displays. Two methods are available for calling up the measurement values:

- An automatically changing presentation of selected measurement value displays with a settable change over time of 0...60 seconds
- The selection of the measurement value display using the keys for a preselected display profile.

There are four display profiles available and each profile can be configured using the PC, specific to the customer needs, and be transferred to the unit.

Rotary field display

THD L3 highest value

Programming
Current transformer

Real energy

LCD contrast

The contrast of the LCD display can be adapted by the user. In order to achieve the optimum contrast throughout the full operating temperature range, an automatic contrast setting takes place using the measured inside temperature.

Operating hour meter

The operating hour meter measures the time (6 minute intervals) after the unit is ready for operation and cannot be reset. In addition, 6 overall runtimes can be programmed using the 6 comparator systems and the overall runtime is recorded using the comparator system result. The measurement values, limits and operands (>=<) are available as parameters. The overall runtimes can also be individually reset.

Modbus / Profibus | Harmonics | Memory | Analogue outputs | Digital I/O

Industrial data communications – interface and field bus

In order to process and analyse the large quantities of generated data, the data are transferred using corresponding communication means and are centrally collected. The incorporation of the UMG 96S in more complex management systems and the connection to PLC controls or central building control systems is also possible. The UMG 96S thereby provides various interfaces (RS232, RS485, M-bus) and protocols for the configuration of the most common field buses (Modbus, Profibus, M-bus). The UMG 96S is characterised by its reliable communication and very high transfer rate.

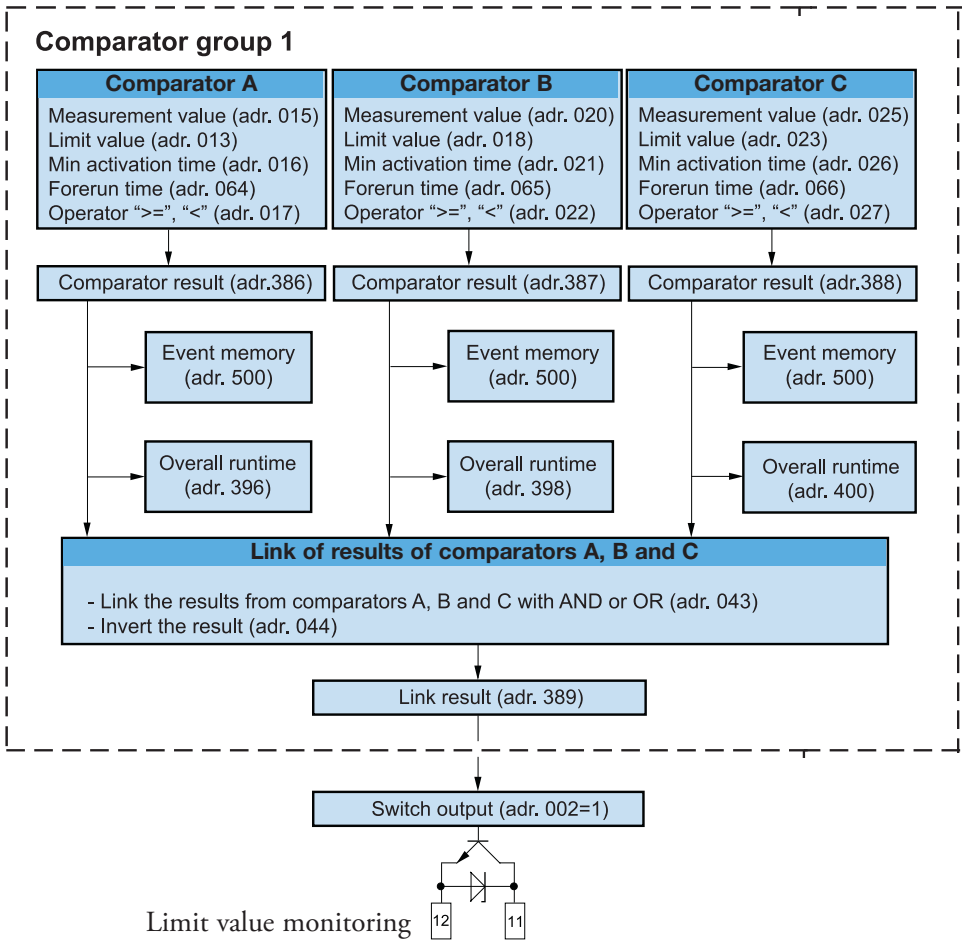
Analogue outputs

The product variants with analogue outputs can either be configured as analogue outputs, pulse outputs or switch outputs. The following parameters are available to each analogue output: measurement value, scale start value (4mA) and the scale end value (20mA).

Digital inputs/outputs

The digital outputs can be used as pulse outputs (max. 10 Hz) for the effective and reactive energy consumption or as switch outputs. The digital outputs can be programmed in order to monitor the measurement data. Up to 3 comparators (A, B, C) can be allocated to each digital output and the result is conducted to the digital output. The comparator result can also be written from externally through the RTU Modbus. The switch outputs can also be set through the Profibus remote.

Integrated logic



UMG 96S

Networks
- TN and TT networks
- 1- and 4-phase networks

Interfaces
- RS 232
- RS 485
- M-bus

2 digital IOs
- Pulse outputs
- Signal input logic
- Status monitoring
- Alarm report
- HT/LT changeover
- Switch output
- Limit value output

Communication
- Modbus RTU
- Profibus DPVO
- M-bus

Memory (optional)
- 512 kByte
- 160 000 measurement values

Measurement accuracy
- Class 1
- Current: 0.5%
- Voltage: 0.5%

Power quality
- THD-I
- THD-U
- Harmonics 1...15

Product variants and technical data

Overview of product variants (transfer rates: Modbus 9.6, 19.2, 38.4kBit/s; Profibus 9.6, 19.2, 93.75, 187.5, 500 kBit/s and 1.5 MBit/s)

Selectable activation*1			Selectable activation*2									
2 digital outputs	2 digital inputs	2 analogue outputs 4-20mA	RS485 (Modbus RTU)	RS232 (Modbus RTU)	Clock / memory	Profibus interface (DP V0)*4	M-bus*4	Auxiliary voltage: 24V DC	**300V standard version** Measurement range: L-N 50 - 300V; AC*3 Measurement range: L-L 87 .. 520V; AC	**150V special version** Measurement range: L-N 25 - 150V; AC Measurement range: L-L 40 .. 250V; AC	**Operating voltage**	**Item number**
●	–	–	●	–	–	–	–	–	●	–	L-N: 85 .. 300V, AC	**52.13.001**
●	–	–	●	●	–	–	–	–	●	–	L-N: 85 .. 300V, AC	**52.13.005**
●	–	–	●	●	●	–	–	–	●	–	L-N: 85 .. 300V, AC	**52.13.009**
●	–	●	●	●	–	–	–	–	●	–	L-N: 85 .. 300V, AC	**52.13.013**
●	–	●	●	●	●	–	–	–	●	–	L-N: 85 .. 300V, AC	**52.13.017**
●	●	–	●	●	–	–	–	–	●	–	L-N: 85 .. 300V, AC	**52.13.021**
●	●	–	●	●	–	●	–	–	●	–	L-N: 140 .. 300V, AC	**52.13.025**
●	●	–	●	●	–	–	●*	–	●	–	L-N: 140 .. 300V, AC	**52.13.040***
●	●	–	●	●	–	–	●	–	●	–	L-N: 140 .. 300V, AC	**52.13.045**
●	●	–	–	●	–	●	–	●	●	–	18 .. 70V DC, 18 .. 33V, AC auxiliary voltage	**52.13.029**
●	–	–	●	–	–	–	–	–	–	●	L-L: 85 .. 260V, AC	**52.13.002**
●	–	–	●	●	–	–	–	–	–	●	L-L: 85 .. 260V, AC	**52.13.006**
●	–	–	●	●	●	–	–	–	–	●	L-L: 85 .. 260V, AC	**52.13.010**
●	–	●	●	●	–	–	–	–	–	●	L-L: 85 .. 260V, AC	**52.13.014**
●	–	●	●	●	●	–	–	–	–	●	L-L: 85 .. 260V, AC	**52.13.018**
●	●	–	●	●	–	–	–	–	–	●	L-L: 85 .. 260V, AC	**52.13.022**
●	●	–	●	●	–	●	–	–	–	●	L-L: 85 .. 260V, AC	**52.13.026**
●	●	–	–	●	–	●	–	●	–	●	18 .. 70V DC, 18 .. 33V, AC auxiliary voltage	**52.13.031**

● = Included – = Not included * Version M-Bus for BTR

*1 - combination options for inputs and outputs: a) 2 digital outputs, b) 2 digital inputs, c) 2 analogue outputs, d) 1 digital output and 1 analogue output, e) 1 digital output and 1 digital input.
*2 - the RS232 interface cannot be simultaneously operated with the RS485 interface.
*3 - auxiliary range for units with Profibus: 140V...300V AC. Also available: special version with operating voltage: L-N: 25...140V, L-L: 85...260VAC
*4 - these units are only suitable for applications in industrial areas.

General technical data

Operating voltage L-N, AC		Refer to order details
Overvoltage category		300V CAT III, 600V CAT II
Quadrants		4
Scanning rate 6 channel	Per channel	2.5 / 3 kHz
Weight		250g
Dimensions		W= 96mm x H= 96mm x D= 49mm
Mounting		Front panel installation
Working temperature		-10…55 °C
Connectable conductors (U/I)	Single wire, multi-wire, fine-wire, pin cable lugs, ferrule	0.08 - 2.5mm^2 1.5mm^2
Protection class (front/reverse)	According to EN60529	IP 50/20

Janitza electronics

Measurement range

Voltage L-N, AC (without voltage transformer)		Refer to order details
Voltage L-L, AC (without voltage transformer)		Refer to order details
Current (transformer: x/1 and x/5A)		0.01...6A
Frequency of mains		45...65Hz
Grid types		TN,TT
Measurement in single phase/multiphase networks		1ph, 2ph, 3ph and up to 3 x 1ph

Measurement values

Measurement parameter	Display range	Measurement range at scaling factor 1	L1	L2	L3	Sum	Lowest value	Average value *1	Maximum value	Measurement accuracy
Current	0.01 .. 60.0 kA	0.01 .. 6 A	●	●	●		●	●	●	+-0.5 %
Current calculated in N	0.01 .. 180.0 kA	0.01 .. 18 A				●	●	●	●	+-1.5 %
Voltage L-N	0.0 .. 34 kV	50 .. 300 V	●	●	●		●		●	+-0.5 %
Voltage L-L	0.0 .. 60 kV	87 .. 520 V	●	●	●		●		●	+-1.0 %
Frequency (U)	45.00 .. 65.00 Hz	45.00 .. 65.00 Hz	●							+-0.1 %
Effective power per phase	0.1 W .. 99.9 MW	0.1 W .. 1.8 kW	●	●	●			●	●	+-1.0 %
Apparent power per phase	0.1 VA .. 99.9 MVA	0.1 VA .. 1.8 kVA	●	●	●			●	●	+-1.0 %
Reactive power per phase	0.1 var .. 99.9 Mvar	0.1 var .. 1.8 kvar	●	●	●			●	ind.	+-1.0 %
Effective power, sum	1.0 W .. 99.9 MW	1.0 W .. 5.4 kW				●		●	●	+-1.0 %
Apparent power, sum	1.0 VA .. 99.9 MVA	1.0 VA .. 5.4 kVA				●		●	●	+-1.0 %
Reactive power, sum	1.0 var .. 99.9 Mvar	1.0 var .. 5.4 kvar				●		●	ind.	+-1.0 %
Cos phi	0.00 kap. .. 1.00 .. 0.00 ind.	0.00 kap. .. 1.00 .. 0.00 ind.				●		●		+-1.0 degree
Effective energy, consumed	0 .. 999.999.999 kWh					●				Class 1(5A) 2 (1A)
Reactive energy, inductive	0 .. 999.999.999 kvarh					●				Class 1(5A) 2 (1A)
Operating hour meter	0 .. 999.999.999 h					●				+-2 min per day

*1 integration over time: 5, 10, 30, 60, 300, 480, 600 and 900 seconds

Power quality

Harmonics, 1st to 15th harmonics, uneven	Current, voltage L1, L2, L3	Accuracy: ± 2%
Distortion factor THD-U in %	L1, L2, L3	Accuracy: ± 2%
Distortion factor THD-I in %	L1, L2, L3	Accuracy: ± 2%
Recorder for threshold events		Yes, for units with memory

Measurement accuracy

Accuracy V, A		± 0.5 %
Reactive energy (karh)	Class	1 (5A) 2 (1A)
Effective energy (kWh)	Class	1 (5A) 2 (1A)

Periphery

Digital inputs	As a status input or pulse input	2, refer to order details
Digital outputs	As a switch output or pulse output	2
Analogue outputs	4...20mA	2, refer to order details
Password protection		Yes
Software GridVis	**Refer to chapter 5**	**Yes**

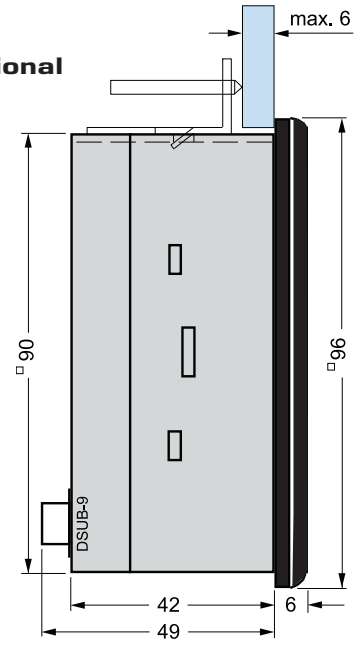
Communication

Interfaces		
RS 232	9.6, 19.2, 38.4 kbps; RJ11	Refer to order details
RS 485	9.6, 19.2, 38.4 kbps; terminal strip	Refer to order details
M-bus	Plug, sub D 9-pole	Refer to order details
Protocols		
Modbus RTU	9.6, 19.2, 38.4 kbps	Yes
Profibus DP V0	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500 kbps	Refer to order details
M-bus	0.3, 2.4, 9.6 kbps	Refer to order details

Connection illustration

Switchboard cut-out
92 x 92mm

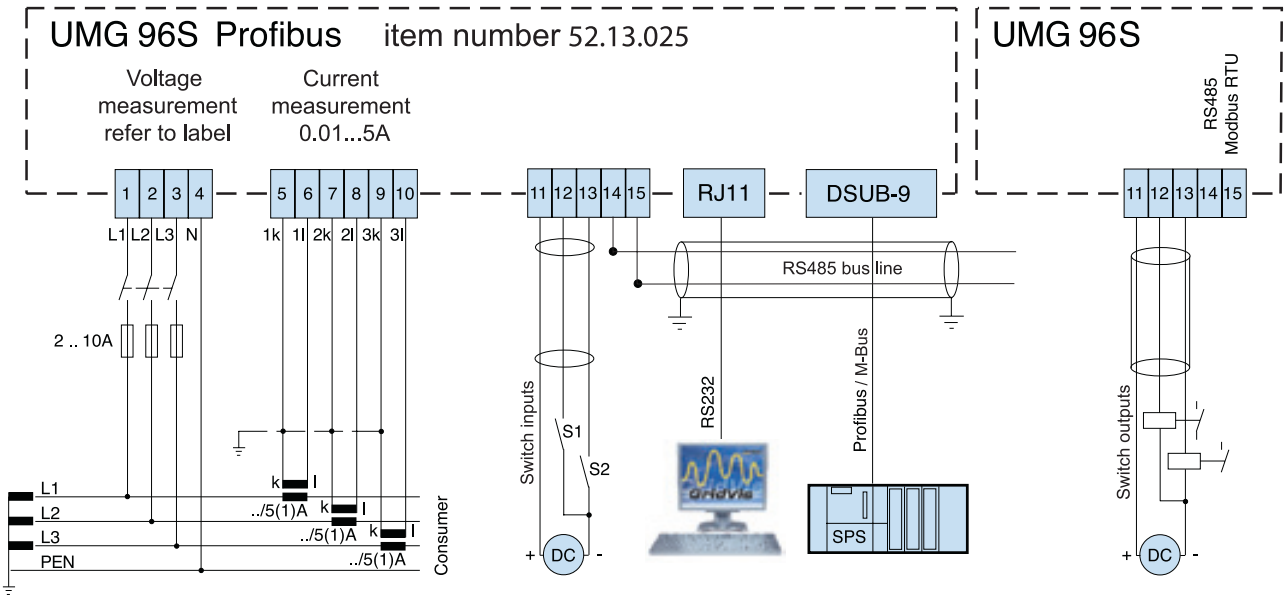
Dimensional drawing



All dimensions stated in this drawing are in mm.

Profibus option

Typical connection options



UMG 96S Profibus with switch inputs, RS 232 and Profibus

UMG 96S without option