UMG 96 S

UMG 96 S

Little
Fieldbus Giant
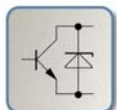
Modbus / Profibus

Harmonics

Memory

Analogue outputs

Digital I/O

Janitza electronics

Universal Measuring Device

Application

The UMG 96 S is a universal measuring device, which is suitable for measuring, saving and supervision of electrical quantities in low and medium voltage networks. The measurement is designed for one phase and three phase systems with neutral conductor, in low voltage networks for the range L-N =85...300V; L-L=148...520V and in medium voltage for the range L-N=49...140V; L-L=85...242V.

One of the main features is the compact design (96x96mm) and the measurement of harmonic current and voltage in each outer conductor. In order to reach all features, about 15 other devices such as amperemeter, voltmeter, voltmeter changeover, power meter (kW, kVA, kvar and cos phi),pulse senders (real/reactive), transducers etc. would be 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
- Transducer for PLC

Functions

The three phase electronic measuring system measures and digitizes the true RMS values of voltage and current in 50/60Hz networks. One random test is carried out each second and 6 periods are scanned for each random test.

From those scanned values, the inserted microprocessor calculates the electrical quantities. The scanning frequency is 2.5 kHz at 50 Hz and 3.0 kHz at 60 Hz. Energy and minimum and maximum values, as well as the programmed data are saved in a none volatile memory (EEPROM).

Memory

The basic model saves energy (total) and the minimum and maximum values without date and time.

Data memory

It is possible to save up to 160.000 measured values or events in the data memory (option). For saving the measured values and events, 4 defined profiles are at your disposal. Each profile can be programmed separately or together with other profiles.

Memory profile 1
Mean value P in L1
Mean value P in L2
Mean value P in L3
Mean value Q Sum
Mean value S Sum

Memory profile 2
Mean value I in L1
Mean value I in L2
Mean value I in L3
Mean value I in N
Mean value cos phi Sum

Memory profile 3
Mean value UL-N
Mean value UL-L
Mean value P Sum
Mean value Q Sum

Memory profile 4
Real energy (consump.)
Reactive energy (ind.)

Memory profile 5
Comparator 1-6

Versions of UMG 96 S

2 digital outputs	2 digital inputs	2 analogue outputs 4..20 mA	Interface RS 485 (Modbus)	Interface RS 232 (Modbus)	Interface Profibus (DP V0)	Clock / memory	supply voltage: 300V standard version L-N: 85V(140V) *3 .. 300V AC	supply voltage: 24V special version: Profibus with supply voltage 18 .. 70V DC; 18 .. 33V AC	Item no.
●	○	○	●	○	○	○	●	○	52.13.001
●	○	○	●	○	○	●	●	○	52.13.005
●	○	○	●	○	●	●	●	○	52.13.009
●	○	●	●	○	○	○	●	○	52.13.013
●	○	●	●	○	○	●	●	○	52.13.017
●	○	○	●	○	○	●	●	○	52.13.021
●	●	○	●	○	●	●	●	○	52.13.025
●	●	○	○	●	●	○	○	●	52.13.029

optionally activatable*1 : 2 digital outputs, 2 digital inputs, 2 analogue outputs 4..20 mA

optionally activatable*2 : Interface RS 485 (Modbus), Interface RS 232 (Modbus), Interface Profibus (DP V0)

Baud rate: Modbus 9.6, 19.2, 38.4 kBit/s;
Profibus 9.6, 19.2, 93.75, 187.5, 500 kBit/s und 1,5 Mbit/s.

*1 combination options of inputs and outputs possible as follows: 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 Interface RS232 cannot be operated simultaneously with interface RS485.
*3 Auxiliary voltage for devices with Profibus: 140V .. 300V AC. Supply also possible as special version for supply voltage: L-N: 25 .. 140V, L-L: 85 .. 260VAC

Measured values

Quantitiy	Indication range	Measuring range at scale factor 1	L1	L2	L3	Sum	Lowest value	Mean value*2	Peak value	Accuracy
Current	0,01 .. 60,0 kA	0,01 .. 6 A	●	●	●		●	●	●	+-0,5 % rng
Current, N	0,01 .. 180,0 kA	0,01 .. 18 A				●	●	●	●	+-1,5 % rng
Voltage L-N	0,0 .. 34 kV	50 .. 300 V	●	●	●		●		●	+-0,5 % rng
Voltage L-L	0,0 .. 60 kV	87 .. 520 V	●	●	●		●		●	+-1,0 % rng
Frequency (U)	45,00 .. 65,00 Hz	45,00 .. 65,00 Hz	●							+-0,1 % rdg
Real power per phase	0,1 W .. 99,9 MW	0,1 W .. 1,8 kW	●	●	●			●	●	+-1,0 % rng
Apparent power per phase	0,1 VA .. 99,9 MVA	0,1 VA .. 1,8 kVA	●	●	●			●	●	+-1,0 % rng
Reactive power per phase	0,1 var .. 99,9 Mvar	0,1 var .. 1,8 kvar	●	●	●			●	ind.	+-1,0 % rng
Real power sum	1,0 W .. 99,9 MW	1,0 W .. 5,4 kW				●		●	●	+-1,0 % rng
Apparent power sum	1,0 VA .. 99,9 MVA	1,0 VA .. 5,4 kVA				●		●	●	+-1,0 % rng
Reactive power sum	1,0 var .. 99,9 Mvar	1,0 var .. 5,4 kvar				●		●	ind.	+-1,0 % rng
cos phi	0,00 kap. .. 1,00 .. 0,00 ind.	0,00 kap. .. 1,00 .. 0,00 ind.				●		●		+-1,0 Degree
Real energy, consumption	0 .. 999.999.999 kWh					●				Class 1(5A) 2 (1A)
Reactive energy, inductive	0 .. 999.999.999 kvarh					●				Class 1(5A) 2 (1A)
Working hour meter	0 .. 999.999.999 h					●				+-2 min. per day
			●	●	●					
Total harmonic content THD U,I	0,1 .. 100 %		●	●	●				●	+-2 % rng
Partial harmonic content I, 1-15*3	0,01 .. 60 kA	1,0 mA .. 6000 mA	●	●	●				●	+-2 % rng
Partial harmonic content U, 1-15*3	0,0 .. 34 kV	0,1 V .. 300,0 V	●	●	●				●	+-2 % rng

rng: of measuring range, rdg: of measured value
*2 Integration over time: 5, 10, 30, 60, 300, 480 and 900 seconds
*3 Only odd partial harmonics

Rotating field indicator

Peak value THD L3

Display examples

Programming of current transformer

Real energy, consumption

Measured value display and display rotation

The measured values are calculated once per second and can be retrieved in measured value displays.
Two methods are available for retrieving the measured data:
• The display rotation of selected measured value displays with a changing time of 0…60 seconds.
• The selection of a measured value display via the key from a selected profile.
Four display profiles are available and a specific profile can be created and transmitted to the instrument via PC.

LCD Contrast

The LCD contrast of the LCD display can be adapted by the user. To reach the best possible contrast over the full range of operating temperature, an automatical setting of the contrast is carried out caused by the measured inner temperature.

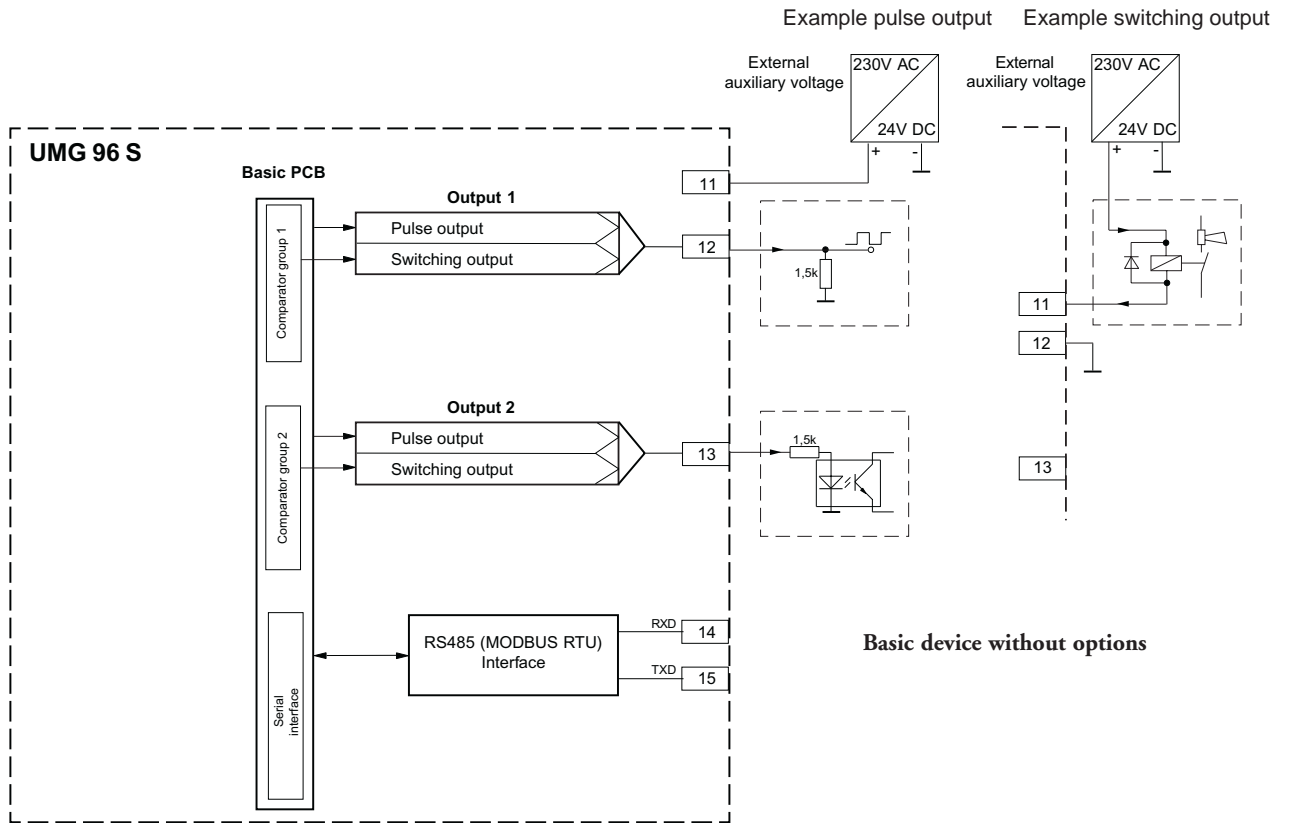## Operating hours counter

The working hour meter measures the time (solution 0.1 hour), after the device is put into service, and cannot be reset. Furthermore, up to 6 total running times can be programmed via the six comparators, and detected as total running time for the comparator. Measured values, limits and operands (>=<) serve as parameters. The total running times can be reset separately.

Digital outputs

The digital outputs can be used as pulse outputs (max. 10Hz) for real and reactive energy or as switching outputs. The digital outputs can be programmed for supervision of measured data. Up to three comparators can be assigned to each digital output.
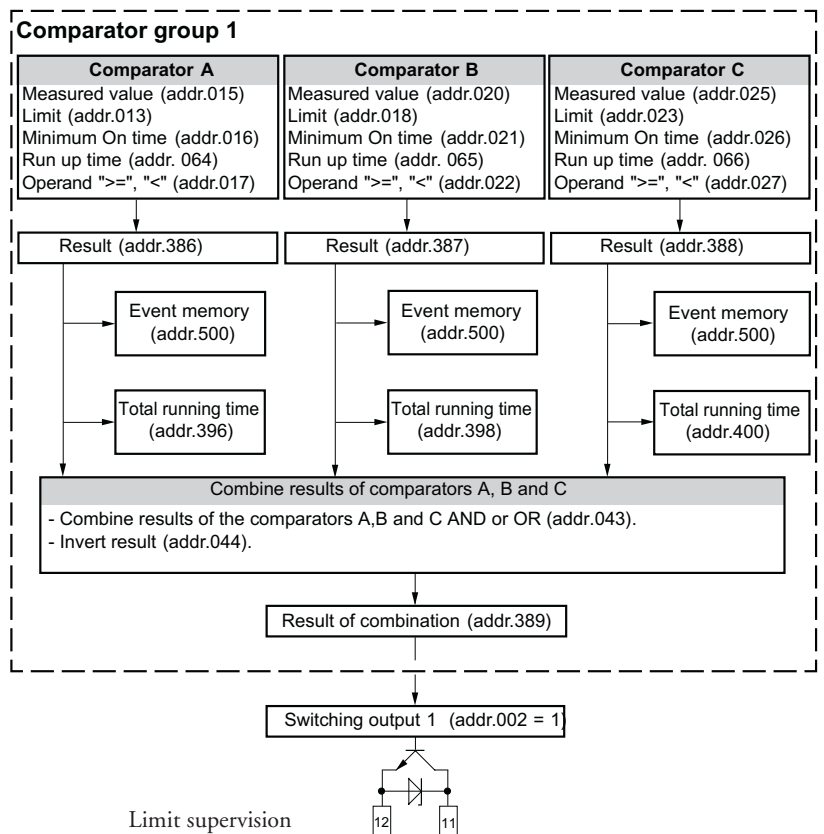
The result of the comparators can be overwritten externally via Modbus RTU. The switching outputs can be set via Profibus-Remote as well.
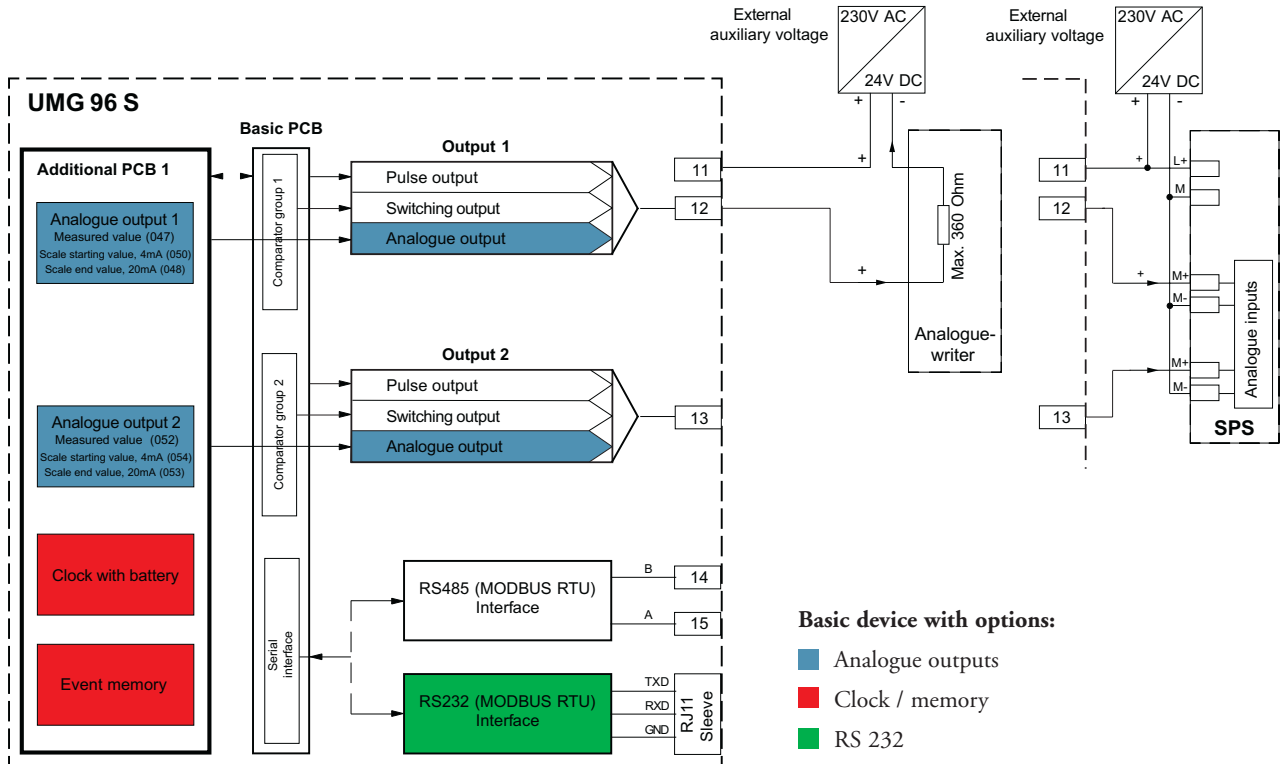
Example pulse output   Example switching output

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Basic PCB

Output 1

Comparator group 1

Pulse output
Switching output

Output 2

Comparator group 2

Pulse output
Switching output

Serial interface

RS485 (MODBUS RTU) Interface

RXD 14
TXD 15

External auxiliary voltage | 230V AC / 24V DC

11
12

1,5k

Basic device without options

Comparators

Two comparator groups with 3 comparators (A,B and C) each are available in the UMG 96 S. Those compare a measured value by an operand >=< and the result can be written into the event memory as event / total running time.

The result of the comparator can be combined by logic combinations AND or OR with other comparators. It can be inverted and given as comparator result at the switching outputs, or read via Modbus RTU.

Comparator group 1

Comparator A	Comparator B	Comparator C
Measured value (addr.015)	Measured value (addr.020)	Measured value (addr.025)
Limit (addr.013)	Limit (addr.018)	Limit (addr.023)
Minimum On time (addr.016)	Minimum On time (addr.021)	Minimum On time (addr.026)
Run up time (addr. 064)	Run up time (addr. 065)	Run up time (addr. 066)
Operand ">=", "<" (addr.017)	Operand ">=", "<" (addr.022)	Operand ">=", "<" (addr.027)
Result (addr.386)	Result (addr.387)	Result (addr.388)
Event memory (addr.500)	Event memory (addr.500)	Event memory (addr.500)
Total running time (addr.396)	Total running time (addr.398)	Total running time (addr.400)

Combine results of comparators A, B and C

- Combine results of the comparators A,B and C AND or OR (addr.043).
- Invert result (addr.044).

Result of combination (addr.389)

Switching output 1 (addr.002 = 1)
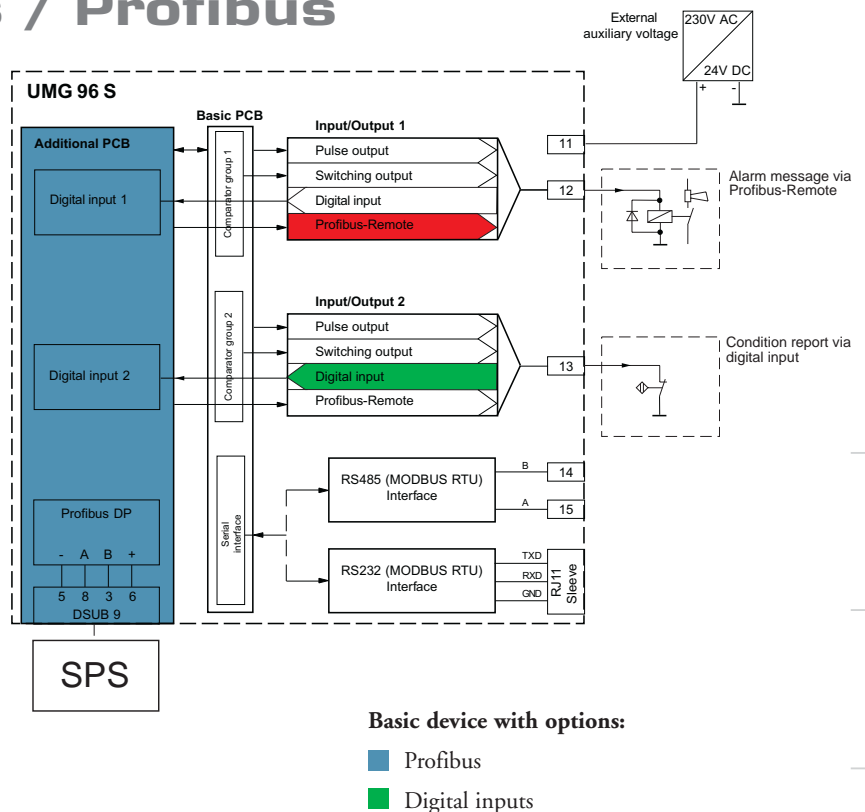
Limit supervision

12 11

Analogue outputs

For the version with analogue outputs, the digital outputs can be configured either as analogue outputs, pulse outputs or switching outputs. For each analogue output, the following parameters are available: Measured values, scale starting value (4mA) and scale end value (20mA).

UMG 96 S

Additional PCB 1

Analogue output 1
Measured value (047)
Scale starting value, 4mA (050)
Scale end value, 20mA (048)

Analogue output 2
Measured value (052)
Scale starting value, 4mA (054)
Scale end value, 20mA (053)

Clock with battery

Event memory

Basic PCB

Comparator group 1

Comparator group 2

Serial interface

Output 1
Pulse output
Switching output
Analogue output

Output 2
Pulse output
Switching output
Analogue output

RS485 (MODBUS RTU) Interface — B — 14, A — 15

RS232 (MODBUS RTU) Interface — TXD, RXD, GND — RJ11 Sleeve

11
12
13

External auxiliary voltage — 230V AC / 24V DC

Max. 360 Ohm

Analogue-writer

External auxiliary voltage — 230V AC / 24V DC

11
12
13

L+
M
M+
M-
M+
M-

Analogue inputs

SPS

Basic device with options:

- Analogue outputs
- Clock / memory
- RS 232

Digital inputs / Profibus

At UMG 96 S Profibus, the two digital outputs can be used as pulse output, switching output, , Profibus-Remote-switching output or digital input. The use as Profibus-Remote-output or digital input (e.g. for alarms, changeover, signal transmission etc.) is up to the user.

For UMG 96 S Profibus very many measured values are available for further processing. To keep the number data, transmitted via Profibus as small as possible, the measured data are available in 14 profiles in integer format and floating point format. As Baud rates are possible: 9.6, 19.2, 93.75, 187.5, 500 kBit/s and 1,5 MBit/s.

UMG 96 S

Additional PCB

Digital input 1

Digital input 2

Profibus DP

- A B +

5 8 3 6

DSUB 9

Basic PCB

Comparator group 1

Comparator group 2

Serial interface

Input/Output 1
Pulse output
Switching output
Digital input
Profibus-Remote

Input/Output 2
Pulse output
Switching output
Digital input
Profibus-Remote

RS485 (MODBUS RTU) Interface — B — 14, A — 15

RS232 (MODBUS RTU) Interface — TXD, RXD, GND — RJ11 Sleeve

External auxiliary voltage — 230V AC / 24V DC

11
12
13

Alarm message via Profibus-Remote

Condition report via digital input

SPS

Basic device with options:

- Profibus
- Digital inputs

Example analogue output 4 - 20 mA

All measured values except real and reactive energy can be given out at the analogue outputs.

Example Modem communication ...31 devices per modem

Software

RS232   RS485

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

Profibus DP VO

RS485

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

Modbus RTU

RS485
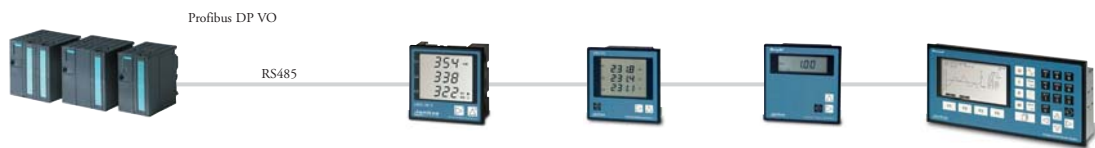
Example PC communication...31 devices (expandable up to 255 devices by a starrepeater)

Software

RS232   RS485

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

Software

RS485

Ethernet
(TCP/IP)
100
BaseT

RS485

Please note: The Com Server is suitable for a local network only

Example fibre optic network ...31 devices per line

Software

RS232   RS485   RS485

LWL

Technical data

Overvoltage class:	CAT III
Pollution degree:	2
Operating temperature:	-10°C .. +55°C
Storage temperature:	-20°C .. +70°C
Humidity:	15% to 95% without dew
Mounting position:	Random
Measuring and auxiliary voltage:[*4]	L-N: 85 .. 300V AC, L-L: 148 .. 520V AC
Frequency:	45 - 65Hz
Current measurement:	.. /5A (../1A)
Minimum working current:	5mA
Switching outputs:	NPN Transistor, Frequency: max. 10Hz, max. 50mA, 5 .. 24V DC (max. 27V DC)
Switching inputs:	20 .. 27V DC, max. 5mA
Analogue outputs: 4 .. 20mA	8Bit, Load: max. 300 Ohm, 20 .. 27V DC
Protection front:	IP 50 according to IEC 60529
Protection front with seal:	IP 65 according to IEC 60529
Protection back side:	IP 20 according to IEC 60529
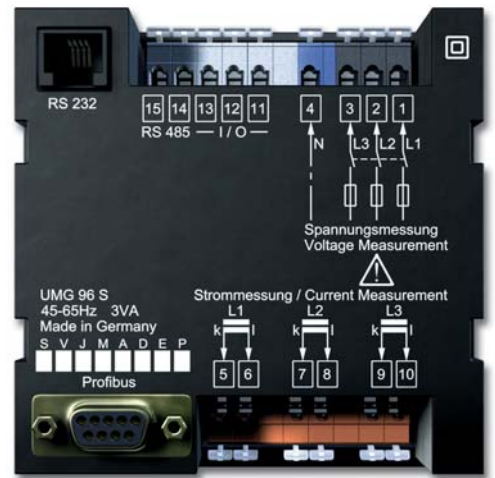
[*4] Special voltage version: Profibus with supply voltage: 18 .. 70V DC; 18 .. 33V AC 50/60Hz

Cut out: 92x92mm
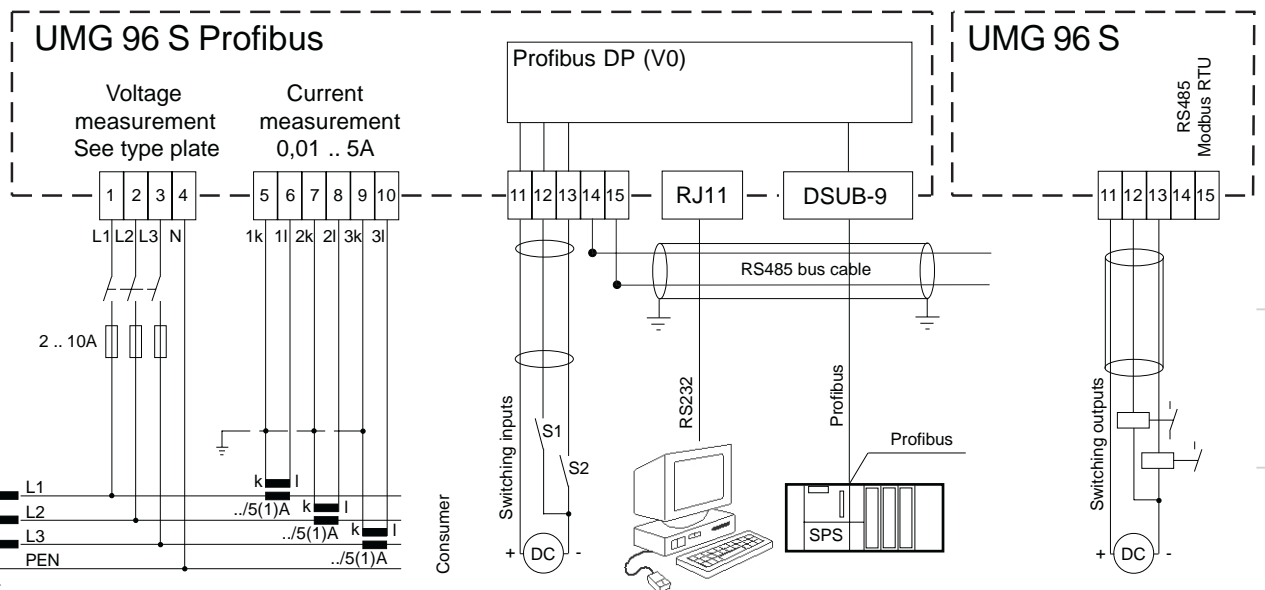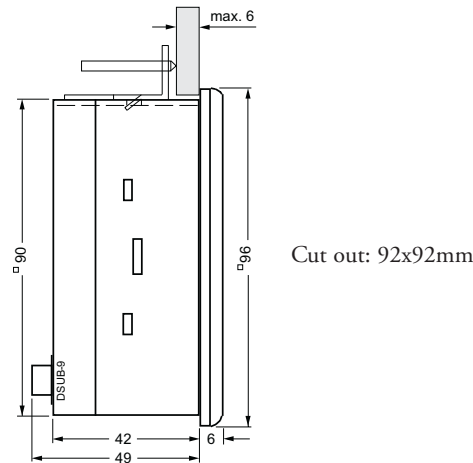
UMG 96 S Profibus with switching inputs, RS 232 and Profibus

UMG 96 S without options

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Representative