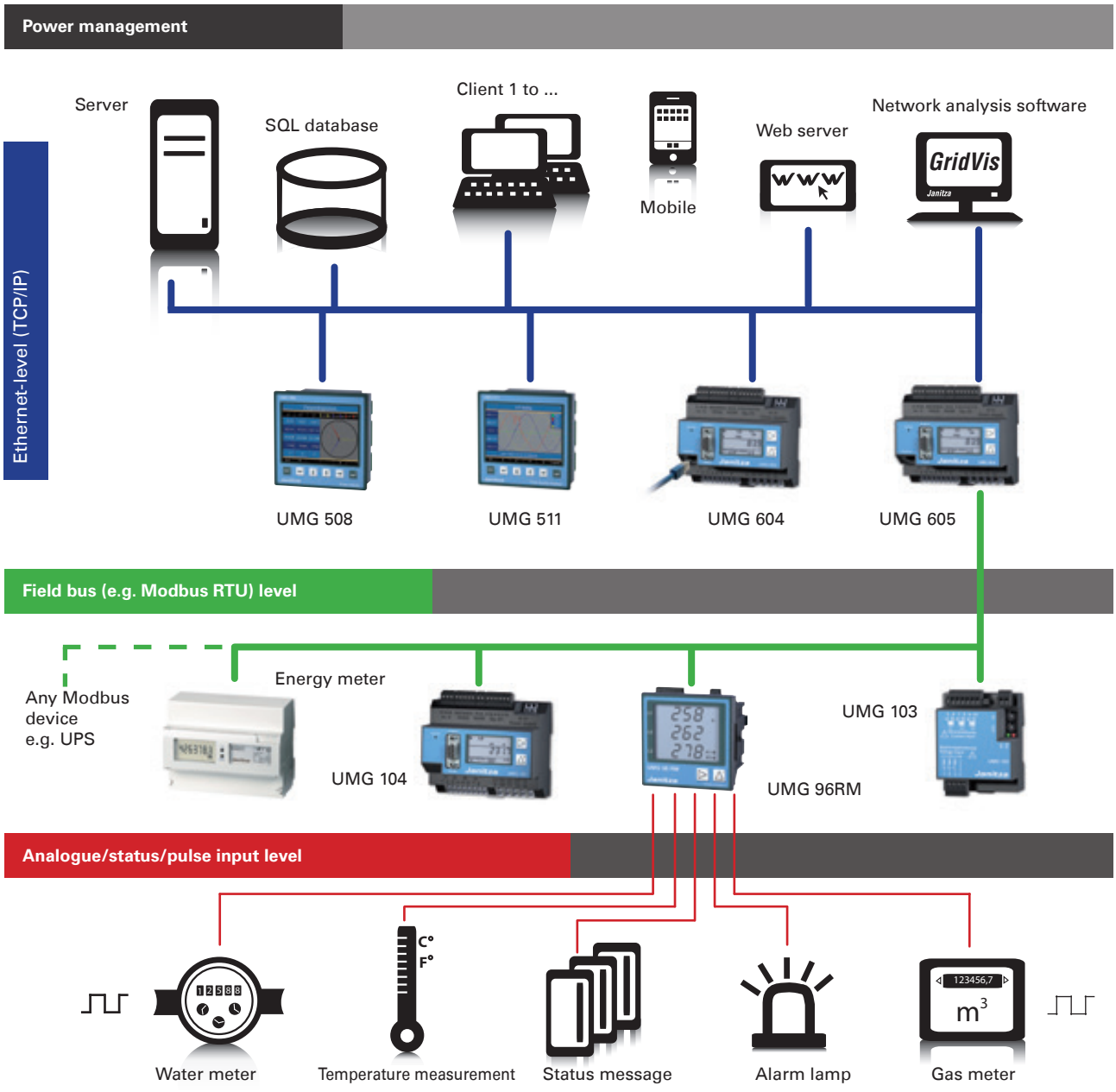
Smart Energy &
Power Quality Solutions

EN 50160 / ISO 50001
Made in Germany

Main catalogue 2012/2013

Janitza®

Janitza electronics®



UMG 508/UMG 604 = Janitza power analyser
UMG 511/UMG 605 = Janitza power quality analyser
UMG 103/UMG 96RM/UMG 104 = Janitza universal measurement devices

Janitza electronics®

The story

For 50 years the German company Janitza electronics® has been active in the field of manufacturing systems for efficient power application, energy measurement and cost savings.

Janitza is active throughout the world as a manufacturer of measurement technology, class A network quality analysers, energy management systems, digital integrated measurement devices, mobile network analysers, reactive power controllers, harmonic filters and compensation systems.

Our customers appreciate the range of products and solutions for modern energy management (e.g. EN 16001 / ISO 50001). Due to the scalability of the products and solutions an energy management system from Janitza can be introduced step-by-step.


CERTIFICATE

Janitza

ISO 9001:2008

Janitza stands for the highest quality standards, a high degree of innovation and products developed to reflect the latest knowledge and standards, manufactured with the most up-to-date production technology.

The regional know-how of our sales engineers provides guidance and concept development through to the commissioning of tailor-made solutions. After commissioning we provide support with maintenance and system support. The regular training courses provide our customers with secure insight into the topics of energy management and network quality as well as our products and system solutions.

The customers

Janitza electronics® GmbH products are generally of interest to all professional consumers of electrical energy. The products from Janitza electronics® are already used by 17 companies which are listed in the German Shares Index (DAX). The most important customers are in the automobile industry, the banking and insurance sector or local councils. The products are used in industry, commercial buildings, by energy suppliers, in airports, supermarkets, universities and in hospitals. However, the use of our products is also lucrative for smaller companies.

Janitza electronics® GmbH has an export ratio of approximately 50% and markets its products in more than 60 countries throughout the world.

The possibility of allocating energy costs to certain products is becoming more and more important to industrial companies. Janitza electronics® also has customised solutions for cost centre analysis.

The reduction of expensive peak demand loads and the compensation of reactive power can immediately cut down the electricity bill.

The focus

Janitza electronics® GmbH is a leading global manufacturer in the field of digital integrated measuring equipment for energy distributors, energy optimisation systems and power quality solutions. The products made by Janitza electronics® are generally used to reduce energy, maintenance and products costs.

Awareness of power quality has gained significance in all companies in the past years. Excessive power quality distortion lead to increased wear and tear in all electrical supply equipment and any connected electrical and electronic loads and can lead even up to production stoppages. Our measuring instruments therefore provide essential information about insufficient power quality and hence enable customers to take measures for the improvement of power quality problems. This leads to a longer lifespan for equipment and improved sustainability of the respective investments.

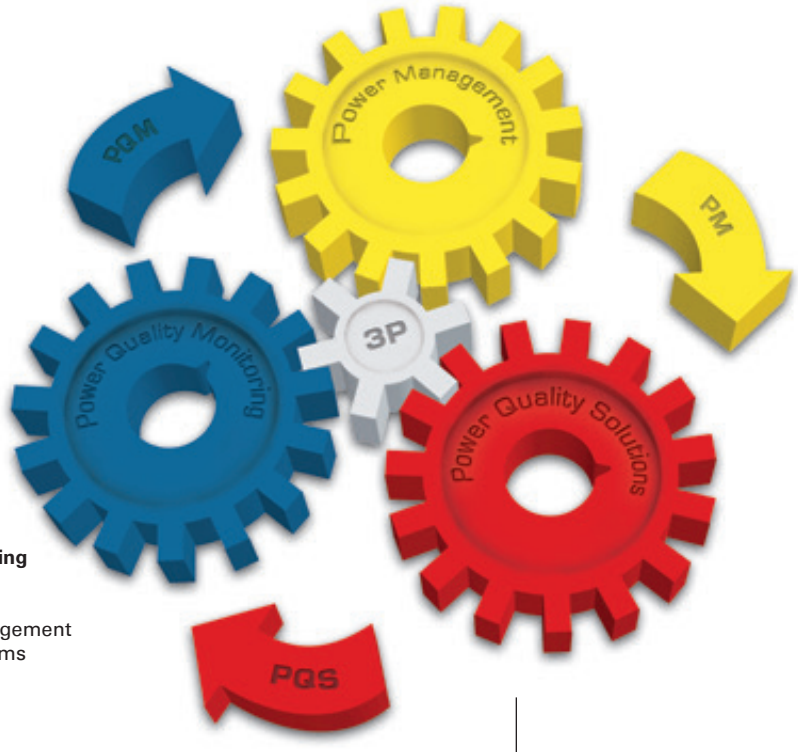
Reflow soldering machine in the PQM device production

Janitza's® 3P Strategy

Power Quality Monitoring - Power Management - Power Quality Solutions

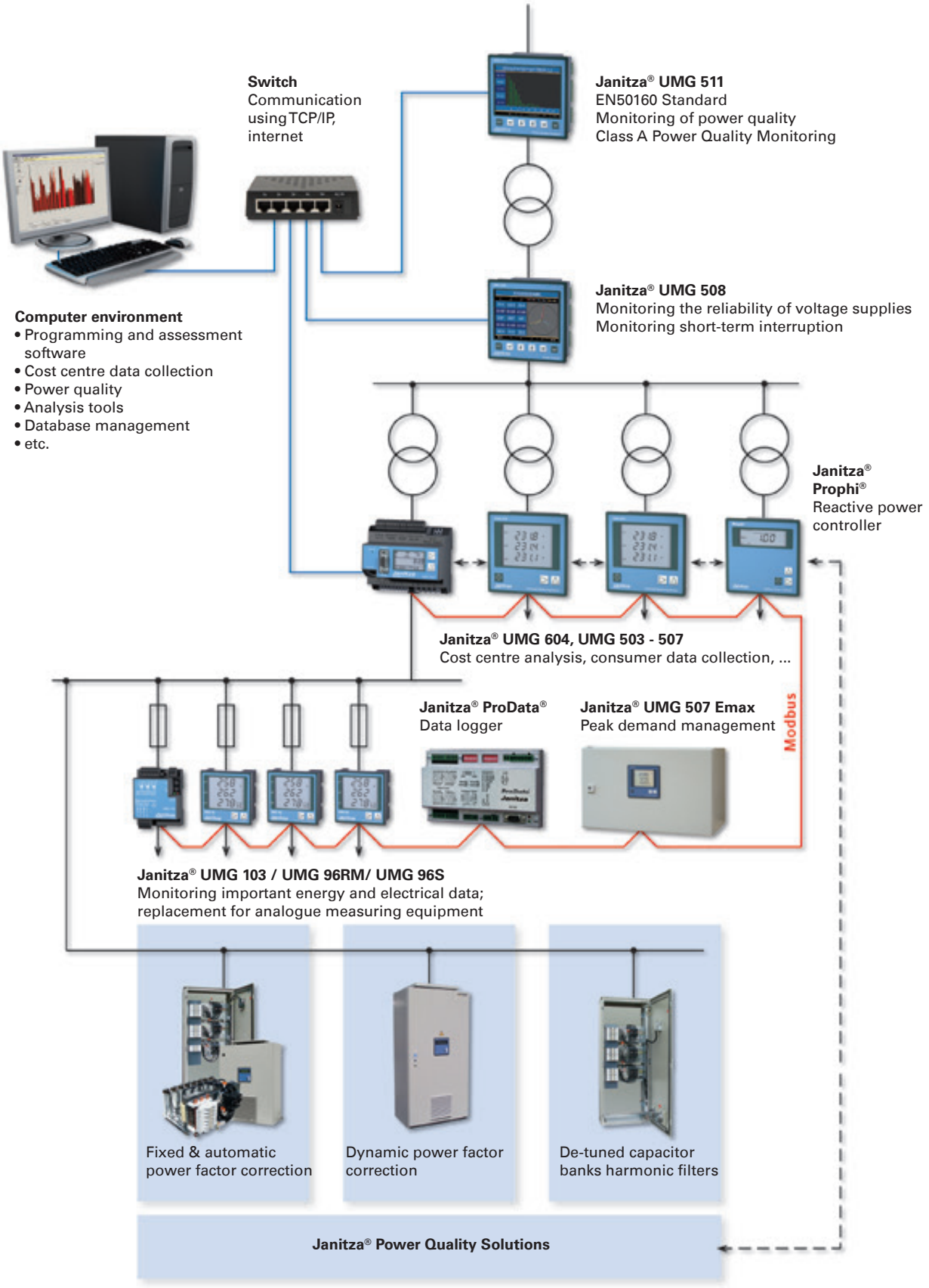
The products, systems and services of Janitza electronics® range from measurement (collection of data) through energy management to solutions for the improvement of power quality. Janitza electronics® does not solely limit itself to the collection of data but, based on the measurement data, offers customised solutions in the fields of power quality and power management. This one-stop offer supports the best possible efficiency and power reliability.

Power Management
Peak demand management
Collection of data
Cost centre management
Energy efficiency



Power Quality Monitoring
Measurement
Monitoring
Automatic alarm management
Detection of PQ problems

Power Quality Solutions
Power factor correction (PFC)
Harmonic filters
Dynamic PFC


Switch
Communication using TCP/IP, internet
Janitza® UMG 511
EN50160 Standard
Monitoring of power quality
Class A Power Quality Monitoring
Janitza® UMG 508
Monitoring the reliability of voltage supplies
Monitoring short-term interruption
Computer environment
• Programming and assessment software
• Cost centre data collection
• Power quality
• Analysis tools
• Database management
• etc.
Janitza® Prophi®
Reactive power controller
Janitza® UMG 604, UMG 503 - 507
Cost centre analysis, consumer data collection, ...
Janitza® ProData®
Data logger
Janitza® UMG 507 Emax
Peak demand management
Modbus
Janitza® UMG 103 / UMG 96RM/ UMG 96S
Monitoring important energy and electrical data;
replacement for analogue measuring equipment
Fixed & automatic power factor correction
Dynamic power factor correction
De-tuned capacitor banks harmonic filters
Janitza® Power Quality Solutions

PQM – Power Quality Monitoring

Energy measurement technology

The first step towards saving energy and improving operational processes is the measurement of the most important parameters of your electrical energy supply while monitoring the peak loads.

Janitza electronics® offers you a complete range of power monitoring units with the corresponding accessories. The UMG measuring equipment and power analysers help you to gain a comprehensive overview of your energy supplies and introduce the correct measures. The power quality is also monitored according to the general valid standards (e.g. EN50160). The GridVis software packages in connection with the measurement equipment and power analysers from Janitza electronics® offer you energy and power monitoring with real-time diagnosis from the provider through to all levels of your enterprise.




Type	UMG 103	UMG 104		UMG 604			UMG 605	
			P	E	EP	DE		
Item number	52.18.001	52.20.001	52.20.002	52.16.002	52.16.001	52.16.041	52.16.027	
Nominal grid voltages								
Nominal voltage L-N, AC	240V	277 V		277 V			277 V	
Nominal voltage L-L, AC	415V	480 V		480 V			480 V	
Over voltage category	300V CAT III	300V CAT III		300V CAT III			300V CAT III	
Operating voltage L-N, AC	115 - 240V	-		-			-	
Auxiliary voltage	-	52.20.001: 95 - 240V AC; 135 - 340V DC*1		95 - 240V AC; 135 - 340V DC*1			95 - 240V AC; 135 - 340V DC*1	
Three phase/four phase	-/•	•/•		•/•			•/•	
Quadrants	4	4		4			4	
Scan frequency 50/60Hz Measurement points per sec.	5.4kHz 5,400	20kHz 20,000		20kHz 20,000			20kHz 20,000	
Continuous measurement	•	•		•			•	
Measurements per second	5	5		5			5	
Effective value from periods 50/60Hz	10/12	10/12		10/12			10/12	
Harmonics V/A	1,3 ... 25	1 - 40		1 - 40			1 - 63	
Distortion factor THD-U in %	•	•		•			•	
Distortion factor THD-I in %	•	•		•			•	
Unbalance	•	•		•			•	
Positive/negative/zero system	•	•		•			•	
Current flicker strength	-	-		-			•	
Short/long-term flicker	-	-		-			•	
Transients	-	-		50µs			50µs	
Short-term interruptions	-	-		•			•	
Accuracy V / A	+-0.2%	+-0.2%		+-0.2%			+-0.2%	
Effective energy classification	0.5 (.../5A)	0.5 (.../5A); 1 (.../1A)		0.5 (.../5A); 1 (.../1A)			0.5 (.../5A); 1 (.../1A)	
Operating hour meter	•	•		•			•	
Weekly time switch	-	-		• Jasic ®			• Jasic ®	
Auxiliary input	-	-		-			-	
Digital inputs	-	2		2			2	
Digital/pulse output	-	2		2			2	
Relay outputs	-	-		-			-	
Analogue inputs	-	-		-			-	
Analogue outputs	-	-		-			-	
Temperature input	-	1		1			1	
Integrated logic	-	-		Jasic® (7 Prg.)			Jasic® (7 Prg.)	
Min/max value memory	•	•		•			•	
Memory size	-	4 MB Flash		128 MB Flash			128 MB Flash	
Number of storage values	-	156k		5,000k			5,000k	
Clock	-	•		•			•	
Bi-metallic function A/kW	•	•		•			•	
Fault recording function	-	•		•			•	
Peak demand management	-	-		•*3			•*3	
Software	GridVis	GridVis		GridVis			GridVis	
Interfaces								
RS 232	-	•	•	•			•	
RS 485	•	•	•	•			•	
USB	-	-	-	-			-	
Profibus DP	-	-	•	-	•	•	•	
M-Bus	-	-	-	-			-	
LON	-	-	-	-			-	
Ethernet	-	-	-	•			•	
Web server / e-mail	-	-	-	•/•			•/•	
Protocols								
Modbus RTU	•	•	•	•			•	
Modbus gateway	-	-	-	•			•	
Profibus DP V0	-	-	•	-	•	•	•	
LonTalk	-	-	-	-			-	
Modbus TCP/IP, Modbus over TCP, SNMP	-	-	-	•			•	
BACnet IP	-	-	-	•*3			•*3	
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• : Included
- : Not included





	UMG 96L	UMG 96S						UMG 96RM						UMG 508	UMG 511
									P	M*7	E*6	CBM	EL*7		
	52.14.001 (52.14.005)	52.13.001	52.13.005	52.13.017	52.13.025	52.13.045	52.13.029	52.22.001	52.22.002	52.22.003	52.22.004	52.22.005	52.22.006	52.21.001	52.19.001
	255V (80V)*1	300V (150V)*1						277V						417V	417V
	442V (139V)*1	520V (260V)*1						480V						720V (3-Leiter 600 V)	720V (3-Leiter 600 V)
	300V CAT III	300V CAT III						300V CAT III						600V CAT III	600V CAT III
	196 - 255V, (45 - 80V)*1	85-300V(5213025/35; 140 -300V)					-	-						-	-
	-	nur 52.13.029: 18 - 70V DC, 18 - 33V AC						95 - 240V AC; 100 - 300V DC						95 - 240V AC; 135 - 340V DC	95 - 240V AC; 135 - 340V DC
	-/•	-/•						•/•						•/•	•/•
	4 *4	4						4						4	4
	2.5/3kHz 50	1.5kHz 180						21.3 / 25.6kHz 21,300 / 25,600						20kHz 20,000	20kHz 20,000
	-	-						•						•	•
	1	1						5						5	5
	1/1	6/6						10/12						10/12	10/12
	-	1.3 ... 15						1 - 40						1 - 40	1 - 63
	-	•						•						•	•
	-	•						•						•	•
	-	-						-						•	•
	-	-						•						•	•
	-	-						-						-	•
	-	-						-						-	•
	-	-						-						50µs	50µs
	-	-						-						•	•
	+-1%	+-0.5%						+-0.2% / +-0.5%						+-0.1% / +-0.2%	+-0.1% / +-0.2%
	2	1 (.../5A)						0.5 (.../5A); 1 (.../5A)						0.2 (.../5A)	0.2 (.../5A)
	•	•						•						•	•
	-	-						-						•	•
	-	-						-						-	-
	-	-	-	-	(2)	(2)	(2)	-	4	-	(3)*8	4	-	8	8
	-	2	2	2	(2)	(2)	(2)	2	6	2	(5)*8	6	-	5	5
	-	-						-						-	-
	-	-						-						-	-
	-	-	-	(2)	-	-	-	-	-	-	-	-	-	-	-
	-	-						-	-	-	2*10	-	-	-	-
	-	Comparator						Comparator						• Jasic®	• Jasic®
	•	•						•						•	•
	-	-	-	512k	-	-	-	-	256MB*9	-	256MB*9	256MB*9	-	256MB	256MB
	-	-	-	160k	-	-	-	-	10.000k	-	10.000k	10.000k	-	10,000k	10,000k
	-	-	-	•	-	-	-	-	•	-	•	•	-	•	•
	•	•						•						•	•
	-	-						-						•	•
	-	-						-						•*3	•*3
	-	GridVis						GridVis						GridVis	GridVis
	-	-	•					-						-	-
	-	•					-	•	•	-	•	•	-	•	•
	-	-						-	•	-	-	•	-	-	-
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	-	-						-	-	-	•	-	-	•	•
	-	-						-	-	-	-	-	-	•*3	•*3
	39	**45**						**53**						**85**	**91**

*1 Other voltages are available as options,
(2) 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,
*3 Option, *4 Not for effective and reactive power, *5 In the 230 V version, *6 Anticipated availability from 2nd quarter of 2012,
*7 Anticipated availability from 3rd quarter of 2012, *8 Combination options for inputs and outputs: a) 5 digital outputs b) 2 digital outputs and 3 digital inputs, *9 192 MB for records, *10 combined function: Either analog/temperature/RCM input




Type	UMG 96	UMG 503					UMG 505	UMG 507					
		L	LS	S	OV	V	LON	L	EL	AD	P	E	EP
Item number	52.09.001	52.07.017	52.07.028	52.07.008	52.07.006	52.07.001	52.10.001	52.15.004	52.15.021	52.15.003	52.15.002	52.15.001	52.15.005
Nominal grid voltages													
Nominal voltage L-N, AC	275V (76V)*1	500V					500V	500V					
Nominal voltage L-L, AC	476V (132V)*1	870V					870V	870V					
Over voltage category	300V CAT III	600V CAT III					600V CAT III	600V CAT III					
Operating voltage L-N, AC	196 - 275V, (49 - 76V)*1	-					-	-					
Auxiliary voltage	-	85 - 265V AC; 80 - 370V DC*1					85 - 265V AC; 80 - 370V DC*1	85 - 265V AC; 120 - 370V DC*1					
Three phase/four phase	-/•	•/•					•/•	•/•					
Quadrants	4 *4	4					4	4					
Scan frequency 50/60Hz Measurement points per sec.	2.5/3kHz 50	6.4/7.68kHz 256					6.4/7.68kHz 256	1.65/1.98kHz 1,650/1,980					
Continuous measurement	-	-					-	•					
Measurements per second	1	2					2	5					
Effective value from periods 50/60Hz	1/1	2/2					2/2	10/10					
Harmonics V/A	-	1 - 20					1 - 20	1.3 - 15					
Distortion factor THD-U in %	-	•					•	•					
Distortion factor THD-I in %	-	•					•	•					
Unbalance	-	-					-	•					
Positive/negative/zero system	-	-					-	•					
Current flicker strength	-	-					-	-					
Short/long-term flicker	-	-					-	-					
Transients	-	-					-	-					
Short-term interruptions	-	-					-	•					
Accuracy V / A	+-1%	+-0.2%					+-0.2%	+-0.2%					
Effective energy classification	2	1					1	1					
Operating hour meter	•	-					-	-					
Weekly time switch	-	-					•	•					
Auxiliary input	-	-	-	-	1*3	1	-	-					
Digital inputs	-	-	-	-	-	-	4	6	-	6	6	6	6
Digital/pulse output	•	-	-	-	1*3	•	5	6	-	6	6	6	6
Relay outputs	-	-	-	-	2*3	2	-	-	-	-	-	-	-
Analogue inputs	-	-	-	-	-	-	-	-	-	1	1	1	1
Analogue outputs	-	-	-	-	1*3	1	4	-	-	2	2	2	2
Temperature input	-	-					-	-	-	1	1	1	1
Integrated logic	Comparator	Comparator					Comparator	•					
Min/max value memory	•	•					•	•					
Memory size	-	128k	128k	128k	512k	512k	512k	256k	16MB	256k	256k	16MB	16MB
Number of storage values	-	80k	80k	80k	320k	320k	320,000	18k	1.000k	18k	18k	1.000k	1.000k
Clock	-	•					•	•					
Bi-metallic function A/kW	•	•					•	•					
Fault recording function	-	-					-	•					
Peak demand management	-	-					-	•					
Software		GridVis					GridVis	GridVis					
Interfaces													
RS 232	-	•	-	-	•	•	•	•	•	•	•	•	•
RS 485	-	-	•	•	•	•	-	•	-	•	•	•	•
USB	-	-	-	-	-	-	-	-	-	-	-	-	-
Profibus DP	-	-	-	-	-	-	-	-	-	-	•	-	•
M-Bus	-	-					-	-	-	-	-	-	-
LON	-	-					•	-	-	-	-	-	-
Ethernet	-	-					-	-	•			•	•
Web server / e-mail	-	-					-/-	-	•/•	-/-	-/-	•/•	•/•
Protocols													
Modbus RTU	-	•	•	•	•	•	•	•	•	•	•	•	•
Modbus-Gateway	-	-	-	-	-	-	-	-	-	-	-	•	•
Profibus DP V0	-	-	-	-	-	-	-	-	-	-	•	-	•
LonTalk	-	-	-	-	-	-	•	-	-	-	-	-	-
Modbus TCP/IP, Modbus over TCP, SNMP	-	-	-	-	-	-	-	-	•	-	-	•	•
BACnet IP	-	-	-	-	-	-	-	-	-	-	-	-	-
Catalogue page	**39**	**61**					**69**	**77**					

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UMG 103 – Universal measuring equipment

for DIN rail mounting

Universal measuring devices of the UMG 103 product family are mainly designed for use in low voltage distribution systems. The UMG 103 is a measuring instrument with an effective energy class of 0.5S.

In addition to a large quantity of electrical measurement values, the UMG 103 offers a multitude of additional functions such as the measurement of harmonics, the storage of minimum and maximum values, operating hour meter, bi-metallic strip function and password protection. The interface and field bus capabilities (Modbus) enable the communication of measurement data and incorporation into a comprehensive energy management system.

Areas of application

- For measuring and checking electrical parameters in energy distribution systems
- Cost centre management solutions for data collection
- Limit value monitoring, measurement value generator for building management systems or PLC
- Monitoring harmonics

Various versions with UL-approval available!

UMG 103 Universal measuring instrument

for DIN rail mounting

The UMG 103 is a very compact universal measuring instrument for mounting on DIN rails. The compact dimensions even enable installation in limited spaces such as in installation sub-distribution boards. Installation and connection costs are significantly reduced by mounting the instrument on a 35mm DIN rail.

In order to make use of the extensive functions of modern measuring instruments, the interconnection and central analysis of data plays an important role. This is the reason for not using a display; two LEDs show the current operating status. The communication of measurement data takes place through a very fast RS485/Modbus interface.

Main features

- Measurement in TN and TT networks
- 3 voltage measurement inputs (300V CAT III), 3 current measurement inputs
- Continuous scanning of the voltage and current measurement inputs
- High measurement accuracy, effective energy class 0.5; U/I, 0.2%
- Harmonic analysis up to the 25th order
- Including GridVis software
- RS 485 (Modbus RTU, slave)
- Mounting on 35mm DIN rail
- Suitable for integration in installation distribution panels

The UMG 103 performance level is usually sufficient for sub-measurements in connection with higher performance power analysers such as the UMG 604 or the UMG 508 applied in more complex energy management systems. In this case, the UMG 103 serves as data measurement point which takes the measurement data and passes it on to a higher-level point (master device). Using power analysers such as the UMG 604 with an integrated Modbus/Ethernet-gateway and integrated web server, data are brought onto the Ethernet level or are visualised on the homepage. Some examples of applications are cost centre management systems in office buildings, monitoring feeders to sub-distribution panels, motor control centres or in IT and data centres.

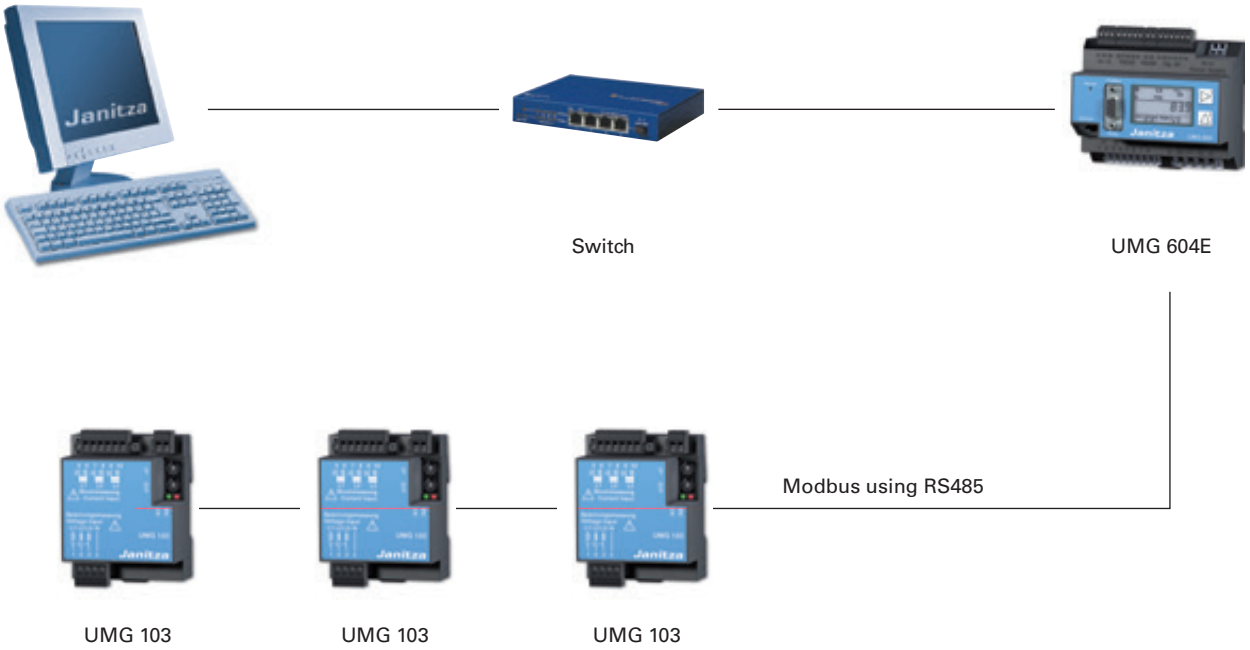
Applications

The UMG 103 is intended for the measurement and calculation of electrical parameters such as current, voltage, power, consumption or harmonics etc. in building installations, on distribution panels, on circuit breakers and on server racks. The UMG 103 is fixed into cabinets or small installation distributors in any installation position. The measurement values can be read out using the serial interface. The highest, lowest and energy values are recorded every two seconds in a non-volatile memory.

The voltage measurement inputs are designed for the measurement in low voltage networks in which nominal voltages up to 300V against ground and surge voltages up to over voltage category III can occur. The UMG 103 is mainly suitable for measurements in low voltage networks because it takes the supply voltage from the measurement voltage and a voltage converter would be therefore necessary for HV grids.

Communication options: Online reading

The connection of a UMG 103 to a PC using an interface converter



The connection of several UMG 103's to a PC using a UMG 604 (with optional Ethernet)

Overview of product variants

Description	Type	Operating voltage	Item number
Universal measuring device 50/60Hz; Current transformer: ../1/5A	**UMG 103**	from one phase L-N: 115 ... 240V AC ±10% from three phase L-N: 80 - 240V AC ±10%	**52.18.001**

Measurement range

Voltage L-N		50-240 V-AC
Voltage L-L		85-415 V-AC
Current (CTs: x/1 and x/5A)		0,001...7,5A
Frequency, mains		45...65 Hz

General technical data

Over voltage category	CAT III	300 V-AC
Nominal voltage	3-phase 4-wire grid	L-N: 240V AC ±10%, L-L: 415V AC ±10%
Scanning rate		5.4 kHz per channel
Quadrants		4
Weight		150g
Dimensions		B=71.5 mm, H=90 mm, T=46 mm
Mounting		35 mm DIN rail
Working temperature		-10...+55 °C
Storage temperature		-20...+70 °C
Protection class	According to EN 60529	IP20
Connectable conductors (U/I)	Single wire, multi-wire, fine-wire, Pin cable lugs, ferrule	0.08-2.5 mm2 1.5 mm2

Measurement values

Voltage	L1, L2, L3, L1-L2, L2-L3, L1-L3	0.2%
Current	L1, L2, L3, N calculated	0.2%
Effective, reactive and apparent power	L1, L2, L3, sum	Accuracy ±0.4%
Cos-phi, power factor	L1, L2, L3, sum	
Effective/reactive energy	Consumed/inductive	Class 0.5S(kWh)
Frequency	L1, L2, L3	Accuracy ±0.1%
Average value		Yes
Minimum/maximum value		Yes
Operating hour meter		Yes

Power quality

Harmonics 1-25th harmonic order, uneven	Current, voltage, L1, L2, L3	Accuracy: 0.5%
Distortion factor THD-U in %	L1, L2, L3	Accuracy: 0.5%
Distortion factor THD-I in %	L1, L2, L3	Accuracy: 0.5%

Communication

Interfaces		
RS 485	Up to 115.2 kbps	Yes
Protocols		
Modbus RTU/slave		Yes

Typical connection options

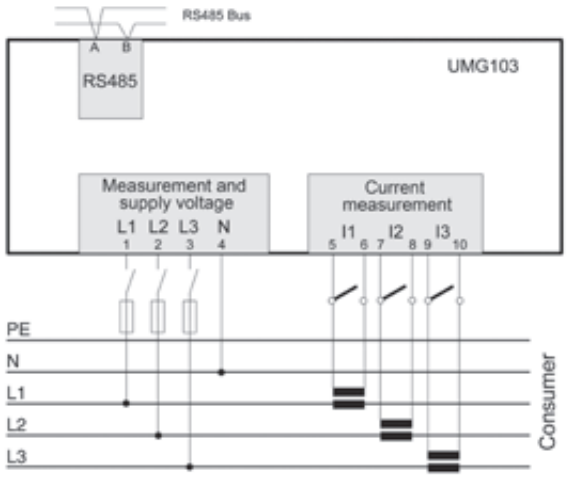


Illustration: connection option UMG 103

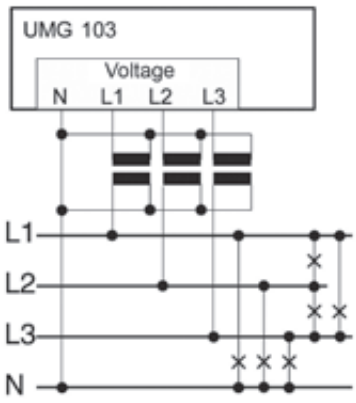


Illustration: connection example for a voltage measurement using a voltage transformer (VT)

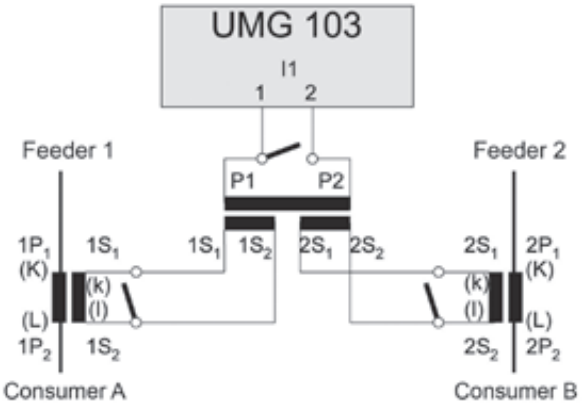


Illustration: current measurement using a sum current transformer (CT)

Mounting illustration

Dimensional drawings

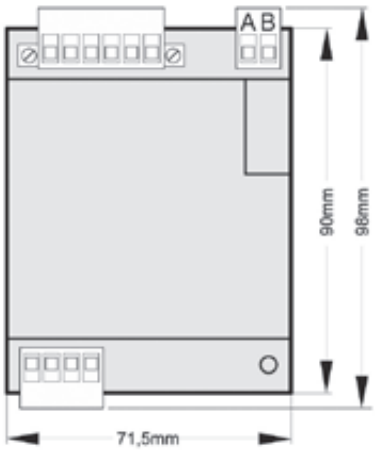


Illustration: front view

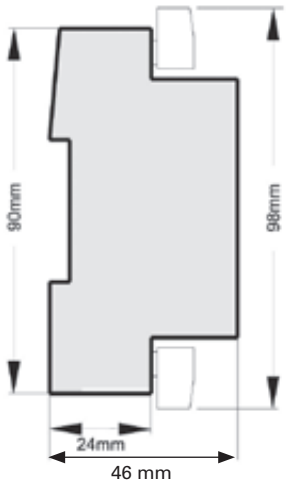
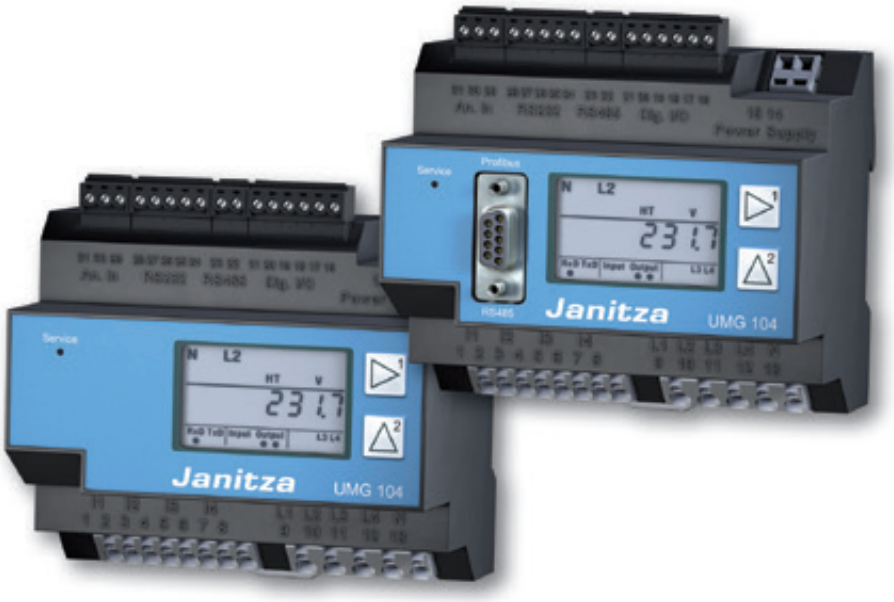


Illustration: side view



UMG 104 – More than just a Multimeter

The UMG 104 equipped with a 500 MHz DSP (digital signal processor) is a very fast and powerful power analyser. The continuous scanning of the 8 channels with 20 kHz per channel allows the recording of all electrical parameters (more than 800 values), minimum - and maximum - values, and the main power quality values such as harmonics (up to the 40th, each phase with the detection of direction).

Based on these data loss of production can be avoided, concepts can be developed, such as the electricity cost reduction programs, and measures introduced. And finally the improvements can be monitored and recorded with the UMG 104 as well.

Using modern communication architectures, the acquired data are fed to a central location, in powerful databases, stored centrally and made available for further processing in an open architecture. The easy integration into an existing building control system or PLC environment extends the capabilities of the UMG 104.

Applications

- Replacement of analogue and digital instrumentation
- Consumption data collection and analysis (load profiles)
- Continuous power quality monitoring
- Cost center management, i.e. breakdown of energy costs, e.g. allocation per product
- Remote control and monitoring of equipment and processes
- Protection of networks
- "Sensor" for building management systems or PLC

Various versions with UL-approval available!

UMG 104 overview

excess value by additional functions

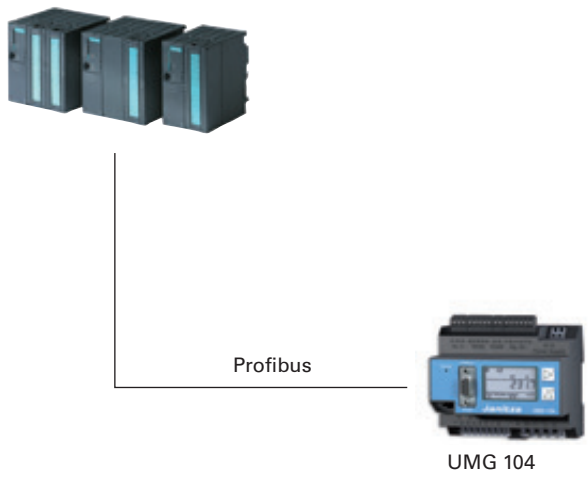
By integration of new functions, the UMG 104 exceeds all limits of digital panel meters:

- **kWh-meter, kvarh-meter**
- **Harmonic analyzer**
- **Event writer**
- **Multifunctional power meter**
- **Supervision of condition**
- **Data logger**

The UMG 104 can accept up to 4 current and 4 voltage inputs, which allows monitoring of up to 4 single phase circuits. Potential applications include data centers, office buildings, motor control centers, etc.

Cost-effective, fast and safe communication Modbus and Profibus

In many cases the costs for installation and communication (e.g. peripheral equipment for field buses) exceed those for the respective power meters. Integration of the UMG 104 in an existing field bus architecture means a fast, cost-efficient and reliable communication. Additional interfaces enable the integration of the power analysers into PLC or building automation systems. The use of open standards offers great flexibility to the user.



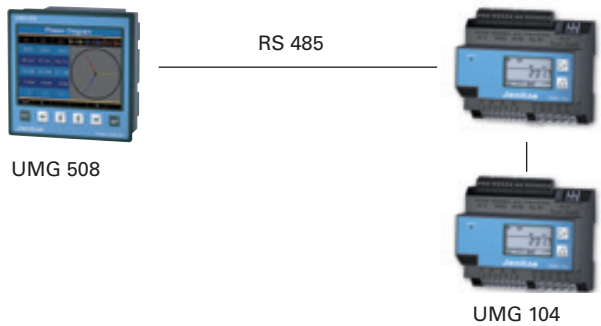
Example PLC communication with Profibus or Modbus

Easy integration of devices with Ethernet interface

With the Modbus interface function of UMG 104 you can connect via Modbus gateways (for example UMG 508, UMG 604, ...) to Ethernet. Each instrument with a Modbus RTU interface can be connected, if its data format and function codes correspond. Data can be scaled and labelled.

Highspeed Modbus

The devices of UMG 104 series can transfer data via RS485 interface with a speed of up to 921,6 kB/s among each other device of this series.



Example Ethernet gateway

Central Building Control System

PLC

Software

Interfaces
- RS 232
- RS 485

Grids
- IT, TN, TT - Grids
- 3 and 4 wire grids
- up to 4 single phase grids

2 Digital inputs
- Pulse input
- Alarm input logic
- Condition monitoring
- High/ low tariff changeover

2 Digital outputs
- Pulse output kWh/ kvarh
- Switching output
- Limit output
- Logical output

Profibus connection (optional)

Communication Protocols
- Profibus (DP/V0)
- Modbus (RTU)

Accuracy
- Energy: class 0.5S (.../5A)
- Current: 0.2 %
- Voltage: 0.2 %

Temperature input
- PT 100, PT 1000, KTY 83, KTY 84

Memory
- 4 MByte Flash

Power quality
- Harmonics, 1st- 40th
- THD-U/I
- Unbalance

Overview of product variants

Three/four phase power analysers; 50/ 60Hz; current transformer ../1/5A; including GridVis programming and analysis software.											
Supply Voltage							Interfaces				
95...240 V AC, 135...340 V DC ±10% of nominal range	50...110V AC 50...155V DC ±10% of nominal range	20...55V AC 20...77V DC ±10% of nominal range	4 Voltage and 4 Current inputs	2 Digital inputs	2 Digital outputs	1 Temperature input	RS 232	RS 485	Profibus DP V0	Type	Artikel-Nr.
•	-	-	•	•	•	•	•	•	-	**UMG 104**	**52.20.001**
-	•	-	•	•	•	•	•	•	-	**UMG 104**	**52.20.003**
-	-	•	•	•	•	•	•	•	-	**UMG 104**	**52.20.005**
•	-	-	•	•	•	•	•	•	•	**UMG 104 P**	**52.20.002**
-	-	•	•	•	•	•	•	•	•	**UMG 104 P**	**52.20.006**

- = not possible • = included

Features

Memory	Measurement data	4 MB
Clock		+/- 1 min per month
Operating hours counter		yes
Tarifs		4 x real energy / 4 x reactive energy

Peripherals

Digital inputs	as status or pulse input	2
Digital outputs	as switching or pulse output	2
Temperature input	PT100, PT1000, KTY83, KTY84	1
Password protection		yes
Software	**GridVis**	**yes**

Communication

Interfaces		
RS 232	9.6, 19.2, 38.4, 115.2 kbps	yes
RS 485	9.6, 19.2, 38.4, 57.6, 76.8, 115.2, 921.6 kbps	yes
Profibus DP	Sub D9-pole up to 12 Mbps	yes, variant P
Protocols		
Modbus RTU		yes
Profibus DP V0		yes, variant P

Measuring range

Voltage L-N, AC (without PT)		10…300 V AC
Voltage L-L, AC (without PT)		17…520 V AC
Current (Transformer: x/1 und x/5 A)		0.005..7.5 A
Frequency of fundamental		45 ..65 Hz
Grids		IT, TN, TT
Measurement in grids		1ph, 2ph, 3 ph, 4 ph up to 4 times 1ph

Technical data

Nominal voltage	3-phase 4-wire grid (L-N, L-L)	277/480 V AC
	3-phase 3-wire grid (L-L)	480 V AC
Overvoltage class		300 V CATIII
Quadrants		4
Continuous Measurement		yes
Sampling rate, 8 channels	per channel	20 kHz
Weight		350 g
Dimensions		W=107.5 mm x D=90 mm x H=82 mm
Mounting	according to IEC EN60999-1/ DIN EN 50022	35 mm DIN rail
Working temperature		-10…55 °C
Connectable wires (U/I)	one wire, more wires, fine stranded wires	0.08 - 2.5 mm²
	cable end sleeve	1.5 mm²
Protection class	according to EN60529	IP 20

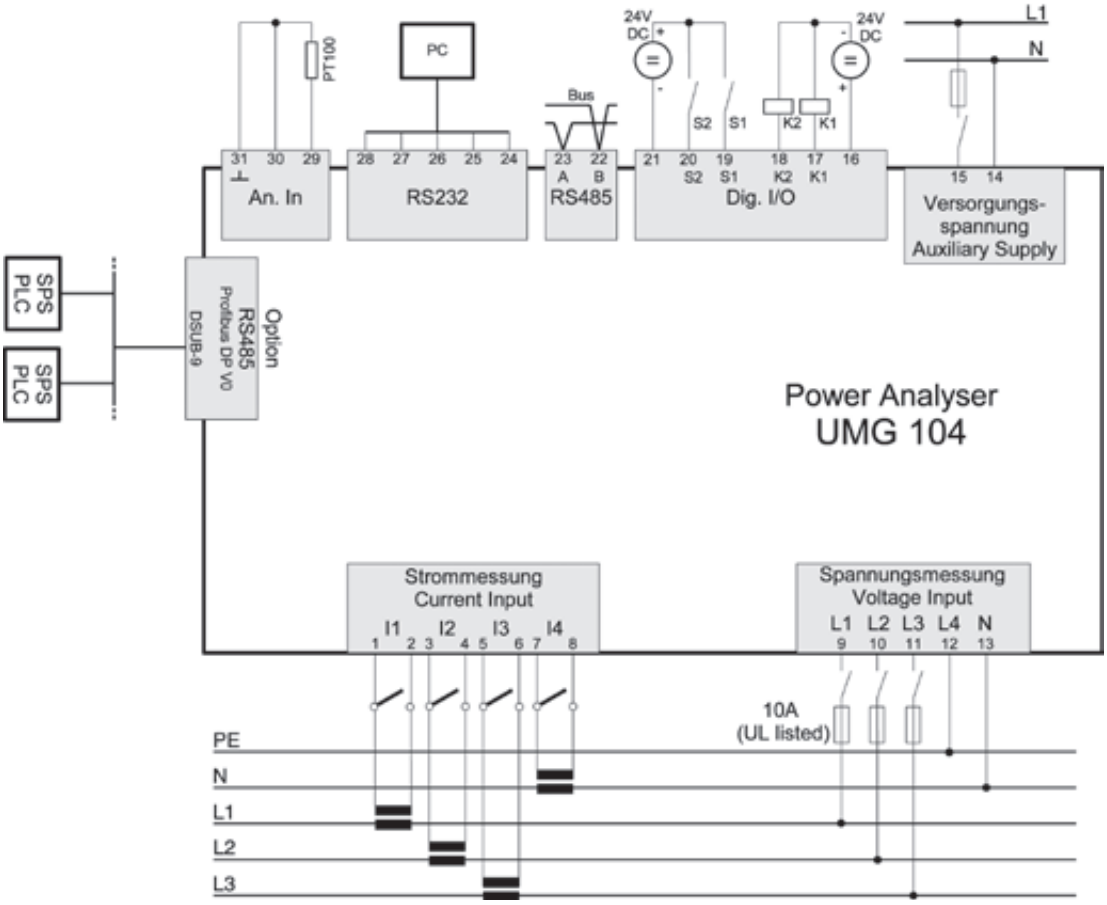
Measured values

Voltage	L1, L2, L3, L4, L1-L2, L2-L3, L1-L3	accuracy ±0.2%
Current	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	accuracy ±0.2%
K-factor	L1, L2, L3, L4	yes
Rotating current components	Positive/ Negative/ Zero Phase Sequence	yes
Real, apparent, reactive power	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	accuracy ±0.4% (EN61557-12)
Cos-phi / power factor	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes
Phase angle	L1, L2, L3, L4	yes
Real energy (kWh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Consumed real energy (rate 1, rate 2) - Supplied real energy (rate 1, rate 2)	Class 0.5S (…/5 A), Class 1 (…/1 A)
Reactive energy (Karh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Inductive energy (rate 1, rate 2) - Capacitive reactive energy	Class 2
Reactive energy (kVAh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes
Wave form voltage	L1, L2, L3, L4	yes
Frequency of mains		accuracy ±0.01 Hz
Temperature input		accuracy ±1.5%
Average values		yes
Minimum and maximum values		yes

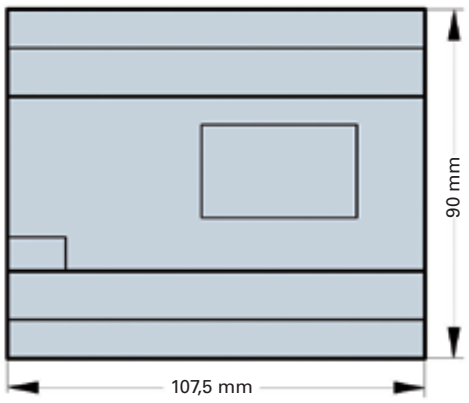
Power quality

Harmonics, 1st- 40th	Current, voltage, real/reactive power (±) L1, L2, L3, L4	accuracy V, I Class 1 (EN61000-4-7)
Distortion factor THD-U in %	L1, L2, L3, L4	yes
Distortion factor THD-I in %	L1, L2, L3, L4	yes
Unbalance		yes
Positive/ Negative/ Zero Phase Sequence		yes
Inrush-currents	10 ms	no
Malfunction writer		no
Short-term interruptions		no

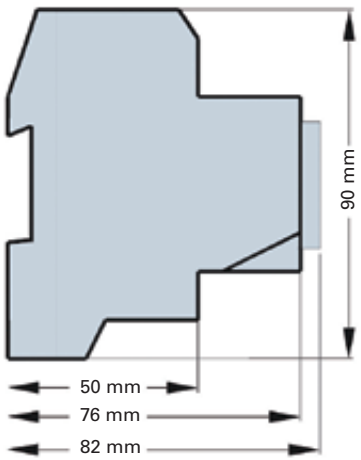
Connection diagram UMG 104



Dimensional drawing



front view



side view

UMG 604 – High performance power analysers

High performance power analysers from the UMG 604 product family are suitable for use at all network levels. The high scanning rate enables a continuous measurement by gathering more than 800 measurement parameters. Due to the very high performance level of the digital signal processor, all important power quality parameters are recorded e.g. short-term interruptions with fault recorder function, transients, harmonics up to a 40th and starting current etc. Extensive communication options e.g. Ethernet (TCP/IP), BACnet, Modbus, Profibus, RS232, RS485, HTTP, FTP, SMTP, SNTP, SNMP or DNS... allow affordable and quick integration in the existing communication architecture. Worldwide access to the embedded web server can be gained through a web browser e.g. for energy consumption analysis. Programs specific to the user can be created with implemented graphic programming. It is possible to run 7 user programs simultaneously.

Areas of application

- For measuring, monitoring and checking electrical parameters in energy distribution units
- Consumption data collection and analysis (cost centre data collection)
- For monitoring the power quality (harmonics, short term interruptions, transients, initial current...)
- Measurement value generator for building management systems or PLC
- Control tasks e.g. depending upon the achieved measurement values or limit values
- Peak demand management (avoidance of costly and dangerous peak loads)
- Ethernet gateway for subordinate measurement points
- Remote monitoring

Various versions with UL-approval available!

UMG 604 the extra compact power analyser

Added value through additional functions

Through the integration of various functions, the UMG 604 power analyser goes far beyond the limits of digital multifunctional measuring equipment and, therefore, offers the respective added value. The UMG 604 and the use of state-of-the-art processors allow to offer a very fast and extremely compact power analyser at an affordable price.

The UMG 604 contains the following functions:

- Power analyser for electrical energy distribution (over 800 parameters)
- Energy consumption and cost centre data collection
- Monitoring of power quality
- Peak demand management (optional)
- PLC function (up to 7 simultaneous freely programmable programs, graphic programming)
- Transient recorder
- Event recorder
- Data logger
- Modbus/Ethernet gateway

Main features

- Continuous measurement
- Collection of all relevant power quality parameters (harmonics, short-term interruptions, unbalance ...)
- Ethernet and embedded web server
- Jasic® interpreter
- Up to 7 user defined programs
- GridVis software - full version included in the delivery

Applications

Major increases of energy costs make electrical energy a driving force in costing. With the UMG 604, you can make the first step towards better cost efficiency. The precise collection of all energy data and electrical parameters ensures the necessary amount of transparency in your energy supplies. Concepts can be developed on the basis of the data e.g. electricity cost reductions and the introduction of measures. These targeted improvements can also be monitored and recorded with the UMG 604.

The UMG 604, equipped with a 500 MHz DSP (digital signal processor), is a fast and high performing power analyser. The continuous scanning of eight channels with 20 KHz per channel enables the collection of all relevant electrical parameters (more than 800 values), minimum and maximum values, the basic power quality values such as harmonics (up to the 40th, each phase with direction recognition) and short-term interruptions. Even fast transients (> 50µs) can be safely identified. Using modern communication processes, the collected data is conducted to a central location, stored centrally in a high-performance database and provided for further processing in an open system. Simple integration in an existing building management system control or PLC environment expands the areas of application of the UMG 604.

DIN rail mounting (6 units):
reduction of installation costs
Measurement equipment is usually installed in the low voltage main distribution as an integral measurement instrument for the switchgear cabinet door. Installation and connection costs are significantly reduced by the installation of the UMG 604 on a 35mm DIN rail. This means that the panel cut-out and wiring to the cabinet door is no longer necessary. In order to make use of the extensive functions of modern measuring equipment, the interconnection and central analysis of the data plays an important role. This means that the on-site display generally serves the purpose of the initialisation and service only.
The decidedly compact UMG 604 is suitable for installation in low voltage main distribution panels and machines as well as in installation distribution boards which is particularly of interest for applications in building services engineering, information technology and data centres.

Modern communication processes through the Ethernet: affordable, rapid and safe communication
The costs for installation and communication (e.g. periphery for field buses) often surpass the costs of the equipment.

By connecting the equipment to an existing Ethernet system, a fast, optimally priced and reliable communication system can be developed. Additional interfaces allow the integration of power analysers in PLC systems or in central building management systems. The use of clear standards offers the user a high amount of flexibility.

Ethernet/Modbus gateway: the affordable connection of units without an Ethernet interface
With the Modbus gateway function, simple Modbus RTU-units can be connected to the Ethernet using the UMG 604. For example, the UMG 604 can be used simultaneously as a gateway for subordinate measurement points or older units which already exist in the installation. Each unit with a Modbus RTU interface, where the data format and function codes match up, can be connected. Data can be marked and scaled.

Highspeed Modbus
The devices of the UMG 604 series can transfer data between the units using the RS485 interface at a speed of up to 921.5 kB/s.

The e-mail and homepage inform you wherever you are…
Who hasn't experienced it before? You are hardly through the door and the telephone is already ringing. There are problems in production, computers are crashing and the energy supplies are lost.

You have direct access to the extremely high performance homepage of the UMG 604 with a web browser and an IP address. Extensive information is already available to you on the homepage. Online data are available together with historical data and graphs recording events. The homepage can be used to directly convert the rates into costs and be exported as a csv file or printed. As an alternative, you can let yourself be informed by e-mail anywhere in the world if your energy supply becomes overloaded, if short-term interruptions to the voltage supplies bring your production processes to a standstill or unauthorized harmonics reduce the lifespan of equipment. The application possibilities are endless.

Residual current measurement (RCM)

Functionality
All lines on the output to be monitored are fed through the current transformer, with the exception of the PE line. If the system is operating correctly, the sum of all currents is equal to zero so that no voltage is induced in the current transformer. In the event that a fault current flows via ground or other channel, the current difference induces a current in the current transformer which is captured by the residual current measurement device.

UMG 604D
The UMG 604D monitors the residual currents of pure alternating currents in TN and IT networks in electrical systems, displays the current value and issues a warning if the limit values are exceeded.

In addition to the operating currents L1-L3, the fourth measurement input for residual current measurement is coloured differently (light grey) and suitable for currents up to 30 mA. The current transformer with a transformation ratio of 600/1A and sufficiently-dimensioned internal dimensions (20x30, 50x80 or 80x120mm) can be found in section 6, page 166.

Differently coloured terminals for residual current measurement (current input 14)

Extended main features of UMG 604D

- Measures the increase in residual current
- Allows for maintenance scheduling
- Warns if the limit values are exceeded
- Detects slowly developing fault currents
- Detects weaknesses in the electrical system
- Residual current monitoring device (RCM – Residual current monitoring)

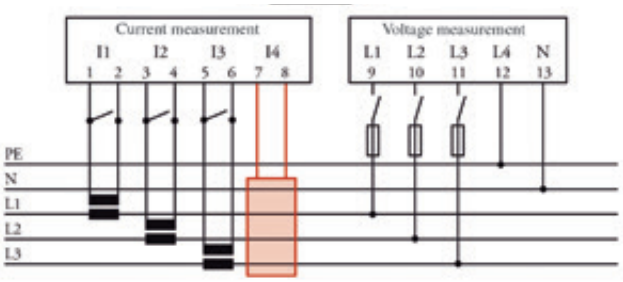


Illustration: Connection for measurement channels and differential current transformer of series KBU (split core).

GridVis EMS-/PQM system software

Online monitoring with the software GridVis
The software GridVis, which comes along with the content of delivery, allows an individual collection, reading out of historic data and visualisation of online data. The received data of multiple measuring points are collected, saved, processed, visualised and provided for further use. All measured values are available in the mode of online measurement either as a line graph or bar graph.

The topology gives a quick overview of the energy distributions and the possibility to locate power failures by comparing measuring points and checking the defined tolerances at a glance.

Depositing some graphical files (common formats such as .jpg) with circuit diagrams, flow processes or building plans and binding of the corresponding instruments by drag and drop to their real position, you can establish customer specific solutions quickly and simply.

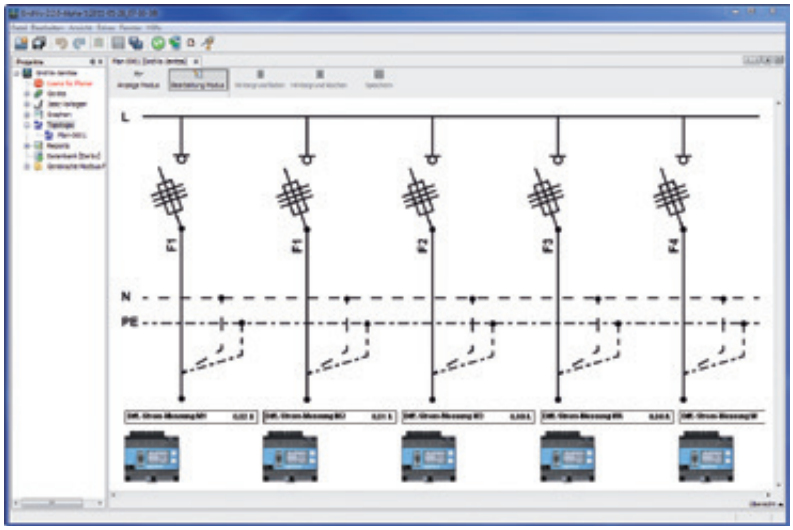


Illustration: topological view

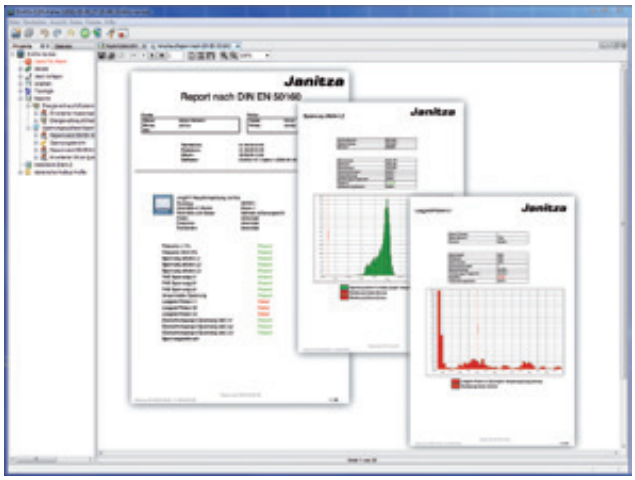


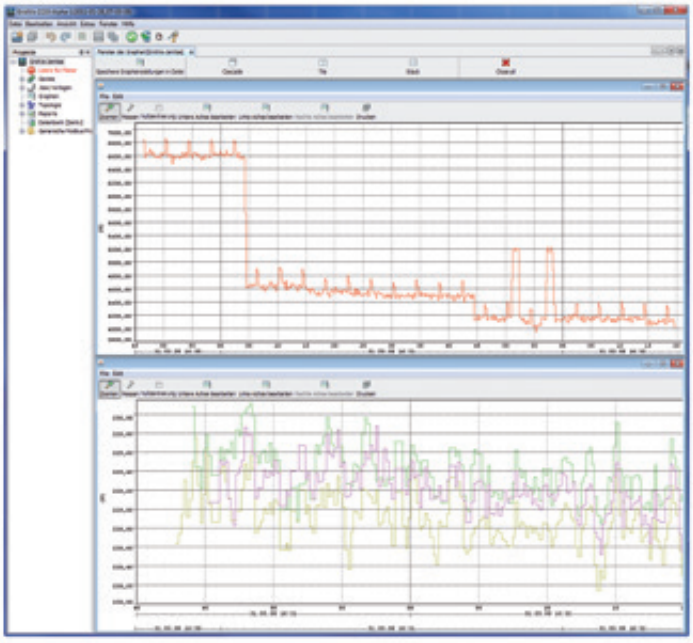
Illustration: Report presentation for voltage quality (simple report)

Main features

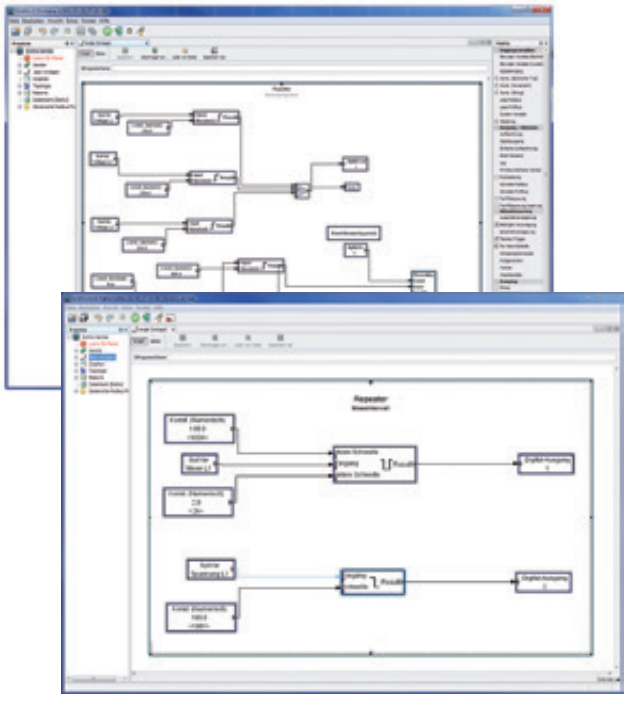
- Parameterisation and programming of UMG measurement equipment
- Visualisation of the measurement values with topological view
- Automatic download of the measurement data
- Data storage
- Online analysis tools
- Analysis tools for historic data

Visualisation, topological view
GridVis allows an individually adaptable visualisation of online data. The topological view provides a rapid overview of energy distribution with the possibility of localising power faults by comparing the individual measurement points and by offering the possibility to check the defined tolerances at a glance.

Customer specific solutions can be quickly and simply implemented through uploading of graphic documents (standard formats such as JPG) with circuit diagrams, production lines or construction plans and incorporating the respective measurement units by drag and drop into their actual locations. Limit value excesses (e.g. THD-U is too high) and the status of inputs and outputs can also be displayed.



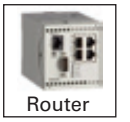
Online values and analysis of historic data
With the graphic line writer function, GridVis enables rapid online presentation of the selected measurement values. In this function, the graph is continuously expanded with new measurement values. For example, load profiles can be presented through the analysis of historic data in order to produce exact consumption analysis for optimised electricity supply contracts. Fault analysis through the comparison of various parameters can also be achieved with a few mouse clicks.



Graphic programming
The graphic programming option for user programs is completely new in the field of digital power analysers. Programs specific to the application can be created with this method such as the free programming of inputs and outputs, monitoring of processes or the issue of reports when defined limit values are achieved. In addition to the operator-friendly graphic programming, the user is also free to program the Jasic® code directly.

programming language
Jasic®

The Jasic® programming language offers brand new opportunities. The user is no longer tied to the functions which are fixed integrations in the unit; the unit can be expanded to include more functions. Up to seven of these freely definable user programs can be processed simultaneously in the unit.


Router


SPS

Software

Interfaces
- Ethernet
- RS 232
- RS 485

Networks
- IT, TN, TT - networks
- 3 phase and 4 phase networks
- Up to 4 single phase networks

2 digital inputs
- Pulse input
- Logic input
- Status monitoring
- HT/LT conversion
- Emax (max. demand) resetting

2 digital outputs
- Pulse output kWh/kvarh
- Switch output
- Limit value output
- Emax output
- Logic output

(can be extended through external I/O modules – see chapter 6)

Profibus connection

Communication
- Profibus (DP/V0)
- Modbus (RTU, UDP, TCP, gateway)
- TCP/IP
- BACnet
- HTTP (freely configurable homepage)
- FTP (file transfer)
- SNMP
- TFTP (automatic configuration)
- NTP (time synchronisation)
- SMTP (e-mail function)
- DHCP

Measurement accuracy
- Class: 0.5S (.../5A) class
- Current: 0.2%
- Voltage: 0.2%

Peak demand management (optional)
- 64 stages for load shedding

Temperature measurement input
- PT 100, PT 1000, KTY 83, KTY 84

Memory
- 128 MB Flash
- 16 MB RAM

Power quality
- Harmonics up to 40th
- Short-term interruptions
- Transient recorder (>50µs)
- Starting current (>10ms)
- Unbalance
- Full wave-effective value recordings (up to 4.5 min)

programming language
Jasic®

Overview of product variants

Three/four phase power analysers; 50/60Hz; current transformer .../1/5a; including GridVis programming and analysis software														
Supply voltage								Interfaces						
95...240 V AC, 135...340 V DC ±10% of nominal range	50...110V AC 50...155V DC ±10% of nominal range	20...55V AC 20...77V DC ±10% of nominal range	4 voltage and 4 current inputs	Memory 128 MB Flash	2 digital inputs	2 digital outputs	1 temperature input	RS 232	RS 485	Ethernet 100baseT	Profibus DP V0	7 freely programmable application programs	Type	Item number
•	-	-	•	•	•	•	•	•	•	•	-	•	**UMG 604 E**	**52.16.002**
-	•	-	•	•	•	•	•	•	•	•	-	•	**UMG 604 E**	**52.16.012**
-	-	•	•	•	•	•	•	•	•	•	-	•	**UMG 604 E**	**52.16.022**
•	-	-	•	•	•	•	•	•	•	•	•	•	**UMG 604 EP**	**52.16.001**
-	-	•	•	•	•	•	•	•	•	•	•	•	**UMG 604 EP**	**52.16.021**
•	-	-	•	•	•	•	•	•	•	•	•	•	**UMG 604 DE**	**52.16.041**
Options (for all versions)														
Emax function application program (peak demand management)													**Emax**	**52.16.080**
BACnet communication													BACnet	52.16.081
Accessories for UMG 604D														
Differential current transformer, transmission ratio of 600/1A, interior dimensions: 20mm x 30mm													KBU 23D	15.03.400
Differential current transformer, transmission ratio of 600/1A, interior dimensions: 50mm x 80mm													KBU 58D	15.03.401
Differential current transformer, transmission ratio of 600/1A, interior dimensions: 80mm x 120mm													KBU 812D	15.03.402

- = Not possible • = Contained

Not suitable for use in residential areas.

General technical data

Nominal voltage	3-phase 4-wire grid (L-N, L-L)	277/480 V AC
	3-phase 3-wire grid (L-L)	480 V AC
Overvoltage category		300V CAT III
Quadrants		4
Continuous measurement		yes
8 channel scanning rate	Per channel	20 kHz
Weight		350g
Dimensions		L=107.5mm* W=90mm* H=62 mm
Mounting	According to IEC EN60999-1/DIN EN50022	35mm DIN rail
Working temperature range		-10...55 °C
Connectable conductor (U/I))	Single wire, multi-wire, fine-wire pin cable lugs, ferrule	0.08 - 2.5 mm², 1.5 mm²
Protection class	According to EN 60529	IP 20

Measurement range

L-N voltage, AC (without voltage transformer)	Free voltage transformer settings	Networks to 480 V AC
Current (transformer: x/1 and x/5A)		0.001...8.5 A
Frequency of mains		45 ..65 Hz
Networks		IT, TN, TT
Measurement in single/multi-phase networks		1 ph, 2 ph, 3 ph, 4 ph and up to 4 x 1 ph

Periphery

Digital inputs	Status, logic or pulse input	2
Digital outputs	Switch logic output or pulse output	2
Temperature measurement input	PT100, PT1000, KTY83, KTY84	1
Password protection	Multilevel	yes
Peak demand management	**Optional 64 channels**	**yes**
Software	**GridVis**	**yes**

Measurement values

Voltage	L1, L2, L3, L4, L1-L2, L2-L3, L1-L3	Accuracy ±0.2%
Current	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	Accuracy ±0.2%
K-factor	L1, L2, L3, L4	yes
Three-phase current components	Positive/negative/zero phase sequence	yes
Effective, reactive and apparent power	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	Accuracy ±0.4%
Cos-phi, power factor	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes
Phase angle	L1, L2, L3, L4	yes
Effective energy (kWh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Purchased effective energy (tariff 1, tariff 2) - Supplied effective energy (tariff 1, tariff 2)	Class 0.5S (.../5 A), Class 1 (.../1 A)
Reactive energy (kvarh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Induktive Blindarbeit (Tarif 1, Tarif 2) - Kapazitive Blindarbeit	Class 2
Apparent energy (kVAh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes
Current/voltage wave form	L1, L2, L3, L4	yes
Frequency of mains		Accuracy ±0.01
Temperature measurement		Accuracy ±1.5%
Average value		yes
Minimum and maximum values		yes

Features

Memory		128 MB
Clock		+/- 1 min per month
Integrated logic		Programming language Jasic®
Operating hour meter		yes
Weekly time switch		Jasic®

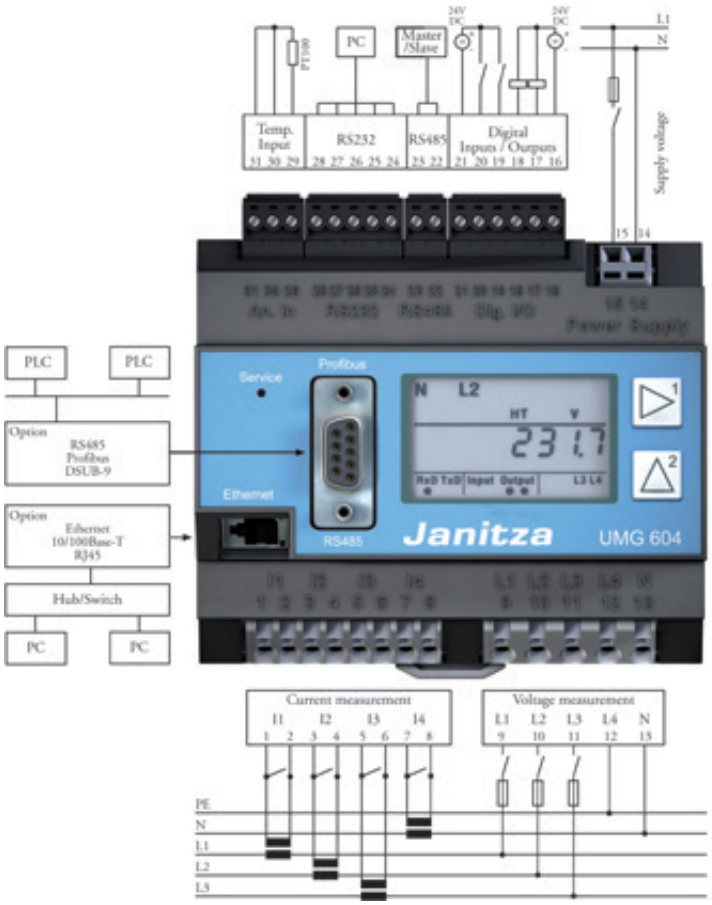
Power quality

Harmonics, 1-40 harmonic	Current, voltage reactive/effective power (±) L1, L2, L3, L4	Accuracy ±0,5%
Distortion factor THD- U in %	L1, L2, L3, L4	yes
Distortion factor THD- I in %	L1, L2, L3, L4	yes
Unbalance		yes
Positive/negative/zero system		yes
Transients	50 µs	yes
Start-up processes	10 ms	yes
Fault recorder function		yes
Short-term interruptions		yes

Communication

Interfaces	RS 232	9.6, 19.2, 38.4, 115.2 kbps	yes
	RS 485	9.6, 19.2, 38.4, 57.6, 76.8, 115.2, 921.6 kbps	yes
	Profibus DP	Plug, sub D 9-pole up to 12Mbps	Yes, EP version
	Ethernet 10/100 Base-TX	RRJ-45 sockets	yes
Protocols	Modbus RTU		yes
	Profibus DP V0		Yes, EP version
	Modbus TCP		yes
	Modbus over TCP		yes
	Modbus-Gateway		yes
	HTTP	Homepage (configurable)	yes
	SMTP	E-mail	yes
	SNMP		yes
	SNTP	Time synchronisation	yes
	TFTP	Automatic configuration	yes
	FTP	File transfer	yes
	DHCP		yes
	BACnet / IP		yes, option

Connection illustration



Dimensional drawing

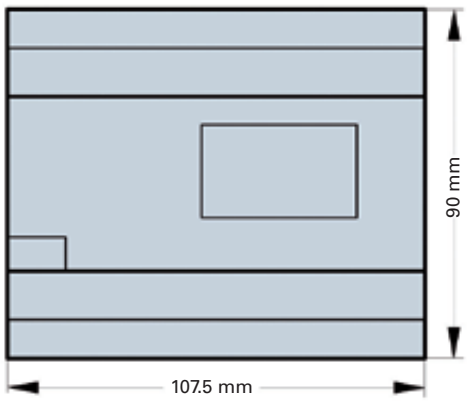


Illustration: **front view**

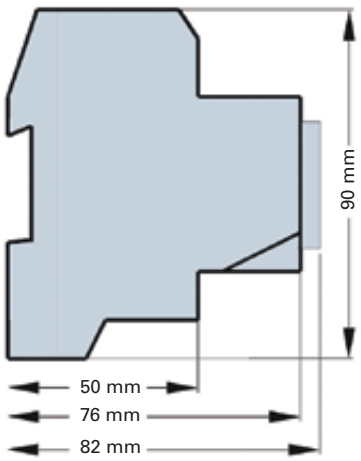


Illustration: **side view**

UMG 605 – power quality analyser

(EN 50160, IEEE 519, ITIC)

The UMG 605 power quality analyser is particularly suitable for monitoring power quality according to standards such as the EN 50160. All power quality parameters are collected and analysed e.g. flicker, short-term interruptions with fault recorder function, transients, harmonics up to 63rd and inrush currents etc. Extensive communication possibilities e.g. RS 485 Modbus, Profibus, Ethernet (TCP/IP), BACnet, HTTP, FTP, SMTP, SNTP, SNMP, DNS .... allow cost effective and rapid integration in existing communication networks. Worldwide access to the embedded web server can be gained through a web browser. The GridVis software included in the content of delivery allows extensive analysis just with the click of a button.

Areas of application

- Continuous monitoring of the power quality e.g. EN 50160
- Ethernet gateway for subordinate measurement points
- Analysis of electrical faults for network problems
- Monitoring of the internal distribution network according to EN 61000-4-7, 4-15, 4-30
- Report generator for EN 50160 analysis
- Control tasks, e.g. depending on achieved measured values or limits
- Transducer for building automation or PLC systems

Various versions with UL-approval available!

UMG 605 the extra compact power quality analyser

Added value through additional functions

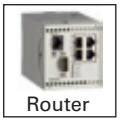
Thanks to state-of-the-art digital signal processor, it is possible to offer the power quality analyser UMG 605 at a very reasonable price. The high sampling rate enables a continuous measurement of more than 2000 measured values per measurement cycle (200ms). The UMG 605 power quality analyser serves the purpose of continuous monitoring of the power quality e.g. in accordance with EN 50160. This serves the purpose of monitoring the supply power quality from the energy supply side. The UMG 605 can also be used in applications for failure analysis on the consumer side and is also used as a preventative measure for network perturbations.

Main Features

- Measurement of power quality according to **DIN EN 61000-4-30**
- **Measurement method class A**
- Fourier analysis **1st to 63rd** harmonics for U-LN, U-LL, I, P (consumption/supply) and Q (ind./cap.)
- Measurement of harmonics and interharmonics (U-LN, U-LL, I)
- Analysis and evaluation according to **DIN EN 50160** with the contained programming and analysis software GridVis
- Flicker measurement according to **DIN EN 61000-4-15**
- Measurement in IT and TT grids (300V CAT III)
- 4 voltage measuring inputs, 4 current measuring inputs
- **Continuous sampling** of the voltage and current measuring inputs with **20kHz**
- Recording of more than 2000 different measurement parameters per measuring cycle (200ms)
- Detection of transients >50µs and storage with up to 16.000 samples
- Data logger/event memory (128MB Flashdisk)
- 2 digital inputs and 2 digital outputs
- Profibus DP/V0 alternatively RS 485 (Modbus RTU, Modbus-Master, optional BACnet)
- **Ethernet** (Web-Server, E-Mail, optional **BACnet**)
- Programming of customer specific applications in Jasic®

Applications

The power quality analyser which is equipped with 4 current and voltage inputs collects and digitalises the effective values (True RMS) from currents and voltages in 40-70Hz (15-440Hz) networks. The integrated microprocessor calculates the electrical parameters from the sampling values. The relevant voltage can be defined as a phase-neutral or a phase-phase voltage for measurement in a three-phase system. The voltage serves the UMG 605 as a reference voltage for harmonic measurement, transient and event recording and for the flicker meter. A nominal current can be set using this for the measurement of electrical current events. The 4th current and voltage input represents a separate measurement system. However, it is generally used for measuring the current in the neutral or PE conductor or used for measuring a voltage difference between N and PE.


Router


SPS

Software

Interfaces
- Ethernet
- RS232
- RS485

Networks
- IT, TN, TT networks
- 3 phase and 4 phase networks
- Up to 4 single phase networks

2 digital inputs
- Pulse input
- Logic input
- Status monitoring
- HT/LT switch over
- Emax (max. demand) resetting

2 digital outputs
- Pulse output kWh/kvarh
- Switch output
- Limit value output
- Emax output
- Logic output

(can be extended through external I/O modules)

Profibus connection

Communication
- Profibus (DP/V0)
- Modbus (RTU, UDP,TCP, Gateway)
- TCP/IP
- BACnet (optional)
- HTTP (freely configurable homepage)
- FTP (file transfer)
- SNMP
- TFTP (automatic configuration)
- NTP (time synchronisation)
- SMTP (e-mail function)
- DHCP
- SNMP

Measurement accuracy
- Class: 0.5S (.../5A) class
- Current: 0.2%
- Voltage: 0.2%

Peak demand management
- 64 stages for load shedding

Temperature measurement input
- PT 100, PT 1000, KTY 83, KTY 84

Memory
- 128 MB Flash
- 16 MB RAM

Power quality
- Harmonics up to 63rd
- Short-term interruptions
- Transient recorder (>50µs)
- Starting current (>10ms)
- Unbalance
- Half wave-effective value recordings (up to 4.5 min)
- Flicker

programming language
Jasic®

Overview

Three/four phase power quality analysers; current transformer .../1/5a; including GridVis programming and analysis software													
Supply voltage							Interfaces						
95...240 V AC, 135...340 V DC ±10% nominal range	50...110V AC 50...155V DC ±10% nominal range	20...55V AC 20...77V DC ±10% nominal range	4 voltage and 4 current inputs	Memory 128 MB Flash	digital inputs	digital outputs	1 temperature input	RS 232	RS 485	Ethernet 100baseT	Profibus DP V0	Type	Item number
•	-	-	•	•	2	2	•	•	•	•	•	**UMG 605**	**52.16.027**
-	•	-	•	•	2	2	•	•	•	•	•	**UMG 605**	**52.16.028**
-	-	•	•	•	2	2	•	•	•	•	•	**UMG 605**	**52.16.029**
Options (for all versions)													
Emax function application program (peak demand management)												**Emax**	**52.16.084**
BACnet communication												**BACnet**	**52.16.083**

- = not possible • = contained

General technical data

Nominal voltage	3-phase 4-wire grid (L-N, L-L)	277/480 V AC
	3-phase 3-wire grid (L-L)	480 V AC
Overvoltage category		300V CAT III
Quadrants		4
Continuous measurement		yes
8 channel scanning rate	Per channel	20 kHz
Weight		350g
Dimensions		L=107.5mm* W=90mm* H=76/82mm
Mounting	According to IEC EN 60999-1/DIN EN 50022	35mm DIN rail
Working temperature range		-10...55 °C
Connectable conductor (U/I)	Single wire, multi-wire, fine-wire, pin cable lugs, ferrule	0.08 - 2.5 mm², 1.5 mm²
Protection class	According to EN 60529	IP 20

Measurement range

L-N voltage, AC (without voltage transformer)	Free voltage transformer settings	Networks to 480 V AC
Current (transformer: x/1 and x/5A)		0.005...6 A
Frequency of mains	(only for static frequence)	15...440 Hz
Networks		IT, TN, TT
Measurement in single/multi-phase networks		1 ph, 2 ph, 3 ph, 4 ph and up to 4 x 1 ph

Periphery

Digital inputs	Status, logic or pulse input	2
Digital outputs	Switch logic output or pulse output	2
Temperature measurement input	PT100, PT1000, KTY83, KTY84	1
Password protection	Multilevel	yes
Demand management	**Optional 64 channels**	**yes**
Software	**GridVis**	**yes**

Features

Memory		128 MB
Clock		+/- 1 min per month
Integrated logic		Programming language Jasic®
Operating hour meter		yes
Weekly time switch		Programming language Jasic®

Measurement values

Voltage	L1, L2, L3, L4, L1-L2, L2-L3, L1-L3	Accuracy ±0.2%
Current	L1, L2, L3, L4/Calculated sum current	±0.2%/±0.6%
K-factor	L1, L2, L3, L4	yes
Three-phase current components	Positive/ Negative/ Zero Phase Sequence	yes
Cos-phi, power factor	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes
Phase angle	L1, L2, L3, L4	yes
Effective energy (kWh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Purchased effective energy (tariff 1, tariff 2) - Supplied effective energy (tariff 1, tariff 2)	Class 0.5S (…/5 A), Class 1 (…/1 A)
Reactive energy (kvarh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Inductive reactive power (tariff 1, tariff 2) - Capacitive reactive power	Class 2
Apparent energy (kVAh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes
Current/voltage wave form	L1, L2, L3, L4	yes
Frequency of mains		Accuracy ±0.1%
Temperature measurement		Accuracy±1.5%
Average value		yes
Minimum and maximum values		yes

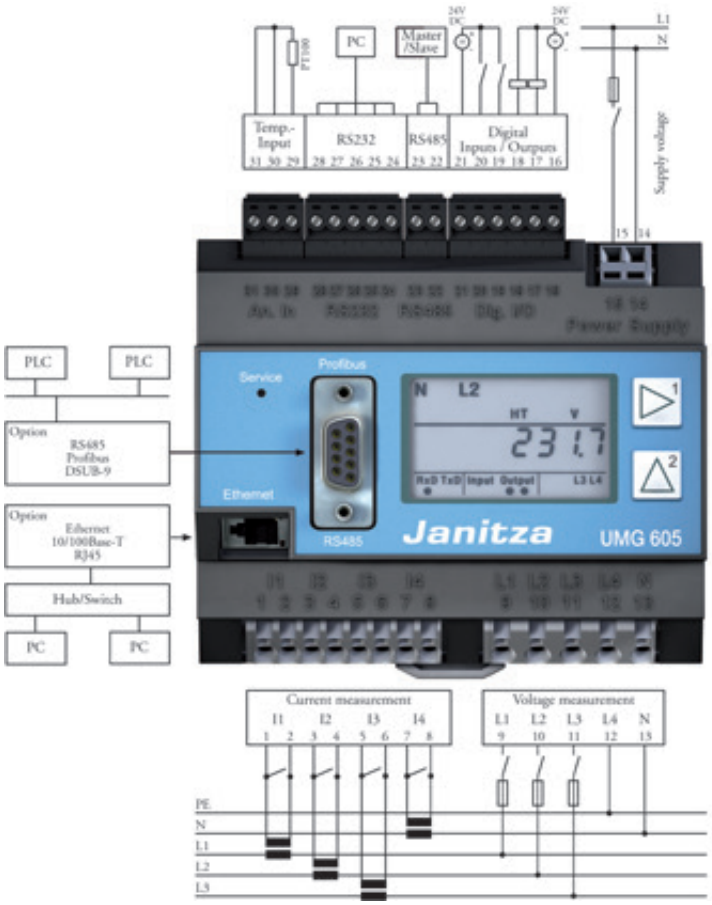
Power quality

Harmonics order, 1.- 63. Harmonics, even/odd	Voltage L1, L2, L3, L4	Accuracy ± 0.5%
Interharmonics	Current, voltage L1, L2, L3, L4	yes
Distortion factor THD- U in %	L1, L2, L3, L4	yes
Distortion factor THD- I in %	L1, L2, L3, L4	yes
Positive/negative/zero system		yes
Actual flicker value	L1, L2, L3, L4	yes
Short term flicker value	L1, L2, L3, L4	yes
Long term flicker value	L1, L2, L3, L4	yes
Transients	50 µs	yes
Trigger events	10 ms	yes
Inrush currents	10 ms	yes
Event recorder		yes

Communication

Interfaces		
RS 232	9.6, 19.2, 38.4, 115.2 kbps	yes
RS 485	9.6, 19.2, 38.4, 57.6, 76.8, 115.2, 921.6 kbps	yes
Profibus DP	Plug, sub D 9-pole up to 12Mbps	yes
Ethernet 10/100 Base-TX	RJ-45 sockets	yes
Protocols		
Modbus RTU		yes
Profibus DP V0		yes
Modbus TCP		yes
Modbus over TCP		yes
Modbus-Gateway		yes
HTTP	Homepage (configurable)	yes
SMTP	E-Mail	yes
SNMP		yes
SNTP	Time synchronisation	yes
TFTP	Automatic configuration	yes
FTP	File Transfer	yes
DHCP		yes
BACnet / IP		yes, Option

Connection illustration



Dimensional drawing

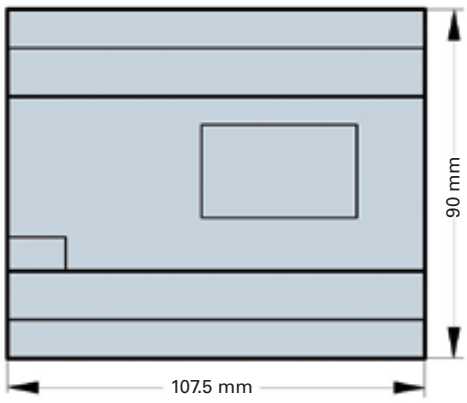


Illustration: front view

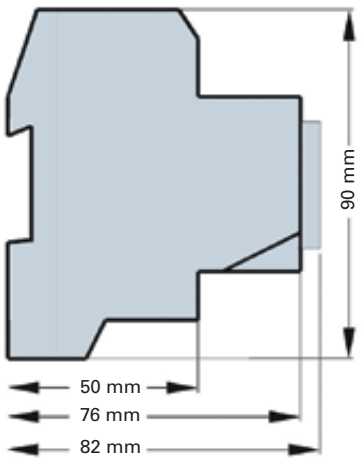


Illustration: side view

UMG 96L/UMG 96–Universal measuring instruments

Digital diversity versus analogue simplicity

Universal measuring instruments of UMG 96L and UMG 96 product families 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 and, therefore, installation costs can be reduced. Additional functions such as the recording of minimum and maximum values, the operating hour meter, the bi-metallic strip function, password protection and many more offer a significant amount of added value. The high measurement accuracy and a large LCD-display means universal application possibilities and offer fundamental advantages in comparison to analogue measuring instruments.

Areas of application

- Replacement of analogue measurement instruments
- Display and control of electrical parameters in energy distribution systems
- Cost centre data collection
- Measurement value generator for building management systems or PLC
- Limit value monitoring

UMG 96L/UMG 96 Universal measuring instruments

96x96 mm front panel mounting

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 switchgear which results in lower installation costs and less wiring efforts in comparison to analogue measuring technology. Universal measuring instruments of the UMG 96L and UMG 96 product families are mainly designed for use in low and medium voltage distribution systems.

Main features

- Compact housing dimensions (96x96 mm), minimal installation depth
- User-friendly and reliable terminals
- Large LCD with outstanding legibility
- The large quantity of electrical measurement values, replaces 13 analogue measurement units and more
- Excellent reliability and long life span

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 many more.

Applications

The UMG 96L and UMG 96 measurement instruments are digital front panel mounted measuring instruments which are suitable for measuring and recording electrical parameters (True-RMS) in 50/60 Hz networks. The measurement is configured for three-phase systems with a neutral conductor (TN and TT networks). At the network frequency of 50 Hz or 60 Hz, the scanning frequency of the random measurements which take place once per second is 2.5 kHz or 3.0 kHz. The supply voltage and scanning frequency for operating the UMG 96L is taken from the L1-N measurement voltage. The effective values and the minimum and maximum values are recorded every 15 minutes and the programming data is immediately stored in a non-volatile memory (EEPROM). The main characteristic of the measurement instrument is the compact construction (96x96 mm) and the high level of stability.

In order to achieve the functional diversity of the universal measurement instrument, you would need 13 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) and a frequency meter. This means that the planning, installation, wiring and storage costs are significantly reduced in comparison to the use of analogue measuring instruments. Another advantage is the higher precision and better legibility.

Measurement value displays
The extremely legible LCD display in connection with the function keys informs the user about the selected measurement values (actual, low, high and average values). Three measurement values can be simultaneously displayed in the LCD data field. The contrast of the LCD display can be adjusted by the user.

Display selection and automatic display rotation
All measurement values can be called up in the initial delivery status. Measurement values which are not required can be hidden and displayed again when necessary. A cycle between 1 and 250 seconds can be set for the automatic display rotation. The display rotation function can also be deactivated.

Display examples

L-L voltage

cos (phi)

Effective power

Effective energy

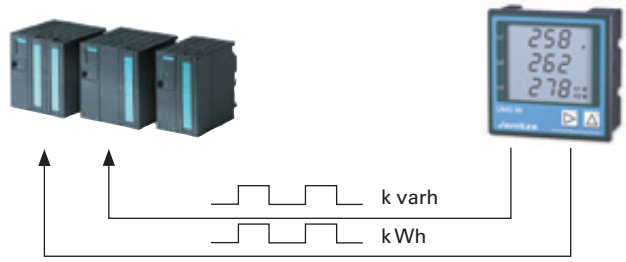
Bi-metallic function (average value generation)
A common average time for achieving measurement values in L1, L2, L3 and N and an average time for the power measurement values of effective power, apparent power and reactive power can be programmed. These values can be integrated at selectable time of 5, 10, 30, 60, 300, 480 and 900 seconds and stored as a highest average value.

Operating hour meter
The operating hour meter is immediately activated when the unit is switched on and can not be reset. The time is recorded at a 15 minute resolution and is displayed in hours.

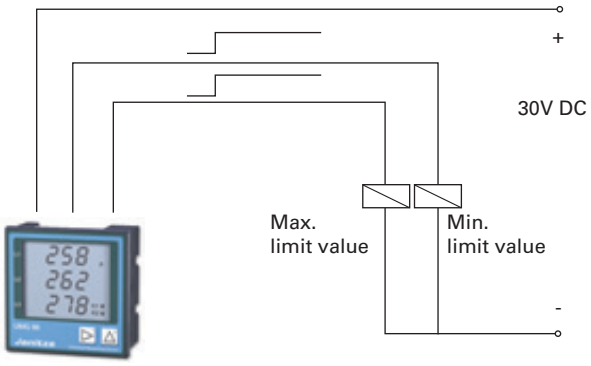
Digital outputs for effective or reactive energy consumption or limit values
Digital outputs can be used as pulse outputs for the effective or reactive energy consumption or as switch outputs. The digital outputs can be programmed in order to monitor the measurement data. The transistor output can also be linked with the measurement value of the limit value by programming which is activated if the value is not achieved or is exceeded. The transistor output is suitable for controlling electrical devices with a DC operating voltage or units with NPN inputs e.g. PLC.

Password
The user can protect programming and configurations against unauthorised changes with a 3-digit password.

Cost centre data collection and monitoring limit values (UMG 96)



Digital output for cost centre data collection



Digital output for limit value monitoring

Overview of product variants

Description	Type	Operating voltage	Item number
Four-phase universal measuring instrument 50/60Hz; Current transformer: ../1/5A Measurement range: L - N: 50 ... 255V-AC; L - L: 86 ... 442V- AC	**UMG 96L**	L-N: 196 ... 255V- AC	**52.14.001**
As above but measurement range: L - N: 16 ... 80V- AC; L - L: 28 ... 139V-AC	**UMG 96L**	L-N: 45 ... 80V- AC	**52.14.005**
Four-phase universal measuring instrument 50/60Hz; Current transformer: ../1/5A, 2 digital /pulse outputs Measurement range: L - N: 50 ... 275V-AC; L - L: 87 ... 476V- AC	**UMG 96**	L-N: 196 ... 275V- AC	**52.09.001**

General technical data

Operating voltage		Refer to order details above
Scanning rate		2.5 / 3 kHz
Weight		250g
Dimensions		W= 96mm x H 96mm x D= 42mm
Mounting		Front panel installation
Working temperature		-10...+55 °C
Storage temperature		-20...+70 °C
Protection class (reverse/front)	According to EN60529	IP 20/50
Connectable conductors (U/I)	Single wire, multi-wire, fine-wire, pin cable lugs, ferrule	0.08 - 2.5mm², 1.5mm²

Measurement range

Voltage L-N		Refer to order details
Voltage L-L		Refer to order details
Current	.../1A or .../5A	0.02...6 A
Frequency, mains		45 ...65 Hz

Measurement values

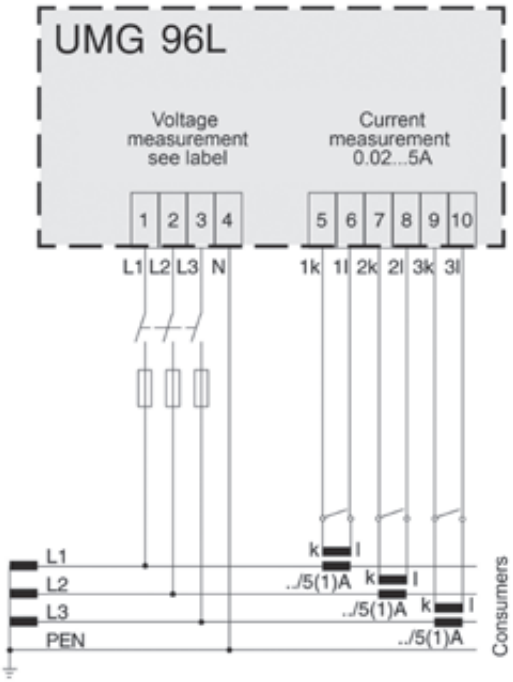
Measurement parameter	Display range	Measurement range at scaling factor 1	L1	L2	L3	Sum	Lowest value	Average value*1	Max		Measurement accuracy
									Average value	Mea-sure value	
Current 1/5A L1-L3	0.00 .. 9.99 kA	0.02 .. 6 A	•	•	•			•	•	•	+-1 %
Current calculated in N	0.00 .. 9.99 kA	0.06 .. 18 A				•		•	•	•	+-3 %
Voltage L-N	0.0 .. 34 kV	50 .. 255 V AC*2	•	•	•		•			•	+-1 %
Voltage L-L	0.0 .. 60 kV	86 .. 442 V AC*2	•	•	•		•			•	+-2%
Frequency (U)	45.0 .. 65.0 Hz		•								+-1.5 %
Effective power, sum,+/-	0.00 W .. 150 MW	1.8 W .. 2.4 kW	•	•	•	•		•	•	•	+-1.5 %
Apparent power, sum	0.00 VA .. 150 MVA	1.8 VA .. 2.4 kVA	•	•	•	•		•		•	+-1.5 %
Reactive power, sum	0.00 var .. 150 MVar	1.8 var .. 2.4 kvar	•	•	•	•		•			ind.+-1.5 %
cos-phi	0.00 ind. .. 1.00 .. 0.00 kap.	0.00 kap. .. 1.00 .. 0.00 ind.	•	•	•	•					+-3 %*4
Effective energy, consumed	0 .. 999,999,999 kWh					•					Class 2*3
Reactive energy, inductive	0 .. 999,999,999 kvarh					•					Class 2*3
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.
*2 see above
*3 - accuracy class according to DIN EN61036:2001-01, VDE0418 part 7, IEC61036:1996 + A1:2000
*4 - the measured apparent power must be in a range between 1 and 100%.

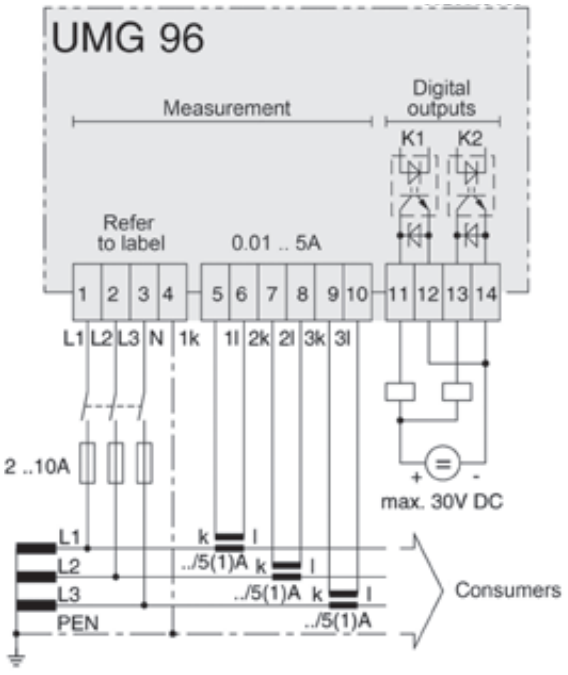
Periphery

2 digital outputs	As switch output or pulse output	UMG 96 only

Typical connection options

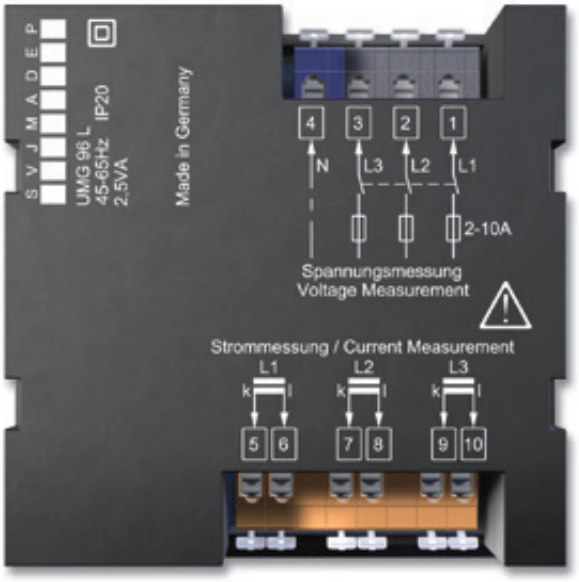


UMG 96L

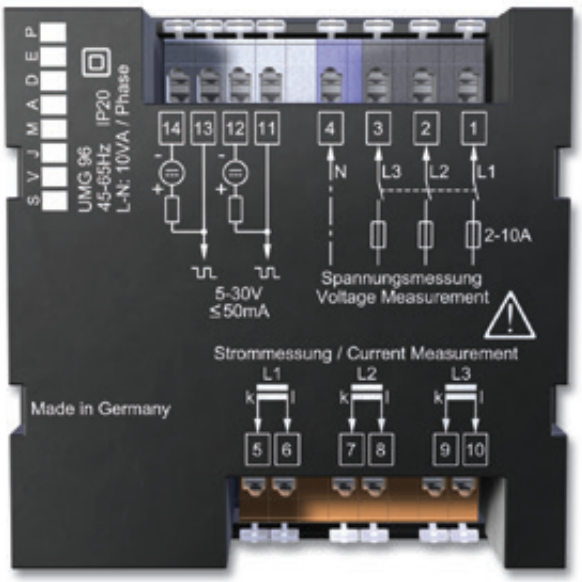


UMG 96

Connection illustrations



UMG 96L - reverse side of unit



UMG 96 - reverse side of unit

Dimensional drawings

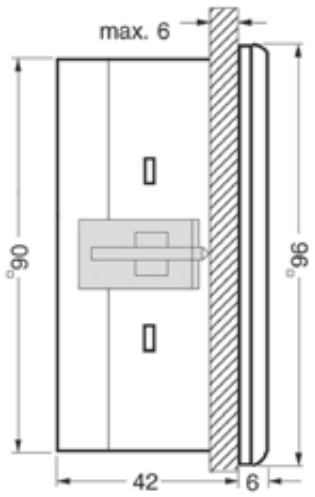


Illustration: Side view
All dimensions in mm.

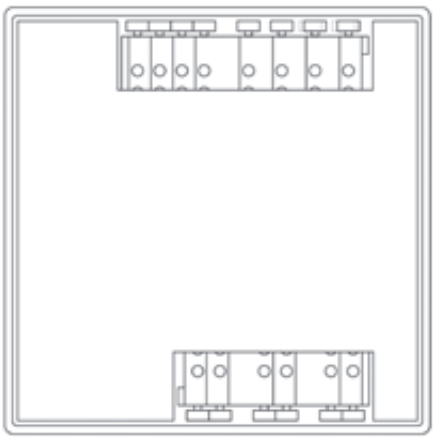


Illustration: Reverse side, panel cut-out dimensions:
92+0.8 x 92+0.8 mm.

UMG 96S – Universal flush-mounting measuring instrument

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

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.

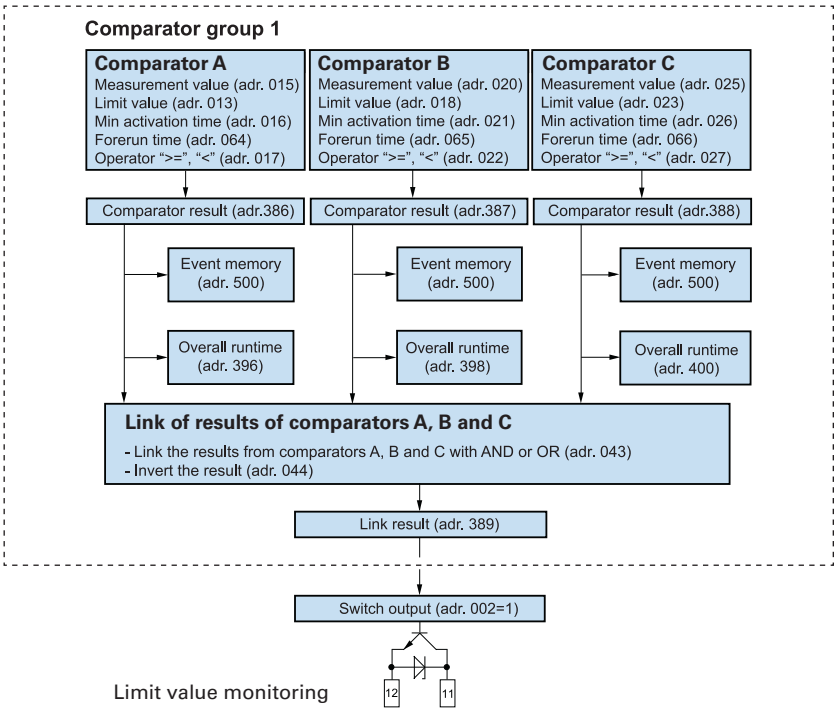
Analogue outputs

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 Modbus RTU. The switch outputs can also be set through the Profibus remote.

Integrated logic



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

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

Interfaces
- RS 232
- RS 485
- M-bus

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

Overview of product variants

Four phase universal measurement instrument; 50/ 60Hz; current transformer ../1/5A; including GridVis programming and analysis software													
Selectable activation*1			Selectble 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*3	Auxiliary voltage: 24V DC	**300V standard version** Measurement range: L-N 50 - 300V; AC 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	**52.13.017**
•	•	-	•	•	-	•	-	-	•	-	L-N: 140 .. 300V, AC	**52.13.025**
•	•	-	•	•	-	-	•	-	•	-	L-N: 140 .. 300V, AC	**52.13.045**
•	•	-	-	•	-	•	-	•	•	-	18 .. 70V DC, 18 .. 33V, 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	**52.13.018**
•	•	-	•	•	-	•	-	-	-	•	L-L: 85 .. 260V, AC	**52.13.026**
•	•	-	-	•	-	•	-	•	-	•	18 .. 70V DC, 18 .. 33V, auxiliary voltage	**52.13.031**

• = Included – = Not included

*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 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 - 2.5mm², 1.5mm²
Protection class (front/reverse)	According to EN60529	IP 50/20

Measurement accuracy

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

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, 3 ph 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

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

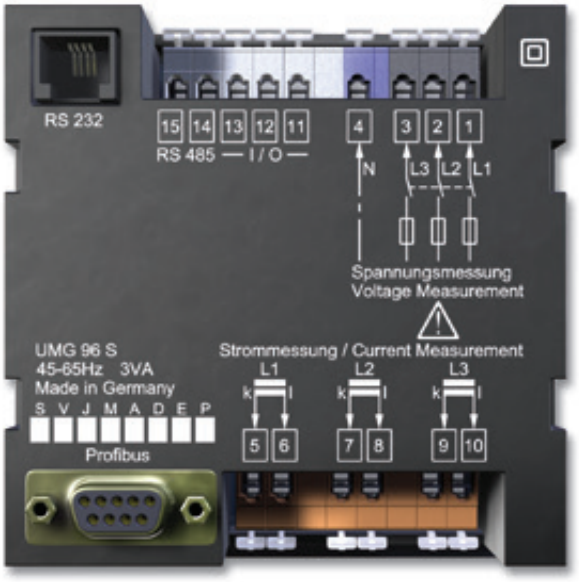
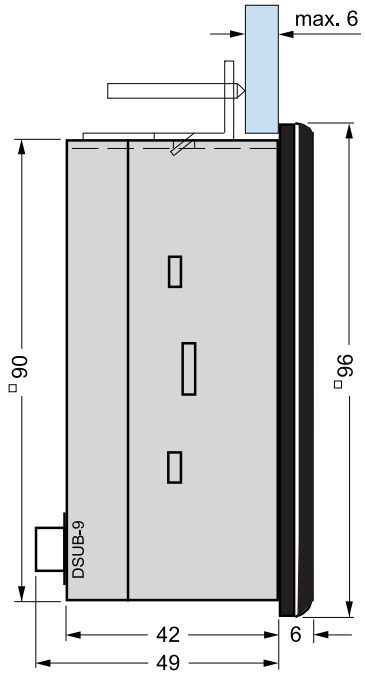


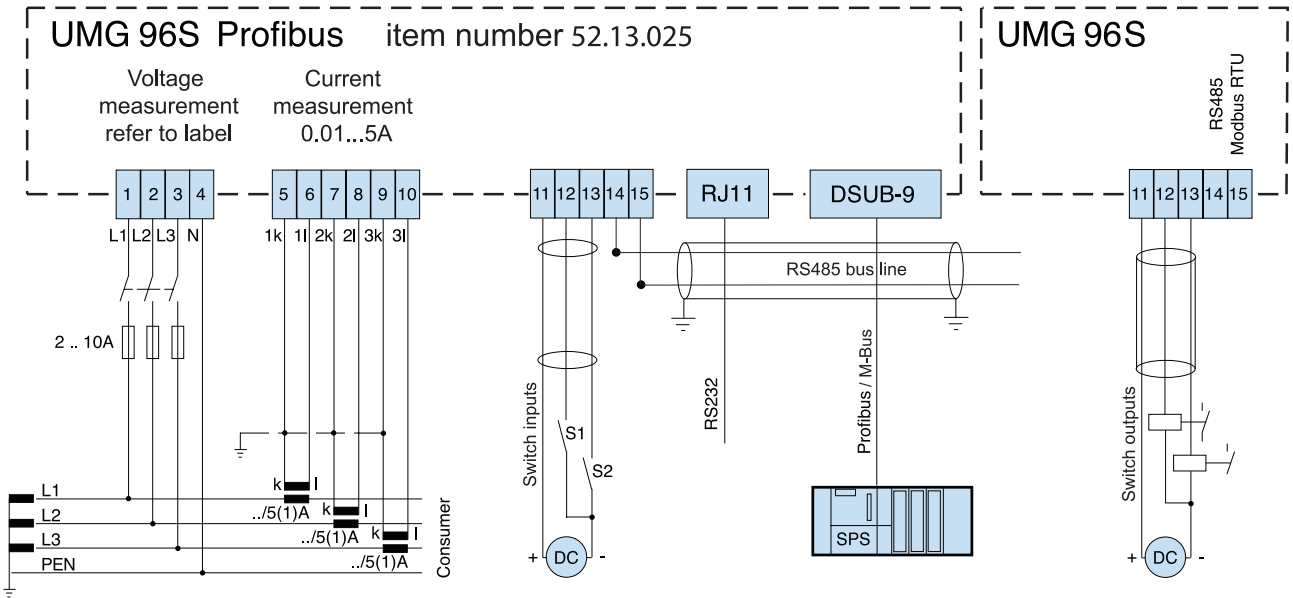
Illustration: reverse side of Profibus-Variant

Dimensional drawing



Switchboard cut-out 92 x 92mm. All dimensions in mm.

Profibus option /Typical connection options



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

UMG 96S without option

UMG 96RM – Universal measurement instrument

Unrivalled in its class

The UMG 96RM is a very compact and powerful universal measurement device, mainly designed for use in low and medium voltage distribution systems.

In addition to the large quantity of electrical measurement values, this innovative measurement instrument offers a multitude of additional functions such as for example the measurement of harmonics up to the 40th order. The continuous sampling with 21.3 kHz enables a detection of the measured values in high resolution and thus provides an effective energy management tool for fault analysis and for monitoring power quality.

Areas of application

- For measuring, monitoring and checking electrical parameters in energy distribution systems
- Recording of load profiles for energy management systems (e. g. ISO50001, EN16001)
- Collection of energy consumption data for cost centre analysis
- Measurement value generator for building management systems or PLC (Modbus)
- Monitoring of power quality characteristics, e.g. harmonics up to the 40th order

UMG 96RM – Compact high performance

The compact and powerful multi-function measurement device for energy measurement.

The UMG 96RM is equipped with a powerful, innovative microprocessor. The sampling rate of all measurement channels at 21.3/25.6 kHz enables a continuous measurement and acquisition of several hundred measurement values in high resolution. The most up-to-date microprocessor technology, components with tight tolerance values, decades of design and production experience and prime firmware assure a very high measurement accuracy and reliability for the UMG 96RM.

Main features

- Measurement in IT and TN grids
- LCD-Display with backlight
- True RMS measurement (TRMS)
- Continuous sampling of voltage and current inputs with 21.3 kHz or 25.6 kHz
- Harmonic analysis up to the 40th order
- 7 Energy meter for L1, L2, L3 and sum
- 8 tariffs
- High measurement accuracy, effective energy class 0.5; accuracy U 0.2% and I 0.5%
- RCM (Option)
- High reliability and long lifespan
- Including extensive package of GridVis software
- up to 6 current inputs

The UMG 96RM collects the electrical energy consumption, electrical standard characteristics such as current, voltage, frequency, power and power quality characteristics, e.g. harmonics, up to the 40th order. The high measurement accuracy, compact construction, extensive measurement data, multi-faceted protocol for integration into upstream systems as well as the economical design result in the UMG 96RM being unrivalled.

Applications

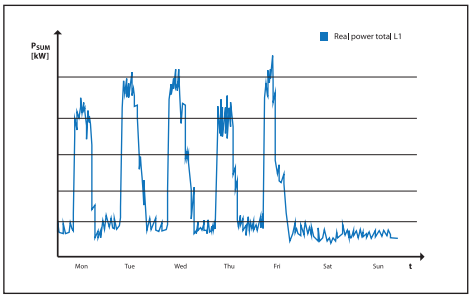
The UMG 96S is a measurement instrument of the newest generation which is suitable for measuring, recording and monitoring electrical parameters (True-RMS) in low and medium voltage networks (1 and 3-phase systems with a neutral conductor).

One of the characteristics of this measurement instrument is the compact construction (96x96 mm), the LCD backlight and the measurement of harmonic currents and voltages in each conductor. The voltage measurement inputs are designed for the measurement in low voltage networks in which nominal voltages up to 300V against ground and surge voltages up to over voltage category III can occur.

An uncomplicated system integration (energy management system, PLC, SCADA, BMS) is assured through a multitude of interfaces and protocols. The GridVis software, which is included as part of the deliverables, is the basis for energy management systems and power quality investigations.

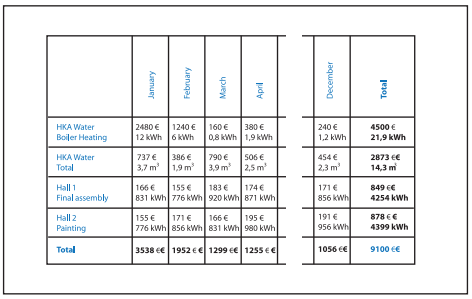
Typical applications

In order to achieve a sustainable reduction in energy costs, an overview of the energy consumption and the energy flows in the electrical system is first required. Whether for the build-up of energy management systems (ISO 50001/EN16001), the cost centre management or the monitoring of the power quality, the universal measurement devices from the UMG 96RM range are the basis for every application.



Energy data acquisition & load profile

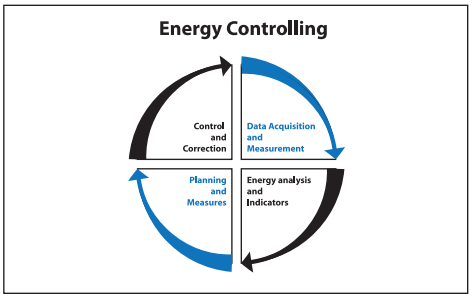
With the help of the UMG 96RM detailed acquisition of energy data and the load profile is a simple task within the scope of energy analysis. This is essential for tracking energy efficiency and the safe design of the energy distribution systems.



	January	February	March	April	December	Total
HKA Water Boiler Heating	2480 € 12 kWh	1240 € 6 kWh	160 € 0,8 kWh	380 € 1,9 kWh	240 € 1,2 kWh	**4500 € 21,9 kWh**
HKA Water Total	737 € 3,7 m³	386 € 1,9 m³	790 € 3,9 m³	506 € 2,5 m³	454 € 2,3 m³	**2873 €€ 14,3 m³**
Hall 1 Final assembly	166 € 831 kWh	155 € 776 kWh	183 € 920 kWh	174 € 871 kWh	171 € 856 kWh	**849 €€ 4254 kWh**
Hall 2 Painting	155 € 776 kWh	171 € 856 kWh	166 € 831 kWh	195 € 980 kWh	191 € 956 kWh	**878 €€ 4399 kWh**
Total	**3538 €€**	**1952 €€**	**1299 €€**	**1255 €€**	**1056 €€**	**9100 €€**

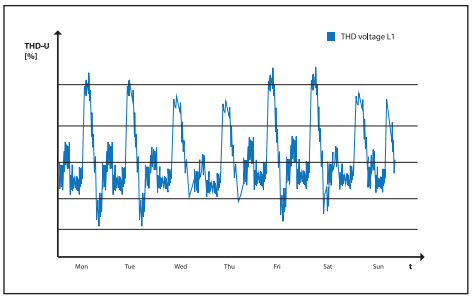
Cost centre analysis

It is becoming more and more important in industrial enterprises to be able to assign energy costs to particular products and to be able to determine the breakdown and allocation of energy costs to charge them to the individual processes and consumers. This also allows employees to focus on specific cost optimisation and conservation of energy.



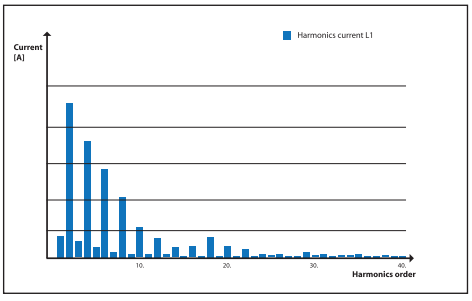
Energy management systems (ISO 50001/EN 16001)

Energy management systems per standard ISO50001/EN16001 are essential for continuous improvements in energy efficiency and reduction of costs. Universal measurement devices from the UMG 96RM range are an important constituent part of energy management systems, which can also secure tax breaks (e. g. in germany) amongst other benefits.



Transparency of energy supply

A higher degree of transparency can be attained through a multi-stage and scalable measurement system within the scope of energy measurement technology. Only by means of continuous measurement with high resolution meters, sporadic events can be analysed and corrective solutions identified.



Power quality monitoring

The UMG 96RM gives indispensable information about insufficient power quality and enables measures to be undertaken to address grid problems. This result is the prevention of production drop-outs, significantly longer service life for the manufacturing resources and thus an improved sustainability for the investment associated with them.

Variants of UMG 96RM

The UMG 96RM is available in different versions to meet the various application specific market requirements. The differences between the variants are primarily with the interfaces, protocols and configuration of the inputs and outputs. The basic device is already comprehensively equipped with a fast RS485 interface with Modbus protocol and 2 digital outputs.

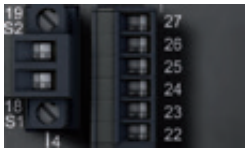
Basic device

The fast RS485 interface with the Modbus protocol and the 2 digital outputs allows a quick and cost-effective monitoring of the power quality and energy consumptions.

Profibus and digital IOs

The Profibus connection is particularly used in systems where the UMG 96RM is to be incorporated into the automation environment (PLC controllers).

Temperature input and analogue output

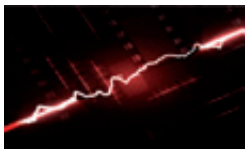


A multitude of inputs and outputs enable effective integration into upstream systems. Low voltage distribution systems, the transformer or the server cabinet can be protected from over-temperature simultaneously by means of the temperature input.

M-Bus

The M-Bus field bus connection for the acquisition of consumption data collection from various different consumption meters, such as water, gas, heat or electrical current. The UMG 96RM can be simply and cost-effectively integrated into economical consumption data acquisition systems via the M-Bus connection.

4th current transformer input



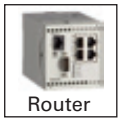
The increasing proportion of non-linear loads leads to increasing pollution effects on the grid, in particular overloading of the neutral conductor by harmonic currents. The N-line can be continuously monitored through the 4th current input.

Ethernet (TCP/IP)

Increasingly communications are moving from typical field bus to Ethernet (TCP/IP). The UMG 96RM Ethernet connection guarantees a simple integration into the network and a fast and reliable communications architecture.

Digital IOs

Along with network transparency Smart Grid stands for the active control of energy flows and power. In addition the UMG 96RM offers a multitude of configurations for IOs for intelligent integration and control tasks.


Router


SPS

Software

Networks
- TN, IT networks
- 3 phase and 4 phase networks
- Up to 4 single phase networks

Interface
- RS 485
- Profibus (Option)
- M-Bus (Option)
- Ethernet (Option)
- USB (Option)

4 digital inputs (Option)
- Pulse input
- Logic input
- Status monitoring
- HT/LT conversion

6 digital outputs (Option)
- Pulse output kWh/kvarh
- Switch output
- Limit value output
- Logic output
- Remote over Modbus / Profibus

3 digital inputs-/outputs (UMG 96RM-E)
- Either inputs or outputs

2 analogue inputs (UMG 96RM-E)
- Analogue, temperature or RCM inputs

Temperature measurement input
- PT 100, PT 1000 (Option)

Memory
(Basic unit: without data memory, energy, min and max values are stored in the EPROM)
- 256 MB Flash

Communication
- Modbus (RTU)
- Profibus DP/V0 (Option)
- TCP/IP (Option)

Power quality
- Harmonics up to 40th
- THD-U
- THD-I
- Unbalance

Measurement accuracy
- Class: 0.5S (.../5A) class
- Current: 0,5 %
- Voltage: 0,2 %

Overview of product variants

Three/four phase power analysers; 50/60Hz; current transformer .../1/5A; including GridVis programming and analysis software														
								Interfaces						
Supply voltage**: 95...240 V AC, 80...340 V DC ±10% vof nominal range	Digital inputs	Digital-/ pulse output	Digital inputs/outputs (either 3 inputs or 3 outputs)	Analogue inputs Temperature/ residual current, combinable	4th current transformer input	Memory size	Clock an battery	RS 485	Profibus	M-Bus	Ethernet 100baseT	USB	Type	Item number
•	-	2	-	-	-	-	-	•	-	-	-	-	**UMG 96RM**	**52.22.001**
•	4	6	-	-	•	256 MB*	•	•	•	-	-	•	**UMG 96RM-P**	**52.22.002**
•	-	2	-	-	-	-	-	-	-	•	-	-	**UMG 96RM-M**	**52.22.003*1**
•	-	2	3	2	•	256 MB*	•	•	-	-	•	-	**UMG 96RM-E**	**52.22.004**
•	4	6	-	-	•	256 MB*	•	•	-	-	-	•	**UMG 96RM-CBM**	**52.22.005**
•	-	-	-	-	-	-	-	-	-	-	•	-	**UMG 96RM-EL**	**52.22.040*2**
Accesories														
Fastening clamps for UMG 96 RM (52.22.001), UMG 96 RM-M (52.22.003) and UMG 96RM-EL (52.22.006). Clamps for fastening the measurement instrument - with front panel thickness from 6 mm or with heavy vibrations.														**52.22.251**

• = Contained – = Not possible

*1 available from 1st quarter 2013 *2 available from 2nd quarter 2013 * 192 MB available for recordings **Optional additional auxiliary voltages.
For parameterization of the basic unit (item-no. 52.22.001) is an interface converter and the software GridVis recommended.

Features

Three wire/Four wire		yes/yes
Sampling frequency		21.33 / 25.6 kHz
Energy tariffs		4 x kWh / 4xkVArh
Harmonics		1..40th
Distortion factor THD-U / THD-I in %		yes
Imbalance		yes
Clock		+/- 1 min per month
Operating hour meter		yes

Communication

Interfaces	RS 485	9.6, 19.2, 38.4, 57.6, 76.8, 115.2, 921.6 kbps	yes, not M andEL
	Profibus DP	Plug, sub D 9-pole up to 12Mbps	yes, Version P
	M-Bus		yes, Version M
	Ethernet	RJ45-sockets	yes, Version E and EL
	USB		yes, Version P and CBM
	Webserver		yes, Version E
Protocols	Modbus RTU		yes, not M and EL
	Profibus DP V0		yes, Version P
	Modbus TCP/IP		yes, Version E and EL
	Modbus over TCP		yes, Version E
	Modbus-Gateway		yes, Version E
	HTTP	Homepage (configurable)	yes, Version E
	SMTP	E-Mail	yes, Version E
	SNMP		yes, Version E
	SNTP	Time synchronisation	yes, Version E
	TFTP	Automatic configuration	yes, Version E
	FTP	File Transfer	yes, Version E
	DHCP		yes, Version E

General technical data

Nominal voltage	3-phase 4-wire grid (L-N, L-L)	277/480 V AC
	3-phase 3-wire grid (L-L)	480 V AC
Overvoltage category		300 V CAT III
Quadrants		4
Continuous measurement		yes
Scanning rate 50/60 Hz	Per channel	21.33 / 25.6 kHz
Mounting		Front panel installation
Working temperature range		-10…55 °C
Connectable conductor (U/I)	Single wire, multi-wire, fine-wire	0.08 - 2.5 mm^2
	pin cable lugs, ferrule	1.5 mm^2
Protection class	According to EN 60529	IP 20

Measurement values

Measurement parameter	Display range	Measurement range at scaling factor 1	L1	L2	L3	Sum	Lowest value	Average value	Maximum value	Measurement accuracy
Current	0 .. 9999 kA	0 .. 5 A	•	•	•		•	•	•	+-0.5 %
Current calculated in N	0,03 .. 9999 kA	0.03 .. 25 A				•	•	•	•	+-1.0 %
Voltage L-N	0 .. 9999 kV	10 .. 300 V	•	•	•		•	•	•	+-0.2 %
Voltage L-L	0,0 .. 9999 kV	18 .. 520 V	•	•	•		•	•	•	+-0.2 %
Frequency (U)	45,00 .. 65,00 Hz	45.00 .. 65.00 Hz	•							+-0.05 %
Effective power per phase	0 W .. 9999 GW	0 W .. 1.8 kW	•	•	•			•	•	+-0.5 %
Apparent power per phase	0 VA .. 9999 GVA	0 VA .. 1.8 kVA	•	•	•			•	•	+-0.5 %
Reactive power per phase	0 var .. 9999 Gvar	0 var .. 1.8 kvar	•	•	•			•	ind.	+-1.0 %
Effective power, sum	0 W .. 9999 GW	0 W .. 5.4 kW				•		•	•	+-0.5 %
Apparent power sum	0 VA .. 9999 GVA	0 VA .. 5.4 kVA				•		•	•	+-0.5 %
Reactive power, sum	0 var .. 9999 Gvar	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 0.5(5A)
Reactive energy, inductive	0 .. 999,999,999 kvarh					•				Class 1(5A)
Operating hour meter	0 .. 999,999,999 h					•				+-2 min per day

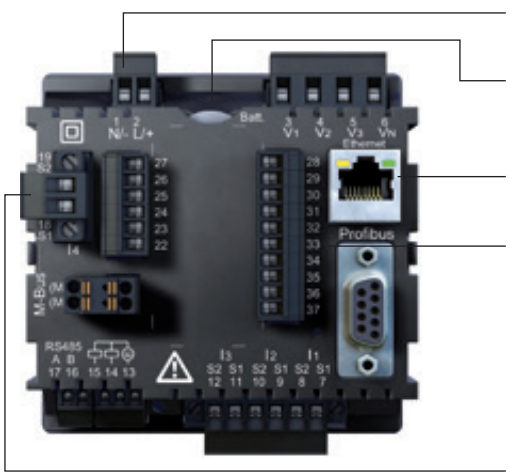
Power quality

Harmonics, 1-40 harmonic	Current, voltage L1, L2, L3	Accuracy class 1
Distortion factor THD-U in %	L1, L2, L3	Accuracy class 1
Distortion factor THD-I in %	L1, L2, L3	Accuracy class 1
Recorder for threshold events		yes, for units with memory

Peripherie

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

Combination of the various variants



External power supply with wide voltage range.

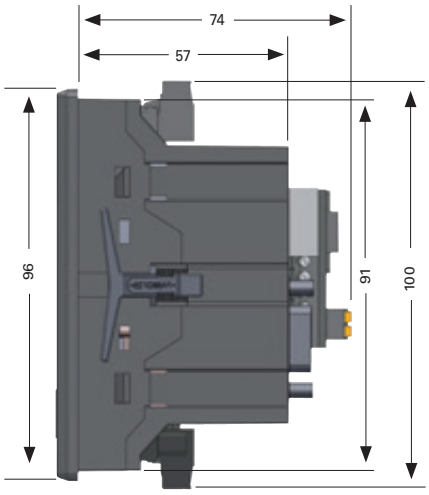
The external battery compartment enables the battery to be replaced whilst the system is running.

Ethernet connection for fast and secure integration into the network, or USB-connector for configuration.

The large number of digital inputs and outputs (up to 4 x IN and 6 x OUT) enables the integration of subordinate measurement points in the same way as the UMG 96RM is integrated into upstream systems.

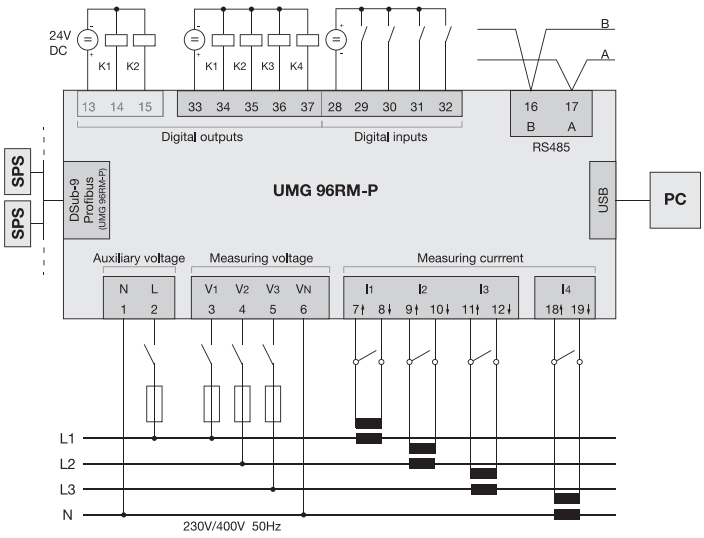
The 4th current transformer input enables monitoring of the N-line or a 4th single phase load.

Dimensional drawing



All dimensions in mm.

Typical connection option (UMG 96RM-P)



The compact...

...particularly for applications with tight spaces. The shallow installation depth enables integration even where space is limited, for example in subdistribution panels. Installation and connection costs can be substantially reduced due to the user-friendly construction.

Side and rear views are showing each a combination of the various variants just to indicate overall dimensions, as well as placement of interfaces and connectors. For the specific design of an individual variant please refer to our operation manual.

UMG 503 – Digital measurement

Power analysers of the UMG 503 product family are mainly designed for use in low and medium voltage distribution systems. The large display in 144 x 144mm housing, the higher accuracy level and the extended measurement range allows universal applications. Additional functions such as the measurement of harmonics, the recording of minimum and maximum values, the relay outputs, pulse and analogue outputs, 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) enable communication of the measurement data and incorporation in extensive energy management systems. The integrated logic enables the analysis of measurement data and the introduction of concrete measures.

Areas of application

- Measurement, monitoring and controlling of electrical parameters in energy distribution systems
- Recording of load profiles for energy management systems
- Collection of energy consumption data for cost centre analysis
- Measurement value generator for building management systems or PLC (Modbus)
- Monitoring of harmonics, limit value monitoring

UMG 503

The universal power analyser

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 due to lower installation costs and less wiring efforts in comparison to analogue measuring technology. Universal measuring instruments of the UMG 503 product family are mainly designed for use in low and medium voltage distribution systems.

Main features

- Large measurement and display range
- A large display in 144x 144mm housing
- RS232, RS485 interface
- Field bus: Modbus
- Harmonics display
- 2 relay outputs (mechanical relay)
- Digital I/O and analogue outputs
- Integrated logic for alarm signals
- High reliability and long lifespan

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 bi-metallic strip function, password protection and many more. Due to the large display, the wide measurement range and the high accuracy level, the UMG 503 power analyser is very popular in low voltage main distribution panels. 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. The integrated harmonics analysis becomes more significant with increasing network pollution (increasing THD-U values).

Applications

The UMG 503 is a digital flush-mounted measurement instrument which is suitable for measuring and recording electrical parameters (True-RMS) in low and medium voltage networks. The measurement is suitable for 1- and 3-phase systems with and without neutral conductors. At a mains frequency of 50 Hz, the scanning frequency of random measurements, which takes place twice per second, is 6.4 kHz. It is characterised by the high accuracy level, the compact construction and the measurement of harmonics in each phase.

In order to achieve the functional diversity of the universal measurement instrument, you would need around 13 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 clock, a frequency meter and a harmonic analyser. This means that the planning, installation, wiring and storage costs are significantly reduced for the UMG 503 in comparison to analogue measuring instruments. Another advantage is the more accurate and better legibility. Selected measurement values and power failure/power return are recorded in a ring buffer with time stamp.

Data memory
A ring buffer for 80,000 or 320,000 measurement values (depending on the variant) is available for storing the selected average values. With the factory settings, average values of U1, U2, U3, I1, I2, I3, P1, P2 and P3 are stored using an average time of 15 minutes for approximately 1 year for variants with 512 k RAM (approximately 3 months for types with 128k RAM).

A total of six limit value windows for storing measurement values can be programmed. The upper and lower limit values can be freely selected. The recording can take place within or outside of the range.

Measurement value displays and automatic display rotation
The extremely well legible LCD data field in connection with the function keys informs the user about the selected measurement values (current, low, high and average values). With the UMG 503, three measurement values can be simultaneously displayed in the LCD data field and up to 140 data fields can be individually designed with the GridVis software. A cycle between 1 and 9999 seconds can be set and a selection of measurement values can be made.

Power values and cos φ

Currents

THD-U

Voltage transformer

Bi-metallic strip function
The bi-metallic strip function is recreated for the three external conductor currents. These values can be integrated in the stated times and be recorded as highest average values.

Summer/winter time switch
The following options can be selected:

a) No switchover
b) Own switchover point
c) EU listed switching

Event memory
The following events can be registered in the event memory:

- Deletion of the event memory
- Relay outputs on/off
- Failure and return of the auxiliary voltage
- Failure and return of the measurement voltage

Interfaces
The communication interfaces of the UMG 503 which are configured in accordance with the EIA RS485 standard (half duplex) support the Modbus RTU in integer format. The communication protocol can be selected by using the menu.

In the Modbus RTU mode, baud rates from 9.6 kBit/s to 115 kBit/s are supported (depending on the design version). The register addresses are available to the PLC user in integer format.

Pulse output[*4]
The pulse output delivers the effective or reactive energy in current pulses. The minimum pulse length is 50ms.

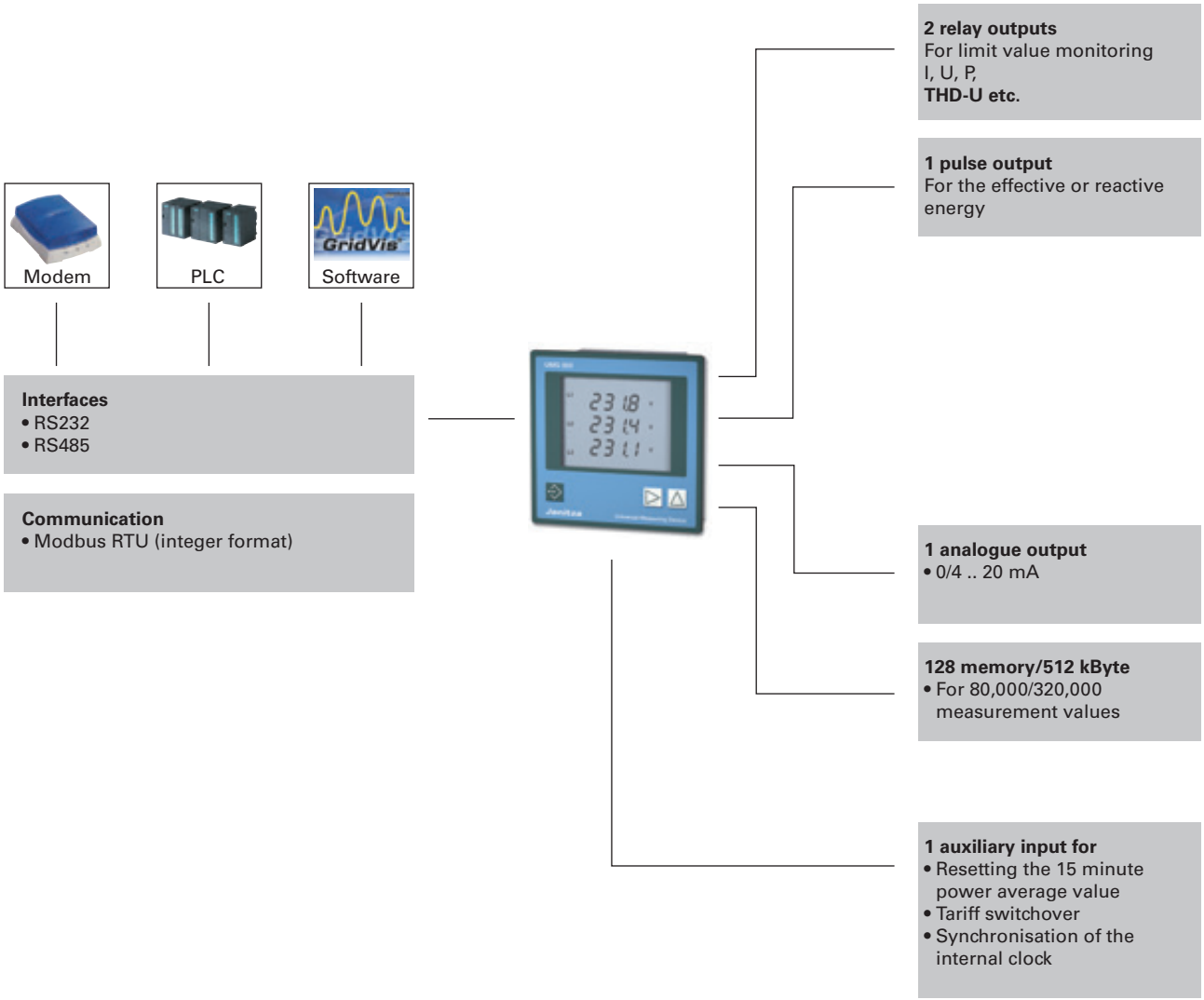
Relay outputs[*4]
The relay outputs K1 and K2 can be used for monitoring limit values. Each relay output can be linked with a measurement value and (recorded with date and time) can be stored if the value is not achieved or is exceeded. A minimum initialisation time can be programmed for each relay output to avoid excessively frequent switching.

Auxiliary input[*4]
The auxiliary input can be programmed for the following functions:

OFF = auxiliary input is not used
1 = reset of the 15 minutes power average value
3 = synchronisation of the internal clock

*4 refer to product variant

Scope of operation and types of variants



Overview of product variants

Three/four-phase universal measurement instruments 50/60Hz; current transformer...1/5A;including GridVis programming and analysis software													
Auxiliary voltage								Interfaces					
85 .. 250V AC, 80 .. 370V DC	40 .. 115V AC, 55 .. 165V DC	15 .. 55V AC, 20 .. 80V DC	Memory 128k RAM	Memory 512k RAM	Relay output	Pulse output	Analogue output 0(4) -20mA	RS 232	RS 485	Auxiliary input	3-phase measurement	Type	Item number
•	-	-	•	-	-	-	-	•	-	-	o	**UMG 503 L**	**52.07.017**
•	-	-	•	-	-	-	-	-	•	-	o	**UMG 503 LS**	**52.07.028**
•	-	-	•	-	-	-	-	-	•	-	o	**UMG 503 S**	**52.07.008**
•	-	-	-	•	•	•	•	•	•	•	•	**UMG 503 V**	**52.07.001**
-	•	-	-	•	•	•	•	•	•	•	•	**UMG 503 V**	**52.07.014**
-	-	•	-	•	•	•	•	•	•	•	•	**UMG 503 V**	**52.07.005**
•	-	-	-	•	o	o	o	•	•	o	o	**UMG 503 OV**	**52.07.006**

• = Contained – = Not possible o = Option which can be supplied with the unit (each option is only possible once)

Options for the units (release code)

Relay outputs (min/max)	OV	**52.07.051**
Pulse output for effective or reactive energy	OV	**52.07.052**
Analogue output 0(4) – 20mA	OV	**52.07.053**
Auxiliary input	OV	**52.07.056**
Three-phase measurement	L/LG/LS/S/OV	**52.07.058**

GridVis software

The UMG 503 power analysers contains the GridVis software upon delivery. On one hand, this software enables simple and complete parameterisation of the respective measurement instruments and on the other hand, it can download the measurement value memory in the unit where available. In GridVis, the data is stored in a database and can be processed in MS Excel for example. More information is available in chapter 5 – "software".

General technical data

Operating voltage L-N, AC		Refer to order details
Overvoltage category		600V CAT III
Quadrants		4
Scanning rate 6 channel	Per channel	6.4 / 7.68 kHz
Weight		1kg
Dimensions		W=144mm x H=144mm x D=66.5mm
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

Measurement range

Voltage L-N, AC (without voltage transformer)		50…500VAC
Voltage L-L, AC (without voltage transformer)		80…870VAC
Current (transformer: x/1 and x/5 A))		0,005...6A
Frequency of mains		45...65Hz
Grid types		TN, TT, (IT)
Measurement in single and multi-phase networks		1ph, 2ph, 3 ph 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	Date/Time	Measure-ment accuracy
Current .. /5A	0.000 .. 9999 A	0.005 .. 6 A	•	•	•		•	•	•	•	+-0.2 %
Current .. /1A	0.000 .. 9999 A	0.005 .. 1 A	•	•	•		•	•	•	•	+-0.2 %
Current, neutral wire	0.000 .. 9999 A	0.060 .. 15 A				•	•	•		•	+-0.6 %
Voltage L-N	0.0 .. 999.9 MV	50 .. 500 V	•	•	•		•	•	•	•	+-0.2 %
Voltage L-L	0.0 .. 999.9 MV	80 .. 870 V	•	•	•		•	•	•	•	+-0.2 %
Frequency (U)	45.00 .. 65.00 Hz	45.00 .. 65.00 Hz						•		•	+-0.2 %
Effective power +/-	0.00 W .. 9999 MW	0.05 W .. 2.5 kW	•	•	•	•	•	•	•	•	+-0.5 %
Apparent power	0.00 VA .. 9999 MVA	0.05 VA .. 2.5 kVA	•	•	•	•	•	•	•	•	+-0.5 %
Reactive power	0.00 kvar .. 999 Mvar	0.05 var .. 2.5 kvar	•	•	•	•	kap.	•	ind.	•	+-0.5 %
Power factor	0.00 kap. .. 1.00 .. 0.00 ind.	0.00 kap. .. 1.00 .. 0.00 ind.	•	•	•	•	kap.	•	ind.	•	+-0.5 %
Effective energy + Effective energy -	0.0 Wh .. 9999 GWh -0.0 Wh .. -9999 GWh	0.05 Wh .. 9999 GWh*2 -0.05 Wh .. -9999 GWh*2				•		•		t^1/t^2	*3
Reactive energy +/-	0.0 .. 9999 Gvarh	0.05vars .. 9999 Mvarh*2				•		•		t^1/t^2	*3

t^1: start time, t^2: runtime, + purchase, - supply, *1 - integration over time: 5, 10, 15, 30 seconds, 1, 5, 10, 15, 30, 60 minutes, *2 memory period 60 minutes, *3 accuracy class according to EN61036:1996, VDE0418 part 7: May 1997, IEC1036:1996, with current transformer ../5A : class 1, with current transformer ../1A : class 2

Power quality

Harmonics, 1st to 20th harmonics, even/uneven	Current, voltage L1, L2, L3	Accuracy: ± 0.5%
Distortion factor THD- U in %	L1, L2, L3	Accuracy: ± 0.5%
Distortion factor THD- I in %	L1, L2, L3	Accuracy: ± 0.5%
Recorder for limit value events		yes

Measurement accuracy

Reactive energy kvarh	Class	1
Effective energy kWh	Class	1

Periphery

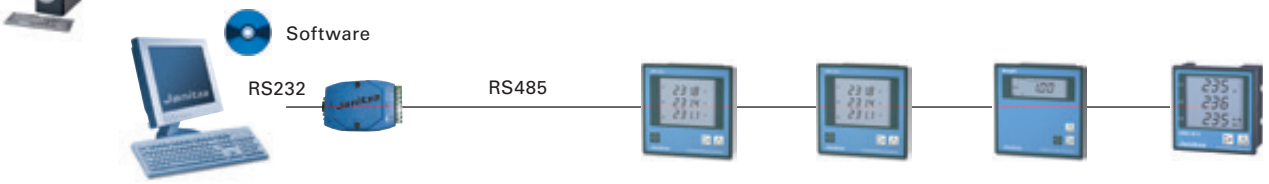
Digital inputs (auxiliary input)	As a status input	1, refer to order details
Relay outputs	As a switch output	2, refer to order details
Pulse outputs		1, refer to order details
Analogue outputs	(0) 4...20mA	1, refer to order details
Password protection		yes
Software GridVis	**Refer to chapter 5**	**yes**

Communication

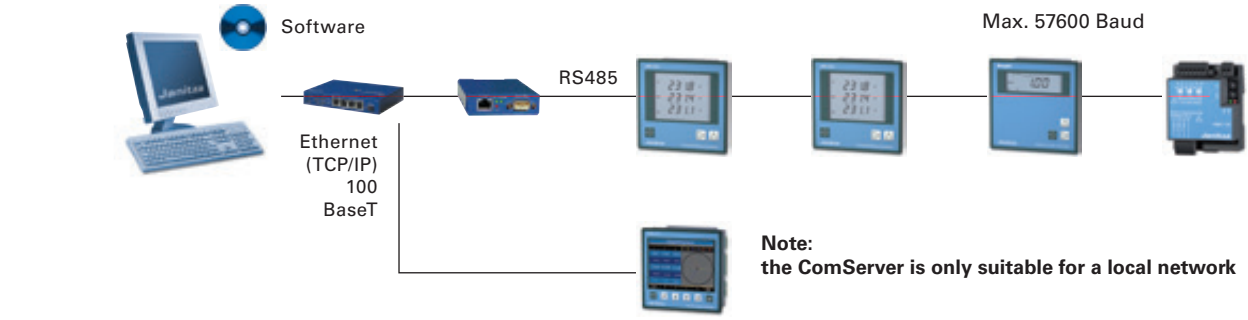
Interfaces		
RS 232	9.6, 19.2, 38.4 kbps	Yes, refer to order details
RS 485	9.6, 19.2, 38.4, 57.6, 115,2 kbps, 1.5 Mbs	Yes, refer to order details
Protocols		
Modbus RTU	Up to 115,2 kbps	yes

PLC communication example ... 31 units (up to 255 units can be added using star repeater)

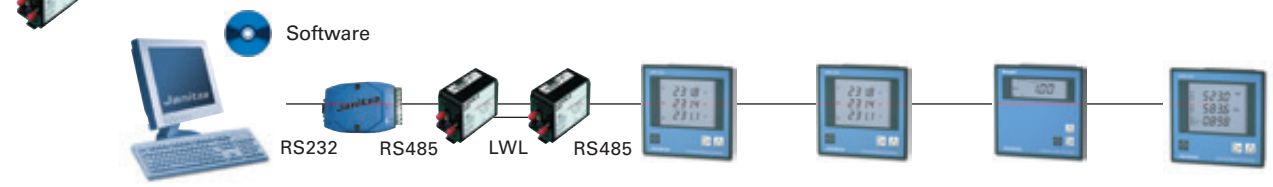
PC communication example ... 31 units (can be extended up to 255 units by star repeater)



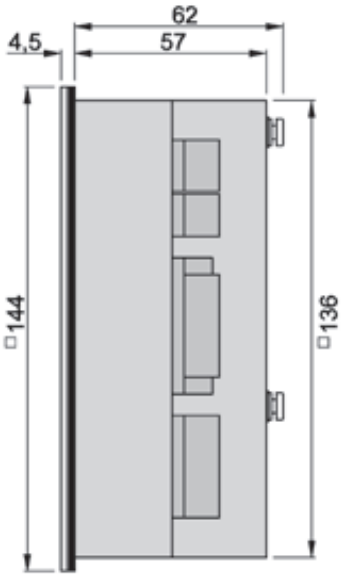
Com server (TCP/IP) example for local networks ... 31 units per ComServer



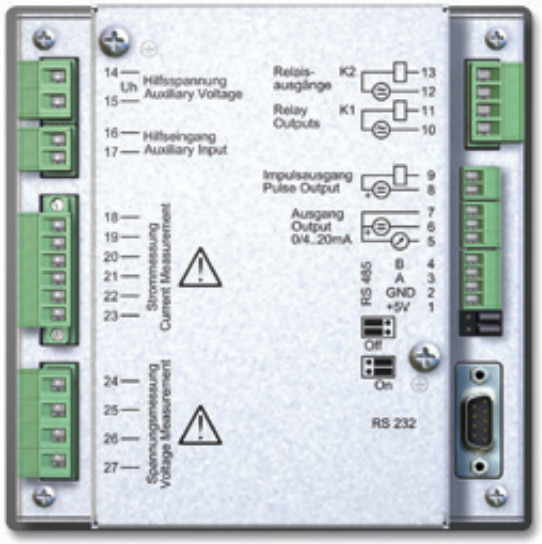
Fibre optic connection example ... 31units per line



Dimensional drawing

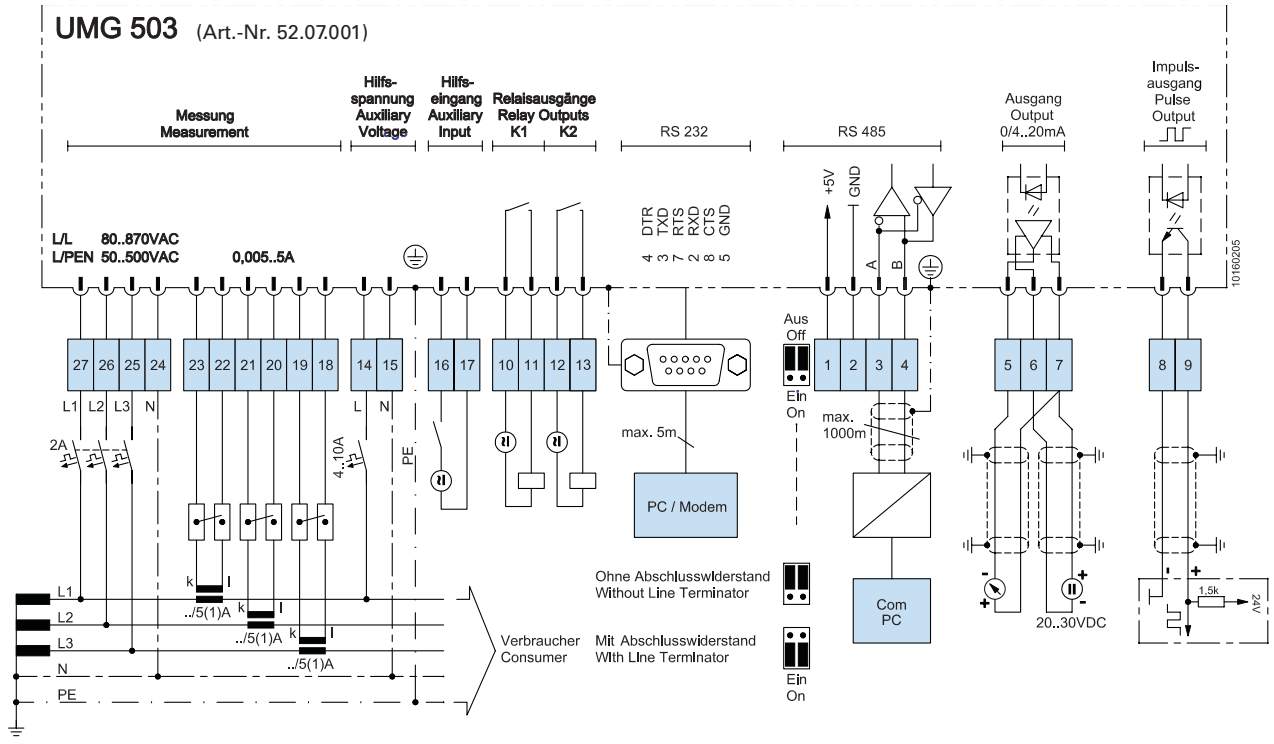


Connection illustration



Switchboard cut-out 139 x 139mm. All dimensions in mm.

Typical connection option



UMG 505 – Power analysis, LON and I/O-Vielfalt

Power analysers of the UMG505 product family are mainly designed for use in low and medium voltage distribution systems. Due to the additional communication options using LON, this power analyser is often used in building management systems. The large number of digital and analogue inputs and outputs (4 DI, 5DO, 4AO) enables the incorporation in monitoring systems, control tasks, information reports, the communication of measurement data (e.g. energy consumption) at a control point and incorporation in an extensive energy management system. Additional functions such as the measurement of harmonics, the recording of minimum and maximum values, pulse and analogue outputs, the bi-metallic strip function, password protection and many more offers an effective tool for fault analysis and for monitoring power quality.

Areas of application

- Measurement, monitoring and control of electrical parameters in energy distribution systems
- Recording of load profiles for energy management systems (cost centre data collection)
- Measurement value generator for central building control systems or PLC
- Monitoring of harmonics, limit value monitoring
- Control tasks e.g. depending upon achieved measurement values or limit values

UMG 505

LON for building services, analogue I/Os for control tasks

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 505 product family are mainly designed for use in low and medium voltage distribution systems.

Main features

- LON bus
- Harmonics display
- 4 analogue outputs
- 4 digital inputs, 5 digital outputs
- Integrated logic for control tasks and alarm signals
- Weekly time switch with 100 channels

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 bi-metallic strip function, password protection and many more. Due to the LON field bus, the UMG 505 is starting to find more applications in building services. The large number of digital and analogue inputs and outputs offers a variety of communication possibilities and allow connection to PLC controls and independent control tasks. The integrated harmonics analysis becomes more significant with increasing network pollution (increasing THD-U values).

Applications

The UMG 505 is a digital flush-mounted measurement instrument which is suitable for measuring and recording electrical parameters (True-RMS) in low and medium voltage networks. The measurement device is suitable for 1- and 3-phase systems with and without neutral conductors. At a mains frequency of 50 Hz, the scanning frequency of random measurements, which takes place twice per second, is 6.4 kHz. It is characterised by the high accuracy level, the compact construction and the measurement of harmonics in each phase.

In order to achieve functional variety of the UMG 505, you would need around 13 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 clock, a frequency meter and a harmonic analyser. This means that the planning, installation, wiring and storage costs are significantly reduced with the UMG 505 in comparison to analogue measuring instruments. Another advantage is the more accurate and better legibility. Selected measurement values and power failure/power return are recorded in a ring buffer with time stamp.

Measurement value displays and automatic display rotation
The extremely legible LCD display in connection with the function keys informs the user about the selected measurement values (actual, low, high and average values). With the UMG 505, three measurement values can be simultaneously displayed in the LCD data field and up to 140 data fields can be individually designed with the GridVis software. A cycle between 1 and 9999 seconds can be set for measurement value rotation and a selection of measurement values can be made.

Memory
The memory of the UMG 505 is split into three areas: the event memory, the lowest and highest memory and the ring buffer.

Event memory
The following events can be stored in the event memory with time and date:

- Deletion of the event memory
- Changes to the digital input
- Failure and return of the auxiliary voltage
- Failure and return of the measurement voltage

Up to a maximum of 9999 events can be stored. The data can only be read out with the PC and the GridVis software.

Ring buffer
The following can be selected for storage in the ring buffer:

- Average of measurement values
- The fixed energy meters

When storing the average values of U1, U2, U3, I1, I2, I3, P1, P2 and P3 using an average time of 15 minutes, the memory is sufficient for a period of 1 year. A total of six limit value windows for storing measurement values can be programmed. The upper and lower limit values can be freely selected. The recording can take place within or outside of the range.

Summer/winter time switch
The following options can be selected:
- No switchover
- Own switchover point
- EU listed switching

Weekly time switch
The time switch in the UMG 505 has 100 time channels. Each time switch channel specifies a period of time. The period of time is specified by the start-up point and the switch off point. The start and stop points are defined by weekdays, hour and minutes. Each time switch channel can simultaneously control a time switch output and select a consumption meter. A time switch output can be allocated to a “digital output” when programming the digital outputs.

Pulse input
Digital input 4 can also be used as a pulse meter input for the effective energy measurement (max 20Hz).

Digital inputs
The 4 optical coupler inputs are illustrated on the internal inputs 1 to 4. The eight inputs from the LON bus interface (option) are illustrated on the internal inputs 5 to 12. The status of the digital inputs 1-4 can be called up using the serial interface.

Each input channel can simultaneously switch a energy counter and synchronise the internal clock.

Two of each of the digital inputs can be linked with each other using AND. The results can be allocated to an input channel. Each digital input 1 to 4 is allocated to an event counter (1-3 max. 1Hz). If one of the digital inputs (1 to 4) is allocated a function, with the exception of pulse value, all changes are recorded with the date and time stamp in the event memory.

Digital output
The UMG 505 has five digital transistor outputs. These outputs are marked on the display with out1 to out5. Each of these outputs can be allocated to a different data source. There are up to 5 different data sources which can be selected:

- Limit value outputs
- Times switch outputs
- LON bus (option)
- Energy meter

Each data source can only be allocated to one output. If an output is allocated to a consumption meter, the output works as a pulse generator.

The signals from all data sources (except the consumption meter) can also be generated as inverted signals.

Pulse outputs
The five digital outputs in the UMG 505 can be assigned as pulse outputs. The minimum pulse length is 50ms and the maximum frequency is 10Hz.

Analogue outputs
The UMG 505 has 4 analogue outputs. The analogue outputs have common ground and are galvanically isolated from the other inputs and outputs in the UMG 505. An external auxiliary voltage of 20V to 30V DC is required to operate the analogue outputs. The sources for analogue outputs are:

- Measurement values
- Values which are sent to the UMG 505 through Modbus.

Interfaces
Depending upon the product variant, the UMG 505 is equipped with an RS485 LON and/or an RS232 interface. The RS232 interface serves as a peer-to-peer connection e.g. as a connection between the UMG 505 and a laptop. The protocol Modbus RTU is available through the RS485 which is used to network the UMG 505. The LON interface is frequently used in central building control systems in order to incorporate the UMG 505 in building automation.

Limit value monitoring
Five limit value outputs can be programmed to monitor the measurement values. Each limit value output can be allocated to up to 3 comparators (A, B, C). The following can be programmed for each comparator:

- 2 limit values and 2 measurement values or
- 2 limit values and 1 measurement value or
- 1 limit value and the minimum start-up time

Any limit value violations established by a limit value output is registered in the event memory with a record of the time and can also be issued on a "digital output".


Modem


PLC

Software

Interfaces
- LON
- RS232

Protocols
- LONTalk
- Modbus RTU (RS 232)

4 digital inputs
- Pulse input
- HT/LT switchover
- Clock synchronisation

5 digital outputs
- Limit value output for I, U, P etc.
- Remote using
- Pulse output effective/reactive energy
- Time switch output

4 analogue outputs
- 0 .. 20 mA or 4 .. 20 mA can be set
- Almost all measurement values
- Values from the Modbus

Limit value programming with 3 comparators
- Minimum start up time if the value is exceeded
- Minimum start up time if the value is not achieved
- Hysteresis if the value is exceeded
- Hysteresis if the value is not achieved
- Within range
- Outside of range
- Both limit values exceeded
- Both limit values not achieved

512k byte memory
- For 320,000 measurement values
- Event memory
- Lowest and highest values
- Ring buffer

Weekly time switch
- 100 channels
- Digital output
- Nominal value switchover HT / LT
- Energy meter, 4 tariffs

Overview of product variants

Three / four phase universal measurement instrument; 50/ 60Hz; current transformer ../1/5A; including GridVis programming and analysis software												
Auxiliary voltage							Interfaces					
85 .. 265V AC, 80 .. 370V DC	40 .. 115V AC, 55 .. 165V DC	15 .. 55V AC, 20 .. 80V DC	Memory 512k RAM	4 digital inputs	5 digital outputs	4 passive analogue outputs 0(4) – 20mA	LON	RS 232	RS 485	3-phase measurement	Type	Item number
•	-	-	•	•	•	•	•	•	-	•	**UMG 505 LON**	**52.10.001**
-	•	-	•	•	•	•	•	•	-	•	**UMG 505 LON**	**52.10.002**
-	-	•	•	•	•	•	•	•	-	•	**UMG 505 LON**	**52.10.003**

• = Included - = Not possible

General technical data

Operating voltage L-N, AC		Refer to order details
Overvoltage category		600V CAT III
Quadrants		4
Scanning rate 6 channels	Per channel	6.4 kHz / 7.68 kHz
Weight		1kg
Dimensions		W= 144mm x H=144mm x D=66.5mm
Mounting		Front panel installation
Working temperature range		-10…55 °C
Connectable conductors (U/I)	Single wire, multi-wire, fine-wire, pin cable lugs, ferrule	0.08 - 2.5 mm^2, 1.5 mm^2
Protection class (front/reverse)	According to EN60529	IP 50/20

Measurement range

Voltage L-N, AC (without voltage transformer)		50…500VAC
Voltage L-L, AC (without voltage transformer)		80…870VAC
Current (transformer: x/1 and x/5 A)		0.005...6 A
Frequency of mains		45...65 Hz
Grid types		TN, TT, (IT)
Measurement in single and multi-phase networks		1ph, 2ph, 3 ph and up to 3 x 1ph

Power quality

Harmonics, 1st to 20th harmonics, even/uneven	Current, voltage L1, L2, L3	Accuracy: ± 0.5%
Distortion factor THD- U in %	L1, L2, L3	Accuracy: ± 0.5%
Distortion factor THD- I in %	L1, L2, L3	Accuracy: ± 0.5%
Recorder for limit value events		yes

Measurement values

Measurement parameter	Display range	Measurement range at scaling factor 1	L1	L2	L3	Sum	Lowest value	Average value*1	Maximum value	Date/Time	Measure-ment accuracy
Current .. /5A	0.000 .. 9999 A	0.005 .. 6 A	•	•	•		•	•	•	•	+-0.2 %
Current .. /1A	0.000 .. 9999 A	0.005 .. 1 A	•	•	•		•	•	•	•	+-0.2 %
Current, calculated in neutral	0.000 .. 9999 A	0.060 .. 15 A				•	•	•	•	•	+-0.6 %
Voltage L-N	0.0 .. 999.9 MV	50 .. 500 V	•	•	•		•	•	•	•	+-0.2 %
Voltage L-L	0.0 .. 999.9 MV	80 .. 870 V	•	•	•		•	•	•	•	+-0.2 %
Frequency (U)	45,00 .. 65.00 Hz	45.00 .. 65.00 Hz	•	•	•		•	•	•	•	+-0.2 %
Effective power +/-	0.00 W .. 9999 MW	0.05 W .. 2.5 kW	•	•	•	•	•	•	•	•	+-0.5 %
Apparent power	0.00 VA .. 9999 MVA	0.05 VA .. 2.5 kVA	•	•	•	•	•	•	•	•	+-0.5 %
Reactive power	0.00 kvar .. 999 Mvar	0.05 var .. 2.5 kvar	•	•	•	•	kap.	•	ind.	•	+-0.5 %
Power factor	0.00 kap. .. 1.00 .. 0.00 ind.	0.00 kap. .. 1.00 .. 0.00 ind.	•	•	•	•	kap.	•	ind.	•	+-0.5 %
Effective energy + Effective energy -	0.0 Wh .. 9999 GWh -0.0 Wh .. -9999 GWh	0.05 Wh .. 9999 GWh*2 -0.05 Wh .. -9999 GWh*2				•		•		t^1/t^2	*3
Reactive energy +/-	0.0 .. 9999 Gvarh	0.05vars .. 9999 Mvarh*2				•		•		t^1/t^2	*3
Harmonic rateTHD U,I	0.0 .. 100 %	0.0 .. 100 %	•	•	•		•	•	•	•	+-0.5 %
Partial harmonic I, 2.-20.	0.000 A .. 9999 A	0.005 A .. 5A (1 A)	•	•	•		•	•	•	•	+-0.5 %
Partial harmonic U, 2.-20.	0.000 V .. 9999 V	0.000 V .. 9999 V	•	•	•		•	•	•	•	+-0.5 %

t^1: start time, t2: runtime, + purchase, - supply
*1 - integration over time: 5, 10, 15, 30 seconds, 1, 5, 10, 15, 30 and 60 minutes
*2 - memory period – 60 minutes
*3 - accuracy class according to EN61036:1996, VDE0418 part 7: May 1997, IEC1036:1996 with current transformer ../5A: class 1 with current transformer .../1A: class 2

Features

Memory size		512kB
Clock		± 3 minutes per month
Weekly time switch		Yes, 100 channels

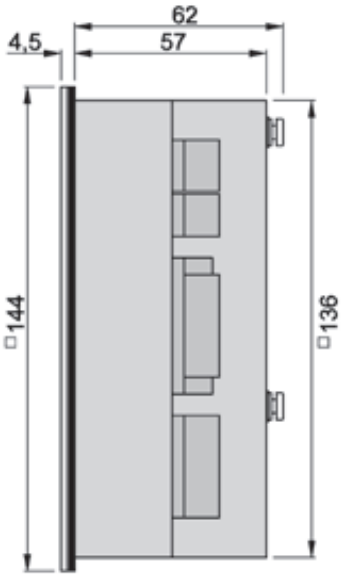
Periphery

Digital inputs	As a status input or pulse input	4
Digital outputs	As a switch output or pulse output	5
Analogue outputs	0(4)...20mA	4
Password protection		yes
Software GridVis	**Refer to chapter 5**	**yes**

Communication

Interfaces		
RS 232	9.6, 19.2, 38.4 kbps	Yes, refer to order details
LON		Yes, refer to order details
Protocols		
Modbus RTU		yes
LonTalk		Yes, refer to order details

Dimensional drawing



Switch board cut-out 139x139 mm. All dimensions in mm.

Connection illustration

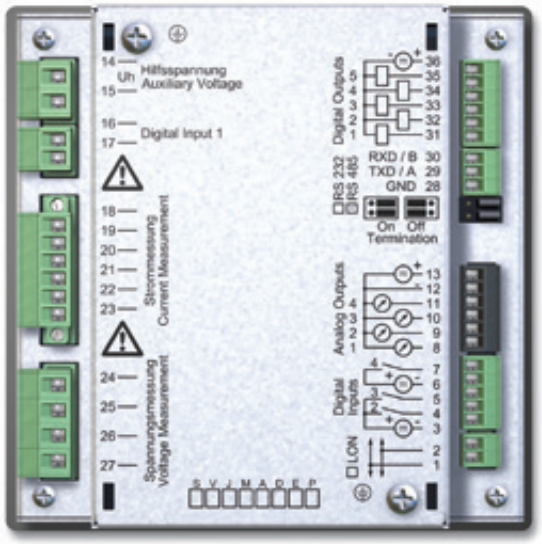
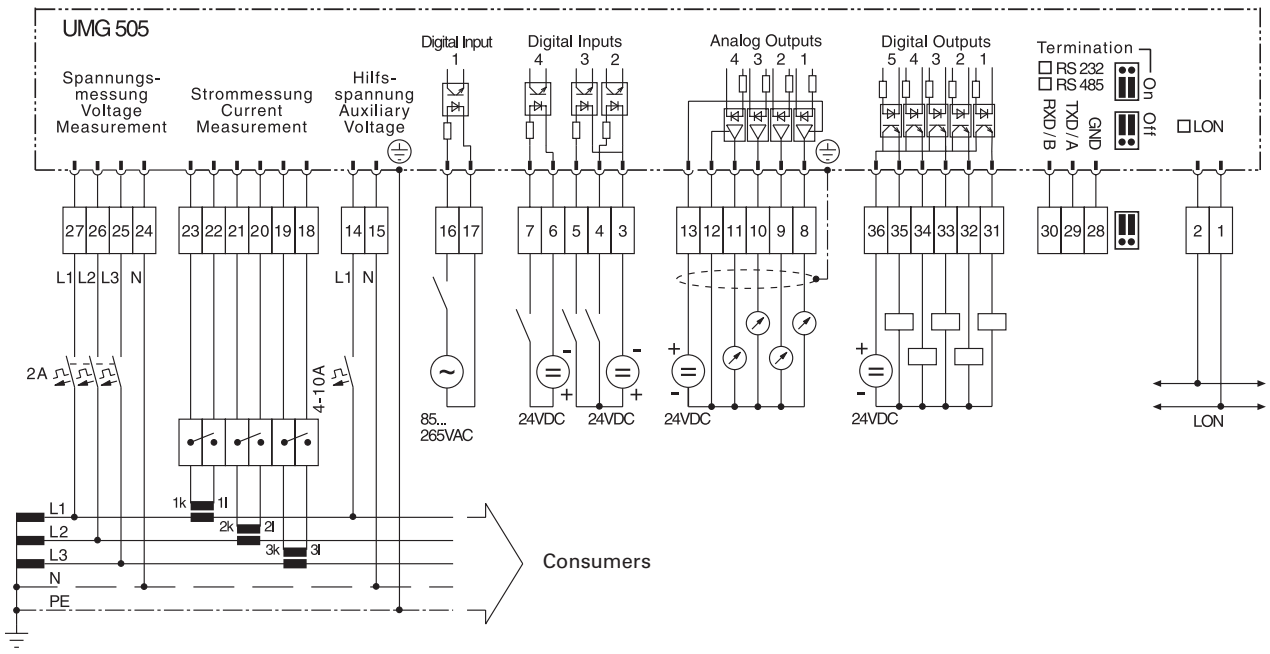


Illustration: option with LON

Typical connection options



UMG 507 – Power analyser

Power analysers of the UMG 507 product family are suitable for use at all network levels. The continuous measurement enables the collection of various measurement parameters, the identification of short-term interruptions, a fault recorder function and harmonic analysis. Extensive communication options e.g. Ethernet (TCP/IP), Modbus, Profibus, RS232, RS485, HTTP, SMTP, UTP or DNS allow affordable and quick integration in existing communication networks. Worldwide access to the embedded web server can be gained through a web browser. This means that the extensive opportunities offered by the UMG 507 are available without any additional software. The large number of digital and analogue inputs and outputs enable incorporation in monitoring systems, control tasks, information reports, the communication of measurement data (e.g. energy consumption) to a central control point and incorporation in extensive energy management systems. Nummerus logic functions allow the analysis of measurement data and the introduction of concrete measures.

Areas of application

- For measuring, monitoring and control of electrical parameters in energy distribution systems
- For recording load profiles (energy consumption) for energy management systems (cost centre data collection)
- For monitoring power quality (harmonics, short term interruptions, inrush currents...)
- Control tasks e.g. depending upon the achieved measurement values or limit values
- Remote monitoring via onboard homepage

UMG 507

Multi-function power analyser

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. Power analysers of the UMG 507 product family are designed for use at all network levels.

Main features

- Continuous measurement
- Data collection of short-term interruptions
- Ethernet and embedded web server
- Harmonics analysis
- 6 digital inputs, 6 digital outputs, 2 analogue outputs, 1 analogue input
- 1 temperature input
- Integrated logic for control tasks and alarm signals
- Modbus master, Ethernet / Modbus gateway

Due to the continuous measurement, short-term interruptions are registered and the fault recorder function provides more information about the event. A rapid, cost-optimised and reliable communication system can be developed through the Ethernet connection. The instrument's own homepage offers you the opportunity to call up the data or configure the instrument directly using the embedded web server. The large number of digital and analogue inputs and outputs offers a variety of communication possibilities and allow connection to PLC controls and independent control tasks. The integrated harmonic analysis becomes more significant with increasing network pollution (increasing THD-U values).

Applications

The three-phase electronic measuring instrument collects and digitalises the effective values of currents and voltages (True RMS) in a 50/60Hz network. The integrated microprocessor calculates the electrical parameters from the sampling values. All measurement values are continuously measured and recorded at intervals of 200ms over 10 periods (50 Hz).

This allows the safe identification of short-term interruptions with the fault recorder function. For short-term events, the effective values are recorded over 128 periods with 64 pre-trigger periods and with the transient memory over 5 periods with 2 pre-trigger periods.

The reaction time of the internal outputs is < 10ms and the external bus outputs < 200ms.

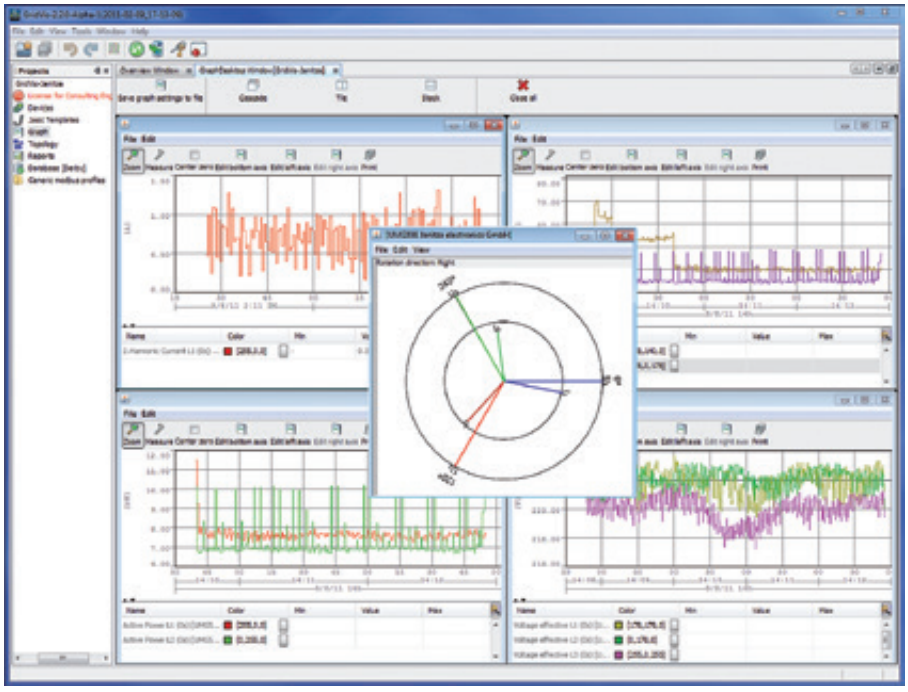
GridVis software
The UMG 507 power analysers already contain the GridVis software upon delivery. On one hand, this software enables simple and complete parameterisation of the respective measurement instruments and on the other hand, can analyse the measurement value memory in the unit. In GridVis, the data are stored in a database and can be processed in MS Excel for example. GridVis also allows online presentation of the measurement values. More information is available in chapter 5 – "Software".

Embedded web server/e-mail
Worldwide access to the UMG 507 can be gained through a web browser. In order to provide access, the web address and access authorisations must be set up. The complete parameterisation software is filed as an HTML page on the flash memory. The open architecture of the UMG 507 allows the user to apply own ideas to design Java-Applets and Active X-components and file them on the UMG 507. If limit value violations or events occur, they can be automatically sent to the set up e-mail address. Data from the memory storage can be sent by e-mail (attachment) at preset times and processed with the GridVis software.
Protocols: HTTP, SMT, UTP, DNS, NTP, MOD TCP, Modbus over TCP, DHCP/BootP.

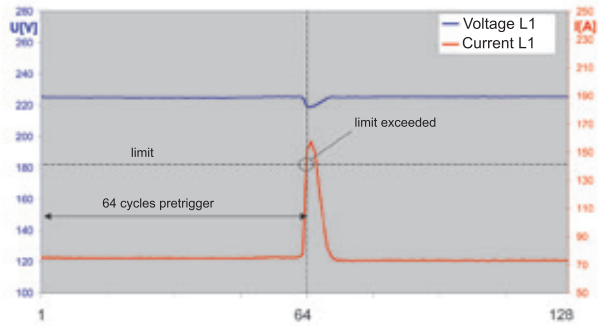
Connection to an DSL router
The unit can be connected to the internet using an external DSL router.

The SMTP authentication enables you to store mails on the internet provider's mailbox using the Plain/Login/Cram-MDS (newest encryption methods).

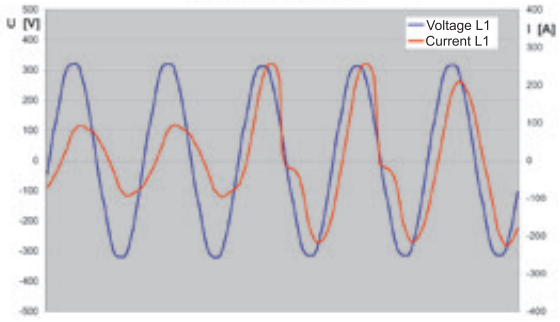
Data collection and recording
The UMG 507 has an internal memory of 256 KB RAM and, depending on the version, an additional memory of 16 MB flash is available for continuous recording of the measured data. This measurement value memory can be freely configured with reference to the measurement values which are to be saved and the recording intervals. In addition, the highest and lowest actual values (200 ms average time) can also be saved within these intervals. The recording of events is prompted by triggers. Events such as excess currents, under voltage or overvoltage can be safely collected from a half period duration. Events are recorded over 128 periods as effective value recorders.



Effective value recorder (128 periods)



Waveform recorder



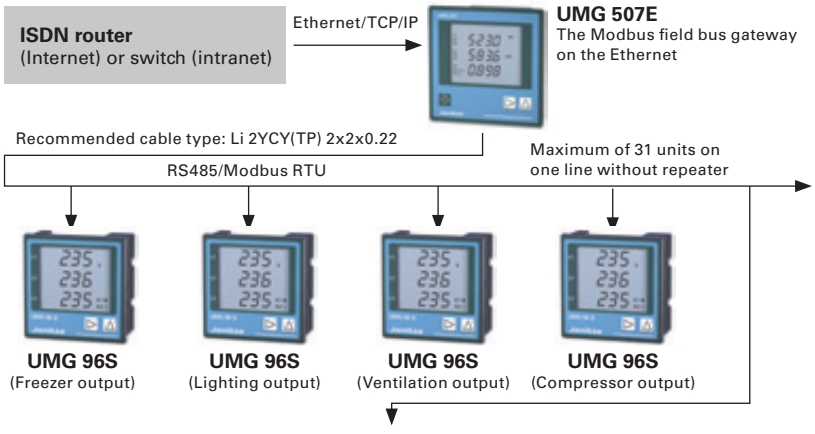
Transformer monitoring, k-factor
The maximum permitted current can be monitored in transformers, fuses or motors by entering the k-factor. The data from transformer manufacturers such as the current and k-factor (1= 100%) can be programmed on the digital output using the comparator. In addition, the temperature input can be used for transformer monitoring.

Inputs and outputs
Depending upon the product variant, the UMG 507 has a large number of internal digital and analogue inputs and outputs (refer to design versions). The top versions of the UMG 507 (AD, P, E and EP) have six digital inputs, six digital outputs, two analogue outputs (0/4-20mA), a temperature input and an analogue input (0/4-20mA). The digital inputs can be used as pulse inputs, synchronisation inputs or signal inputs. The digital outputs can be defined as limit value outputs, pulse outputs, time switch outputs or logic outputs. Both analogue outputs can be applied as measurement value transducers or for analogue control of generators (0-20mA). Transformer temperature data can be collected using the temperature input. Any process signals can be allocated to the analogue input.

Integrated logic
The 128 programmable logic links provide connections between inputs and outputs, measurement values and internal functions of the UMG 507. The standard operators AND, NAND, OR, XOR, EQU, rising edge and falling edge are available. The events are allocated to free flags which can also be linked with other flags. The incoming information through the Modbus RTU or the Profibus can also be incorporated in the logic links.

Trigger events, the virtual weekly time switch channels and Emax channels, the limit value comparator and signals received through the field bus are available as operands. These flags can then prompt the switchover of digital outputs, tariff changes, measurement value synchronisation, the time setting or the despatch of an e-mail. Measurement values can also be added, subtracted, multiplied or divided.

Modbus RTU master function / Modbus gateway
The RS485 of the UMG 507E/EP can also be used as a Modbus RTU master. This means that the measurement instruments UMG 96, UMG 503, UMG 507L, UMG 505 and Prodata with RS485, protocol Modbus RTU can be connected to the RS485 of the UMG 507E/EP and, in full functionality, can be illustrated on the Ethernet TCP/IP for example. In addition, the instrument inputs and outputs can be decentrally expanded using the WAGO modules. For the Modbus data of other bus users, a minimum of 32 and a maximum of 64 three Modbus data points are available such as in the topology view of the GridVis.




Modem


PLC

Software

Interfaces
- Ethernet
- RS232
- RS485

Highlights
- The despatch of e-mails including ring buffer contents

- **Web server**
  - JAVA Applets
  - Active X components
  - Macromedia FLASH in MX

- Modbus master function
- Supports WAGO I/O using the RS 485 and Modbus TCP/IP*
- Capturing short term interruption >=10ms for U and I
- Measurement value recorder (1 measurement value every 200 ms)
- Connection to DSL/ISDN router

* Special software is necessary on the WAGO coupler - available from us.

Protocols
- Profibus DP V0
- Modbus RTU
- Modbus TCP/IP (Port 502)
- UTP
- Modbus over TCP/IP (Port 8000)
- SMTP
- HTTP
- DNS
- NTP

6 digital inputs
- Pulse input
- HT/LT switchover
- Clock synchronisation
- Signal input logic

6 digital outputs
- Limit value output for I, U, P etc.
- Remote using Modbus / Profibus
- Pulse output effective energy/reactive energy
- Signal output short term interruption reaction time <=10ms
- Logic output

2 analogue outputs
- Settings: 0...20mA or 4...20mA

1 analogue outputs

16Mbyte memory
- For 1000k events and measurement values

256kByte RAM memory
- For 18k events and measurement values

Weekly time switch
- 24 channels
- Digital output
- Nominal value switchover HT/LT
- Send e-mail

Limit value programming with 16 comparators
- Within window
- Within window with hysteresis
- Outside of window
- Outside of window with hysteresis
- Over limit value
- Over limit value with hysteresis
- Under limit value
- Under limit value with hysteresis, setting: lead/follow-up time

Ethernet / Modbus gateway*
- Simple connection of Modbus devices

* Master/Slave operation only possible with UMG 96S, UMG 503, UMG 505, Prophi and ProData

Overview of product variants

Three/four-phase universal measurement instruments 50/60Hz; current transformer...1/5A; including GridVis programming and analysis software

Auxiliary voltage										Interfaces						
85 .. 265V AC, 120 .. 370V DC	40 .. 115V AC, 55 .. 165V DC	20 .. 45V AC, 20 .. 60V DC	Memory 256k RAM	Additional 16MB flash memory	6 digital inputs	6 digital outputs	1 temperature input	1 analogue input	2 passive analogue outputs	RS 232	RS 485	Ethernet 10baseT	Profibus DP V0	Integrated weekly time switch clock	Type	Item number
•	-	-	•	-	•	•	-	-	-	•	•	-	-	•	**UMG 507 L**	**52.15.004**
•	-	-	•	•	-	-	-	-	-	•	-	•	-	-	**UMG 507 EL**	**52.15.021**
•	-	-	•	-	•	•	•	•	•	•	•	-	-	•	**UMG 507 AD**	**52.15.003**
•	-	-	•	-	•	•	•	•	•	•	•	-	•	•	**UMG 507 P**	**52.15.002**
•	-	-	•	•	•	•	•	•	•	•	•	•	-	•	**UMG 507 E**	**52.15.001**
-	•	-	•	•	•	•	•	•	•	•	•	•	-	•	**UMG 507 E**	**52.15.006**
-	-	•	•	•	•	•	•	•	•	•	•	•	-	•	**UMG 507 E**	**52.15.011**
•	-	-	•	•	•	•	•	•	•	•	•	•	•	•	**UMG 507 EP**	**52.15.005**
-	•	-	•	•	•	•	•	•	•	•	•	•	•	•	**UMG 507 EP**	**52.15.010**
-	-	•	•	•	•	•	•	•	•	•	•	•	•	•	**UMG 507 EP**	**52.15.015**

• = Included - = Not possible

General technical data

Operating voltage L-N, AC		Refer to order details
Overvoltage category		600V CAT III
Quadrants		4
Measurement	Per channel	Continuous
Weight		1kg
Dimensions		W= 144mm x H= 144mm x D=66.5mm
Mounting		Front panel installation
Working temperature range		-10...55 °C
Connectable conductors (U/I)	Single wire, multi-wire, fine-wire, pin cable lugs, ferrule	0.08 - 2.5 mm^2, 1.5 mm^2
Protection class (front/reverse)	According to EN60529	IP 50/20

Measurement range

Voltage L-N, AC (without voltage transformer)		50...500VAC
Voltage L-L, AC (without voltage transformer)		80...870VAC
Current (transformer: x/1 and x/5 A)		0.005...6 A
Frequency of mains		45...65 Hz
Grid types		TN, TT, (IT)
Measurement in single and multi-phase networks		1ph, 2ph, 3 ph and up to 3 x 1ph

Measurement accuracy

Accuracy VA		± 0,2%
Reactive energy kvarh	Class	1 (5A), 2 (1A)
Effective energy kWh	Class	1 (5A), 2 (1A)

Measurement values

Measurement parameter	Display range	Measurement range at scaling factor 1	L1	L2	L3	Sum	Lowest value	Maximum average value	Average value*1	Maximum value	Date/Time	Measurement accuracy
Current .. /(1)5A	0.000 .. 9999 A	0.005 .. /(1)6A	•	•	•			•	•	•	•	+-0.2 %
Current, N	0.000 .. 9999 A	0.060 .. 15 A				•		•		•	•	+-0.6 %
Voltage L-N	0.0 .. 999.9 MV	50 .. 500 V	•	•	•		•	•		•	•	+-0.2 %
Voltage L-L	0.0 .. 999.9 MV	90 .. 870 V	•	•	•		•	•		•	•	+-0.2 %
Pos./neg./ zero sequence	0.0 .. 999.9 MV	50 .. 500 V						•		•	•	+-0.5 %
Frequency (U)	45.00 .. 65.00 Hz	45.00 .. 65.00 Hz	•	•	•		•	•		•	•	+-0.2 %
Effective power +/-	0.00 W .. 9999 MW	0.05 W .. 2.5 kW	•	•	•	•		•	•	•	•	+-0.5 %
Apparent power	0.00 VA .. 9999 MVA	0.05 VA .. 2.5 kVA	•	•	•	•		•		•	•	+-0.5 %
Reactive power	0.00 kvar .. 999 mvar	0.05 var .. 2.5 kvar	•	•	•	•		•		ind.	•	+-0.5 %
Power factor	0.00 kap. .. 1.00 .. 0.00 ind.	0.00 kap. .. 1.00 .. 0.00 ind.	•	•	•	•		•		ind.	•	+-0.5 %
Effective energy + Effective energy -	0.0 Wh .. 9999 GWh -0.0 Wh .. -9999 GWh	0.05 Wh .. 9999 GWh*2 -0.05 Wh .. -9999 GWh*2				•		•			t^1/t^2	Class *3 1 (5A), 2 (1A)
Reactive energy +/-	0.0 .. 9999 Gvarh	0.05vars .. 9999 Mvarh*2				•		•			t^1/t^2	Class *3 1 (5A), 2 (1A)

t^1: start time, t^2: runtime, + purchase, - supply
*1- integration over time: 5, 10, 15, 30 seconds, 1, 5, 10, 15, 30 and 60 minutes
*2 - memory period – 60 minutes
*3 - accuracy class according to DIN EN61036: 2001-01, VDE0418 part 7, IEC1036:1996 + A1: 2000

Power quality

Harmonics, 1st to 20th harmonics, uneven	Current, voltage L1, L2, L3	Accuracy: ± 0.5%
Distortion factor THD- U in %	L1, L2, L3	Accuracy: ± 0.5%
Distortion factor THD- I in %	L1, L2, L3	Accuracy: ± 0.5%
Voltage positive/negative/zero system		Accuracy:: ± 0.5%
Short-term interruptions	10ms	yes
Initial current	10ms	yes
Recorder for limit value events		yes

Features

Memory size		256kB/16MB – refer to order details
Clock		± 2 minutes per month
Integrated logic	128 links, 16 comparators	yes
Weekly time switch	24 channels	yes

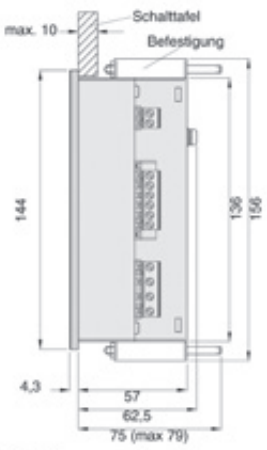
Periphery

Digital inputs	As a status input or pulse input	6, refer to order details
Digital outputs	As a switch output or pulse output	6, refer to order details
Analogue outputs	0(4)...20mA	2, refer to order details
Temperature measurement input	Pt100, Pt1000, KTY83, KTY84	1, refer to order details
Analogue input	0(4)...20mA	1, refer to order details
Password protection		yes
Software GridVis	**Refer to chapter 5**	**yes**

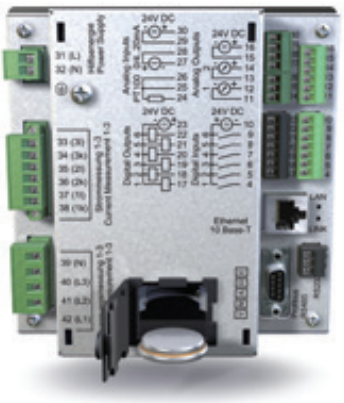
Communication

Interfaces		
RS 232	38.4 kbps	yes
RS 485 (Modbus/Profibus)	9.6, 38.4, 115.2 kbps up to 1.5 Mbps (Sub D 9 pole)	Yes, refer to order details
Ethernet 10 Base-T	RJ45	Yes, refer to order details
Protocols		
Modbus RTU		Yes, refer to order details
Profibus DP V0		Yes, refer to order details
Modbus Gateway		Yes, refer to order details
Embedded Webserver	Configurable homepage	Yes, refer to order details
TCP/IP		Yes, refer to order details
SMTP	E-Mail	Yes, refer to order details
DHCP		Yes, refer to order details
Modbus TCP		Yes, refer to order details
Modbus over Ethernet		Yes, refer to order details
BootP		Yes, refer to order details
NTP		Yes, refer to order details

Dimensional drawing

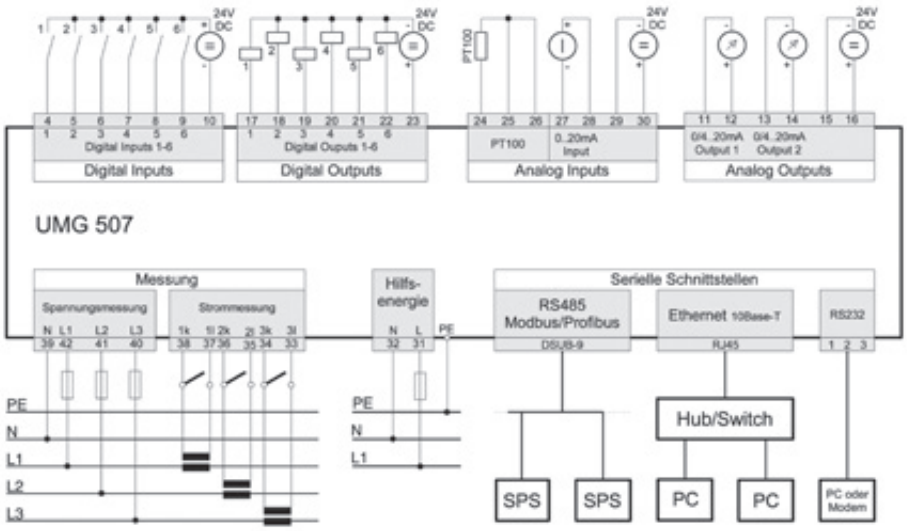


Connection illustration



Switchboard cut-out: 139x139 mm. All dimensions in mm.

Typical connection options (e. g. UMG 507EP)



UMG 508 – Multifunctional Power Analyser

with Ethernet and BACnet

The Power Analyser UMG 508 is an all-rounder for the front door panel mounting. The device is equipped with a colourful graphic display with intuitive user interface. The extensive measuring functions, such as monitoring of short term interruptions, inrush currents, transients, harmonics up to the 40th order ...) are unique in this price range.

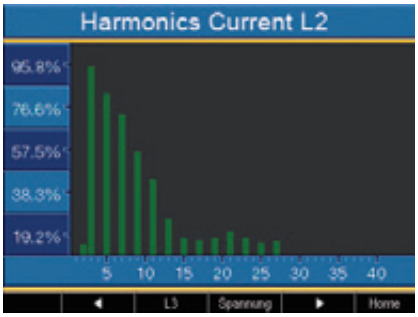
Extensive communication options, such as RS485 (Modbus RTU, Profibus), Ethernet TCP / IP, BACnet, HTTP, FTP, SNMP, SMTP, SNTP, or DNS allow a cost effective and rapid integration into existing communication structures.

The measurement is made on 4 separate current inputs, either for three phase systems with additional measurements in N or PE or the measurement of 4 individual single-phase loads. The UMG 508 has per each current input a separate energy counter. The very large data memory of 256 MB permits the logging of all readings for months even without intermediate reading.

Areas of application

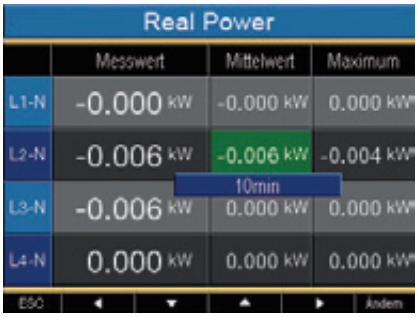
- Monitoring of a wide range of electrical and energy parameters
- Continuous monitoring of the power quality parameters
- Ethernet-Gateway for subordinate measurement devices
- Analysis of electrical faults and root cause analysis in case of power failures
- Cost centre management
- Remote monitoring for real estate management
- Usage in test facilities (e.g. in universities)

Various versions with UL-approval available!

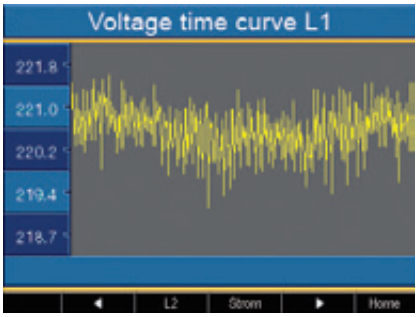


User-friendly graphical colour display with intuitive user interface
The high-resolution graphic display provides informative presentations of line graphs, FFT harmonic as bar diagram, clear display of the kWh-month values, alarm management/event viewer with dates and time stamp, and many other features.

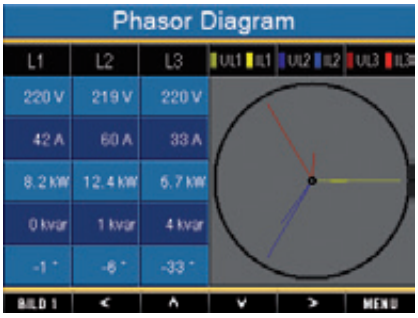
In addition to the information content the redesign of the UMG displays focused very much on a user-friendly, self-explanatory and intuitive operation of the UMG 508.



Modern communication architecture via Ethernet:
Cost-effective, fast and safe communication
In many cases the costs for installation and communication (e.g. peripheral equipment for field buses) exceed those for the respective power meters. Integration of the UMG 508 in an existing Ethernet architecture means a fast, cost-efficient and reliable communication. Additional interfaces enable the integration of the power analysers into PLC or building automation systems. The use of open standards offers great flexibility to the user.



Modbus Gateway:
Easy integration of devices without Ethernet interface
With the Modbus Gateway function of UMG 508 you can connect less sophisticated Modbus RTU meters to Ethernet. The UMG 508 can be used simultaneously as a gateway for sub-meters or prior instruments existing within the installation. Each instrument with a Modbus RTU interface can be connected, if its data format and function codes correspond. Data can be scaled and labelled.



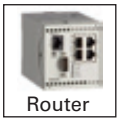
Highspeed Modbus
The UMG 508 series can transfer data via RS485 interface with a speed of up to 921.6 kB/s among each other device of this series.

Alarm management:
E-mail and homepage inform you, wherever you are...
Who would not agree? Just leaving the building the first call arrives about certain problems in production, computer failure, energy breakdown...

By using a webbrowser and IP address you have direct access to the extremely powerful homepage of your UMG 508. You get detailed information about the actual condition of your powergrid from the homepage. Online data as well as historical data and graphs of events are available. Via homepage you can directly calculate the costs of your energy consumption and export it into a CSV-file or print it out.

Alternatively, an e-mail informs you, if overload occurs, short-term interruptions disrupt your production process, harmonics reduce the life expectancy of your technical equipment...

The applications are ceaseless.


Router


SPS

Software

Interfaces
- Ethernet
- Profibus / RS485 (DSUB-9)

Grids
- TN, TT - grids
- 3 and 4 wire grids
- up to 4 single phase grids

8 Digital inputs
- Pulse input
- Alarm input logic
- Condition monitoring
- High/ low tariff changeover
- Emax reset

5 Digital outputs
- Pulse output kWh/ kvarh
- Switching output
- Limit output
- Emax output
- Logical output

Communication
- Protocols: Profibus (DP/V0)
- Modbus (RTU, UDP, TCP, Gateway)
- TCP/IP
- BACnet
- HTTP: freely programmable homepage
- FTP (file transfer)
- SNMP
- TFTP (automatic configuration)
- NTP (time synchronisation)
- SMTP (e-mail function)
- DHCP

Memory
- 256 MByte Flash
- 16 Mbyte RAM

Power quality
- Harmonics, 1st- 40th
- Short-term interruptions
- Transients (>50 µs)
- Inrush currents (> 10 ms)
- Unbalance
- Full period RMS recording (< 4.5 min.)

Accuracy
- Energy: class 0.2 (.../5A)
- Current: 0.2 %
- Voltage: 0.1 %

Maximum demand control
- 64 outputs

Programming language
Jasic®

Overview of product variants

Three / four phase universal measurement instrument; 50/ 60Hz; current transformer ../1/5A; including GridVis programming and analysis software												
Supply voltage							Interfaces					
95...240V AC, 80...340V DC ±10% of nominal range	44...130V AC 48...180V DC ±10% of nominal range	20...50V AC 20...70V DC ±10% of nominal range	4 voltage and 4 current inputs	Additional memory 256 MB Flash	8 digital inputs	5 digital outputs	RS 485*	Ethernet 100base T	Profibus DP V0	7 freely programmable application programmes	Type	Item number
•	-	-	•	•	•	•	•	•	•	•	**UMG 508**	**52.21.001**
-	•	-	•	•	•	•	•	•	•	•	**UMG 508**	**52.21.002**
-	-	•	•	•	•	•	•	•	•	•	**UMG 508**	**52.21.003**
optionally available												
Application programme Emax function											**Emax**	**52.21.080**
BACnet communication											**BACnet**	**52.21.081**

• = Contained - = Not possible *1 x DSUB-9 connector

Features

Memory		256 MB
Clock		+/- 1 min per month
Integrated logic		Programming language Jasic®
Operating hours counter		yes
Weekly switching clock		Jasic®

Periphery

Digital inputs	as status or pulse input	8
Digital outputs	as switching or pulse output	5
Password protection		yes
Maximum demand control	**optional 64 channels**	yes
Software	**GridVis**	yes

Communication

Interfaces		
RS 485*	9.6, 19.2, 38.4, 57.6, 76.8, 115.2, 921.6 kbps	yes
Profibus DP*	Sub D9-pole up to 12 Mbps	yes
Ethernet 10/100 Base-TX	RJ-45 connector	yes
Protocols		
Modbus RTU		yes
Profibus DP V0		yes
Modbus TCP		yes
Modbus over TCP		yes
Modbus-Gateway		yes
HTTP	homepage (configurable)	yes
SMTP	E-Mail	yes
SNTP	time synchronization	yes
TFTP	automatic configuration	yes
FTP	file transfer	yes
SNMP		yes
DHCP		yes
TCP/IP		yes
BACnet		yes

*1 x DSUB-9 connector

Technical data

Nominal voltage	3-phase 4-wire grid (L-N, L-L) 3-phase 3-wire grid (L-L)	417/720 V AC +10% 600 V AC +10%
Overvoltage class		600 V CAT III
Quadrants		4
Continuous Measurement		yes
Sampling rate, 8 channels	per channel	20 kHz
Weight		1 kg
Dimensions		H=144 mm x W=144 mm x D=81 mm
Mounting	according to IEC EN60999-1/ DIN EN50022	Frontpanel mounting
Working temperature		-10…55 °C
Connectable wires (U/I)	one wire, more wires, fine stranded wires cable end sleeve	0.08 - 2.5 mm^2 1.5 mm^2
Protection class	according to EN60529	IP 20

Measuring range

Voltage L-N, AC (without VT)		10…600 V rms
Voltage L-L, AC (without VT)		18…1000 V rms
Current (Transformer: x/1 und x/5 A)		0.001...8.5 A
Frequency of fundamental		40...70 Hz
Grids		TN, TT, IT
Measurement in grids		1 ph, 2 ph, 3 ph, 4 ph and upt to 4 x 1 ph

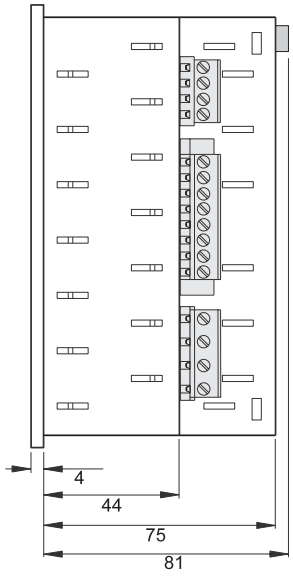
Measured values

Voltage	L1, L2, L3, L4, L1-L2, L2-L3, L1-L3	accuracy ±0.1 %
Current	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	accuracy ±0.2 %
K-factor	L1, L2, L3, L4	yes
Rotating current components	Positive/ Negative/ Zero Phase Sequence	yes
Real, apparent, reactive power	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	accuracy ±0.4 %
Cos-phi / phase angle	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes
Phase angle	L1, L2, L3, L4	yes
Real energy (kWh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Consumed real energy (rate 1, rate 2) - Supplied real energy (rate 1, rate 2)	Class 0.2 (…/5 A), Class 1 (…/1 A)
Reactive energy (Karh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Inductive energy (rate 1, rate 2) - Capacitive reactive energy	Class 2
Apparent energy (kVAh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes
Wave form voltage	L1, L2, L3, L4	yes
Frequency of mains		accuracy ±0.1 %
Average values		yes
Minimum and maximum values		yes

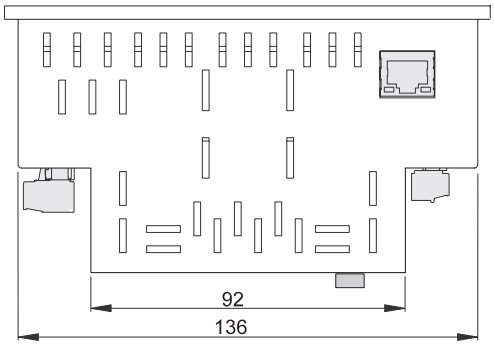
Power quality

Harmonics, 1st- 40th	Current, voltage, real/reactive power (±) L1, L2, L3, L4	accuracy ±(0.5% rdg + 0.05 rng)
Distortion factor THD- U in %	L1, L2, L3, L4	yes
Distortion factor THD- I in %	L1, L2, L3, L4	yes
Unbalance		yes
Positive/ Negative/ Zero Phase Sequence		yes
Transients	50 µs	yes
Inrush-currents	10 ms	yes
Malfunction writer		yes
Short-term interruptions		yes

Dimensional drawing



Side view



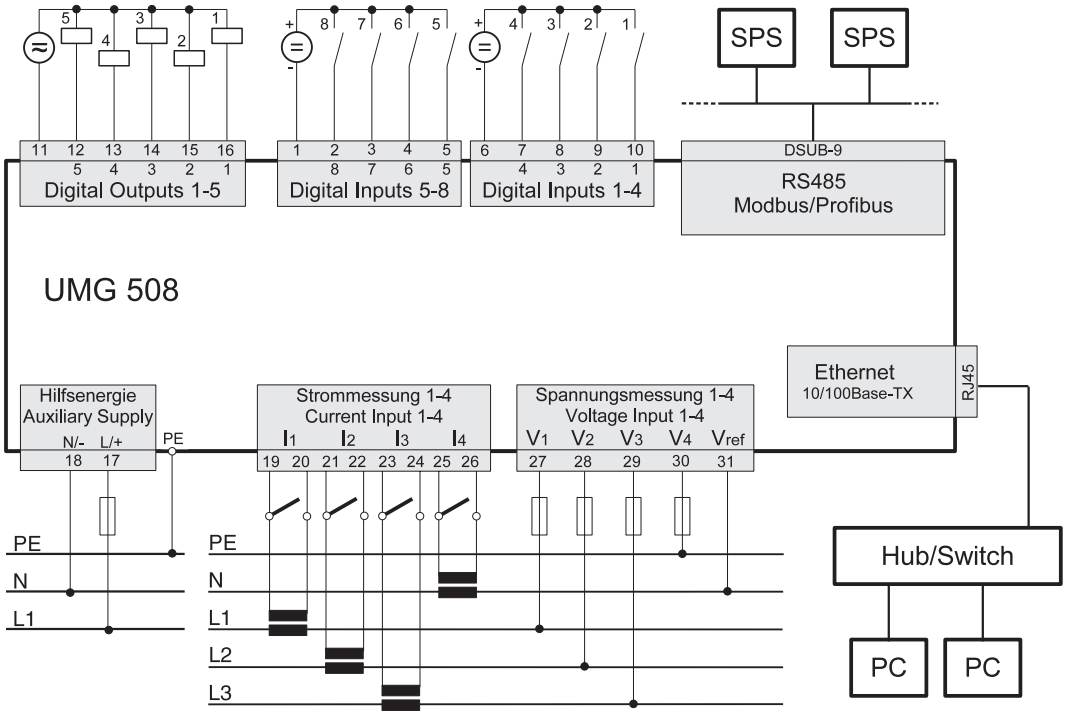
All dimensions in mm.

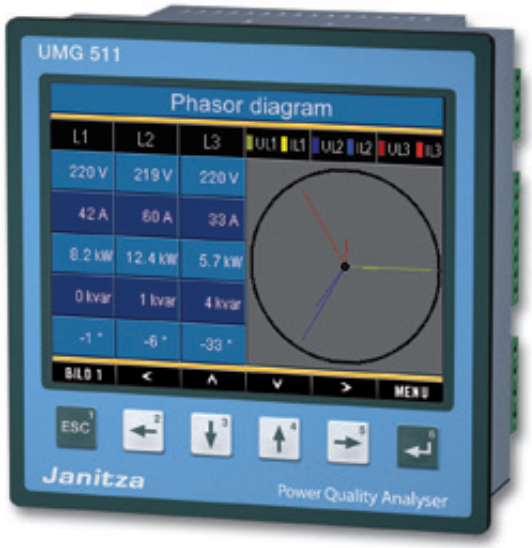
View from below

Connection illustration

Ethernet connection

Typical connection





UMG 511 – Class A power quality analyser

according to IEC 61000-4-30

The UMG 511 power quality analyser is particularly suitable for monitoring power quality according to standards such as the EN 50160. All power quality parameters are collected and analysed e.g. flicker, short term interruptions with fault recorder function, transients, harmonics up to the 63rd and inrush currents etc. Extensive communication possibilities e.g. RS 485 Modbus, Profibus, Ethernet (TCP/IP), BACnet, HTTP, FTP, SMTP, SNTP, DNS ... allow cost effective and rapid integration in existing communication networks. Worldwide access to the embedded web server can be gained through a web browser. The GridVis software included in the content of delivery allows extensive analysis just by the click of a button.

Areas of application

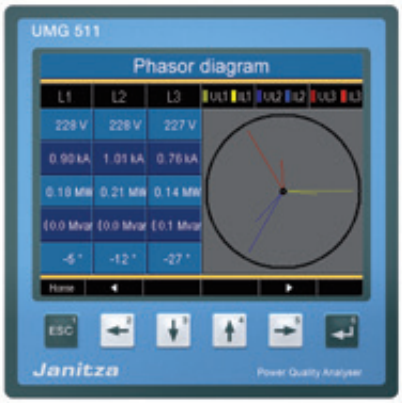
- Continuous monitoring of the power quality e.g. EN 50160
- Ethernet gateway for subordinate measurement points
- Analysis of electrical faults for network problems
- Monitoring of the internal distribution network according to EN 61000-4-7, 4-15, 4-30
- Report generator for EN 50160 analysis
- Remote control

Various versions with UL-approval available!

UMG 511

Added value with additional functions

Continuous monitoring of the power quality e.g. in accordance with EN 50160. This serves for the purpose of monitoring the supply power quality from the energy supply side. The UMG 511 can also be used in applications for failure analysis on the consumer side and is also used as a preventative measure for network perturbations. A rapid, cost-optimised and reliable communication system can be developed through the Ethernet connection. The instrument's own homepage offers you the opportunity to call up the data or configure the instrument directly using the embedded web server.



The large number of digital and analogue inputs and outputs offer a variety of communication systems possibilities and allows connection to PLC systems and independent control tasks. The GridVis analysis software represents a fundamental part of the standard delivery. The GridVis can be used to practically trigger analysis in accordance with EN 50160 with the click of a button. The presentation of online data and the analysis of historical data is also a benefit for finding the root cause of network problems.

Main features

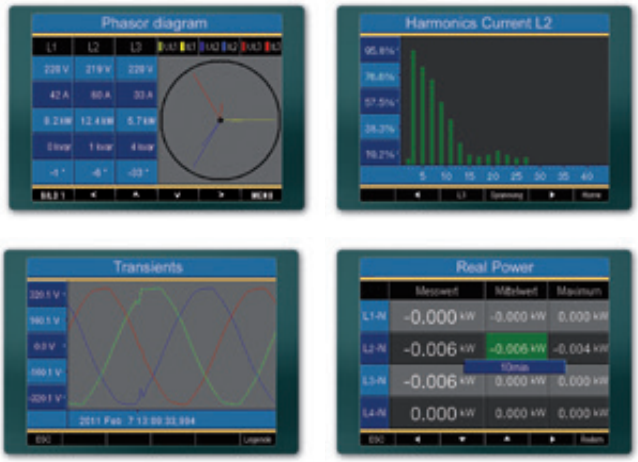
- Measurement of power quality according to DIN EN 61000-4-30, Class A
- Fourier analysis 1st to 63rd harmonic for U-LN, U-LL, I, P (consumption/supply) and Q (ind./cap.)
- Measurement of harmonics and interharmonics (U-LN, U-LL, I) according to DIN EN 61000-4-7
- Analysis and evaluation according to DIN EN 50160 with the contained programming and analysis software GridVis
- Flicker measurement according to DIN EN 61000-4-15
- Measurement in TN and TT grids (600V CAT III)
- 4 voltage measuring inputs, 4 current measuring inputs
- Continuous sampling of voltage and current inputs with 20kHz
- Recording of more than 2000 different measurement parameter per measuring cycle (200ms)
- Detection of transients >50µs and storage with up to 16.000 samples
- Data logger / event memory (256MB Flashdisk)
- 8 digital inputs and 5 digital outputs
- Profibus DP/V0 alternatively RS 485 (Modbus RTU, Modbus-Master, optional BACnet)
- Ethernet (Web-Server, E-Mail, optional BACnet)
- Programming of customer specific applications in Jasic®

Applications

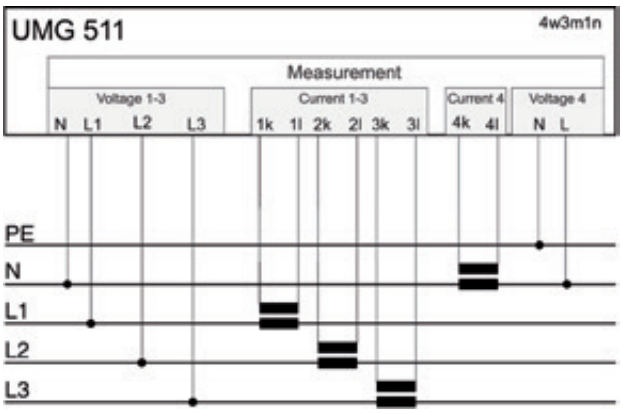
The power quality analyser which is equipped with 4 current and voltage inputs collects and digitalises the effective values (True RMS) from currents and voltages in 40-70Hz (15-440Hz) networks. The integrated microprocessor calculates the electrical parameters from the sampling values. The relevant voltage can be defined as a phase-neutral or a phase-phase voltage for measurement in a three-phase system. The voltage serves the UMG 511 as a reference voltage for harmonic measurement, transient and event recording and for the flicker meter. A nominal current can be set using this for the measurement of electrical current events. The 4th current and voltage input represents a separate measurement system. However, it is generally used for measuring the current in the neutral or PE conductor or used for measuring a voltage difference between N and PE.

Display examples

The backlighted active matrix display (5,7“) of the UMG 511 enables the presentation of measurement values in numerical form, as a bar chart or as a line graph. Selected displays can automatically be displayed in alternation (automatic display rotation). The instrument is programmed using userfriendly clear text menus or the GridVis software.



Example of a UMG 511 connection illustration



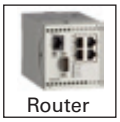
Measurement in a four-phase network with main measurement and auxiliary measurement

Main measurement

The UMG 511 has 4 measurement channels for current and voltage. The first three channels (main measurement) are intended for use in a three-phase system.

Auxiliary measurement

The auxiliary measurement can be used for measurement in a single-phase or symmetrical three-phase system. Alternatively, the current input can be allocated to the three-phase system of the main measurement for measuring the neutral-conductor current. For example, the voltage input could then be used for recording the voltage between the neutral conductor and PE. The auxiliary measurement provides all measurement parameters like in the main measurement (current, voltage, power, harmonics, transients, events and flicker).


Router


PLC

Software

Interfaces
- Ethernet
- Profibus 485

Networks
- IT, TN, TT networks
- 3 phase and 4 phase networks

8 digital inputs
- Pulse input
- Logic input
- Status monitoring
- HT/LT switch over
- Emax (max. demand) resetting

5 digital outputs
- Pulse output kWh/kvarh
- Switch output
- Limit value output
- Emax output
- Logic output

(can be extended through external I/O modules)

Communication
- Profibus (DP/V0)
- Modbus (RTU, UDP, TCP, gateway)
- TCP/IP
- BACnet
- HTTP (freely configurable homepage)
- FTP (file transfer)
- TFTP (automatic configuration)
- NTP (time synchronisation)
- SMTP (e-mail function)
- DHCP
- SNMP

Memory
- 256 MByte Flash
- 16 Mbyte RAM

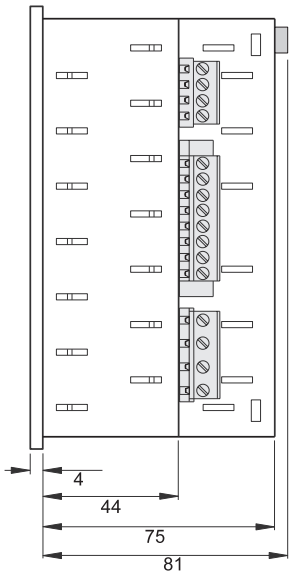
Power quality
- Harmonics up to 63rd
- Short-term interruptions
- Transient recorder (>50µs)
- Starting current (>10ms)
- Unbalance
- Half wave-effective value recordings (up to 4.5 min)
- Flicker

Measurement accuracy
- Class: 0.5S (.../5A) class
- Current: 0.2%
- Voltage: 0.1%

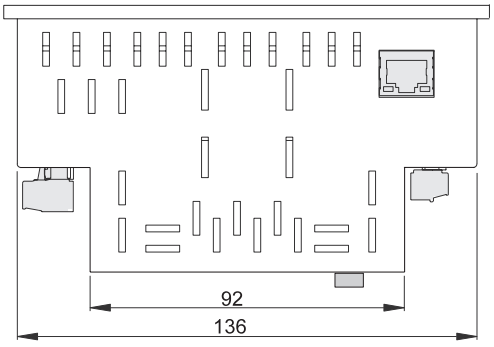
Peak demand management
- 64 stages for load shedding

programming language
Jasic®

Dimensional drawing



Side view



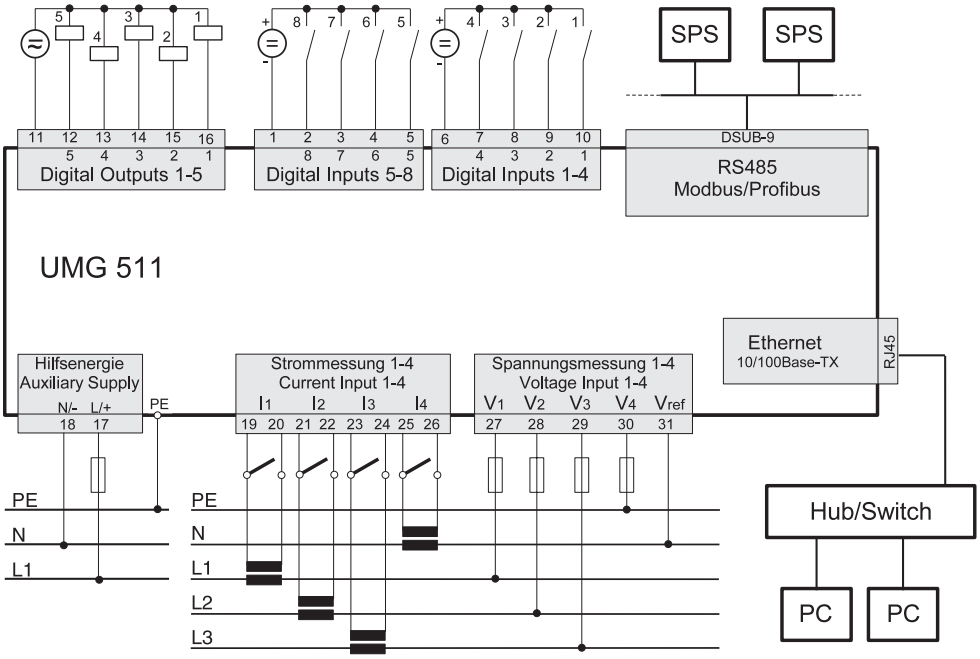
All dimensions in mm.

View from below

Connection illustration

Ethernet connection

Typical connection



Overview of product variants

Three/four phase power quality analysers; current transformer .../1/5a; including GridVis programming and analysis software											
Supply voltage							Interfaces				
95...240V AC, 80...340V DC ±10% of nominal range	44...130V AC 48...180V DC ±10% of nominal range	20...50V AC 20...70V DC ±10% of nominal range	4 voltage and 4 current inputs	Memory 256 MB Flash	digital inputs	digital outputs	RS 485*	Ethernet 100baseT	Profibus DPV0	Type	Item number
•	-	-	•	•	8	5	•	•	•	UMG 511	**52.19.001**
-	•	-	•	•	8	5	•	•	•	UMG 511	**52.19.002**
-	-	•	•	•	8	5	•	•	•	UMG 511	**52.19.003**
Options (for all versions)											
Emax function application program (peak demand management)										Emax	**52.19.080**
BACnet communication										BACnet	**52.19.081**

• = Contained - = Not possible *[1] x DSUB-9 connector

General technical data

Nominal voltage	3-phase 4-wire grid (L-N, L-L) 3-phase 3-wire grid (L-L)	417/720 V AC +10% 600 V AC +10%
Overvoltage category		600 V CAT III
Quadrants		4
Continuous measurement		yes
8 channel scanning rate	Per channel	20 kHz
Weight		1 kg
Dimensions		L=144mm x W=144mm x H=81 mm
Mounting	According to IEC EN 60999-1/DIN EN 50022	Front panel mounting
Working temperature range		-10...55 °C
Connectable conductor (U/I)	Single wire, multi-wire, fine-wire pin cable lugs, ferrule	0.08 - 2.5 mm² 1.5 mm²
Protection class	According to EN 60529	IP 50 front /IP 20 rear

Measurement range

L-N voltage, AC (without voltage transformer)	Free voltage transformer settings	10…600 V AC rms
L-L voltage, AC (without voltage transformer)	Free voltage transformer settings	18…1000 V AC rms
Current (transformer: x/1 and x/5A)		0.001...8.5 A
Frequency of mains	(only for static frequence)	15...440 Hz
Networks		TN, TT, IT
Measurement in single/multi-phase networks		1 ph, 2 ph, 3 ph, 4 ph

Periphery

Digital inputs	Status, logic or pulse input	8
Digital outputs	Switch logic output or pulse output	5
Password protection	Multilevel	yes
Peak load management	**Optional 64 channels**	**yes**
Software	**GridVis**	**yes**

Features

Memory		256 MB
Clock		+/- 1 min per month
Integrated logic		Programming language Jasic®
Operating hour meter		yes
Weekly time switch		Jasic®

Measurement values

Voltage	L1, L2, L3, L4, L1-L2, L2-L3, L1-L3	Accuracy ±0.1 %
Current	L1, L2, L3, L4 Calculated sum current	±0.2 % ±0.5%
K-factor	L1, L2, L3, L4	yes
Three-phase current components	Positive/ Negative/ Zero Phase Sequence	yes
Effective, reactive and apparent power	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4 40 ..70 Hz, cos-phi = 1 40 ..70 Hz, cos-phi = > 0.8 40 ..70 Hz, cos-phi = > 0.5 15 ..440 Hz, cos-phi = > 0.5	Accuracy ±(0.4% + 0.10%) ±(0.4% + 0.0075%) ±(0.5% + 0.0075%) ±(0.5% + 0.0075%) ±(3.0% + 0.0075%)
Cos-phi, power factor	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes
Phase angle	L1, L2, L3, L4	yes
Effective energy (kWh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Purchased effective energy (tariff 1, tariff 2) - Supplied effective energy (tariff 1, tariff 2)	Class 0.2 (…/5A), Class 0.5 (…/1A)
Reactive energy (kvarh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Inductive reactive power (tariff 1, tariff 2) - Capacitive reactive power	Class 2
Apparent energy (kVAh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes
Current/voltage wave form	L1, L2, L3, L4	yes
Frequency of mains		Accuracy ±0.1 %
Average value		yes
Minimum and maximum values		yes

Power quality

Harmonics order, 1st to 63rd Harmonics, even/odd	Voltage L1, L2, L3, L4	Accuracy ± 5% Accuracy ± 0.05
Interharmonics	Current, voltage L1, L2, L3, L4	yes
Distortion factor THD- U in %	L1, L2, L3, L4	yes
Distortion factor THD- I in %	L1, L2, L3, L4	yes
Positive/negative/zero system		yes
Actual flicker value	L1, L2, L3, L4	yes
Short-term flicker value	L1, L2, L3, L4	yes
Long-term flicker value	L1, L2, L3, L4	yes
Transients	50 µs	yes
Trigger events	10 ms	yes
Inrush currents	10 ms	yes
Event recorder		yes,

Communication

Inter-faces	RS 485	9.6; 19.2; 38.4; 57.6; 76.8; 115.2; 921.6 kbps	yes
	Profibus DP	Plug, sub D 9-pole up to 12 Mbps	yes
	Ethernet 10/100 Base-TX	RJ-45 sockets	yes
Protocols	Modbus RTU		yes
	Profibus DP V0		yes
	Modbus TCP		yes
	Modbus over TCP		yes
	Modbus-Gateway		yes
	HTTP	Homepage (configurable)	yes
	SMTP	E-Mail	yes
	SNMP		yes
	SNTP	Time synchronisation	yes
	TFTP	Automatic configuration	yes
	FTP	File Transfer	yes
	DHCP		yes
	BACnet / IP		yes, option

Mobile power analysers

MRG 604/605/508/511

Again and again we see components and equipment failing in electrical networks, with the reason behind it often suspected to be mains feedback effects. Often only mobile measurement devices can provide information on this if there are no fixed integrated measurement devices available in the respective energy distribution system. This is where the MRG 604/605/508/511 comes into its own.

The focal point here is the checking of the supplies in accordance with EN 50160 as well as the distribution in the internal network according EN 61000-2-4.

Causes of network problems can be identified and rectified.

MRG 604/605/508/511

Added value through additional functions

Network analysers from the MRG range are intended for fault analysis and cause identification in low voltage systems. Thus, with overloaded capacitors in a reactive power compensation system a long-term harmonics analysis can provide information on whether the overload is perhaps caused by too much noise on the grid (THD-U), for example. However, the recording of load profiles can also play an important role in the new dimensioning of system components or for the negotiation of power supply contracts. Mobile network analysers offer an advantage in particular with sporadic problems or fault analysis or in cases where certain measured values must be even more closely localised.

Along with the large number of electrical measured values this range offers a multitude of additional functions such as the saving of minimum and maximum values, operating hours counter, bi-metallic strip function, password protection and much more.

Main features

- Continuous monitoring of the voltage quality
- Capturing of all significant voltage quality parameters (harmonics, short-term interruptions, asymmetries etc.)
- Ethernet and embedded web server
- GridVis software
- EN50160 , IEEE519, ITIC, EN61000-2-4 analyses
- Cost centre report
- 128/256MB internal memory for storing measurement data

Applications

The mobile network analysers from the MRG range are suitable for measuring and saving electrical variables in low voltage networks. The measurement is designed for single and 3-phase systems with voltages up to L-N 10 – 600 V AC, L-L 18 – 1000 V AC (MRG 604 / 508 / 511) L-N 10 – 277 V AC, L-L 18 – 480 V AC (MRG 605) or with an auxiliary voltage of 95 – 240 V AC.

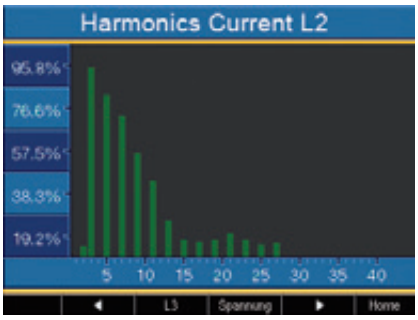
Areas of application

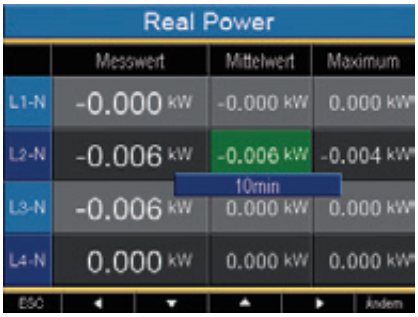
The MRG range is used as a portable measuring device in distribution systems where there are no fixed integrated measurement devices available. These are ideally suited to carrying out mobile measurements, e.g. for the design of reactive power compensation systems, for the determination of load profiles or harmonic analyses of up to 63rd level harmonics. Thanks to the integrated measured value memory it is not necessary to set up additional equipment, such as a laptop or printer, with the measurement device. The evaluation can be carried out conveniently "back at base" on the PC.

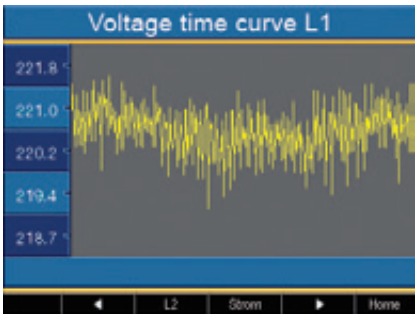
Capture and recording

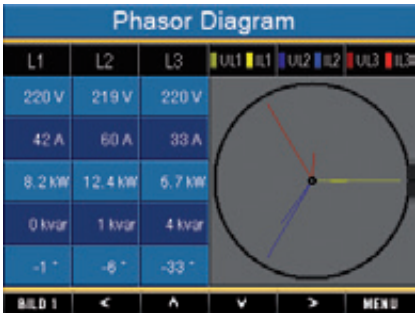
All measured values can be stored in arbitrary intervals in the MRGs internal 128/256 MByte flash memory. The Software GridVis which is skope of the delivery can then read out and visualise this data. The recording interval is also the averaging period of the respective measured value. The maximum and minimum instantaneous values (200ms averaging period) can also be recorded at the same time, for saving and evaluating the data as of curves y(t). Of course it is also possible to save the data in the form of a histogram, i.e. distribution curves. The recording of transients and events is initiated through triggers. Transients are captured from times of 50µs or more. Events such as overcurrent or undervoltage/overvoltage (>10ms) can also be recorded at the same time.

A network quality report allows a transparent overview regarding whether the standards EN 50160 or EN 61000-2-4 are fulfilled over the stipulated time-frame, practically with one mouse click. A printout is implemented in paper form or as a PDF file. An Ethernet TCP/IP interface connection to the PC is available.









MRG 508/511:
User-friendly colour graphical display with intuitive user guidance
The MRG 508/511 device's high resolution graphical display provides informative presentation of online graphs, FFT with harmonics displayed in bar diagrams, clear presentation of the monthly kWh values, alarm management / event display with date and time stamps and many other functions. Along with the informational content great emphasis was placed on the user-friendly, self-explanatory and intuitive operation of the device, when the device display was being re-designed.

Modern communications architecture via Ethernet:
Cost-effective, fast and secure communication
Through connection to an existing Ethernet architecture, fast, cost-optimised and reliable communication can be set up.

Large measured data memory, free recording configuration
The large measured data memory of 128 or 256 MB enables the recording of the measurement data for up to one year, depending on the recording configuration. The user can freely define which of the 800/2000 different values have to be recorded and with which averaging period.

Limit value programming via graphical programming
Each measurement parameter can be used to establish limit values. Links and logical decisions can also be created via the graphical programming with high flexibility.

Alarm management:
Emails and homepage keep you informed, wherever you are...
Who isn't familiar with this situation? Only barely out of the building and the first call comes in with problems in production, computers have failed, the power supply has failed ...

With a web browser and an IP address you have direct access to the extremely powerful device homepage. You can pick up extensive information straight away, directly from the homepage. Online data are available along with historical data and graphs of events and transients.

The accumulated work can be converted to costs directly on the homepage, and then exported as a csv file or printed out.

Alternatively, have yourself kept informed globally by email - if your energy supply should be overloaded, short-term interruptions in the power supply bring your manufacturing process to a standstill, impermissible harmonics reduce the service life of your equipment...

The application opportunities are boundless.

MRG range, scope of delivery:

- Compact, robust Peli case with measurement device and all connections
- Separate soft bag with measurement accessories
- DVD with GridVis software
- Measurement cable set
- Voltage tap-off set with fuses
- Crosspatch cable for connection with a laptop
- Mains cable
- Patch cable for the network

Optional accessories:
AC clamp sensor (100/200/300 or 250/500/1000 or 1000/2000/3000 A)

GridVis software
Power quality analysis & energy management

Energy management (ISO 50001) and network quality (EN 50160, ITIC, IEEE 519)
The GridVis software is part of the delivery scope of all MRG measurement devices and can be used for energy management systems and network quality analysis. The software enables the readout of historical data values, e.g. load profiles that allow trend analysis, as well as the reading of online values for monitoring the present load.

The software is a powerful tool for voltage quality. It provides online values or display of waveform of current and voltage and a quick overview of the actual online situation, for example.

Automatically generated reports for the most power quality standards (EN 50/60, IEEE 519, ITIC, EN 61000-2-4) as well as energy consumption reports can be freely planned by the user.

Overview of product variants

Portable power analysers		MRG 508	MRG 511	MRG 604	MRG 605
Item number		52.21.901	52.19.901	52.16.901	52.16.902

Features

		MRG 508	MRG 511	MRG 604	MRG 605
Memory		256 MB	256 MB	128 MB	128 MB
Clock		+/- 1 min per month	+/- 1 min per month	+/- 1 min per month	+/- 1 min per month
Integrated logic		Programming language Jasic®	Programming language Jasic®	Programming language Jasic®	Programming language Jasic®
Operating hours counter		yes	yes	yes	yes
Weekly switching clock		Jasic®	Jasic®	Jasic®	Jasic®
Display		Colordisplay	Colordisplay	yes	yes

Periphery

		MRG 508	MRG 511	MRG 604	MRG 605
Digital inputs	3-phase 4-wire grid (L-N, L-L)	no	no	2	2
Digital outputs	as switching or pulse output	no	no	2	2
Temperature measurement input		no	no	yes	yes
Password protection		yes	yes	yes	yes
Software	**GridVis**	yes	yes	**yes**	**yes**

Communication

		MRG 508	MRG 511	MRG 604	MRG 605
Interfaces					
RS 232	9.6, 19.2, 38.4, 115.2 kbps	no	no	yes	yes
RS 485	9.6, 19.2, 38.4, 57.6, 76.8, 115.2, 921.6 kbps	no	no	yes	yes
Ethernet 10/100 Base-TX	RJ- 45 sockets	yes	yes	yes	yes
Protocols					
Modbus RTU		no	no	yes	yes
Modbus TCP		yes	yes	yes	yes
Modbus over TCP		yes	yes	yes	yes
Modbus-Gateway		no	no	yes	yes
HTTP	Homepage (configurable)	yes	yes	yes	yes
SMTP	E-Mail	yes	yes	yes	yes
SNTP	Time synchronisation	yes	yes	yes	yes
TFTP	Automatic configuration	yes	yes	yes	yes
FTP	File Transfer	yes	yes	yes	yes
SNMP		yes	yes	yes	yes
DHCP		yes	yes	yes	yes
TCP/IP		yes	yes	yes	yes

General technical data

		MRG 508	MRG 511	MRG 604	MRG 605
Nominal voltage L-N, AC Nominal voltage L-N, L-L		417 V 720 V (3-wire 600 V)	417 V 720 V (3-wire 600 V)	277 480 V	277 480 V
Overvoltage category		600 V CATIII	600 V CATIII	300V CATIII	300V CATIII
Quadrants		4	4	4	4
Continuous measurement		yes	yes	yes	yes
8 channel scanning rate	Per channel	20 kHz	20 kHz	20 kHz	20 kHz
Weight		6 kg	6 kg	2.2kg	2.2kg
Dimensions		411 mm x 322 mm x 168 mm	411 mm x 322 mm x 168 mm	270mm x 246mm x 124mm	270mm x 246mm x 124mm
Working temperature range		-10…55 °C	-10…55 °C	-10…55 °C	-10…55 °C

Measurement range

		MRG 508	MRG 511	MRG 604	MRG 605
L-N voltage, AC (without voltage transformer)		720 V AC	720 V AC	480 V AC	480 V AC
Current (transformer: x/1 and x/5A)		0.001...8.5 A	0.001...8.5 A	0.001...8.5 A	0.005...6 A
Frequency of mains		40...70 Hz	15...440 Hz	45 ..65 Hz	15...440 Hz
Networks		TN, TT	TN, TT	IT, TN, TT	IT, TN, TT

Power quality

		MRG 508	MRG 511	MRG 604	MRG 605
Harmonics order		up to 40.	up to 63.	up to 40.	up to 63.
Distortion factor THD- U in %	L1, L2, L3, L4	yes	yes	yes	yes
Distortion factor THD- I in %	L1, L2, L3, L4	yes	yes	yes	yes
Unbalance		yes	yes	yes	yes
Positive/negative/ zero system		yes	yes	yes	yes
Transients	50 µs	yes	yes	yes	yes
Inrush currents	10 ms	yes	yes	yes	yes
Event recorder		yes	yes	yes	yes
Short-term interruptions		yes	yes	yes	yes
Flicker		no	yes	no	yes

Measurement values

		MRG 508	MRG 511	MRG 604	MRG 605
Voltage	L1, L2, L3, L4, L1-L2, L2-L3, L1-L3	Accuracy ±0.1 %	Accuracy ±0.1 %	Accuracy ±0.2%	Accuracy ±0.2%
Current	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	Accuracy ±0.2 %	Accuracy ±0.2 %	Accuracy ±0.2%	Accuracy ±0.2%
K-factor	L1, L2, L3, L4	yes	yes	yes	yes
Three-phase current components	Positive/ Negative/ Zero Phase Sequence	yes	yes	yes	yes
Cos-phi, power factor	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes	yes	yes	yes
Phase angle	L1, L2, L3, L4	yes	yes	yes	yes
Effective energy (kWh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Purchased effective energy (tariff 1, tariff 2) - Supplied effective energy (tariff 1, tariff 2)	Class 0.2 (…/5 A), Class 1 (…/1 A)	Class 0.2 (…/5A), Class 0.5 (…/1A)	Class 0.5S (…/5 A), Class 1 (…/1 A)	Class 0.5S (…/5 A), Class 1 (…/1 A)
Reactive energy (kvarh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Inductive reactive power (tariff 1, tariff 2) - Capacitive reactive power	Class 2	Class 2	Class 2	Class 2
Apparent energy (kVAh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes	yes	yes	yes
Current/voltage wave form	L1, L2, L3, L4	yes	yes	yes, GridVis	ja, GridVis
Temperature measurement		PT 100/1000 KTY 83/84	-	yes	yes
Average value		yes	yes	yes	yes
Minimum and maximum values		yes	yes	yes	yes

Accessories CT

Description		Item number
Clamp CT 100/200/300 - 1 A	usually 4 pieces required	**15.05.221**
Clamp CT 250/500/1000 - 5 A	usually 4 pieces required	**15.05.203**
Clamp CT 1000/2000/3000 -5 A	usually 4 pieces required	**15.05.222**

Electronic pulse output – energy meter, EM-series **109**
- Modbus, M-Bus, EIB-KNX - communication module
- 2 tariffs
- 4 quadrant measurement
- With and without MID (Measuring Instruments Directive)
- Up to 125A direct measurement

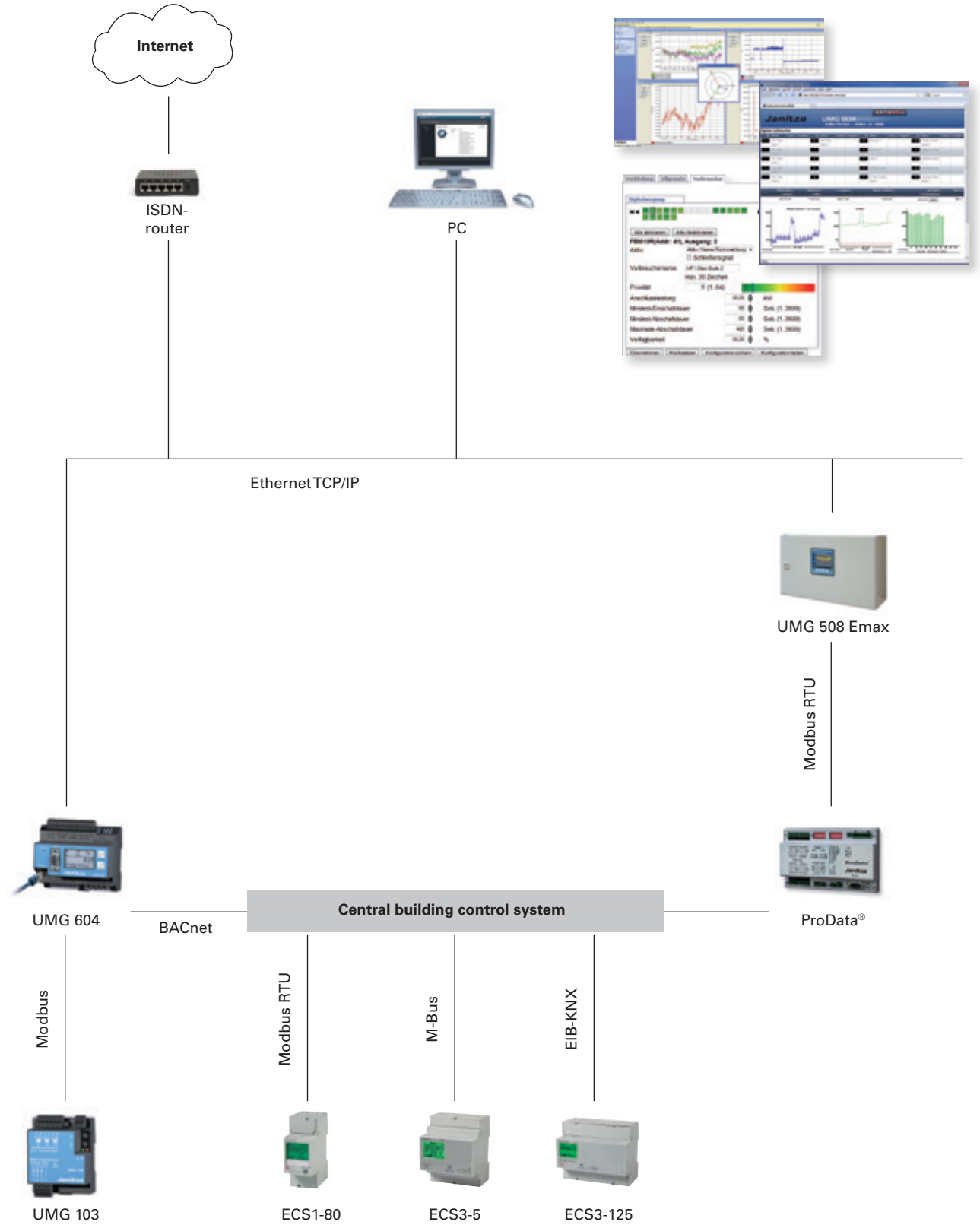
Peak demand management systems UMG 508Emax **115**
- For limiting peak loads
- Up to 64 load shedding stages
- Including UMG 508 power analyser with continuous measurement
- RS232, RS485, Modbus, Ethernet (optional Profibus)

Data logger ProData® **123**
- Collection and storage of counter values
- 16 digital inputs
- 64 bit counter
- RS232, RS485, Modbus

PM – Power Management

Professional energy management considers aspects such as peak demand management, energy data collection and cost centre management. With the UMG 508Emax and ProData® product groups and state-of-the-art pulse output energy meters, the energy supply for your company can be actively controlled with regard to power peaks and energy consumption. The electricity consumption and electricity costs can, therefore, be sustainably reduced.

The ProData® series enables you to have a transparent invoicing system within the company and monitors the individual cost centres with separate invoicing. This improvement to cost transparency enables the respective allocation to cost centres. This is especially important for accurate determination of the costs for your products and services and for transferring electricity costs to your end consumers.


Internet
ISDN-
router
PC
Ethernet TCP/IP
UMG 508 Emax
Modbus RTU
UMG 604
BACnet
Central building control system
ProData®
Modbus
Modbus RTU
M-Bus
EIB-KNX
UMG 103
ECS1-80
ECS3-5
ECS3-125

Electronic energy meter with pulse output

Electronic energy meters are measuring instruments which are used to determine energy consumption of electrical loads. The meters can either be used for direct connection or for current transformer measurements. Typical areas of application are in the field of energy management for cost centre analysis, as a measurement value generator for PLC controls or in central building control systems. Electronic meters should be calibrated and sealed for invoicing purposes in order to guarantee continuous accuracy and to protect the meter from misuse or unintended reprogramming.

The ECS series energy meter

Areas of application
Electronic energy meters are mainly used for collecting data of effective and reactive energy consumption. Their standard area of application is in the field of energy management for cost centre analysis. There are various communication possibilities available in order to avoid time-consuming manual readings at site. The effective pulses can be connected via two impulse outputs e.g. DDC, PLC, SCADA systems or the data logger ProData®. In the area of central building control systems the protocols M-Bus, EIB-KNX and Modbus RTU are available through additional communication modules which read the actual meters using an optical interface and which provide the respective value on the field bus through the interface. The selection of additional values such as voltage, current, power, power factor and frequency together with effective and reactive energy are available on the bus cable through the communication modules. For consumption data collection, the ECS meters can also be used as instruments for sub-metering for the UMG 604 through Modbus RTU.

Main features

- Communication modules: Modbus, M-Bus, EIB-KNX
- Direct measurement up to 125A or through current transformer
- 2 tariffs
- With and without MID calibration
- Sealed clamp covers
- Four quadrants measurement
- Measurement values: effective energy, reactive energy, effective power, reactive power
- Class 1

Applications
The electronic energy meters of the ECS series are suitable for the measurement of effective- and reactive-energy consumption. Measurement is laid out for a 1- and 3-phase system with a voltage of L-N 184-276VAC. The current inputs are designed for direct connection or for measurement through current transformers. Installation is undertaken on DIN-rails, whereby the extremely compact construction is of particular value. There are two versions available: a non-calibrated version and a calibrated version (MID). All meters in the ECS series can be sealed. The effective and reactive energy is available in two tariffs and in four quadrants. The accuracy of the meters is class 1 for effective energy and class 2 for reactive energy.

Data collection and recording
All meters store the counter values in non-volatile memories. The meter reading cannot be reset in the calibrated version. In the non-calibrated version the readings can be reset. The current transformer ratio is fixed (5:5) for calibrated meters.

Overview of product variants

Types	ECS1-80	ECS3-80	ECS3-125	ECS3-5
without MID **Item number**	ECS1-80 (without MID) **14.01.301**	ECS3-80 (without MID) **14.01.320**	ECS3-125 (without MID) **14.01.330**	ECS3-5 (without MID) **14.01.310**
with MID **Item number**	ECS1-80 (MID) **14.01.302**	ECS3-80 (MID) **14.01.321**	ECS3-125 (MID) **14.01.331**	ECS3-5 (MID) **14.01.311**

General technical data

Operating voltage	184…276VAC	184…276VAC	184…276VAC	184…276VAC
Dimensions [mm]	W= 36x H= 90x D=70	W= 72 x H= 90 x D= 70	W= 108 x H= 90 x D= 70	W= 72 x H= 90 x D= 70
Width in units	2	4	6	4
Working temperature	-10…+55°C	-10…+55°C (Option -25…+55°C)	-10…+55°C (Option -25…+55°C)	-10…+55°C (Option -25…+55°C)
Storage temperature	-25…+70°C	-25…+70°C	-25…+70°C	-25…+70°C
Protect. class (front/clamps)	IP 51/20	IP 51/20	IP 51/20	IP 51/20
Max connectable conductors	Current 35mm² Voltage 1.5mm²	Current 35mm² Voltage 1.5mm²	Current 50mm² Voltage 1.5mm²	Current 4mm² Voltage 1.0mm²

Measurement range

Voltage L-N	184…276VAC	184…276VAC	184…276VAC	184…276VAC
Voltage L-L	-	319…478VAC	319…478VAC	319…478VAC
Current	0,025…80A	0,015…80A	0,020…125A	0,003…6A (…/5A)
Frequency, mains	50Hz	50Hz	50Hz	50Hz
Measurement	1-phase	3-phase	3-phase	3-phase
Measurement mode	Direct	Direct	Direct	CTs

Measurement value

Effective energy	Class 1	Class 1	Class 1	Class 1
Reactive energy	Class 2	Class 2	Class 2	Class 2
4 quadrants	Yes	Yes	Yes	Yes
2 tariffs	Yes	Yes	Yes	Yes
Effect.,reactive-power display	Yes	Yes	Yes	Yes

Periphery

Pulse outputs	2	2	2	2
Pulse value	1000 Imp/kWh	500 Imp/kWh	500 Imp/kWh	1/10/100 Imp/kWh
Pulse length	30 ± 2ms*	50 ± 2ms*	50 ± 2ms*	50 ± 2ms*
Digital input	1	1	1	1

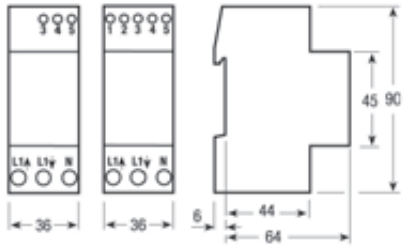
Optional communication modules

Types		Item number
Modbus RTU / ASCII (Full)	Baud rate: up to 38,4kBaud Applicable parameters: Wh, kvarh, V, A, Hz, cos-phi, kW, kvar	**14.01.410 ***
M-Bus (Full)	Baud rate: 300…9600Baud Applicable parameters: Wh, kvarh, V, A, Hz, cos-phi, kW, kvar	**14.01.411 ***
EIB-KNX (Full)	Baud rate: 9600Baud Applicable parameters: Wh, kvarh, V, A, Hz, cos-phi, kW, kvar	**14.01.412**

* For parameterization and configuration of the Modbus communication modules, an interface converter (eg. K2075) is required.
** For parameterization and configuration of the M-Bus communication modules, a level converter is required.

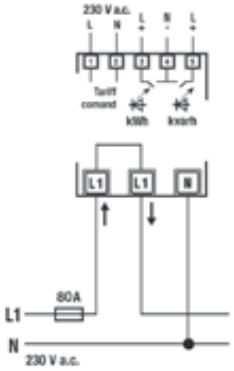
ECS1-80 - single-phase energy meter

Dimensional drawing

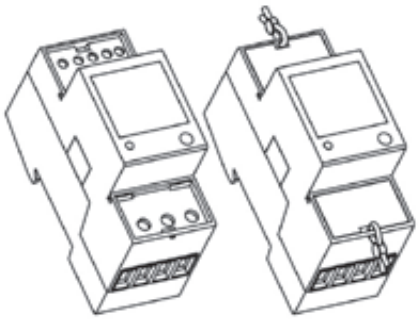


All dimensions in mm.

Circuit diagram

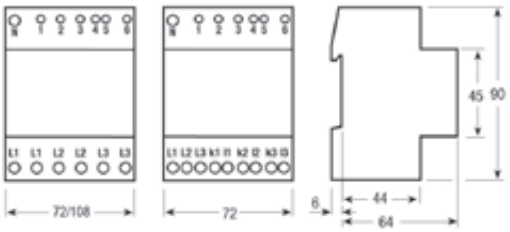


Sealable clamp terminal



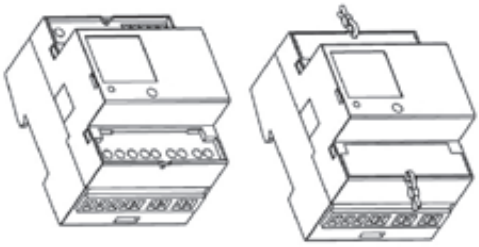
Three-phase energy meter

Dimensional drawing

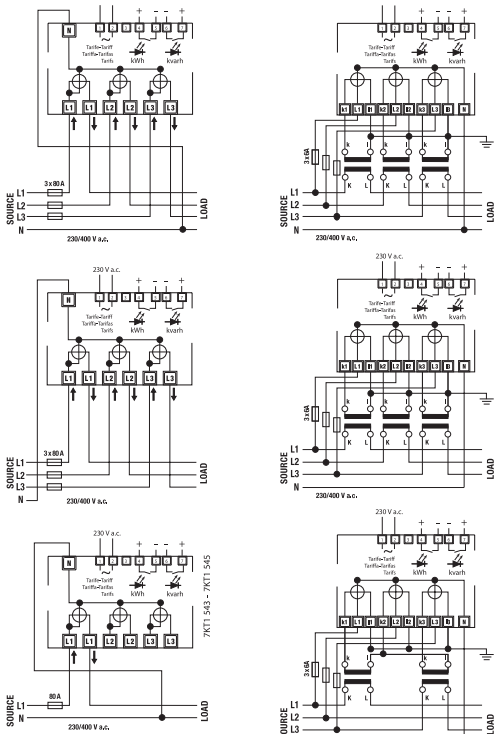


All dimensions in mm.

Sealable clamp terminal



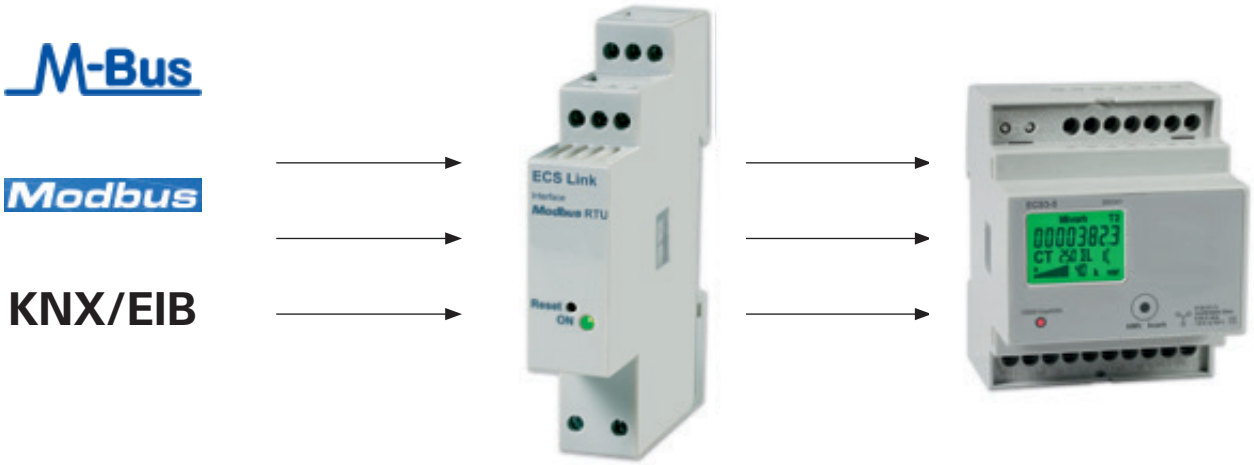
Circuit diagram



Information for connecting meters with CTs
A 6A fuse on L1 is recommended to protect the cables. Current transformers must not be operated with open clamps because dangerously high voltages can occur. Failure to observe this information can lead to injury to persons and damage to property. Furthermore, CTs can be thermally overloaded.

Communication modules – width is 1 unit for DIN-rails (35mm)

The lateral optical IR-interface and desired communication module allow the power meter to be integrated into the building-services engineering easily and cost-effectively. The simple click-assembly of the commincation module allows the power meter to be expanded with further communication technologies (M-Bus, EIB-KNX, Modbus RTU and LAN).



M-Bus module

The M-Bus interface (installation on DIN rail, 1 module wide) allows devices such as power meters to be connected to the M-Bus. The M-Bus is commonly used for the remote reading of power meters and multiple sensors. The interface is powered via the bus itself, which receives measured quantities from the meter via an IR optical interface. The only electrical connection which must be made is the bus-cable connection (standard telephone cable). The interface may be used for single and three-phase power meters and other measurement devices.

M-Bus

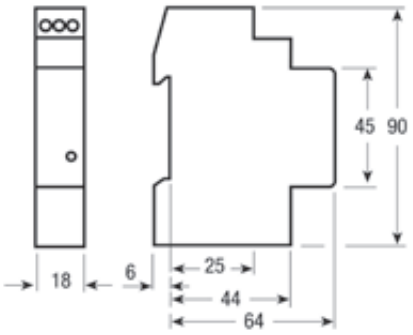
Mains electricity supply

LED operation control

M-Bus connection

Side infrared interface for communication to the energy meter

Dimensional drawing



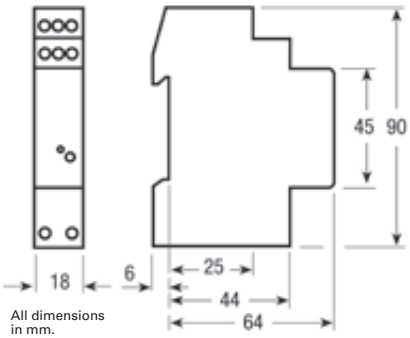
All dimensions in mm.

Modbus RTU- and ASCII-Modul

The module may be connected to a remotely-operated station (such as a power meter with IR interface) for transferring values detected via a measurement device over a modbus network. The data transfer module automatically recognises the connected measurement instrument over the IR interface and is able to transfer all quantities detected by this measurement device.

Modbus

Dimensional drawing



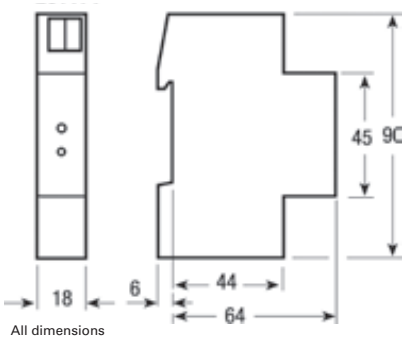
All dimensions in mm.

EIB-KNX-Modul

The bus EIB-KNX is commonly used in residential and commercial properties. The interface is powered via the bus line itself, where the existing adjacent IR optical interface receives measured quantities from the meter. The only electrical connection which must be made is the bus-cable connection.

KNX/EIB

Dimensional drawing



All dimensions in mm.

UMG 508Emax peak demand management systems

Energy consumption varies significantly over a 24 hour cycle period. This leads to massive strains on production and distribution systems and also causes expensive peak load coverage e.g. pumped storage power plants. In order to balance out these effective power peaks, the energy suppliers have introduced corresponding demand price tariffs. According to the tariffs offered by power companies, the highest measured power peak value within a period of 15 minutes is used to establish the monthly electricity costs. Using this peak value, the network allocation costs and the monthly energy price are then calculated. If this peak value is reduced the electricity costs will also be reduced. In times of constant increases in the costs of electrical energy, it is imperative that optimum adjustment of the load distribution profile is ensured on the peak load optimisation systems. The solution to this is an Emax application for Jasic® devices such as the UMG 604, UMG 605, UMG 508 or UMG 511. Depending on the trend value, the installed Emax application switches off the consumer temporarily, which allows the switching times to be configured freely. Unnecessary switching actions are avoided if consumer feedback is connected.

Areas of application

- Reduction of effective power peaks and, therefore, significant reduction of electricity costs
- Avoidance of short-term overloads in energy distribution systems (e.g. triggers power switches)
- Stabilisation of energy supply and production processes
- Hotels, canteen kitchens, hospitals, industry, compressors, thermal processes

UMG 508Emax - peak demand management systems

The intelligent reduction of effective power peaks

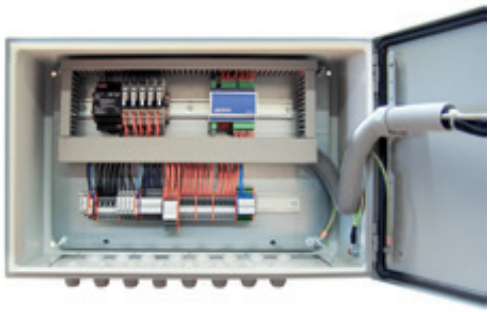
Emax applications for Jasic® devices continuously capture all electrical parameters. Integrated smart control algorithms calculate the effective power trend and compare it with the fixed target effective power. The trend calculation allows the Emax application for Jasic® devices to intervene in the operational process precisely and to switch off non-critical consumers temporarily.

If feedback processing is connected, only those consumers which draw power at the time of the calculation are switched off or included in the trend value calculation. If feedback processing is not possible, fixed availability may be set in percentages, which to some extent helps to avoid cost-intensive peak loads and achieves considerable cost saving potential. Incidental peak loads are avoided.

Main features of the Emax APP

- Optional limitation of effective peak loads
- Up to 64 switch-off stages with feedback, depending on the device type and Emax APP
- Inclusive UMG 508 network analyser with constant measurement
- Inclusive GridVis Software
- UMG 508Emax6, optionally available with profibus

Peak load manager UMG 508MAX 15-A in stainless steel casing:



Example systems:

UMG 508MAX 15-A (item no 52.21.222)
Maximum monitoring system with 15 switch-off stages in stainless steel casing for wall mounting.

Dimensions: W600 x H380 x D210 mm,
Colour: RAL 7035

Fully assembled and wired:
- 1 function module KMK 5 with 5 relay outputs (changeover contact 2A potential free)
- 8 digital inputs, 1 of which for effective power pulse and 1 digital input for resetting the measurement period
- 1 field bus module FBM10 R-NC, item no 15.06.XX with 10 relay outputs (break contact) with status display

UMG 508MAX 15-AE (item no 52.21.223)
Maximum monitoring system with 15 switch-off stages in stainless steel casing for wall mounting.

Dimensions: W600 x H380 x D210 mm,
Colour: RAL 7035

Fully assembled and wired:
- 1 function module KMK 5 with 5 relay outputs (changeover contact 2A potential free)
- 8 digital inputs, 1 of which for effective power pulse and 1 digital input for resetting the measurement period
- 1 field bus module FBM 10 R-NC, item no 15.06.XX with 10 relay outputs (break contact) with status display
- Field bus module FBM 10 I, item no 15.06.076 with 10 digital inputs with status display

Applications
The UMG 508 is a multifunctional device which plays a role as basic equipment in all low-voltage mains distributors. The optional Emax application reduces the effective power maximum by temporarily switching off consumers.

As a basic unit, the UMG 508 is assembled with additional components in stainless steel casing or available as individual components. As a measurement device, the UMG 508 records the load conditions of electrical power supply equipment so as to prevent the occurrence of overloads. Furthermore, the device is also designed to measure and save virtually all electrical values including flow and power values. Visualisation of the measured values recorded by the maximum monitor is displayed on the device homepage. Display of the measured quantities on the display is not possible.

Functional principle
On the basis of the effective power pulse emitted at a digital input or the total effective power calculated by the measurement device (direct measurement), the Power Analyser Emax programme records the necessary quantities in order to observe a pre-set nominal value. In doing so, the system constantly calculates the average value, instantaneous value, trend value and corrective power within the pre-set measurement period.

Should the Power Analyser detect that the maximum may have been exceeded, it determines the need for a switch-off with the help of the set loads. Loads are then switched-off with due consideration for the pre-defined rules. The aim of this method is to adhere to the set maximum at the end of the measurement period with as few switch-offs as possible, and therefore as little negative impact to the operational process as possible. A feedback input (release) may be assigned to each load of the Emax function. These inputs allow the availability of the load for maximum monitoring to be restricted. In order for it to be possible to switch the load off, one or more expansion modules with digital outputs are required (FMB 10 R-NC). Should the status of loads be taken into account via a feedback input, an appropriate input module (FBM10I) must be connected to the serial interface.

Peak load management up to 64 switch-off stages, depending on the device type and Emax application

The device can be fully configured and analysed via the device homepage. The homepage also allows for straightforward configuration of the device parameters.

Summary of parameterisation options:
nominal value, actual value for average value calculation, measurement period duration, off-time, pause time, availability

The following can be set for each load:
load name, priority, connection cable, minimum on duration, minimum off duration, maximum off duration and availability as a percentage

Illustration: Emax status display

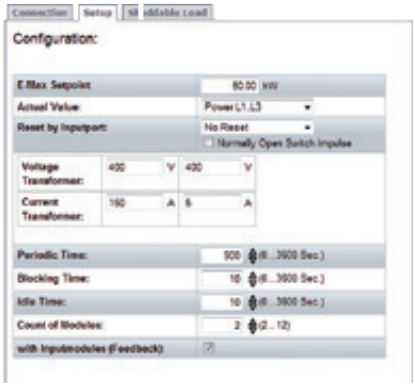


Illustration: Configuration of basic values

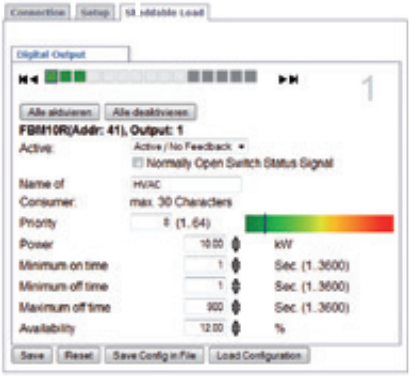


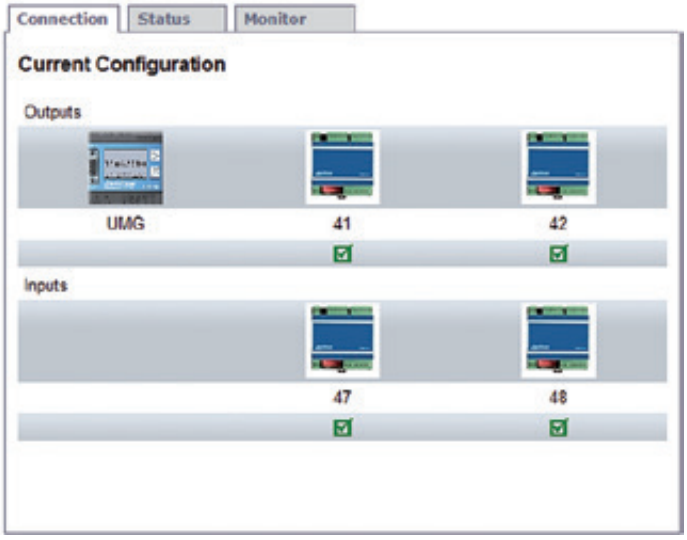
Illustration: Configuration of loads

Status display of Emax measured quantities and status of the current switch-off actions, status of the release (feedback as to whether a load is on/off) via the device homepage.

The following measured quantities are saved to the device memory:

- Effective power average synchronously to the measurement period reset
- Measurement period reset on status change
- Trend value recording

Analysis is performed with the GridVis.



Display of communication status between measurement device and function modules.

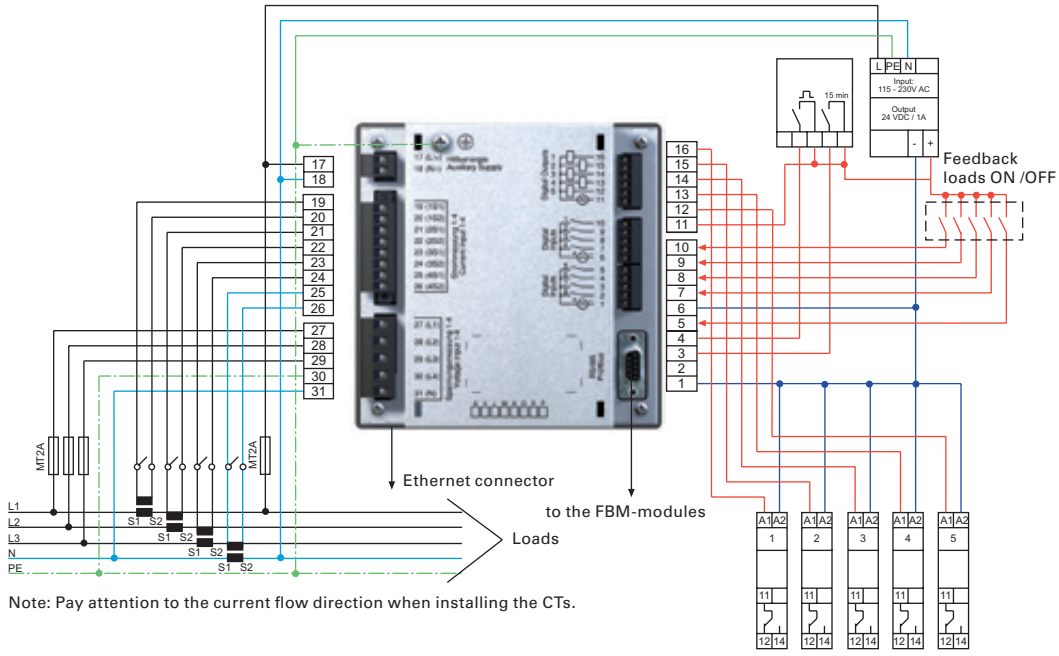
Overview of product variants UMG 508Emax

Supply voltage: 95 .. 240V AC, 135 .. 340V DC ±10% of nominal range	Load shedding stages	Outputs Type of contact NC + NO	Feedback / Input	4 voltage and 4 current inputs	Additional memory 256 MB Flash memory	Interfaces: RS 485	Interfaces: Ethernet 10/100 baseT	Interfaces: Profibus DP V0	3 free programmable user programs	Type	Item number
•	5	5	5	•	•	•	•	•	•	**UMG 508MAX 5-AE**	**52.21.217**
•	15	15	-	•	•	•	•	-	•	**UMG 508MAX 15-A**	**52.21.222**
•	15	15	15	•	•	•	•	-	•	**UMG 508MAX 15-AE**	**52.21.223**
•	25	25	-	•	•	•	•	-	•	**UMG 508MAX 25-A**	**52.21.224**
•	25	25	25	•	•	•	•	-	•	**UMG 508MAX 25-AE**	**52.21.225**
•	35	35	-	•	•	•	•	-	•	**UMG 508MAX 35-A**	**52.21.226**
•	35	35	35	•	•	•	•	-	•	**UMG 508MAX 35-AE**	**52.21.227**
•	45	45	-	•	•	•	•	-	•	**UMG 508MAX 45-A**	**52.21.228**
•	45	45	45	•	•	•	•	-	•	**UMG 508MAX 45-AE**	**52.21.229**
•	65	65	-	•	•	•	•	-	•	**UMG 508MAX 65-A**	**52.21.230**
•	65	65	65	•	•	•	•	-	•	**UMG 508MAX 65-AE**	**52.21.231**

• = Included - = Not available

More functions and technical data – refer to UMG 508 in the energy measurement technology chapter.
The UMG 508E is integrated in the above variants as a basic control unit.

Typical connection



Note: Pay attention to the current flow direction when installing the CTs.

General technical data

Supply voltage L-N, AC	230V, 50/60Hz
Overvoltage category	600V CAT III
Operational voltage	400V, 50/60Hz
Weight (6/12/32 stages)	18/19/20kg
Dimensions	W= 600mm x H=380mm x D=210mm
Mounting	Wall mounting
Working temperature range	-10…55 °C
Protection class	IP 43
Colour	RAL 7035
Software	GridVis
Shutdown stages	up to 64

Measurement range

Voltage L-N, AC (without voltage transformer)	10…600 V rms
Voltage L-L, AC (without voltage transformer)	18…1000 V rms
Current (transformer: x/1 and x/5 A)	0.005...6A
Frequency, mains	40…70Hz
Grid types	TN, TT, (IT)
Measurement in 1-phase / multiphase networks	1ph, 2ph, 3 ph, 4 ph and up to 4 x 1 ph

Measured values

Voltage	L1, L2, L3, L4, L1-L2, L2-L3, L1-L3	accuracy ±0.1 %
Current	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	accuracy ±0.2 %
K-factor	L1, L2, L3, L4	yes
Rotating current components	Positive/ Negative/ Zero Phase Sequence	yes
Real, apparent, reactive power	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	accuracy ±0.4 %
Cos-phi / phase angle	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes
Phase angle	L1, L2, L3, L4	yes
Real energy (kWh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Consumed real energy (rate 1, rate 2) - Supplied real energy (rate 1, rate 2)	Class 0.2 (…/5 A), Class 1 (…/1 A)
Reactive energy (Karh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Inductive energy (rate 1, rate 2) - Capacitive reactive energy	Class 2
Reactive energy (kVAh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	yes
Wave form voltage	L1, L2, L3, L4	yes
Frequency of mains		accurancy ±0.1 %
Average values		yes
Minimum and maximum values		yes

Power quality

Harmonics, 1st- 40th	Current, voltage, real/reactive power (±) L1, L2, L3, L4	accuracy ±(0.5% rdg + 0.05 rng)
Distortion factor THD-U in %	L1, L2, L3, L4	yes
Distortion factor THD-I in %	L1, L2, L3, L4	yes
Unbalance		yes
Positive/ Negative/ Zero Phase Sequence		yes
Transients	50 µs	yes
Inrush-currents	10 ms	yes
Malfunction writer		yes
Short-term interruptions		yes

Communication

Interfaces		
RS 485*	9.6, 19.2, 38.4, 76.8, 115.2, 921.6 kbps	yes
Profibus DP*	Stecker, DSUB-9 up to 12Mbps	yes
Ethernet 10/100 Base-TX	RJ- 45 connector	yes
Protocols		
Modbus RTU, Profibus DP V0, Modbus TCP, Modbus over TCP, Modbus-Gateway, HTTP, SMTP, SNTP, TFTP, FTP, SNMP, DHCP, TCP/IP, BACnet		

*1 x DSUB-9 connector

Emax variants as APP

The Emax applications for Jasic® devices integrate the maximum monitor functionality and constantly capture all electrical parameters. Smart control algorithms calculate the effective power trend and compare it with the fixed target effective power. The trend calculation allows the Emax application to intervene in the operational process precisely and to switch off non-critical consumers temporarily.

Emax APP for UMG 605/UMG 604 Item number 51.00.213

This app includes the following configuration variants	
Emax-H-02A	Maximum 2 channels (UMG 605/604 outputs) without feedback
Emax-H-10A	Maximum 10 channels with 1 x FBM10 R-NC without feedback
Emax-H-10AE	Maximum 10 channels with 1 x FBM10 R-NC and 1 x FBM10I for feedback
Emax-H-20A	Maximum 20 channels with 2 x FBM10 R-NC without feedback
Emax-H-20AE	Maximum 20 channels with 2 x FBM10 R-NC and 2 x FBM10I for feedback
Emax-H-30A	Maximum 30 channels with 3 x FBM10 R-NC without feedback
Emax-H-30AE	Maximum 30 channels with 3 x FBM10 R-NC and 3 x FBM10I for feedback
Emax-H-40A	Maximum 40 channels with 4 x FBM10 R-NC without feedback
Emax-H-40AE	Maximum 40 channels with 4 x FBM10 R-NC and 4 x FBM10I for feedback
Emax-H-50A	Maximum 50 channels with 5 x FBM10 R-NC without feedback
Emax-H-50AE	Maximum 50 channels with 5 x FBM10 R-NC and 5 x FBM10I for feedback
Emax-H-60A	Maximum 60 channels with 6 x FBM10 R-NC without feedback
Emax-H-60AE	Maximum 60 channels with 6 x FBM10 R-NC and 6 x FBM10I for feedback

Emax APP for UMG 508/UMG 511 Item number 51.00.214

This app includes the following configuration variants	
Emax-D-05A	Maximum 5 channels via the UMG 508/511 outputs without feedback
Emax-D-05AE	Maximum 5 channels via the UMG 508/511 outputs with 5 x feedback via the UMG 508/511 inputs
Emax-D-15A	Maximum 10 channels with 1 x FBM10 R-NC, in addition, 5 UMG 508/511 outputs are used each
Emax-D-15AE	Maximum 10 channels with 1 x FBM10 R-NC and 1 x FBM10I for feedback In addition, 5 UMG 508/511 inputs/outputs are used each
Emax-D-25A	Maximum 20 channels with 2 x FBM10R-NC, in addition, 5 UMG 508/511 outputs are used each
Emax-D-25AE	Maximum 20 channels with 2 x FBM10 R-NC and 2 x FBM10I for feedback In addition, 5 UMG 508/511 inputs/outputs are used each
Emax-D-35A	Maximum 30 channels with 3 x FBM10R-NC, in addition, 5 UMG 508/511 outputs are used each
Emax-D-35AE	Maximum 30 channels with 3 x FBM10 R-NC and 3 x FBM10I for feedback In addition, 5 UMG 508/511 inputs/outputs are used each
Emax-D-45A	Maximum 40 channels with 4 x FBM10R-NC, in addition, 5 UMG 508/511 outputs are used each
Emax-D-45AE	Maximum 40 channels with 4 x FBM10 R-NC and 4 x FBM10I for feedback In addition, 5 UMG 508/511 inputs/outputs are used each
Emax-D-55A	Maximum 50 channels with 5 x FBM10R-NC maximum 50 channels with 5 x FBM10R-NC
Emax-D-55AE	Maximum 50 channels with 5 x FBM10 R-NC and 5 x FBM10I for feedback In addition, 5 UMG 508/511 inputs/outputs are used each
Emax-D-64A	Maximum 60 channels with 6 x FBM10R-NC, in addition, 4 UMG 508/511 outputs are used each
Emax-D-64AE	Maximum 60 channels with 6 x FBM10 R-NC and 6 x FBM10I for feedback In addition, 4 UMG 508/511 inputs/outputs are used each

Maximum configuration level with the UMG 508/UMG 511: 64 channels with 64 feedbacks

Emax APP SPS Communication Modbus/Profibus

Emax APP for UMG 604 and UMG 605 SPS communication modbus/profibus	**Item no.: 51.00.215**
Emax APP for UMG 508 and UMG 511 SPS communication modbus/profibus	**Item no.: 51.00.216**
APP add-on profibus for UMG 604, UMG 605, UMG 508 and UMG 511	**Item no.: 51.00.217**

The APPs for SPS communication do not incorporate a control for function modules. Switch-offs for these APPs must be performed via the GLT/SPS. Switch-off actions are added to global register addresses for modbus TCP/IP or modbus RTU. For profibus communication you should also install the profibus add-on APP to App Emax. The add-on installs an additional profile. Nominal value switching and feedback processing are also possible via the profibus. Measurement period reset is not possible via either the modbus or profibus. Measurement period reset is only possible via a digital input.

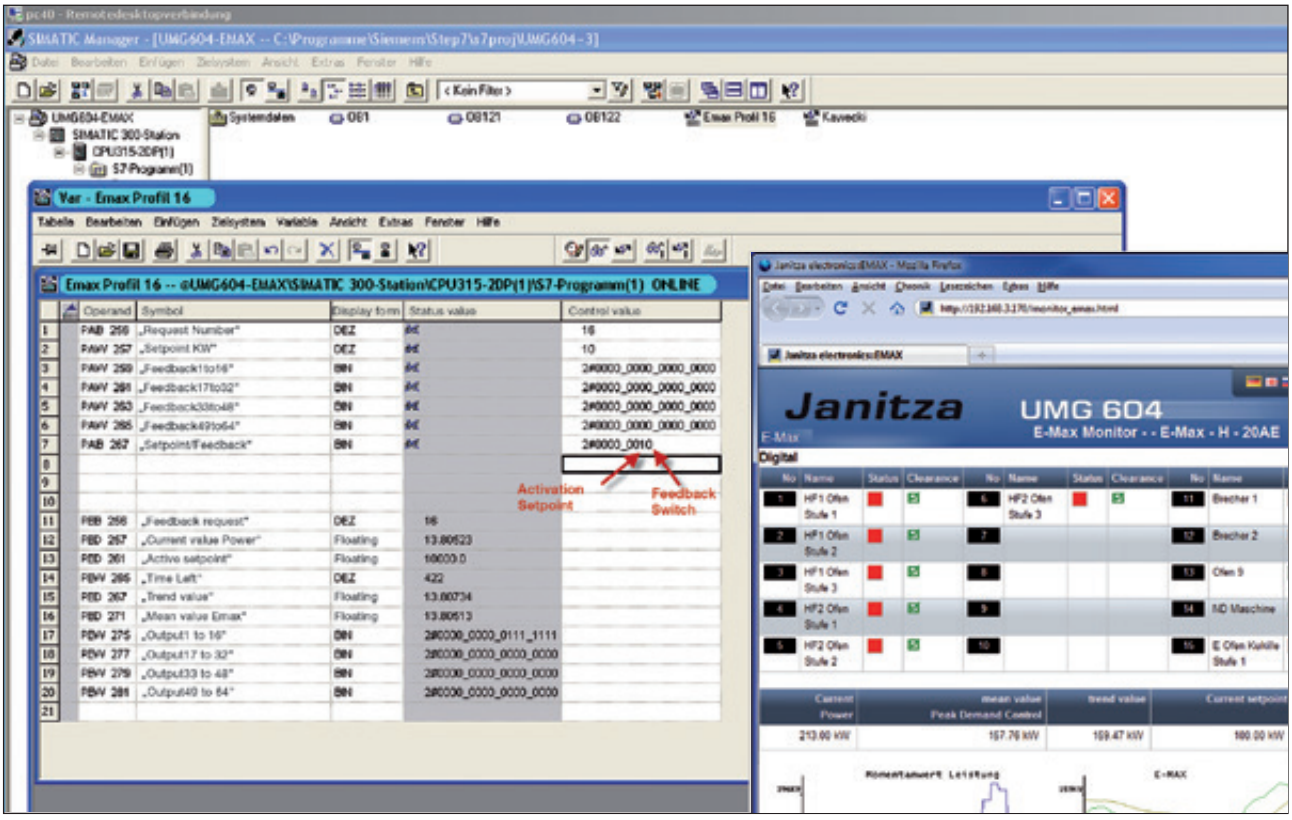
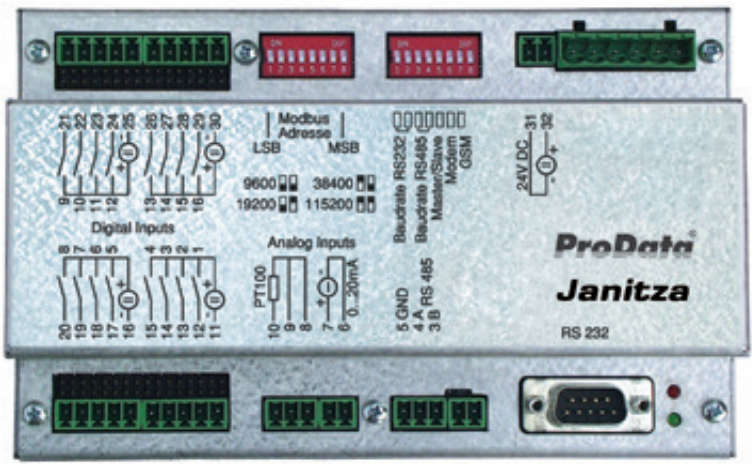


Illustration: Example of PLC profibus use



ProData® data logger

Data collection and recording

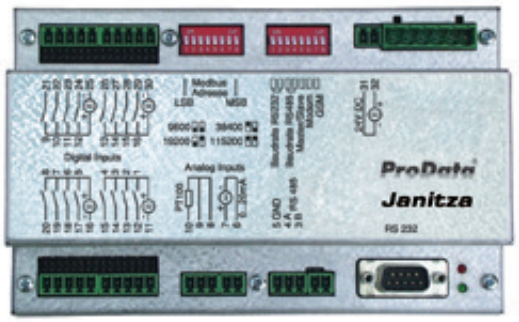
ProData® data loggers are used for the collection of any physical measurement data (temperature, pressure, ...) or any consumption values (electricity, water, gas, coolant...). ProData® data loggers consist of a programmable microprocessor, storage media, several interfaces and 16 channels for connecting sensors or pulse generators. External sensors are used to collect the measurement data and convert it with analogue-digital converters into "memory-safe" data in order to be able to be stored by the ProData® storage media. The collected data is read out through an interface and is analysed with suitable software. The ProData® can also be configured for the application through one of these interfaces (e.g. measurement intervals etc). Data loggers are indispensable for energy management systems e.g. for cost centre management. ProData® data loggers are also indispensable in the field of status monitoring.

Areas of application

- Data collection and recording of meter values
- Electricity cost data collection and cost centre management
- Analysis of process data
- Condition monitoring

ProData® data logger

The ProData® data logger is suitable for collecting data and recording meter values.



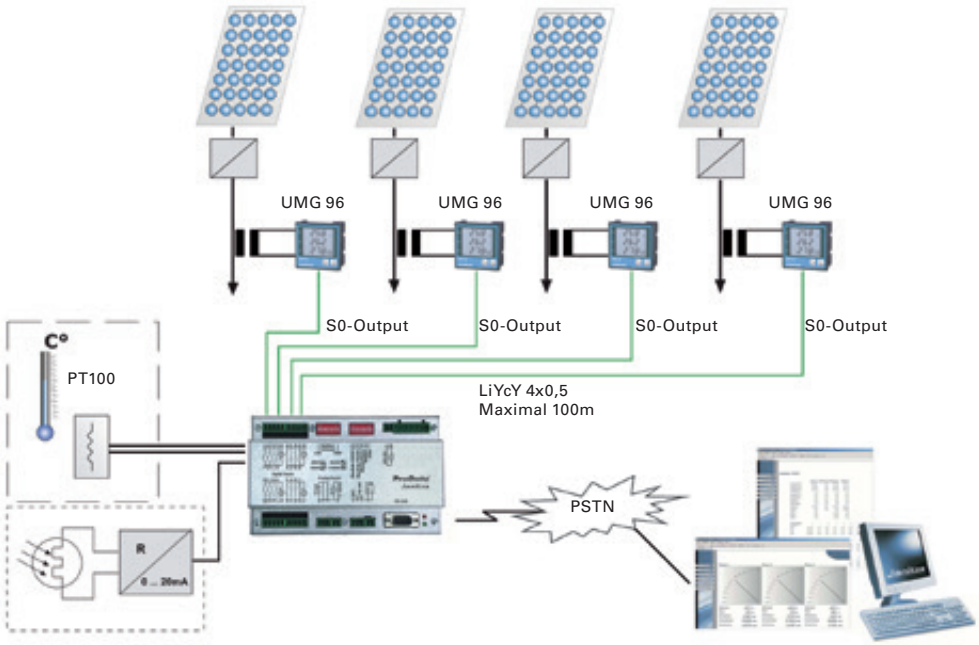
Main features

- The collection and recording of meter values
- 16 digital inputs (Connection of 15 meters; one input reserved as tariff input)
- 64 bit counter
- RS232, RS485, Modbus
- 1 analogue input
- 1 temperature input
- Including GridVis software

Data recording

The analogue measurement values can be recorded in set time intervals (1 sec ...12h) as minimum, average and maximum values. In the set time intervals (1 sec ...12h), the difference between the overall meter readings and the meter reading at the last recording time is shown. The ring buffer for the values storage consists of 430KB and is sufficient for 3 months if the digital counters are recorded every 15 minutes.

Application example – photovoltaic



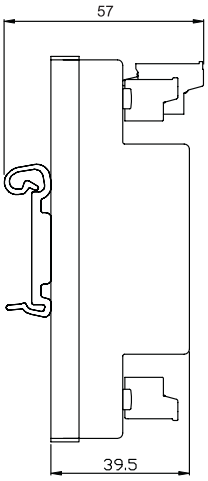
Analogue inputs
- 1 analogue input 0 (4) – 20mA, -20/20mA programmable
- 1 input for temperature sensor: PT100, PT200, PT500, PT1000, NTC10k oder KTY83

The measurement values can be read through Modbus.

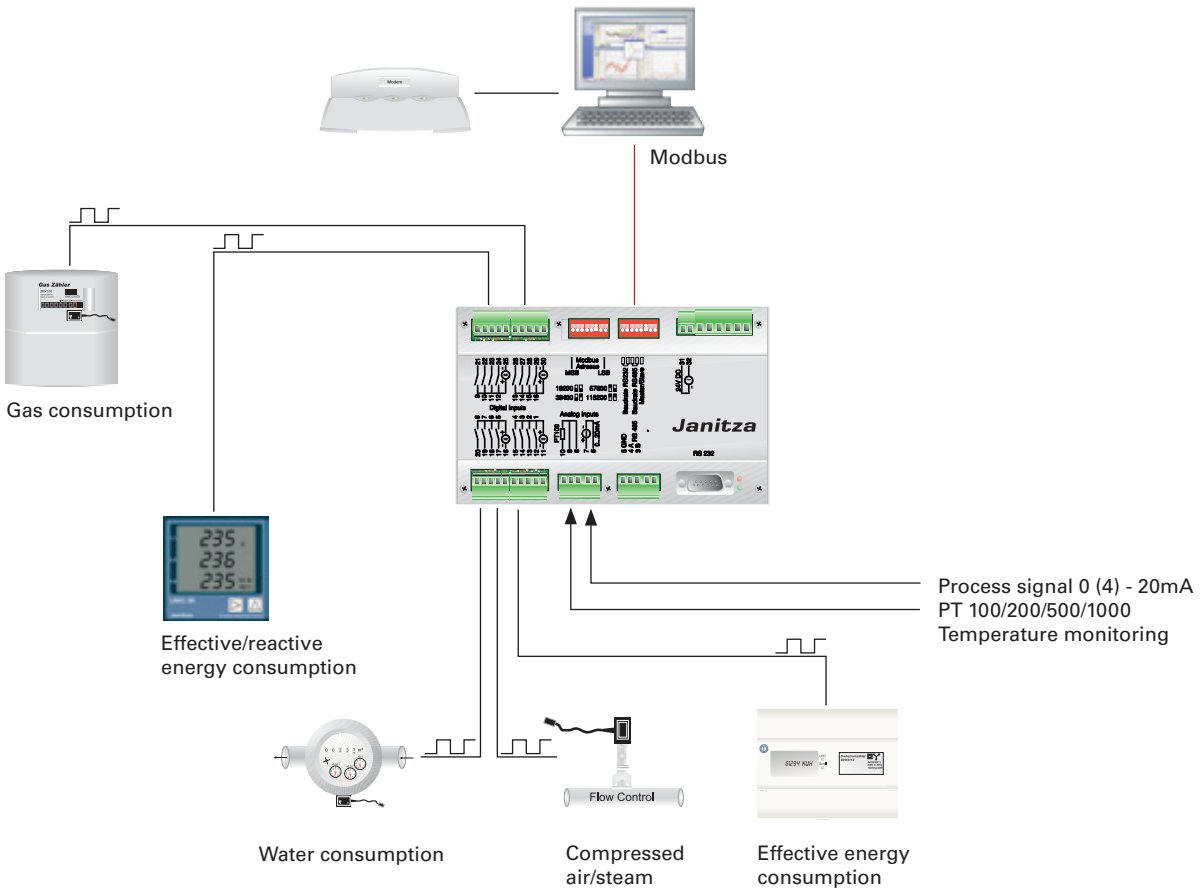
Digital inputs
16 digital inputs can be used as:
- An overall pulse counter at each input – maximum frequency 50Hz, 64 bit counter
- Frequency measurement on each input for monitoring flow quantities, power etc.

The stated measurement values can be read through the Modbus. The digital inputs (4x4) can be set as pulse (S0 interface) or as signal inputs using jumpers.

Dimensional drawing



Typical application



Overview of product variants

Description	Type	Item number
Data logger	ProData®	**52.11.001**
External power supply	24VDC	**16.05.002**

General technical data

Supply voltage	External power supply is necessary	24VDC (+15/-35%)
Overvoltage category		CAT II
Weight		660g
Dimensions		W=174mm x H=110mm x D=57mm
Mounting		DIN rail
Working temperature		-10…55 °C
Storage temperature		-20…60°C
Protection class	According EN60529	IP 20

Measurement range

Effective energy (kWh) purchase/supply	Through the pulse input	yes
Reactive energy (Karh), inductive/capacitive	Through the pulse input	yes
Apparent energy	Through the pulse input	yes
Temperature measurement input	-150…400°C	Accuracy: ± 1°C
Analogue input	4…20mA	Accuracy: ± 0.3mA

Features

Consumption data collection		
Memory size		430kB
Clock		± 1 minute per month
Event recording		yes

Periphery

Digital inputs	As status or pulse input	16 (max. 50Hz, 64 bit counter)
Temperature measurement input	Pt100, Pt200, Pt500, Pt1000, NTC10k, KTY83	1
Analogue input	4…20mA, scaleable	1
Software GridVis		yes

Communication

Interfaces		
RS 232	9.6, 19.2, 38.4, 115.2 kbps	yes
RS 485	9.6, 19.2, 38.4, 115.2 kbps	yes
Protocols		
Modbus RTU		yes

Power factor controller Prophi® **129**

- Power factor controller for use in conventional and dynamic (fast switching) PFC systems
- Hybrid switching (conventional and dynamic PFC are mixed)
- Protocols: Profibus DP V0 + Modbus (RTU) slave

PFC system lifespan Prophi®

Optimised control for long

The Prophi® power factor controller has an optimised control mode. The implemented control algorithms reduces the number of switching cycles as well as the operating time per capacitor stage.

The aim is to have the same number of switching cycles and, if possible, the same operating time per capacitor stage. In addition, the number of switching cycles is reduced by up to 80%.

The lifespan of the entire system can be significantly increased through even loading of all stages with an automatically regulated PFC system. This means that invested capital earns money for a longer time period and that new investments can be avoided.

The hybrid switching (i.e. the combination of capacitor contactors and dynamic thyristor modules for contact-free rapid switching of capacitors) combines the advantages of rapid switching without network perturbation with the cost advantages of common PFC systems.

Power factor controller Prophi®

Applications

PFC systems are used to discharge unnecessarily overloaded supply systems through inductive reactive power and to save reactive consumption costs. The reactive power controller is the main part of a PFC system and automatically switches capacitors steps on or off. The Prophi® power factor controller is suitable for use in conventional and dynamic PFC systems. A mixed operation (hybrid switching) is possible as well.

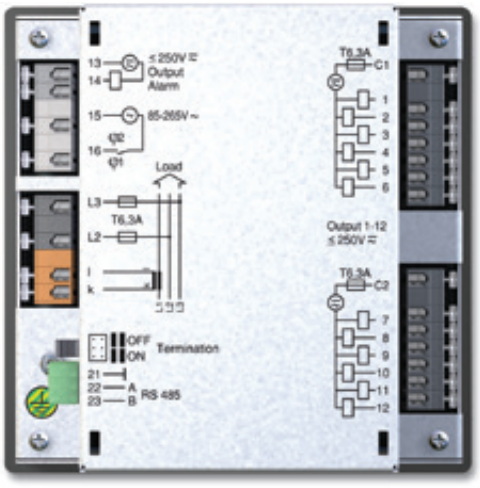


Illustration: Reverse of Prophi® 12RS

Features

- Automatic configuration
- Display of U, I, f, Q, P, S, cos-phi, uneven current and voltage harmonics, 1-19th
- Display of capacitor currents
- Display of switching cycles per capacitor step
- Display of capacitor step connection time
- Zero voltage release within 15ms
- Detuning degree in % is programmable for each step from 0-20%
- Setting of discharging time for all capacitor steps from 0-1200 secs
- Capacitor power can be individually programmed
- Temperature sensor for ventilator control
- Excess temperature shutdown can be programmed
- Control of external semiconductors (max. 50 switch actions per second)
- Current transformer input for ../1A and ../5A
- Automatic or manual configuration
- Password protection
- External target cos-phi changeover

Alarm output is programmable for:

- Under-voltage recognition
- Over voltage recognition
- Under-compensation
- Measurement current exceeding
- Harmonic limit value
- Supply of effective power
- Excess temperature

Functional principle

The single-phase electronic measuring system collects the reactive and effective current ratios of the network through the current and voltage measurement. Using the current from one phase and the voltage from the other two phases, the reactive power controller calculates the necessary reactive power to achieve the set target power factor. The capacitor steps are switched on or off if any differences occur and the reactive power controller differentiates between the switching of capacitors through contactors or thyristors. The control through capacitor contactors is optimised; this means that the reactive power factor controller achieves the cos-phi target with a minimum of switching actions. The transistor outputs control the semiconductor switches for almost immediate compensation of any differences.

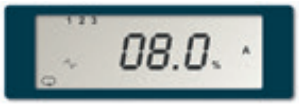
Ventilator control
Simple ventilator controls can be developed with the temperature sensor which is built into the Prophi® and a ventilator. A relay output or the alarm relay is used for controlling the ventilators. The upper/lower temperature limit can be programmed for this feature.

Automatic configuration
The "LEARN" function offers the opportunity to learn the connection configuration of the power factor controller and save it.

LCD display
The Prophi® power factor controller has a high-quality LCD display with high contrast. Extensive measurement parameters (approx. 100 measurement values) can be displayed via LCD.

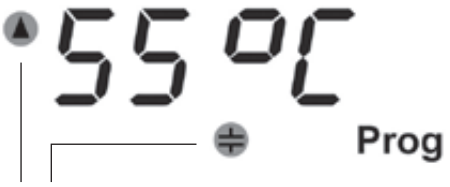
Display examples: voltage

reactive power



harmonics

Excess temperature shutdown
Connected capacitor steps can be disconnected with the excess temperature shutdown function in order to reduce the temperature inside the PFC-system cabinet and to protect the capacitors. The upper/lower limit temperature and pause time can be set by the user.



Upper limit temperature

Interface
The Prophi® power factor controller is equipped with a RS485 interface depending upon the product variant. The Modbus RTU or Profibus DPV0 protocols are available through the RS485 in order to interconnect the Prophi® or connect it to PLC systems.

Communication speed: 9.6, 19.2, 38.4, 57.6, 115.2 kBit/s
Profibus: up to 1.5 MBit/s

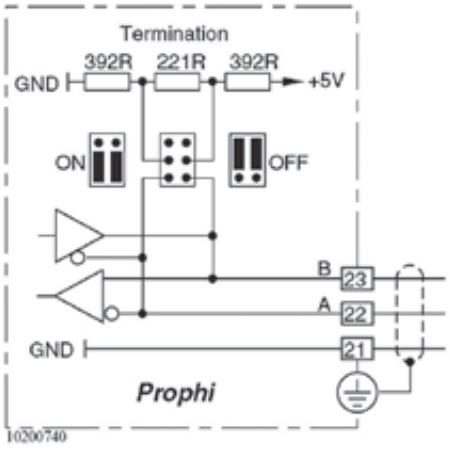


Illustration: RS485 interface terminal configuration

Overview of product variants

Relay outputs (conventional)	Transistor outputs (dynamic)	Alarm output	Target cos-phi change over 1/2	Measurement and auxiliary voltage 400V AC (+10%, -15%) *1	RS 485 interface *2	GridVis software	Type	Item number
6	-	•	-	•	-	-	**Prophi® 6R**	**52.08.002**
12	-	•	•	•	-	-	**Prophi® 12 R**	**52.08.003**
-	6	•	-	•	-	-	**Prophi® 6T**	**52.08.005**
-	12	•	•	•	-	-	**Prophi® 12T**	**52.08.006**
6	6	•	•	•	-	-	**Prophi® 6T6R**	**52.08.007**
12	-	•	•	•	•	o	**Prophi® 12RS**	**52.08.008**
6	6	•	•	•	•	o	**Prophi® 6T6RS**	**52.08.009**
-	12	•	•	•	•	o	**Prophi® 12TS**	**52.08.091**

• = Included - = Not possible o = Option *1 optional measurement and auxiliary voltage 100V, 110V, 200V, 230V, 440V AC (+10% - 15%)
*2 not possible at 50 switching actions per second

General technical data

Operating voltage L-L, L-N AC		Refer to product overview
Overvoltage category		CAT III
Quadrants		4
Sampling rate		3.2 kHz (at 50Hz)
Weight		1kg
Dimensions		W=144mm x H=144mm x D=49mm
Mounting		Front panel installation
Working temperature range		-10…55 °C
Storage temperature range		-20…60 °C
Connectable conductors (U/I)	Single wire, multi-wire, fine-wire, pin cable lugs, ferrule	0.08 - 2.5 mm² 1.5 mm²
Protection class (front/reverse)	According to EN60529	IP 50/20

Measurement range

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

Measurement values

Voltage	1 phase L-N or L-L	Accuracy: ± 0.5%
Current	1 phase	Accuracy: ± 0.5%
Effective, apparent and reactive power	Sum L1-L3	Accuracy: ± 1%
cos-phi	Sum L1-L3	Accuracy: ± 1%
Frequency of mains		Accuracy: ± 0.5%
Minimum and maximum values		yes

Power quality

Harmonics 1st to 19th, uneven	Current, voltage 1-phase	Accuracy: ± 2%
Distortion factor THD-U in %	1-phase	yes
Distortion factor THD-I in %	1-phase	yes

Features

Capacitor current		yes
Capacitor opertion time		yes
No. of switching per step		yes
Zero voltage release		yes
Automatic configuration		yes
Password protection		yes

Periphery

Relay outputs	As switch output	6 or 12, refer to product overview
Transistor outputs	As switch output	6 or 12, refer to product overview
Alarm output	As status output	1
Digital input	For tariff change over	1, refer to product overview
Temperature sensor	Internal	1
Software GridVis		yes

Communication

Interfaces		
RS 485	9.6, 19.2, 38.4, 57,6, 115.2 kbps	Yes, refer to product overview
Profibus DP V0	9.6 kbps to 1.5 Mbps	Yes, refer to product overview
Protocols		
Modbus RTU		Yes, refer to product overview
Profibus DP V0		Yes, refer to product overview

Typical connection

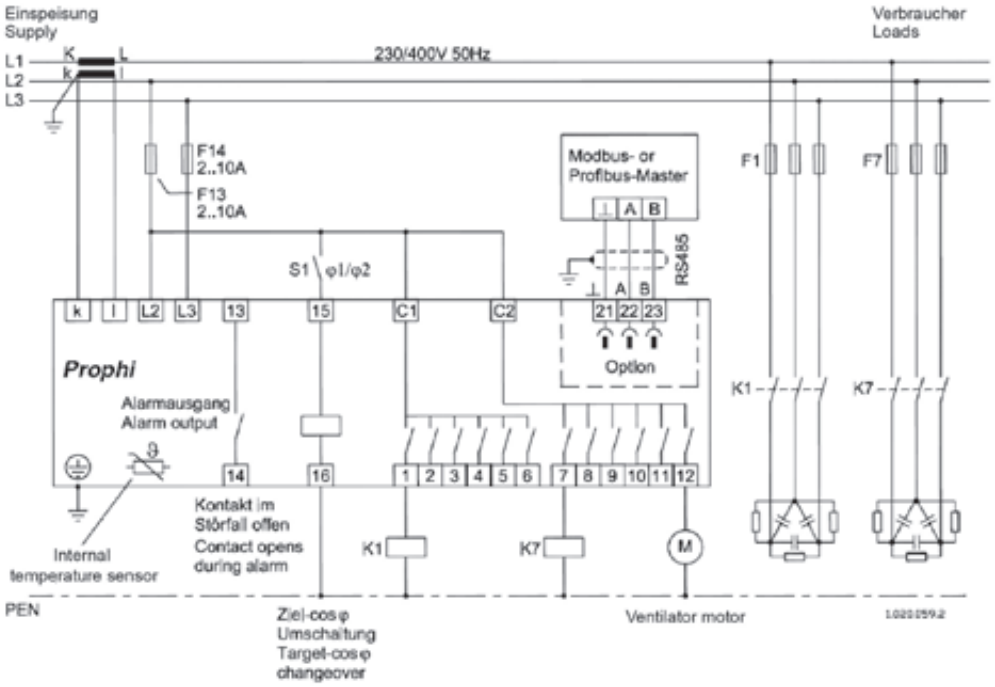
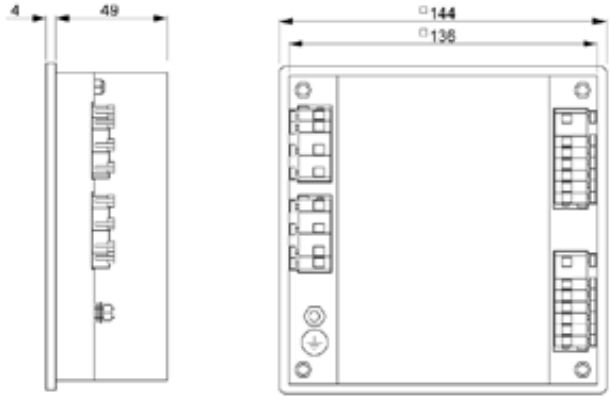


Illustration: connection example - Prophi® power factor controller 12 RS (item no. 52.08.008) with L2-L3 voltage measurement, 12 relay outputs, target cos-phi changeover, alarm output and RS485 interface.

Dimensional drawing



(all dimensions in mm)

Connection illustration

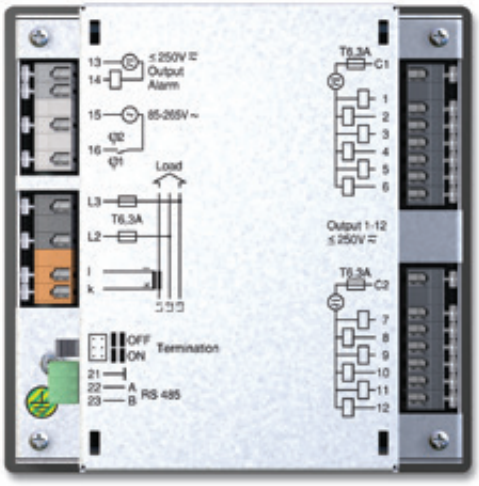
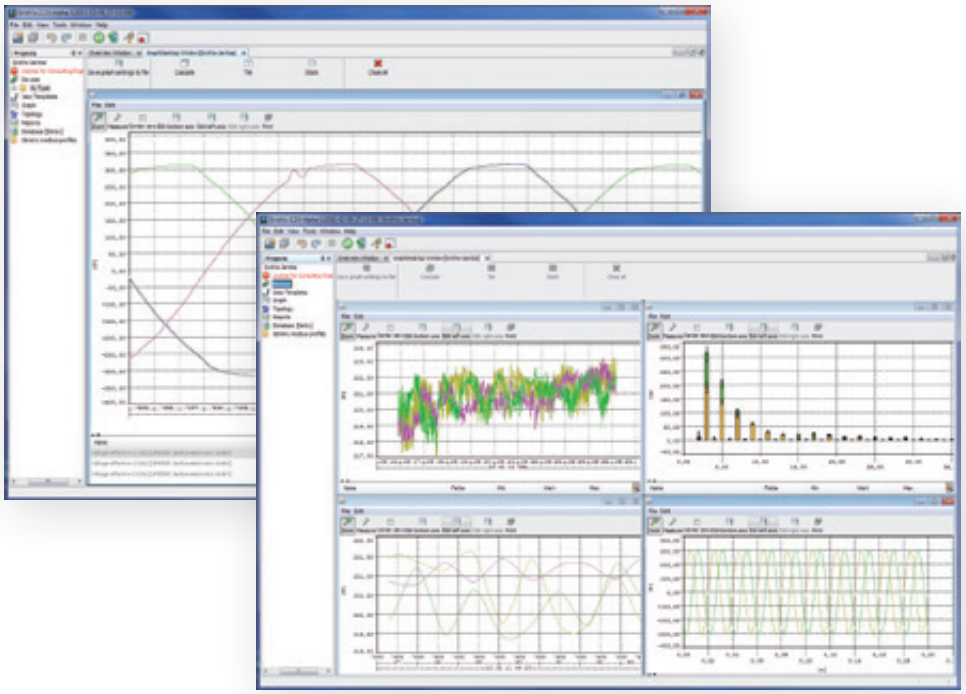


Illustration: Prophi® 12 RS, reverse side



Software solutions – especially adapted to suit you

In the field of energy management, the processing and analysis of energy data and measurement data for electrical power quality is the main focus. All important measurement data should be able to be documented without any interruptions in order to be able to find reasons for production breakdowns, manufacturing problems or quality defects. For example, the chronological arrangement of voltage fluctuations, harmonics or network failures can prove whether these are the causes of the occurring problems. If insufficient power quality is identified within time, increased wear and tear or the ruin of electrical supply systems and equipment can be avoided and the danger of fire can be significantly reduced. Load profiles and consumption can be analysed to introduce measures for the improvement of energy efficiency.

The GridVis software systems of Janitza electronics® GmbH, is suitable for programming and configuring power quality analysers, power analysers, universal measurement instruments, data loggers and reactive power controllers as well as for the administration and visualisation of all measured data. The electrical data from companies can be monitored at a glance in the topology overviews. The measured values are written in the data memories of the units or directly online in databases and can then be presented as line graphs, bar charts or histograms.

Power quality reports can be created from the database for measuring instruments according to actual regulations (e.g. EN 50160).

Illustration: GridVis with 4 measurement windows and phasor diagram

Illustration: GridVis screen with historical analysis

GridVis EM & PQS-system-software

Grid visualisation for more transparency in the network

The GridVis Basic software is part of the standard package supplied with the power quality analysers, power analysers, universal measuring devices, data logger and power factor controller.

This software can be used to present the measurement values as actual values online and a graphic presentation of the values read from the measurement value memory is also possible.

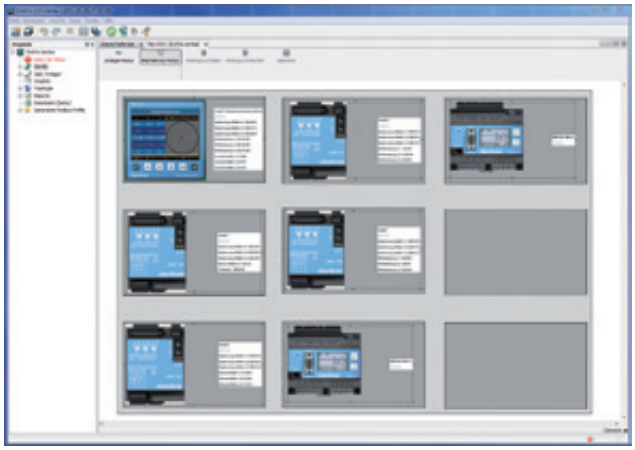
The topology overview guarantees a quick overview of the complete electrical network. The GridVis software also serves the purpose of parameterisation of the measurement instruments. Furthermore, the creation of customer-specific programs is possible using our own developed programming language, Jasic®, or the user-friendly graphic programming periphery.

NEW! PQDIF-Tool

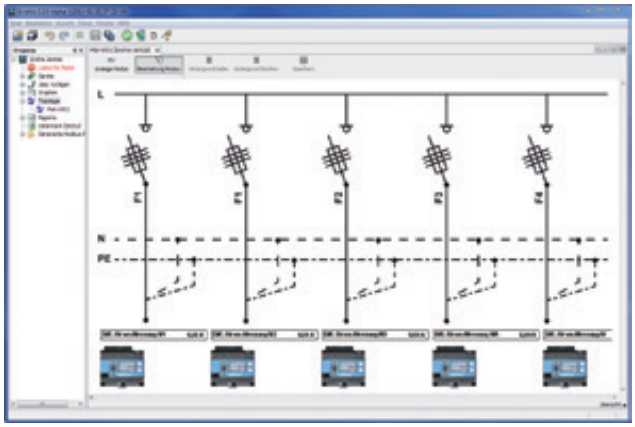
GridVis

Software for grid visualisation

The GridVis software for programming and grid visualisation, which is part of the standard delivery package of all power meters, enables a simple and complete parameterisation of the power analysers. Customer specific visualisation of the energy supply is possible with the topology view. The individual measurement instrument can also be operated online using the mouse, if the corresponding device supports this feature. Measurement data can be directly recorded on the PC in online graphs. Furthermore, GridVis offers convenient opportunities for presentation and analysis of historical data from the database.



The automatic ring buffer download and integrated data management has a particular positive effect in medium and large sized projects as data can be stored in various database formats. With the graphical programming, user specific programs can be created for the measurement instrument families UMG 604, UMG 605, UMG 508 and UMG 511.



Main features

- Easy operation
- Visualisation of measurement values, parameters and topologies
- Configuration of the system and measuring instruments
- Measurement device management
- Automatic or manual data readout
- Graphical presentation of online measurement values and historical datas
- Two categories of data in a graph represented
- Visualisation of any number of measuring values in each category within one graph, even of different UMGs
- Free selectable graph drawing (step-, line-, cubic-, difference- and bargraph-painter)
- Presentation of mean values in a graph
- Export function of measurement values into a CSV file
- Storage of the data in a database incl. a database management
- Central database access by all clients (not with Derby-Database)
- Topology views (configurable topology views with selectable register-level)
- Graphical programming of user programs or programming with Jasic® source code
- APPs management (device-specific applications)
- Parameterisation, visualisation, data management and analysis
- Customizable schedules for example, report generator
- Measurement data analysis and report generator (costs and power quality)
- Limit value display
- Watchdog
- Pre-configured profiles for recording and fieldbus
- Use of virtual devices

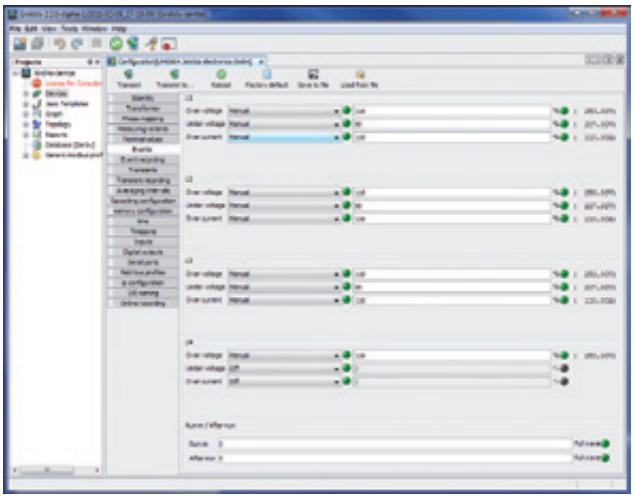


Illustration: Configuration of power analyser UMG 604

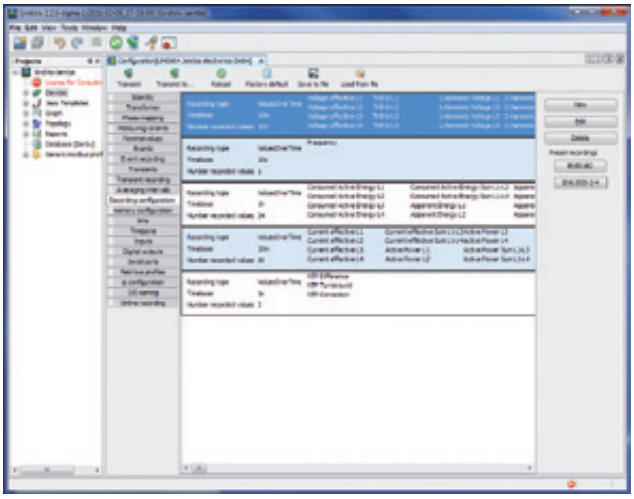


Illustration: Pre-configured recording profiles

Applications

- The development of extensive energy management systems
- Visualisation of energy supplies with the help of a topology view
- Documentation of power quality for freely definable periods of time
- Analysis of the root causes of faults
- Cost centre management i.e. simple and precise electricity cost calculation
- Stabilisation of energy supply through the alarm function when limit values are exceeded e.g. overvoltage or short-term interruption
- Improvement of power quality e.g. harmonic analysis for fault detection
- Load profile analysis e.g. consumption prognosis for electricity contract negotiations
- Online storage of up to 10 devices without memory

Programming and configuration

Using the software GridVis all power analysers are completely configurable. Any name can be given to the instruments and connection mode and PTs and CTs ratio values can be set. Trigger values for the measurement of events and transients, as well as the measurement values which are to be stored and their recording intervals are determined. Limit values for the monitoring function of the digital outputs are programmed using the comparator or the pulse value for the digital inputs or outputs is established.

The external temperature sensor can be selected. The time server for time synchronisation is also determined. If it is necessary to carry out an update on the measuring instruments, this can conveniently be done by the software without the instrument having to be dismantled or returned to Janitza.

The most recent updates for software and instrument firmware are available free of charge at www.janitza.de.

Online data

The software GridVis allows an individual collection, reading out and visualisation of online data. The received data of multiple measuring points are collected, saved, processed, visualised and provided for further use. All measured values are available in the mode of online measurement either as a line graph or bar graph. The line graphs are permanently actualised and the most obsolete data are cancelled. Two scales can be created for two different units per graph. Any number of measurement data from each unit, including from several measurement instruments, can be observed in the same graph. In the graphs, the indication of transients and events is displayed. The colour of the graphs can be adjusted as required.

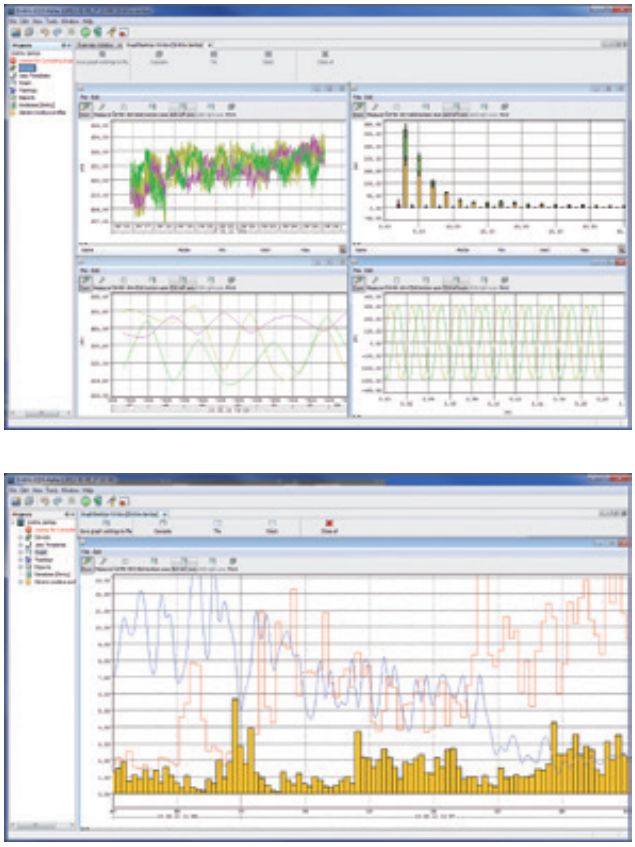


Illustration: GridVis indication of various online data

Virtual device: combine measured values

The creation of a virtual device allows measured values to be „combined“ within the GridVis. Therefore, it is possible to make different data sources from a range of measurement devices available to the virtual device as an input.

Mathematical connection of input sources can be realised using operators, and various and freely-definable outputs can be assigned.

The virtual device appears as a real measurement device within the GridVis. The capture, readout and visualisation of online and historical data is carried out analogous to the actual measurement devices.

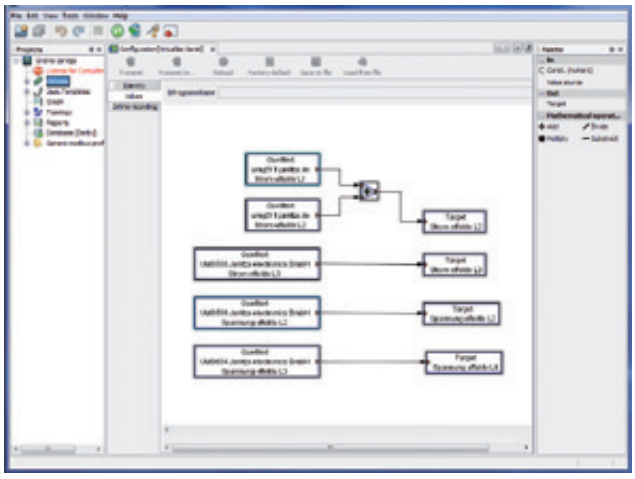
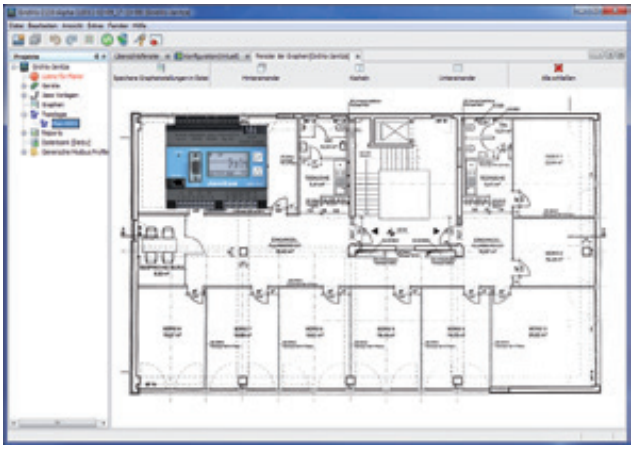


Illustration: Configuration of a virtual device



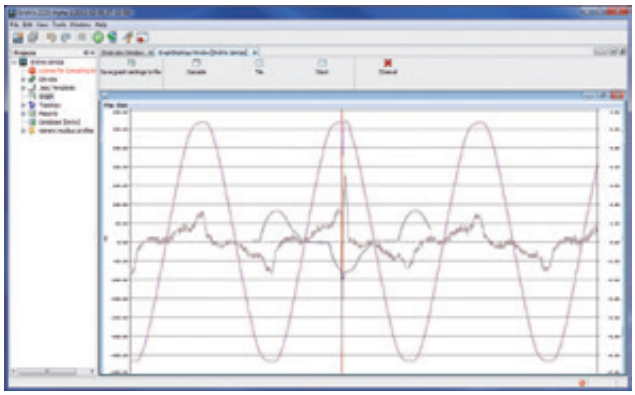


Illustration: Transients

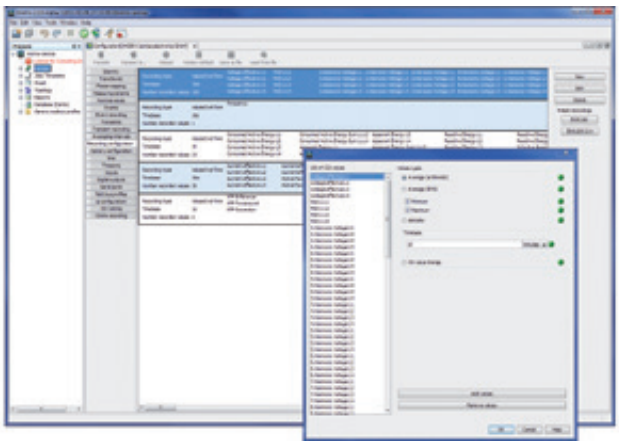


Illustration: Freely configurable data memory and average time

Topology View (Graphical User Interface)
A device view of any instrument in the network can be called up. Beside watching the actual display, you may also remotely control the complete instrument as if you were on site. All measured data can be displayed simultaneously. The topology gives a quick overview of the energy distributions and the possibility to locate power failures by comparing measuring points and checking the defined tolerances at a glance.

Depositing some graphical files (common formats such as.jpg) with circuit diagrams, flow processes or building plans and binding of the corresponding instruments by drag and drop to their real position, you can establish customer specific solutions quickly and simply. Limit violations e.g. high THD-V as well as conditions of inputs or outputs can be indicated as well.

Event and transient browser
With the two functions EVENT- and TRANSIENT-browser, freely definable time periods can be checked regarding occurred events and transients. These functions (e.g. illustration: transient browser) are especially essential for failure analysis.

Data memory
Most measuring instruments have a memory. Reading out the memory, the data are saved within a database. e.g. Derby, SQL and MySQL are available. The most preferable databases are MySQL or Microsoft SQL server databases, as they are much faster than the derby database, which is of importance especially in large projects. MySQL can be downloaded free of charge at www.MySQL.org.

Offline data

Data stored in the GridVis database can be displayed as line graphs, bar graphs or histograms. Also parameters such as year, month and day are stored. Therefore, the data can be easily selected. Particularly interesting periods of time can be enlarged with the zoom feature. The graphs can be provided with titles and comments and be printed out. The display of transients and events also takes place here within the transient and event browser. The flag browser can be used to examine whether measurement data are missing at certain periods of time or whether the data are not reliable. With the analysis of historical data you can build load profiles for exact demand analysis to opain optimised supply contracts. Also failure analysis by comparing various parameters can be carried out by a few mouse clicks.

Important parameters of the electrical energy supply must be measured and monitored within the context of energy analysis. The data sets provided by the measurement devices are displayed in the GridVis online as an instantaneous value or from historical values. Analysis of these data is possible using the report and statistics generators in the GridVis, where the most important parameters are presented in tabular or graphic form. Individual reports are generated automatically using freely-definable schedules or manually generated by the user. Reports can be produced in paper format or as an HTML, XML, Excel, Word or PDF file.

- Power quality reports in accordance with EN50160 and EN61000-2-4
- Current quality reports in accordance with EN50160-IEEE519
- Power reports for the power quality
- Statistic functions
- Energy consumption/cost centre reports

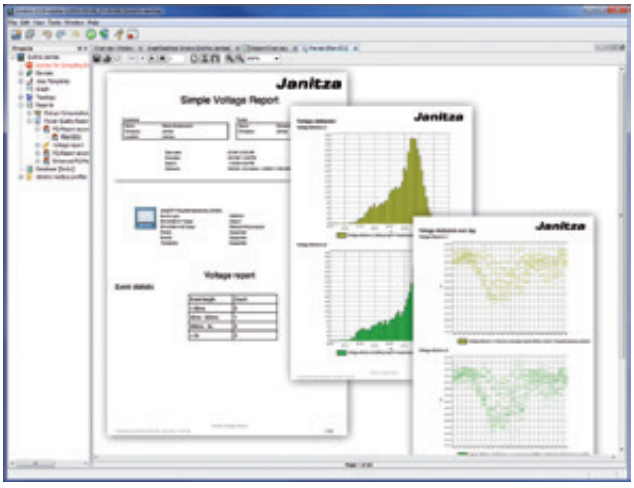


Illustration: Display of electrical parameters in accordance with standard EN61000-2-4 in tabular and graphic form.

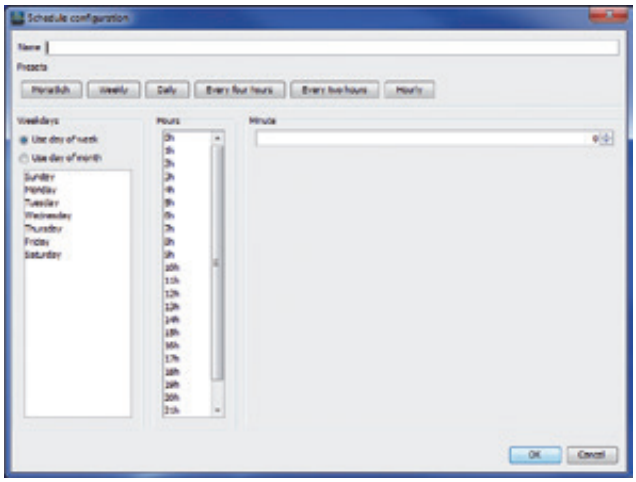


Illustration: Schedule configuration

Illustration: Report display of power quality (simple report)

Software licenses • GridVis driver license model are valid until 30.04.2012

Description			Item number
GridVis Lizenz	Graphic programming module (write/read Modbus)	Allows the „read/write modbus“ function module in the graphical programme editor to be used. This function may be used by measurement devices that support Jasic® (such as UMG 604, UMG 508 etc.). Consequently, measured values are exchanged amongst one another via modbus TCP/IP (port 502) or modbus RTU and processed in Jasic® programmes.	**51.00.117**
GridVis Lizenz	Database driver for SQL server (MS SQL / MySQL database)	Enables data exchange between the GridVis and an SQLServer. Without the driver, the GridVis uses the integrated Derby database. MS SQL databases from 2005 and MySQL databanks from version 5 are supported. Note: MS SQL Express versions cannot be connected with this driver!	**51.00.123**
GridVis Lizenz	Devices driver for generic Modbus devices	In addition to devices from the Janitza UMG family, third-party devices with modbus TCP/IP (port 502) or modbus RTU protocol may be integrated. Optional profile for reading out the devices/register may be created. The generic measurement devices may be integrated into and analysed in reports, graphs and topology. Measured value archiving can be configured with the aid of the online readout. In order for online readout to function, the GridVis software must run at all times.	**51.00.120**
GridVis Lizenz	Virtual device	Additional virtual measurement points may be added. This function allows items such as measurement devices/measurement points to be added and thus organised into categories or groups. The configuration allows basic mathematical operations such as addition, subtraction, division and multiplication to be performed. Individual measured values can be linked from multiple measurement points. The virtual measurement devices may be integrated into reports, graphs and topology and analysed either historically or live.	**51.00.121**
GridVis Lizenz	Service	Background process (program runs in the background) with automatic collection of data and storage in the database.	**51.00.124**

The GridVis driver licenses will be maintained until 31.12.2013.

Software versions • GridVis license model are valid from 01.05.2012

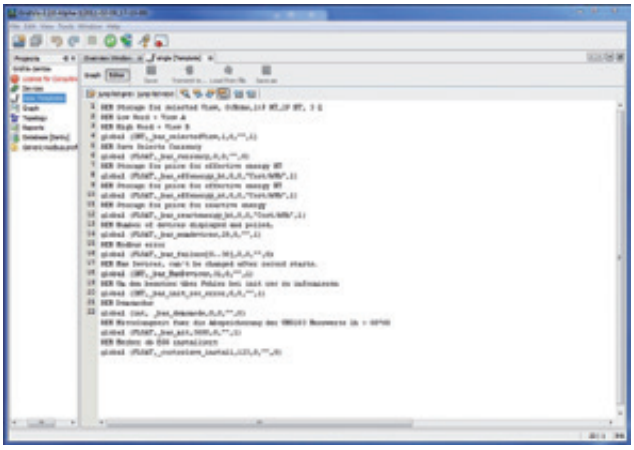
Description	Basic	Professional	Enterprise	Service
Installations (desktop)	1	3	5	5
Installations (service / WEB)	0	0	0	2
Number of measurement devices	5	not limited	not limited	not limited
Update period	not limited	1 year	1 year	1 year
Telephone support	not limited	not limited	not limited	not limited
Graphs	•	•	•	•*1
Database JanDB / Derby	•	•	•	•*1
Manual reports	•	•	•	•
Graphical programming	•	•	•	•*1
Topology	•	•	•	•*1
MS SQL / MySQL	-	•	•	•
Automatic reading	-	•	•	•
Virtual device	-	•	•	•
Automatic CSV export	-	-	•*2	•*2
Generic ModBus	-	-	•	•
Graphic programming module (write/read Modbus)	-	-	•	•*1
Cost centers	-	-	•	•
Automatic reports	-	-	•	•*1
Online recording	-	-	-	•
Service	-	-	-	•
Item number	**51.00.116**	**51.00.160**	**51.00.170**	**51.00.180**

*1 This feature is only available in conjunction with the GridVis installation on the desktop.
*2 For automatical CSV-Export you have to demand on the service „Creation of Groovy scripts“ with article no. 51.01.015.

Number of devices: Maximum quantity of simultaneous running devices (i. e. by using the basic version: one project with 5 devices or 5 projects with one device each).
Update period: Period of time where new versions can be installed free of charge.
Automatic reading: Automatic download of measurement data according free configurable schedules.
Online recording: Measuring values of devices without memory will be averaged in the GridVis-Software.
Automatic CSV export: An automatic download of values enabled an automatic CSV-Export.
Service: The GridVis-Software is running in the background and will start automatically without user login on the computer and will record the values of the devices. GridVis Enterprise will be included in the package and will be necessary for the configuration and the handling of data.

Unlimited Programming Options

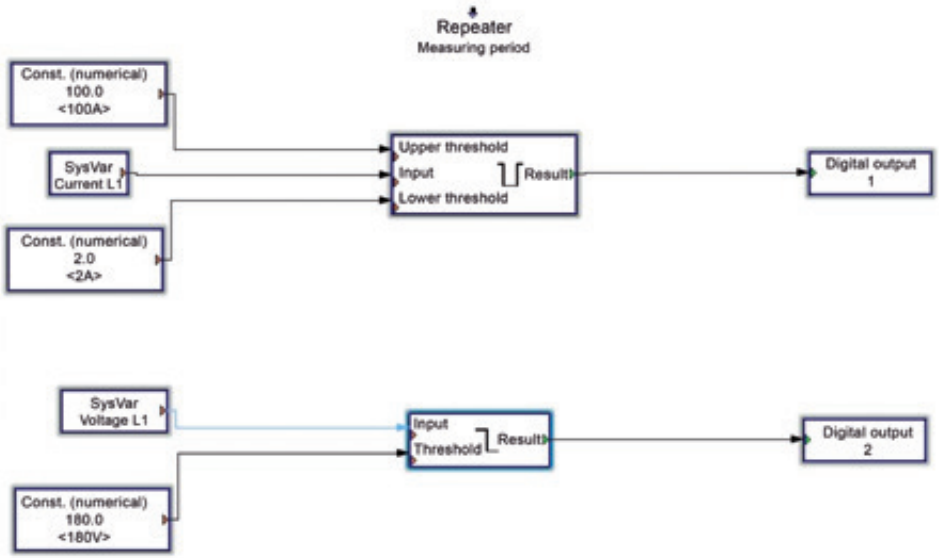
The programming language Jasic® opens up completely new possibilities. You are no longer limited to the device's built-in functions, but the device can be extended with your own functions and applications. The graphical programming is used to create and configure logical operations or mathematical functions. You can activate your own digital outputs depending on pre-defined thresholds for example and digital inputs are evaluated. In addition, it is possible to analyze or write registers of external Modbus devices (license). With the tool „graphical programming" it is possible to customize your own applications according specific requirements and extend by far the functionality of the measurement devices of the UMG device series UMG 604, UMG 605, UMG 508 and UMG 511. Even limit violations, timer functions or recordings of special values are user configurable with the graphical programming. The self-made programs can be stored on the computer as a file, or directly transmitted to the UMG measurement device. For the storage of your customized programs there are 7 memory locations, each with 128 kByte memory space available. The graphical programming feature of customized programs is a real novelty in the field of digital power analyzers. Besides the user-friendly graphical programming the user is free to go directly for the source code programming, which opens even more advanced options.

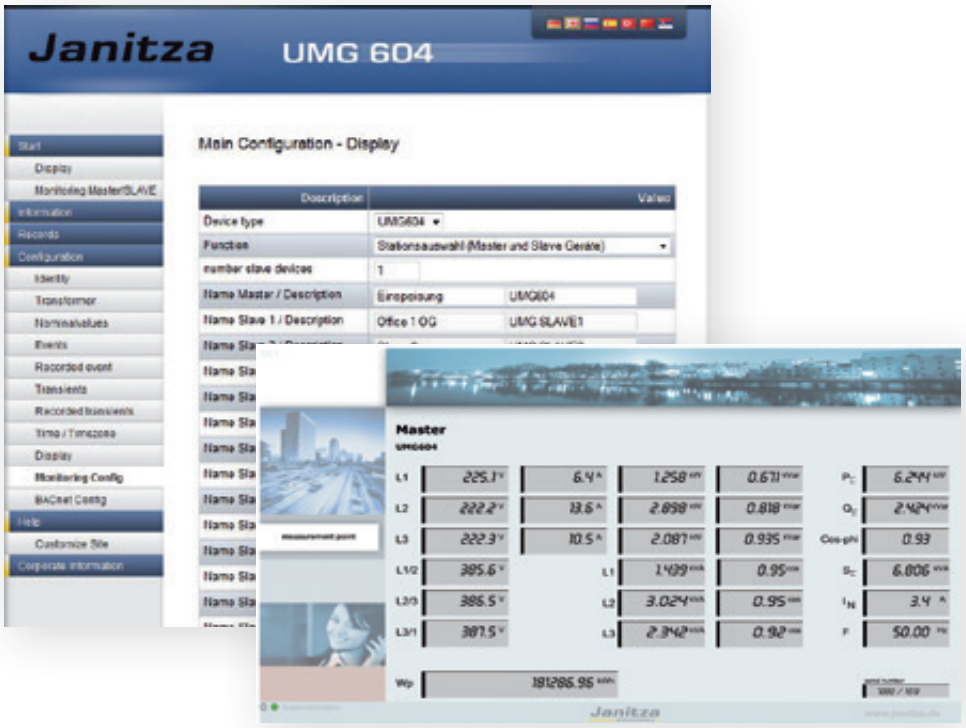


Threshold monitoring (comparator)

In the example threshold monitoring, we see two versions of the monitoring of a measurement value. The first example shows the monitoring of the current L1, by the upper and lower threshold values are defined fixed constants. In case one of the pre-defined limit values is exceeded, a digital „1" signal is fed to the digital output 1, means the digital output is activated.

The second example is monitoring the voltage L1, but only the lower threshold limit, means the digital output 2 is activated in case of under voltage below 180V.





APPs – Expansion with know-how

For flexible or client-specific solutions, Janitza electronics® offers software-based expansion options (APPs) for a range of measurement devices. The functions that are integrated into the device can therefore be expanded, controlled and visualised using APPs.

Depending on the application, an APP comprises multiple Jasic®, flash and homepage files. Management and installation is carried out using the GridVis software. In addition to the APP range provided by Janitza electronics®, the open structure allows users and third-party vendors to develop APPs and to use them with measurement devices.

- The programming language for the development of APPs is Jasic®.
- Jasic® uses syntax similar to that of BASIC.
- Alternatively, programming may also be undertaken graphically using the GridVis.
- Depending on application programming knowledge, APP development may be undertaken in Jasic®, JAVA Script, JSON, AJAX or Action Script.

Standard APPs

Janitza electronics® offers standard expansion APPs for various measurement devices which can be installed on the device in question using the GridVis software:

- **APP Multitouch** (item no 51.00.207)
- **APP Watchdog** (item no 51.00.210)
- **APP DCF77**(item no 51.00.212)
- **APP Fault message** (item no 51.00.209)
- **APP FBM10PT1000** (item no 51.00.211)
- **APP Emax** (item no 51.00.213-215)

APP Multitouch (item no 51.00.207)

The APP reads out 25 measured values (pre-set defaults) from up to 31 slave devices (configurable) via RS485 and registers them in the master to global variables* or BACnet datapoints.

The measured values are displayed on the JPC35 touch panel or the device homepage (browser with flash plug-in required). It is not possible to save the measured values in the master devices; the expansion is a simple live value display.

The APP contains an integrated BACnet gateway function (optional, item no 52.16.083), where the measured value from the global variables is added to BACnet datapoints. The BACnet can be modified via the homepage. Note that the COV in this application is not supported.

The programme installs a control programme which calls a corresponding subroutine, depending on the master device (UMG 604, UMG 605, UMG 508, UMG 511) (slave device: UMG 96S, UMG 103, UMG 104, UMG 604, UMG 605 and UMG 96RM).

The choice of substation is made via a user-friendly general overview which displays all possible communication errors (RS485 bus) via a status display.

Up to 31 slave devices can be visualised. The number of devices and device descriptions can be configured via the master device homepage. The master is recognised automatically and registered in the ‚device type' field.

BACnet configuration is also performed via the master device homepage, where a unique BACnet ID can be assigned to each device. In addition, it is also possible for the BACnet ID to be assigned for object names automatically.

An EDE file for importing BACnet datapoints in a BACnet GLT also forms part of the scope of delivery.

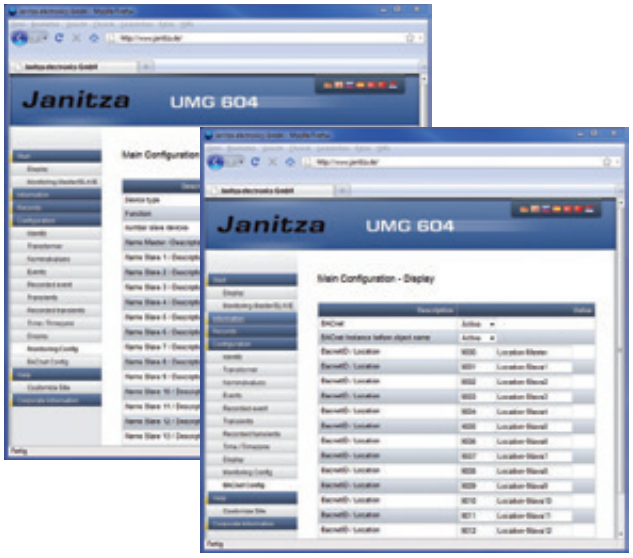
Note: Object names are fixed and cannot be modified.

Suitable for:	UMG604/605/508/511
Name des APP:	MultiTouch(XX)-Build(X).app (X=version number)

* Global variables: self-defined measured values which are made available on a modbus register.

Illustration: Device list

Illustration: Slave measurement values



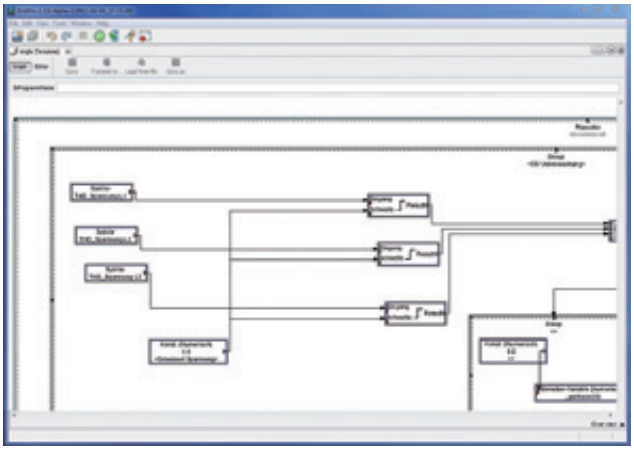


Illustration: Graphic programming

Illustration: Measured value display via the device homepage

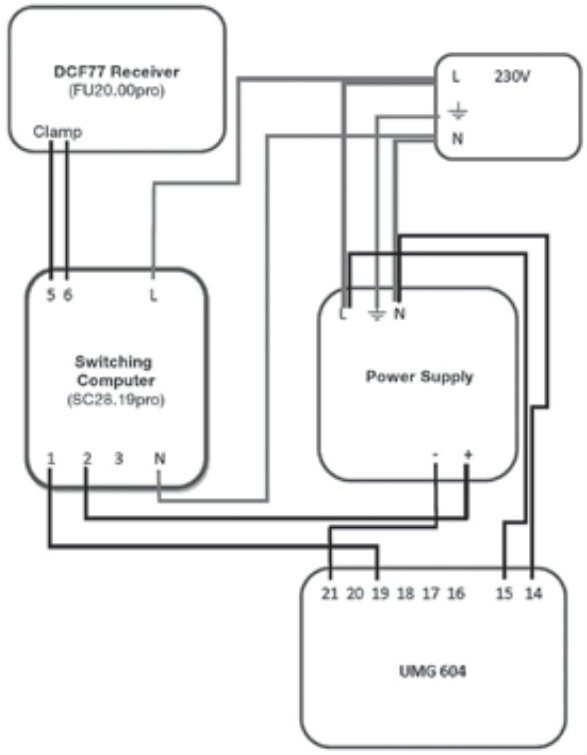


Illustration: Principle connection diagram of a Hugo Müller clock relay

APP Fault message (item no 51.00.209)

This APP installs a scalable/configurable Jasic® programme on the selected measurement device to enable fault messages to be sent by email.
Depending on the configuration, fault messages are sent when the following incidents arise: Total distortion factor voltage exceeded, temporary interruption detected, transient detected. Furthermore, incident messages and transient messages are saved to the modbus register. These can be read out for each GLT. The APP is programmed graphically and can be modified by the user. Consequently, it is possible to modify the limit values, for example, and to monitor additional measured values.

Suitable for: UMG604/605/508/511
Name of the APP: FaultIndication (XX)-Build(X).app

APP Watchdog (item no 51.00.210)
This expansion assists the ethernet monitoring for network analysers UMG 604 and UMG 605 (UMG 508, UMG 511 from the fourth quarter of 2011). Up to 40 measurement devices per master can be monitored for communication failures. Simultaneous installation on two devices enables redundant monitoring or expansion on more than 40 devices
In the event of loss of communication, the APP sends an email. Furthermore, a status email is sent at the change of day, whereby the current status is displayed on the measurement device homepage.

Suitable for: UMG604/605/508/511
Name of the APP: WatchdogEthernet(XX)-Build(X).app

APP FBM10 PT1000 (item no 51.00.211)
This APP expands the UMG 604, UMG 605, UMG 508 and UMG 511 via the RS485 interface by additional 10 temperature inputs. The hardware expansion FBM10 PT1000, a DIN rail module with 10 PT1000 inputs, is necessary for facilitating this.

Suitable for: UMG604/605/508/511
Name of the APP: FBM10PT1000 (XX)-Build(X).app

APP DCF77 (item no 51.00.212)

Synchronisation of the device time on devices UMG 604, UMG 605, UMG 508 and UMG 511 via a digital input. The time is always synchronised to the full hour via the requisite clock relay with DCF77 receiver.The APP is used if an NTP connection is not possible or available.The DCF77 signal is not analysed immediately, but the switching pulse of a DCF77 clock relay which is connected to a free digital input. Consequently, it is also possible to use a switching pulse from an SPS/GLT as synchronisation.

Suitable for: UMG604/605/508/511
Name of the APP: SyncDIGINdcf(XX)-Build(X).app

APP Emax

The Emax application for Jasic® devices integrates the maximum monitor functionality and constantly captures all electrical parameters. Smart control algorithms calculate the effective power trend and compare it with the fixed target effective power. The trend calculation allows the Emax application to intervene in the operational process precisely and to switch off non-critical consumers temporarily. Depending on the APP or configuration level and FBM modules, up to 64 consumers can be controlled. Power data is captured directly via the measurement device current path and voltage path or via a pulse input. Note for APP Emax: Full functionality for activated Emax option (item no 52.16.084).

Illustration: Emax display

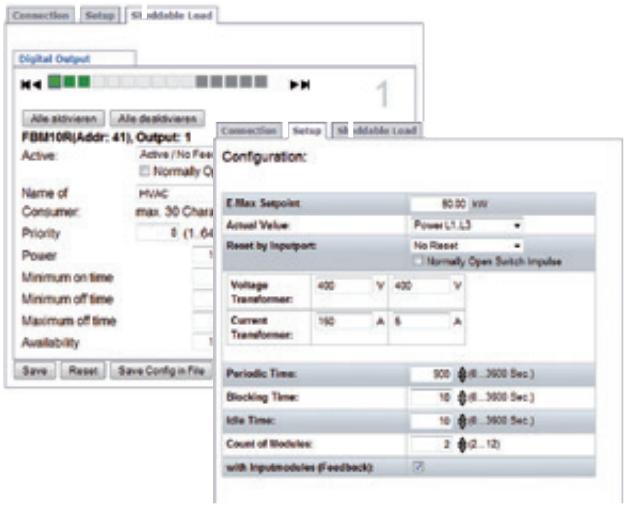


Illustration: Emax configuration

The following Emax APPs are currently available:

- **APP Emax for UMG 604 and UMG 605** (Art.Nr.: 51.00.213)The APP contains the peak load switch-off programme (maximum monitor function) for devices UMG 508 and UMG 511. Depending on the hardware configuration, a maximum of 64 switch-off stages may be realised.
  Name of the APP:
  Emax_App_for_UMG604-605 (XX)-Build(X).app

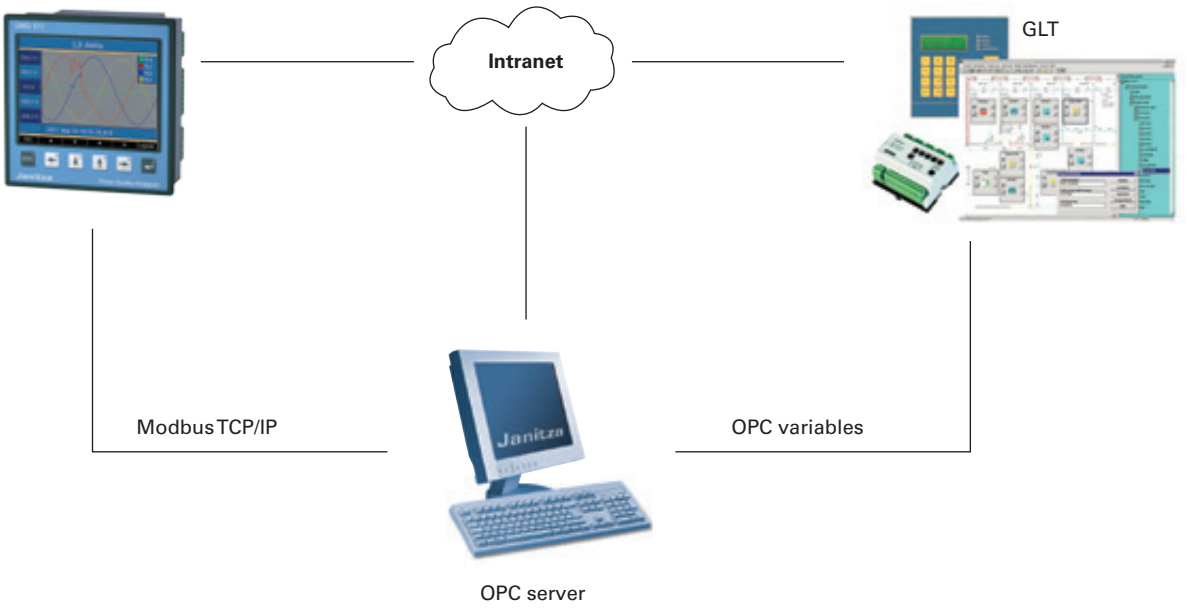
- **APP Emax for UMG 508 and UMG 511** (item no 51.00.214)
  The APP contains the peak load switch-off programme (maximum monitor function) for devices UMG 508 and UMG 511. Depending on the hardware configuration, a maximum of 64 switch-off stages may be realised.
  Name of the APP:
  Emax_App_for_UMG508-511 (XX)-Build(X).app

- **APP Emax for UMG 604 and UMG 605 SPS communication modbus/profibus** (item no 51.00.215)
  The APP contains the peak load switch-off programme (maximum monitor function) for devices UMG 604 and UMG 605. The switch-off actions are added to the modbus register. An additional add-on is required for the profibus (item no 61.00.217).
  Name of the APP: Emax_SPS_GLT_App_for_UMG604-605 (XX)-Build(X).app

- **APP Emax for UMG 508 and UMG 511 SPS communication modbus/profibus** (item no 51.00.216)
  The APP contains the peak load switch-off programme (maximum monitor function) for devices UMG 508 and UMG 511. The switch-off actions are added to the modbus register. An additional add-on is required for the profibus item no 51.00.217 **Name of the APP**: Emax_SPS_GLT_App_for_UMG508-511 (XX)-Build(X).app

- **APP Emax for UMG 604, UMG 605, UMG 508, UMG 511 Profibus** (item no 51.00.217) The APP installs an Emax profibus profile. Attention: Additionally, an APP Emax GLT/SPS 604/604 or APP Emax GLT/SPS 508/511 must be installed separately.
  Name of the APP:
  Emax_Profibus-ADDON(XX)-Build(X).app

For further information concerning the expansion of Emax: see section 3, peak load optimisation.



OPC server

the big, wide world of automation

Once a while it is required to incorporate measurement values from power analysers into non-Janitza visualisation systems but the existing visualisation system does not support the protocol which is contained in the measuring instrument. OPC servers act as an interface between the measuring instrument and the central building control system or PLC in these cases.

OPC drivers, therefore, offer a standardised interface for easy data exchange without exact knowledge about the communication options in the counterpart system.

The OPC can be used to link the measurement data with the data from other trades and archive it in the database structures for process control techniques. OPC drivers for process control techniques are used by almost all renowned manufacturers of building automation systems.

Modbus Suite TOP Server

Janitza electronics® GmbH has been recommending the proven and cost-effective OPC Top server with Modbus suite from Software Toolbox (www.softwaretoolbox.com) for years. Support is also provided in connection with UMG measuring instruments and power analysers.

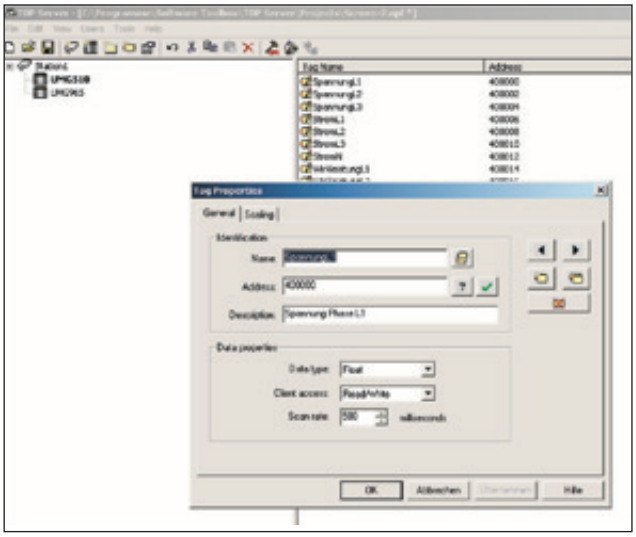


Illustration: Determining OPC variables

Functions of the OPC server

The OPC server is a software driver and must be installed on a PC in the network. If the existing automation software is already running on a computer with sufficient power reserves and if the operating system is compatible with the OPC server, installation will be possible on this computer. If sufficient power reserves are available, the OPC server also will runs on systems in which GridVis is already installed.

The software driver contains a Modbus TCP/IP or a Modbus over TCP/IP Master and an OPC server. The data (e.g. measurement values) is read out using the Ethernet interface (port 502 or port 8000) and is passed on to the OPC server. The OPC server then passes on the data to the OPC client of the external program. Access can be simultaneously gained to up to 6 software applications on port 502 of the UMG 507E/EP and UMG 604E/EP. Another two applications can be simultaneously accessed on down-stream measuring instruments using the RS485 (Ethernet encapsulation). This means that measurement data can be simultaneously read with GridVis and the OPC server.

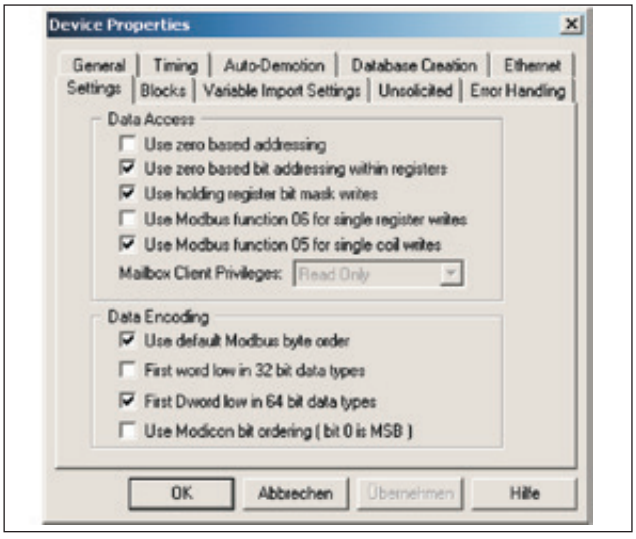


Illustration: Communication settings

Configuration of the OPC server

The OPC server is configured using a convenient operating area but does require some basic knowledge of the data types (Word, float etc) and bus technology. Communication settings can be individually adapted for each channel.

Following data types are supported:

Char, Byte, Long, Float, Word and Double as Big-Endian and Ldittle-Endian. The OPC server also contains an OPC Quick Client for quick online control of the data. This means that the data is automatically taken from the configuration table and displayed. The statistics function assists fault detection.

The meaning of OPC

OPC is an abbreviation for “OLE for process control” and is a standardised interface in the field of automation technology. This term is frequently used in the field of building automation. OPC was created to provide industrial bus systems and protocols with a universal communication possibility. An OPC driver can be integrated into any size control and monitoring system without any major adaptation efforts.

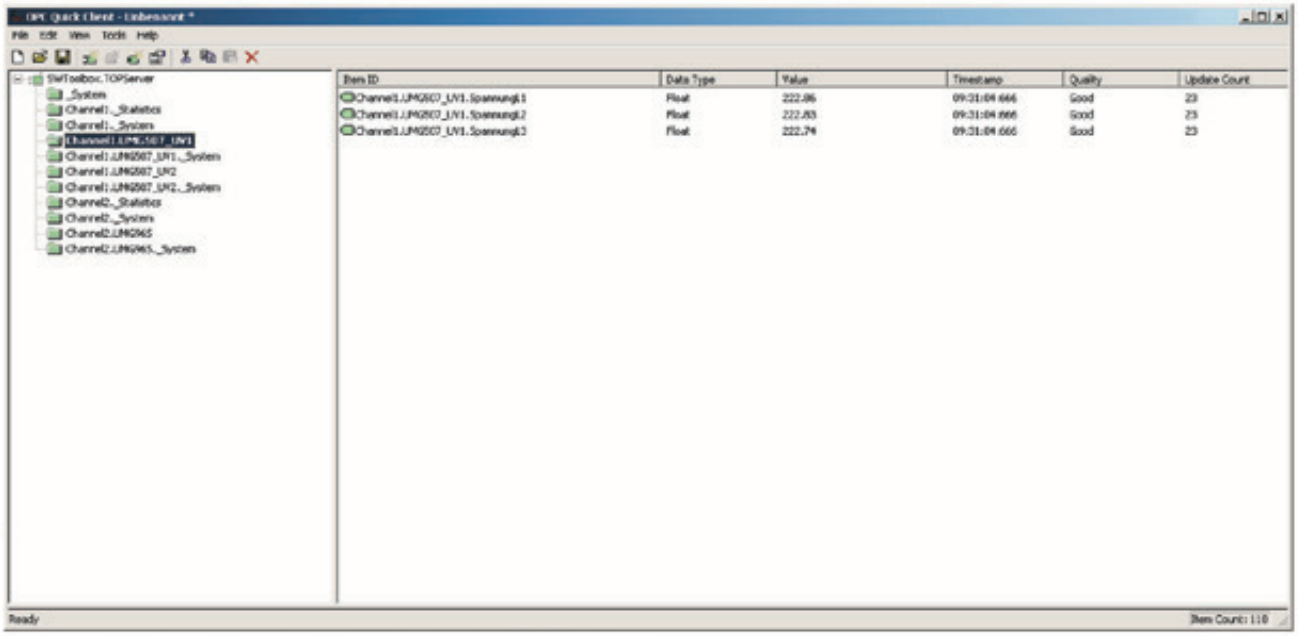
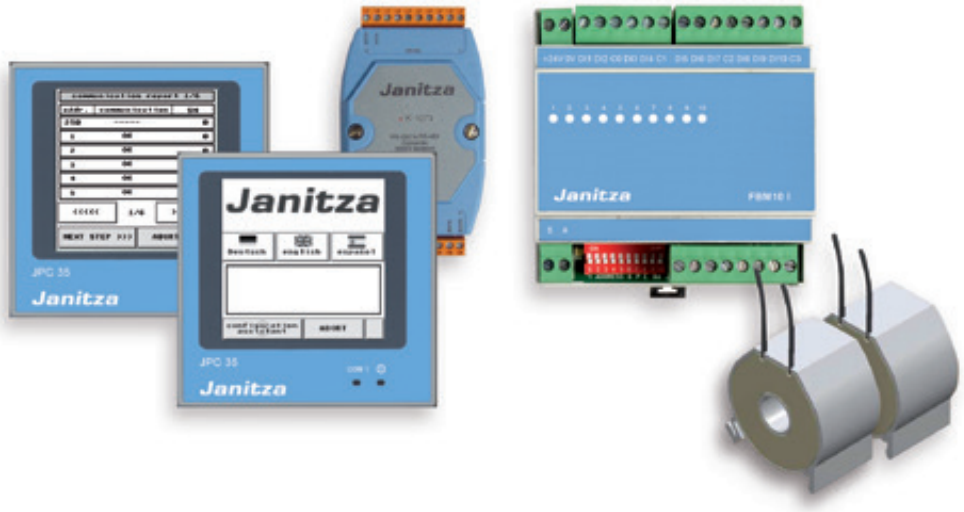


Illustration: OPC Quick Client

OPC-Server

Description		Item number
Modbus Suite Top Server	TCP/IP Port 502, over TCP/IP Port 8000	**51.00.150**

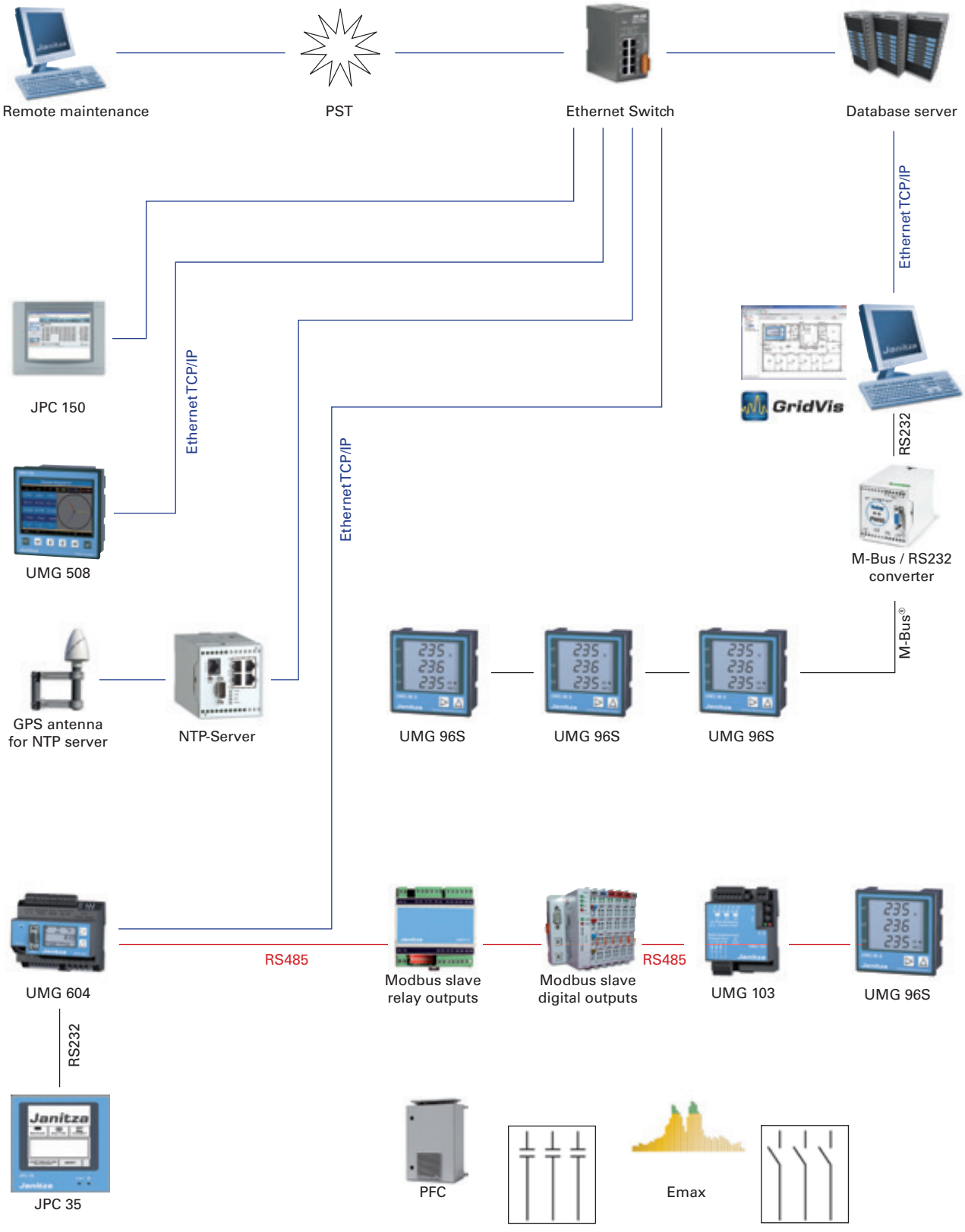


Accessories

The respective communication systems are necessary for the development of extensive energy management systems. Janitza electronics® offers a wide range of field bus components such as converters and repeaters etc.

In order to be able to manage the large quantities of data and maintain availability over the years, we offer high speed servers with the necessary reliability.

Touch panels are used for simple visualisation, including in industrial environments.


Remote maintenance
PST
Ethernet Switch
Database server
Ethernet TCP/IP
JPC 150
Ethernet TCP/IP
GridVis
RS232
UMG 508
Ethernet TCP/IP
M-Bus / RS232
converter
M-Bus®
GPS antenna
for NTP server
NTP-Server
UMG 96S
UMG 96S
UMG 96S
RS485
Modbus slave
relay outputs
RS485
Modbus slave
digital outputs
UMG 103
UMG 96S
UMG 604
RS232
JPC 35
PFC
Emax

Current transformers

The link between power currents and digital technology

Obviously currents of several hundreds to thousands of Ampere cannot be directly digitally measured. Current transformers convert almost any amount of primary current into "bite-sized" secondary currents. The secondary output is .../1 or .../5A.

Janitza electronics® GmbH has a wide range of various current transformers whether these are moulded case type current transformer, summation current transformer or cable split core type transformer.

It is recommended to select the accuracy classification of the current transformer to match the accuracy classification of the connected measuring instruments.

Areas of application

- Conversion of high primary currents into standardized secondary currents .../1A or .../5A
- Transformer classes 0.5 or 1 depending on the instrument
- Transformers are available for various bus bars and cables
- Moulded case type transformers for cable or bus bars
- Cable split core type transformers for cables when the electricity path cannot be opened
- Summation current transformers

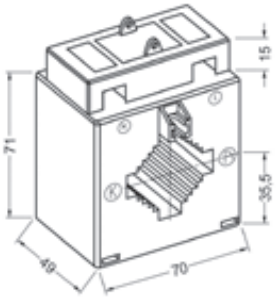
Moulded case current transformers

Applications
Current transformers are used when currents cannot be directly measured. They are a special form of transformers which transform the primary current into a (mostly) smaller secondary current and galvanically separate the primary and secondary circuits from each other. Due to the physically determined saturation aspect of the core material, additional protection against high currents in the secondary circuit is achieved.

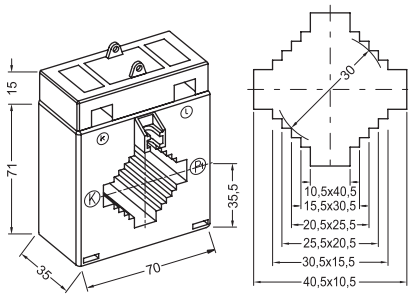
General mechanical properties

- Sturdy plastic housing made of polycarbonate
- Flame resistant in accordance with UL94VO and self extinguishing
- Nickel secondary clamps with positive-negative screws (2Nm)
- Integrated secondary clamp plates

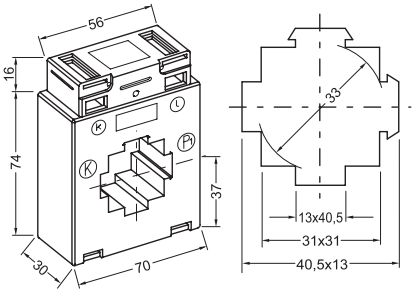
Dimensional drawing IPA40.5
(All dimensions stated in these drawings are in mm)



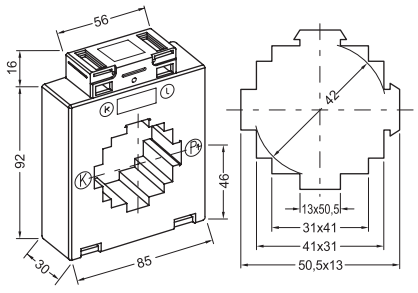
Dimensional drawing IPA40
(All dimensions stated in these drawings are in mm)



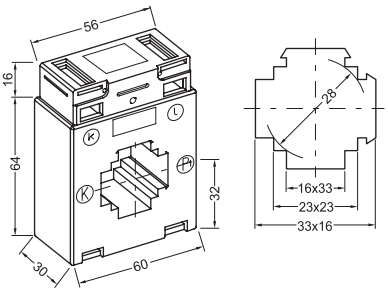
Dimensional drawing 7A412.3
(All dimensions stated in these drawings are in mm)



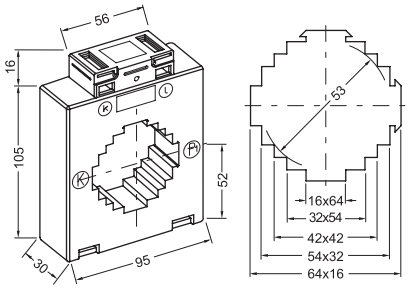
Dimensional drawing 8A512
(All dimensions stated in these drawings are in mm)



Dimensional drawing 6A315.3
(All dimensions stated in these drawings are in mm)



Dimensional drawing 9A615.3
(All dimensions stated in these drawings are in mm)



Technical data

- Nominal frequency 50 Hz to 60 Hz
- Insulation class E (other classifications upon request)
- Thermal short-term current Ith = 60 x IN/1s
- Surge current Idyn = 2.5 x Ith, minimum 100kA for all bushing type current transformers
- Highest voltage for materials Um = 0.72kV
- Calculation of insulation level (test voltage) 3kV/1 min (in accordance with EN6044-1)
- Overvoltage limit factor FS5 or FS10
- Harmonic currents up to the 50th harmonic

Overview of current transformers class 1

Description	Type	Primary current in A	Secondary current in A	Power in VA	Class	Primary conductor	Circular conductor	Construction width	Item number
Current transformer 50/5	IPA 40	50	5	2.5	1	40x10mm, 30x15mm, 25x20mm	30mm	70mm	**09.05.110**
Current transformer 75/5	IPA 40	75	5	2.5	1	40x10mm, 30x15mm, 25x20mm	30mm	70mm	**09.05.112**
Current transformer 100/5	6A315.3	100	5	2.5	1	30x15mm, 20x20mm	28mm	60mm	**09.00.404**
Current transformer 150/5	6A315.3	150	5	5	1	30x15mm, 20x20mm	28mm	60mm	**09.00.452**
Current transformer 200/5	6A315.3	200	5	5	1	30x15mm, 20x20mm	28mm	60mm	**09.00.424**
Current transformer 250/5	6A315.3	250	5	5	1	30x15mm, 20x20mm	28mm	60mm	**09.00.425**
Current transformer 300/5	6A315.3	300	5	5	1	30x15mm, 20x20mm	28mm	60mm	**09.00.426**
Current transformer 400/5	6A315.3	400	5	5	1	30x15mm, 20x20mm	28mm	60mm	**09.00.427**
Current transformer 500/5	6A315.3	500	5	5	1	30x15mm, 20x20mm	28mm	60mm	**09.00.428**
Current transformer 600/5	6A315.3	600	5	5	1	30x15mm, 20x20mm	28mm	60mm	**09.00.429**
Current transformer 800/5	7A412.3	800	5	5	1	40x12mm, 2x30x10mm	33mm	70mm	**09.00.981**
Current transformer 1000/5	7A412.3	1000	5	5	1	40x12mm, 2x30x10mm	33mm	70mm	**09.00.982**
Current transformer 1250/5	8A512.3	1250	5	5	1	50x12mm, 2x40x10mm	42mm	85mm	**09.01.412**
Current transformer 1500/5	8A512.3	1500	5	5	1	50x12mm, 2x40x10mm	42mm	85mm	**09.01.413**
Current transformer 1500/5	9A615.3	1500	5	5	1	63x15mm, 2x50x10mm	53mm	95mm	**09.01.900**
Current transformer 1600/5	9A615.3	1600	5	10	1	63x15mm, 2x50x10mm	53mm	95mm	**09.01.901**
Current transformer 2000/5	9A615.3	2000	5	10	1	63x15mm, 2x50x10mm	53mm	95mm	**09.01.902**
Current transformer 2500/5	9A615.3	2500	5	10	1	63x15mm, 2x50x10mm	53mm	95mm	**09.01.903**
Accessories									
Snap fixing	For EN50022-35 DIN rails, suitable for IPA 30 and IPA 40 versions								**09.09.000**
Snap fixing	For EN50022-35 DIN rails, suitable for 6A315.3, 7A412.3 and 8A512.3 versions								**09.09.001**

Secondary current transformers .../1A upon request.

Moulded case current transformer class 0.5

Technical data

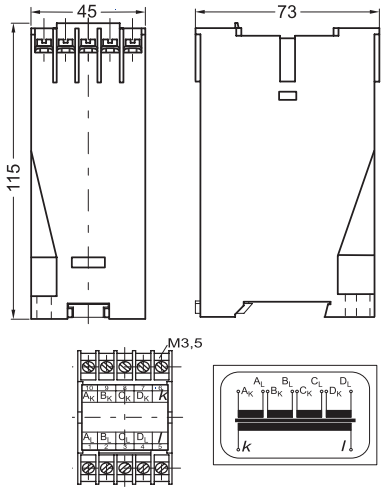
- Nominal frequency 50 Hz to 60 Hz
- Insulation class E (other classifications upon request)
- Thermal short-term current Ith = 60 x IN/1s
- Surge current Idyn = 2.5 x Ith, minimum 100kA for all bushing type current transformers
- Highest voltage for materials Um = 0.72kV
- Calculation of insulation level (test voltage) 3kV/1 min (in accordance with EN6044-1)
- Overvoltage limit factor FS5 or FS10
- Harmonic currents up to the 50th harmonic

Overview of current transformers class 0,5

Description	Type	Primary current in A	Secondary current in A	Power in VA	Class	Primary conductor	Circular conductor	Construction width	Item number
Current transformer 50/5	IPA 40.5	50	5	2.5	0.5	40x10mm, 30x15mm, 25x20mm	30mm	70mm	**09.05.250**
Current transformer 75/5	IPA 40.5	75	5	2.5	0.5	40x10mm, 30x15mm, 25x20mm	30mm	70mm	**09.05.252**
Current transformer 100/5	IPA 40.5	100	5	5	0.5	30x15mm, 20x20mm	30mm	70mm	**09.05.234**
Current transformer 150/5	IPA 40.5	150	5	10	0.5	30x15mm, 20x20mm	30mm	70mm	**09.05.236**
Current transformer 200/5	6A315.3	200	5	3.75	0.5	30x15mm, 20x20mm	28mm	60mm	**09.00.360**
Current transformer 250/5	6A315.3	250	5	5	0.5	30x15mm, 20x20mm	28mm	60mm	**09.00.361**
Current transformer 300/5	6A315.3	300	5	5	0.5	30x15mm, 20x20mm	28mm	60mm	**09.00.362**
Current transformer 400/5	6A315.3	400	5	5	0.5	30x15mm, 20x20mm	28mm	60mm	**09.00.363**
Current transformer 500/5	6A315.3	500	5	5	0.5	30x15mm, 20x20mm	28mm	60mm	**09.00.364**
Current transformer 600/5	6A315.3	600	5	5	0.5	30x15mm, 20x20mm	28mm	60mm	**09.00.365**
Current transformer 800/5	7A412.3	800	5	5	0.5	40x12mm, 2x30x10mm	33mm	70mm	**09.00.887**
Current transformer 1000/5	7A412.3	1000	5	5	0.5	40x12mm, 2x30x10mm	33mm	70mm	**09.00.888**
Current transformer 1250/5	8A512.3	1250	5	5	0.5	50x12mm, 2x40x10mm	42mm	85mm	**09.01.339**
Current transformer 1500/5	8A512.3	1500	5	5	0.5	50x12mm, 2x40x10mm	42mm	85mm	**09.01.340**
Current transformer 1500/5	9A615.3	1500	5	5	0.5	63x15mm, 2x50x10mm	53mm	95mm	**09.01.820**
Current transformer 1600/5	9A615.3	1600	5	10	0.5	63x15mm, 2x50x10mm	53mm	95mm	**09.01.821**
Current transformer2000/5	9A615.3	2000	5	10	0.5	63x15mm, 2x50x10mm	53mm	95mm	**09.01.822**
Current transformer 2500/5	9A615.3	2500	5	10	0.5	63x15mm, 2x50x10mm	53mm	95mm	**09.01.823**

Secondary current transformers .../1A upon request. Dimensional drawings – refer to page 158.

Summation current transformers (CTs)



All dimensions in mm.

General mechanical properties

- Sturdy plastic housing made of ABS, IP40
- Flame resistant in accordance with UL94VO and self extinguishing
- Nickel clamps with positive-negative screws
- Integrated contact protection, IP10
- Nominal frequency 50 Hz to 60 Hz
- Insulation class E (other classifications upon request)
- Thermal short-term current Ith= 60 x IN/1s
- Surge current Idyn=2.5 x IN
- Maximum operating voltage Um = 0.72kV (other voltages upon request)
- Calculation of insulation level (test voltage) 3kV/1min (other voltages upon request)
- Overvoltage limit factor FS5 or FS10

Applications

Summation current transformers have the task of adding up the secondary currents from various main, CTs and, therefore, making the measurement of an instrument accessible. Summation current transformers redeliver a norm signal at the output. This means that not only an addition of the input currents takes place but also the sum is divided through the amount of summands (number of inputs). We differentiate between summation current transformers for even and uneven main transformers.

Overview of current transformers class 1

Description	Type	Primary current in A	Transmission ratio	Secondary current in A	Power in VA	Class	Item number
SCT	IPS20	5+5	1:1	5	15	1	**15.02.510**
SCT	IPS30	5+5+5	1:1:1	5	15	1	**15.02.515**
SCT	IPS40	5+5+5+5	1:1:1:1	5	15	1	**15.02.520**
SCT	IPS20	1+1	1:1	1	15	1	**09.05.306**
SCT	IPS30	1+1+1	1:1:1	1	15	1	**09.05.316**
SCT	IPS40	1+1+1+1	1:1:1:1	1	15	1	**09.05.326**

Overview of current transformers class 0.5

Description	Type	Primary current in A	Transmission ratio	Secondary current in A	Power in VA	Class	Item number
SCT	IPS20	5+5	1:1	5	15	0.5	**15.02.511**
SCT	IPS30	5+5+5	1:1:1	5	15	0.5	**15.02.516**
SCT	IPS40	5+5+5+5	1:1:1:1	5	15	0.5	**15.02.519**

Note: the conversion ratio of the main CTs must be provided when placing an order.
The ratio of the largest to smallest primary current should not be greater than 10:1 for uneven **main transformers.**

Cable split core CTs

KUW1/2

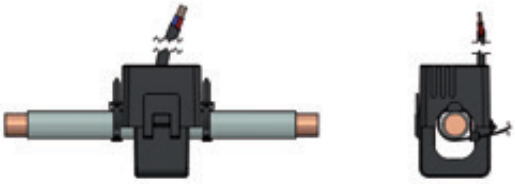
KUW4

Application
The cable split core CTs of the types KUW1, 2 and 4, due to their very compact design and easy mounting, are well suitable for in limited space or places difficult to reach. Cable split core CTs are especially used in cases, when the electricity path may not be interrupted.

Type KUW 1 and KUW 2
The cable split core CT, type KUW1 and 2 is a very compact current transformer and especially suitable for digital panel meters. The design of the CT provides correct mounting arround the cable and is closed with a clearly audible "click". The two delivered cable binders of UV-resistant material protect the CT additionally.

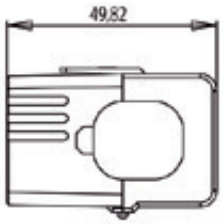
Types KUW 4
The special rubber coating around the PVC housing keeps the parts of the current transformers together and additionally protects against external influence. The UV-resistant cable binders enable a quick and convenient installation on the insulated primary cable.

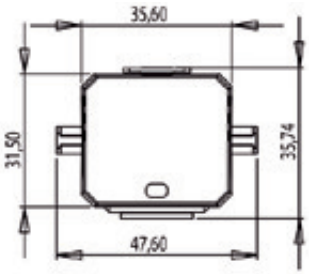
The specified data below about burden and accuracy class refer to the ends of the multi-coloured coded, 5 meter long secondary leads which are supplied.



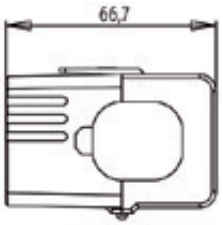
...for 28 mm and 27 mm cable diameter

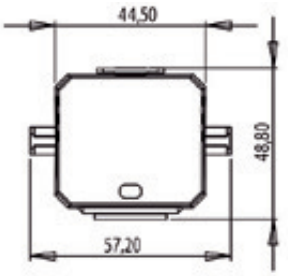
KUW1/30 for 18 mm primary lead-diameter



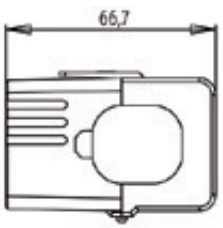


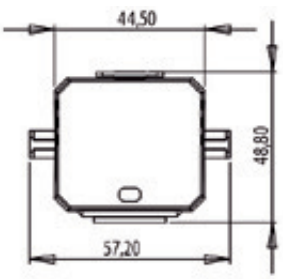
KUW1/40 for 18 mm primary lead-diameter



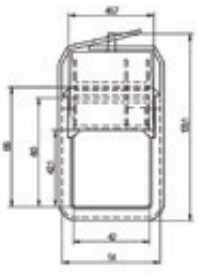


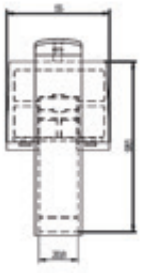
KUW2/40 for 28 mm primary lead-diameter





KUW4/55 for 42 mm primary lead-diameter





All dimensions in mm.

Technical data

Application	Indoor/only for insulated cables
Capacity Ith	60*In/1s
Overload capability	120 % duty cycle
Insulation material class	E
Ambient temperature	-5 to +40°C
Frequency	50/60Hz
Diameter	../1A: 0.5mm2 ../5A: 2.5mm2
Version	PVC

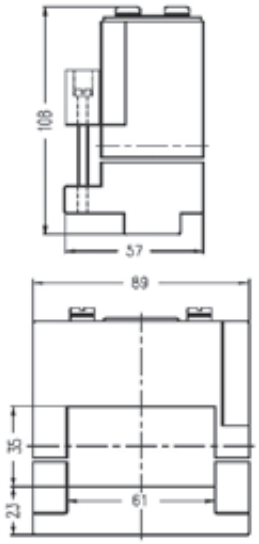
Overview of product variants

Type	Primary current in A	Secondary current in A	Burden in VA (at the end of the line)	Cable length in m	Class	Diameter of primary in mm	Item number
Type KUW1 for insulated cables, max. 18mm diameter							
KUW1/30-60	60	1	0.2	5	3	18	**15.03.310**
KUW1/30-75	75	1	0.2	5	3	18	**15.03.311**
KUW1/30-100	100	1	0.2	5	3	18	**15.03.312**
KUW1/30-125	125	1	0.2	5	3	18	**15.03.313**
KUW1/30-150	150	1	0.2	5	3	18	**15.03.314**
KUW1/30-200	200	1	0.2	5	3	18	**15.03.315**
KUW1/40-100	100	1	0.2	3	1	18	**15.03.320**
KUW1/40-125	125	1	0.2	3	1	18	**15.03.321**
KUW1/40-150	150	1	0.2	3	1	18	**15.03.322**
KUW1/40-150	150	5	1	0.5	1	18	**15.03.329**
KUW1/40-200	200	1	0.2	3	0.5	18	**15.03.325**
KUW1/40-200	200	5	1	0.5	1	18	**15.03.330**
KUW1/40-250	250	1	0.2	3	0.5	18	**15.03.326**
KUW1/40-250	250	5	1	0.5	0.5	18	**15.03.331**
Type KUW2 for insulated cables, max. 28mm diameter							
KUW2/40-200	200	1	0.2	3	1	28	**15.03.351**
KUW2/40-250	250	1	0.2	3	1	28	**15.03.352**
KUW2/40-250	250	5	1	0.5	1	28	**15.03.353**
KUW2/40-300	300	1	0.2	3	1	28	**15.03.354**
KUW2/40-300	300	5	1	0.5	1	28	**15.03.355**
KUW2/40-400	400	1	0.2	3	1	28	**15.03.356**
KUW2/40-400	400	5	1	0.5	1	28	**15.03.357**
KUW2/40-500	500	1	0.2	3	0.5	28	**15.03.358**
KUW2/40-500	500	5	1	0.5	1	28	**15.03.359**
Type KUW4 for insulated cables, max. 42mm diameter							
KUW4/55-250	250	1	0.25 - 0.5	5	1	42	**15.02.360**
KUW4/55-300	300	1	0.25 - 0.5	5	1	42	**15.02.361**
KUW4/55-400	400	1	0.25 - 1.5	5	1	42	**15.02.362**
KUW4/55-500	500	1	0.25 - 2.5	5	1	42	**15.02.363**
KUW4/55-600	600	1	0.25 - 5	5	1	42	**15.02.364**
KUW4/55-750	750	1	0.25 - 5	5	1	42	**15.02.365**
KUW4/55-800	800	1	0.25 - 5	5	1	42	**15.02.366**
KUW4/55-1000	1000	1	0.25 - 5	5	1	42	**15.02.367**

Split core current transformers

Split core current transformer
For bus bars: 2 x 60 x 10mm
60 x 10(35)mm
For cables: Max diameter 35mm

Dimensional drawing



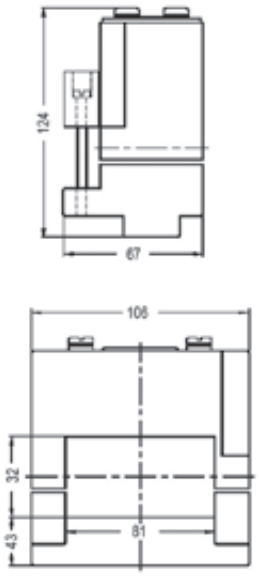
All dimensions in mm.

Overview of product variants

Type	Primary current in A	Secondary current in A	Power in VA	Class	Item number
Split-100	100	5	3	3	**15.02.800**
Split-150	150	5	4	3	**15.02.801**
Split-200	200	5	5	3	**15.02.802**
Split-250	250	5	5	3	**15.02.803**
Split-300	300	5	7.5	3	**15.02.804**
Split-400	400	5	5	1	**15.02.805**
Split-500	500	5	7.5	1	**15.02.806**
Split-600	600	5	7.5	1	**15.02.807**
Split-750	750	5	10	1	**15.02.808**
Split-800	800	5	10	1	**15.02.809**

Split core current transformer
For bus bars: 2 x 80 x 10mm
80 x 10(32)mm
For cables: Max diameter 35 mm

Dimensional drawing



All dimensions in mm.

Overview of product variants

Type	Primary current in A	Secondary current in A	Power in VA	Class	Item number
Split-1000	1000	5	10	0.5	**15.02.810**
Split-1200	1200	5	10	0.5	**15.02.811**
Split-1250	1250	5	10	0.5	**15.02.812**
Split-1500	1500	5	15	0.5	**15.02.813**
Split-1600	1600	5	15	0.5	**15.02.814**
Split-2000	2000	5	15	0.5	**15.02.815**

DIN-rail current transformer

DIN-rail current transformer
CT 35/1A and 64/1A with voltage tap

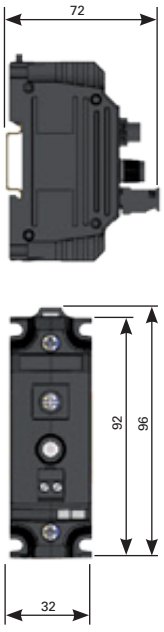
While measuring in substations, there are often problems regarding the space, as voltage and current are necessary for each phase. Those problems can be solved by using the DIN-rail CTs, which combine three functions in one device. The DIN-rail CT consists of series terminal, current transformer and voltage tap with fuse. The fuse is directly mounted on the primary and therefore the non protected part of the measuring cable is very short, which ensures a high intrinsic safety.

The DIN-rail CTs lead to simple wiring, low mounting costs and high reliability due to less connections, retrenchment of space and rare connection errors.

Technical data

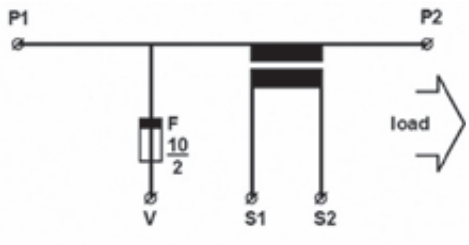
Generals	
Maximum voltage	690V
Insulation voltage	1890V / 50Hz 1min.
Rated current	67A
Maximum current (16 mm²)	76A
Protection class	E
Protection	IP 20
Ambient temperature	-5 .. +40°C
Housing	PA, 30% glas
Screw terminal	Cross recess DIN 7962-H2
Series terminal	Standard IEC60947-7-1
Connection diameter	1.5 bis 16qmm
Voltage tap	
Short-circuit strength	70kA bei 400V; 50Hz
Connection diameter max.	4 qmm
Fuse	5x25mm with indicating pin; max. 2A SIBA DIN 41576-2
Current transformer	Standard IEC60044-1
Capacity	60xIn/1s

Dimensional drawing



All dimensions in mm.

Connection diagram



CT variants

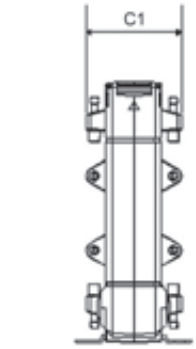
Type	Transmission ratio	Power in VA	Class	Item number
CT 35/1A	35/1A	0.2	1	**15.03.002**
CT 64/1A	64/1A	0.2	0.5	**15.03.003**

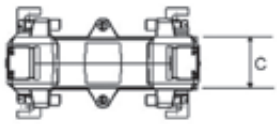
Differential current transformer

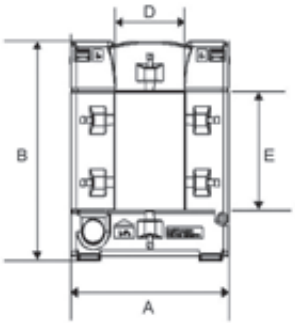
The opening and closing of the current transformers allows for quick and cost-effective installation of the compact KBU series current transformers. The simple push-button locking system eliminates the separation and disconnection of the primary conductor.

- Safe to handle and compact
- Simple and cost-effective installation
- No operation interruption
- Various innerdiameter available

Dimensional drawing







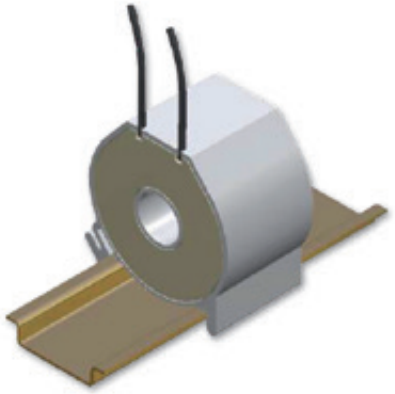
Technical data

General	Class
Type	Single-wire, low-voltage current transformer
Casing material	Polycarbonate, grey RAL 7035
Max. voltage for electrical equipment	Um <= 0.72 kV
Insulation test voltage	3 kV Ueff.; 50 Hz; 1 minute
Rated frequency	50 Hz
Secondary connections	measurement profile, nickel-plated, max. 4.0 mm²
Transformation ratio	600/1A
Nominal ratio Ipn/Isn	10 / 0.0167 A (600/1)
Operating frequency range	30... 1000 Hz
Secondary rated apparent power	0.05 VA
Accuracy classes	1
Operating temperature range	-5°C ... +45°C
Max. temperature of the primary conductor	70° C
Insulation material class	E
Technical standards maintained	DIN EN60044-1 (03/2004 edition)

Type	A (mm)	B (mm)	C/C1 (mm)	Weight (kg)	D (mm)	E (mm)	Item number
KBU 23D	93	106	34/58	0.85	20	30	**15.03.400**
KBU 58D	125	152	34/58	1.08	50	80	**15.03.401**
KBU 812D	155	198	34/58	1.32	80	120	**15.03.402**

DINCT64/1/1 – DIN rail current transformers

"Deeper" measurements (sub-distributions or loads/ individual output) are more and more common in electrical installations.The nominal currents are, therefore, relatively low (64, 32 or 16A), the space is restricted and the accuracy of the current transformer must be sufficient for the power measurement (minimum class 1). These characteristics are often difficult to combine.

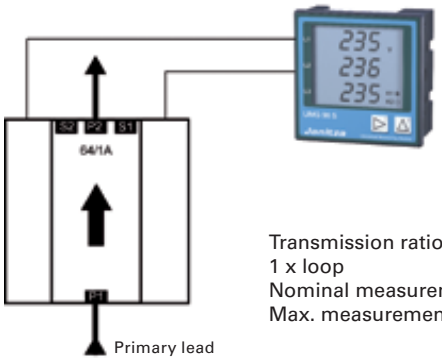


The DINCT64/1/1 combines these characteristics in a single product. Due to the unique construction, no solder, crimp or clamp connections are required. The secondary leads are 1 meter long.

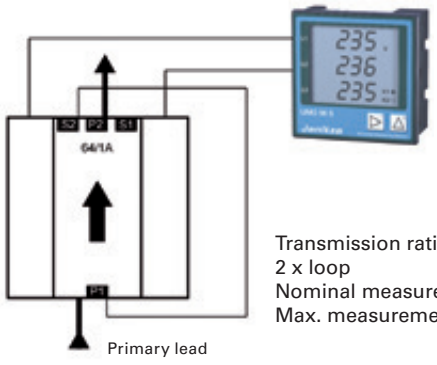
Technical data

Transmission ratio	64/1A (32/1A & 16/1A)
Accuracy	Class 1
Power	0.5VA
Ic_{th}; continuous limit current	120%
I_{th}; thermal limit current	60xIn/1s
Frequency	50Hz
Secondary lead diameter	0.5mm²
Ambient temperature	45°C max.
Standard	IEC6000-44-1
Material	PA6.6
Item number	**15.02.849**

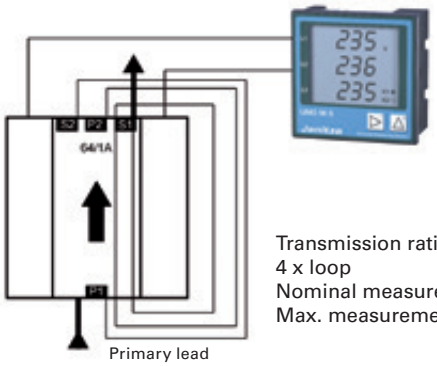
Applications



Transmission ratio 64/1A
1 x loop
Nominal measurement current 64A
Max. measurement current 76A

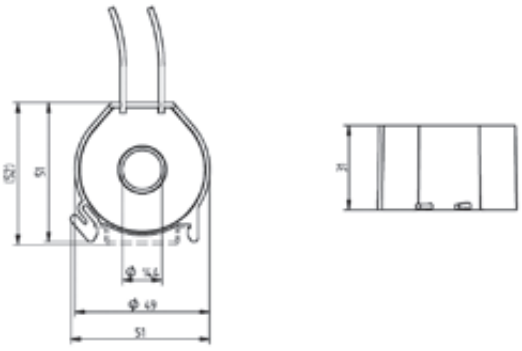


Transmission ratio 32/1A
2 x loop
Nominal measurement current 32A
Max. measurement current 38A



Transmission ratio 16/1A
4 x loop
Nominal measurement current 16A
Max. measurement current 19A

Dimensional drawing



Voltage transformer accessories

Application

These voltage transformers are used in the following applications:

- in IT grids without neutral conductor
- in applications in which the grid voltage is too high for the measuring inputs

The voltage transformer consists of a three phase input and three phase output with additional neutral. Using these transformers, even the measurement devices of the series UMG 96... can be used in IT grids. Furthermore, it can be used for all metering instruments, when the grid voltage ist too high for the measuring inputs.

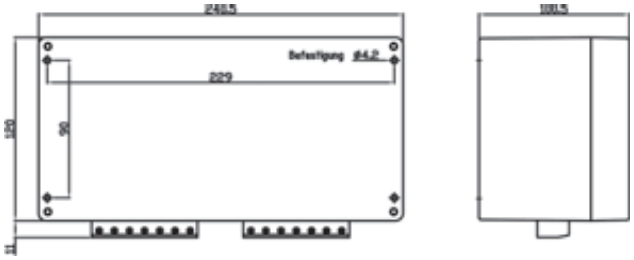
Technical data

3-phase voltage transformer	
Protection class	IP20
Accuracy class	1
Core diameter	M65/27.8
Standards	EN 61558 + EN60044-2
Rated voltage	see below (0,028A)
Output voltage	400V AC, 0.013A
Frequency	50/60Hz
Fuse	Primary M 0.032A 5x3mm
Rated power	5 VA
Connection type	Dzn0
Weight	3.30 kg

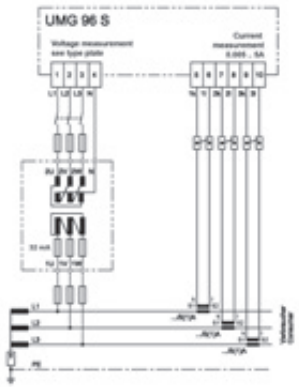
Illustration: Voltage transformer closed with open connection terminals

Illustration: Voltage transformer without cover with fuses

Dimensional drawing



Connection example



Overview of product variants

Type	Voltage primary	Voltage secondary	Fuse primary	Rated power	Item number
Voltage transformer BV	525V AC	400V AC	0.032A	5VA	**15.04.035**
Voltage transformer BV	705V AC	400V AC	0.032A	5VA	**15.04.036**
Voltage transformer BV	765V AC	400V AC	0.032A	5VA	**15.04.037**

Mechanical and electronic accessories

Assembly and installation assistance

Instruments often have to be mounted on DIN rails, cut-outs in doors which are no longer needed must be closed, digital outputs have to be made potential-free and so on and so forth. Janitza electronics® GmbH supplies little helpers which make mounting work easier for the customer.

Areas of application

- DIN rail mounting of front panel mounting devices
- Covering or reducing the size of cut-outs
- Connection of RS485 bus interfaces
- Potential separation of outputs
- Power filters for the protection of the UMG series against heavy network interference

Mechanical accessories for UMG devices

Description		Type	Item number
Adapter for DIN rail mounting Dimensions: W x H x D = 85 x 60 x 90 mm UMG 96L / UMG 96 / UMG 96S UMG 96RM (52.22.001)		**AH96**	**52.09.201** **52.22.666**
Adapter for DIN rail mounting Dimensions: W x H x D = 85 x 113 x 90 mm UMG 96S (with Profibus) UMG 96RM (52.22.002/003/004/005/006)		**AH96P**	**52.09.202** **52.22.667**
Adapter for DIN rail mounting Dimensions: W x H x D = 160 x 95 x 74 mm UMG 503 / 505 / 507, Prophi® UMG 508 / 511		**AH144**	**52.07.666** **52.19.666**
Sealing (front protection class to IP65) for UMG 96,96S, 96L, 96RM Sealing (front protection class to IP65) for UMG 503-511, and Prophi®		**D96** **D144**	**29.01.907** **29.01.903**
Blank cover in black plastic 96 x 96 mm		**BA96**	**29.12.001**
Blank cover in black plastic 144x144 mm		**BA144**	**29.12.002**
Adapter plate 144 mm to 96 mm RAL 7032 Adapter plate 144 mm to 96 mm RAL 7035		**AB144/1** **AB144/2**	**29.12.912** **29.12.913**
Profibus connector 9 pole, SUBCON-PLUS-ProfiB/AX/SC as before, however bent		**AX/SC** **AX/SC**	**13.10.539** **13.10.543**
Connector, e.g. for M-Bus (not possible to terminate) DB-9 connection plug (with screw clamps)		**DB-9 plug**	**13.10.520**
Ethernet front feed-through with extension frame and RJ45 socket type VS-08-BU-RJ45/BU		**EFD**	**13.08.016**

Description		Type	Item number
Protective cover; flat design for covering the RJ45 contact insert in the extension frame		**EFDD**	**13.08.017**

Calibration protocol

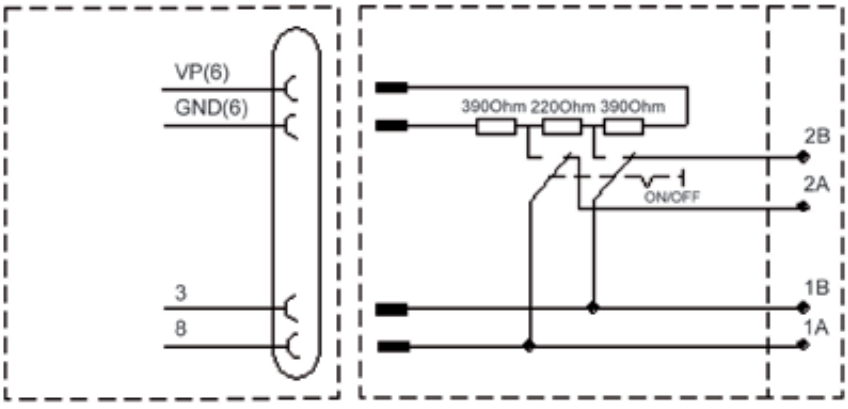
Type		Item number
Calibration protocol UMG	for UMG 96/96S/96L/103/503/505/507 and Prophi®*1	**33.03.300**
Calibration protocol UMG	for UMG 96RM/104/604/605/508/511	**33.03.303**

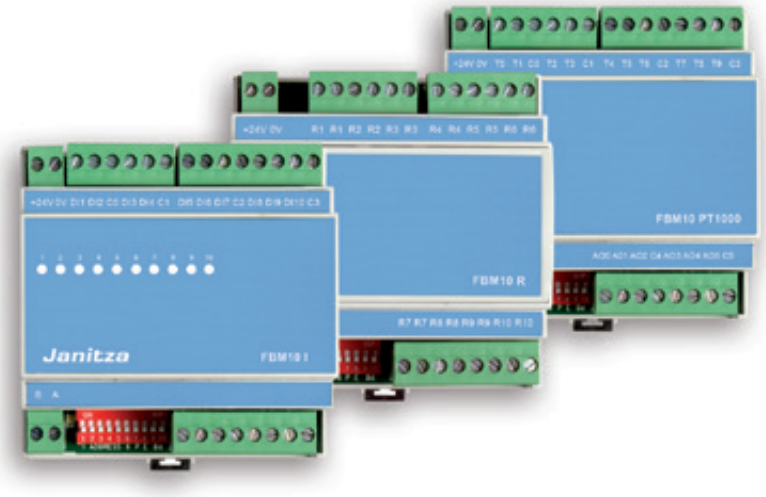
*1 For products of the series UMG 96L and UMG 96 test protocols can be ordered only along with the original PO, and cannot be issued at a later stage.

Some instruments with Profibus connections require a Profibus connector. The incoming bus cable is connected to the 1A/1B terminal and the continuing bus conductor is connected to the 2A/2B terminal. The slide switch is used to activate the terminal resistance at the beginning and end of the bus system. The terminal clamps (2A/2B) are simultaneously switched off for the continuing bus conductor.

Note:
For the UMG 507, UMG 508, UMG 511 the Profibus connector is also used for the Modbus.

Dimensional drawing





IT and field bus components

In addition to simple data collection with power analysers, industrial data communication, i.e. the transfer, central storage and processing of the data, also plays an important role in energy management. Janitza electronics® offers frequently used and proven IT and field bus components supported by Janitza®. Interface converters are included together with IO modules, repeaters, industrial Ethernet switches, ISDN modems, signal converters and a mini UPS for problem-free operation of your system.

Field bus components

De-centralized field bus IO/modules series FBM10
All FBM10 modules have an interface RS485 with Modbus RTU protocol and can be used as slaves to the devices of the UMG 604, UMG 605, UMG 508 and UMG 511 series. The UMG 104 and UMG 507 series cannot be used as a master for the FBM10 modules.

All FBM10 modules are configured and programmed accordingly by Janitza electronics® for each device.

Distance
The I/O modules of the FBM-series can be connected up to 1000m distance to the RS485 Modbus master. Cable type should be used either a Profibus cable or type Li2YCY (TP cable) 2x2x0.22.

Application of I/O field buses
The field bus module has no own intelligence, but it takes up the various input and output signals in order to distribute to the participant. To use the field bus modules, a connection to each Modbus master device such as the UMG 604, UMG 605, UMG 508 or UMG 511 is necessary.

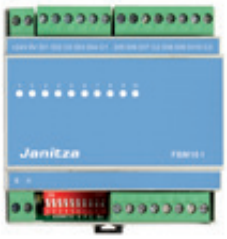
With the inclusion of the remote I/O modules are two different versions available. The user can basically integrate all data points in his Janitza® system. In this case the Janitza® system is no longer limited only on electrical parameters. In principle, other values such as process data, status, alarms, limits, alarm outputs or the like can be recorded. This values can be captured with the software GridVis for live and historical data.

Example of use of inputs
- Emax blocking or release
- Tariff change
- Set point Emax
- Synchronization of measuring period
- Alarms
- Status messages

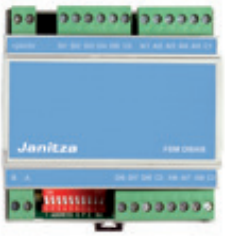
Example of using the outputs
- Emax-Outputs (max. 64)
- Limit outputs for values (alarms)

Use of the module FBM10PT1000
The PT1000 temperature field bus module is used for capturing up to 10 temperature measurements (e.g. with PT100 or PT1000). The measured values are plotted and visualised using a UMG 604, UMG 605, UMG 508 or UMG 511 and a necessary expansion (in accordance with the section APPs).

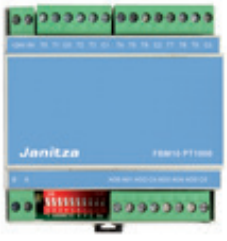
Example
- Temperature monitoring
- Over temperature detection



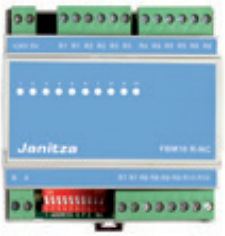
FBM10 I



FBM DI8-AI8



FBM10 PT1000



FBM10 R-NC

Overview I/O field bus series FBM10

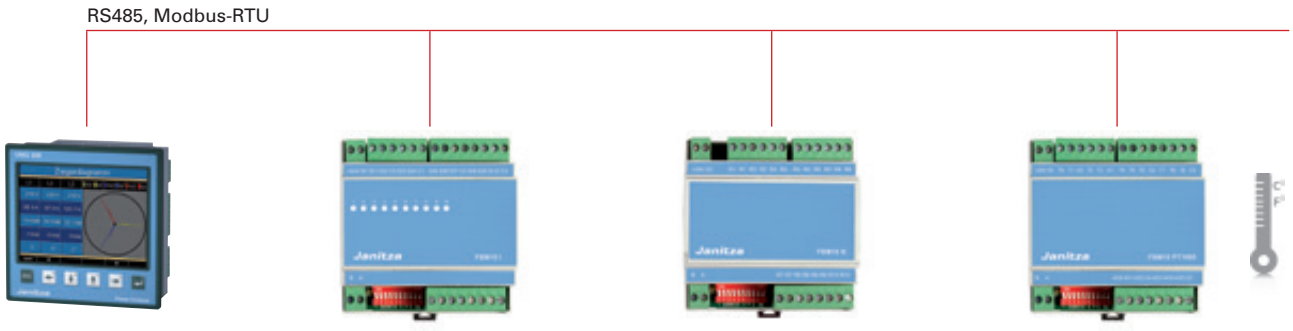
Type	Relay outputs	Digital inputs*	Analogue inputs**	Temperature inputs	Item No.
FBM10I	-	10	-	-	**15.06.076**
FBM10PT1000	-	-	-	10	**15.06.077**
FBM10R-NC	10	-	-	-	**15.06.078**
FBM DI8-AI8	-	8	8	-	**15.06.079**

* only status messages ** 4-20mA

Technical data

Auxilary voltage	24V DC ±20%
Load current	20mA
Bus protocol	RS485, Modbus-RTU
Transmission rate	4,800 to 38,400Bit/s
Digital input	24V DC, 5mA
Relay outputs	24V DC 0.5A / 250V / 3A AC1 / 2A AC3
Ambient temperature	-10...+50°C
Accuracy	<0.1% for temperature measurement PT1000
EMV	EN 55011
Terminals	Plug-in terminals up to 1 mm²
Case	45mm rail mounted system H x W x D 90 x 88 x 58 mm
Mounting	DIN rail
Humidity	<95° r.H. non condensing
Protection	IP20
Standards	CE conformity

Application



Field bus components

Decentralised WAGO I/O system for client-specific programming (APPs)

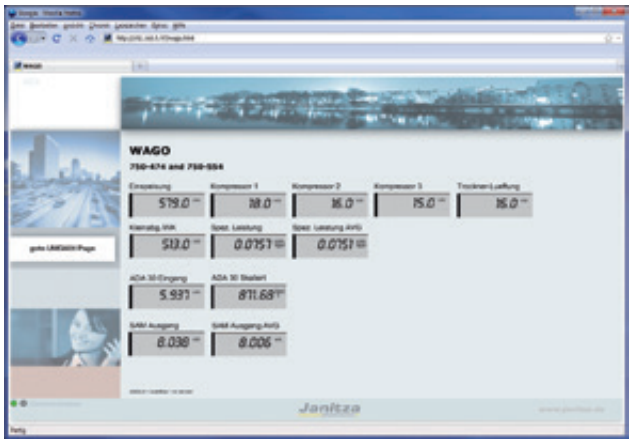
Application
Client-specific programming is achieved with the help of the WAGO I/O system. The decentralised field bus coupling is controlled via RS485 Modbus RTU. Communication takes place between the UMG instruments and one or more bus couplers to which the corresponding inputs and outputs are detachably interconnected.

The WAGO I/O system is attached to a DIN rail. As a bus cable, a profibus cable or other suitable cable, such as Li2YCY(TP) 2x2x0.22 should be used, where the maximum distance between the master and slave may extend to 1000m.

Suitable for devices: UMG 604/UMG 605/UMG 508/
UMG 511

The APPs are programmed on an application by application basis depending on client requirements. For tendering purposes, an appropriate application description is required (specifications). A separate homepage is created for each application for displaying the measured values.
Possible applications: Compressed air capture via analogue inputs, analogue output of calculated or measured values, display of physical measured quantities etc.

Illustration: WAGO coupler with RS485 connection (15.06.202) with outputs (15.06.250) and end terminal (15.06.251).



Example of client programming

WAGO standard components
The WAGO field bus couplers can generally be used with all plug-in terminals from WAGO. However, only the most common ones are shown here:

Description	Item No.
Field bus coupler, Modbus RTU, RS485 for digital and analogue signals, 9.6, 19.2, 38.4, 115.2 kBaud, supply voltage 24VDC	**15.06.202**
Field bus coupler, Ethernet TCP/IP for digital signals, supply voltage 24VDC	**15.06.204**
Digital output terminal 2-channel relay, 230 VAC, 2 change-over 1A	**15.06.250**
Analogue input terminal PT100/PT1000, 3 conducter connection	**15.06.271**
Analogue output terminal 2-channel 4...20mA	**15.06.262**
Analogue output terminal 2-channel, 0...20mA	**15.06.261**
Analogue input terminal PT100/PT1000, 3 conducter connection	**15.06.273**
Connector for the RS485 interface on the module WAGO	**13.10.539**
End terminal	**15.06.251**
Interface cable UMG bus coupler RS485, 5m length	**08.02.424**

Accessories for universal measuring instruments

Description		Type	Item number
RS232 <-> RS485 converter with galvanic separation and 3000 volt insulation; variable baud rate 300...9600...baud 115 kBaud; incl. power supply 230V/ sec. 12VDC, 300mA; max transfer length 1000m; **software:** GridVis; **products:** UMG 507, UMG 503, UMG 505, UMG 96S, ProData®, Prophi®, UMG 604, UMG 103		**K-2075**	**15.06.015**
RS485 Repeater 1 x RS485 input and output for extension of a RS485 network with 31 further measuring instruments or a further 1000m transfer length; max. 7 repeaters possible in a RS485 network; with 3000V galvanic separation. variable baud rate 300...9600...baud 115 kBaud (note: repeater is not suitable for Profibus); **products:** UMG 507, UMG 503, UMG 505, UMG 96S, UMG 604, UMG 103, ProData®, Prophi® **Power supply "connectpower" is required.**		**K-1075**	**15.06.024**
RS485 HUB 1 x RS485 input and 3 x RS485 outputs for construction of a star-shaped RS485 network with galvanic separation and 3000 volt insulation; variable baud rate 300...9600...baud 115kBaud. **products:** UMG 507, UMG 503, UMG 505, UMG 96S, ProData®, Prophi®, UMG 604, UMG 103 **Power supply "connectpower" is required.**		**K-1375**	**15.06.035**
RS485 <-> USB with galvanic separation and 3000 volt insulation; variable baud rate 75...115kBaud; compatible with USB v1.1 standard; USB type-A connector; incl. driver disc; max transfer length 1000m; **operating systems:** Windows 2000/XP; **software:** GridVis; **products:** UMG 507, UMG 503, UMG 505, UMG 96S, ProData®, Prophi®, UMG 604, UMG 103		**K-6175**	**15.06.025**
M-Bus signal converter PW60 Integrated RS232 interface (PC as master), galvanic separation between M-Bus and PC, Baud rates: 300 to 9600 baud, protection against excess currents and short-circuits in the M-Bus; operational display, data transactions, maximum bus current and excess current; housing for DIN-C rails or wall mounting, protection class: IP20; external 24V DC or AC power supply is required		**PW60**	**15.06.048**

Accessories for universal measuring instruments

Description		Type	Item number
Power supply for DIN rail mounting prim. 115-230V 50/60 Hz, sec. 24V DC; 1A		Connectpower	**16.05.002**
Power supply for DIN rail mounting prim. 85 - 264V 50/60Hz, sec. 24V DC; 5A		TCL	**16.05.004**
Profibus connector 9 pole, SUBCON-PLUS-ProfiB/AX/SC as before, however bent		AX/SC AX/SC	**13.10.539** **13.10.543**
Connector, e.g. for M-Bus (not possible to terminate) DB-9 connection plug (with screw clamps)		DB-9 Buchse	**13.10.520**
S0 converter – interface to M-Bus, baud rate M-Bus 2400, 9600 baud; single S0 interface in accordance with DIN EN 43864 or potential-free pulse; in support rail housing W26 x L75 x H111mm; IP40; (products: UMG 96, UMG 96S, UMG 104, UMG 503, UMG 505, UMG 507, UMG 508, UMG 511, UMG 604 and UMG 605)		PadPuls M1C	**15.06.028**
Industrial DIN rail Ethernet switch NS-208 8 x 10/100 Mbps Ethernet-ports, shielded RJ-45 connections; compatible with IEEE 802.3, 802.3u and 802.3x Supply voltage: 10 to 30V DC (separate power supply required)		NS-208	**15.06.041**
Hager switch, 5 ports switch for DIN rail mounting 10/100 Mbit/s transfer rate, protection class II, protection type IP20; integrated power supply (230V) (+/- 10%) 50 Hz. Dimensions: 6 units, Anwendung: for mounting in installation boards e.g. next to a UMG 604E/EP.		TN025	**15.06.039**

Industrial DIN rail Ethernet switch NS-208
Item number: 15.06.041

Application

The economic NS-208 Ethernet switch is suitable for connecting the Ethernet units in the switch board. The 8-fold switch which supports 10/100 base-T can be used anywhere where several Ethernet units must be connected with each other. It possesses all of the necessary properties which can be expected from a non-configurable, industrial switch. With its robust plastic housing and the large temperature range from -30°C to +75°C, it is ideal for industrial applications.

Technical data

Switch	8 x RJ45, 10/100MBit/s
Band width	2.0 Gbps
ESD protection	8kV direct contact 15kV discharge gap
Network cable	10/100 Base-T (Cat 5 UTP cable; 100m max.)
Supply voltage	10 to 30V DC (separate power supply required)
Consumption	app. 0.12A bei 24VDC; ± 5%
Cable connection electricity supply	Removable screw clamps
Dimensions (WxLxH)	64x110x97.5mm
Mounting	Mounting on DIN rail
Housing	Robust plastic housing
Operating temperature	-30 .. +75 °C
Storage temperature	-40 .. +85 °C
Humidity	10 .. 90% (non-condensing)

General features

- 8 x 10/100 Mbps Ethernet-ports
- Shielded RJ45 connections
- Automatic setting of the transfer rate
- Compatible with IEEE 802.3, 802.3u and 802.3x

Hager switch, 6PLE, 5 ports TN025, Item number: 15.06.039

General features

- 5 ports switch for DIN rail mounting
- 10/100 Mbit/s transfer rate
- For 5 power analysers
- RJ45 plug sockets with protective caps for plug sockets which are not in use
- Integrated power supply (230V) (+/- 10%) 50 Hz
- Protection class II, protection type IP20
- Dimensions: 6 units

Application

For Mounting in installation boards e.g. next to a UMG 604E/EP

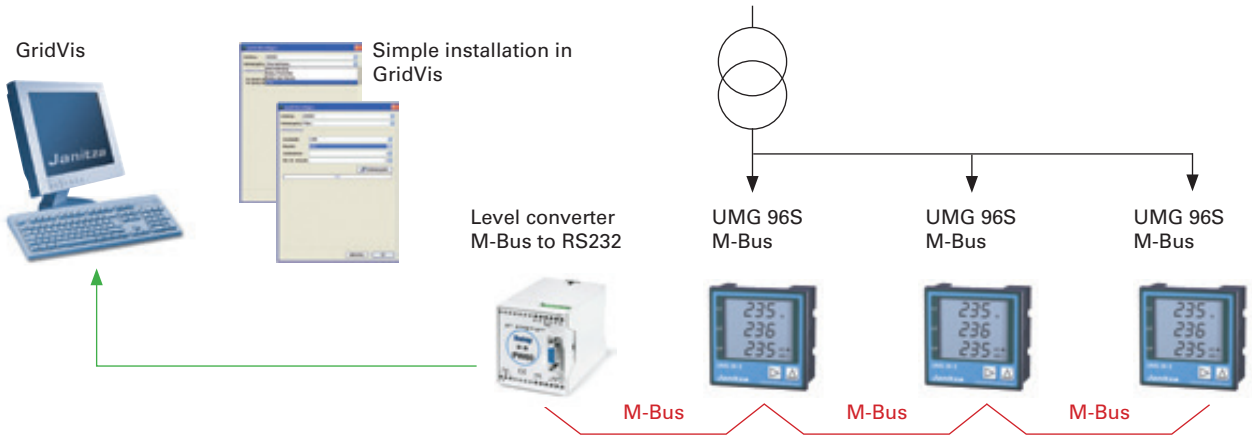
M-Bus signal converter PW60

M-Bus installations are characterised by their simple cabling. Janitza electronics® has made accommodations for this and has developed the UMG 96S with M-Bus interface.
Using the signal process-controlled M-Bus level converter PW60, up to 60 x UMG 96S M-Bus can be connected to one PC (master). M-Bus software which is available on the market or the GridVis software can be used to analyse the data.

Features

- Integrated RS232 interface (PC as master)
- Galvanic separation between M-Bus and PC
- Baud rates: 300 to 9600 baud
- Bit recovery
- Protection against excess currents and short-circuits in the M-Bus
- Echo reduction and collision recognition with break signals
- Operational display, data transactions, maximum bus current and excess current
- External 24V DC or AC power supply is required
- Housing for DIN-C rails or wall mounting
- Dimensions (WxLxD) = 78 x 70 x 118mm
- Protection class: IP20
- Maximum network dimension for JYSTY Nx2x0.8 = 1km (9600 baud) 4km (2400 baud)
- Maximum distance to slave for JYSTY Nx2x0.8 => 1200m
- Power consumption: 15W
- Operating voltage range: 20...45V DC or 20...30 V AC
- Operating temperature range: 0...+55°C
- Storage temperature: -20...60°C
- Item number: **15.06.048**

Application



In GridVis, the following measurement parameters are available online with M-Bus

Effective energy, effective energy purchase (purchase or high tariff), effective energy (supply or low tariff), reactive energy, reactive energy (capacitive or high tariff), reactive energy (inductive or low tariff), apparent energy, comparator runtimes 1a to 2c, operating hours meter, current in N, effective power sum, reactive power sum, apparent power sum, UL1, UL2, UL3, IL1, IL2, IL3, PL1, PL2, PL3.

Note: it is not possible to read the UMG 96S memory with the M-Bus. However, online recording can be activated in GridVis. Please note that due to the low M-Bus baud rates in case many measuring instruments are used longer delays can occur.

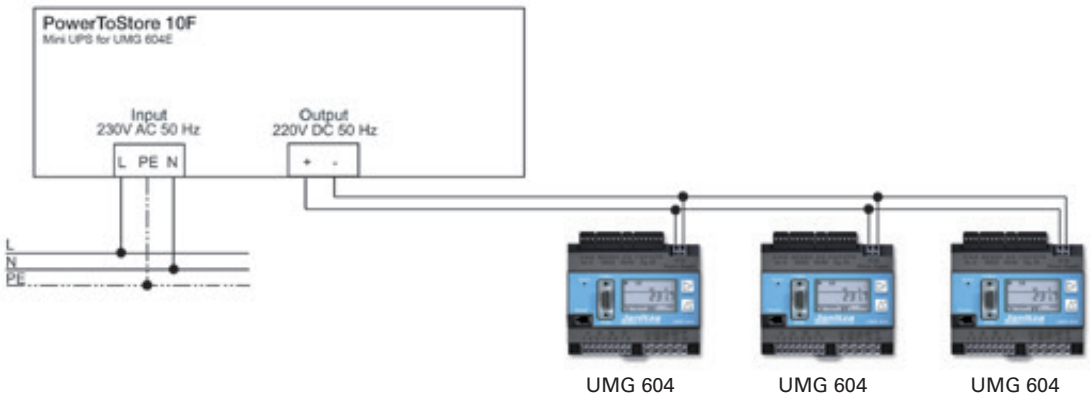
PowerToStore 10F – mini UPS for UMG 604E

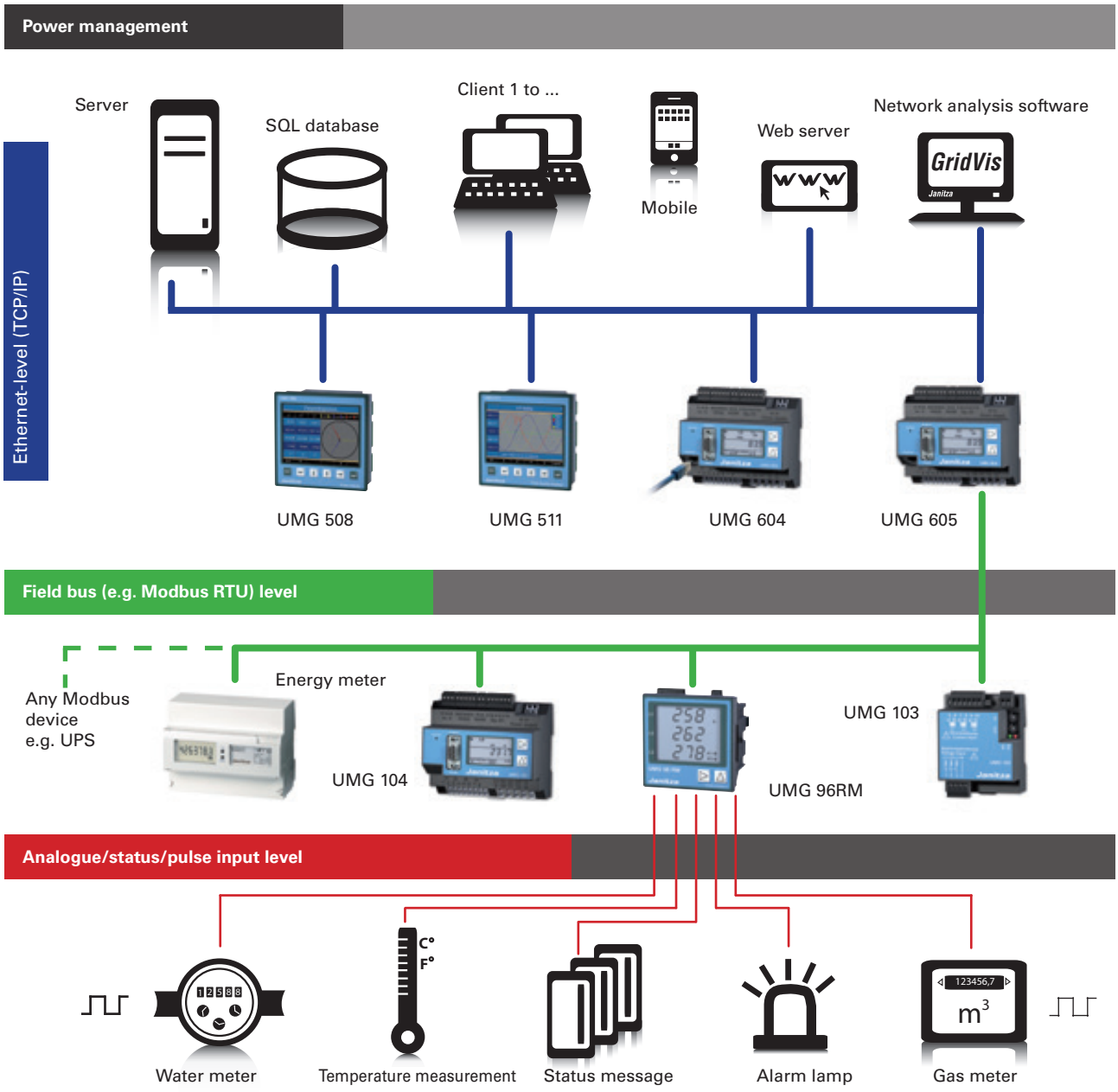
Capturing short-term interruptions is one of the strengths of the UMG 604/605/508/511. Due to the small construction and the large memory, the instrument is ideally suitable for monitoring transformer stations. The UMG 604's auxiliary voltage supply is provided through a switch mode power supply which has been developed for both DC and AC operation. Voltage interruptions of approximately 80ms are safely bridged. Voltage interruptions which are longer than 80 ms cause the UMG 640E to shut down. In order to capture longer short-term interruptions, the auxiliary voltage supply of the UMG 604 must be backed up with a UPS. If a UPS is not available, the PowerToStore will be used. Usually batteries are used in UPS units. However, the disadvantage of batteries is the regular maintenance. The PowerToStore 10F is an energy buffer based on capacitors. Therefore it does not require batteries and is maintenance free. The capacity level has been designed so that 3 x UMG 604E can be supplied with energy for approximately 3.5 minutes. The maximum number of UMG 604s which can be connected is limited to 3 instruments.

Technical data

Potential separation	Yes
Input voltage	max. 240V AC (DC)
Output voltage	ca. 220V DC
Output current	max. 90mA
Storage capacity	10 farad
Dimensions (WxHxL)	220 x 105 x 80 mm
Cable connections	screw/plug clamps
Mounting	fixing on din rail
Housing	aluminium mould housing
Operating temperature	-25° ... +55°C
Lifespan	ca. 15 to 20 years to 40°C
Degree of protection	IP54
Weight	1.5 kg
Item number	**15.06.400**

Application





UMG 508/UMG 604 = Janitza® power analyser
UMG 511/UMG 605 = Janitza® power quality analyser
UMG 103/UMG 96RM/UMG 104 = Janitza® universal measurement devices

Database server

Extensive power quality monitoring and energy management applications require high-performance server solutions. Janitza electronics® can support you with the selection of a suitable system. Furthermore, we can offer you a high-performance server as a complete solution. Janitza electronics® guarantees problem-free and immediate use.

Your system administrator only needs to integrate the server which we configure into your own network. We supply a fully installed database server with GridVis software. You can choose between an MSSQL or MySQL database.

Janitza electronics® uses high-performance towers or rack servers from Dell. Dell Power Edge-Servers offer a high quality and reliability with maximum extension options. A high level of data security is offered by the use of RAID 5 systems with HotPlug hard drives.

We leave you also after the purchase not in the lurch...

With Janitza electronics® maintenance remote diagnosis, the service technician can remotely access your database server (only with your permission!) and can, therefore, diagnose and correct the problem within a few minutes. We use common remote maintenance solutions with triple level coding according to industry standards.

We currently recommend the following server configuration for larger projects:

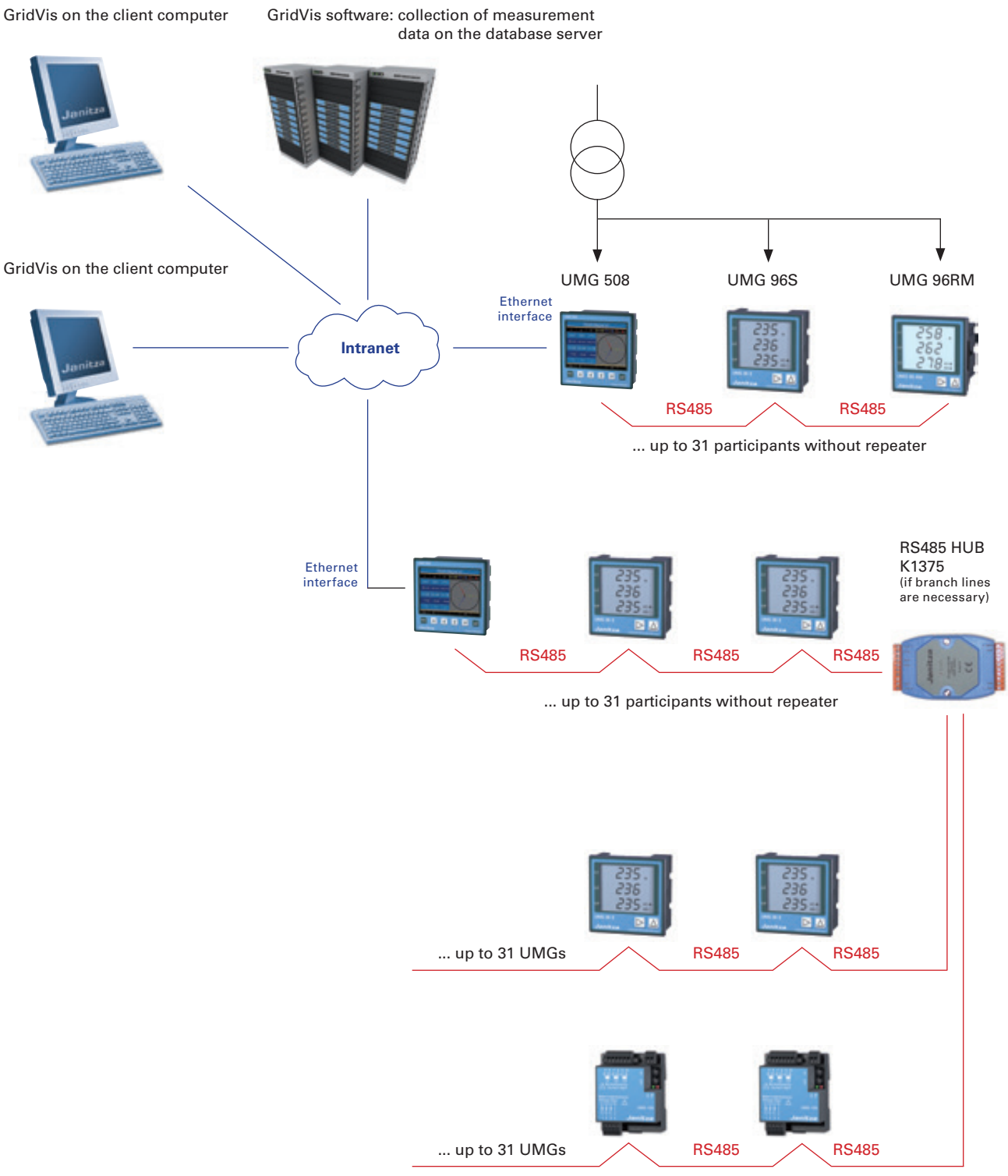
- current Intel processor
- 16 GB RAM
- RAID controller
- RAID 10 with 4 hard disks (each 1 TB capacity)
- DVD Rom drive
- incl. mouse and keyboard
- Windows 2008 Server with 5 CALs, 64 Bit (german or english version)
- incl. installation of software GridVis
- incl. database installation Janitza-DB, MySQL or MS-SQL

Quotes are available upon request

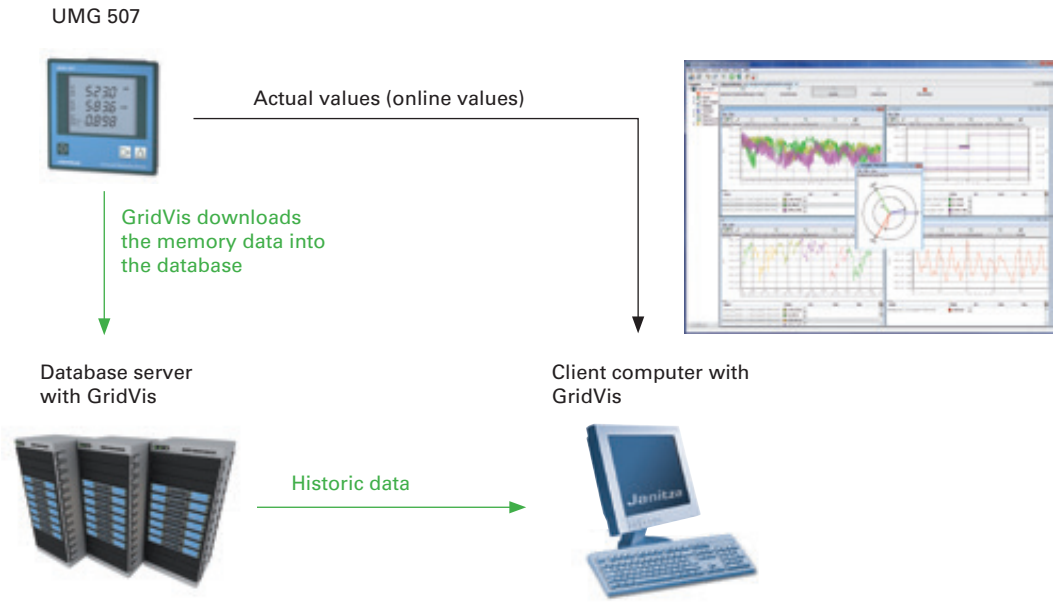
Areas of application
Recommended for larger projects with a high number of measuring instruments and everywhere where high data security and maximum performance is required. Systems can be individually configured for small and large sized companies.

Application
The GridVis software works with an additional programme as a service on the server. The user does not have to be logged on. For measurement value analysis, the client computers access the server directly through the network.

Application



Application
Any number of client systems can access the measurement data within the database. The presentation of online measurement values is dependent upon the number of ports per unit i.e. the client computers directly access the UMG instruments for online values and for historical data from the database. The following graphic illustrates this:



The UMG 507E, for example, currently has 6 communication ports. Two of these ports are designed as a gateway (port 8000) for downstream RS485 units.

The ports can be allocated as follows:

Port 1 = database server for downloading the UMG memory by automatic download
Port 2 = client computer 1 accesses the online values from UMG 507E and UMG 96S
Port 3 = client computer 2 accesses the online values from UMG 507E and UMG 96S
Port 4 = client computer 3 accesses the online values from UMG 507E
Port 5 = BMS (Building management software) accesses the online values from UMG 507E
Port 6 = OPC server accesses the online values from UMG 507E

Touch panels

For user-friendly visualisation of measurement parameters without PC directly at site, touch panels are a perfect solution. The simple installation, which is almost enabled with plug & play, guarantees the rapid display of measurement values in the switch board door.

Numerous measuring instruments can be compiled on to one display. Just one cut-out is now sufficient instead of several switchboard door cut-outs which were formerly required. This saves space and costs and ensures that a better overview is achieved. Standard applications can be supplied for all touch panels. The touch panel JPC150, based on a web browser, can provide customer-specific solutions upon request with a display of a circuit plan or the display of service telephone numbers etc.

Touch panels

General
In order to monitor electrical data at site, so-called embedded systems provide solutions in the form of touch panels. Due to the fact that only slight tolerances are permitted for production machines and processes and that stand stills outside of certain maintenance intervals are not tolerated, there are obviously increased requirements for visualisation by these embedded systems. Classic PC´s do not generally meet these requirements because hard drives and ventilators cannot be used in a harsh industrial environment. This is where compact-flash memory cards can be used due to the integration of special processors and coolers which do not include any ventilators. Dust, dirt and moisture are no problem thanks to the high front side protection class.

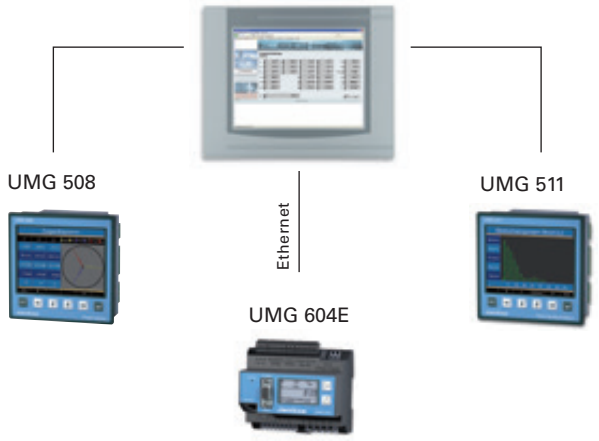
Areas of application
In the field of energy measurement technology and energy management, touch panels are used for the visualisation of process and energy data at site. The communication takes place through two existing Ethernet interfaces in the JPC150 models. The JPC35 has a RS485 or RS232 interface. The standard application for the visualisation of up to 32 measuring points* is available for both panels.

Application JPC150
The 15“ touch panel features a pre-installed Windows Embedded operating system. This panel allows visualisation of websites or different Apps (expansions) such as “MultiTouch“ via a web browser (e.g. Firefox or Internet Explorer). All Power Analysers from Janitza electronics® with an ethernet interface feature a webserver and can be used for graphic or tabular visualisation of standard measured values. Client-specific websites can also be transferred to the devices. Janitza electronics® GmbH can also develop special applications on request.

JPC35 “MultiTouch“
The JPC35 “MultiTouch“ has a 3.5“ touch panel and can be modified and configured for a range of uses. The panel allows the measured values from up to 32 measurement devices* to be displayed. The configuration and menu navigation has been constructed to be intuitive and user-friendly. Each measurement point can be given a specific name which allows for transparent organisation of the measured values. The display mode is variable and can be configured from the display itself.

* 31 slave device and one master device

JPC150 application example



The following modes may be used:

Standard:	Displays the standard measured values of a measurement device (UMG 604/UMG 605).
Station selection:	Displays the standard measured values from up to 32 measurement points (31 measurement devices serially-connected to the RS485).
Energy table:	Displays the energy consumption of the individual measurement points in tabular form.

A UMG 604 or UMG 605 may be used for the connection. The RS232 interface is required for communication between the master and JPC35. The serial RS485 allows connection of up to 31 slave devices. Modbus RTU communication (RS485) is monitored and in the event of an error, a message appears on the display.

The JPC35 "MultiTouch" requires the App (expansion) (free of charge) "MultiTouch" (item no 15.00.207) on the measurement device.

Info: The address allocation of the measurement points is fixed and cannot be modified! (Address 1 to 31)

The JPC "MultiTouch" displays the following measured values for a master and up to 31 slave devices

Measurement values	Display range	Unit
Voltage:L1, L2, L3 / L1-L2 , L2-L3,L1-L3	0...999999,9V	V
Current: L1, L2, L3, current in N	0...999999,9A	A
Effective power: L1, L2, L3, sum	0...999999,9 kW	kW
Apparent power: Sum	0...999999,9 kVA	kVA
Reactive power: Sum	0...999999,9 kvar	kvar
Cos-phi: L1, L2, L3, sum	0.00 kap - 0.00 ind	-
THD: UL1, UL2, UL3	0 - 100%	%
Frequency	45 - 65 Hz	Hz
Rotating field	left / right	-
Average current	0...999999,9A with over line	A
Effective energy sum	0...99999999 kWh	kWh
Reactive energy ind. sum	0...99999999 kvarh	kvarh
Measuring point text input	max. 15 characters	-

JPC35 remote display

The JPC35 "remote display" comprises a 3.5" touch panel and can be used to display measured values from a measurement point (UMG 104, UMG 604, UMG 605, UMG 508, UMG 511, UMG 96RM*), where the name of the measurement point can be freely configured. It is possible to switch between measured value list and measured value display within the display mode. Connection and communication is effected via an RS232 or RS485 interface (see item no). No expansion (App) is required on the measurement device for use.

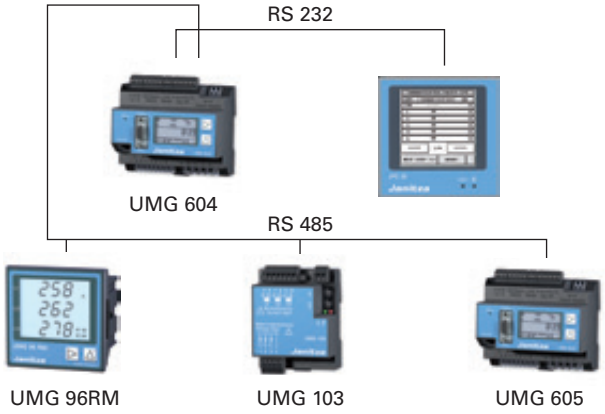
Info: The measurement device address of the JPC35 remote display RS485 is always fixed at 1.

** Attention, not applicable to UMG 96RM due to the absence of RS232 interface.

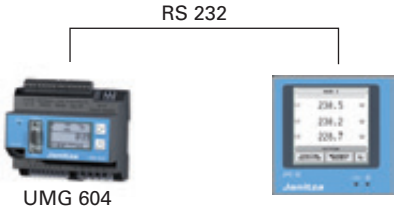
Standard Menu JPC35

JPC35 “MultiTouch“ Box, Item no. 15.06.313

Mode Station selection

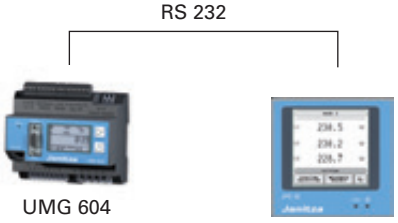


Modus Standard



Prerequisite components:
• JPC35 (Item no.1506313) • 1 master (UMG 604/UMG 605) • 0 to 31 slave(s) (UMG 103, UMG 96S, UMG 104, UMG 604 and UMG 605; UMG 96RM integrated from Q4/2011) • 1 power supply 24V (e. g. Item no. 16.05.002) • App MultiTouch (Item no. 51.00.207)
Information
• Connection via RS232 (max. 15 meter distance to master) • “MultiTouch“ App must be installed on the UMG 604 / UMG 605 • The display mode can be configured via the display • The number of measurement points can be configured via the display • Names of measurement points (max. 15 characters) are configured via the display • Language selection (German, English, Spanish) • Communication monitoring of slave devices • Configuration assistant
Display (measured value/mode)
• Display of real values: UL1, UL2, UL3, ULL1, ULL2, ULL3, I1, I2, I3, ISUM, P1, P2, P3, PSUM, SSUM, QSUM, CosPhi1, CosPhi2, CosPhi3, CosPhiSum, THDU1, THDU2, THDU3, HZ, Drehfeld, AVG_I1, AVG_I2, AVG_I3, KWH, kvarh • Mode setting: Standard, station selection safety measurement, energy list

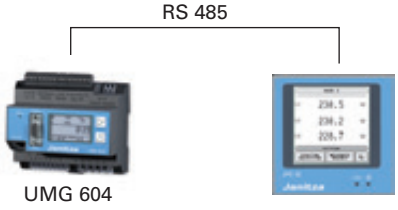
JPC35 Remote Display Box (RS232), Item no. 15.06.314



Note: Not suitable for the UMG 96RM, UMG 508 and UMG 511 because this device has no RS232 interface.

Prerequisite components:
• JPC35 (Item no. 1506314) • UMG 604, UMG 605, UMG 104 • 1 power supply 24V (e. g. Item no. 16.05.002)
Information
• Remote display via RS232 (max. 15 meter distance) • No device App installation required • Name of measurement points (max. 15 characters) • Language selection (German, English, Spanish) • Configuration assistant
Display (measured value/mode)
• Display of real values: UL1, UL2, UL3, ULL1, ULL2, ULL3, I1, I2, I3, ISUM, P1, P2, P3, PSUM, SSUM, QSUM, CosPhi1, CosPhi2, CosPhi3, CosPhiSum, THDU1, THDU2, THDU3, HZ, rotation field, AVG_I1, AVG_I2, AVG_I3, KWH, kvarh • Mode setting: Display matrix devices, measurement values list

JPC35 Remote Display Box (RS485), Item no. 15.06.315



Note: The JPC35 works in this version as RS485 Master. The RS485/Ethernet-gateway function can not be used.

Prerequisite components:
• JPC35 (Item no. 1506315) • UMG 604, UMG 605, UMG 104, UMG 508, UMG 511, UMG 96RM • 1 power supply 24V (e.g. Item no. 16.05.002) • DSub9 connection plug, angled sides(Item no. 13.10.514)
Information
• Remote display via RS485 (max. 1200 meter distance) • No device App installation required • Name of measurement points (max. 15 characters) • Name of measurement points (max. 15 characters) • Configuration assistant
Display (measured value/mode)
• Display of real values: UL1, UL2, UL3, ULL1, ULL2, ULL3, I1, I2, I3, ISUM, P1, P2, P3, PSUM, SSUM, QSUM, CosPhi1, CosPhi2, CosPhi3, CosPhiSum, THDU1, THDU2, THDU3, HZ, rotation field, AVG_I1, AVG_I2, AVG_I3, KWH, kvarh • Mode setting: Display matrix devices, measurement values list

Overview of product variants

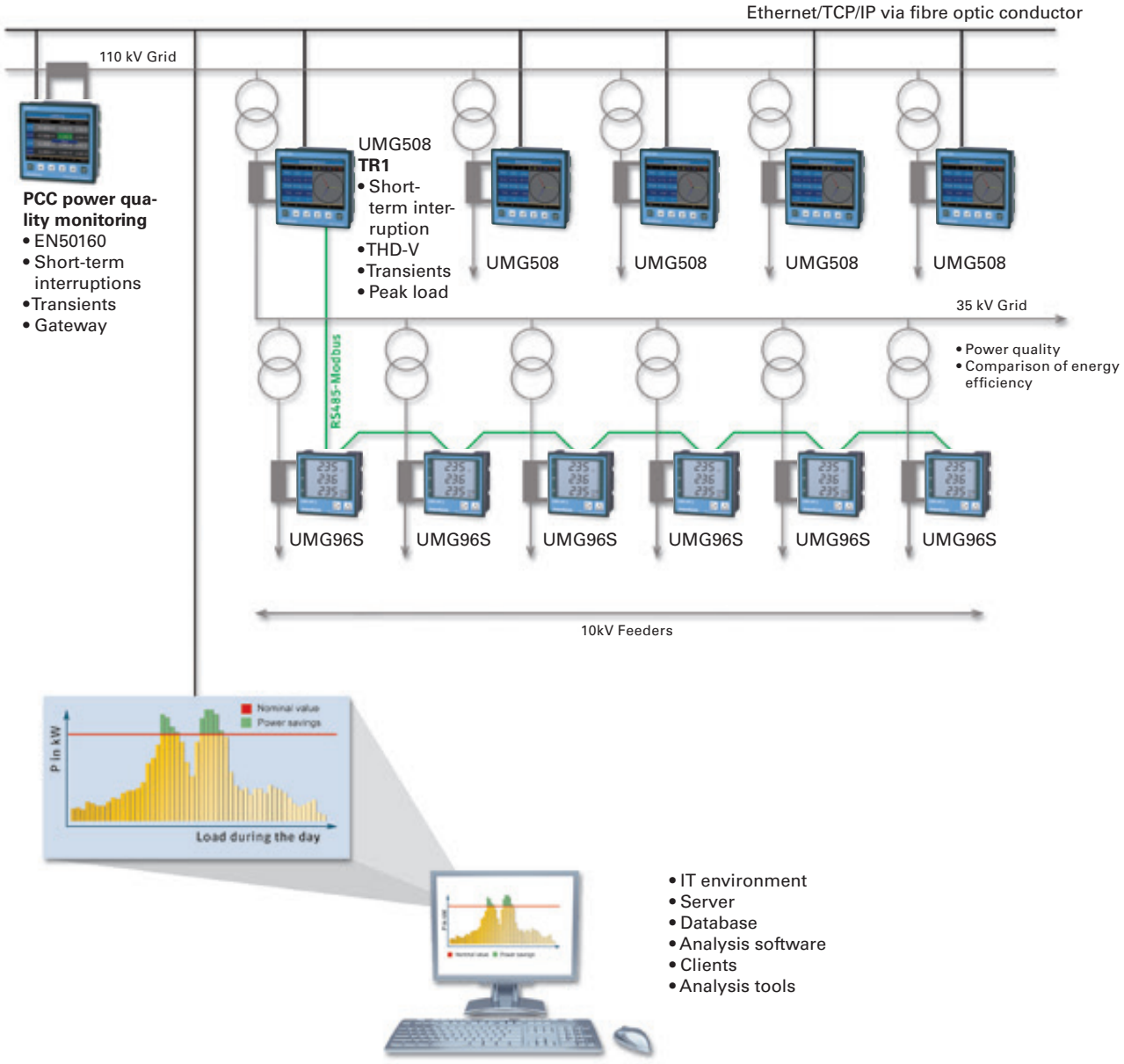



Type	JPC35 "MultiTouch"	JPC35 remote desiplay RS232	JPC35 remote desipla RS485	JPC150
Item number	**15.06.313**	**15.06.314**	**15.06.315**	**15.06.302**
Frontpanel				
Resolution [Pixel]	240 x 240	240 x 240	240 x 240	1024 x 768
Brightness [cd/m2]	110	110	110	300
Number of colours	16 levels of grey	16 levels of grey	16 levels of grey	65.000 colours
Input	Resistive Touch	Resistive Touch	Resistive Touch	Resistive Touch
Screen diagonal	3.5"	3.5"	3.5"	15"
General technical data				
Voltage supply (external)	24 VDC ± 15%	24 VDC ± 15%	24 VDC ± 15%	24 VDC ± 20%
Weight [kg]	0.21	0.21	0.21	5.0
Operating temperature [°C]	0...50	0...50	0...50	0...50
Storage temperature [°C]	-10...60	-10...60	-10...60	-20...60
External measurements [mm]	96 x 96 x 40,6	96 x 96 x 40,6	96 x 96 x 40,6	452 x 357 x 86
Installation measurements [mm]	89.3 x 89.3	89.3 x 89.3	89.3 x 89.3	429 x 334
Front protection class	IP65	IP65	IP65	IP65
CPU				
Prozessor [MHz]	32 Bit RISC	32 Bit RISC	32 Bit RISC	300
Communication				
Interfaces				
Ethernet, RJ45	No	No	No	2
RS485	No	No	Yes	option
RS232	Yes	Yes	No	Yes
USB	No	No	No	2
VGA	No	No	No	Yes
Keyboard/mouse	No	No	No	PS/2
Protocols				
Modbus RTU	Yes	Yes	Yes	No
Ethernet TCP/IP	No	No	No	Yes
Operating system				
XP embedded	No	No	No	Yes
Applications (optional)				
Display of measured values from slave devices possible	Yes	No	No	Yes
Requires extension (App)	Yes	No	No	Yes
Webserver display	No	No	No	Yes

Please provide type and number of instruments to be visualized while placing your order.

Application at an energy supply company in Eastern Europe

In this project, an energy supply company wanted to link the measurements from its 110kV transformer station and 35kV substation with each other. The transformer stations are linked with the central control centre of the energy supply company by using fibre optics. Communication is achieved with Ethernet - TCP/IP. Across various voltage levels depending upon the information required from the measuring point and the communication requirements various power analysers and measuring instruments where used. The aim was to read out the fundamental electrical values from all stations automatically together with power quality measurement values and collect, store and analyse them centrally.



Janitza electronics® GmbH

...provides information in the appendix regarding the subjects of energy measurement technology, power management, power quality solutions and logistics. Case studies and reference projects are also shown. This information is intended to quickly provide our customers, distributors and representatives worldwide with basic information.

More information and a collection of application reports can be found on our homepage at: **www.janitza.com**

Important note

Some parts of the appendix chapter contain statements about the application, use or availability in certain areas of use or applications. These statements are based on our experiences, typical applications and typical requirements in connection with specific applications. It is the responsibility of the customer to check whether a product of Janitza electronics® can be used with the respective specifications and specific standards for the application and whether the following information can be applied to the specific application. The following information can be changed by us without providing information about the changes and can be updated if required. Our products are specified in detail in our catalogues and operating manuals.

Communication

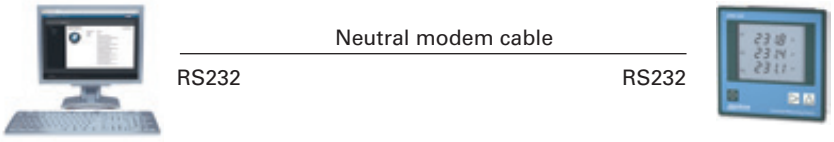
Field buses & interfaces in the UMG family

Protocol	UMG 103	UMG 104	UMG 96S	UMG 96RM	UMG 503	UMG 505	UMG 507	UMG 508	UMG 511	UMG 604	UMG 605	Interface
Modbus RTU	X without RS232	X	X	X	X	X	X DSub9	X without RS232	X without RS232	X	X	RS232 RS485
Modbus TCP/IP	-	-	-	X	-	-	X	X	X	X	X	Ethernet RJ45
Modbus UDP	-	-	-	X	-	-	X	X	X	X	X	Ethernet RJ45
Profibus DPV0	-	X	X	X	-	-	X	X	X	X	X	DSub9
MBus	-	-	X	X	-	-	-	-	-	-	-	DSub9
LONBus	-	-	-			X	-	-	-	-	-	Lon Interface
BACnet	-	-	-	-	-	-	-	X	X	X	X	RS485 Ethernet RJ45

Direct connection via RS232 interface

Possible with:
UMG 96S • UMG 104 • UMG 503L, LG, OV, V • UMG 505 • UMG 507L, AD, P, E, EP • UMG 604 • UMG 605 • Prodata®

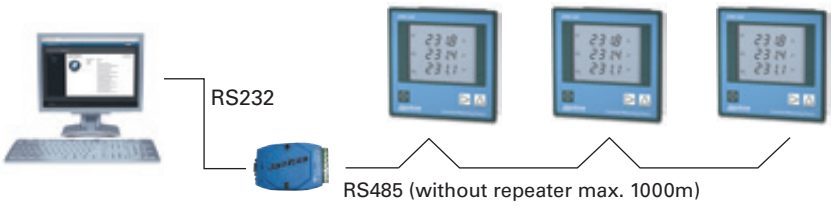
Neutral modem cable	**Item number**
For UMG 503	08.02.405
For UMG 505	08.02.425
For UMG 96S	08.01.501



Connection with RS485 interface

Possible with:
UMG 96S • UMG 96RM • UMG 103 • UMG 104 • UMG 503 • UMG 505 • UMG 507 • UMG 508 • UMG 511 • UMG 604 • UMG 605 • ProData® • Prophi®

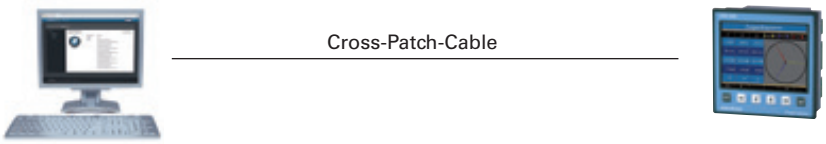
Item	**Item number**
RS485 converter K2075	15.06.015
RS485 repeater K1075	15.06.024
RS485 Hub K1375	15.06.035



Direct connection via Ethernet

Possible with:
UMG 96RM • UMG 507E, EP, EL • UMG 508 • UMG 511 • UMG 604E, EP • UMG 605

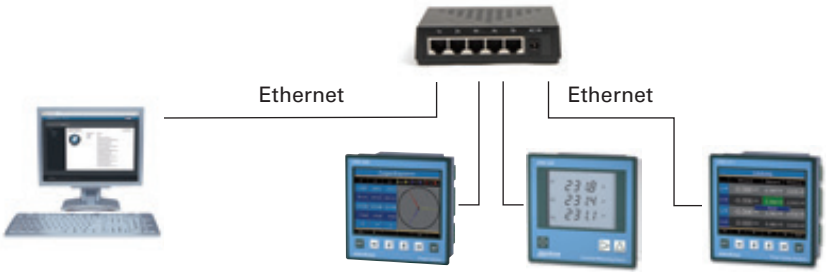
Item	Item number
Cross-Patch-Cable	08.01.506



Connection via Ethernet (Intranet)

Possible with: UMG 96RM • UMG 507E, EP, EL • UMG 508 • UMG 511 • UMG 604E, EP • UMG 605

Item	Item number
Patch-Cable	08.01.504

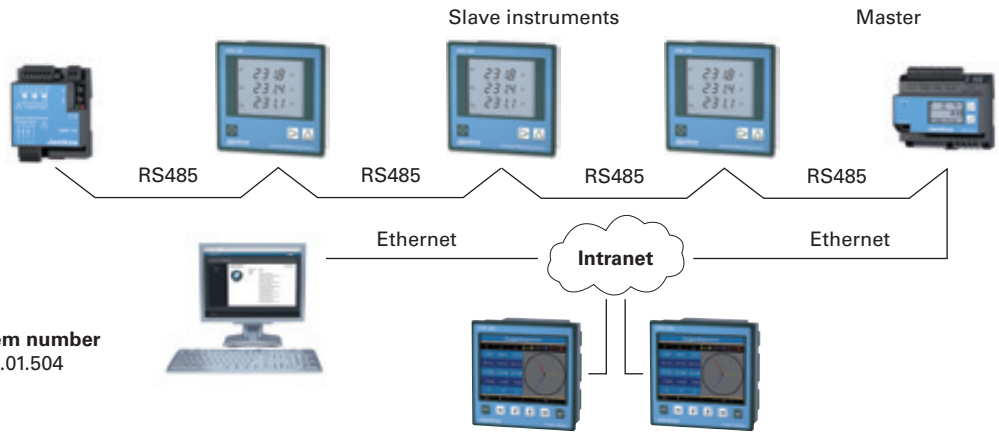


Modbus gateway (Intranet)

Possible with master instrument types:
UMG 507E*, EP* • UMG 508 • UMG 511 • UMG 604E, EP • UMG 605

Slave:
UMG 96RM • UMG 96S • UMG 103 • UMG 104 • UMG 503LS, S, OV, V • UMG 507L, AD, P, E, EP
UMG 505 • ProData® • Prophi® • UMG 103 • UMG 104

Item	Item number
Patch-Cable	08.01.504



* Master/Slave mode only with UMG96S, UMG 503, UMG 505, Prophi® and ProData®

Logistics information

Table 1: Unit carton

Type	Dimensions WxHxD in mm	Net weight of unit in kg	Gross weight in kg (mailable: incl. packing and operating manual etc.)	Device typ	Number of units in package	Item number
Unit carton 1	180x85x145	0.275	0.38	UMG 96L/96	1	**31.01.035**
Unit carton 1	180x85x145	0.455	0.56	UMG 96S /UMG 96RM /-M /-EL	1	**31.01.035**
Unit carton 1	180x85x145	0.195	0.30	UMG 103	1	**31.01.035**
Unit carton 2	180x140x170	0.390	0.95	UMG 96RM-P /-CBM /-E	1	**31.01.034**
Unit carton 2	180x140x170	1.190	1.36	UMG 503/505	1	**31.01.034**
Unit carton 2	180x140x170	1.150	1.32	UMG 507	1	**31.01.034**
Unit carton 2	180x140x170	0.340	0.78	UMG 104/604/605	1	**31.01.034**
Unit carton 2	180x140x170	1.010	1.18	Prophi	1	**31.01.034**
Unit carton 2*1	180x140x170	1.500	1.67	UMG 508/511	1	**31.01.034**
Unit carton 3*2	150x210x240	1.500	1.79	UMG 508/511	1	**31.01.031**

*1 This packaging is not suitable for individual despatch of UMG 508 and UMG 511.
*2 This packaging is only used for individual despatches of UMG 508 and UMG 511.

Table 2: Cardboard packaging sizes

Shipping packaging					**Total weight in kg with the respective device type*3**								
Type	Dimensions WxHxD in mm	Packaging weight in kg	Max number of unit carton 1 or 2 (Tab. 1)		UMG 96/96L	UMG 96S*3 UMG 96RM /-M /-EL	UMG 96RM-P /-CBM /-E	UMG 103	UMG 503/505	UMG 507	UMG 104/604/605	Prophi®	UMG 508/511
			1	2									
Master carton 1	315x225x170	0.21	3	-	1.35	1.89	-	1.11	-	-	-	-	-
Master carton 2	400x300x250	0.39	10	4	4.19	5.99	5.00	3.39	5.83	5.67	3.51	5.91	6.87
Master carton 3	340x240x280	0.28	8	4	3.32	4.76	4.10	2.68	5.72	5.56	3.40	5.00	6.76
Master carton 4	395x340x390	0.76	16	8	6.97	9.85	8.50	5.69	11.77	11.45	7.13	10.33	13.85
Master carton 5	440x395x390	0.86	26	12	10.80	15.50	12.35	8.72	17.25	16.76	10.28	15.08	20.36
Master carton 6	700x400x400	1.42	40	20	16.62	23.82	20.50	13.42	28.62	27.82	17.02	25.10	33.82
Master carton 7	800x400x400	1.52	46	20	19.01	27.28	20.60	15.32	28.72	27.92	17.12	25.12	33.92
Master carton 8 on throw-away pallet*	800x600x400	7.25	72	34	34.61	47.57	39.60	28.85	53.50	52.20	33.80	47.40	62.60
Master carton 9 on throw-away pallet*	1180x780x675	24.50	210	96	95.90	135.1	109.00	80.90	148.00	143.50	92.50	131.00	173.00
Master carton 10 on throw-away pallet*	1180x780x905	27.80	280	128	123.10	175.4	140.20	102.6	192.68	187.56	118.44	169.64	225.96

- Master cartons will be packed with devices from one type.
* Pallets are IPPC certified.
*3 The weight of item number 52.13.025 has been applied to the UMG 96S. The details of the total weight of the respective unit type is based on a single variety only. Unit carton 1 and 2 is also used inside the master cartons. Packaging 3 is exclusively used for single shipments of UMG 5xx and UMG 6xx outside of Europe due to the customs documents.

Tabelle 3: Cardboard packaging sizes for 10 project packets

Shipping packaging				Total weight in kg with the respective device type*3				
Type	Dimensions WxHxD in mm	Max. number of units	10%-Zubehör (Stk.) Anleitung, GridVis Basic, RS232-Kabel (nur beim UMG 96S mit RS232)	UMG 96	UMG 96L	UMG 96S*3	UMG96 RM/-M	UMG 103
Master carton 5	440x395x390	60 (6x10 pc.)	6	17,4	17,4	20,1	20,8	11,5
Master carton 6	700x400x400	90 (9x10 pc.)	9	26,1	26,1	30,1	31,1	17,2
Master carton 8 on throw-away pallet*	800x600x400	150 (15x10 pc.)	15	48,7	48,7	55,2	56,8	33,8
Umkarton 9 on throw-away pallet*	1180x780x675	600 (60x10 pc.)	60	189,9	189,9	216,2	222,6	130,7
Umkarton10 on throw-away pallet*	1180x780x905	840 (84x10 pc.)	84	259,4	259,3	296,2	305,3	176,4

- Dimensions: 10 units project packet: L 225 x W 315 x H 105mm, item no. 31.01.040
- Project packets will be packed with devices from one type.
- 10% of accessories will be consist of the project packets. Mounting brackets will be consisting of 100%.

* Pallets are IPPC certified.

*3 The weight of item number 52.13.025 has been applied to the UMG 96S

Tabelle 4: Cardboard packaging sizes for 12 project packets

Shipping packaging				Total weight in kg with the respective device type				
Type	Dimensions WxHxD in mm	Max. number of units	10%-Zubehör (Stk.) Anleitung, GridVis Basic, Daten-Kabel, Schraubendreher (nur beim UMG104/604/605)	UMG 96RM-CBM/-P	UMG 96RM-E	UMG 104	UMG 604	UMG 605
Master carton 5	440x395x390	36 (3x12 pc.)	4	17.1	17.4	15.0	15.3	15.3
Master carton 8 on throw-away pallet*	800x600x400	96 (8x12 pc.)	10	50.1	50.8	44.2	44.9	45.0
Master carton 9 on throw-away pallet*	1180x780x675	336 (28x12 pc.)	34	204.5	206.3	180.0	182.8	183.0
Master carton on throw-away pallet*	1180x780x905	468 (39x12 pc.)	47	234.7	237.3	206.6	209.8	210.0

- Dimensions: 12 units project packet (foam inserts): L 450 x W 330 x H 150mm, item no. 31.01.042
- Project packets will be packed with devices from one type.
- 10% of accessories will be consist of the project packets. Mounting brackets will be consisting of 100%.

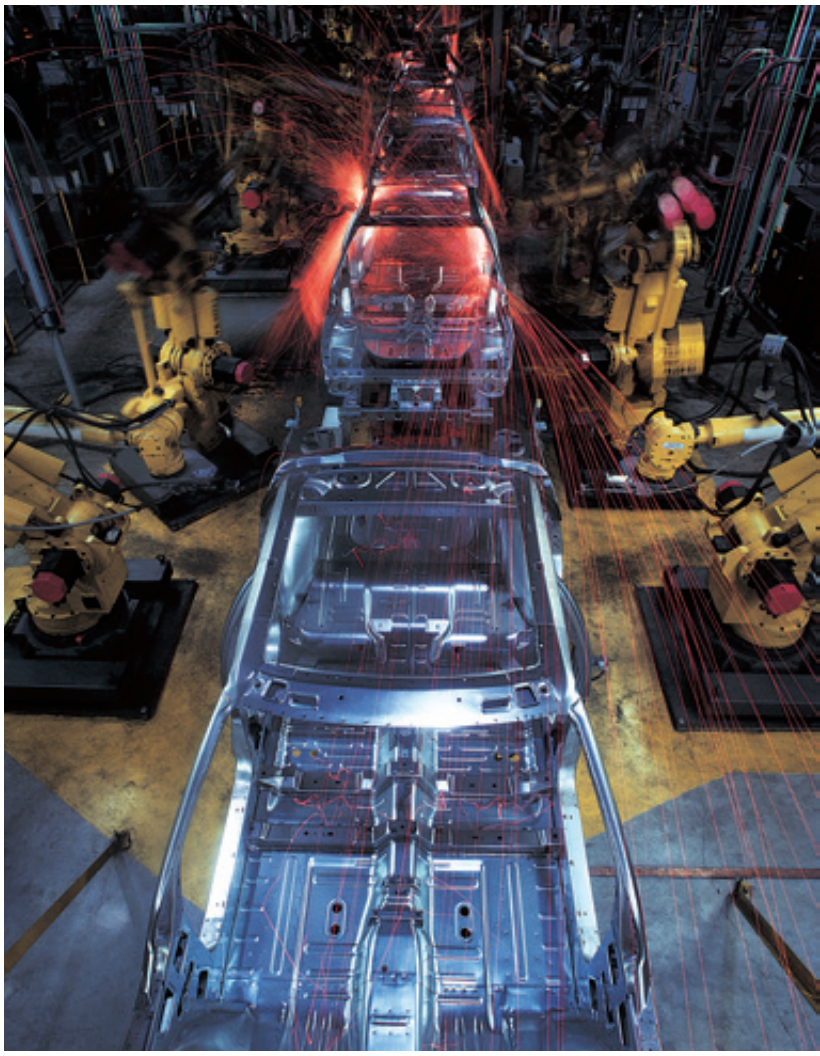
* Pallets are IPPC certified.

Project description – industry

The problem
Transparency regarding energy costs and power quality is continuously becoming more and more important in industrial companies. Energy consumption must be allocated to the production stages and the final products in order to simplify pricing policies.

Due to the use of non linear consumers such as frequency converters, problems often arise with electronic equipment and controls. Reactive power compensation systems are usually subject to particularly high loads and, therefore, require skilled engineering.

Expensive peak loads can be avoided with intelligent peak demand management.



The task
A supplier to the automobile industry decided to relocate its complete production facilities and construct the buildings in a "green belt" area. The company wanted to collect consumption data for all welding robots together with compressed air consumption and heating supplies and provide the data to the controlling department.

The power quality from the four main feeds needed to be monitored and the four respective PFC systems needed to be integrated in the energy management system.

Peak demand management had to be anticipated in order to reduce high electricity costs due to high loadpeaks, shutdowns of compressors and air conditioning units etc. for a short period will be the solution. Intranet was available as a communication medium.

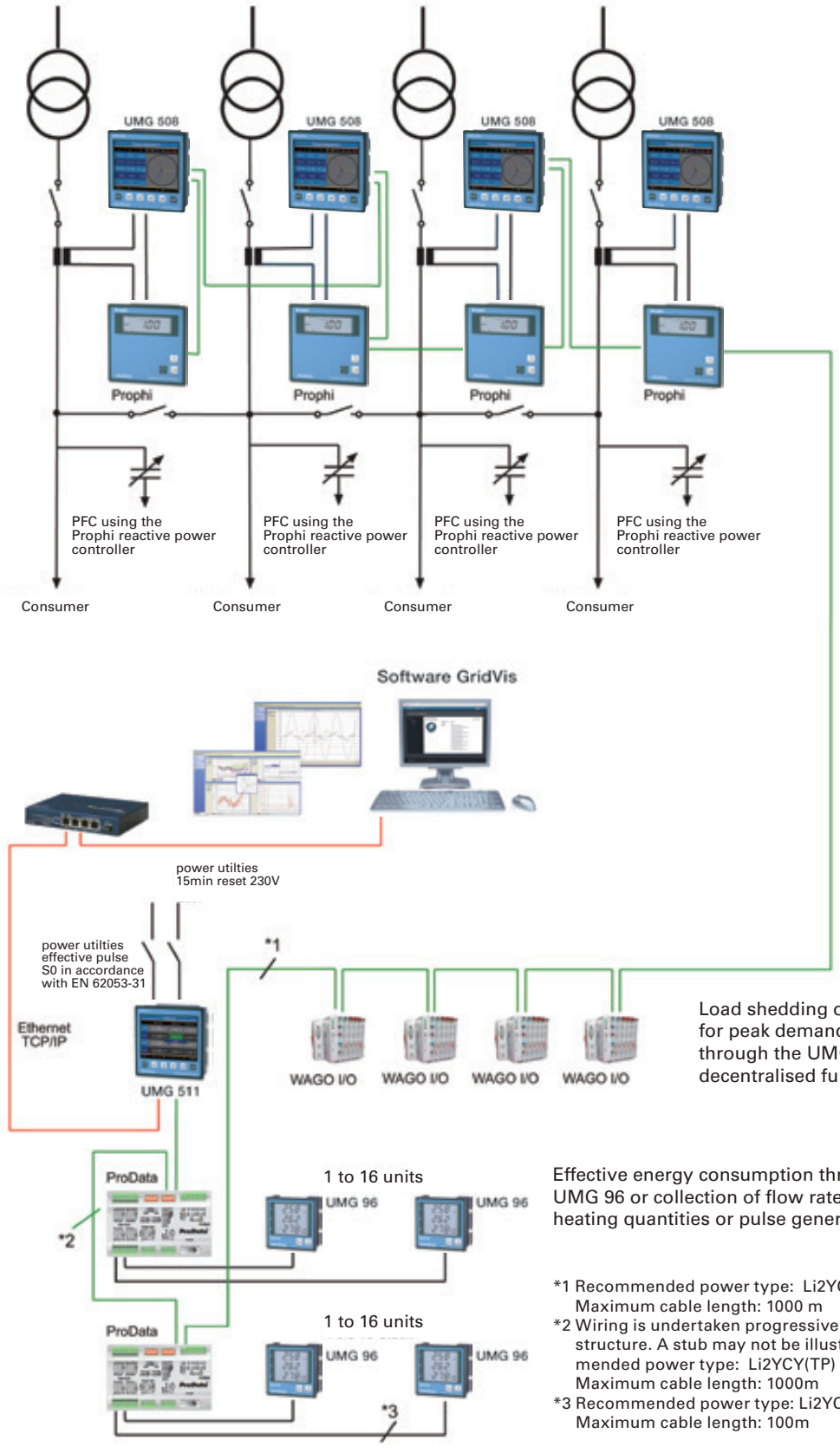
The solution
The UMG 96 of Janitza electronics®, which passes on the effective pulses to the ProData® data logger, was used as a meter for electrical energy consumption. Other pulse meters for compressed air and heating were also connected to the ProData® using the pulse outputs.

Four UMG 508´s were deployed in the four main feeders in order to determine the power quality. Four Prophi® 12TS reactive power controllers were also visualised using the RS485 in GridVis software. Distinctive feature:

The four PFC systems work as a so-called mixed operation, which means that the base load is compensated using the conventional contactors. The rapidly changing load proportions, as caused by welding systems, are switched using thyristor modules.

This means that dynamic PFC can be created for almost the same price as the conventional compensation system. A globally unique feature of the Prophi® controller. The UMG 511 works as peak demand management and as a master for downstream WAGO modules as well as a gateway for the RS485 bus cable to Ethernet/TCP/IP.

Direct connection via RS232 interface



Load shedding of consumers for peak demand management through the UMG 508 using the decentralised function modules.

Effective energy consumption through the UMG 96 or collection of flow rate quantities, heating quantities or pulse generators

*1 Recommended power type: Li2YCY(TP) 2x2x0.22. Maximum cable length: 1000 m
*2 Wiring is undertaken progressively in the bus structure. A stub may not be illustrated. Recommended power type: Li2YCY(TP) 2x2x0.22 Maximum cable length: 1000m
*3 Recommended power type: Li2YCY(TP) 2x2x0.22. Maximum cable length: 100m

Project description – Bank

The problem
In banks, insurance companies and other commercial buildings, increasing power problems with reference to harmonics, flickers, voltage peaks and similar effects have occurred in the past years. Network perturbations are often transported into the building from the medium voltage network.

The reason for internal power problems is the large number of PCs and switched mode power supply units which are used. Due to the widely branched 5-conductor networks, so-called "stray" currents can occur in ground wires. These are caused by incorrect grounding. These particularly lead to problems in data networks because they proceed in cables.

Flickering can lead to discomfort, headaches and tiredness among the members of staff. These disturbances are certainly not welcome because working in these types of buildings is made more difficult and may even become impossible without safe communication options. European norms have existed for several years for the assessment of network perturbations.

EN50160 regulates the power quality which must be provided by the energy supplier. The EN61000-2-4 provides the opportunity to measure the power quality within a building.

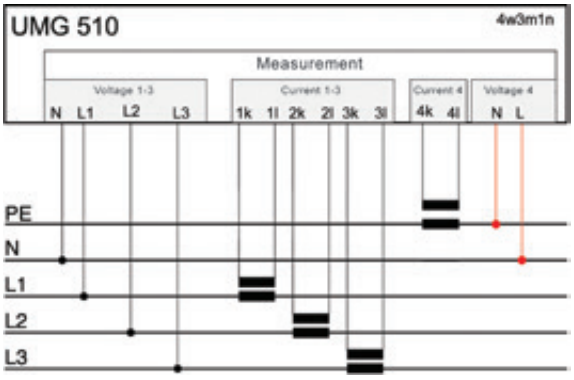
The task
The power quality must be checked in a large bank at the feeders in accordance with EN50160 and at the sub-distributions in accordance with EN61000-2-4. Furthermore, the reasons for frequent problems in the data cables had also to be identified. The employees in building services should have access to the data at all times. Intranet was provided as the communication medium.

The solution
A total of 39 x UMG 511 were installed in the feeders and all important distributions for communication, such as in the server rooms etc. An important feature is the fourth current and voltage input on the instrument. Due to the installation of the fourth current transformer in the protective earth conductor, stray currents could be tracked down. Potential differences due to incorrect grounding were identified using a separate measurement with the bridge between N and PE.

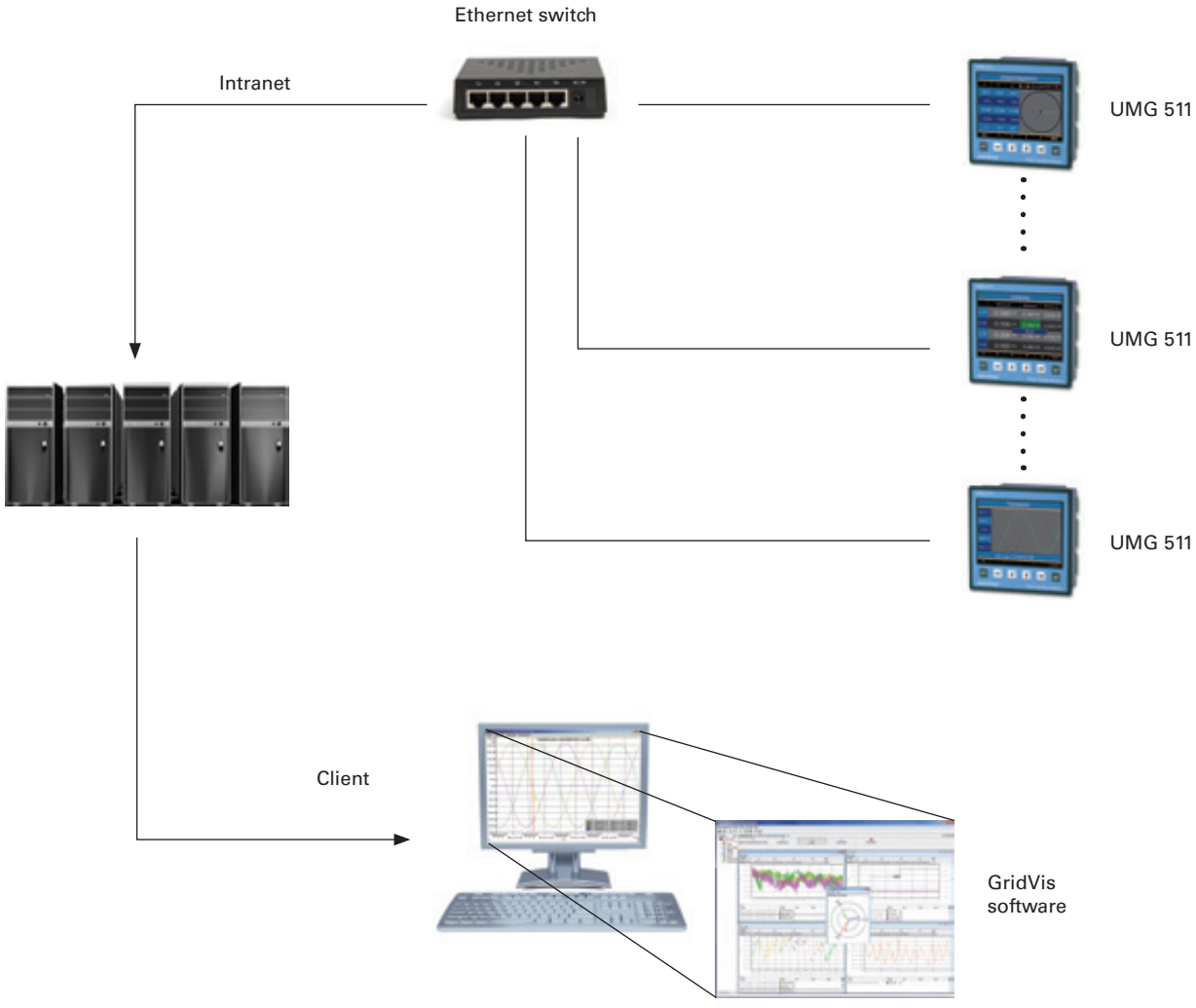
The existing grounding errors could, therefore, be corrected. Obviously all of the data with reference to the power quality and all current related data were stored in the 256 MB memory of the UMG 511. The GridVis software could be used to read the data at any time. An Ethernet TCP/IP interface was available for this purpose.

The reasons for the frequent loss of communication in the data network were found and important knowledge about the power quality was gained. The producers of harmonics could, therefore, be tracked down. Materials such as electronic controls or server supply units, which were previously destroyed due to network perturbations, could be protected with suitable power filters.

Furthermore, the monitoring of the power quality from the energy supplier was made possible in accordance with EN50160. A pleasing side-effect is the control of energy purchases or the power utility meter.



Measurement in the distribution network with main measurement and auxiliary measurement of protective earth.



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