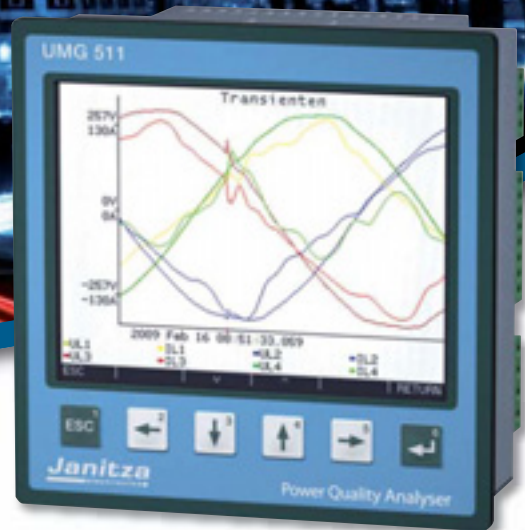


You can find us everywhere.
There must be a reason.



Main catalogue 2010

*“Quality is never an accident;
it is always the result of intelligent effort.”*

John Ruskin



UMG 604 power analyser

- Reduce electricity costs
- Stabilise production processes
- Reliable supply with energy
- Reduce maintenance costs

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The story

Janitza® electronics GmbH was founded by Mr. Eugen Janitza and Mr. Markus Janitza in Lahnau in the year 1986. After Eugen Janitza, one of the co-founders, retired from the company, his son, Markus Janitza, took over as general manager.

As a medium-sized family company, Janitza electronics® GmbH is an important employer in the region with a significant upwards tendency. The management is dedicated to the site in Germany which is testified by the continual, active apprenticeship schemes for young talents. The complete chain of value creation including product development, production and sales is based in Lahnau and the major expansion of production area at the beginning of 2007 shows that this will continue to be the case in the future. Traditional values such as continuity and reliability are of great interest to our customers along with innovative technology and products together with a rapid, professional service.



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, supermar-

kets, 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 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.

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.



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

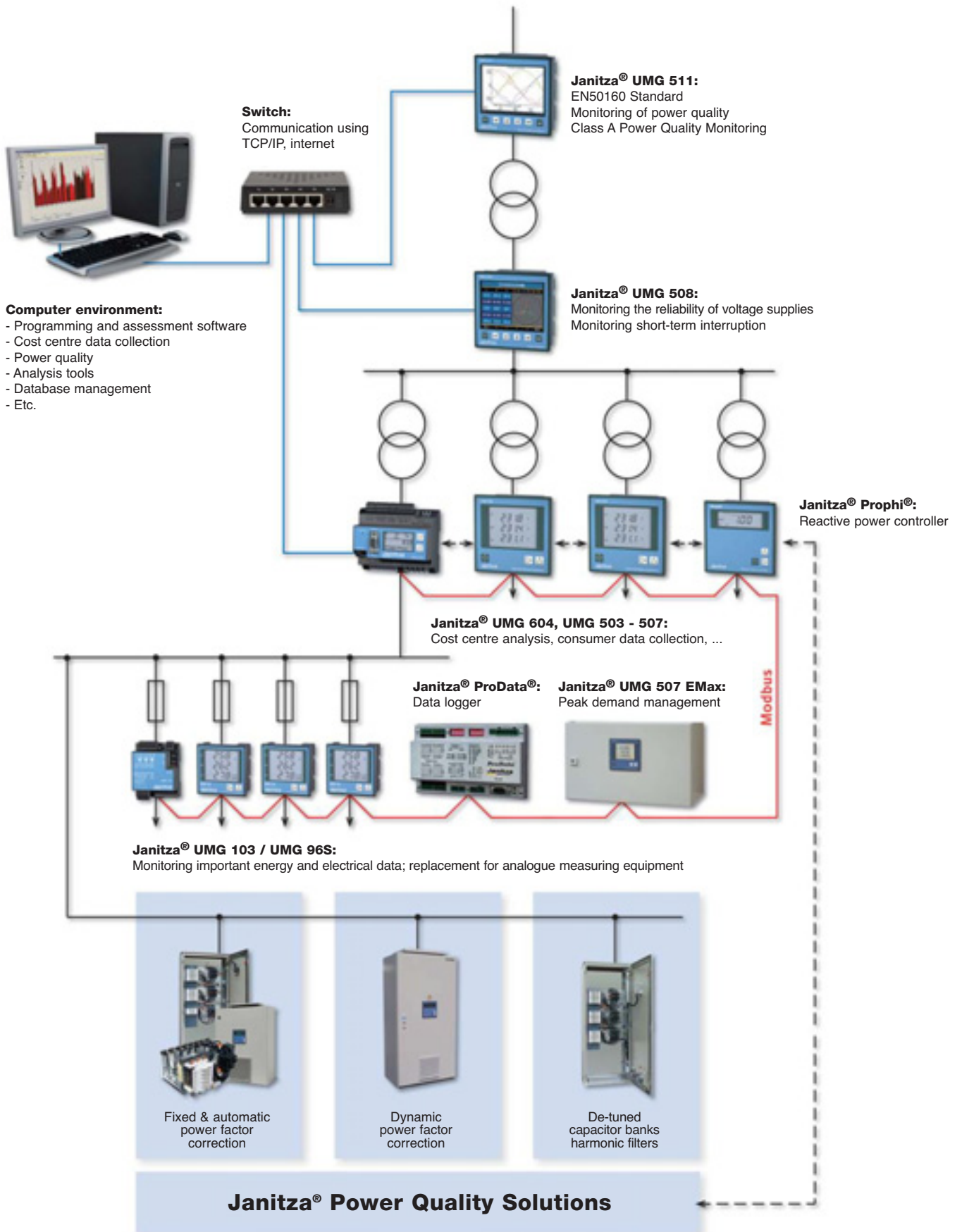
- Measurement
- Monitoring
- Automatic alarm management
- Detection of PQ problems

Power Quality Solutions

- Power factor correction (PFC)
- Harmonic filters
- Dynamic PFC

An overview of application options

An overview of application options



**UMG 103**

- Universal measuring device for DIN rail mounting without display
- Interface and harmonic measurement up to 25th in current and voltage

Pages 12 - 17

New

**UMG 104**

- Power analyser for DIN rail mounting with display
- Interface and harmonic measurement up to 40th in current and voltage

Pages 18 - 23

**UMG 604**

- Power analyser for DIN rail mounting
- 800 various measurement parameters
- Continuous measurement with recognition of short-term interruptions
- Ethernet, Bacnet, Modbus, Profibus, RS232, RS485
- Extendable up to 7 user programs (graphic programming)
- Peak demand management; accuracy classification 0.5S

Pages 24 - 31

New

**UMG 605**

- Power quality analyser for DIN rail mounting according to EN50160 and EN61000-2-4
- 2000 various measurement parameters
- THD, flicker, short-term interruptions, transients, unbalanced ...

Pages 32 - 37

**UMG 96L/UMG 96**

- Digital diversity in comparison to analogue simplicity
- Universal measuring device (96x96mm)
- UMG 96 with pulse outputs/signal output

Pages 38 - 43

**UMG 96S**

- Economic universal measuring device with interface
- 2 digital outputs (as pulse or signal output)
- Profibus/Modbus/M-bus/ harmonic display
- Clock/memory

Pages 44 - 51

**UMG 503**

- Power analyser (144x144mm)
- Extended measurement range, higher accuracy
- Modbus, RS232, RS485, 2 relay outputs, pulse output, analogue output

Pages 52 - 59

**UMG 505**

- Power analyser (144x144mm)
- LON, Modbus, RS232, RS485
- 5 digital outputs, 4 analogue outputs, 4 digital inputs

Pages 60 - 67

**UMG 507**

- Power analyser (144x144mm)
- Continuous measurement with detection of short-term interruptions
- Ethernet, Modbus, Profibus, RS232, RS485
- 6 digital inputs and outputs, 2 analogue outputs, 1 temperature input
- Peak demand management

Pages 68 - 75

New

**UMG 508**

- Power analyser (144x144 mm)
- Continuous measurement with recognition of short-term interruptions
- Ethernet, Modbus, Profibus, RS485
- THD, short-term interruptions, transient, unsymmetrical ...

Pages 76 - 81

New

**UMG 511**

- Class A power quality analyser according to IEC61000-4-30
- Power quality reports in line with EN50160 and EN61000-2-4
- Harmonics up to a 63rd
- THD, flicker, short-term interruptions, transient, unsymmetrical ...
- Including GridVis software with report generator for EN50160

Pages 82 - 88



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.

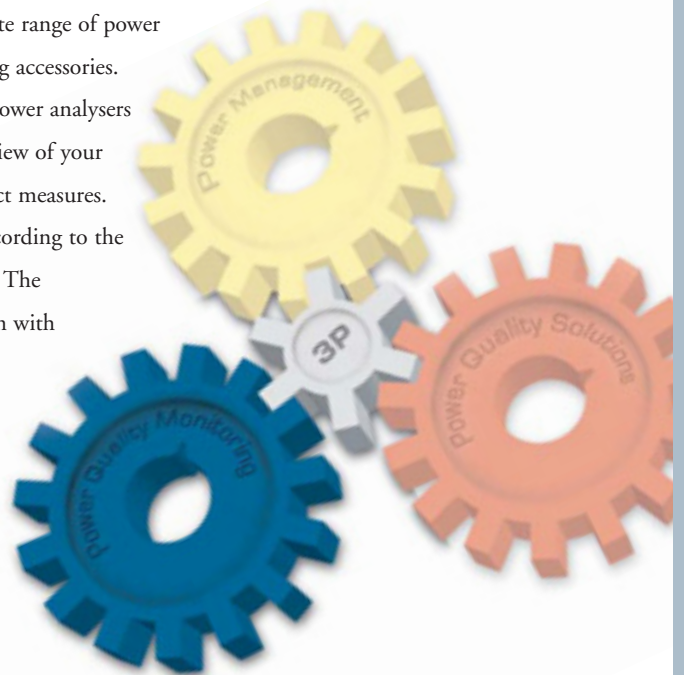
The power quality is also monitored according to the general valid standards (e.g. EN50160). The

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	UMG 96L
			P	L	E	P	EP		
Item number	52.18.001	52.20.001	52.20.002	52.16.003	52.16.002	52.16.004	52.16.001	52.16.027	52.14.001 (52.14.005)
Measurement range L-N, AC	50 - 300V	10 - 600Vrms		10 - 600Vrms				10 - 600Vrms	50 - 255V, (16 - 80V)*1
Measurement range L-L, AC	85 - 520V	18 - 1000Vrms		18 - 1000Vrms				18 - 1000Vrms	86 - 442V, (28 - 139V)*1
Over voltage category	300V CAT III	300V CAT III		300V CAT III				300V CAT III	300V CAT III
Operating voltage L-N, AC	115-240V	-		-				-	196 - 255V, (45 - 80V)*1
Auxiliary voltage	-	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	4 *4
Scan frequency 50/60Hz	5,4kHz	20kHz		20kHz				20kHz	2,5/3kHz
Measurement points per sec.	5,400	20,000		20,000				20,000	50
Continuous measurement	●	●		●				●	-
Measurements per second	5	5		5				5	1
Effective value from periods 50/60Hz	10/12	10/12		10/12				10/12	1/1
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%	+1%
Effective energy classification	0.5S	0.5S		0.5S				0.5S	2
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	-	-		●				●	-
Software	GridVis	GridVis		GridVis				GridVis	-
Interfaces									
RS 232	-	●	●	●	●	●	●	●	-
RS 485	●	●	●	●	●	●	●	●	-
Profibus DP	-	-	●	-	-	●	●	●	-
M-Bus	-	-	-	-	-	-	-	-	-
LON	-	-	-	-	-	-	-	-	-
Ethernet	-	-	-	-	●	-	●	●	-
Web server / e-mail	-	-	-	-	●/●	-	●/●	●/●	-
Protocols									
Modbus RTU	●	●	●	●	●	●	●	●	-
ISDN router	-	-	-	-	●	-	●	●	-
Modbus gateway	-	-	-	-	●	-	●	●	-
Profibus DP V0	-	-	●	-	-	●	●	●	-
LonTalk	-	-	-	-	-	-	-	-	-
Modbus TCP/IP,	-	-	-	-	●	-	●	●	-
Modbus over TCP	-	-	-	-	●	-	●	●	-
BACnet IP/MSTP	-	-	-	-/●	●/●	-/●	●/●*3	●/●*3	-
Catalogue page	12	18		24				32	38

*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



Type	UMG 96	UMG 96S										UMG 508	UMG 511
Item number	52.09.001 (52.09.002)	52.13.001	52.13.005	52.13.009	52.13.017	52.13.013	52.13.021	52.13.025	52.13.040	52.13.029	52.21.001	52.19.001	
Measurement range L-N, AC	50 - 275V, (49 - 76V) ^{*1}	50 - 300V (25 - 150V) ^{*1}										10 - 600V	10 - 600V
Measurement range L-L, AC	86 - 476V, (85 - 132V) ^{*1}	87 - 520V										18 - 1000V	18 - 1000V
Over voltage category	300V CAT III	300V CAT III										600V CAT III	600V CAT III
Operating voltage L-N, AC	196 - 275V, (49 - 76V) ^{*1}	85-300V(5213025/35; 140 -300V)										-	-
Auxiliary voltage	-	nur 52.13.029; 18 - 70V DC, 18 - 33V AC										95 - 240V AC; 135 - 340V DC	95 - 240V AC; 135 - 340V DC
Three phase/four phase	-/●	-/●										●/●	●/●
Quadrants	4 ^{*4}	4										4	4
Scan frequency 50/60Hz	2.5/3kHz	1.5kHz										20kHz	20kHz
Measurement points per sec.	50	180										20,000	20,000
Continuous measurement	-	-										●	●
Measurements per second	1	1										5	5
Effective value from periods 50/60Hz	1/1	6/6										10/12	10/12
Harmonics V/A	-	1.3 ... 15										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	+/-1%	+/-0.5%										+/-0.1%	+/-0.1%
Effective energy classification	2	1										0.2S	0.2S
Operating hour meter	●	●										●	●
Weekly time switch	-	-										●	●
Auxiliary input	-	-										-	-
Digital inputs	-	-	-	-	-	(2)	(2)	(2)	(2)	(2)	8	8	
Digital/pulse output	●	2	2	2	2	2	(2)	(2)	(2)	(2)	5	5	
Relay outputs	-	-										-	-
Analogue inputs	-	-										-	-
Analogue outputs	-	-	-	-	(2)	(2)	-	-	-	-	-	-	
Temperature input	-	-										-	-
Integrated logic	Comparator	Comparator										● Jasic®	● Jasic®
Min/max value memory	●	●										●	●
Memory size	-	-	-	512k	512k	-	-	-	-	-	256MB	256MB	
Number of storage values	-	-	-	160k	160k	-	-	-	-	-	10,000k	10,000k	
Clock	-	-	-	●	●	-	-	-	-	-	●	●	
Bi-metallic function A/kW	●	●										●	●
Fault recording function	-	-										●	●
Peak demand management	-	-										●	●
Software	-	GridVis										GridVis	GridVis
Interfaces													
RS 232	-	-				●					-	-	
RS 485	-						●				●	●	
Profibus DP	-							●	-	●	●	●	
M-Bus	-								●	-	-	-	
LON	-										-	-	
Ethernet	-										●	●	
Web server / e-mail	-										●/●	●/●	
Protocols													
Modbus RTU	-					●					●	●	
ISDN router	-										●	●	
Modbus gateway	-										●	●	
Profibus DP V0	-	-	-	-	-	-	-	●	-	●	●	●	
LonTalk	-										-	-	
Modbus TCP/IP	-										●	●	
Modbus over TCP	-										●	●	
BACnet IP/MSTP	-										●/● ^{*3}	●/● ^{*3}	
Catalogue page	38	44										76	82

*3 Option *4 Not for effective and reactive power

● : Included - : Not included

Overview of universal measuring instruments

Overview of universal measuring instruments



Type	UMG 503						UMG 505				UMG 507					
	L	LG	LS	S	OV	V	MOD	MOD	LON	LON	L	EL	AD	P	E	EP
Item number	52.07.017	52.07.027	52.07.028	52.07.008	52.07.006	52.07.001	52.10.004	52.10.007	52.10.001	52.10.013	52.15.004	52.15.021	52.15.003	52.15.002	52.15.001	52.15.005
Measurement range L-N, AC	50 - 500V						50 - 500V				50 - 500V					
Measurement range L-L, AC	80 - 870V						80 - 870V				80 - 870V					
Over voltage category	600V CAT III						600V CAT III				600V CAT III					
Operating voltage L-N, AC	-						-				-					
Auxiliary voltage	85 - 265V AC; 80 - 370V DC*1						85 - 265V AC; 80 - 370V DC*1				85 - 265V AC; 80 - 370V DC*1					
Three phase/four phase	●/●						●/●				●/●					
Quadrants	4						4				4					
Scan frequency 50/60Hz	6.4/7.68kHz						6.4/7.68kHz				1.65/1.98kHz					
Measurement points per sec.	256						256				1,650/1,980					
Continuous measurement	-						-				●					
Measurements per second	2						2				5					
Effective value from periods 50/60Hz	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	+0.2%						+0.2%				+0.2%					
Effective energy classification	1						1				1					
Operating hour meter	-						-				-					
Weekly time switch	-						-				-					
Auxiliary input	-	-	-	-	-	1*3	1	-	-	-	-	-	-	-	-	-
Digital inputs	-	-	-	-	-	-	-	4	-	6	-	6	6	6	6	6
Digital/pulse output	-	-	-	-	-	1*3	●	5	-	6	-	6	6	6	6	6
Relay outputs	-	-	-	-	-	2*3	2	-	-	-	-	-	-	-	-	-
Analogue inputs	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1
Analogue outputs	-	-	-	-	-	1*3	1	4	-	-	-	2	2	2	2	2
Temperature input	-						-				-					
Integrated logic	Comparator						Comparator				-					
Min/max value memory	●						●				●					
Memory size	128k	512k	128k	128k	512k	512k	512k				256k	16MB	256k	256k	16MB	16MB
Number of storage values	80k	320k	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	-	-	●	●	●	●	-	●	-	●	-	●	●	●	●	●
Profibus DP	-	-	-	-	-	-	-	-	-	-	-	-	●	-	●	
M-Bus	-						-				-					
LON	-						-				-					
Ethernet	-						-				-					
Web server / e-mail	-						-/-				-/-					
Protocols																
Modbus RTU	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
ISDN router	-	-	-	-	-	-	-	-	-	-	●	-	-	●	●	
Modbus gateway	-	-	-	-	-	-	-	-	-	-	-	-	-	●	●	
Profibus DP V0	-	-	-	-	-	-	-	-	-	-	-	-	●	-	●	
LonTalk	-	-	-	-	-	-	-	●	●	-	-	-	-	-	-	
Modbus TCP/IP, Modbus over TCP	-	-	-	-	-	-	-	-	-	-	●	-	-	●	●	
BACnet IP/MSTP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Catalogue page	52						60				68					

*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
 *4 not for effective and reactive power

● : Included - : Not included



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

UMG 103 universal measuring device 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.

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.



Main features

- Measurement in TN and TT networks
- 3 voltage measurement inputs (300V CATIII), 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

Applications

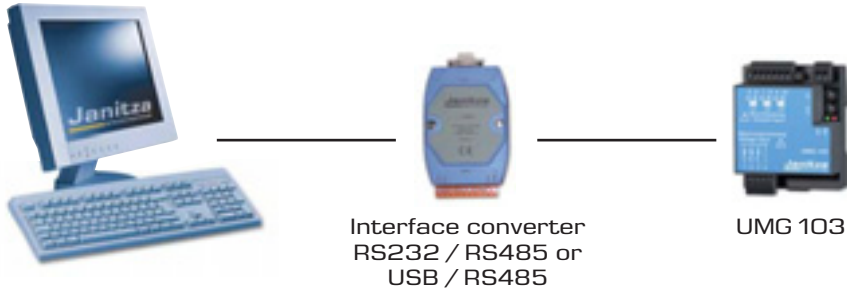
The UMG 103 is intended for the measurement and calculation of electrical parameters such as current, voltage, power, consumption or harmonics etc. in building installations, on distribution panels, on circuit breakers and on server racks. The UMG 103 is fixed into cabinets or small installation distributors 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.

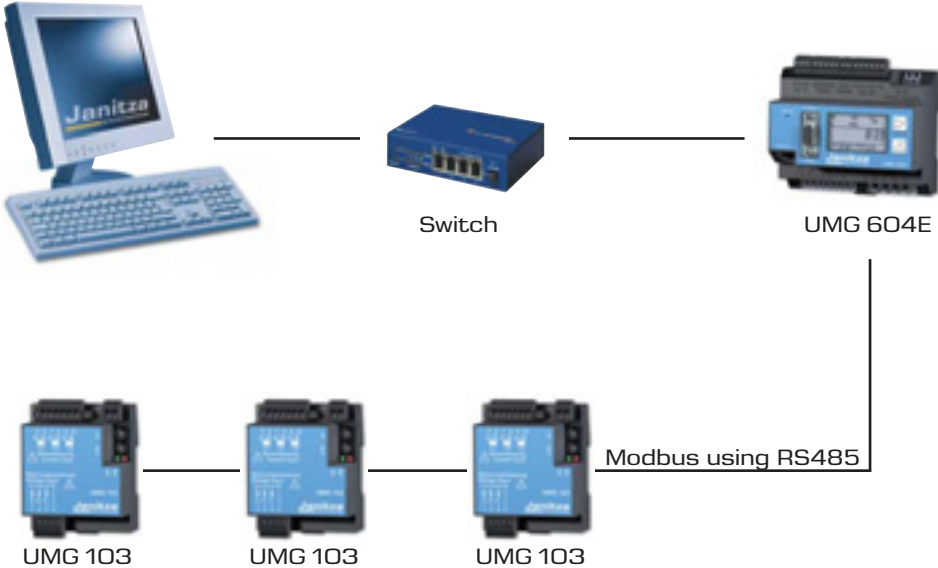


Communication options

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	L-N: 115 ... 240 VAC	52.18.001

Measurement range

Voltage L-N		50-300 V-AC
Voltage L-L		85-520 V-AC
Current (CTs: x/1 and x/5A)		0.001...7.5A
Frequency, mains		45...65 Hz

General technical data

Operating voltage	CAT III	110 ...240 V-AC
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 mm ² 1.5 mm ²

Measurement values

Voltage	L1, L2, L3, L1-L2, L2-L3, L1-L3	0.2% rdg + 0.02% rng
Current	L1, L2, L3, N calculated	0.2% rdg + 0.02% rng
Effective, reactive and apparent power	L1, L2, L3, sum	Accuracy ±(0.4% rdg + 0.10% rng)
Cos-phi, power factor	L1, L2, L3, sum	
Effective/reactive energy	Consumed/inductive	Class 0.5S(kWh)
Frequency	L1, L2, L3	Accuracy ±0.1% rdg
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% rdg + 0.05% rng
Distortion factor THD-U in %	L1, L2, L3	Accuracy: 0.5% rdg + 0.05% rng
Distortion factor THD-I in %	L1, L2, L3	Accuracy: 0.5% rdg + 0.05% rng

Communication

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



Typical connection options

UMG 103

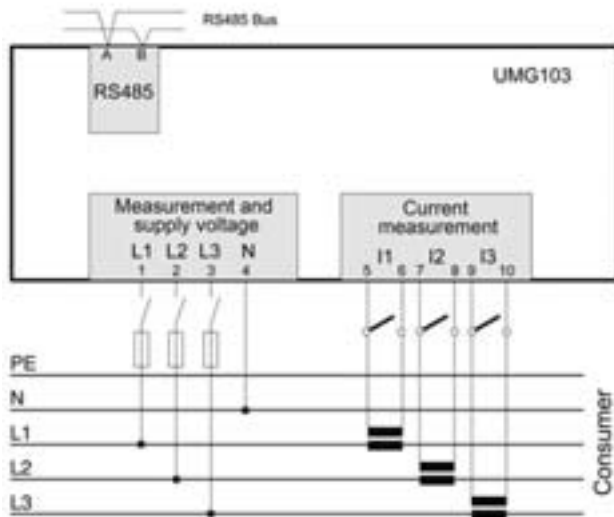


Illustration: connection option UMG 103

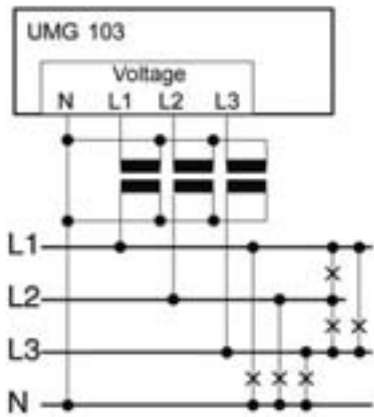


Illustration: connection example for a voltage measurement using a voltage transformer (VT)

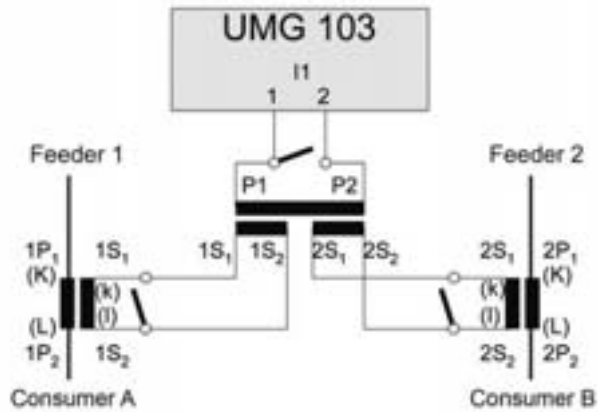
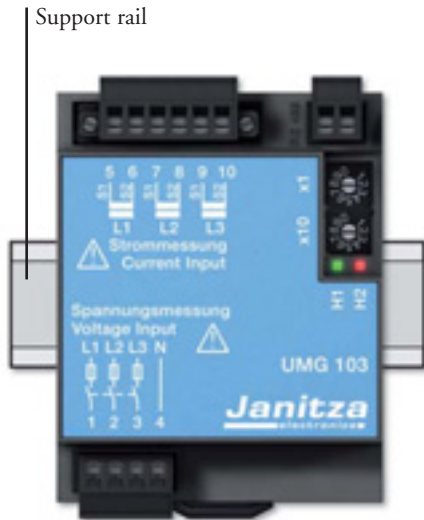


Illustration: current measurement using a sum current transformer (CT)

Mounting illustration



Dimensional drawings

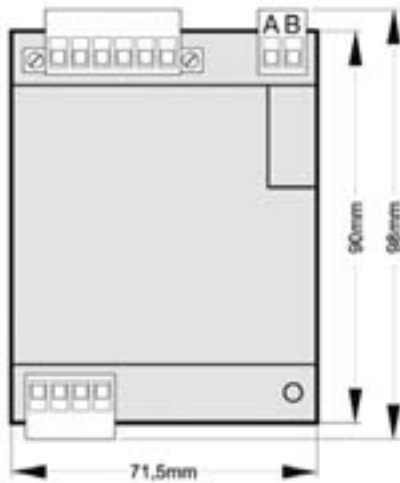


Illustration: front view

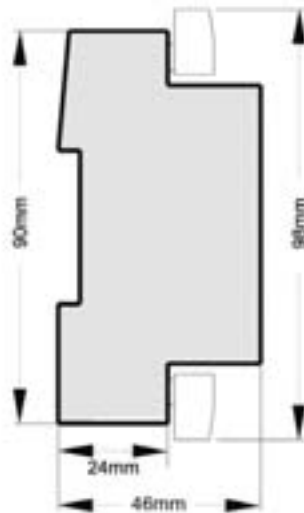


Illustration: side view



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.

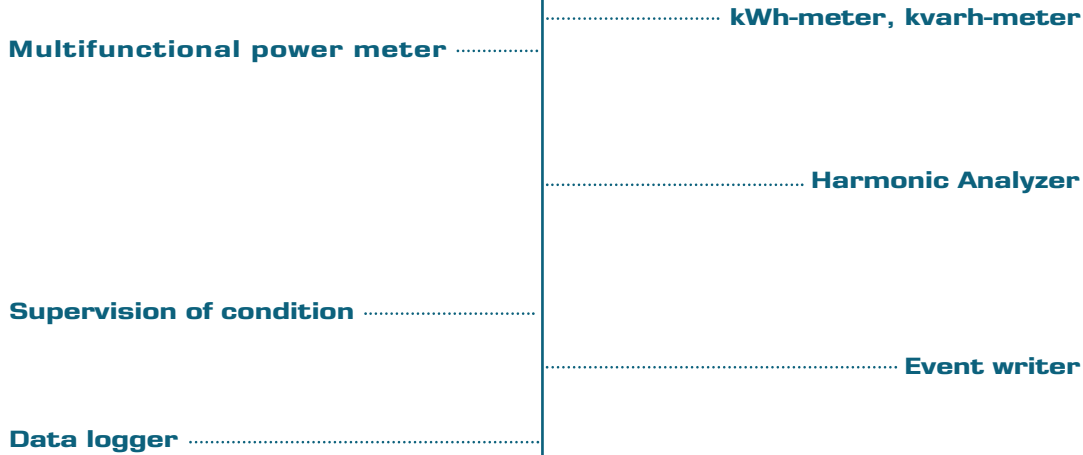
Using modern communication architectures, the acquired data are fed to a central location, in powerful databases, stored centrally and made available for further processing in an open architecture. The easy integration into an existing building control system or PLC environment extends the capabilities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

excess value by additional functions

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



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

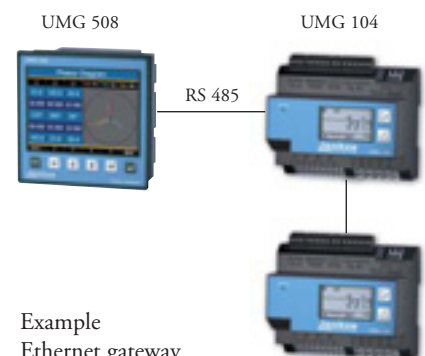
In many cases the costs for installation and communication (e.g. peripheral equipment for field buses) exceed those for the respective power meters. Integration of the UMG 104 in an existing field bus architecture means a fast, cost-efficient and reliable communication. Additional interfaces enable the 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.

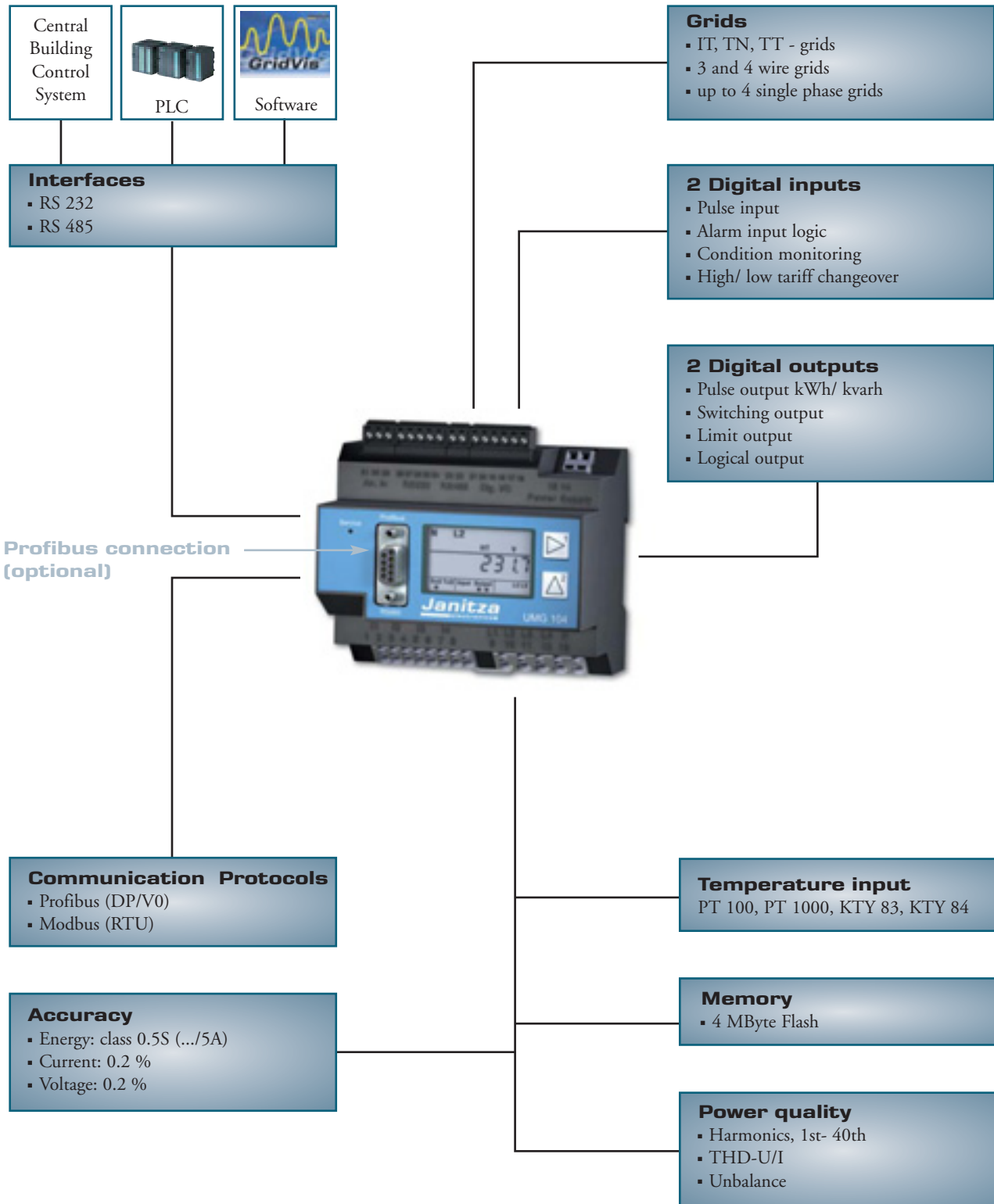


Example Ethernet gateway

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.

UMG 104 overview



Overview of product variants

Three/four phase power analysers; 50/ 60Hz; current transformer ..1/5A; including GridVis programming and analysis software.

Supply Voltage			4 Voltage and 4 Current inputs	2 Digital inputs	2 Digital outputs	1 Temperature input	Interfaces		Profibus DP V0	Type	Item no.
95...240 V AC, 135...340 V DC ±10% of nominal range	50...110V AC ±10% of nominal range	20...55V AC 20...77V DC					RS 232	RS 485			
●			●	●	●	●	●	●	-	UMG 104	52.20.001
	●		●	●	●	●	●	●	-	UMG 104	52.20.003
		●	●	●	●	●	●	●	-	UMG 104	52.20.005
●			●	●	●	●	●	●	●	UMG 104 P	52.20.002
	●		●	●	●	●	●	●	●	UMG 104 P	52.20.004
		●	●	●	●	●	●	●	●	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, 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



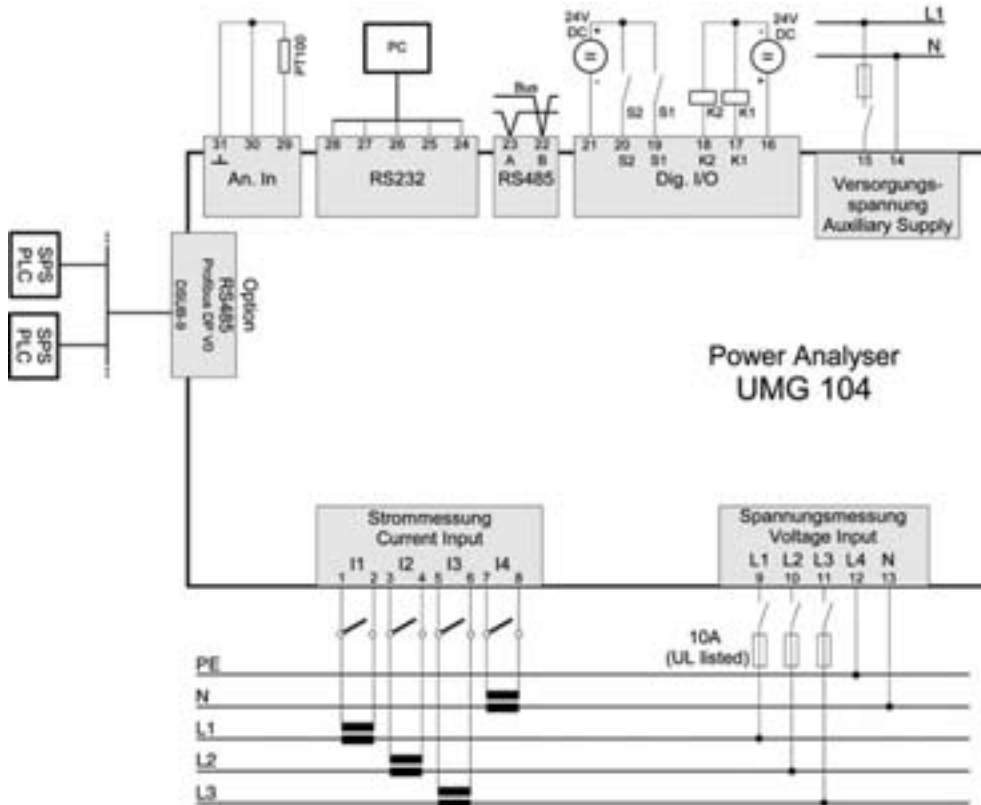
Technical data		
Voltage measurement	3-phase 4-wire grid (L-N, L-L) 3-phase 3-wire grid (L-L)	277/480 V AC 480 V AC
Overtoltage class		300 V CATIII
Quadrants		4
Continuous Measurement		yes
Sampling rate, 8 channels	per channel	20 kHz
Weight		350 g
Dimensions		W=107.5 mm x D=90 mm x H=82 mm
Mounting	according 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 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 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

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 (kVarh)	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% rmg
Average values		yes
Minimum and maximum values		yes

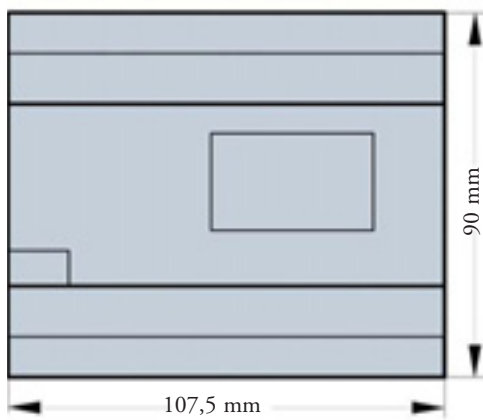
Power quality		
Harmonics, 1st- 40th	Current, voltage, real/reactive power (±) L1, L2, L3, L4	accuracy V, I Class 1 (EN61000-4-7)
Distortion factor THD-U in %	L1, L2, L3, L4	yes
Distortion factor THD-I in %	L1, L2, L3, L4	yes
Unbalance		yes
Positive/ Negative/ Zero Phase Sequence		yes
Inrush-currents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

Connection diagram UMG 104

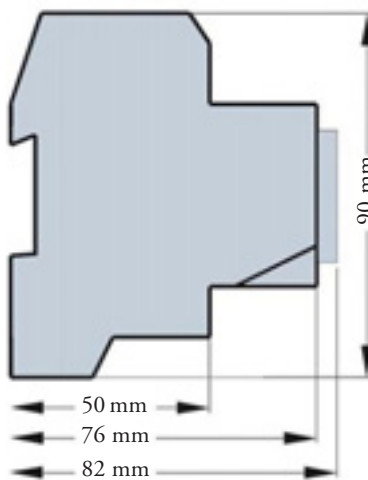


Dimensional drawing

front view



side view





High performance power analysers for DIN rails

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, SNMP, 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

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 inter-connection 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.

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.

High-speed 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.



Power visualisation software

The data gained from various measurement points must be collected, saved, visualised and made available. The GridVis software contained in the UMG 604 package allows

- 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

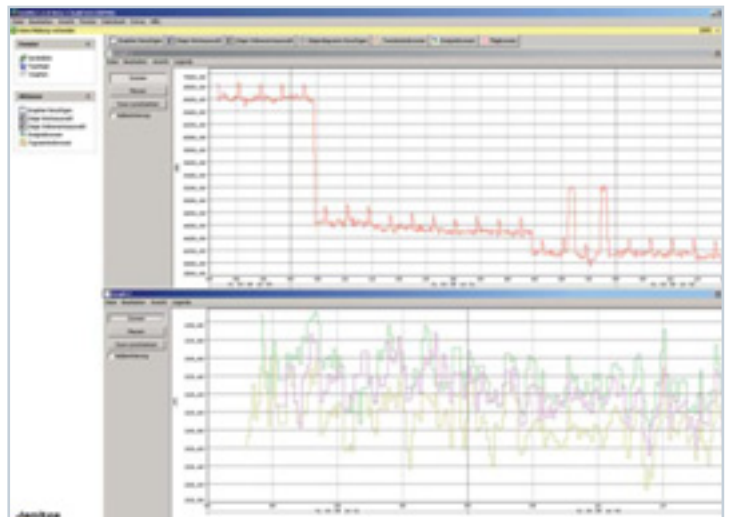
Visualisation, topological view

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.

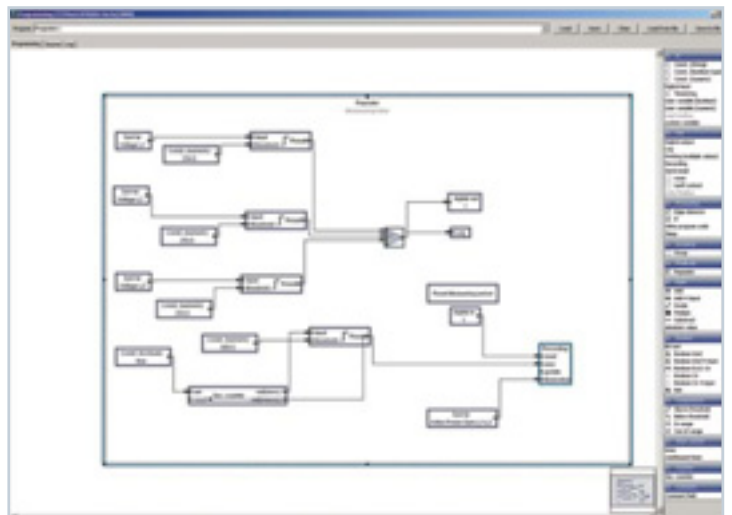


Graphic programming

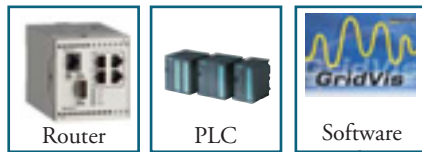
The graphic programming option for user programs is completely new in the field of digital power analysers. Programs specific to the application can be created with this method such as the free programming of inputs and outputs, monitoring of processes or the issue of reports when defined limit values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

Jasic® programming language

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.



UMG 604



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

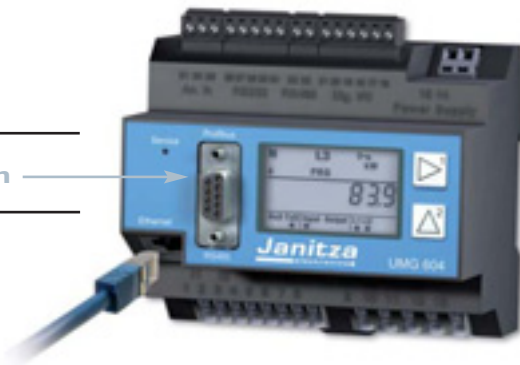
- Pulse input
- Logic input
- Status monitoring
- HT/LT conversion
- Emax (max. demand) resetting

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% rng
- Voltage: 0.2% rng

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

Jasic®

programming language

Overview of product variants														
Three/four phase power analysers; 50/60Hz; current transformer .../1/5; including GridVis programming and analysis software														
Supply voltage			Interfaces										Type	Item number
95...240V AC, 135...340V 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		
●			●	●	●	●	●	●	●	●	-	●	UMG 604 E	52.16.002
●			●	●	●	●	●	●	●	●	●	●	UMG 604 EP	52.16.001
	●		●	●	●	●	●	●	●	●	-	●	UMG 604 E	52.16.012
	●		●	●	●	●	●	●	●	●	●	●	UMG 604 EP	52.16.011
		●	●	●	●	●	●	●	●	●	-	●	UMG 604 E	52.16.022
		●	●	●	●	●	●	●	●	●	●	●	UMG 604 EP	52.16.021
Options (for all versions)														
Emax function application program (peak demand management)													Emax	52.16.080
BACnet communication													BACnet	52.16.081

- = not possible ● = contained

Not suitable for use in residential areas.

General technical data		
Voltage measurement	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 CATIII
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	0.08 - 2.5 mm ²
	pin cable lugs, ferrule	1.5 mm ²
Protection class	According to EN 60529	IP 20

Measurement range		
L-N voltage, AC (without voltage transformer)	Free voltage transformer settings	50...300 VAC
L-L voltage, AC (without voltage transformer)	Free voltage transformer settings	87...520 VAC
Current (transformer: x/1 and x/5A)		0.001...7.5 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



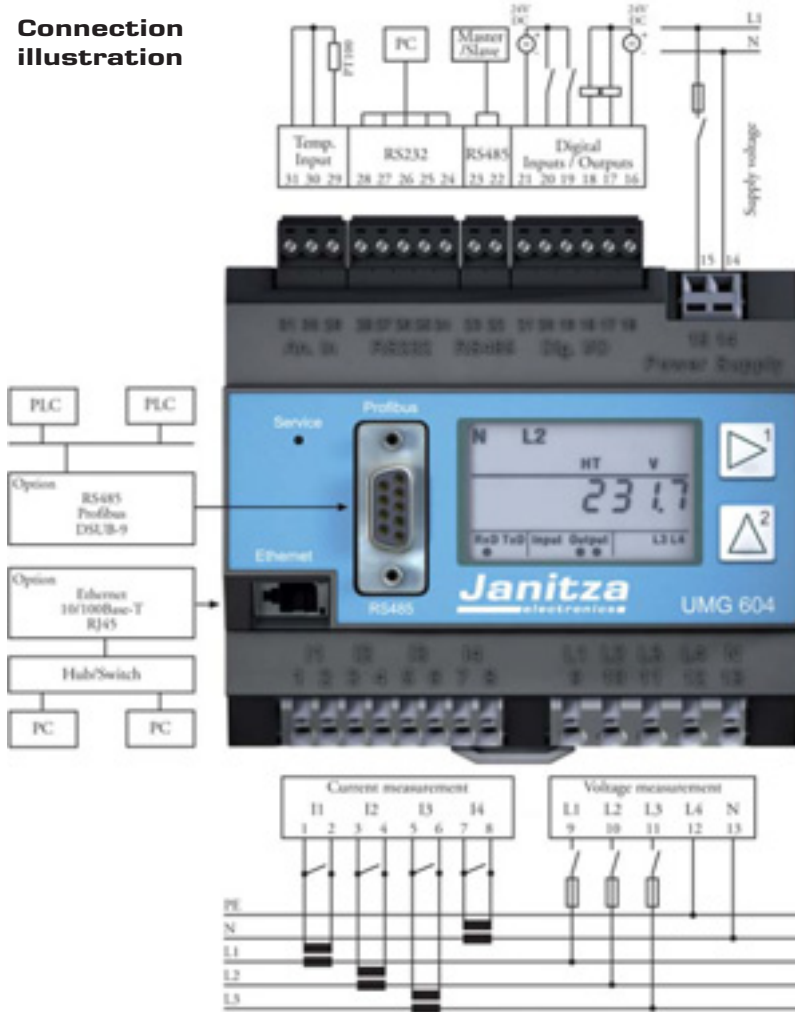
Measurement values		
Voltage	L1, L2, L3, L4, L1-L2, L2-L3, L1-L3	Accuracy $\pm(0.2\% \text{ rdg} + 0.02\% \text{ rng})$
Current	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	Accuracy $\pm(0.2\% \text{ rdg} + 0.05\% \text{ rng})$
K-factor	L1, L2, L3, L4	Yes
Three-phase current components	Positive/negative/zero phase sequence	Yes
Effective, reactive and apparent power	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	Accuracy $\pm(0.4\% \text{ rdg} + 0.10\% \text{ rng})$
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 (.../5A), Class 1 (.../1A)
Reactive energy (kvarh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Inductive reactive energy (tariff 1, tariff 2) - Capacitive reactive energy	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 $\pm 0.1\% \text{ rdg}$
Temperature measurement		Accuracy $\pm 1.5\% \text{ rng}$
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 (\pm) L1, L2, L3, L4	Accuracy $\pm(0.5\% \text{ rdg} + 0.05 \text{ rng})$
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 system		Yes
Transients	50 μ s	Yes
Start-up processes	10 ms	Yes
Fault recorder function		Yes
Short-term interruptions		Yes

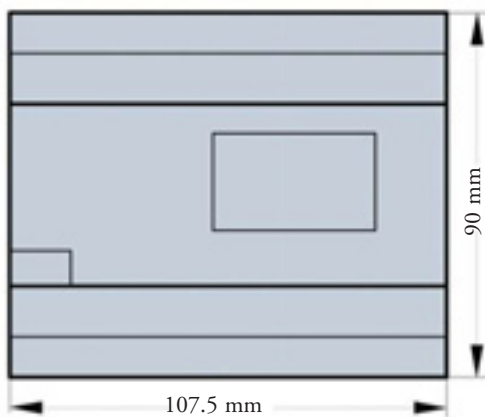
Communication		
Interfaces		
RS 232	9.6, 19.2, 38.4, 115.2 kbps	Yes
RS 485	9.6, 19.2, 38.4, 76.8, 115.2, 921.6 kbps	Yes
Profibus DP	Plug, sub D 9-pole up to 12Mbps	Yes, EP version
Ethernet 10/100 Base-TX	RJ-45 sockets	Yes
Protocols		
Modbus RTU		Yes
Profibus DP V0		Yes, EP version
Modbus TCP		Yes
Modbus 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 or MSTP		Yes, option

Connection illustration

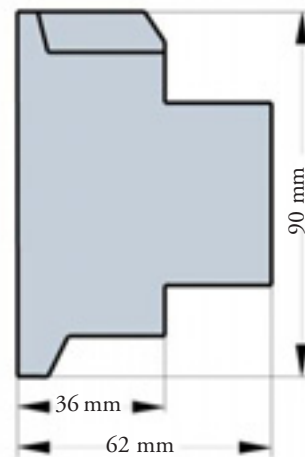


Dimensional drawing

Front view



Side view





High performance power quality analyser for DIN rails according to EN 50160

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, 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

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.



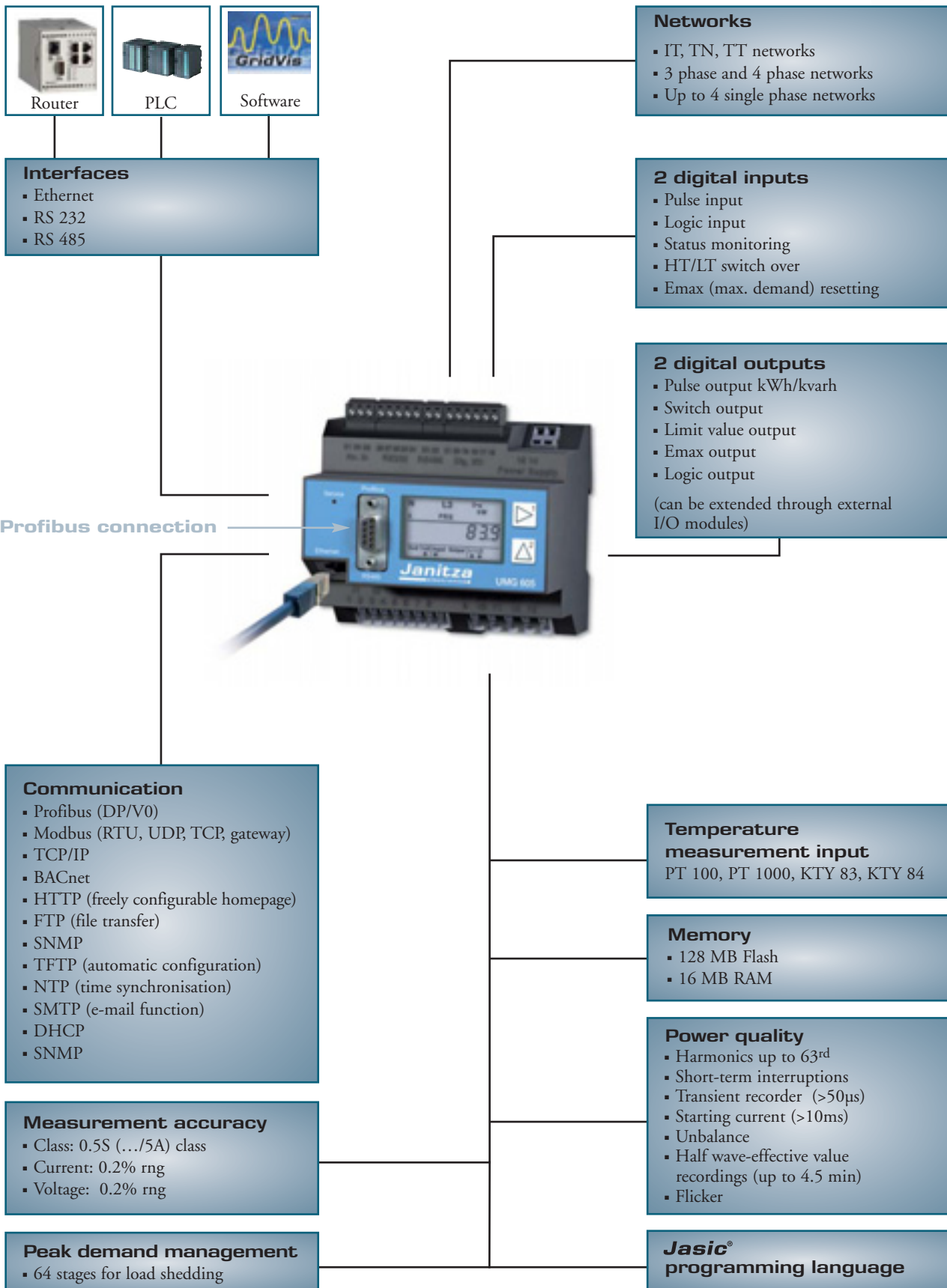
Main Features

- 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 CATIII)
- 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.

UMG 605



Scope of operation and types of variants

Overview													
Three/four phase power quality analysers; current transformer .../1/5a; including GridVis programming and analysis software													
Supply voltage			4 voltage and 4 current inputs	Memory 128/256 MB Flash	digital inputs	digital outputs	1 temperature input	Interfaces				Type	Item number
95...240V AC, 135...340V 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						RS 232	RS 485	Ethernet 100base T	Profibus DP V0		
●			●	●	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)												Type	Item number
Emax function application program (peak demand management)											Emax	52.16.084	
BACnet communication											BACnet	52.16.083	

- = not possible ● = contained

General technical data		
Voltage measurement	3-phase 4-wire grid (L-N, L-L) 3-phase 3-wire grid (L-L)	277/480 V AC 480 V AC
Overvoltage category		300V CATIII
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 mm ² 1.5 mm ²
Protection class	According to EN 60529	IP 20

Measurement range		
L-N voltage, AC (without voltage transformer)	Free voltage transformer settings	50 ... 300 VAC
L-L voltage, AC (without voltage transformer)	Free voltage transformer settings	87...520 VAC
Current (transformer: x/1 and x/5A)		0.005..6 A
Frequency of mains		40 ..70 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		Jasic®

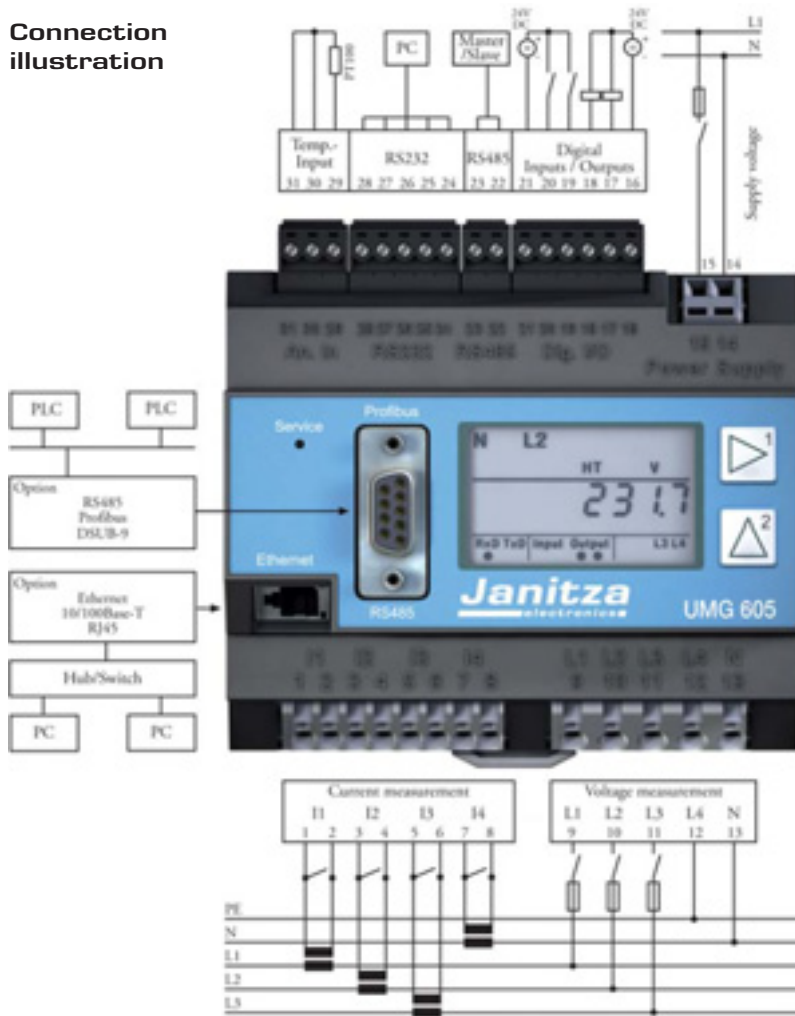


Measurement values		
Voltage	L1, L2, L3, L4, L1-L2, L2-L3, L1-L3	Accuracy $\pm(0.2\% \text{ rdg} + 0.02\% \text{ rng})$
Current	L1, L2, L3, L4	$\pm(0.2\% \text{ rdg} + 0.05\% \text{ rng})$
	Calculated sum current	$\pm(0.6\% \text{ rdg} + 0.05\% \text{ rng})$
K-factor	L1, L2, L3, L4	yes
Three-phase current 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:	Class 0.5S (.../5A)
	- Purchased effective energy (tariff 1, tariff 2) - Supplied effective energy (tariff 1, tariff 2)	Class 1 (.../1A)
Reactive energy (kvarh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4:	Class2
	- Inductive reactive power (tariff 1, tariff 2) - Capacitive reactive power	
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 $\pm 0.1\% \text{ rdg}$
Temperature measurement		Accuracy $\pm 1.5\% \text{ rng}$
Average value		yes
Minimum and maximum values		yes

Power quality		
Harmonics order, 1- 63 rd Harmonics, even/odd	Voltage L1, L2, L3, L4	Accuracy $\pm 5\% \text{ rdg}$ Accuracy $\pm 0.05 \text{ rng}$
	Measure value > 3% of measuring range	
	Measure value < 3% of measuring range	
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

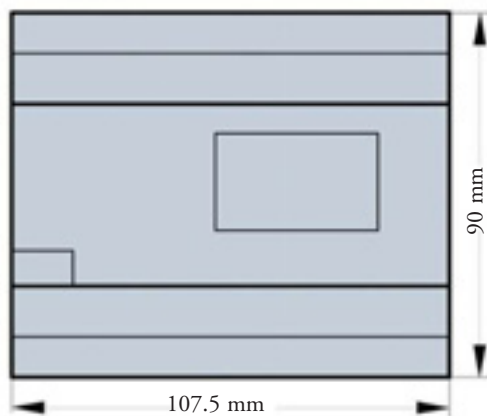
Communication		
Interfaces		
RS 232	9.6, 19.2, 38.4, 115.2 kbps	yes
RS 485	9.6, 19.2, 38.4, 76.8, 115.2, 921.6 kbps	yes
Profibus DP	Plug, sub D 9-pole up to 12Mbps	yes
Ethernet 10/100 Base- TX	RJ-45 sockets	yes
Protocols		
Modbus RTU		yes
Profibus DP V0		yes
Modbus TCP		yes
Modbus over TCP		yes
Modbus 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 or MSTP		yes, option

Connection illustration

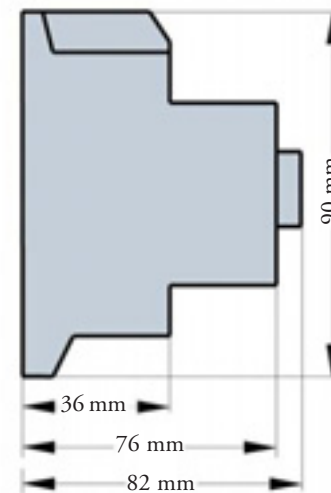


Dimensional drawing

Front view



Side view





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 96 x 96mm 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.

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.



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

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, $\cos \varphi$), 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.



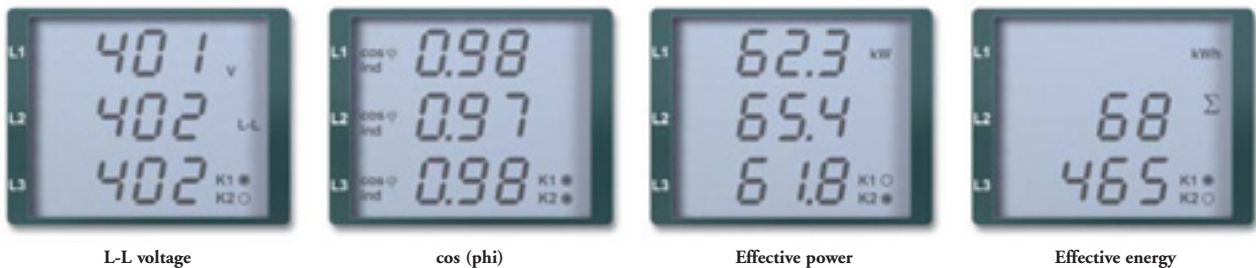
Measurement value displays

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 measurements 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



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.

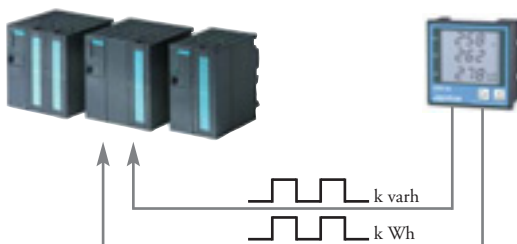
Digital outputs for effective or reactive energy consumption or limit values

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.

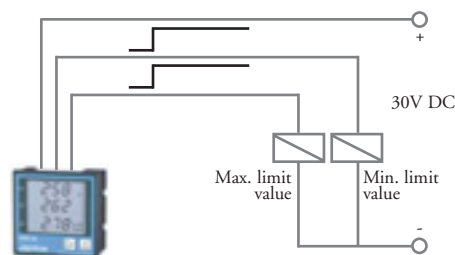
Password

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
As above but measurement range: L - N: 25 ... 160V- AC; L - L: 45 ... 277V-AC	UMG 96L	L-N: 90 ... 160V- AC	52.14.007
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
As above but measurement range: L - N: 20 ... 76V- AC; L - L: 35 ... 132V-AC	UMG 96	L-N: 49 ... 76V- AC	52.09.002
As above but measurement range: L - N: 30 ... 140V- AC; L - L: 52 ... 242V-AC	UMG 96	L-N: 98 ... 140V- AC	52.09.005

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	Single wire, multi-wire, fine-wire, pin cable lugs, ferrule	0.08 - 2.5mm ² 1.5mm ²

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	Measurement value	
Current 1/5A L1-L3	0.00 .. 9.99 kA	0.02 .. 6 A	●	●	●			●	●	●	+/-1 % rng
Current calculated in N	0.00 .. 9.99 kA	0.06 .. 18 A				●		●	●	●	+/-3 % rng
Voltage L-N	0.0 .. 34 kV	50 .. 255 V AC*2	●	●	●		●			●	+/-1 % rng
Voltage L-L	0.0 .. 60 kV	86 .. 442 V AC*2	●	●	●		●			●	+/-2% rng
Frequency (U)	45.0 .. 65.0 Hz		●								+/-1.5 % rdg
Effective power, sum ,+/-	0.00 W .. 150 MW	1.8 W .. 2.4 kW	●	●	●	●		●	●	●	+/-1.5 % rng
Apparent power, sum	0.00 VA .. 150 MVA	1.8 VA .. 2.4 kVA	●	●	●	●		●		●	+/-1.5 % rng
Reactive power, sum	0.00 var .. 150 MVar	1.8 var .. 2.4 kvar	●	●	●	●		●			Ind.+/-1.5 % rng
Cos phi	0.00 ind. .. 1.00 .. 0.00 kap.	0.00 kap. .. 1.00 .. 0.00 ind.	●	●	●	●					+/-3 % rng*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

rng: of measurement range, rdg: of measurement value

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

*2 - also available: measurement range: L-N 16 .. 80V, AC, L-L 28 .. 139V, AC, operating voltage: L-N 45 .. 80V, AC and measurement range: L-N 25 .. 160V, AC, L-L 45 .. 277V, AC,

Operating voltage: L-N 90 .. 160V, AC (the operating voltage is taken from the measurement voltage)

*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

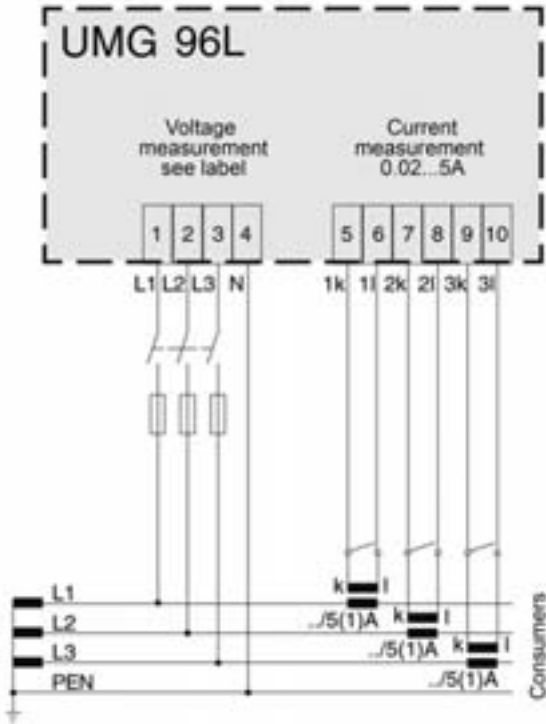
2 digital outputs	As switch output or pulse output	UMG 96 only
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UMG 96L / UMG 96

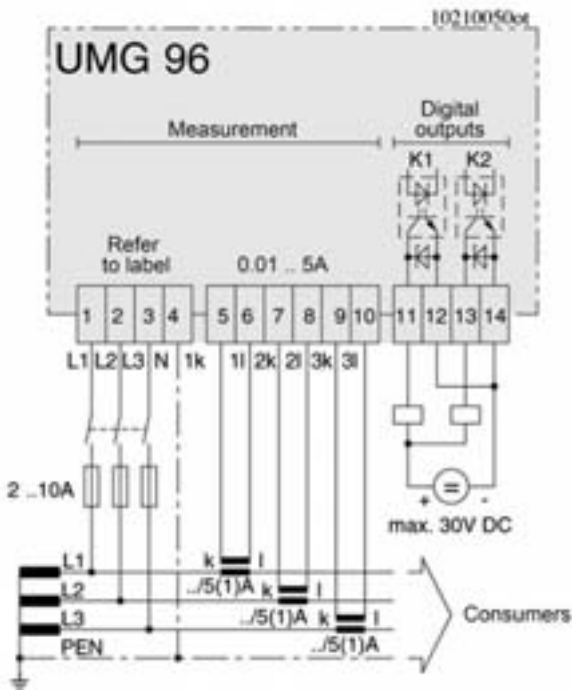


Typical connection options

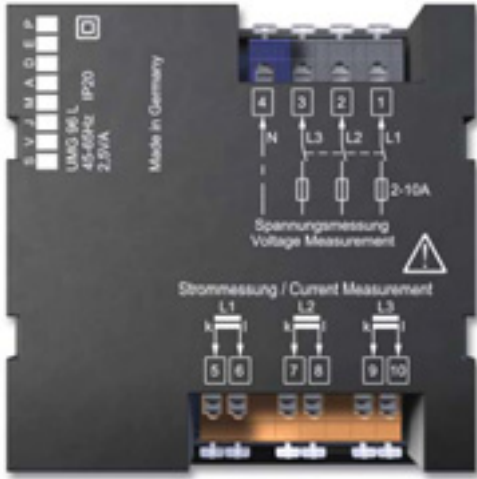
UMG 96L



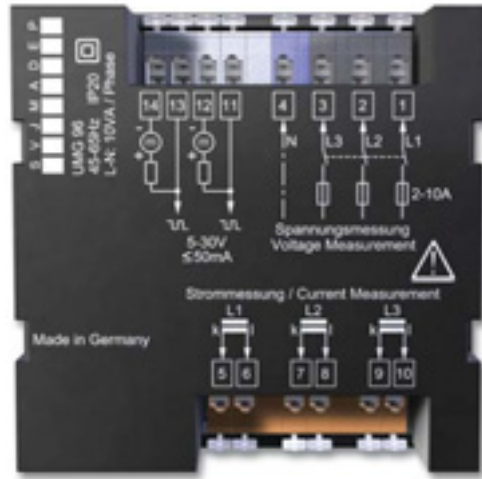
UMG 96



Connection illustrations

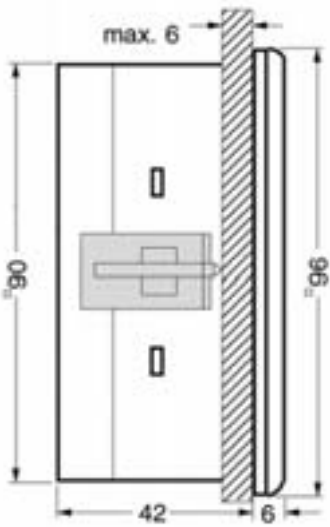


UMG 96L - reverse side of unit

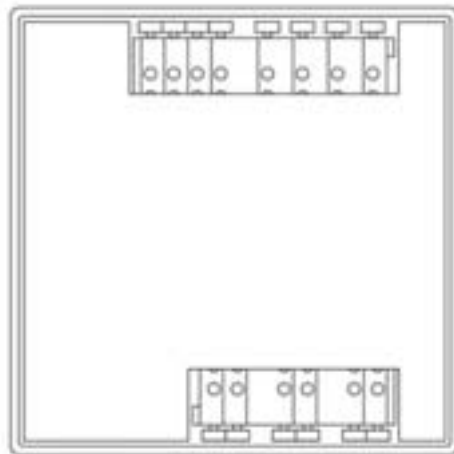


UMG 96 - reverse side of unit

Dimensional drawings



Side view



Reverse side, panel cut-out dimensions: 92^{+0.8}x92^{+0.8} mm

All dimensions stated in this drawing are in mm.



The little field bus giant

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

Areas of application

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

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, $\cos \varphi$), 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 (\geq / \leq) are available as parameters. The overall runtimes can also be individually reset.



Modbus /
Profibus



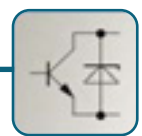
Harmonics



Memory



Analogue outputs



Digital I/O

Industrial data communications - interface and field bus

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

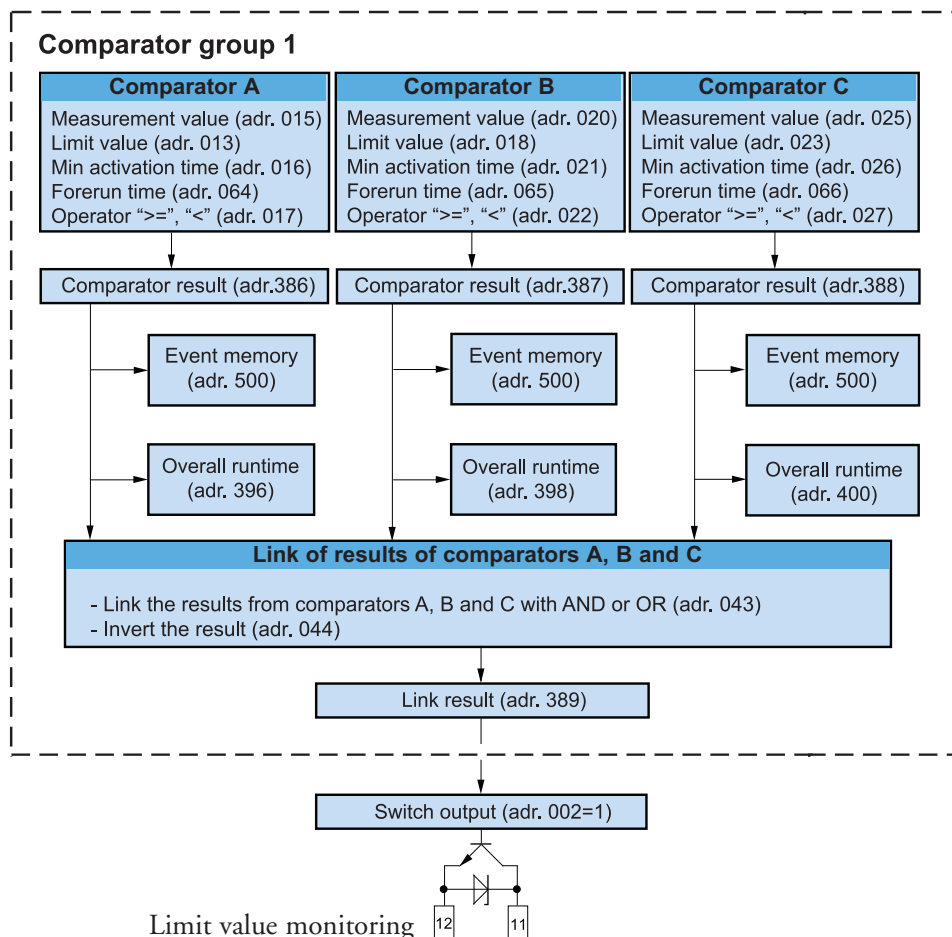
Analogue outputs

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

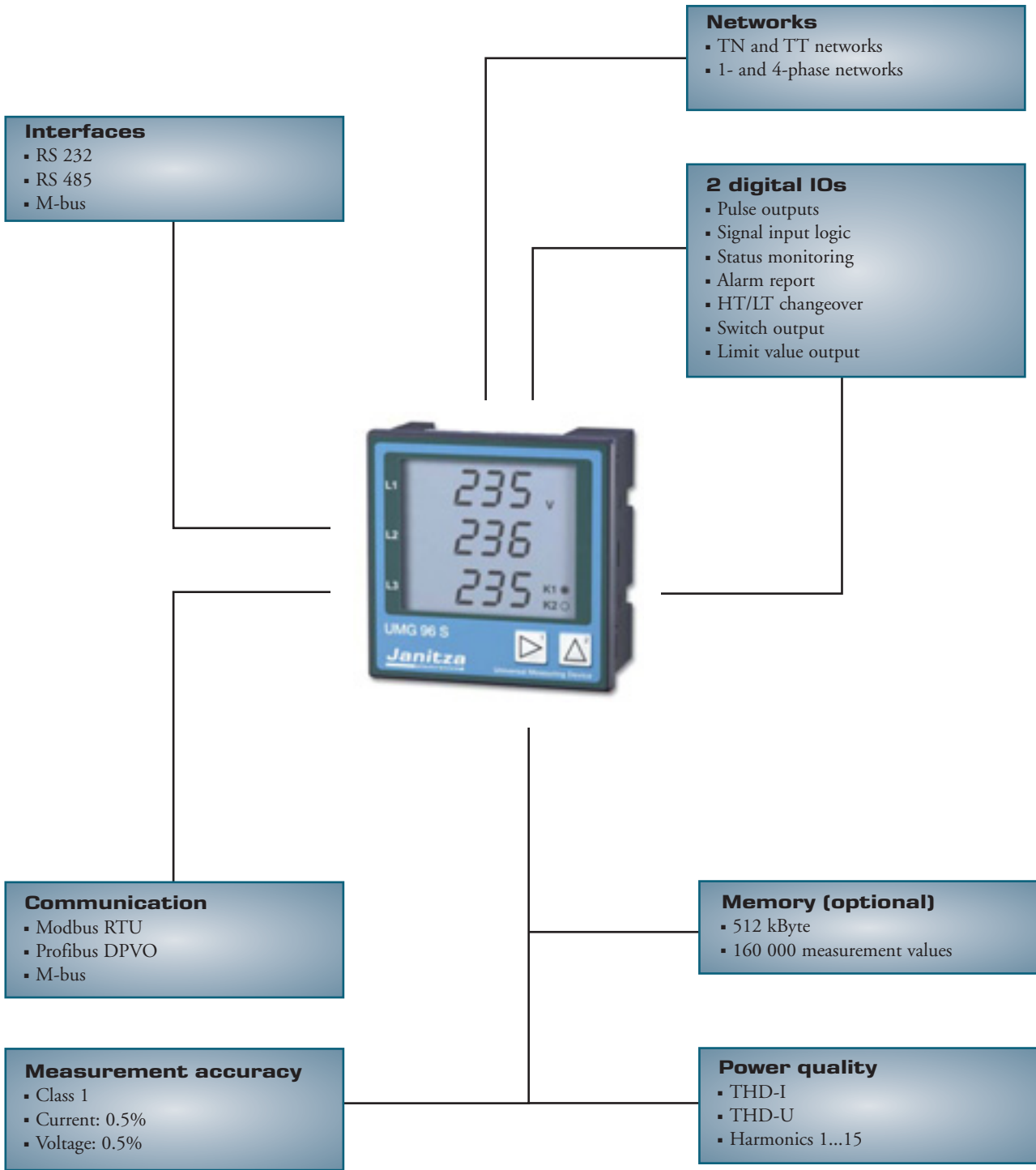
Digital inputs/outputs

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

Integrated logic



UMG 96S



Overview of product variants (transfer rates: Modbus 9.6, 19.2, 38.4kBit/s; Profibus 9.6, 19.2, 93.75, 187.5, 500 kBit/s and 1.5 MBit/s)													
Selectable activation*1			Selectable activation*2										
2 digital outputs	2 digital inputs	2 analogue outputs 4-20mA	RS485 (Modbus RTU)	RS232 (Modbus RTU)	Clock / memory	Profibus interface (DP V0)*4	M-bus*4	Auxiliary voltage: 24V DC	300V standard version Measurement range: L-N 50 - 300V; AC*3 Measurement range: L-L 87 .. 520V; AC	150V special version Measurement range: L-N 25 - 150V; AC Measurement range: L-L 40 .. 250V; AC	Operating voltage	Item number	
●	○	○	●	○	○	○	○	○	●	○	L-N: 85 .. 300V, AC	52.13.001	
●	○	○	●	●	○	○	○	○	●	○	L-N: 85 .. 300V, AC	52.13.005	
●	○	○	●	●	●	○	○	○	●	○	L-N: 85 .. 300V, AC	52.13.009	
●	○	●	●	●	○	○	○	○	●	○	L-N: 85 .. 300V, AC	52.13.013	
●	○	●	●	●	●	○	○	○	●	○	L-N: 85 .. 300V, AC	52.13.017	
●	●	○	●	●	○	○	○	○	●	○	L-N: 85 .. 300V, AC	52.13.021	
●	●	○	●	●	○	○	○	○	●	○	L-N: 140 .. 300V, AC	52.13.025	
●	○	○	●	●	○	○	●	○	●	○	L-N: 140 .. 300V, AC	52.13.040	
●	●	○	○	●	○	●	○	●	●	○	18 .. 70V DC, 18 .. 33V, AC auxiliary voltage	52.13.029	
●	○	○	●	○	○	○	○	○	○	●	L-L: 85 .. 260V, AC	52.13.002	
●	○	○	●	●	○	○	○	○	○	●	L-L: 85 .. 260V, AC	52.13.006	
●	○	○	●	●	●	○	○	○	○	●	L-L: 85 .. 260V, AC	52.13.010	
●	○	●	●	●	○	○	○	○	○	●	L-L: 85 .. 260V, AC	52.13.014	
●	○	●	●	●	●	○	○	○	○	●	L-L: 85 .. 260V, AC	52.13.018	
●	●	○	●	●	○	○	○	○	○	●	L-L: 85 .. 260V, AC	52.13.022	
●	●	○	●	●	○	●	○	○	○	●	L-L: 85 .. 260V, AC	52.13.026	
●	●	○	○	●	○	●	○	●	○	●	18 .. 70V DC, 18 .. 33V, AC auxiliary voltage	52.13.031	

● = Included ○ = Not included

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

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



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

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

rng: of measurement range, rdg: of measurement value

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

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

Measurement accuracy		
Accuracy V, A		± 0.5 % rng
Reactive energy (kvarh)	Class	1 (5A) 2 (1A)
Effective energy (kWh)	Class	1 (5A) 2 (1A)

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

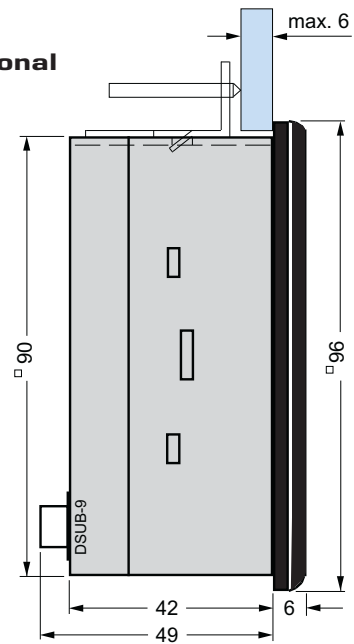
Communication		
Interfaces		
RS 232	9.6, 19.2, 38.4 kbps; RJ11	Refer to order details
RS 485	9.6, 19.2, 38.4 kbps; terminal strip	Refer to order details
M-bus	Plug, sub D 9-pole	Refer to order details
Protocols		
Modbus RTU	9.6, 19.2, 38.4 kbps	Yes
Profibus DP V0	9.6, 19.2, 45.45, 93.75, 187.5, 500,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

Connection illustration



Switchboard cut-out
 92 x 92mm

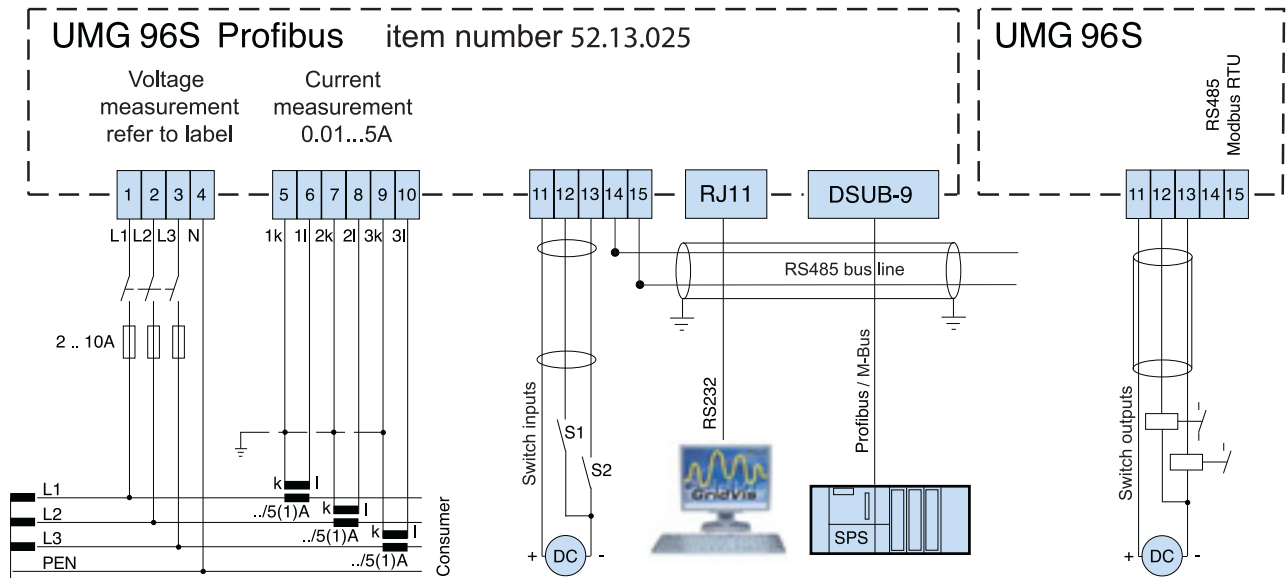
Dimensional drawing



All dimensions stated in this drawing are in mm.

Profibus option

Typical connection options



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

UMG 96S without option



Digital measurement in perfection

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.



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 distributor 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).

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

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, $\cos \varphi$), 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

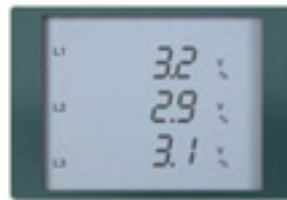
The extremely legible LCD data field in connection with the function keys informs the user about the selected measurement values (current, low, high and average values). With the UMG 503, three measurement values can be simultaneously displayed in the LCD data field and up to 140 data fields can be individually 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 $\cos \varphi$



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.

Scope of operation and types of variants

Pulse output ^{*4}

The pulse output delivers the effective or reactive energy in current pulses.
The minimum pulse length is 50ms.

Relay outputs ^{*4}

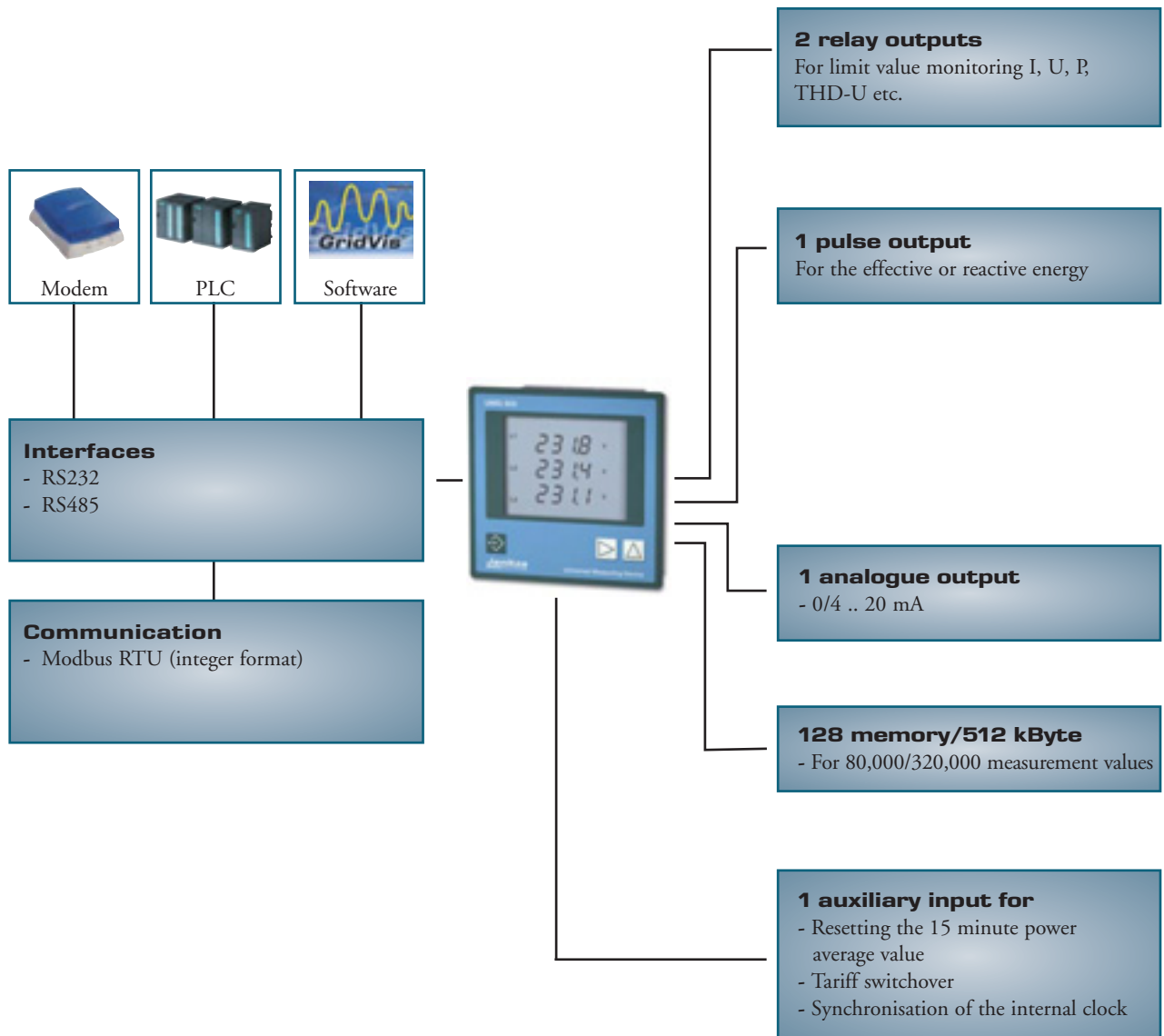
The relay outputs K1 and K2 can be used for monitoring limit values. Each relay output can be linked with a measurement value and (recorded with date and time) can be stored if the value is not achieved or is exceeded. A minimum initialisation time can be programmed for each relay output to avoid excessively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





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										Type	Item number
85 .. 250V AC, 80 .. 370V DC	40 .. 115V AC, 55 .. 165V DC	15 .. 55V AC, 20 .. 80V DC	128k RAM memory	512k RAM memory	Relay output	Pulse output	Analogue output 0(4) -20mA	RS 232	RS 485	Auxiliary input	3-phase measurement			
●	-	-	●	-	-	-	-	●	-	-	○	UMG 503 L	52.07.017	
-	●	-	●	-	-	-	-	●	-	-	○	UMG 503 L	52.07.019	
-	-	●	●	-	-	-	-	●	-	-	○	UMG 503 L	52.07.022	
●	-	-	-	●	-	-	-	●	-	-	○	UMG 503 LG	52.07.027	
-	●	-	-	●	-	-	-	●	-	-	○	UMG 503 LG	52.07.033	
-	-	●	-	●	-	-	-	●	-	-	○	UMG 503 LG	52.07.068	
●	-	-	●	-	-	-	-	-	●	-	○	UMG 503 LS	52.07.028	
-	●	-	●	-	-	-	-	-	●	-	○	UMG 503 LS	52.07.074	
-	-	●	●	-	-	-	-	-	●	-	○	UMG 503 LS	52.07.037	
●	-	-	●	-	-	-	-	-	●	-	○	UMG 503 S	52.07.008	
-	●	-	●	-	-	-	-	-	●	-	○	UMG 503 S	52.07.015	
-	-	●	●	-	-	-	-	-	●	-	○	UMG 503 S	52.07.009	
●	-	-	-	●	●	●	●	●	●	●	●	UMG 503 V	52.07.001	
-	●	-	-	●	●	●	●	●	●	●	●	UMG 503 V	52.07.014	
-	-	●	-	●	●	●	●	●	●	●	●	UMG 503 V	52.07.005	
●	-	-	-	●	○	○	○	●	●	○	○	UMG 503 OV	52.07.006	
-	●	-	-	●	○	○	○	●	●	○	○	UMG 503 OV	52.07.016	
-	-	●	-	●	○	○	○	●	●	○	○	UMG 503 OV	52.07.007	

● = Included - = Not possible ○ = Option which can be supplied with the unit (each option is only possible once)

Options for the units (release code)	UMG 503..	
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, 3ph and up to 3x1ph

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	Measurement accuracy
Current .. /5A	0.000 .. 9999 A	0.005 .. 6 A	●	●	●		●	●	●	●	+0.2 % rng
Current .. /1A	0.000 .. 9999 A	0.005 .. 1 A	●	●	●		●	●	●	●	+0.2 % rng
Current, neutral wire	0.000 .. 9999 A	0.060 .. 15 A				●	●	●		●	+0.6 % rng
Voltage L-N	0.0 .. 999.9 MV	50 .. 500 V	●	●	●		●	●	●	●	+0.2 % rng
Voltage L-L	0.0 .. 999.9 MV	80 .. 870 V	●	●	●		●	●	●	●	+0.2 % rng
Frequency (U)	45.00 .. 65.00 Hz	45.00 .. 65.00 Hz						●		●	+0.2 % rdg
Effective power +/-	0.00 W .. 9999 MW	0.05 W .. 2.5 kW	●	●	●	●	●	●	●	●	+0.5 % rng
Apparent power	0.00 VA .. 9999 MVA	0.05 VA .. 2.5 kVA	●	●	●	●	●	●	●	●	+0.5 % rng
Reactive power	0.00 kvar .. 999 Mvar	0.05 var .. 2.5 kvar	●	●	●	●	kap.	●	ind.	●	+0.5 % rng
Power factor	0.00 kap. .. 1.00 .. 0.00 ind.	0.00 kap. .. 1.00 .. 0.00 ind.	●	●	●	●	kap.	●	ind.	●	+0.5 % rng
Effective energy +	0.0 Wh .. 9999 GWh	0.05 Wh .. 9999 GWh ²				●		●		t ₁ /t ₂	*3
Effective energy -	-0.0 Wh .. -9999 GWh	-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

Rng: from measurement range, rdg: from measurement value, t: start time, t_r: 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, 1 st to 20 th harmonics, even/uneven	Current, voltage L1, L2, L3	Accuracy: ± 0.5% rng
Distortion factor THD-U in %	L1, L2, L3	Accuracy: ± 0.5% rng
Distortion factor THD-I in %	L1, L2, L3	Accuracy: ± 0.5% rng
Recorder for limit value events		Yes

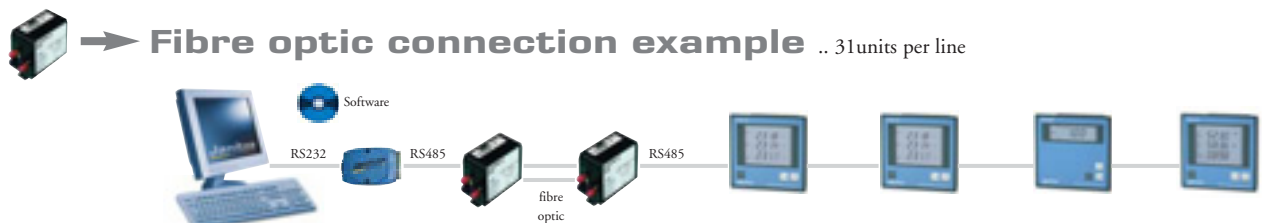
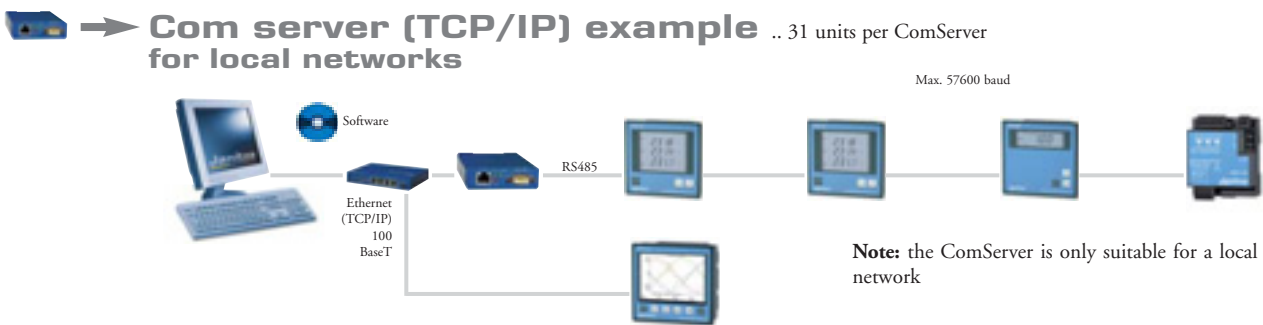
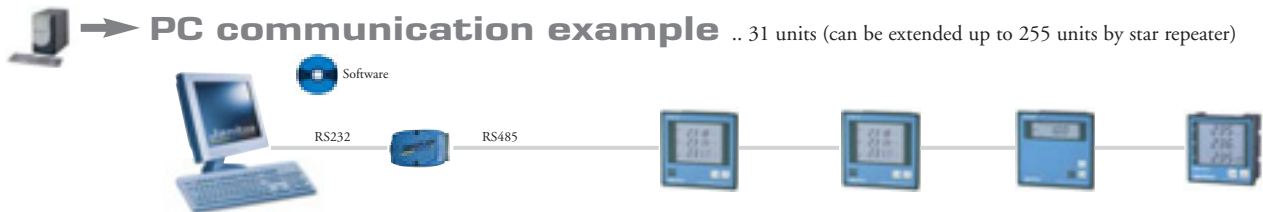
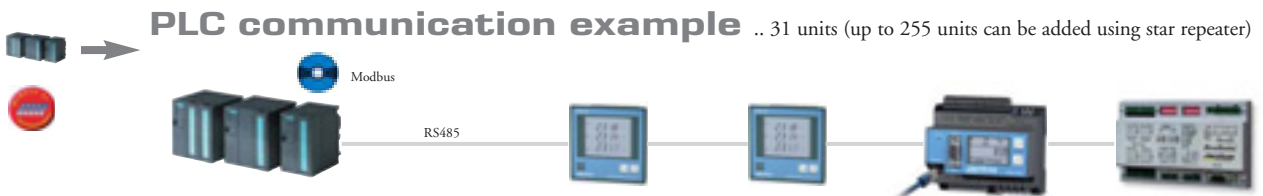
Measurement accuracy

Reactive energy kvarh	Class	1
Effective energy kWh	Class	1



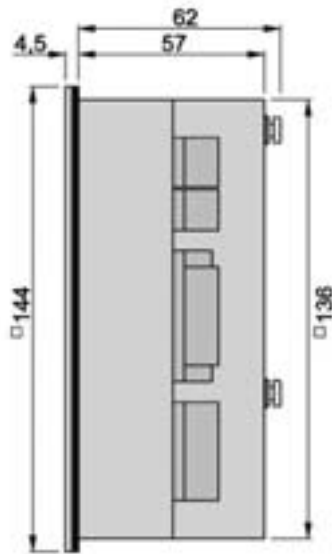
Periphery		
Digital inputs (auxiliary input)	As a status input	1, refer to order details
Relay outputs	As a switch output	2, refer to order details
Pulse outputs		1, refer to order details
Analogue outputs	(0) 4...20mA	1, refer to order details
Password protection		Yes
Software GridVis	Refer to chapter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



Dimensional drawing

Switchboard cut-out
 139 x 139mm

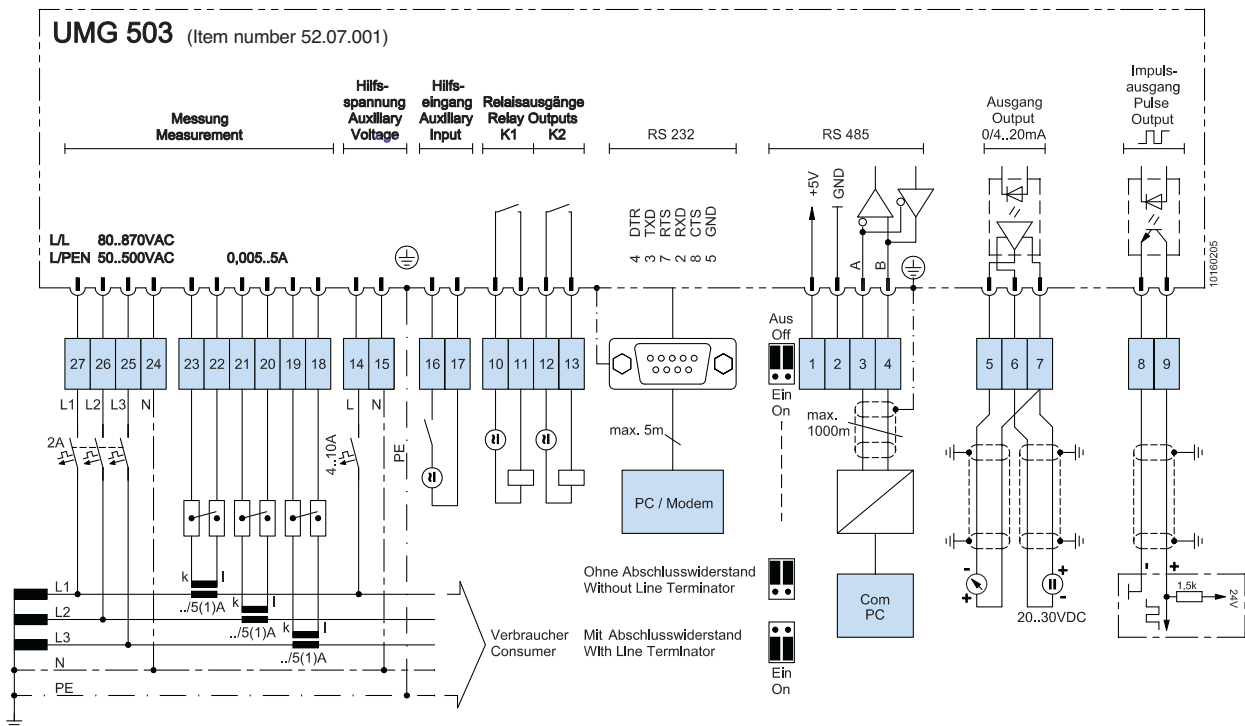


Connection illustration



All dimensions stated in this drawing are in mm.

Typical connection option





Power analysis, LON and I/O diversity

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. 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, the relay output, 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)
- Data logging (water, gas, cooling, electrical ...)
- 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 power analyser

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 UMG505 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 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).

Main features

- LON bus, Modbus RTU
- 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

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, $\cos \varphi$), 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 UMG 505 has a total of 20 internal inputs. The eight inputs from the LON bus interface (option) are illustrated on the internal inputs 5 to 12 and eight inputs from the MODBUS interface (option) are illustrated on the internal inputs 13 to 20. 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)
- MODBUS (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".



Interfaces

- RS232
- RS485
- LON

Protocols

- LONTalk
- Modbus RTU (RS232 or RS485)



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

4 digital inputs

- Pulse input
- HT/LT switchover
- Clock synchronisation

5 digital outputs

- Limit value output for I, U, P etc
- Remote using Modbus/LON
- 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

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													
Auxiliary voltage				512k RAM memory	4 digital inputs	5 digital outputs	4 passive analogue outputs 0(4) – 20mA	Interfaces			3-phase measurement	Type	Item number
85 .. 265V AC, 80 .. 370V DC	40 .. 115V AC, 55 .. 165V DC	15 .. 55V AC, 20 .. 80V DC	LON					RS 232	RS 485				
●	-	-	●	●	●	●	-	●	-	●	UMG 505 MOD	52.10.004	
-	●	-	●	●	●	●	-	●	-	●	UMG 505 MOD	52.10.005	
-	-	●	●	●	●	●	-	●	-	●	UMG 505 MOD	52.10.006	
●	-	-	●	●	●	●	-	-	●	●	UMG 505 MOD	52.10.007	
-	●	-	●	●	●	●	-	-	●	●	UMG 505 MOD	52.10.008	
-	-	●	●	●	●	●	-	-	●	●	UMG 505 MOD	52.10.009	
●	-	-	●	●	●	●	●	●	-	●	UMG 505 LON	52.10.001	
-	●	-	●	●	●	●	●	●	-	●	UMG 505 LON	52.10.002	
-	-	●	●	●	●	●	●	●	-	●	UMG 505 LON	52.10.003	
●	-	-	●	●	●	●	●	-	●	●	UMG 505 LON	52.10.013	
-	●	-	●	●	●	●	●	-	●	●	UMG 505 LON	52.10.015	
-	-	●	●	●	●	●	●	-	●	●	UMG 505 LON	52.10.016	

○ = Option - = Not possible ● = Included

General technical data		
Operating voltage L-N, AC		Refer to order details
Overtoltage 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, 3ph and up to 3x1ph



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	Measurement accuracy
Current .. /5A	0.000 .. 9999 A	0.005 .. 6 A	●	●	●		●	●	●	●	+0.2 % rng
Current .. /1A	0.000 .. 9999 A	0.005 .. 1 A	●	●	●		●	●	●	●	+0.2 % rng
Current, calculated in neutral	0.000 .. 9999 A	0.060 .. 1.5 A				●	●	●	●	●	+0.6 % rng
Voltage L-N	0.0 .. 999.9 MV	50 .. 500 V	●	●	●		●	●	●	●	+0.2 % rng
Voltage L-L	0.0 .. 999.9 MV	80 .. 870 V	●	●	●		●	●	●	●	+0.2 % rng
Frequency (U)	45.00 .. 65.00 Hz	45.00 .. 65.00 Hz	●	●	●		●	●	●	●	+0.2 % rdg
Effective power +/-	0.00 W .. 9999 MW	0.05 W .. 2.5 kW	●	●	●	●	●	●	●	●	+0.5 % rng
Apparent power	0.00 VA .. 9999 MVA	0.05 VA .. 2.5 kVA	●	●	●	●	●	●	●	●	+0.5 % rng
Reactive power	0.00 kvar .. 999 Mvar	0.05 var .. 2.5 kvar	●	●	●	●	cap	●	ind.	●	+0.5 % rng
Power factor	0.00 kap. .. 1.00 .. 0.00 ind.	0.00 kap. .. 1.00 .. 0.00 ind.	●	●	●	●	cap.	●	ind.	●	+0.5 % rng
Effective energy +	0.0 Wh .. 9999 GWh	0.05 Wh .. 9999 GWh ²				●	●			t ₁ /t ₂	*3
Effective energy -	-0.0 Wh .. -9999 GWh	-0.05 Wh .. -9999 GWh ²									
Reactive energy +/-	0.0 .. 9999 Gvarh	0.05vars .. 9999 Mvarh ²				●	●			t ₁ /t ₂	*3
Harmonic rate THD U,I	0.0 .. 100 %	0.0 .. 100 %	●	●	●		●	●	●	●	+0.5 % rng
Partial harmonic I, 2 nd to 20 th	0.000 A .. 9999 A	0.005 A .. 5A (1 A)	●	●	●		●	●	●	●	+0.5 % rng
Partial harmonic U, 2 nd to 20 th	0.0 V .. 99.99 kV	0.000 V .. 9999 V	●	●	●		●	●	●	●	+0.5 % rng

Rng: of measurement range, rdg: of measurement value, t1: 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

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

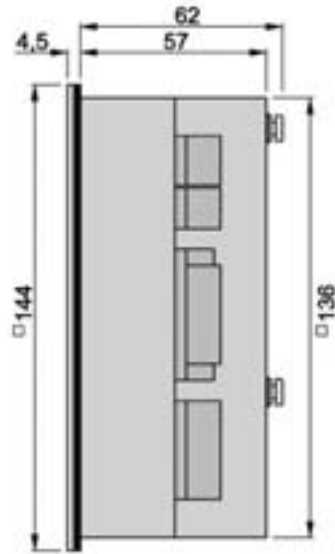
Features		
Memory size		512kB
Clock		± 3 minutes per month
Weekly time switch		Yes, 100 channels

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
RS 485	9.6, 19.2, 38.4, 57.6, 115.2 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



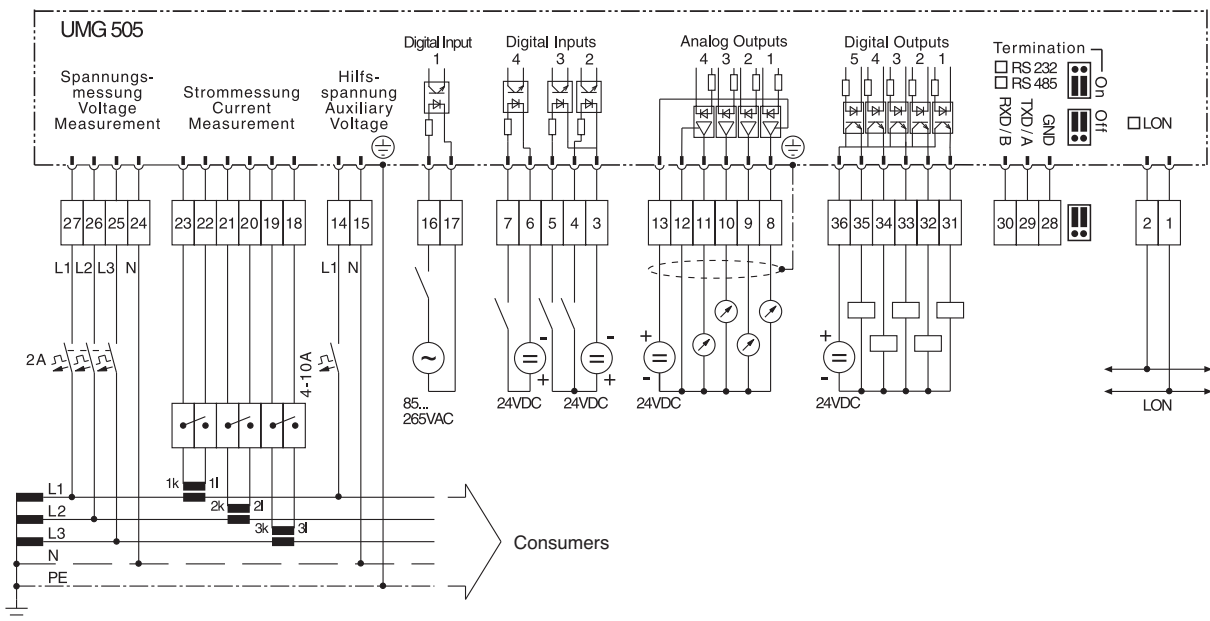
All dimensions stated in this drawing are in mm.

Connection illustration



Illustration: option with LON

Typical connection options





Continuous measurements and the Ethernet

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. Extensive 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
- Data logging (electricity, gas, water, cooling ...)
- Peak demand management (avoidance of costly and dangerous peak loads)
- Remote monitoring via onboard homepage

UMG 507 power analyser**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.



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).

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

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 is 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”.

Peak demand management (Emax)

The release of the Emax function for peak demand management is available as an option. More information can be found in chapter 3 – energy management.

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 UMG507. 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.

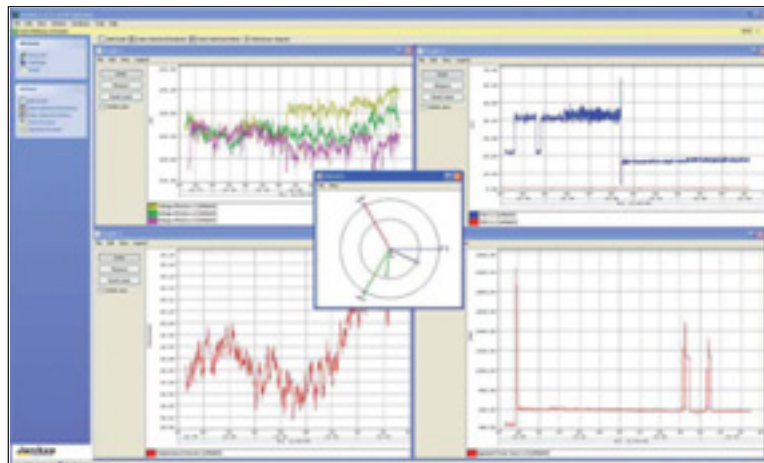
Connection to an ISDN router / DSL router

The unit can be connected to the internet using an external router (e.g. ISDN router or DSL router).

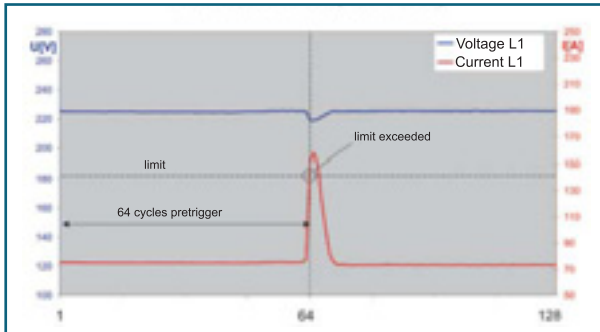
The SMTP authentication enables you to store mails on the internet provider’s mailbox using the Plain/Login/Cram-MDS (newest encryption methods).

Data collection and recording

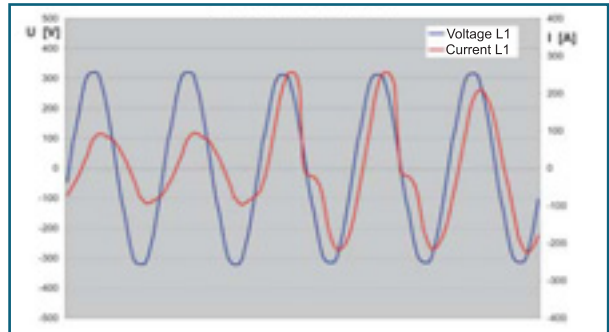
The UMG 507 has an internal memory of 256 KB RAM and, depending on the version, an additional memory of 16 MB flash is available for continuous recording of the measured data. This measurement value memory can be freely configured with reference to the measurement values which are to be saved and the 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, B, 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, Emax outputs (option), time switch outputs or logic outputs. Both analogue outputs can be applied as measurement value transducers or for analogue control of generators (0-20mA) in the Emax function (option). Transformer temperature data can be collected using the temperature input. Any process signals can be allocated to the analogue input.

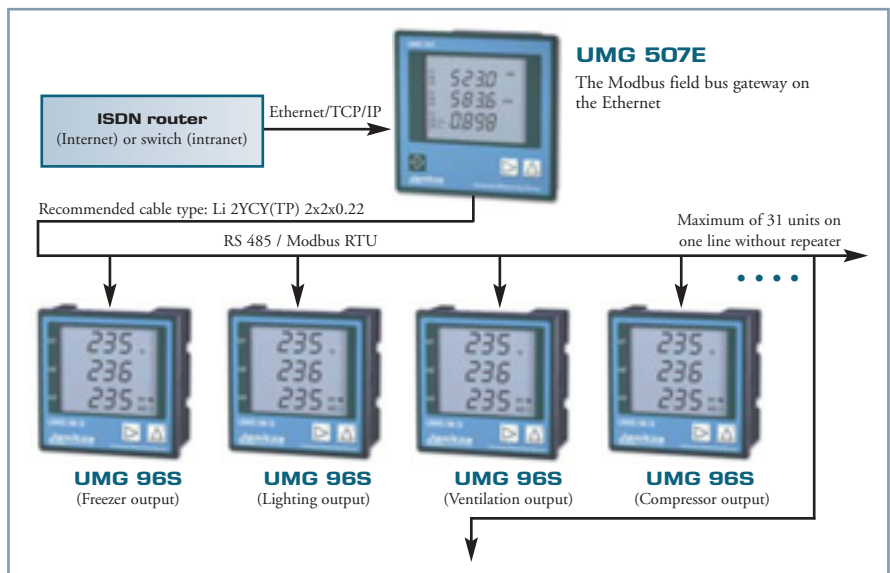
Integrated logic

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 RS 485 of the UMG 507 can also be used as a Modbus RTU master. This means that any measurement instrument from Janitza electronics® with RS 485, protocol Modbus RTU can be connected to the RS 485 of the UMG 507 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 module. 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.





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 ≥ 10 ms 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

Peak demand management

- 6 on-board outputs
- Up to 32 steps for load shedding (external)



1 temperature input

- PT 100 / PT 1000 / KTY 83 or 84

6 digital inputs

- Pulse input
- HT/LT switchover
- Clock synchronisation
- Signal input logic
- Emax resetting

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 ≤ 10 ms
- Logic output
- Emax output

2 analogue outputs

- Settings: 0...20mA or 4...20mA
- Emax analogue output
- Emax generator control

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

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											Type	Item number
85 .. 250V AC, 80 .. 370V DC	40 .. 115V AC, 55 .. 165V DC	15 .. 50V AC, 20 .. 70V DC	256k RAM memory	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 10base T	Profibus DP V0	Integrated weekly time switch clock		
●	-	-	●	-	●	●	-	-	-	●	●	-	-	●	UMG 507 L	52.15.004
-	●	-	●	-	●	●	-	-	-	●	●	-	-	●	UMG 507 L	52.15.009
●	-	-	●	●	-	-	-	-	-	●	-	●	-	-	UMG 507 EL	52.15.021
-	●	-	●	●	-	-	-	-	-	●	-	●	-	-	UMG 507 EL	52.15.022
●	-	-	●	-	●	●	●	●	●	●	●	-	-	●	UMG 507 AD	52.15.003
-	●	-	●	-	●	●	●	●	●	●	●	-	-	●	UMG 507 AD	52.15.008
●	-	-	●	-	●	●	●	●	●	●	●	-	●	●	UMG 507 P	52.15.002
-	●	-	●	-	●	●	●	●	●	●	●	-	●	●	UMG 507 P	52.15.007
●	-	-	●	●	●	●	●	●	●	●	●	●	-	●	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
Unit options																
Emax function (maximum demand controller)														Emax	52.15.080	

- = Not possible ● = Included

General technical data

Operating voltage L-N, AC		Refer to order details
Overtoltage 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 - 2.5mm 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, 3ph and up to 3x1ph



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 % rng
Current, N	0.000 .. 9999 A	0.060 .. 15 A				●		●		●	●	+0.6 % rng
Voltage L-N	0.0 .. 999.9 MV	50 .. 500 V	●	●	●		●	●		●	●	+0.2 % rng
Voltage L-L	0.0 .. 999.9 MV	90 .. 870 V	●	●	●		●	●		●	●	+0.2 % rng
Pos./neg./zero sequence	0.0 .. 999.9 MV	50 .. 500 V					●	●		●	●	+0.5 % rng
Frequency (U)	45.00 .. 65.00 Hz	45.00 .. 65.00 Hz	●	●	●			●		●	●	+0.2 % rdg
Effective power +/-	0.00 W .. 9999 MW	0.05 W .. 2.5 kW	●	●	●	●		●	●	●	●	+0.5 % rng
Apparent power	0.00 VA .. 9999 MVA	0.05 VA .. 2.5 kVA	●	●	●	●		●		●	●	+0.5 % rng
Reactive power	0.00 kvar .. 999 Mvar	0.05 var .. 2.5 kvar	●	●	●	●		●		ind.	●	+0.5 % rng
Power factor	0.00 kap. .. 1.00 .. 0.00 ind.	0.00 kap. .. 1.00 .. 0.00 ind.	●	●	●	●		●		ind.	●	+0.5 % rng
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)

rng: of measurement range, rdg: of measurement value, t: start time, t₁: 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, 1 st to 20 th harmonics, uneven	Current, voltage L1, L2, L3	Accuracy: ± 0.5% rng
Distortion factor THD-U in %	L1, L2, L3	Accuracy: ± 0.5% rng
Distortion factor THD-I in %	L1, L2, L3	Accuracy: ± 0.5% rng
Voltage positive/negative/zero system		Accuracy: ± 0.5% rng
Short-term interruptions	10ms	yes
Initial current	10ms	yes
Recorder for limit value events		yes

Measurement accuracy		
Accuracy VA		± 0.2%
Reactive energy kvarh	Class	1 (5A), 2 (1A)
Effective energy kWh	Class	1 (5A), 2 (1A)

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

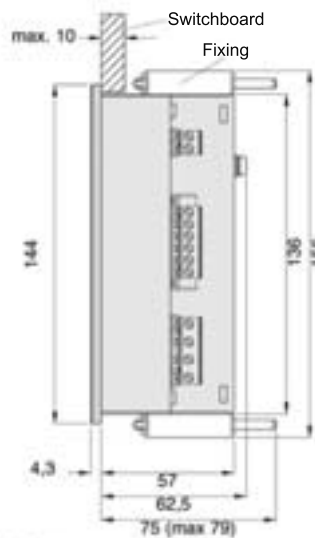
Communication

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 web server	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

Switchboard cut-out:
139x139 mm

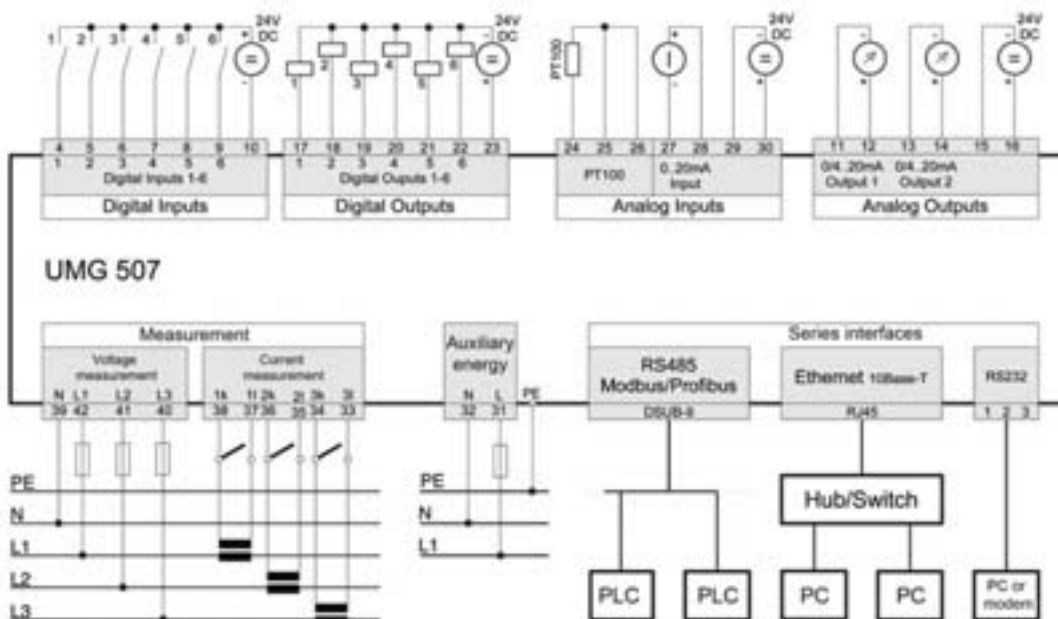
All dimensions stated in
this drawing are in mm.



Connection illustration



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





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, SNTIP, 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)

User-friendly graphical color 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 analyzers 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

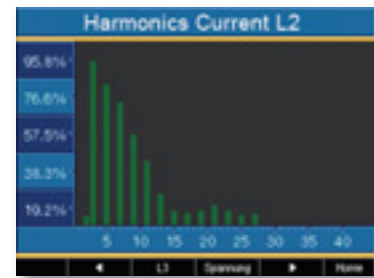
The UMG 508 series can transfer data via RS485 interface with a speed of up to 921.6 kB/s among each other device of this series.

Alarm management: E-mail and homepage inform you, wherever you are...

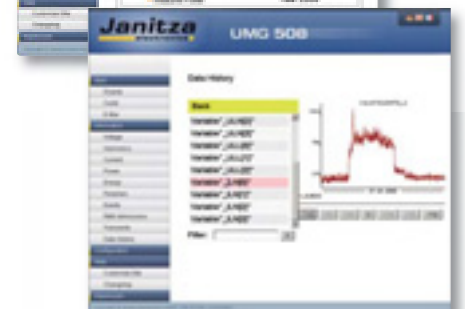
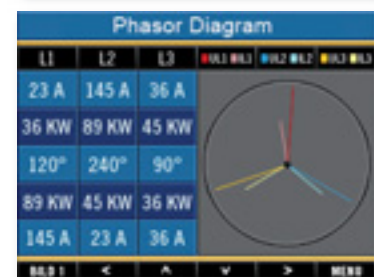
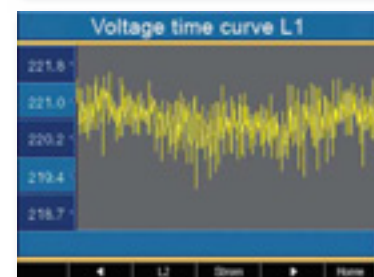
Who would not agree? Just leaving the building the first call arrives about certain problems in production, computer failure, energy breakdown...

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.

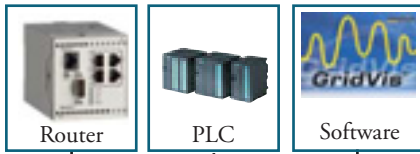
Alternatively, an e-mail informs you, if overload occurs, short-term interruptions disrupt your production process, harmonics reduce the life expectancy of your technical equipment... The applications are ceaseless.



	Measured	Midlevel	Maximum
L1-N	-0.000 kW	-0.000 kW	0.000 kW
L2-N	-0.006 kW	-0.006 kW	-0.004 kW
L3-N	-0.006 kW	0.000 kW	0.000 kW
L4-N	0.000 kW	0.000 kW	0.000 kW



UMG 508



Interfaces

- Ethernet
- Profibus / RS485(D-Sub9)

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

Accuracy

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

Power quality

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

Maximum demand control

- 64 outputs

Programming language Jasic®

Overview of product variants UMG 508

Supply voltage			4 voltage and 4 current inputs	Additional memory 256 MB Flash	8 digital inputs	5 digital outputs	Interfaces			7 freely programmable application programmes	Type	Item number
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					RS 485*	Ethernet 100baseT	Profibus DP V0*			
●			●	●	●	●	●	●	●	●	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

- = not possible ● = contained *1 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®

Peripherals

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, 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 DSUB-9 connector



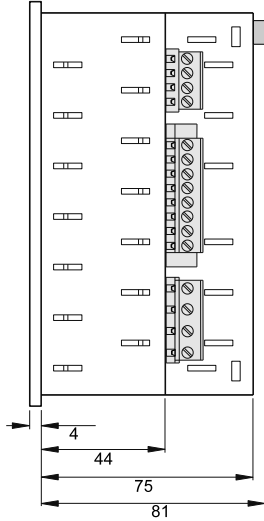
Technical data		
Voltage measurement	3-phase 4-wire grid (L-N, L-L) 3-phase 3-wire grid (L-L)	417/720 V AC 480 V AC
Overvoltage class		600 V CATIII
Quadrants		4
Continuous Measurement		yes
Sampling rate, 8 channels	per channel	20 kHz
Weight		1 kg
Dimensions		H=144 mm x W=144 mm x D=81 mm
Mounting	according 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)		50...500 V AC
Voltage L-L, AC (without VT)		8...870 V AC
Current (Transformer: x/1 und x/5 A)		0.005...6 A
Frequency of fundamental		40...70 Hz
Grids		TN, TT
Measurement in grids		1ph, 2ph, 3ph, 4ph up to 4 times 1ph

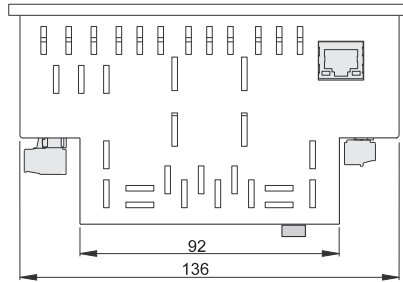
Measured values		
Voltage	L1, L2, L3, L4, L1-L2, L2-L3, L1-L3	accuracy ±0.1 %
Current	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4	accuracy ±0.2 %
K-factor	L1, L2, L3, L4	yes
Rotating current components	Positive/ Negative/ Zero Phase Sequence	yes
Real, apparent, reactive power	L1, L2, L3, L4, Sum L1-L3, Sum 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 0.2S (.../5 A), Class 1 (.../1 A)
Reactive energy (Kvarh)	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 ±0.1% rdg
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



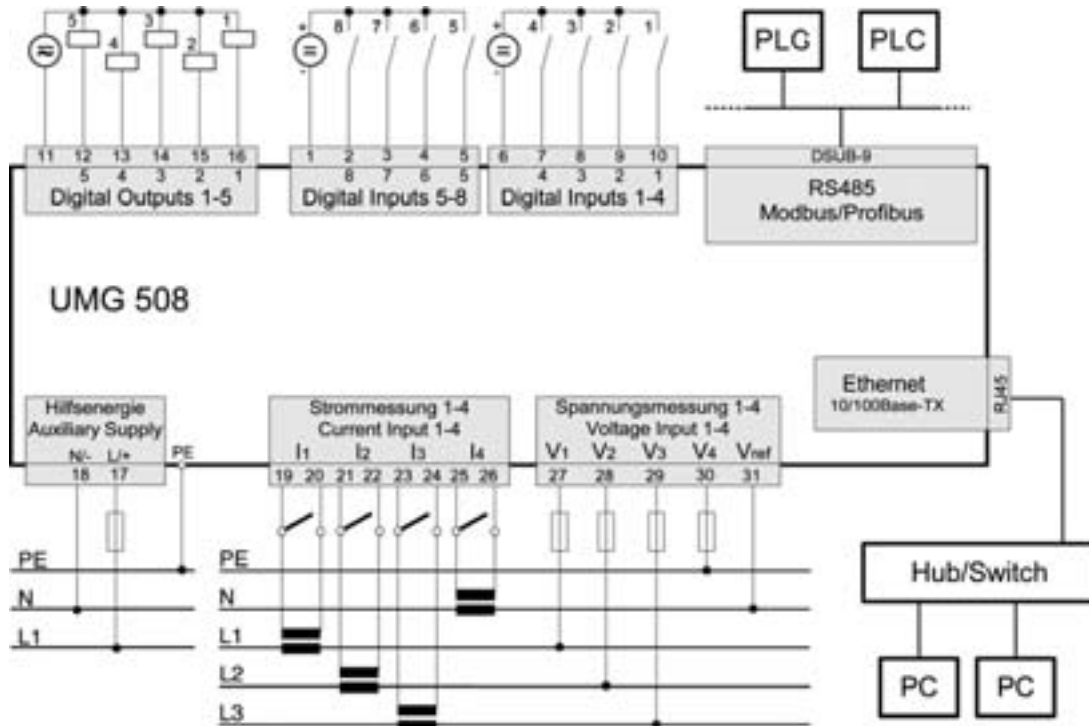
View from below.
 All measurement data in mm.

Connection illustration



Ethernet connection

Typical connection





Class A power quality analyser according to IEC61000-4-30

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, 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 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

UMG 511 power quality analyser

Added value with additional functions

The UMG 511 power quality analyser serves for the purpose of 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 CATIII)
- 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

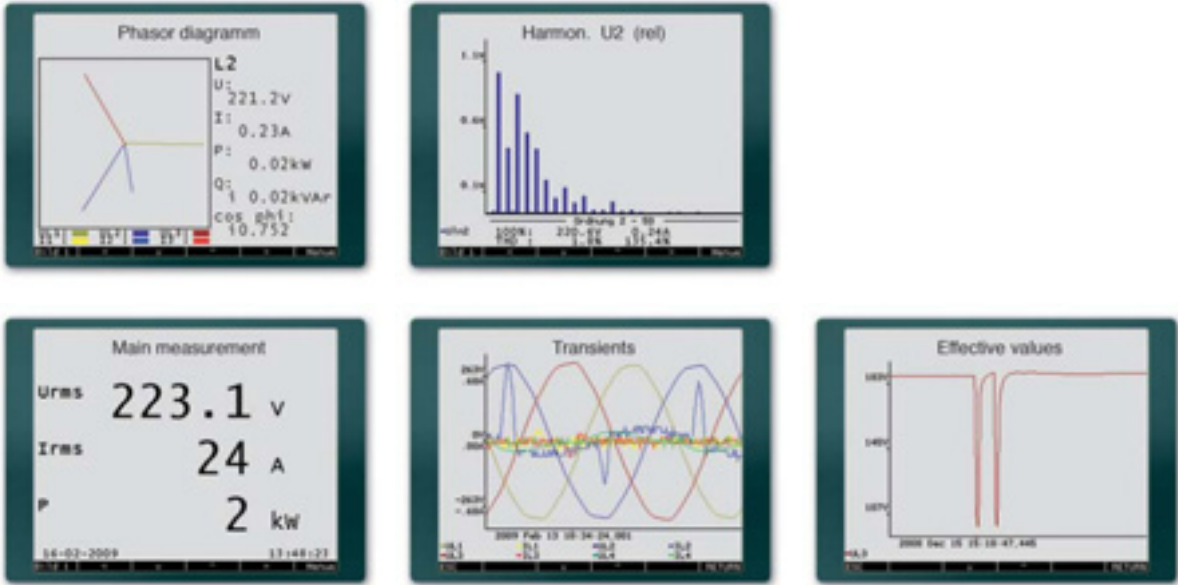
The power quality analyser which is equipped with 4 current and voltage inputs collects and digitalises the effective values (True RMS) from currents and voltages in 40-70Hz (15-440Hz) networks. The integrated microprocessor calculates the electrical parameters from the sampling values. The relevant 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 refer-

ence 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.



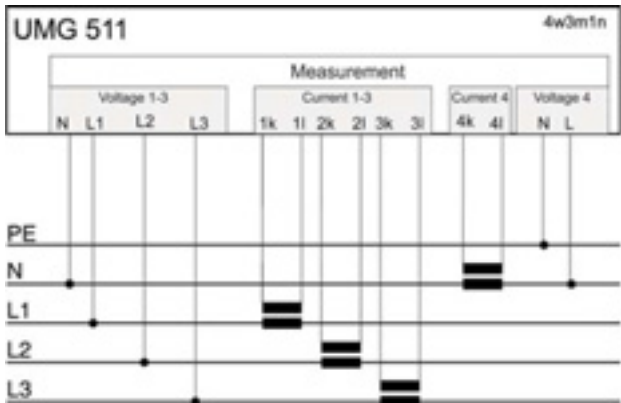
Display examples

The backlit 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

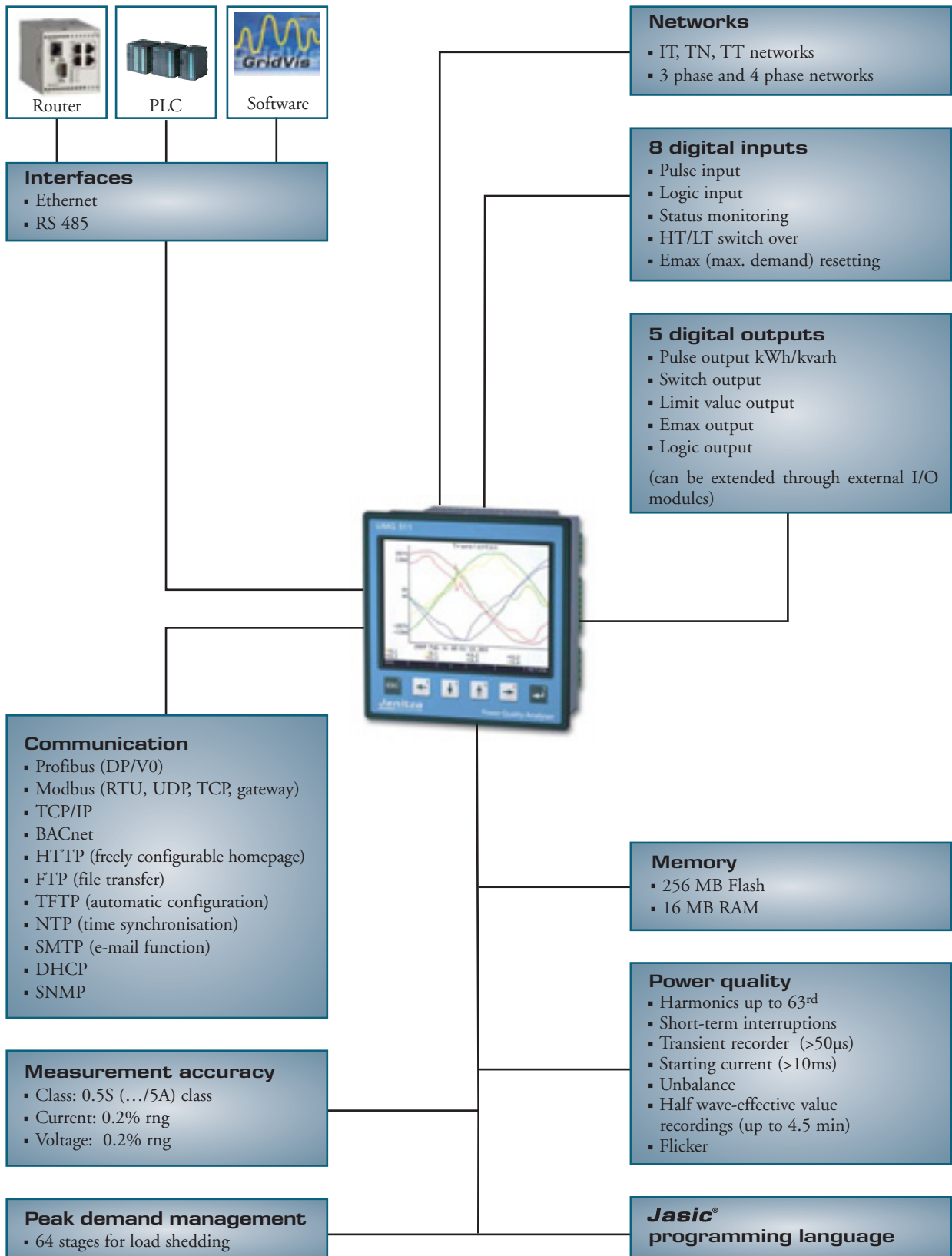
The UMG 511 has 4 measurement channels for current and voltage. The first three channels (main measurement) are intended for use in a three-phase system.

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).

Scope of operation

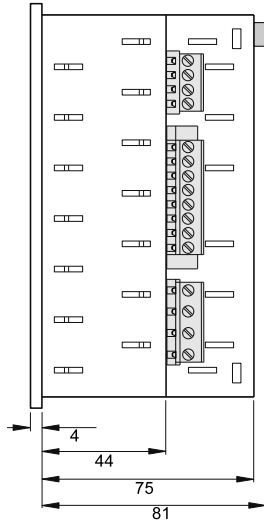
Scope of operation



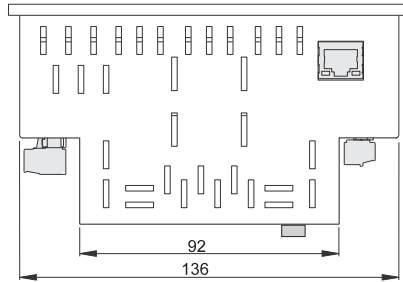
UMG 511



Dimensional drawing



Side view



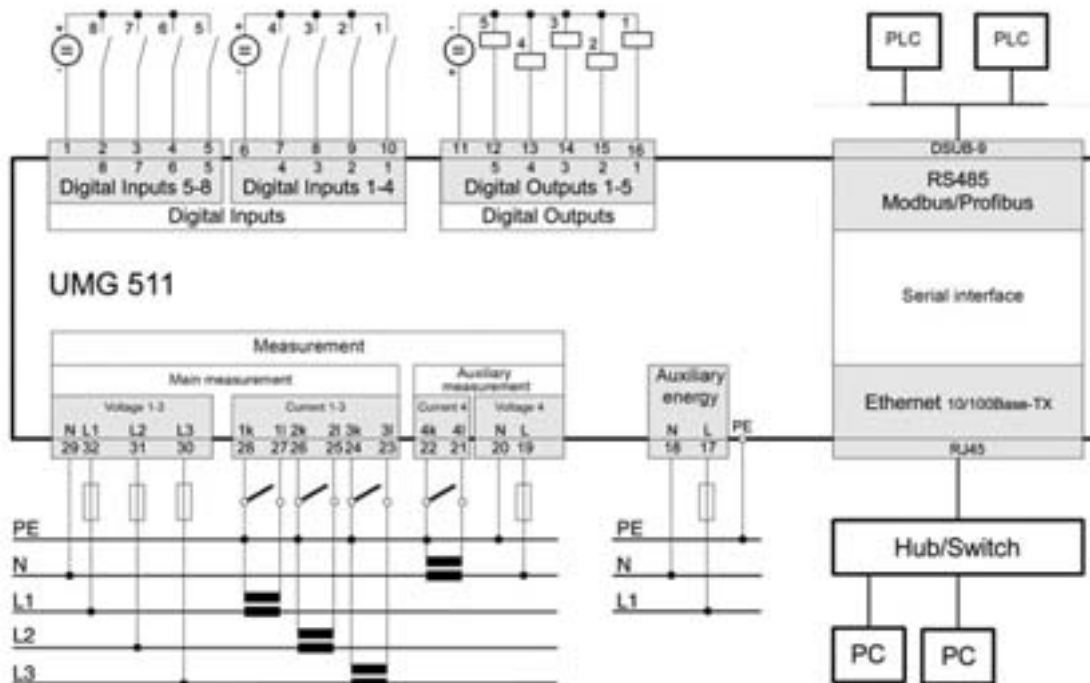
View from below.
All measurement data in mm.

Connection illustration



Ethernet connection

Typical connection



Overview of product variants UMG 511											
Three/four phase power quality analysers; current transformer .../1/5a; including GridVis programming and analysis software											
Supply voltage			4 voltage and 4 current inputs	Memory 256 MB Flash	digital inputs	digital outputs	Interfaces			Type	Item number
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					RS 485	Ethernet 100baseT	Profibus DP V0		
●			●	●	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

- = not possible ● = contained

General technical data		
Voltage measurement	3-phase 4-wire grid (L-N, L-L) 3-phase 3-wire grid (L-L)	417/720 V AC 480 V AC
Overvoltage category		600V CATIII
Quadrants		4
Continuous measurement		yes
8 channel scanning rate	Per channel	20 kHz
Weight		1kg
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...50 °C
Connectable conductor (U/I)	Single wire, multi-wire, fine-wire pin cable lugs, ferrule	0,08 - 2,5 mm ² 1,5 mm ²
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	5 ...500 VAC
L-L voltage, AC (without voltage transformer)	Free voltage transformer settings	8...870 VAC
Current (transformer: x/1 and x/5A)		0,005..6 A
Frequency of mains		40 ..70 Hz
Networks		TN, TT
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	ja
Software	GridVis	ja

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 $\pm 0.12\%$
Current	L1, L2, L3, L4	$\pm 0.2\%$
	Calculated sum current	$\pm 0.56\%$
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 $\pm 0.2\%$ acc. EN 61557-12:2008
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 0.2S (.../5A), Class 0.5S (.../1A)
	Reactive energy (kvarh)	L1, L2, L3, L4, Sum L1-L3, Sum L1-L4: - Inductive reactive power (tariff 1, tariff 2) - Capacitive reactive power
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 $\pm 0.01\%$
Average value		yes
Minimum and maximum values		yes

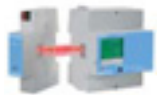
Power quality, Class A, according to EN61000-4-30		
Harmonics order, 1 st to 63 rd Harmonics, even/odd	Voltage L1, L2, L3, L4	Class 1 acc. EN61000-4-7
Interharmonics	Current, voltage L1, L2, L3, L4	yes
Distortion factor THD-U in %	L1, L2, L3, L4	yes
Distortion factor THD-I in %	L1, L2, L3, L4	yes
Positive/negative/zero 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 μ s	yes
Trigger events	10 ms	yes
Inrush currents	10 ms	yes
Event recorder		yes

Communication		
Interfaces		
RS 485	9.6, 19.2, 38.4, 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 or MSTP		yes, option



An overview of DIN rail kWh-meters

Page 91



Electronic pulse output - energy meter, EM-series

Page 93

- Modbus, M-Bus, EIB-KNX - communication module
- 2 tariffs
- 4 quadrant measurement
- With and without MID (Measuring Instruments Directive)
- Up to 125A direct measurement



Electronic pulse output - energy meter, H-series

Page 97

- Direct measurement or with current transformer
- SO interface pulse output
- Mounting on 35mm DIN rail
- 7 digit LCD display
- Calibrated/non-calibrated



Peak demand management systems UMG 507Emax

Page 100

- For limiting peak loads
- Up to 32 load shedding stages
- Including UMG 507 power analyser with continuous measurement
- RS232, RS485, Modbus, Ethernet (optional Profibus)



Data logger ProData®

Page 106

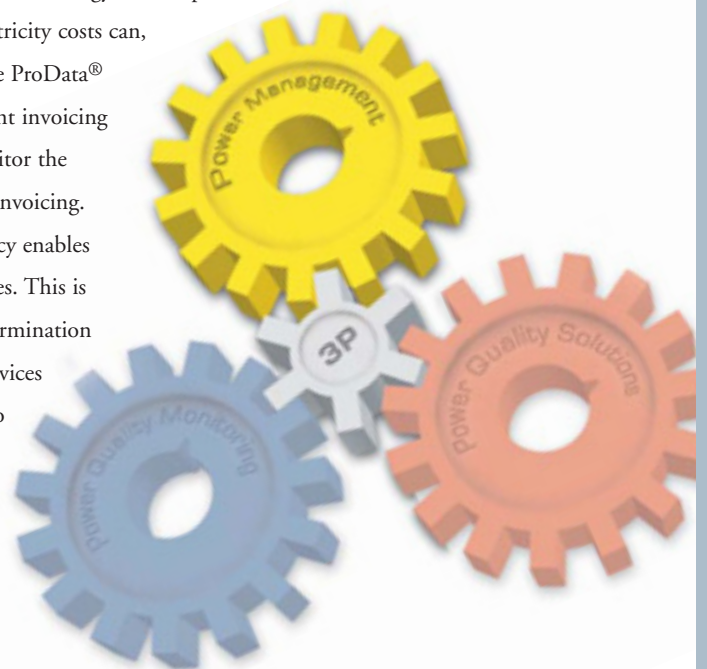
- Collection and storage of counter values, operational statuses and process data
- 16 digital inputs
- 64 bit counter
- 128 programmable comparators
- RS232, RS485, modem, LON, Modbus, Modbus-master



PM - Power Management

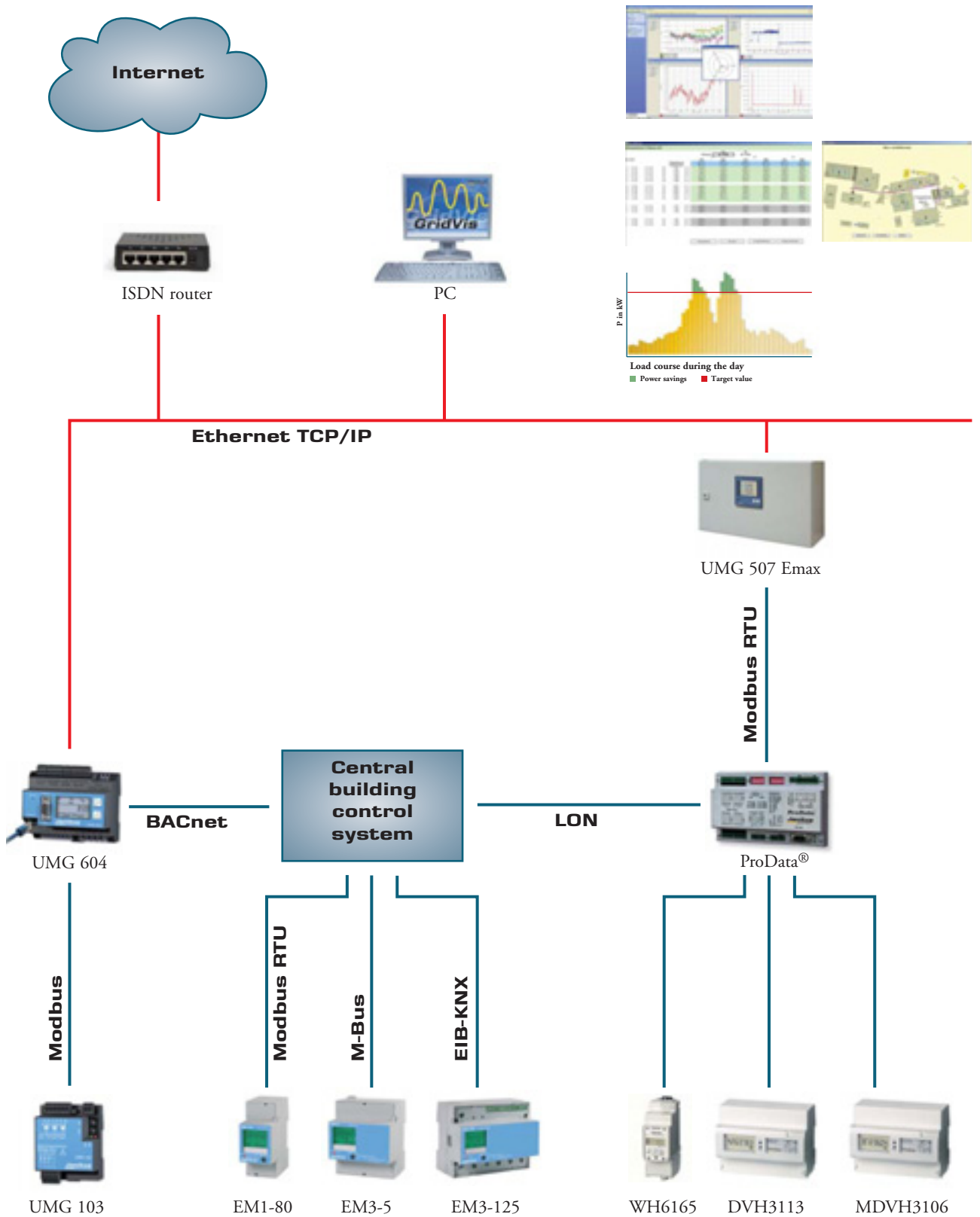
Professional energy management considers aspects such as peak demand management, energy data collection and cost centre management. With the UMG 507Emax and ProData® product groups and state-of-the-art pulse output energy meters, the energy supply for your company can be actively controlled with regard 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 monitor 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.



An overview of energy meters

An overview of energy meters



Electronic energy meters



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.

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 EM meters can also be used as instruments for sub-metering for the UMG604 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 EM 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 EM 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.

Product variants and technical data



Overview of product variants				
Types	EM1-80	EM3-80	EM3-125	EM3-5
without MID	EM1-80 (without MID)	EM3-80 (without MID)	EM3-125 (without MID)	EM3-5 (without MID)
Item number	14.01.301	14.01.320	14.01.330	14.01.310
with MID	EM1-80 (MID)	EM3-80 (MID)	EM3-125 (MID)	EM3-5 (MID)
Item number	14.01.302	14.01.321	14.01.331	14.01.311

General technical data				
Operating voltage	184...276VAC	184...276VAC	184...276VAC	184...276VAC
Dimensions [mm]	W= 36 x H= 90 x 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	-10...+55°C	-10...+55°C
Storage temperature	-25...+70°C	-25...+70°C	-25...+70°C	-25...+70°C
Protection class (front/clamps)	IP 51/20	IP 51/20	IP51/20	IP51/20
Max connectable conductors	Current 35mm ² Voltage 2.5mm ²	Current 35mm ² Voltage 2.5mm ²	Current 50mm ² Voltage 2.5mm ²	Current 6mm ² Voltage 2.5mm ²

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	0.025...80A	0.12...125A	0.05...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
Effective-, reactive-power display	Yes	Yes	Yes	Yes

Periphery				
Pulse outputs	2	2	2	2
Pulse value	10 Imp/kWh	10 Imp/kWh	10 Imp/kWh	1/10/100 Imp/kWh
Pulse length	100 ± 5ms	100 ± 5ms	100 ± 5ms	100 ± 5ms
Digital input	1	1	1	1

Optional communication modules		
Modbus RTU / ASCII	Baud rate: up to 115kBaud	
Types:		
Modbus RTU / ASCII (Basic)	Applicable parameters: Wh, kvarh	Item number: 14.01.400
Modbus RTU / ASCII (Full)	Applicable parameters: Wh, kvarh, V, A, Hz, cosphi, kW, kvar	Item number: 14.01.410
M-Bus	Baud rate: 300...9600Baud	
Types:		
M-Bus (Basic)	Applicable parameters: Wh, kvarh	Item number: 14.01.401
M-Bus (Full)	Applicable parameters: Wh, kvarh, V, A, Hz, cosphi, kW, kvar	Item number: 14.01.411
EIB-KNX	Baud rate: 9600Baud	
Types:		
EIB-KNX (Basic)	Applicable parameters: Wh, kvarh	Item number: 14.01.402

The EM series energy meters

EM1-80 - single-phase energy meter

Dimensional drawing	Circuit diagram	Sealable clamp terminal

Three-phase energy meter

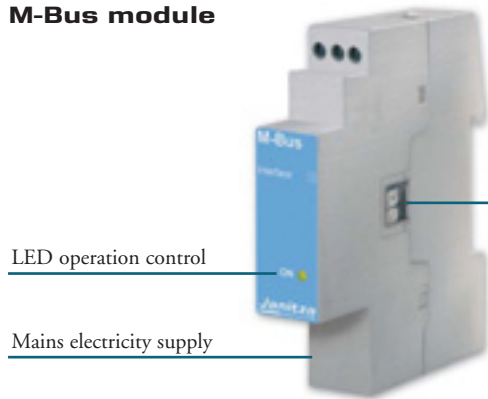
Dimensional drawing	Circuit diagram
<p>All dimensions stated in this drawing are in mm.</p>	
<h3>Sealable clamp terminal</h3>	
<p>Information for connecting meters with CTs</p>	
<p>A 6A fuse on L1 is recommended to protect the cables. Current transformers must not be operated with open clamps because 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.</p>	

Module technology



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

M-Bus module



LED operation control

Mains electricity supply

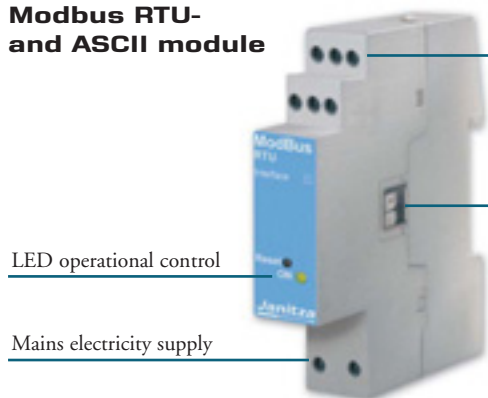
Side infrared interface for communication to the energy meter



Dimensional drawing



Modbus RTU- and ASCII module



LED operational control

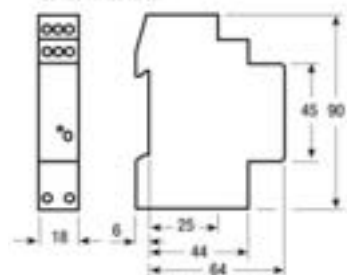
Mains electricity supply

Modbus connection

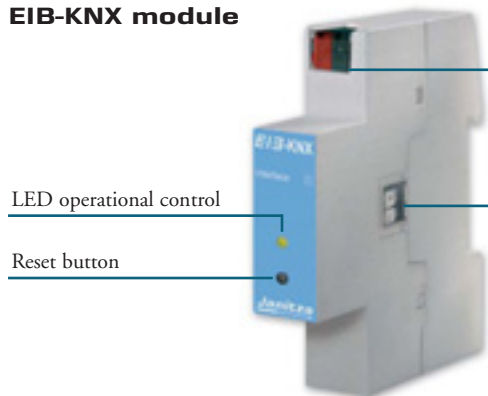
Side infrared interface for communication to the energy meter



Dimensional drawing



EIB-KNX module



LED operational control

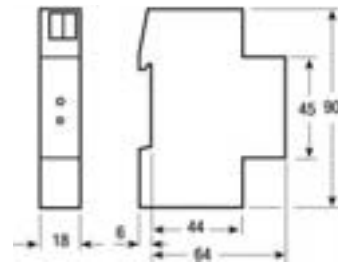
Reset button

EIB-KNX interface

Side infrared interface for communication to the energy meter



Dimensional drawing



All dimensions stated in these drawings are in mm.

Product variants and technical data



Overview of product variants			
	WH6165	DVH3113	MDVH3106
Item number (non-calibrated instrument)	14.01.020	14.01.021	14.01.022
Item number (calibrated instrument)	14.01.023	14.01.024	14.01.025


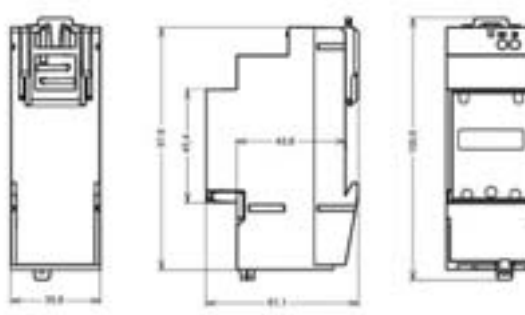
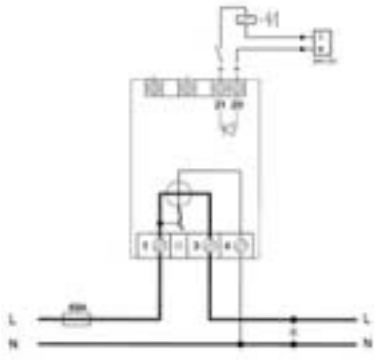
General technical data			
	WH6165	DVH3113	MDVH3106
Operating voltage	207...253VAC	207...253VAC	207...253VAC
Dimensions [mm]	W= 36 x H= 106 x D= 61,1	W= 125 x H= 96 x D= 66	W= 125 x H= 96 x D= 66
Width in units	2	7	7
Working temperature	-20...+55°C	-20...+55°C	-20...+55°C
Storage temperature	-25...+70°C	-25...+70°C	-25...+70°C
Protection class (front/clamps)	IP51/20	IP51/20	IP51/20
Weight	140g	500g	500g
Max connectable conductors	Current: 16 mm ² , voltage: 2.5mm ²	Current: 25 mm ² , voltage: 2.5mm ²	Current: 10 mm ² , voltage: 2.5mm ²
Certification	Option	Option	Option


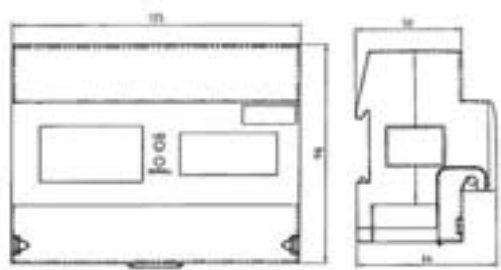
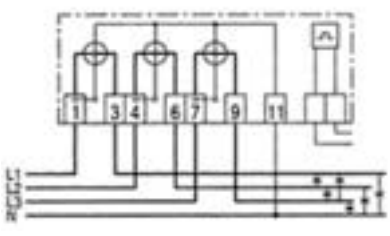
Measurement range			
	WH6165	DVH3113	MDVH3106
Voltage L-N	207...253VAC	207...253VAC	207...253VAC
Voltage L-L	-	358...438VAC	358...438VAC
Current	0...65A	0...65A	0...5A
Frequency, mains	50/60Hz	50/60Hz	50/60Hz
Measurement	1-phase	3-phase	3-phase
Measurement mode	Direct	Direct	CTs


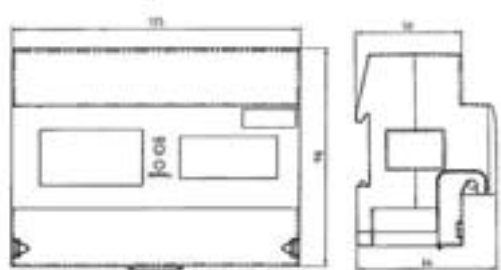
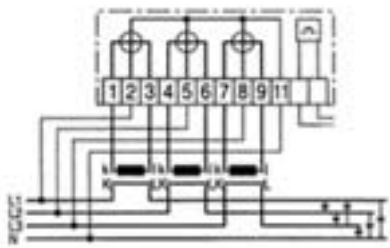
Measurement value			
	WH6165	DVH3113	MDVH3106
Effective energy	Class 1	Class 1	Class 1

Periphery			
	WH6165	DVH3113	MDVH3106
Pulse output	1	1	1
Pulse value	1000 pulses/kWh	500 pulses/kWh	5000 pulses/kWh
Pulse length	Min. 30ms	Min. 30ms	Min. 30ms

Dimensional drawings and connection illustrations

WH6165	Dimensional drawing	Connection illustration
		

DVH3113	Dimensional drawing	Connection illustration
		

MDVH3106	Dimensional drawing	Connection illustration
		

All dimensions stated in these drawings are in mm.



UMG 507Emax

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. Due to permanently increasing electricity costs in current times, it is necessary to guarantee the optimum adaptation of load distribution profile to the supply conditions offered by the energy suppliers. The UMG 507Emax peak demand management systems are the solution. The UMG 507Emax reduces the power of certain loads or switches them off according to customer defined settings.

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 507Emax - peak demand management systems

The intelligent reduction of effective power peaks

The UMG 507Emax peak demand management systems continuously collect data of all electrical parameters. The UMG 507Emax is equipped with intelligent algorithms which calculate the effective power trends and compare them with the agreed target for effective power.

Due to the trend calculations, the UMG 507Emax can precisely interact with the operational process and can quickly disconnect any non-critical loads according to information provided by the user. This means that some very expensive power peaks can be safely avoided and significant cost savings can be achieved. Any random power peaks are avoided. And the processes itself are not negatively influenced.

UMG 507Emax peak demand management system

- Assembled in a steel housing for wall mounting
- Wired ready for connection on terminals
- Includes GridVis software and standard programming
- Auxiliary voltage: 230 V; 50/60 Hz
- Dimensions:
W= 600mm x H= 380mm x D= 210mm
- Colour: RAL 7035



Main features

- Optimum limitation of effective power peaks
- Up to 32 load shedding stages
- Includes UMG 507E power analyser with continuous measurement (also available with other UMG 507)
- RS232, RS485, Modbus, Ethernet
- Including GridVis software
- Capturing short-term interruptions
- Harmonics display, monitoring of short-term interruptions
- With Ethernet and embedded web server
- UMG 507Emax6 optional with Profibus

Applications

The UMG 507Emax is a multifunctional instrument which is essential as basic equipment in low voltage main distribution systems. The maximum effective power is reduced with the peak load manager UMG 507Emax through the short period shutdown of loads. Furthermore, the system also enables time- or event-related switching of loads with the integrated weekly time switch.

The UMG 507E is available as a basic instrument with additional components integrated in compact steel cabinet or as individual component. As a measuring instrument, the UMG 507Emax monitors the loads upon the electrical supply systems in order to avoid overload. The UMG 507E is also designed to measure and store almost all electrical parameters including average current and power values (refer to catalogue page 68 et seq).



Functional principle

The UMG 507Emax determines the necessary parameters for compliance with up to 5 stipulated nominal values in kW based on the effective power pulses entering the digital input or the overall effective power calculated by the instrument. The instrument continuously calculates the average value, actual value, trend value and correction power within the set time period.

If the instrument identifies that the maximum effective power may be exceeded, it checks whether the consumers have to be switched off using the preset consumer parameters. The aim of this method is to insignificantly impair the operational process with as few switching processes as possible while still complying with the given nominal demand value.

Depending upon the product variant, there are up to 32 shutdown stages available (change over contact is potential free) for the loads and two optional analogue Emax channels for the control of generators.

Peak demand management up to 32 load shedding stages / 5 nominal values

Measurement period length:

In order to be synchronised with the measurement of the power utility, resetting is undertaken through a digital input of the UMG 507Emax or through an interface. If the instrument is not reset within the programmed measurement period, it is reset automatically by the internal clock. When the measurement period is reset, the Emax effective power is deleted and a new measurement period is started. The last measured maximum effective power is used for storing the minimum and maximum values and, if programmed, is recorded in the UMG 507Emax memory.

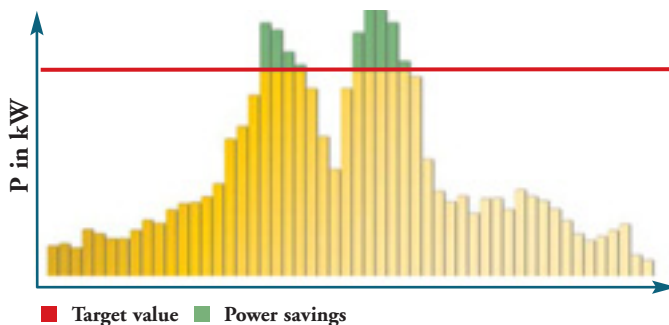
Off-time:

This starts at the beginning of the measurement period and avoids brief power peaks at the beginning of the measurement period leading to shut down.

Pause time:

This is the time between two switching actions. Because switching actions do not have an immediate effect on the network, the delayed reaction can be regarded with the pause time.

Load profile over a time period of 24 hours



Involved loads:

Involved loads are given priority for shutdown. Only involved loads are included in the trend value calculation. This means that the Emax program tries to comply with the maximum demand by only using the “involved loads” under consideration of the switching times and load power. If this is not possible, other defined loads are also used for shutdown.

Priority

Each shutdown level can be given priority between 0 and 32. Emax outputs with a priority of 0 are not included in the trend value calculation undertaken by the Emax program. Emax outputs with a low priority (e.g. 1) are shut down first and are last to be switched on again.

Connection load

In order to be able to determine the time of shut down more accurately, the nominal load power of the connected load must be programmed for each Emax output. The switching times allocated to each Emax output are complied with on priority.

Minimum connection time

This determines how long a load must remain switched on between two switching actions.

Minimum disconnection time

This determines how long a load must remain switched off after shutdown.

Maximum disconnection time

This determines how long a load may remain switched off after shutdown.

Availability

The availability of a load can be set as a percentage value.

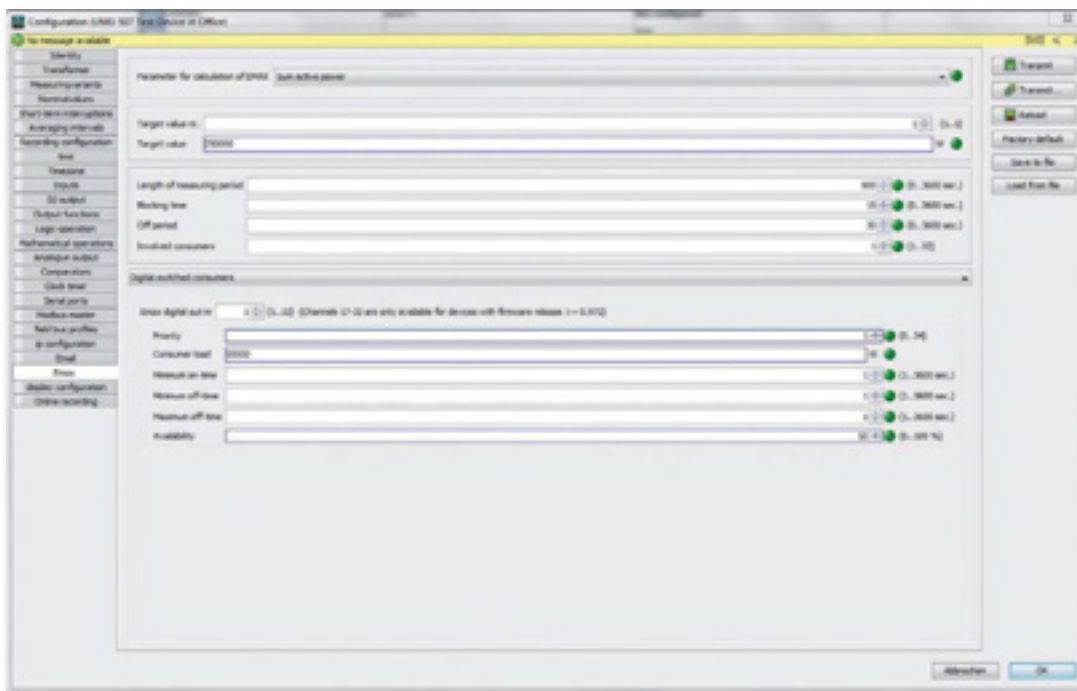


Illustration: Emax programming using GridVis software

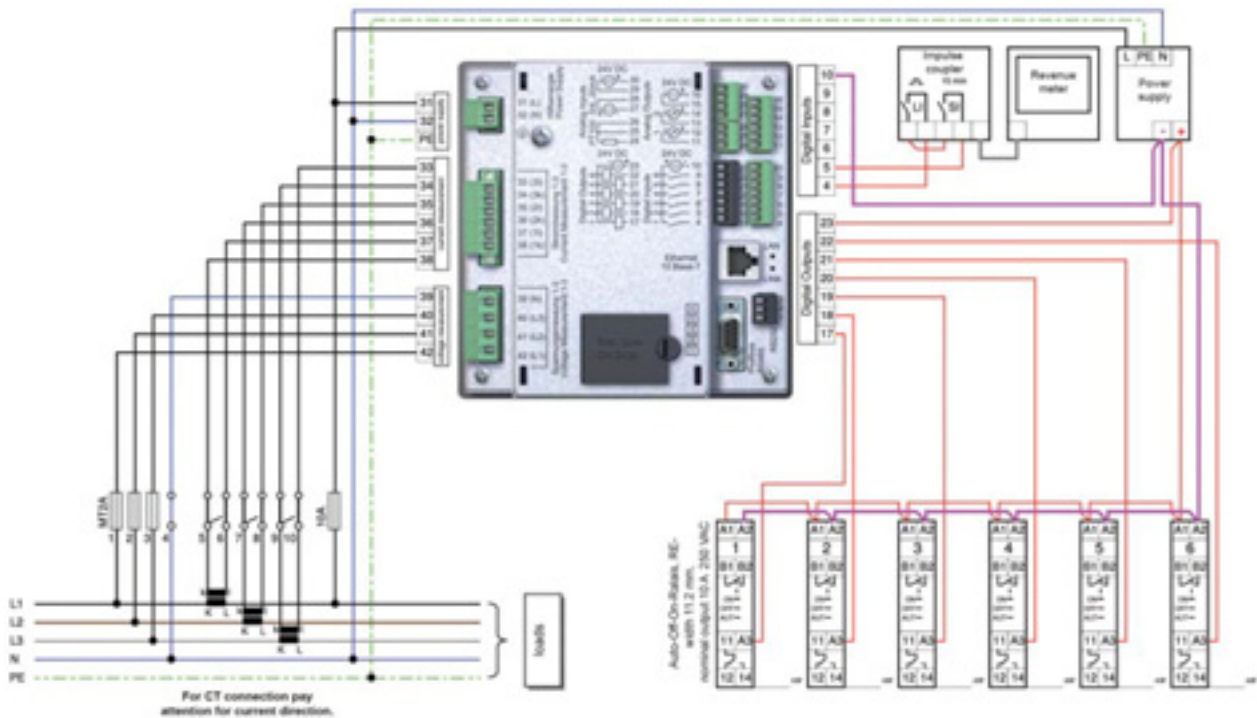


UMG 507Emax product variants														
256k RAM memory	16MB flash additional memory	6 digital inputs	Shutdown stages	Contact type, 1A change over	1 temperature input	1 analogue input	2 passive analogue outputs	Interfaces				Integrated weekly time switch	Type	Item number
								RS 232	RS 485	Ethernet 10baseT	Profibus DP V0			
●	●	●	6	●	●	●	●	●	●	●	○	●	UMG 507MAX6	52.15.217
●	●	●	16	●	●	●	●	●	●	●	-	●	UMG 507MAX16	52.15.222
●	●	●	32	●	●	●	●	●	●	●	-	●	UMG 507MAX32	52.15.232

○ = Option ● = Included

More functions and technical data – refer to UMG 507 in the energy measurement technology chapter.
The UMG 507E is integrated in the above variants as a basic control unit.

Typical connection



General technical data

Supply voltage L-N, AC	230V, 50/60Hz
Overtoltage 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	6/16/32

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)	0.02...6A
Frequency, mains	45...65Hz
Grid types	TN, TT, (IT)
Measurement in 1-phase / multiphase networks	1ph, 2ph, 3 ph

Communication

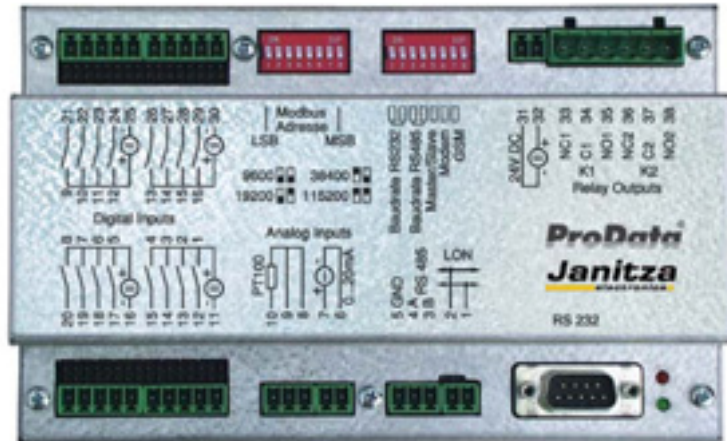
Interfaces		
RS 232	38.4 kbps	Yes, refer to order details
RS 485	9.6, 38.4, 115.2 kbps	Yes, refer to order details
Profibus DP	9.6kbps up to 1.5Mbps, SUB D 9-pole	Optional for UMG 507MAX6
Ethernet 10 Base-T	RJ45	Yes
Protocols		
Modbus RTU		Yes
Profibus DP V0		Option
TCP/IP		Yes

Measurement values

Voltage	L1, L2, L3 L1-L2, L2-L3, L1-L3	Accuracy: ± 0,2% rng Accuracy: ± 0,2% rng
Current	L1, L2, L3 N (calculated)	Accuracy: ± 0,2% rng Accuracy: ± 0,6% rng
Effective, apparent or reactive power	L1, L2, L3, Sum L1-L3	Accuracy: ± 0,5% rng
cosphi	L1, L2, L3, Sum L1-L3	Accuracy: ± 0,5% rng
Effective energy (kWh) purchase/supply	Sum L1-L3	Class 1 (.../5A), Class 2 (.../1A)
Reactive energy (karh), inductive/capacitive	Sum L1-L3	Class 2
Apparent energy (kVAh)		Class 2
Mains frequency		Accuracy: ± 0,2% rdg
K-factor	L1, L2, L3	Yes
Average value		Yes
Minimum and maximum values		Yes

Power quality

Harmonics, 1 st to 15 th harmonics, odd	Current, voltage L1, L2, L3	Accuracy: ± 0,5% rng
Distortion factor THD-U in %	L1, L2, L3	Accuracy: ± 0,5% rng
Distortion factor THD-I in %	L1, L2, L3	Accuracy: ± 0,5% rng
Voltage pos./neg./zero system		Accuracy: ± 0,5% rng
Short-term interruptions	10ms	Yes
Initialisation current	10ms	Yes
Limit value event recorder		Yes



ProData® data logger

Data collection and recording

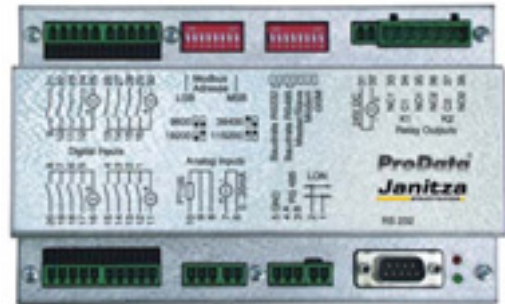
ProData® data loggers are used for the collection of any physical measurement data (temperature, pressure, operating period...) or any consumption values (electricity, water, gas, coolant...). ProData® data loggers consist of a programmable microprocessor, storage media, several interfaces and 16 channels 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. start and stop time for measurement, 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 e.g. number of switching cycles of circuit breakers or operating times for equipment which requires intensive maintenance.

Areas of application

- Data collection and recording of meter values and operational conditions
- Electricity cost data collection and cost centre management
- Analysis of process data
- Remote monitoring
- Condition monitoring
- Alarm signal when a meter reading or condition is reached

ProData® data logger

The ProData® data logger is suitable for collecting data and recording meter values, operating conditions and process data. The data can be used for analysing energy consumption, operating hours or for monitoring switch conditions and faults in buildings and companies etc. The alarm for faults or limit value violations takes place through the relay outputs, the analogue modem or field bus.



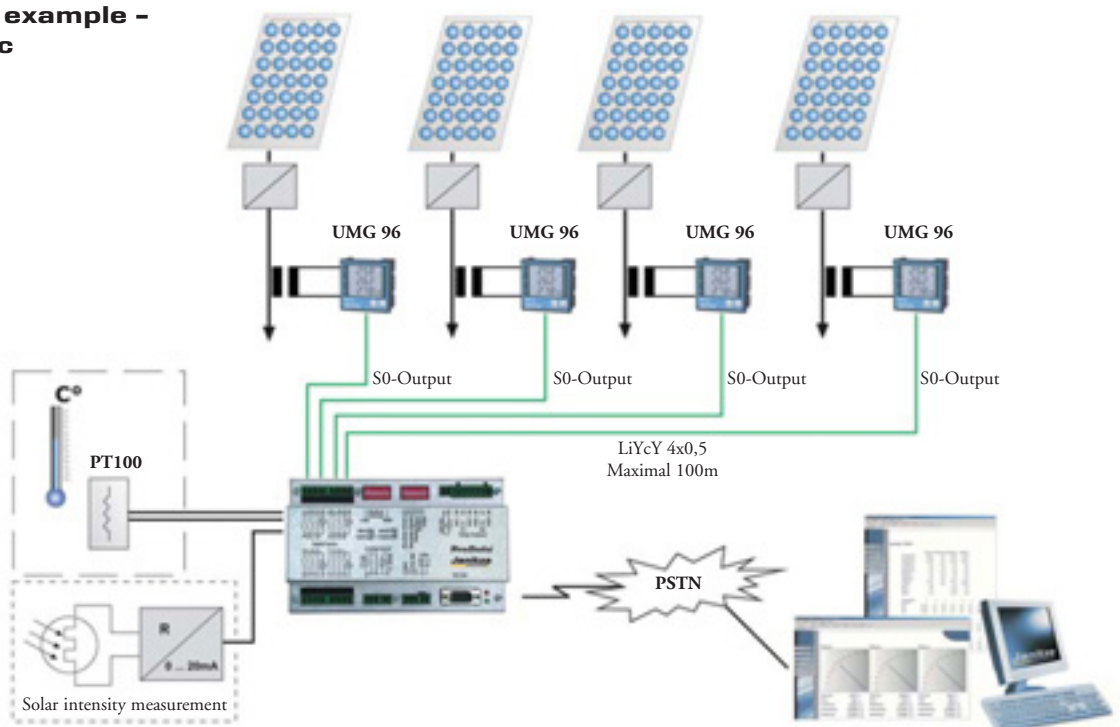
Main features

- The collection and recording of meter values, operating conditions and process data
- 16 digital inputs
- 64 bit counter
- 128 programmable comparators
- RS232, RS485, modem, LON, Modbus or Modbus-master
- 1 analogue input
- 1 temperature input
- 2 relay outputs
- 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. Condition changes to the inputs can be provided with a time stamp (1 sec resolution) and collected. Various internal events (e.g. failure and return of the electricity supply) are registered. Condition changes to the programmable limit values/alarm triggers can be recorded as an event with a time stamp. All recorded values and events are recorded in a ring buffer. This 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 or KTY83

The measurement values can be read through Modbus. The temperature measurement value and the scaled 20mA measurement values are available through LON.

Relay outputs

- 2 internal relay outputs (change over contact)
- 31 decentralised relay outputs (optional)

The relay outputs can be used as: Threshold monitoring, alarm contact and annual time switch. The ProData® can handle in Modbus-master operation up to 31 de-centralized outputs.

Digital inputs

16 digital inputs can be used as:

- An overall pulse counter at each input – maximum frequency 50Hz, 64 bit counter
- Pulse meter with automatic resetting in set time intervals between 1 sec and 12 hours or external synchronisation with automatically saved meter reading at the last reset
- Collection of all switch-on and shutdown times for each input e.g. operating hour meter/service intervals. Resolution: 1 sec, maximum time >100 years
- Monitoring function for switch-on and shutdown times
- Frequency measurement on each input for monitoring flow quantities, power etc.

The stated measurement values can be read through the Modbus. The overall meter readings are available as 32 bit values through LON. The digital inputs (4x4) can be set as pulse (S0 interface) or as signal inputs using jumpers.

Threshold comparator

The ProData® has 128 programmable comparators. These compare the input value with the upper and lower thresholds (with hysteresis) and check whether the value is within or beyond of the two threshold levels. The result can be linked to another comparator result using a logical link (AND, OR, NOT). Various actions can be taken depending upon the result. Switch-on and shutdown delays can be programmed separately.

Every internal available measurement value or register contents can be used as an input value for a comparator. In the Modbus-master operation, a measurement value or register of a slave unit can be read and used as an input value.

The following actions are possible:

- | | |
|---|---|
| ■ Switch on or switch off relay output or LED | ■ Switch on relay output or LED for a programmable time |
| ■ Set internal status marker | ■ Write the comparator result in a register of a Modbus slave |
| ■ Record event in the ring buffer | ■ Alarm through an analogue modem, text message through a GSM modem |

The internal status flags (4 pcs) can be read out through LON. The relays and LEDs can be switched through LON as well.

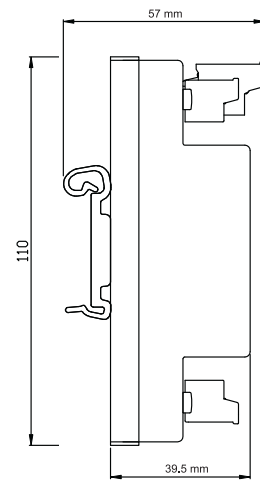
Application options

Modbus-master

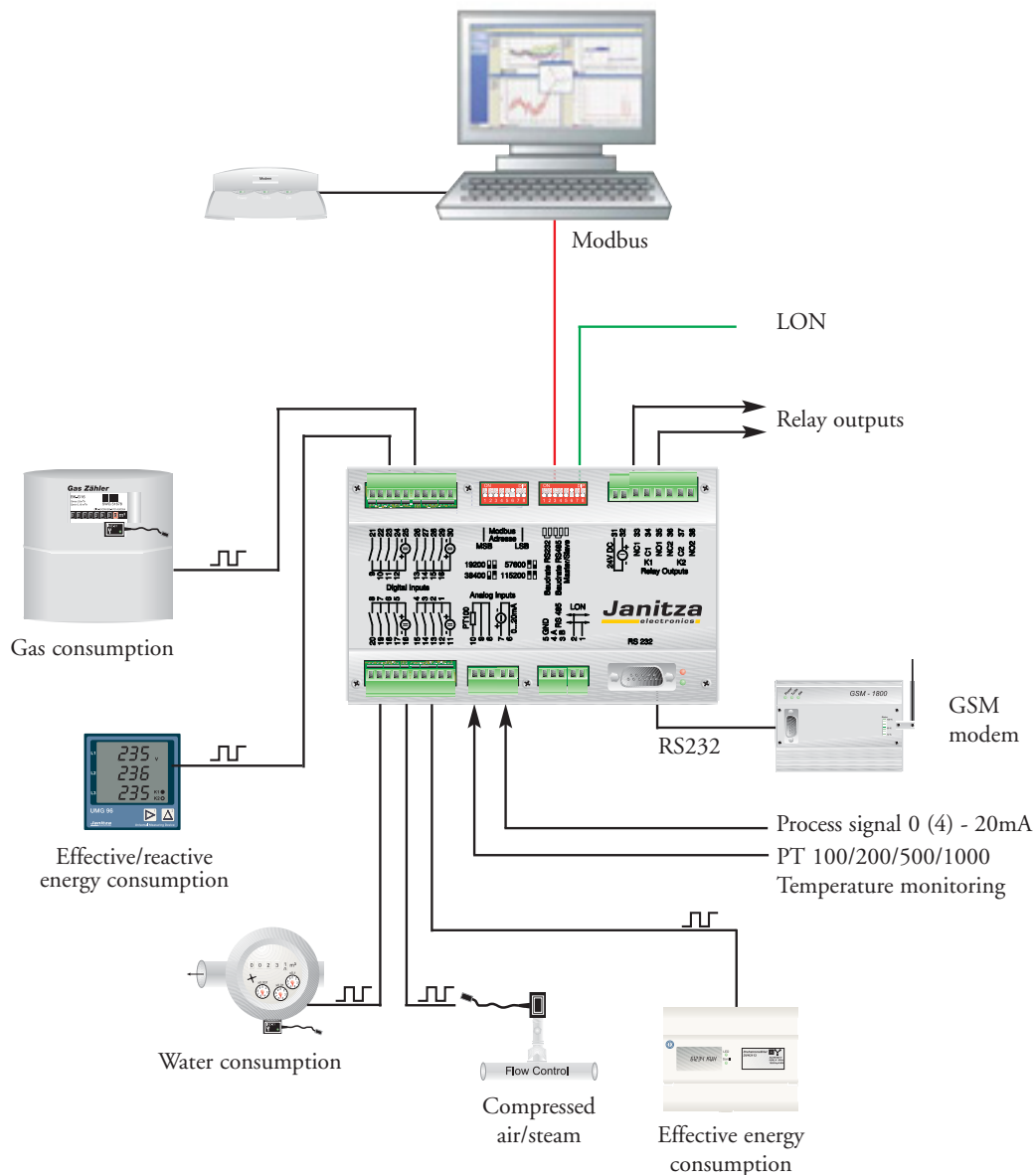
The RS485 interface can be switched in the master mode. In this mode, the ProData® registers from other Modbus units can be read (e.g. additional ProData® or UMG 503). The ProData® can also write the results of the programmable comparators in the registers of other units.

For example, this means that the number of relay outputs can be increased by connecting a corresponding module to the Modbus as a slave. In the Modbus-master mode, Modbus telegrams which enter the RS232 interface and are not intended for the ProData® are transferred to the connected slaves on the RS485 bus.

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%)
Overtoltage 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 (Kvarh), 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	-20...20mA	Accuracy: ± 0.3mA

Features		
Consumption data collection		
Memory size		430kB
Clock		± 1 minute per month
Integrated logic	128 programmable comparators	Yes
Event recording		Yes

Periphery		
Digital inputs	As status or pulse input	16 (max. 50Hz, 64 bit counter)
Relay outputs	As switch output, change over	2 (2A, 250VAC)
Temperature measurement input	Pt100, Pt200, Pt500, Pt1000, NTC10k, KTY83	1
Analogue input	-20...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
LON	FTT-10A	Yes
Protocols		
Modbus RTU		Yes
LonTalk		Yes



Prophi® power factor controller

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- 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-Power capacitors

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- Can-type capacitors in aluminium housing
- Square capacitors in steel housing
- De-tuned power capacitors in steel cabinet



Power factor correction (without reactors)

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For power factor correction (PFC) in low voltage networks with a low amount of non-linear loads, i.e. low harmonic distortion.



De-tuned power factor correction, passive harmonic filters

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- Passive harmonic filters (de-tuned reactive power compensation, tuned filters)



Dynamic (fast switching) power factor correction

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Switching times of approx. 20-30 milliseconds can be achieved with dynamic reactive power compensation systems. Reactive power compensation can be achieved in real time together with the highly dynamic power factor controller Prophi®-T

- Drawer modules for integration in existing switch boards
- Dynamic power factor correction (without reactors)
- De-tuned dynamic power factor correction (dynamic harmonic filter)

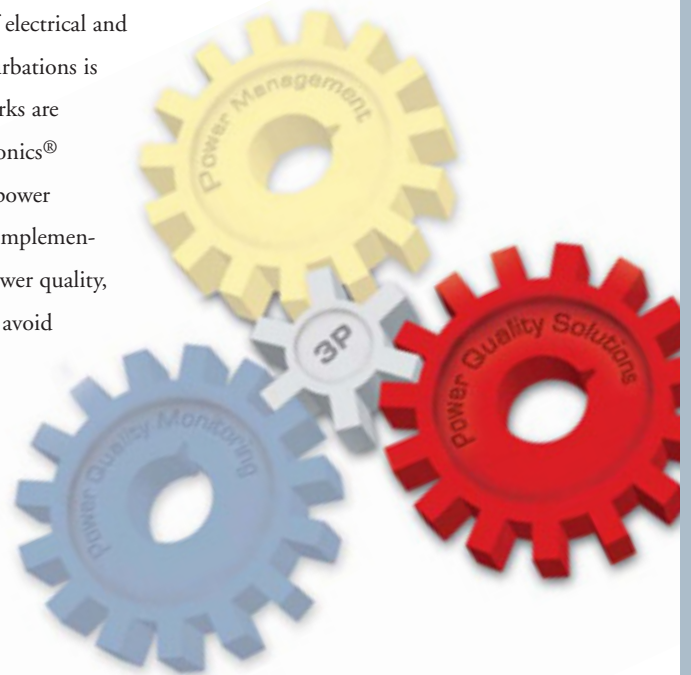


PQS - Power Quality Solutions

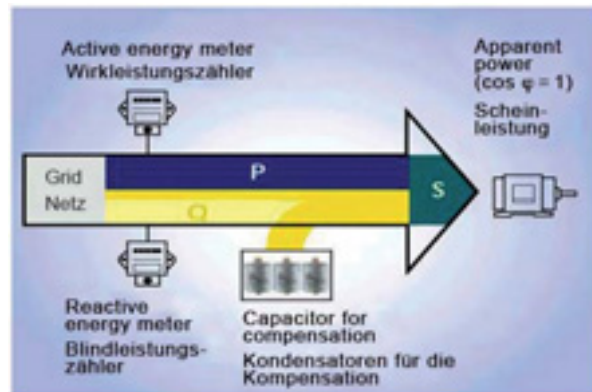
Power quality

Power quality and supply reliability are extremely important in the modern world of business. Highly sensitive equipment and working processes are heavily dependant upon precisely defined power quality. On the other hand, the number of electrical and electronic consumers with system perturbations is increasing which means that the networks are becoming more polluted. Janitza electronics® offers systems for the improvement of power quality and the necessary expertise for implementation. You, therefore, improve your power quality, save electricity, stabilise your processes, avoid production interruptions and reduce maintenance costs.

- Electricity cost savings
- Reduction of reactive power consumption
- Saving of CO₂ emissions
- Reduction of voltage drops
- Avoidance of transients
- Compensation of rapidly changing loads
- Filtering of harmonics



In power factor correction systems the reactive current and the corresponding reactive power drawn by loads will be compensated by the means of PFC capacitors.



What is reactive power?

Reactive power is necessary for the generation of electromagnetic fields. Because these fields continuously develop and reduce, the reactive power fluctuates between producers and users. In contrast to active power, reactive power cannot be used i.e. cannot be converted into another form of energy and strain the electricity supply network and the production equipment (generators and transformers). Furthermore, all energy distribution systems must be constructed larger for the allocation of reactive currents.

It is, therefore, necessary to reduce the same amount of occurring inductive reactive power near to the consumer with a capacitive reactive power. This process is called compensation. During compensation, the ratio of reactive power in the network reduces by the reactive power of the power capacitor or the PFC system. The energy generation systems and the energy transmission systems are, therefore, discharged from reactive currents.

What can be done to combat reactive power?

Energy supply companies invoice the reactive consumption whereby significantly increased costs usually occur. Reactive power compensation systems reduce the high costs for extra reactive consumption and offer the following additional advantages:

- Reduced electricity invoices through lower reactive power costs
- Reduced I^2R losses which means lower kWh consumption
- Discharge of transformers, cables and supply systems
- Increased lifespan of electrical distribution systems
- Active environment protection through the reduction of CO_2 emissions
- Improved utilization of networks i.e. additional loads (kWh) can be connected
- Voltage stabilisation (reduced apparent current reduces the voltage drops)

Prophi® power factor controller



Prophi®

Optimised control for long PFC system lifespan

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.

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 capacitor 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.

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



Illustration: Reverse of Prophi® 12RS

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.

Prophi® power factor controller



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

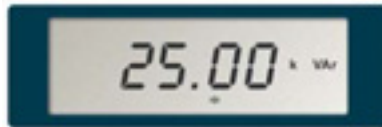
The “LEARN” function offers the opportunity to learn the connection configuration of the power factor controller and save it.

LCD display

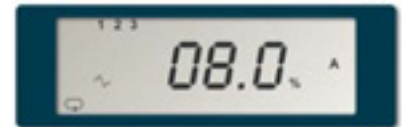
The Prophi® power factor controller has a high-quality LCD display with high contrast. Extensive measurement parameters (approx. 100 measurement values) can be displayed via LCD.



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

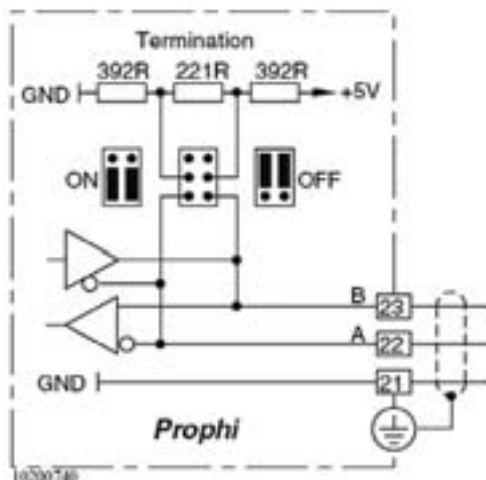


Illustration: RS485 interface terminal configuration

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® 12 T	52.08.006
6	6	●	●	●	-	-	Prophi® 6T6R	52.08.007
12	-	●	●	●	●	○	Prophi® 12RS	52.08.008
6	6	●	●	●	●	○	Prophi® 6T6RS	52.08.009
-	12	●	●	●	●	○	Prophi® 12TS	52.08.091

● = included - = not possible ○ = 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 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)		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

Prophi® power factor controller



Measurement values		
Voltage	1 phase L-N or L-L	Accuracy: $\pm 0.5\%$ rdg
Current	1 phase	Accuracy: $\pm 0.5\%$ rdg
Effective, apparent and reactive power	Sum L1-L3	Accuracy: $\pm 1\%$ rdg
cosphi	Sum L1-L3	Accuracy: $\pm 1\%$ rdg
Frequency of mains		Accuracy: $\pm 0.5\%$ rdg
Minimum and maximum values		Yes

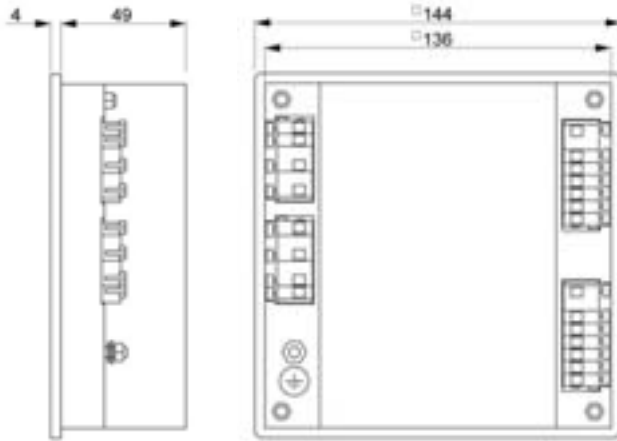
Power quality		
Harmonics 1 st to 19 th , uneven	Current, voltage 1-phase	Accuracy: $\pm 2\%$ rdg
Distortion factor THD-U in %	1-phase	Yes
Distortion factor THD-I in %	1-phase	Yes

Features		
Capacitor current		Yes
Capacitor operation 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	9.6kbps to 1.5Mbps	Yes, refer to product overview
Protocols		
Modbus RTU		Yes, refer to product overview
Profibus DP V0		Yes, refer to product overview

Dimensional drawing (all dimensions in mm)



Connection illustration



Illustration: Prophi® 12 RS– reverse side

Typical connection

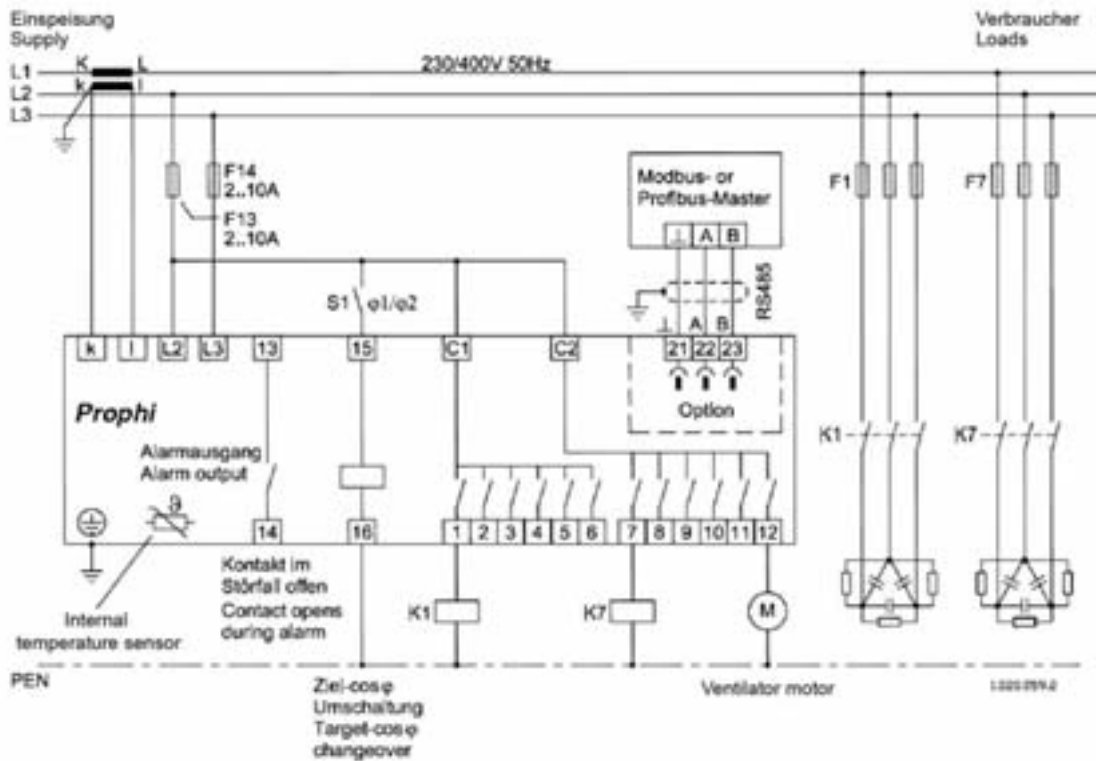


Illustration: connection example - Prophi® power factor controller 12 RS (item no. 52.08.008) with L2-L3 voltage measurement, 12 relay outputs, target cos-phi changeover, alarm output and RS485 interface.



Highest safety and long lifespan
with dry technology

PFC-Power capacitors for power factor correction allow the configuration of fixed capacitors, automatic PFC systems and harmonic filters for all requirements.

Our capacitors are designed with dry technology due to safety reasons. All capacitors are designed according to the international valid standards EN60831-1 and -2 and production is monitored in accordance with our quality management system.

Main features

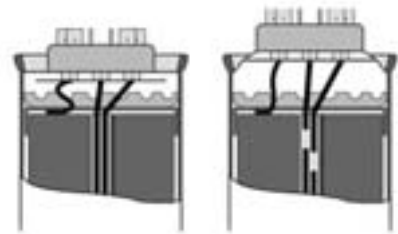
The main requirements of power capacitors are a long lifespan and a high level of safety. A quadruple safety system for optimum protection:

- Selfhealing dielectric
- Dry impregnation (PCB free)
- Over pressure tear-off fuse
- Integrated discharge resistors

The over pressure tear-off fuse: the main protection element

If voltage-related, thermal overloads or numerous breakdowns at the end of the lifespan of the capacitor lead to increased self-healing processes with the corresponding development of gas, excess pressure builds up in the capacitor. The capacitors are generally equipped with an over pressure tear-off fuse to avoid the capacitor can bursting.

This protection feature consists of nominal break points in the internal connection wires. If there is excess pressure in the capacitor, the cylindrical capacitor casing expands and the electrical supply to the active capacitor elements is irreversibly interrupted at the nominal break point.



Attention:

This safety principle is only reliably effective within the defined (specified) load and overload limits.

Technical data and limit values for power capacitors		
Standards		IEC 60831-1+2, EN 60831-1+2
Overvoltage	U_{max}	$U_n + 10\%$ (up to 8 hours each day) / $U_n + 15\%$ (up to 30 mins each day) $U_n + 20\%$ (up to 5 mins each day) / $U_n + 30\%$ (up to 1 min each day)
Excess current	I_{max}	Up to $1,3 \times I_n$ (up to $1,5 \times I_n$ combined effects from harmonics, overvoltage and capacity tolerance)
Inrush current	IS	Up to $300 \times I_n$
Losses		Approx. 0.2 Watt per kvar
Nominal frequency	f	50/60 Hz
Capacity tolerance		-5% / +10%
Test voltage (terminal/terminal)	VTT	$2.15 \times U_n$, AC, 10 s
Test voltage (terminal/casing)	VTC	Up to $U_n \leq 660$ V: 3000 VAC, 10 s, over $U_n = 660$ V: 6000 VAC, 10 s
Average life expectancy	$t_{LD(Co)}$	Up to 150 000 hours
Environmental temperature		-25/D; max temp 55 °C; max 24 hour average = 45 °C; max 1 year average = 35 °C; lowest temperature = -40 °C
Cooling		Natural or forced air cooling
Air humidity	H_{rel}	Max. 95 %
Operation height		Max. 4000m above sea level
Fixing and earth		M12 thread bolts on the housing bottom
Safety		Dry technology, over pressure tear-off fuse, selfhealing, maximum permitted fault current 10000A in accordance with UL810 standard
Discharge		Discharge resistors
Housing		Aluminium can and steel housing
Protection class		IP20, indoor (optional with terminal cover, IP54)
Dielectric		Polypropylene film
Impregnation		Dry
Number of switching cycles per year		Maximum 5000 switching cycles in accordance with IEC60831

Can-type capacitor in aluminium housing

Delta connected with discharge resistors – protection class: IP00 – frequency: 50Hz



Nominal power in kvar at a nominal voltage of:					Type	Item number	Capacity in $\mu\text{F} +10\% -5\%$	Dimensions	kg
400V	415V	440V	480V	525V					
2.4	2.6	2.9	3.5	4.17	LKT5,6-610-D52	19.02.575	3x16	D= 60mm x H= 225mm	0.7
2.5	2.7	3.0	3.6	4.3	LKT4,3-525-D52	19.02.505	3x16.6	D= 60mm x H= 150mm	0.5
3.5	3.77	4.17	5	5.9	LKT8,0-610-D52	19.02.570	3x22	D= 60mm x H= 225mm	0.8
4.8	5.2	5.8	7	8.33	LKT11,2-610-D52	19.02.549	3x32	D= 70mm x H= 225mm	0.9
5	5.4	6	7.2	8.6	LKT8,6-525-D52	19.02.510	3x33.2	D= 60mm x H= 225mm	0.8
5.8	6.3	7	8.33	10	LKT10-525-D52	19.02.550	3x38.5	D= 70mm x H= 225mm	0.8
6.25	6.8	7.6	9.0	-	LKT9,0-480-D52	19.02.511	3x41.7	D= 60mm x H= 225mm	0.7
7.2	7.8	8.7	10.5	12.5	LKT12,5-525-D52	19.02.580	3x47.9	D= 70mm x H= 225mm	1.1
8.7	9.4	10.5	12.5	15	LKT15,0-525-D52	19.02.503	3x57.7	D= 70mm x H= 265mm	1.2
7.5	8.1	9.1	10.8	-	LKT10,8-480-D52	19.02.515	3x49.9	D= 60mm x H= 225mm	0.7
10	10.8	12.1	14.4	-	LKT14,4-480-D52	19.02.517	3x66.3	D= 70mm x H= 225mm	1.1
10.8	11.6	13.1	15.5	-	LKT15,5-480-D52	19.02.516	3x71.4	D= 70mm x H= 225mm	1.1
9.3	10	11.2	-	-	LKT11,2-440-D52	19.02.519	3x61.4	D= 70mm x H= 225mm	1.1
10	10.8	12.1	-	-	LKT12,1-440-D52	19.02.520	3x66.3	D= 70mm x H= 225mm	1.1
11.7	12.5	14.1	-	-	LKT14,1-440-D52	19.02.521	3x77.3	D= 70mm x H= 225mm	1.1
12.5	13.4	15.1	-	-	LKT15,1-440-D52	19.02.525	3x82.9	D= 70mm x H= 225mm	1.1
20	-	24.2	-	-	LKT24,2-440-D52	19.02.528	3x132.6	D= 85mm x H= 285mm	2.4
23.3	25.1	28.2	-	-	LKT28,2-440-D52	19.02.526	3x154.6	D= 85mm x H= 355mm	2.5
25	26.9	30.2	-	-	LKT30,2-440-D52	19.02.527	3x165.5	D= 85mm x H= 355mm	2.6
Protection cap with cable gland construction height + 77mm					SK60	19.02.620	For power capacitors with a diameter of 60mm		
Protection cap with cable gland construction height + 75mm					SK70	19.02.621	For power capacitors with a diameter of 70mm		
Connection cap for D60/70mm with spring force clamp 2x6qmm					ASS 1	19.02.610	Height = 28mm		
Connection cap for D85mm with spring force clamp 16qmm					ASS 2	19.02.612	Height = 30.5mm		

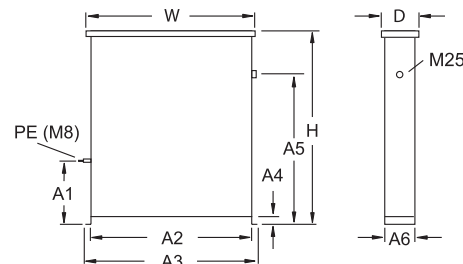


Square capacitor in steel housing

Application: mainly for fixed PFC, freestanding and for high mechanical protection
With discharge resistors – IP53 – network: 400V/50Hz – nominal capacitor voltage: 440V



LK-440V power capacitors				
Nominal power in kvar	Type	Item number	Dimensions	kg
2,5	JF440/2,5H/LK	50.61.000	H341 x W355 x D132 mm	5
5	JF440/5H/LK	50.61.050	H341 x W355 x D132 mm	5
10	JF440/10H/LK	50.61.150	H341 x W355 x D132 mm	8
12,5	JF440/12,5H/LK	50.61.200	H341 x W355 x D132 mm	8
15	JF440/15H/LK	50.61.250	H341 x W355 x D132 mm	9
20	JF440/20H/LK	50.61.350	H341 x W355 x D132 mm	10
25	JF440/25H/LK	50.61.400	H341 x W355 x D132 mm	10
30	JF440/30H/LK	50.61.450	H341 x W355 x D132 mm	15
40	JF440/40H/LK	50.61.650	H341 x W355 x D132 mm	19
50	JF440/50H/LK	50.61.700	H341 x W355 x D132 mm	19
60	JF440/60I/LK	50.61.750	H500 x W645 x D165 mm	20
70	JF440/70I/LK	50.61.780	H500 x W645 x D165 mm	20
75	JF440/75I/LK	50.61.820	H500 x W645 x D165 mm	20
80	JF440/80I/LK	50.61.860	H500 x W645 x D165 mm	21
90	JF440/90I/LK	50.61.900	H500 x W645 x D165 mm	21
100	JF440/100I/LK	50.61.945	H500 x W645 x D165 mm	21



Dimensions (mm) 2.5 kvar – 50 kvar
H=341, W=355, D=132, A1= only from 50 kvar
A2=300, A3=345, A4=15, A5=230, A6=132

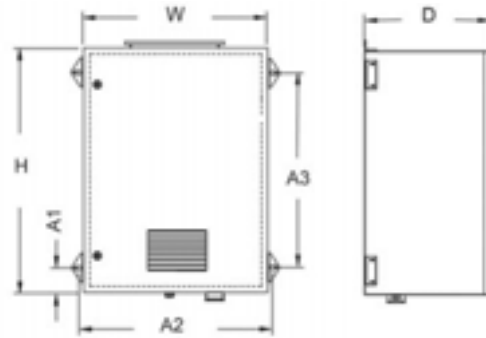
Dimensions (mm) from 60 kvar
H=500, W=645, D=165, A1=120,
A2=630, A3=680, A4=20, A5=395, A6=160

De-tuned power capacitors in steel cabinets

Application

For fixed PFC in networks with a high proportion of non-linear loads or for filtering of harmonics.

- Nominal voltage:** 400V, 3-phase, 50 Hz
- Protection class:** IP32
- Cooling:** Natural cooling – from 25 kvar with ventilators in the switchboard cabinet door
- Filter frequency:** 7 % = 189 Hz, 14 % = 134 Hz



KB4: H=600, W=400, D=210, A1=23, A2=430, A3=535
KB8: H=800, W=600, D=250, A1=23, A2=630, A3=735
 All measurements in mm.

7% De-tuning (with reactors)

LK-FK7 power capacitors				
Nominal power in kvar	Type	Item number	Dimensions	kg
5	JF440/5LK-KB4-FK7	50.24.050	H600 x W400 x D210 mm	23
10	JF440/10LK-KB4-FK7	50.24.100	H600 x W400 x D210 mm	28
12.5	JF440/12,5LK-KB4-FK7	50.24.130	H600 x W400 x D210 mm	29
20	JF440/20LK-KB4-FK7	50.24.170	H600 x W400 x D210 mm	36
25	JF440/25LK-KB8-FK7	50.24.220	H800 x W600 x D250 mm	38
30	JF440/30LK-KB8-FK7	50.24.280	H800 x W600 x D250 mm	40
40	JF440/40LK-KB8-FK7	50.24.350	H800 x W600 x D250 mm	49
50	JF440/50LK-KB8-FK7	50.24.450	H800 x W600 x D250 mm	82



Cooling determines the lifespan of the capacitor

14% De-tuning (with reactors)

LK-FK14 power capacitors				
Nominal power in kvar	Type	Item number	Dimensions	kg
5	JF525/5LK-KB4-FK14	50.25.050	H600 x W400 x D210 mm	24
10	JF525/10LK-KB4-FK14	50.25.100	H600 x W400 x D210 mm	29
12.5	JF525/12,5LK-KB4-FK14	50.25.130	H600 x W400 x D210 mm	30
20	JF525/20LK-KB8-FK14	50.25.170	H800 x W600 x D250 mm	37
25	JF525/25LK-KB8-FK14	50.25.220	H800 x W600 x D250 mm	39
30	JF525/30LK-KB8-FK14	50.25.280	H800 x W600 x D250 mm	51
40	JF525/40LK-KB8-FK14	50.25.350	H800 x W600 x D250 mm	63
50	JF525/50LK-KB8-FK14	50.25.450	H800 x W600 x D250 mm	83

Isolator or capacitor contactors available upon request.
 Other network voltages, powers, detuning and designs are available upon request.

Automatic PFC-Systems (without reactors)



Quality components for a long lifespan.

Automatic PFC-systems for central compensation in low voltage distribution boards or group compensation of system parts. Due to exclusive use of quality components from leading manufacturers, the Prophi® power factor controller, as a central control unit, guarantees the best safety and a long lifespan thanks to the years of experience in the field of PFC- systems.

PFC-systems without reactors are considered for use in applications with a low proportion of non-linear loads i.e. low harmonic loads. There are four different designs customised to suit your individual application.

Conventional and detuned automatic PFC-systems

Information

PFC-systems without reactors must **not** be used (refer to DIN EN61921 and other norms) in the following situations:

- Converter power (non-linear loads) > 15 % of the connection power
- Overall harmonic distortion of THD-U > 3 %
- Networks with de-tuned capacitors
- Critical ripple control systems within a range of 270-425Hz
- PFC output > 35% of the transformer or connection power

Technical data for automatic PFC-systems

Standards	DIN, VDE 0660 part 500, EN60439-1 and EN60831-1/2			
Design in accordance with:	DIN EN60439 part 1, partially type tested combination			
Construction form	Steel plate cabinet for KB and ES versions Mounting plate for MP version Module for MO version			
Power factor controller	Prophi® according to data sheet or selection table			
Nominal voltage	400 V, 50 Hz; other voltages upon request			
Control voltage	230 V, 50 Hz			
Capacitor voltage	440 V at 5.67 - 7 %, 525 V at 14%			
Voltage rating of the capacitor	At p=5.67 - 7 %	440 V	at p = 14%	525 V
	8 hours each day	484 V		577 V
	30 minutes each day	506 V		604 V
	5 minutes	528 V		630 V
	1 minute	572 V		682 V
Power losses	Capacitors <0.3 W/kvar, systems 4-7 W/kvar			

System design	Permitted harmonic currents		harmonic voltage	
	I 250 Hz	I 350 Hz	U 250 Hz	U 350 Hz
FK 5,67	0.565 IN	0.186 IN	5 %	5%
FK 7	0.31 IN	0.134 IN	5 %	5 %
FK 14	0.086 IN	0.051 IN	5%	5 %
Capacitor contactor switching cycles	Max 100,000 switching cycles			
Optional thyristor actuator	Unlimited switching cycles			
Current transformer connection	.. /1A, ../5A			
Nominal power/nominal current	Refer to option overview			
Switching ratio	Refer to option overview			
Discharging	With discharge resistors in accordance with EN60831-1/2			
Installation height	Up to 2000m above sea level			
Environmental temperature	According to DIN EN 60439 part 1			
Protection class	KB, ES: IP 32 and MP, MO: IP 00			
Cooling	Self-ventilating or forced ventilation depending on type			
Colour	RAL 7035			
Noise emissions (FK)	< 60 dB at a distance of 1m from the closed unit			
Connection cable diameters and fuses	Refer to option overview			

The following detuning can be applied in networks with ripple control systems:

Power utility ripple control frequency	Detuning factor	Series resonance frequency
<168Hz	p=14%	fr=134Hz
168-183Hz	p=14/5.67%	fr=134/210Hz
>228Hz	p=7%	fr=189Hz
>350Hz	p=5.67%	fr=210Hz

Compact design



Automatic PFC in compact design (without reactors)

Applications

This is a space-saving design for smaller nominal power levels and wall mounting, for grids with low harmonic content.

Nominal voltage	400 V, 3-phase, 50 Hz
Protection class	IP32
Cooling	Natural – pay attention to sufficient convection
Controller	Prophi® 6R with AUTO configuration
Reactor	No reactor

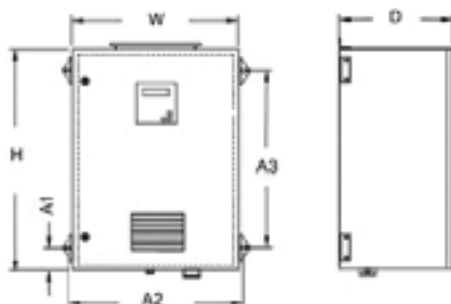


Compact design						
Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg	Version
7.5	2.5/5	1:2	JF440/7.5ER3KB4	50.39.005	25	KB4
10	2.5/2.5/5	1:1:2	JF440/10ER4KB4	50.39.015	25	KB4
12.5	2.5/5/5	1:2:2	JF440/12.5ER5KB4	50.39.030	25	KB4
15	5/10	1:2	JF440/15ER3KB4	50.39.045	26	KB4
17.5	2.5/5/10	1:2:4	JF440/17.5/ER7KB4	50.39.060	26	KB4
20	5/5/10	1:1:2	JF440/20ER4KB4	50.39.075	29	KB4
25	5/10/10	1:2:2	JF440/25ER5KB4	50.39.095	27	KB4
31	6.2/12.5/12.5	1:2:2	JF440/31ER5KB4	50.39.145	35	KB4
35	5/10/20	1:2:4	JF440/35ER7KB4	50.39.175	35	KB4
40	10/10/20	1:1:2	JF440/40ER4KB4	50.39.195	36	KB4
50	10/20/20	1:2:2	JF440/50ER5KB4	50.39.235	38	KB4
55	5/10/20/20	1:2:4:4	JF440/55ER11KB8	50.39.270	77	KB8
60	10/20/30	1:2:3	JF440/60ER6KB8	50.39.295	78	KB8
75	12/12/25/25	1:1:2:2	JF440/75ER6KB8	50.39.345	70	KB8
80	20/20/40	1:1:2	JF440/80ER4KB8	50.39.370	92	KB8
100	12/12/25/50	1:1:2:4	JF440/100ER8KB8	50.39.420	95	KB8
100	20/40/40	1:2:2	JF440/100ER5KB8	50.39.430	95	KB8
110	10/20/40/40	1:2:4:4	JF440/110ER11KB8	50.39.440	96	KB8
120	20/20/40/40	1:1:2:2	JF440/120ER6KB8	50.39.450	97	KB8

Other nominal voltages, frequencies, powers, mechanical designs or versions with circuit breaker are available upon request.

Extension units, units in ISO housing and audio frequency blocking circuits are available upon request.

Dimensional drawing



KB4: H=600, W=400, D=210, A1=23, A2=421, A3=560

KB8: H=800, W=600, D=250, A1=23, A2=620, A3=756

All measurements in mm

in modular design (without reactors)

Applications

These are automatically regulated PFC systems in steel cabinets in modular design. The output can be easily expanded inside the cabinet or with additional cabinets. For grids with low harmonic content.

Nominal voltage	400 V, 3-phase, 50 Hz
Protection class	IP32
Cooling	Natural cooling – pay attention to sufficient convection
Controller	Prophi® with AUTO configuration
Reactor	No reactor



Modular design ES8184 (W= see below x H= 1820mm x D= 400mm)						
Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg	Width
150	25/25/50/50	1:1:2:2	JF440/150ER6ES8184**	50.81.400	208	800mm
150	12/12/25/50/50	1:1:2:4:4	JF440/150ER12ES8184**	50.81.415	208	800mm
150	25/25/25...	1:1:1:1:1:1	JF440/150ER6ES8184**	50.81.425	208	800mm
160	20/20/40...	1:1:2:2:2	JF440/160ER8ES8184**	50.81.450	209	800mm
175	25/50/50/50	1:2:2:2	JF440/175ER7ES8184**	50.81.475	210	800mm
175	12/12/25/25/50...	1:1:2:2:4:4	JF440/175ER14ES8184***	50.81.490	210	800mm
180	20/40/40...	1:2:2:2:2	JF440/180ER9ES8184**	50.81.515	211	800mm
200	50/50...	1:1:1:1	JF440/200ER4ES8184**	50.81.540	212	800mm
200	25/25/50...	1:1:2:2:2	JF440/200ER8ES8184**	50.81.550	212	800mm
200	12/12/25/50...	1:1:2:4:4...	JF440/200/ER16ES8184**	50.81.560	212	800mm
200	20/20/40...	1:1:2:2:2:2	JF440/200ER10ES8184**	50.81.570	212	800mm
240	20/20/40...	1:1:2:2...	JF440/240ER12ES8184***	50.81.600	232	800mm
250	50...	1:1:1:1:1	JF440/250ER5ES8184**	50.81.625	233	800mm
250	25/25/50...	1:1:2:2...	JF440/250ER10ES8184**	50.81.635	233	800mm
250	12/12/25/50...	1:1.2:4:4...	JF440/250ER20ES8184***	50.81.645	233	800mm
300	50/50...	1:1:1:1:1:1	JF440/300ER6ES8184**	50.81.670	236	800mm
300	25/25/50...	1:1:2:2...	JF440/300ER12ES8184***	50.81.680	236	800mm
300	12/12/25/50...	1:1:2:4:4...	JF440/300ER24ES8184***	50.81.690	236	800mm
400	50/50/50...	1:1...	JF440/400ER8ES8184***	50.81.693	475	2 x 800mm
500	50/50/50...	1:1...	JF440/500ER10ES8184***	50.81.696	500	2 x 800mm
600	50/50/50...	1:1...	JF440/600ER12ES8484***	50.81.701	525	2 x 800mm
Accessories						
Socket 100mm high	SO 100/800/400			29.03.317	5	
Socket 200mm high	SO 200/800/400			29.03.322	10	

** With Prophi® 6R
*** With Prophi® 12R

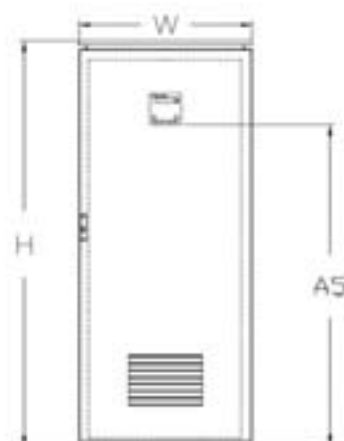
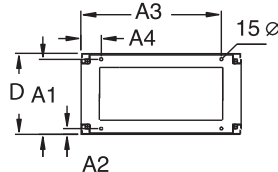
Other nominal voltages, frequencies, powers, mechanical designs or versions with circuit breakers are available upon request.

Extension units, units in ISO housing and audio frequency blocks are available upon request.

Dimensional drawing

ES8184:
H=1820, W=800, D=400,
A1=374, A2=25, A3=700,
A4=100, A5=1480

All measurements in mm





Automatic PFC system on mounting plate (without reactors)

Applications

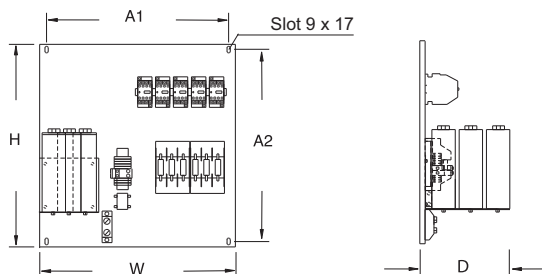
This is the compact design of a PFC system on mounting plate for installation in existing switchboard cabinets or distribution boards. For grids with low harmonic content.

Nominal voltage	400 V, 3-phase, 50 Hz
Protection class	IP00
Cooling	Natural cooling – pay attention to sufficient convection
Controller	Prophi® 6R with AUTO configuration
Reactor	No reactor

MP4, MP8 mounting plate						
Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg	Version
7.5	2.5/5	1:2	JF440/7.5ER3MP4	50.33.005	10	MP4
10	2.5/2.5/5	1:1:2	JF440/10ER4MP4	50.33.015	10	MP4
12.5	2.5/5/5	1:2:2	JF440/12.5ER5MP4	50.33.030	10	MP4
15	5/10	1:2	JF440/15ER3MP4	50.33.045	11	MP4
17.5	2.5/5/10	1:2:4	JF440/17.5/ER7MP4	50.33.060	11	MP4
20	5/5/10	1:1:2	JF440/20ER4MP4	50.33.075	14	MP4
25	5/10/10	1:2:2	JF440/25ER5MP4	50.33.095	14	MP4
31	6.2/12.5/12.5	1:2:2	JF440/31ER5MP4	50.33.145	26	MP4
35	5/10/20	1:2:4	JF440/35ER7MP4	50.33.175	26	MP4
40	10/10/20	1:1:2	JF440/40ER4MP4	50.33.195	28	MP4
50	10/20/20	1:2:2	JF440/50ER5MP4	50.33.245	29	MP4
55	5/10/20/20	1:2:4:4	JF440/55ER11MP8	50.33.270	29	MP8
60	10/20/30	1:2:3	JF440/60ER6MP8	50.33.295	30	MP8
75	12/12/25/25	1:1:2:2	JF440/75ER6MP8	50.33.345	32	MP8
80	20/20/40	1:1:2	JF440/80ER4MP8	50.33.370	35	MP8
100	12/12/25/50	1:1:2:4	JF440/100ER8MP8	50.33.420	38	MP8
100	20/40/40	1:2:2	JF440/100ER5MP8	50.33.430	38	MP8
110	10/20/40/40	1:2:4:4	JF440/110ER11MP8	50.33.440	39	MP8
120	20/20/40/40	1:1:2:2	JF440/120ER6MP8	50.33.450	40	MP8

Audio frequency blocking circuits, other nominal voltages, frequencies, outputs, mechanical designs or versions with circuit breakers are available upon request.

Dimensional drawing



MP4: H=555, W=350, D=210, A1=295, A2=555
MP8: H=750, W=550, D=250, A1=510, A2=745

All measurements in mm



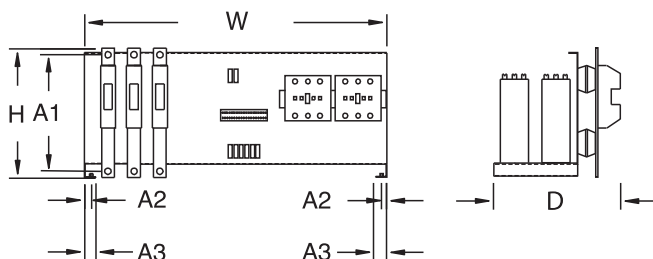
Power factor correction system on extractable module - MO84 (without reactor)**Application**

This is a ready to install extractable PFC module for installation in existing switchboard cabinets or low voltage distribution boards. The module includes capacitors, contactors, 630A bus bar system, HRC fuses and fuse sockets, discharge resistors...

Nominal voltage	400 V, 3-phase, 50 Hz
Protection class	IP00
Cooling	Natural cooling – pay attention to sufficient convection
Controller	None
Reactor	No reactor

PFC Module MO84					
Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg
50	50		JF440/50EK1MO84	50.80.700	22
50	25/25	1:1	JF440/50/2EK2MO84	50.80.740	22
50	10/20/20	1:2:2	JF440/50/3EK5MO84	50.80.770	22
50	12/12/25	1:1:2	JF440/50/3/EK4MO84	50.80.774	22
60	20/40	1:2	JF440/60/2EK3MO84	50.80.775	23
60	10/10/20/20	1:1:2:2	JF440/60/4EK6MO84	50.80.776	23
75	25/50	1:2	JF440/75/2EK3MO84	50.80.800	24
75	25/25/25	1:1:1	JF440/75/3EK3MO84	50.80.810	24
75	12/12/25/25	1:1:2:2	JF440/75/4EK6MO84	50.80.811	24
80	40/40	1:1	JF440/80/2EK2MO84	50.80.835	24
80	20/20/40	1:1:2	JF440/80/3EK4MO84	50.80.837	24
100	50/50	1:1	JF440/100/2EK2MO84	50.80.875	25
100	25/25/50	1:1:2	JF440/100/3EK4MO84	50.80.880	25
100	25/25/25/25	1:1:1:1	JF440/100/4EK4MO84	50.80.900	25
100	20/40/40	1:2:2	JF440/100/3EK5MO84	50.80.902	25
100	12/12/25/50	1:1:2:4	JF440/100/4EK8MO84	50.80.903	25
Control module with Prophi® 6R controller, Fuse separation switch, current transformer clamp and 2m connection cable (mounted on the capacitor module)				50.80.003	
Control module with Prophi® 12R controller, Fuse separation switch, current transformer clamp and 2m connection cable (mounted on the capacitor module)				50.80.004	
Accessories Module fixing rail for Rittal cabinet on the left				29.12.435	
Module fixing rail for Rittal cabinet on the right				29.12.436	

Other nominal voltages, frequencies, powers, mechanical designs or versions with circuit breakers are available upon request.

Dimensional drawing

MO84: H=330, W=703, D=333, A1=290, A2=14, A3=26.5

All measurements in mm



De-tuned power factor correction (with reactors)

Harmonic filters



Harmonic filters for improved power quality.

In electrical power networks, ranging from the industrial electricity network through to office buildings, system perturbation occur when operating electrical and electronic loads. We refer to network perturbation when the original “clean” sine wave of the voltage or current changes.

Network perturbation cause additional costs and should be limited. Janitza® offers various approaches to solutions which limit harmonic currents and therefore improve power quality. The solutions range from passive harmonic filters e.g. de-tuned PFC systems through to customized tuned harmonic filters.

Investments in harmonic filters generally pay off within 6-24 months. This means that kWh losses are reduced, reactive power costs are decreased, the lifespan of electrical instruments is lengthened and production processes are stabilised.

Improvement of power quality, energy savings and stabilisation of the power supply

The permanently increasing number of non-linear loads in our electricity networks cause rising “network impurities”. We talk about network perturbations in a similar way to the way we talk about the environment with its water and air pollution. In an ideal situation, the generators in a power plant produce a pure sinusoidal-shaped current at the output terminals. This sinusoidal-shaped voltage form is regarded as the ideal form of alternating current and any deviation from this form is described as a network perturbation. More and more consumers take a non-sinusoidal-shaped current from the network. The FFT fast-fourier transformation of these polluted currents results in a wide range of harmonic frequencies which are usually referred to as harmonics.

Harmonics are causing negative effects to electrical networks and can sometimes be dangerous. Connected loads can suffer in a way which is similar to the unhealthy effect impure water has on the human body. This results in overload, reduced lifespan and under some circumstances can even lead to premature failure of electrical and electronic components. Harmonics overloads are the main cause of invisible power quality problems with enormous maintenance costs and investments for the replacement of defective equipment. Excessive network perturbations and the resulting poor power quality can also lead to problems in production processes and can even result in production stoppages.

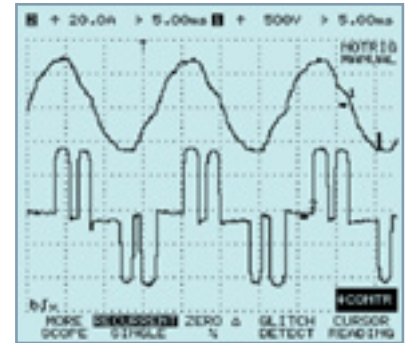


Illustration: network perturbation through a frequency converter (above: voltage; below: current)

What can you do to improve your power quality?

There are different solutions for the restriction of harmonic currents which are caused by non-linear consumers which can therefore contribute to the improvement of power quality.

De-tuned PFC systems (passive, de-tuned filter)

Passive filters and de-tuned PFC systems are some of the traditional measures. In de-tuned PFC systems, power capacitors are switched to the network individually or in groups and are regulated according to the power factor. Low-pass filters with a de-tuning factor, which is more or less dependent upon a broadband filter effect (towards high frequencies), is generated through the filter circuit reactors which are connected to the capacitor in series. This means that the occurrence of resonance is avoided and some harmonics are reduced from the network.

Advantages

Network optimisation with de-tuned PFC systems (harmonic filters) from Janitza® result in the following advantages:

- Reduction of electricity bills through the elimination of reactive power
- Reduction of electricity bills through reduced kWh losses (I^2R losses)
- Avoidance of resonance problems and significant safety risks
- Improvement of the general power quality (reduction of THD-U)
- Saving of maintenance costs
- Delay or avoidance of new investments through improved utilization of energy distribution systems and equipment
- Stabilisation of production processes
- Stabilisation of supply voltage

De-tuned power factor correction (with reactors)

Passive harmonic filters



De-tuned, automatically regulated power factor correction

Passive harmonic filters

De-tuned automatically regulated PFC (passive harmonic filters) for central compensation in low voltage distribution boards or group compensation. The exclusive use of quality components from leading manufacturers and the Prophi[®] power factor controller, as a central control unit, guarantees the best safety and a long lifespan also thanks to the years of experience in the field of PFC systems. Reactors with high linearity and low power losses reduce electricity costs.

De-tuned PFC systems are suitable for use in applications with non-linear loads i.e. harmonic loads (refer to data sheet for maximum harmonic loads).

There are four different product families customised to suit your individual application.

Compact design

De-tuned power factor correction (harmonic filters) in compact design

Applications

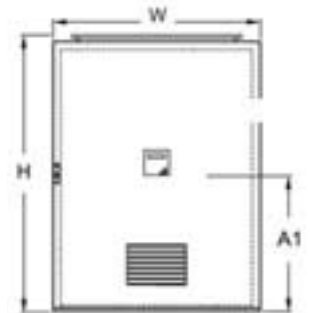
Small sized automatically regulated PFC systems for grids with harmonics.

Nominal voltage	400 V, 3-phase, 50 Hz
Protection class	IP32
Cooling	With ventilator in cabinet door from 31 kvar and above
Controller	Prophi® 6R with AUTO configuration
Reactor	5...14 %



7% De-tuning with a filter frequency of 189Hz

Compact design						
Nominal power kvar	Level power kvar	Standard ratio	Type	Item number	kg	Version
15	5/10	1:2	JF440/15ER3KB6825FK7	50.52.020	112	KB6825
20	5/5/10	1:1:2	JF440/20ER4KB6825FK7	50.52.040	113	KB6825
25	5/10/10	1:2:2	JF440/25ER5KB6825FK7	50.52.080	116	KB6825
31	6.25/12.5/12.5	1:2:2	JF440/31/ER5KB6825FK7	50.52.110	118	KB6825
35	5/10/20	1:2:4	JF440/35ER7KB6825FK7	50.52.150	122	KB6825
43.75	6.25/12.5/25	1:2:4	JF440/43.75ER7KB6825FK7	50.52.180	138	KB6825
50	10/20/20	1:2:2	JF440/50ER5KB6825FK7	50.52.210	142	KB6825
60	10/20/30	1:2:3	JF440/60ER6KB6123FK7	50.52.225	158	KB6123
75	12.5/25/37.5	1:2:3	JF440/75ER6KB6123FK7	50.52.240	167	KB6123



All measurements in mm

KB6825: W=600, H=800,

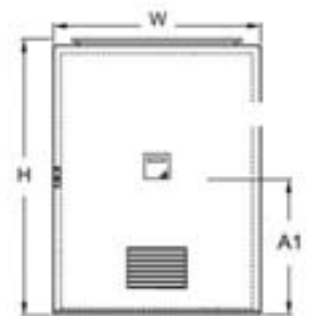
D=250, A1=410

KB6123: W=600, H=1200,

D=300, A1=655

14% De-tuning with a filter frequency of 134Hz

Compact design						
Nominal power kvar	Level power kvar	Standard ratio	Type	Item number	kg	Version
15	5/10	1:2	JF525/15ER3KB6825FK14	50.52.520	123	KB6825
20	5/5/10	1:1:2	JF525/20ER4KB6825FK14	50.52.540	124	KB6825
25	5/10/10	1:2:2	JF525/25ER5KB6825FK14	50.52.580	128	KB6825
31	6.25/12.5/12.5	1:2:2	JF525/31/ER5KB6825FK14	50.52.610	130	KB6825
35	5/10/20	1:2:4	JF525/35ER7KB6825FK14	50.52.650	134	KB6825
43.75	6.25/12.5/25	1:2:4	JF525/43.75ER7KB6825FK14	50.52.680	152	KB6825
50	10/20/20	1:2:2	JF525/50ER5KB6825FK14	50.52.710	173	KB6825
60	10/20/30	1:2:3	JF525/60ER6KB6123FK14	50.52.725	184	KB6123
75	12.5/25/37.5	1:2:3	JF525/75ER6KB6123FK14	50.52.729	195	KB6123



All measurements in mm

KB6825: W=600, H=800,

D=250, A1=410

KB6123: W=600, H=1200,

D=300, A1=655

Other nominal voltages, frequencies, outputs, reactors, mechanical designs or versions with circuit breakers are available upon request. Refer to page 137 for accessories.

Extractable modular design



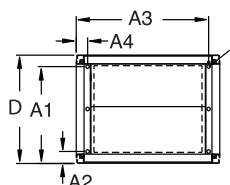
7% De-tuned PFC (harmonic filters) in extractable design

Application

These are automatically regulated PFC systems in steel cabinets constructed in extractable modular design. The output in the systems can be expanded as required. For grids with harmonics distortions.

Nominal voltage 400 V, 3-phase, 50 Hz
Protection class IP32
Cooling Ventilator in cabinet door
Controller Prophi® with AUTO configuration
Reactor 7 % (189Hz filter)

ES8206:
 H=2020, W=800 or 1600,
 D=600, A1=537
 A2=63, A3=737, A4=62, A5=1480
 All measurements in mm



Extractable modular design ES8206 FK7						
Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg	Width
60	10/20/30	1:2:3...	JF440/60ER6ES8206FK7 **	50.89.040	278	800mm
75	12/12/25...	1:1:2...	JF440/75ER6ES8206FK7 **	50.89.080	278	800mm
100	25/25/50	1:1:2	JF440/100ER4ES8206FK7 **	50.89.120	288	800mm
100	12/12/25/50	1:1:2:4	JF440/100ER8ES8206FK7 **	50.89.200	288	800mm
100	10/20/30/40	1:2:3:4	JF440/100ER10ES8206FK7 **	50.89.250	288	800mm
120	20/20/40/40	1:1:2:2	JF440/120ER6ES8206FK7 **	50.89.320	340	800mm
150	25/25/50/50	1:1:2:2	JF440/150ER6ES8206FK7 **	50.89.400	344	800mm
175	25/50/50/50	1:2:2:2	JF440/175ER7ES8206FK7 **	50.89.440	367	800mm
200	50...	1:1:1...	JF440/200ER4ES8206FK7 **	50.89.480	314	800mm
200	25/25/50...	1:1:2...	JF440/200ER8ES8206FK7 **	50.89.520	314	800mm
200	12/12/25/50...	1:1:2:4...	JF440/200ER16ES8206FK7 **	50.89.560	314	800mm
250	50...	1:1:1...	JF440/250ER5ES8206FK7 **	50.89.600	437	800mm
250	25/25/50...	1:1:2...	JF440/250ER10ES8206FK7 **	50.89.640	437	800mm
300	50...	1:1:1...	JF440/300ER6ES8206FK7 **	50.89.685	487	800mm
300	25/25/50...	1:1:2...	JF440/300ER12ES8206FK7 ***	50.89.687	498	800mm
350	50...	1:1:1...	JF440/350ER7ES8206FK7-1S ***	50.89.720	520	800mm
350	50...	1:1:1...	JF440/350ER7ES8206FK7 ***	50.89.722	352/347	1600mm
400	50...	1:1:1...	JF440/400ER8ES8206FK7-1S ***	50.89.744	570	800mm
400	50...	1:1:1...	JF440/400ER8ES8206FK7 ***	50.89.740	2x370	1600mm
450	50...	1:1:1...	JF440/450ER9ES8206FK7 ***	50.89.770	437/347	1600mm
500	50...	1:1:1...	JF440/500ER10ES8206FK7 ***	50.89.800	479/359	1600mm
550	50...	1:1:1...	JF440/550ER11ES8206FK7 ***	50.89.805	2x431	1600mm
600	50...	1:1:1...	JF440/600ER12ES8206FK7 ***	50.89.820	2x481	1600mm

Other nominal voltages, frequencies, outputs, reactors, mechanical designs or versions with circuit breakers are available upon request. Refer to page 137 for accessories.

** with Prophi® 6R, ***with Prophi® 12R

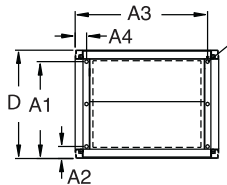
14% De-tuned PFC (harmonic filters) in extractable design

Application

These are automatically regulated PFC systems in steel cabinets constructed in extractable modular design. The output in the systems can be expanded as required. For grids with harmonics distortions.

Nominal voltage	400 V, 3-phase, 50 Hz
Protection class	IP32
Cooling	Ventilator in cabinet door
Controller	Prophi® with AUTO configuration
Reactor	14% (134Hz filter)

ES8206:
H=2020, W=800 or 1600,
D=600, A1=537,
A2=63, A3=737, A4=62, A5=1480
All measurements in mm



Extractable modular design ES8206 FK14						
Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg	Width
60	10/20/30	1:2:3	JF525/60ER6ES8206FK14**	50.93.040	317	800mm
75	12/12/25/25	1:1:2:2	JF525/75ER6ES8206FK14**	50.93.080	318	800mm
100	25/25/50	1:1:2	JF525/100ER4ES8206FK14**	50.93.120	368	800mm
100	12/12/25/50	1:1:2:4	JF525/100ER8ES8206FK14**	50.93.200	380	800mm
100	10/20/30/40	1:2:3:4	JF525/100ER10ES8206FK14**	50.93.250	387	800mm
120	20/20/40/40	1:1:2:2	JF525/120ER6ES8206FK14**	50.93.320	379	800mm
150	25/25/50/50	1:1:2:2	JF525/150ER6ES8206FK14**	50.93.400	375	800mm
175	25/50/50/50	1:2:2:2	JF525/175ER7ES8206FK14**	50.93.440	407	800mm
200	50	1:1:1:1	JF525/200ER4ES8206FK14**	50.93.480	420	800mm
200	25/25/50...	1:1:2...	JF525/200ER8ES8206FK14**	50.93.520	421	800mm
200	12/12/25/50...	1:1:2:4...	JF525/200ER16ES8206FK14**	50.93.560	371	800mm
250	50	1:1:1...	JF525/250/ER5ES8206FK14**	50.93.600	478	800mm
250	25/25/50...	1:1:2...	JF525/250ER10ES8206FK14**	50.93.640	490	800mm
300	50	1:1:1...	JF525/300ER6ES8206FK14**	50.93.685	500	800mm
300	25/25/50...	1:1:2...	JF525/300ER12ES8206FK14***	50.93.690	500	800mm
350	50...	1:1:1...	JF525/350ER7ES8206FK14-1S***	50.93.720	550	800mm
350	50...	1:1:1...	JF525/350ER7ES8206FK14***	50.93.722	424/365	1600mm
400	50...	1:1:1...	JF525/400ER8ES8206FK14-S***	50.93.740	600	800mm
400	50...	1:1:1...	JF525/400ER8ES8206FK14***	50.93.742	2x424	1600mm
450	50...	1:1:1...	JF525/450ER9ES8206FK14***	50.93.770	2x478	1600mm
500	50...	1:1:1...	JF525/500ER10ES8206FK14***	50.93.800	500/420	1600mm
550	50...	1:1:1...	JF525/550ER11ES8206FK14***	50.93.805	500/478	1600mm
600	50...	1:1:1...	JF525/600ER12ES8206FK14***	50.93.920	500/500	1600mm

Other nominal voltages, frequencies, outputs, reactors, mechanical designs or versions with circuit breakers are available upon request. Refer to page 137 for accessories.

** with Prophi® 6R, ***with Prophi® 12R

Extractable modular design



De-tuned capacitor modules (harmonic filters)

Application

These are automatically regulated PFC modules for installation in existing cabinets or low voltage distribution boards constructed in extractable modular design. The output can be expanded to 300 kvar (in series). Supply complete with set of copper bus bar links for connecting multiple modules.

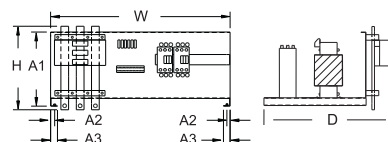
Nominal voltage	400 V, 3-phase, , 50 Hz
Protection class	IP00
Cooling	Natural – pay attention to sufficient ventilation
Controller	None
Reactor	7 % and 14 %



7% De-tuned capacitor module (189Hz)

Capacitor module MO86FK7 (width 800mm, depth 600mm)					
Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg
10	10		JF440/10EK1MO86FK7	50.88.650	24
12,5	12,5		JF440/12,5EK1MO86FK7	50.88.680	26
20	20		JF440/20EK1MO86FK7	50.88.710	33
25	25		JF440/25/EK1MO86FK7	50.88.740	33
40	40		JF440/40EK1MO86FK7	50.88.770	43
50	50		JF440/50EK1MO86FK7	50.88.800	45
20/2	10	1:1	JF440/20/2EK2MO86FK7	50.88.801	36
25/2	12,5	1:1	JF440/25/2EK2MO86FK7	50.88.830	38
30/2	10/20	1:2	JF440/30/2EK2MO86FK7	50.88.860	42
40/2	20	1:1	JF440/40/2EK2MO86FK7	50.88.890	55
40/3	10/10/20	1:1:2	JF440/40/3EK2MO86FK7	50.88.891	55
50/2	25	1:1	JF440/50/2EK2MO86FK7	50.88.930	56
75/2	25/50	1:2	JF440/75/2EK2MO86FK7	50.88.932	72
80/2	40	1:1	JF440/80/2EK2MO86FK7	50.88.933	72
100/2	50	1:1	JF440/100/2EK2MO86FK7	50.88.931	86

For cabinet depth 600mm



H=330, W=703, D=533, A1=290, A2=14, A3=26.5

All measurements in mm

14% De-tuned capacitor module (134Hz)

Capacitor module MO86FK14 (construction width 800mm, depth 600mm)					
Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg
10	10		JF525/10EK1MO86FK14	50.92.650	34
12,5	12,5		JF525/12,5EK1MO86FK14	50.92.680	35
20	20		JF525/20EK1MO86FK14	50.92.710	40
25	25		JF525/25EK1MO86FK14	50.92.740	40
40	40		JF525/40EK1MO86FK14	50.92.770	52
50	50		JF525/50EK1MO86FK14	50.92.800	54
20/2	10	1:1	JF525/20/2EK2MO86FK14	50.92.803	53
25/2	12,5	1:1	JF525/25/2EK2MO86FK14	50.92.804	60
30/2	10/20	1:2	JF525/30/2EK2MO86FK14	50.92.849	45
40/2	20	1:1	JF525/40/2EK2MO86FK14	50.92.850	67
40/3	10/10/20	1:1:2	JF525/40/3EK3MO86FK14	50.92.851	72
50/2	25	1:1	JF525/50/2EK2MO86FK14	50.92.890	69
75/2	25/50	1:2	JF525/75/2EK2MO86FK14	50.92.893	78
80/2	40	1:1	JF525/80/2EK2MO86FK14	50.92.896	78
100/2	50	1:1	JF525/100/2EK2MO86FK14	50.92.892	92

Other nominal voltages, frequencies, outputs, reactors, mechanical designs (e.g. 500mm cabinet depth) or versions with circuit breakers are available upon request. Refer to page 137 for accessories.

... Accessories

... Accessories



Controller modules

Item	Item number
Controller module with Propphi® 6R controller, 6 steps (relay outputs), Fuses, current transformer clamps and 2m connection cable (mounted on the capacitor module)	50.80.003
Controller module with Propphi® 12R controller, 12 steps (relay outputs), Fuses, current transformer clamps and 2m connection cable (mounted on the capacitor module)	50.80.004

Fixing rails for extractable modules in Rittal cabinets

Item	Item number
Fixing rail (left) for MO84 Rittal cabinets	29.12.435
Fixing rail (right) for MO84 Rittal cabinets	29.12.436
Fixing rail (left) for MO86 Rittal cabinets	29.12.431
Fixing rail (right) for MO86 Rittal cabinets	29.12.432

Cabinet socket

Item		Item number
Socket 100mm high	SO 100/800/600	29.03.325 & 326
Socket 200mm high	SO 200/800/600	29.03.327 & 319

Harmonic analyser with Ethernet connection

Item		Item number
UMG 508	With display in cabinet door	52.21.001
UMG 604E	Din rail mounting (inside the cabinet)	52.16.002
Refer to chapter 2 for other versions		

Dynamic (fast switching) power factor correction



For use with rapid and high load changes

Dynamic PFC systems are particularly used in applications with rapid and high load changes. These are automatically regulated systems for central compensation in low voltage distribution boards or for group compensation of sub-systems.

De-tuned PFC systems for use in applications with non-linear loads i.e. harmonic loads.

There are various designs customised to suit your individual application.

Applications

Dynamic PFC systems are particularly used in applications with rapid and high load changes. In such cases, conventional PFC systems are not fast enough to follow the load changes which means that these systems are either undercompensated or overcompensated.

Electromechanical contactors are not suitable for these types of frequent switching cycles. If contactors or capacitor contactors are still used in such applications, the contactors are worn out very quickly and this can lead to significant safety risks for the whole system. Dynamic PFC systems avoid this problem with the help of semiconductors. Semiconductors gently connect the capacitors to the network i.e. without network perturbations and capacitor stresses.

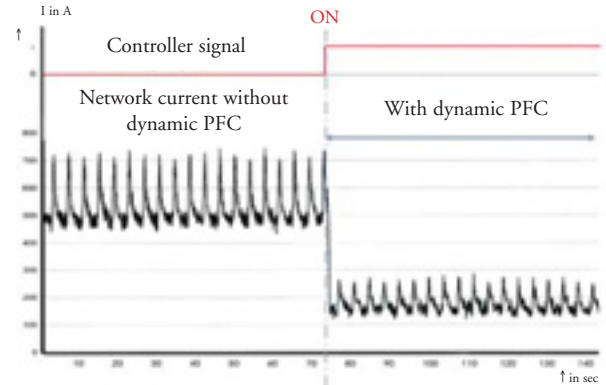


Illustration: current reduction through dynamic PFC

This results in the following advantages:

- Improved power quality i.e. high inrush currents from power capacitors are avoided
- The lifespan of PFC systems is increased
- The safety of the full system is significantly increased (i.e. damages due to defective contactors and as a result of exploding capacitors are avoided)
- Extremely rapid regulation of the power factor and therefore consequential reduction of reactive power costs and kWh losses
- Voltage stabilisation (e.g. network support during the start-up phase for large motors)
- Improved utilization for energy distribution (transformers, cable, switch gear etc.) through the elimination of power peaks
- Process times can be shortened (e.g. welding)

Typical applications

- Automobile industry (welding machines, presses...)
- Elevator systems and cranes
- Start-up compensation for larger motors
- Drilling rigs in oil production
- Wind power plants
- Welding
- Steel production
- Plastic injection moulding units
- Trawlers

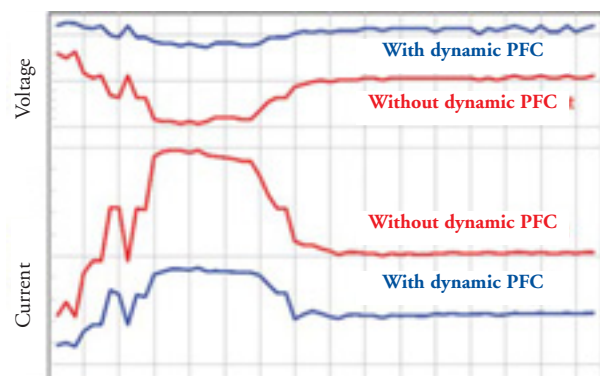


Illustration: comparison of current and voltage with and without dynamic PFC when starting up a large motor.

Extractable modular design



De-tuned dynamic capacitor module in extractable modular design

Application

Automatically regulated dynamic PFC modules in extractable design for applications with rapid and high load changes. This is an extractable module for use in existing cabinets or low-voltage main distribution systems.

Nominal voltage 400 V, 3-phase, 50 Hz
Protection class IP00
Reactor 5 ... 14%

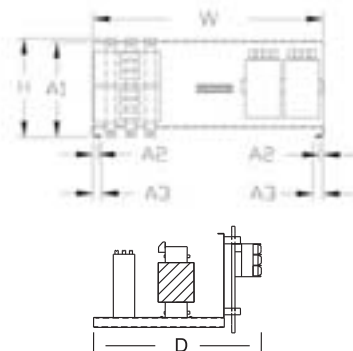


7 % Reactor

Capacitor module MO86FK7Th (width 800mm, depth 600mm)					
Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg
10	10		JF440/10EK1MO86FK7Th	50.18.650	26
12.5	12.5		JF440/12.5EK1MO86FK7Th	50.18.680	28
20	20		JF440/20EK1MO86FK7Th	50.18.710	35
25	25		JF440/25/EK1MO86FK7Th	50.18.740	35
40	40		JF440/40EK1MO86FK7Th	50.18.770	45
50	50		JF440/50EK1MO86FK7Th	50.18.800	47
20	10	1:1	JF440/20/2EK2MO86FK7Th	50.18.801	40
25	12.5	1:1	JF440/25/2EK2MO86FK7Th	50.18.830	42
30	15	1:1	JF440/30/2EK2MO86FK7Th	50.18.860	46
40	20	1:1	JF440/40/2EK2MO86FK7Th	50.18.890	57
50	25	1:1	JF440/50/2EK2MO86FK7Th	50.18.930	58
75	25/50	1:2	JF440/75/2EK2MO86FK7Th	50.18.932	76
80	40/40	1:1	JF440/80/2EK2MO86FK7Th	50.18.933	77
100	50/50	1:1	JF440/100/2EK2MO86FK7Th	50.18.931	90

14 % Reactor

Capacitor module MO86FK14Th (width 800mm, depth 600mm)					
Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg
10	10		JF525/10EK1MO86FK14Th	50.12.650	36
12.5	12.5		JF525/12.5EK1MO86FK14Th	50.12.680	37
20	20		JF525/20EK1MO86FK14Th	50.12.710	42
25	25		JF525/25EK1MO86FK14Th	50.12.740	43
40	40		JF525/40EK1MO86FK14Th	50.12.770	54
50	50		JF525/50EK1MO86FK14Th	50.12.800	56
20	10	1:1	JF525/20/2EK2MO86FK14Th	50.12.803	57
25	12.5	1:1	JF525/25/2EK2MO86FK14Th	50.12.804	64
30	15	1:1	JF525/30/2EK2MO86FK14Th	50.12.849	69
40	20	1:1	JF525/40/2EK2MO86FK14Th	50.12.850	71
50	25	1:1	JF525/50/2EK2MO86FK14Th	50.12.890	73
75	25/50	1:2	JF525/75/2EK2MO86FK14Th	50.12.893	82
80	40/40	1:1	JF525/80/2EK2MO86FK14Th	50.12.896	84
100	50/50	1:1	JF525/100/2EK2MO86FK14Th	50.12.892	96



H=330, W=703, D=550,
A1=290, A2=14, A3=26,5
All measurements in mm

Other nominal voltages, frequencies, outputs, reactors, mechanical designs or versions with circuit breakers are available upon request. Refer to page 144 for accessories.

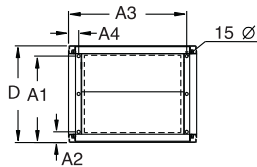
Dynamic PFC in extractable module design

Application

Automatically regulated PFC systems in extractable module design for applications with rapid and high load changes. The modules are built into steel cabinets constructed in extractable module design in which the output can be expanded as required.

Nominal voltage 400 V, 3-phase, 50 Hz
Protection class IP32
Cooling Ventilator in cabinet door
Controller Prophi® with AUTO configuration
Reactor None

ES8184:
 H=1800, W=800, D=400, A1=537,
 A2=63, A3=737, A4=62, A5=1480
 All measurements in mm



Extractable module design ES8184Th						
W=see below x H=1800mm x D=400mm						
Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg	Width
100	12.5/12.5/25/50	1:1:2:4	JF440/100ER8ES8184Th**	50.81.920	190	800mm
125	12.5/25/37.5/50	1:2:3:4	JF440/125ER10ES8184Th**	50.81.921	195	800mm
150	12.5/12.5/25/50/50	1:1:2:4:4	JF440/150ER12ES8184Th**	50.81.922	208	800mm
150	25/25/50/50	1:1:2:2	JF440/150ER6ES8184Th**	50.81.923	208	800mm
175	12.5/25/37.5/50/50	1:2:3:4:4	JF440/175ER14ES8184Th**	50.81.924	210	800mm
180	20/40/40/40/40	1:2:2:2:2	JF440/180ER9ES8184Th**	50.81.925	211	800mm
200	50/50/50/50	1:1:1:1	JF440/200ER4ES8184Th**	50.81.926	212	800mm
200	25/25/50/50/50	1:1:2:2:2	JF440/200ER8ES8184Th**	50.81.927	212	800mm
200	12.5/12.5/25/50...	1:1:2:4...	JF440/200ER16ES8184Th**	50.81.928	212	800mm
250	50/50/50/50/50	1:1:1:1:1	JF440/250ER5ES8184Th**	50.81.929	233	800mm
250	25/25/50/50/50/50	1:1:2:2:2:2	JF440/250ER10ES8184Th**	50.81.930	233	800mm
250	12.5/12.5/25/50...	1:1:2:4...	JF440/250ER20ES8184Th***	50.81.931	233	800mm
300	50/50...	1:1...	JF440/300ER6ES8184Th**	50.81.932	236	800mm
300	25/25/50...	1:1:2...	JF440/300ER12ES8184Th***	50.81.933	236	800mm
400	50/50...	1:1...	JF440/400ER8ES8184Th***	50.81.934	380	1600mm
500	50/50...	1:1...	JF440/500ER10ES8184Th***	50.81.935	460	1600mm
600	50/50...	1:1...	JF440/600ER12ES8184Th***	50.81.936	540	1600mm

Other nominal voltages, frequencies, outputs, mechanical designs or versions with circuit breakers are available upon request. Refer to page 144 for accessories.

** With Prophi® 6T *** With Prophi® 12T

Extractable modular design

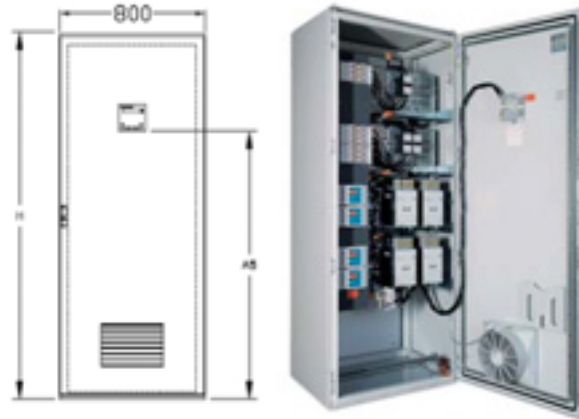


7% De-tuned dynamic PFC in extractable module design

Application

Automatically regulated PFC systems in extractable module design for applications with rapid and high load changes. The modules are built into steel cabinets constructed in extractable module design in which the power can be expanded as required. 7% reactors for networks with predominantly 3-phase non-linear loads i.e. a lower proportion of 3rd harmonics.

Nominal voltage 400 V, 3-phase, 50 Hz
Protection class IP32
Cooling Ventilator in cabinet door
Controller Prophi® with AUTO configuration
Reactor 7% (189Hz filter)



ES8206:
 H=2020, W=800, D=600, A1=537,
 A2=63, A3=737, A4=62, A5=1480
 All measurements in mm

Extractable module design ES8206 FK7Th						
W=see below x H=2020mm x D=600mm						
Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg	Width
60	10/20/30	1:2:3	JF440/60ER6ES8206FK7Th**	50.19.040	290	800mm
75	12.5/12.5/25/25	1:1:2:2	JF440/75ER6ES8206FK7 Th**	50.19.080	290	800mm
100	25/25/50	1:1:2	JF440/100ER4ES8206FK7Th**	50.19.120	306	800mm
100	20/40/40	1:2:2	JF440/100/ER5ES8206FK7Th**	50.19.160	306	800mm
100	12.5/12.5/25/50	1:1:2:4	JF440/100ER8ES8206FK7Th**	50.19.200	306	800mm
120	20/20/40/40	1:1:2:2	JF440/120ER6ES8206FK7Th**	50.19.320	362	800mm
150	25/25/50/50	1:1:2:2	JF440/150ER6ES8206FK7Th**	50.19.400	366	800mm
175	25/50/50/50	1:2:2:2	JF440/175ER7ES8206FK7Th**	50.19.440	379	800mm
200	50	1:1	JF440/200ER4ES8206FK7Th**	50.19.480	381	800mm
200	25/25/50/50/50	1:1:2:2:2	JF440/200ER8ES8206FK7Th**	50.19.520	381	800mm
200	12.5/12.5/25/50	1:1:2:4:4:4	JF440/200ER16ES8206FK7Th**	50.19.560	385	800mm
250	50...	1:1...	JF440/250/ER5ES8206FK7Th**	50.19.600	454	800mm
250	25/25/50...	1:1:2:2...	JF440/250ER10ES8206FK7Th***	50.19.640	456	800mm
300	50...	1:1...	JF440/300ER6ES8206FK7Th**	50.19.685	492	800mm
300	25/25/50...	1:1:2:2...	JF440/300ER12ES8206FK7Th***	50.19.687	496	800mm
350	50...	1:1...	JF440/350ER7ES8206FK7Th***	50.19.722	362/359	1600mm
400	50...	1:1...	JF440/400ER8ES8206FK7Th***	50.19.740	2x376	1600mm
450	50...	1:1...	JF440/450ER9ES8206FK7Th***	50.19.770	459/376	1600mm
500	50...	1:1...	JF440/500ER10ES8206FK7Th***	50.19.800	492/372	1600mm
550	50...	1:1...	JF440/550ER11ES8206FK7Th***	50.19.805	2x456	1600mm
600	50...	1:1...	JF440/600ER12ES8206FK7Th***	50.19.820	2x496	1600mm

Other nominal voltages, frequencies, outputs, reactors, mechanical designs or versions with circuit breakers are available upon request. Refer to page 144 for accessories.

** With Prophi® 6T *** With Prophi® 12T

14% De-tuned dynamic PFC in extractable module design

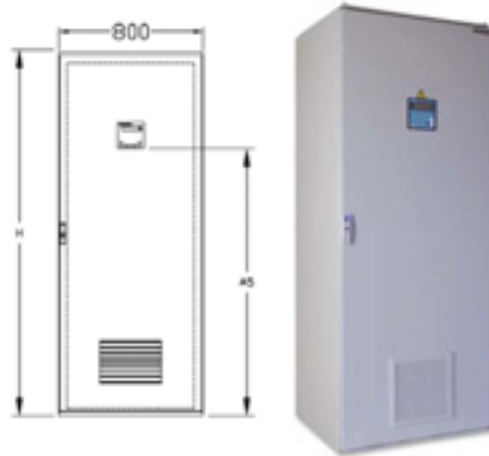
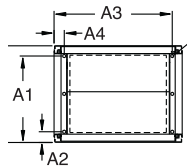
Application

Automatically regulated PFC systems in extractable module design for applications with rapid and high load changes. The modules are built into steel cabinets constructed in extractable module design in which the power can be expanded as required. 14% reactors for networks with a high proportion of 1-phase non-linear loads i.e. a high proportion of 3rd harmonics.

Nominal voltage	400 V, 3-phase, 50 Hz
Protection class	IP32
Cooling	Ventilator in cabinet door
Controller	Prophi® with AUTO configuration
Reactor	14% (134Hz filter)

ES8206:

H=2020, W=800, D=600, A1=537,
A2=63, A3=737, A4=62, A5=1480
All measurements in mm



Extractable module design ES8206 Th
W=see below x H=2020mm x D=600mm

Nominal power kvar	Step power kvar	Switching ratio	Type	Item number	kg	Width
100	12.5/12.5/25/50	1:1:2:4	JF525/100ER8ES8206FK14Th**	50.98.200	380	800mm
125	12.5/25/37.5/50	1:2:3:4	JF525/125ER10ES8206FK14Th**	50.98.325	390	800mm
150	12.5/12.5/25/50...	1:1:2:4...	JF525/150ER12ES8206FK14Th**	50.98.330	410	800mm
150	25/25/50/50	1:1:2:2	JF525/150ER6ES8206FK14Th**	50.98.400	410	800mm
175	12.5/25/37.5/50...	1:2:3:4...	JF525/175ER14ES8206FK14Th**	50.98.440	420	800mm
200	50/50/50/50	1:1:1:1	JF525/200ER4ES8206FK14Th**	50.98.480	430	800mm
200	25/25/50...	1:1:2...	JF525/200ER8ES8206FK14Th**	50.98.520	430	800mm
200	12.5/12.5/25/50...	1:1:2:4...	JF525/200ER16ES8206FK14Th**	50.98.560	435	800mm
250	50/50...	1:1...	JF525/250ER5ES8206FK14Th**	50.98.600	478	800mm
250	25/25/50...	1:1:2...	JF525/250ER10ES8206FK14Th**	50.98.640	490	800mm
250	12.5/12.5/25/50...	1:1:2:4...	JF525/250ER20ES8206FK14Th***	50.98.645	495	800mm
300	50/50...	1:1...	JF525/300ER6ES8206FK14Th**	50.98.685	500	800mm
300	25/25/50...	1:1:2...	JF525/300ER12ES8206FK14Th***	50.98.690	500	800mm
400	50/50...	1:1...	JF525/400ER8ES8206FK14Th***	50.98.742	2 x 421	1600mm
500	50/50...	1:1...	JF525/500ER10ES8206FK14Th***	50.98.800	500/421	1600mm
600	50/50...	1:1...	JF525/600ER12ES8206FK14Th***	50.98.920	2 x 500	1600mm

Other nominal voltages, frequencies, outputs, reactors, mechanical designs or versions with circuit breakers are available upon request. Refer to page 144 for accessories.

** With Prophi® 6R *** With Prophi® 12R

Capacitor modules and accessories

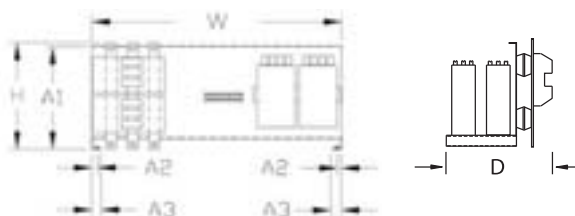


Dynamic capacitor modules without reactors (thyristor switches)

Nominal voltage	400 V, 50 Hz
Capacitor voltage	440 V, 50 Hz
Protection class	IP00
Reactor	None

Capacitor module MO84Th (width 800mm, depth 400mm)					
Nominal power kvar	Step power kvar	Switching ratio	Type	kg	Item number
50	50		JF440/50EK1MO84Th	24	50.81.700
50	25	1:1	JF440/50/2EK2MO84Th	28	50.81.740
60	20/40	1:2	JF440/60/2EK3MO84Th	28	50.80.775
75	25/50	1:2	JF440/75/2EK3MO84Th	30	50.80.800
80	40	1:1	JF440/80/2EK2MO84Th	32	50.80.835
100	50	1:1	JF440/100/2EK2MO84Th	34	50.80.875

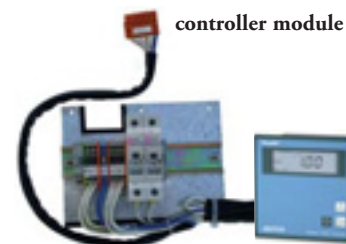
MO84:
 H=330, W=703, D=345, A1=290,
 A2=14, A3=26,5
 All measurements in mm



Accessories

Dynamic PFC accessories			
Item	Type	kg	Item number
100mm high socket	SO 100/800/600	8	29.03.325 & 326
200mm high socket	SO 200/800/600	15	29.03.327 & 319

PFC controller module	
Item	Item number
Controller module with Prophi® 6T controller, Fuse separation switch, current transformer clamp and 2m connection cable (mounted on the capacitor module)	50.10.003
Controller module with Prophi® 12T controller, Fuse separation switch, current transformer clamp and 2m connection cable (mounted on the capacitor module)	50.10.004
Fixing rails	
Fixing rail (left) for MO84 Rittal cabinets	29.12.435
Fixing rail (right) for MO84 Rittal cabinets	29.12.436
Fixing rail (left) for MO86 Rittal cabinets	29.12.431
Fixing rail (right) for MO86 Rittal cabinets	29.12.432





GridVis grid visualisation software

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- Standard supply for all devices of the UMG series, Prodata® and Prophi®
- Parameterisation, visualisation, data management and analysis



Programming language Jasic®

Page 153

- Graphic programming of user programs



OPC server

Page 154

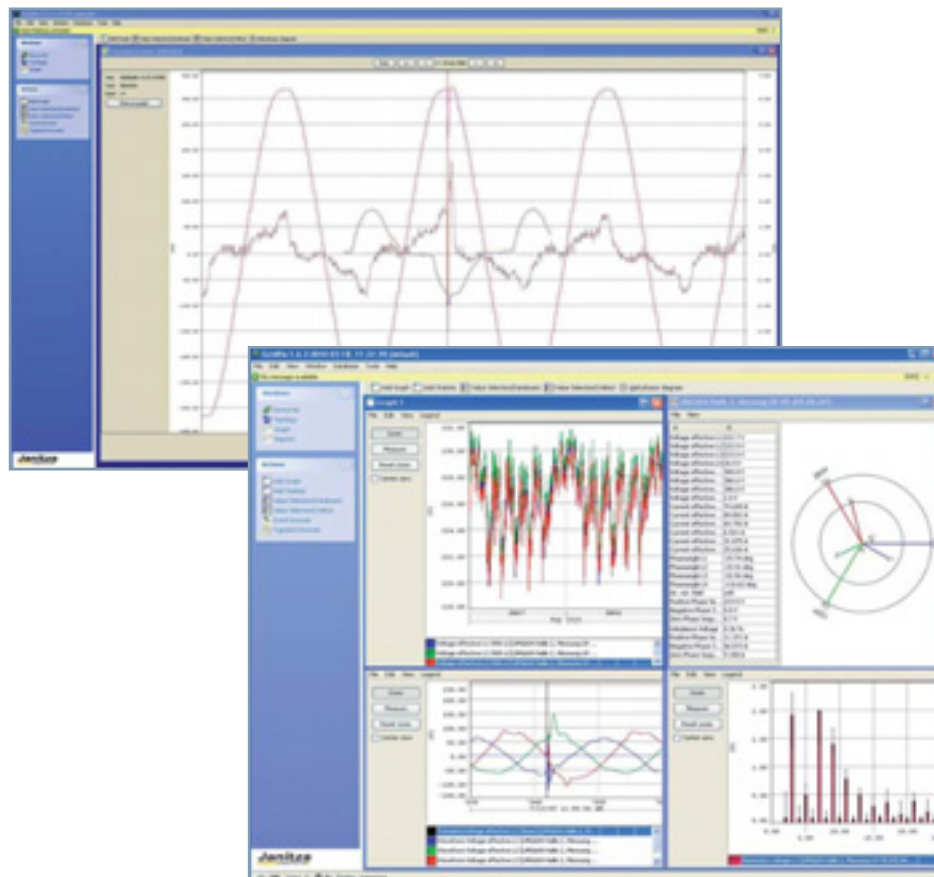
- Standardised interface to other systems
- Integration in central building control system or automation systems



MS Excel analysis tools

Page 156

- Customer specific data analysis such as cost centre analysis



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). Furthermore, a library of MS Excel macros is available for further processing and analysis of the gained measurement data.

Chapter 5

Software

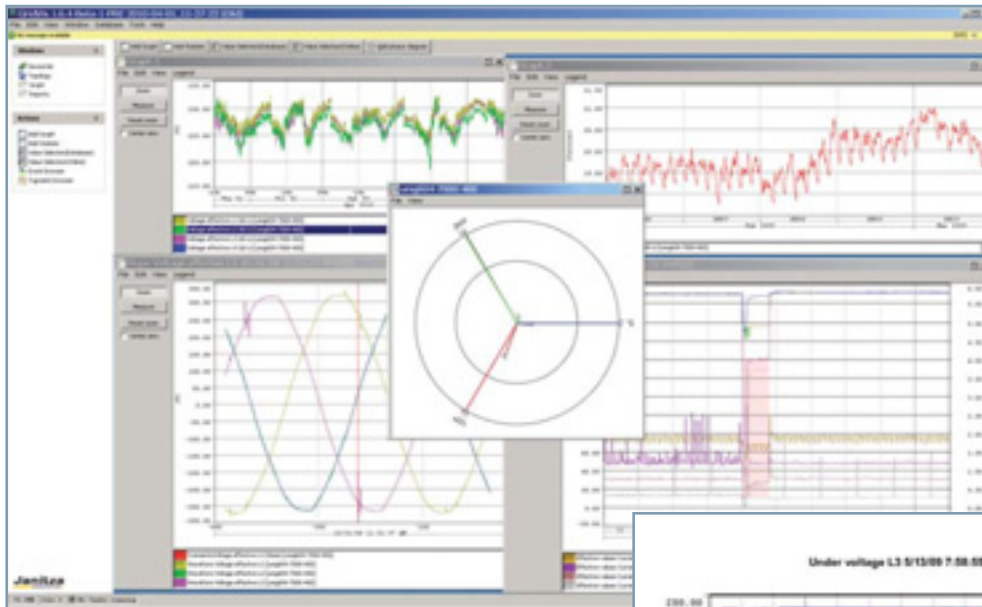


Illustration: GridVis with 4 measurement windows and phasor diagram

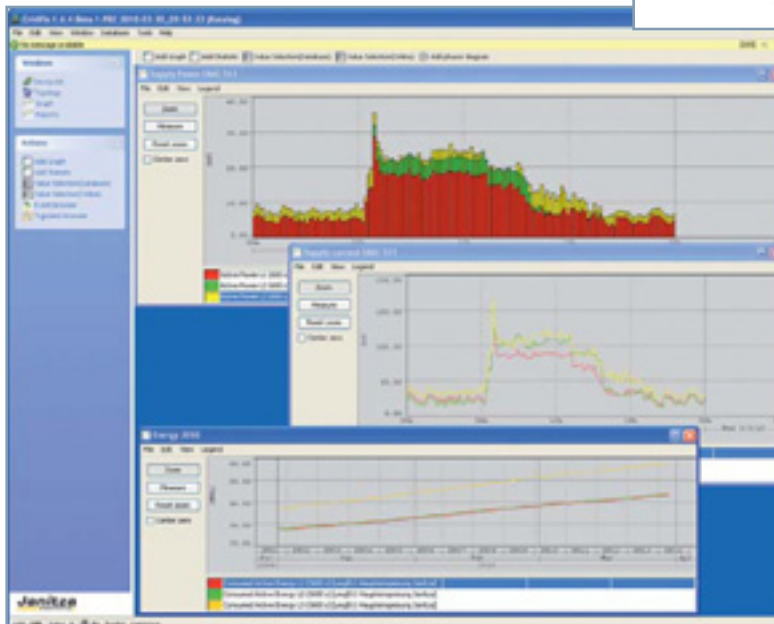
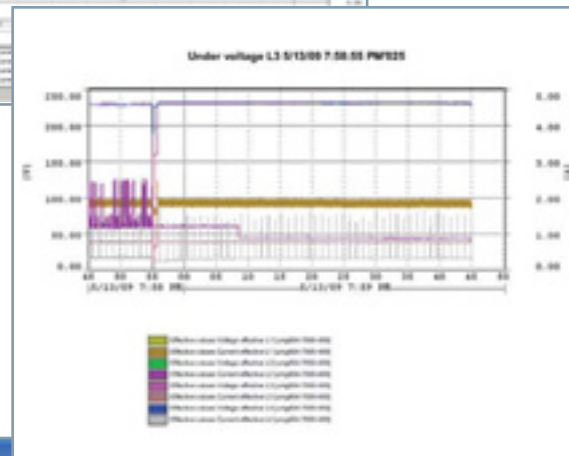


Illustration: GridVis screen with 3 historical analysis



Grid visualisation for more transparency in the network

The GridVis 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 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.

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 instruments families UMG 604, UMG 605, UMG 508 and UMG 511.



Main features

The GridVis grid visualisation software enables the following:

- Visualisation of measurement values
- Automatic ring buffer readout from the connected measurement instruments
- Storage of the data in a database
- Graphical presentation of online measurement values
- Configurable topology overview with freely selectable register levels
- Configuration of the measuring instruments
- Graphical programming of user programs or programming with Jasic® source code
- Parameterisation, visualisation, data management and analysis
- Measurement data analysis

Applications

The GridVis software has a multitude of 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



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.



Illustration: Configuration of power analyser UMG 604

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.

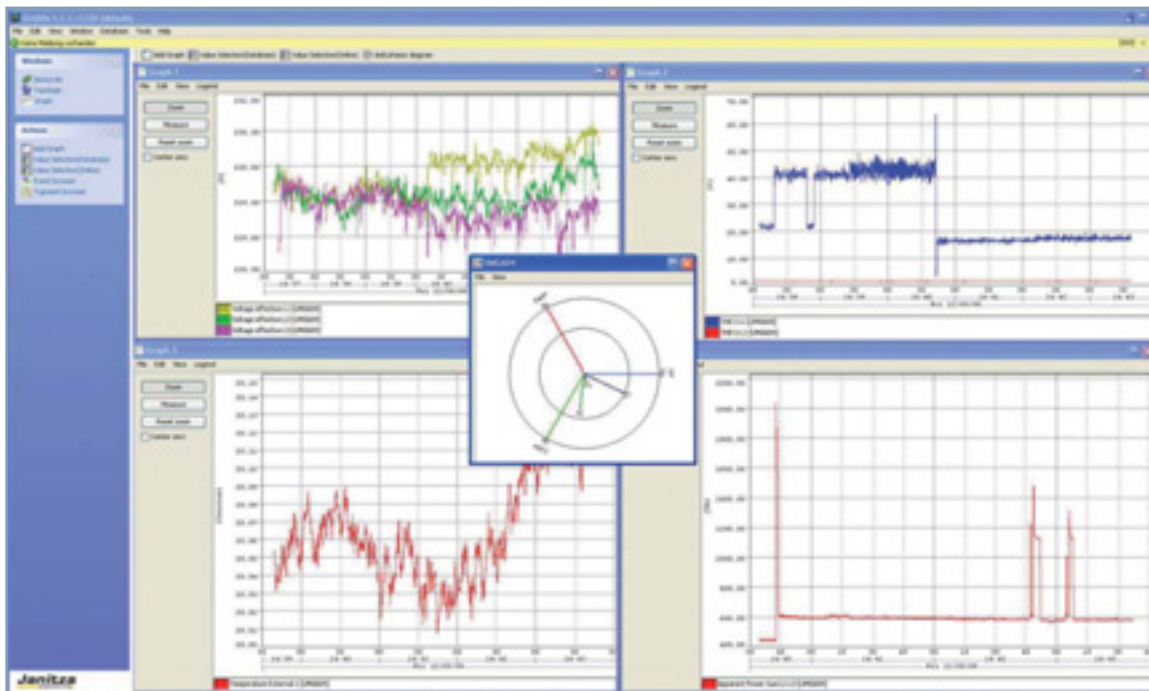


Illustration: GridVis indication of various online data

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 same 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.

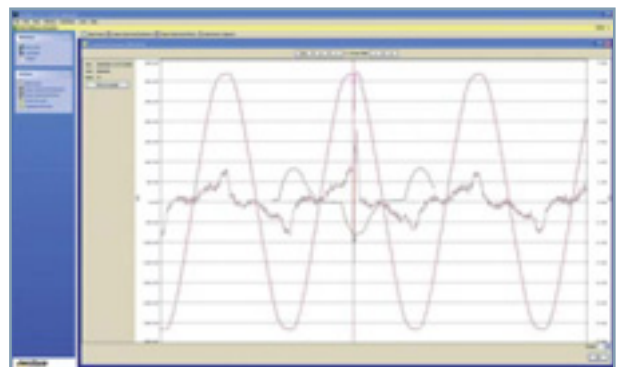


Illustration: Transient browser

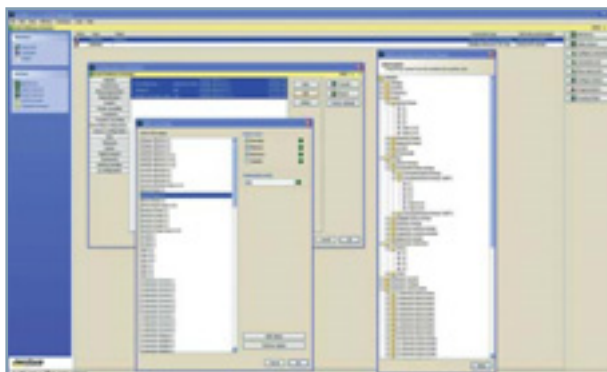


Illustration: Freely configurable data saving and average times

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

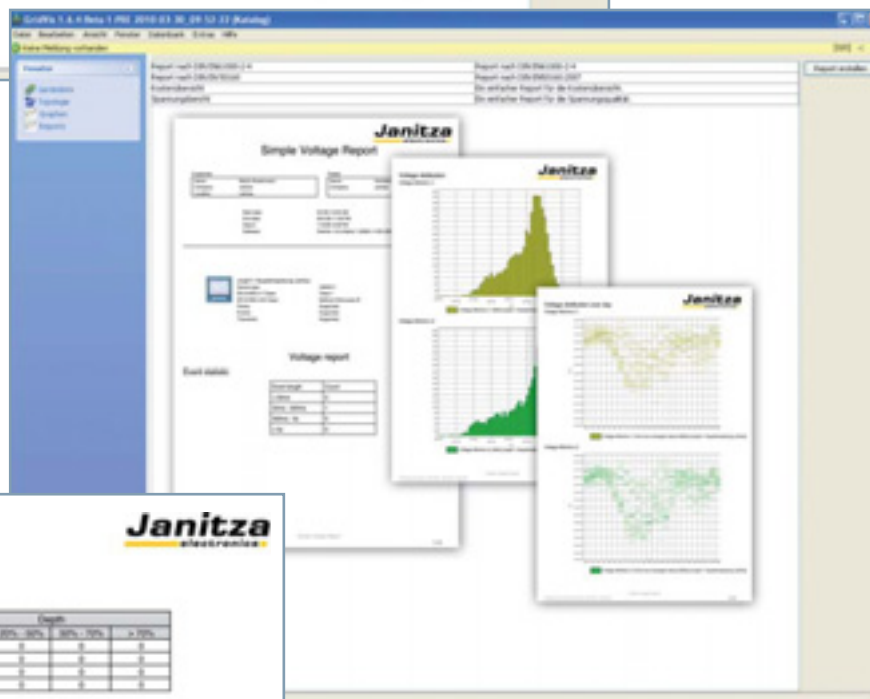
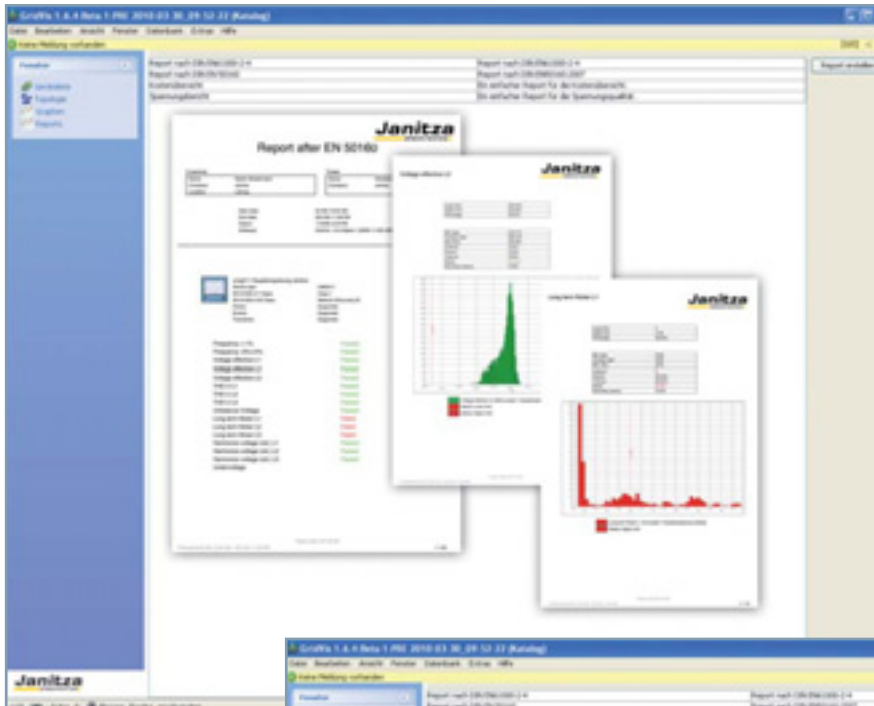
Data stored in the GridVis database can be displayed as line graphs, bar graphs or histogram. Also parameters such as year month and day are stored. Therefore, the data can be easily selected. Particularly interesting periods of time can be enlarged with the zoom feature. The graphs can be provided with 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 for optimised supply contracts. Also failure analysis by comparing various parameters can be carried out by a few mouse clicks.



Reporting and statistical functions

With the integrated reporting and statistical functions the following reports and information can be created, printed on paper or exported via HTML, Excel, images, or as PDF files.

- EN50160 Power Quality Report
- EN61000-2-4 Report
- Statistical functions
- Cost Centre Report



Janitza electronics

Undervoltage
1 Events have been found.

Category	Depth				
	< 25%	25% - 50%	50% - 75%	> 75%	> 95%
Category	0	0	0	0	0
Category	0	0	0	0	0
Category	0	0	0	0	0
Category	0	0	0	0	0

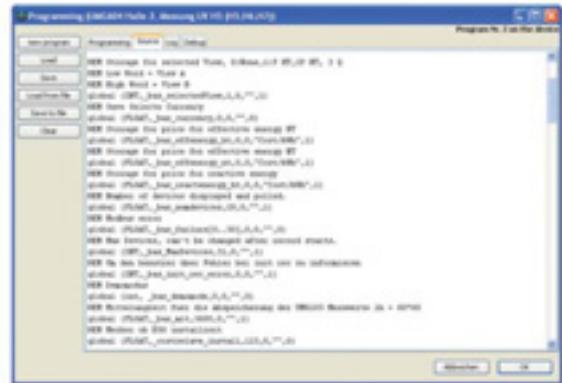
1 depth events

Category	Depth	Event	EventDate	Value	Min	Max	Min	Max
Category	Depth	Event	EventDate	Value	Min	Max	Min	Max
Category	Depth	Event	EventDate	Value	Min	Max	Min	Max

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. **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.

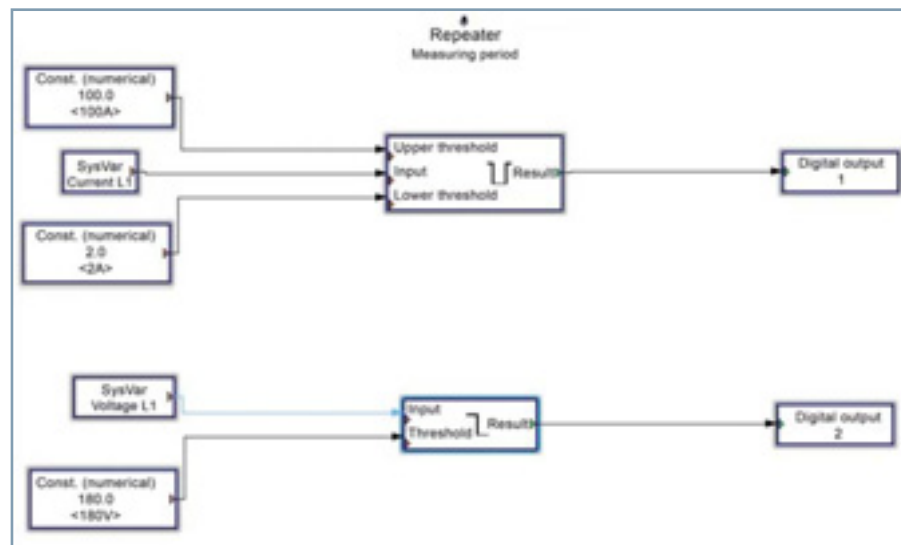


Threshold monitoring (comparator)

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, with fixed constants the upper and lower threshold values are defined. 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.



Licenses

Optional the following extension modules are available for GridVis

GridVis licence 1, item number 51.00.117

Graphic programming module – write/read Modbus

This allows the graphic programming of the UMG604 as a Modbus master for reading/writing Modbus units using the graphic programming.

GridVis licence 2, item number 51.00.118

Database driver for the Microsoft SQL server

This enables the data exchange between the GridVis and a MS-SQL server. Without this driver, the GridVis software uses the integrated Derby database.

GridVis licence 3, item number 51.00.119

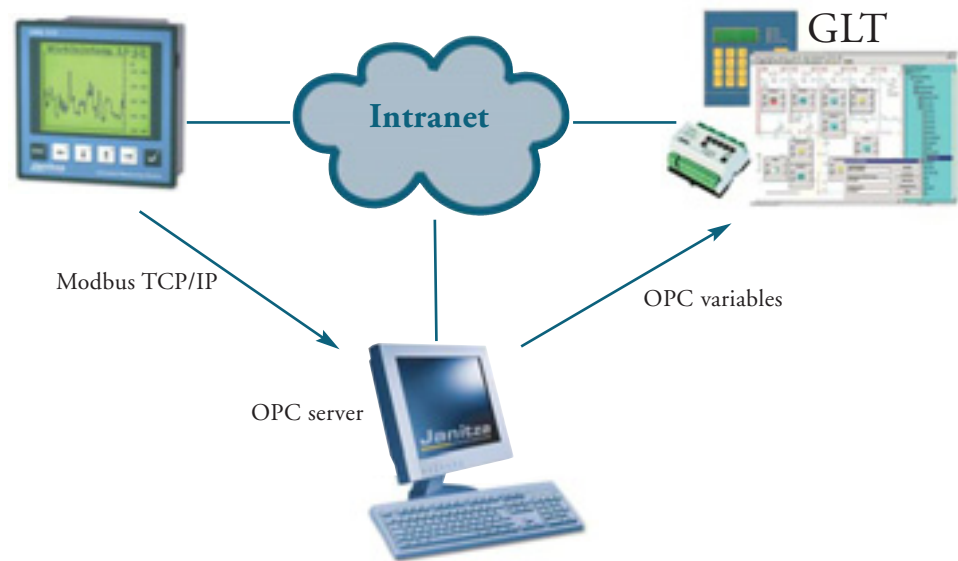
Database driver for the MySQL server

This enables the data exchange between the GridVis and a MySQL server. Without this driver, the GridVis software uses the integrated Derby database.

GridVis licence 4, item number 51.00.120

Devices driver for generic Modbus devices

In addition to devices of the Janitza-UMG-families non-Janitza devices with Modbus protocol can be integrated. Any profiles for reading out of such devices can be created.



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 serve 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.

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 is possible on this computer. If sufficient power reserves are available, the OPC server also 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 downstream measuring instruments using the RS485 (Ethernet encapsulation). This means that measurement data can be simultaneously read with GridVis and the OPC server.

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 little-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.

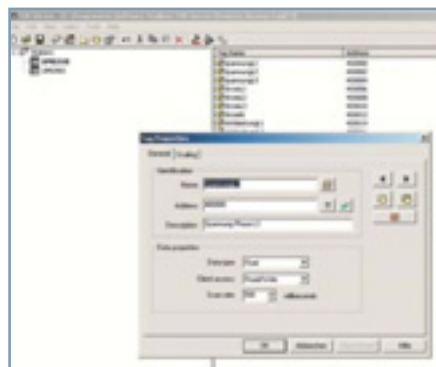


Illustration: Determining OPC variables

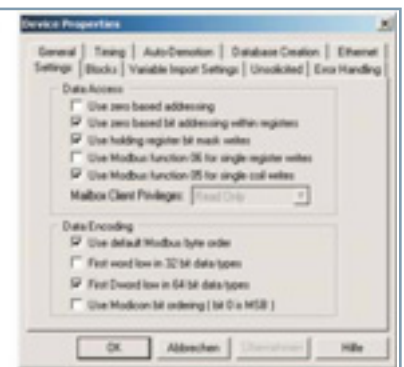


Illustration: Communication settings

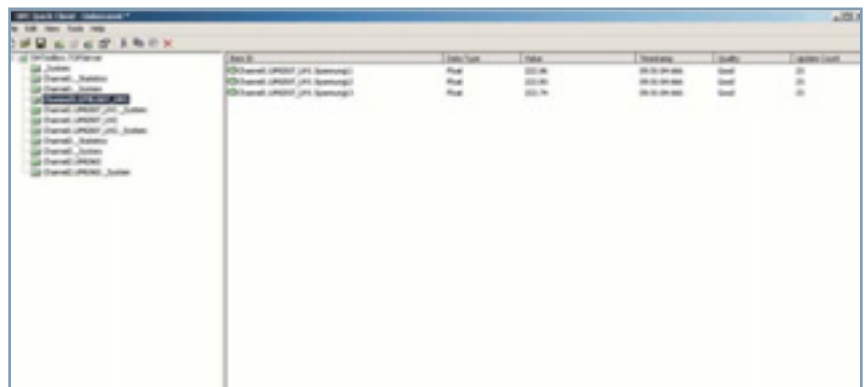


Illustration: OPC Quick Client

MS Excel analysis tools



Customer-specific MS Excel solutions

In order to be able to offer an affordable solution, e.g. for cost centre analysis, Janitza electronics® offers MS Excel solutions specific to the customer. An expensive process control solution is, therefore, superfluous. The measurement data in Janitza electronics® products also available through MS Excel macro or in the MS Excel functions. The costs per data point in MS Excel are just a fraction of the costs for a data point in process control technology.

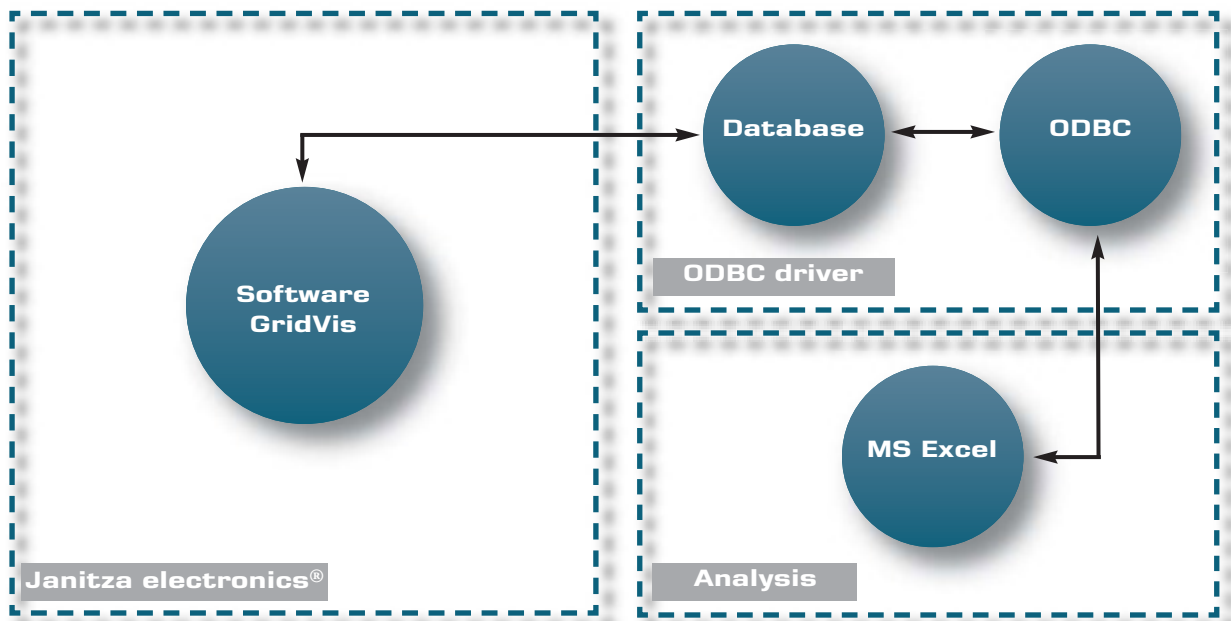
Another advantage is the maintenance of the system. Simple changes can be made by the user at any time if the user has sufficient knowledge about MS Excel. Furthermore, the MS Excel macros can be installed on as many computers as required. There are no additional license costs. Obviously a licensed MS Excel version (2003 or 2007) with the most recent service packs is a prerequisite.

MS Excel analysis

The analysis of measurement data can be carried out using the software for the instruments or additionally by using the MS Excel macros which are available as an option. The macros produce MS Excel functions similar to the familiar MS Excel function = sum (). The macros can be incorporated in MS Excel as an add-in. The macros use an ODBC driver to directly access the measuring instrument's database. Complex analysis can be created even if the user only has moderate knowledge of MS Excel.

The customer specific MS Excel solutions, which are directly created by Janitza electronics®, can program progress charts and user interfaces which are specially produced for the application. For example, it is possible to create a complete cost analysis as a PDF document with the push of a button. The integration of the building plan or the entering of a password is also possible.

You will not recognise the standard MS Excel at all. The MS Excel solutions developed by us come very close to visualisation system but only cost a fraction of the price and do not have any complicated, expensive license management. You only require a licensed version of MS Excel on the computer on which the analysis is to be carried out. The actual macros themselves can be used as required.



Main features

- Affordable, just a fraction of the cost per data point in comparison to process control visualization solutions
- View changes can be undertaken by the end customer at any time if the customer has sufficient MS Excel knowledge
- The complete functional diversity of MS Excel is available
- Many users can access the database via MS Excel at the same time
- Many programs can directly access MS Excel
- The MS Excel macros are consistently adapted to the database models of Janitza electronics®. This means that a rapid data flow rate is achieved.
- The standard MS Excel terms are used for all Janitza® MS Excel functions such as sum = (,.,...)
- A standard file with the most important analysis is available free of charge
- The software supports MS Excel 2003 and MS Excel 2007 with ribbon UI
- A user interface in the look&feel function in Office 2007 (ribbon UI) can be created



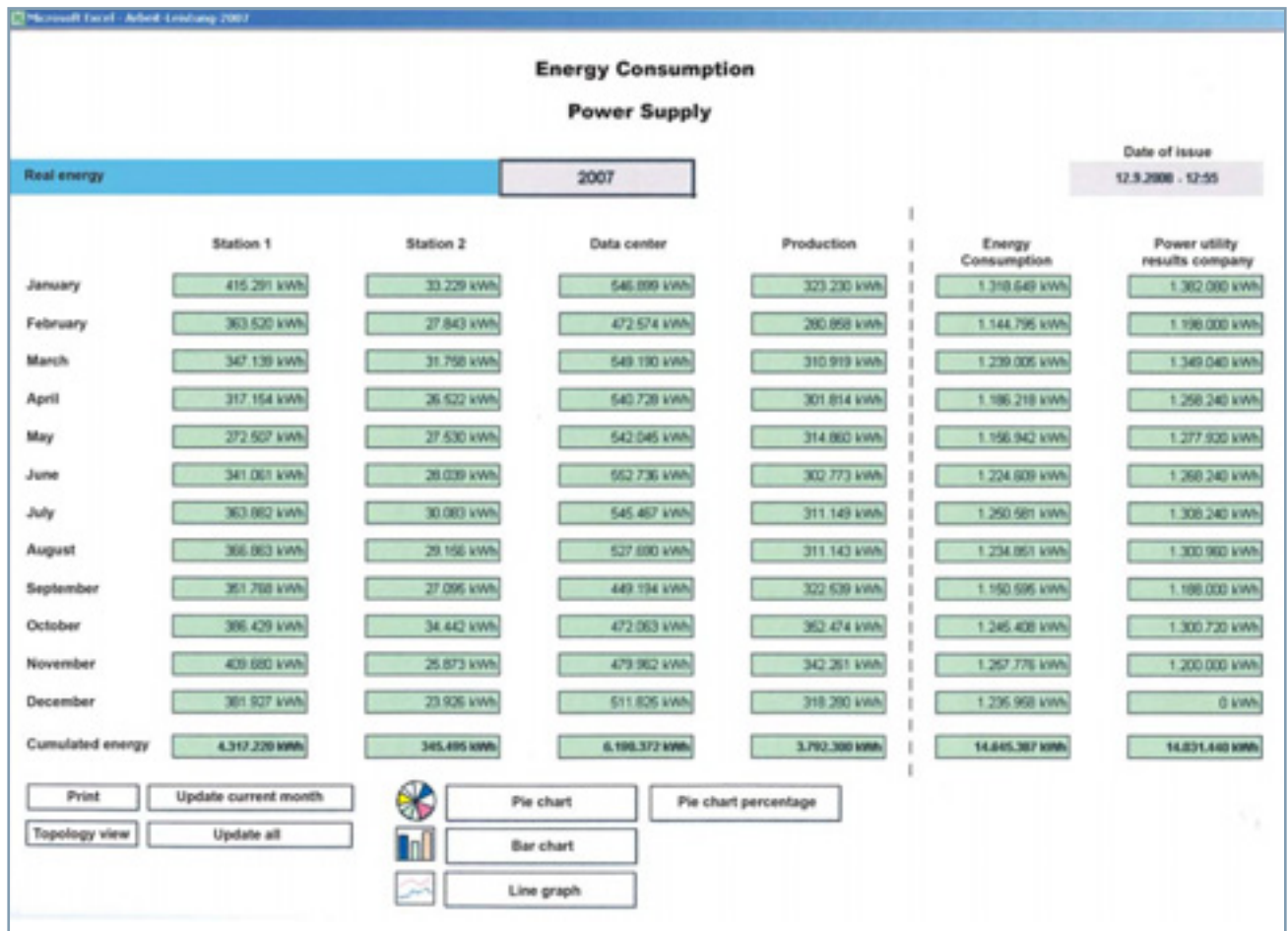
Applications

The MS Excel functions which are especially programmed for the database model offer a wide range of selection options. For example, it is possible to let the software carry out a targeted search for peak values. It is even possible to create an average value over any period of time and to create the maximum value of a measurement parameter. The loading of a transformer can also be identified at an early stage. Here is a small selection of the possible functions:

- AverageValue: provides the average value of a measurement parameter in a month
- AverageDates: provides the average value of a measurement parameter within the time range
- Maximum: provides the maximum value of a measurement parameter in a month
- MaximumDates: provides the maximum value of a measurement parameter within the time range
- MaximumDate_time_month: provides the date and time of the maximum value
- Minimum: provides the minimum value of a measurement parameter in a month
- MinimumDates: provides the minimum value of a measurement parameter within the time range
- MinimumDate_time_month: provides the date and time of the minimum value
- ConsumedRealEnergy: provides the effective energy drawn in a month
- ConsumedRealEnergyDates: provides the effective energy drawn within the time range
- Get_AvgValues_oneMonth: this function produces a list with measurement values for a month.

A total of more than 50 functions are available

Example of an application implemented with macros

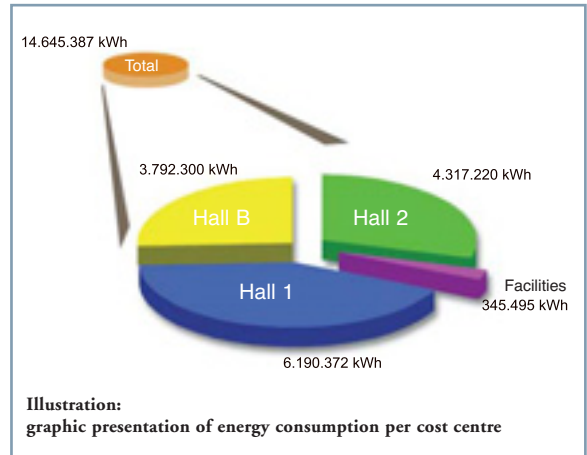


MS Excel VBA

VBA (Visual Basic for applications) is an independent, object-orientated programming language for MS Office applications. It serves the purpose of expanding the extent of functions of MS office products. Through the use of these programs (macros), MS Excel becomes even more powerful because MS Excel tables can be automated for example.

Who can benefit from the MS Excel analysis tools?

Analysis tools are applied when functions of the GridVis software systems are not sufficient. They, therefore, make sense for complex cost centre analysis, large-scale applications and when measurement data has to be compared with certain specifications. The MS Excel analysis tools can be an affordable introduction to the world of process control technology for medium-sized companies which do not have their own building automation and visualisation. But MS Excel analysis tools can also offer an option to make necessary data accessible to all members of staff in large companies in which all employees may not have access to building automation. This means that consumption levels and power peaks can easily be passed on to controlling in customer specific form or invoices can be issued directly from MS Excel if the MS Excel sheet already has an invoice template.



Function

The macros take the respective measurement data from the database created by GridVis and enter it in an MS Excel document. The time periods, for example, are now simply entered and the respective measurement values, consumptions, costs or other values calculated by MS Excel are issued as a graph or table. All MS Excel instruments are available for creating the MS Excel documents. The MS Excel macro is incorporated in MS Excel as an add-in. This can be used to create graphics of the building complex or systems. Set function keys can be used to zoom in on individual buildings or building parts in order to be able to monitor the incurred costs, consumptions or any other measurement data.

Configuration cost center															
Unit type	kWh	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 - K14 Reading Power Utility	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 - K15 Press 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3 - K16 Press 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
4 - K17 Press 3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5 - K18 Distribution panel 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6 - K19 Fan	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
7 - K10 Workshop 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8 - K11 Workshop 2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9 - K12 Workshop 3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10 - K13 Aircondition 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
11 - K14 Aircondition 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
12 - K15 Aircondition 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
13 - K16 Aircondition 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
14 - K17 Aircondition 1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sum (kWh)	0 kWh	0 kWh	0 kWh	0 kWh	0 kWh	0 kWh	0 kWh	0 kWh	0 kWh	0 kWh	0 kWh	0 kWh	0 kWh	0 kWh	0 kWh

Buttons: Back, Print, Update, Show configuration, Hide configuration

Illustration: configuration of costs centres



Advantages

The data are made available as measured in the databases of the various software systems of Janitza electronics® GmbH. However, in the MS Excel analysis tools any computing processes can be undertaken which are provided by MS Excel. The measurement data from the macros can be reprocessed in formulas. This means that the facility manager has almost unrestricted options for analysis e.g. for the comparison with reference data, for percentage distributions, for comparisons of various properties or any graphs etc. This means that the customer is no longer tied to the rigid functions of ready to use software and can either create MS Excel sheets himself, whereby Janitza electronics® GmbH provides the macros, or he can allow Janitza electronics® GmbH to undertake programming of complete solutions (service against payment at very reasonable charges).

UMG 503/505/507 energy consumption weekdays										
Time	Monday 11.02.2007		Tuesday 12.02.2007		Wednesday 13.02.2007		Thursday 14.02.2007		Friday 15.02.2007	
	Consumption	amount	Consumption	amount	Consumption	amount	Consumption	amount	Consumption	amount
1 00:00:00 bis 01:00:00	13 kWh	1,95 €	11 kWh	1,70 €	12 kWh	1,79 €	13 kWh	1,98 €	12 kWh	1,86 €
2 01:00:00 bis 02:00:00	11 kWh	1,67 €	11 kWh	1,64 €	11 kWh	1,64 €	11 kWh	1,65 €	11 kWh	1,67 €
3 02:00:00 bis 03:00:00	13 kWh	1,95 €	12 kWh	1,84 €	12 kWh	1,80 €	12 kWh	1,87 €	12 kWh	1,87 €
4 03:00:00 bis 04:00:00	13 kWh	1,98 €	12 kWh	1,74 €	12 kWh	1,73 €	12 kWh	1,80 €	12 kWh	1,82 €
5 04:00:00 bis 05:00:00	12 kWh	1,85 €	12 kWh	1,76 €	12 kWh	1,75 €	12 kWh	1,79 €	12 kWh	1,83 €
6 05:00:00 bis 06:00:00	12 kWh	1,87 €	15 kWh	2,18 €	14 kWh	2,05 €	15 kWh	2,18 €	14 kWh	2,15 €
7 06:00:00 bis 07:00:00	13 kWh	1,91 €	33 kWh	4,93 €	23 kWh	3,41 €	23 kWh	3,40 €	33 kWh	4,91 €
8 07:00:00 bis 08:00:00	11 kWh	1,66 €	39 kWh	5,87 €	32 kWh	4,79 €	33 kWh	4,93 €	40 kWh	5,99 €
9 08:00:00 bis 09:00:00	12 kWh	1,85 €	42 kWh	6,25 €	41 kWh	6,15 €	41 kWh	6,08 €	43 kWh	6,49 €
10 09:00:00 bis 10:00:00	12 kWh	1,81 €	40 kWh	6,07 €	40 kWh	6,05 €	41 kWh	6,17 €	42 kWh	6,30 €
11 10:00:00 bis 11:00:00	12 kWh	1,80 €	40 kWh	6,03 €	41 kWh	6,09 €	41 kWh	6,14 €	42 kWh	6,24 €
12 11:00:00 bis 12:00:00	12 kWh	1,74 €	41 kWh	6,12 €	40 kWh	6,01 €	42 kWh	6,24 €	41 kWh	6,19 €
13 12:00:00 bis 13:00:00	12 kWh	1,81 €	41 kWh	6,10 €	42 kWh	6,24 €	41 kWh	6,18 €	42 kWh	6,26 €
14 13:00:00 bis 14:00:00	11 kWh	1,58 €	36 kWh	5,43 €	37 kWh	5,56 €	39 kWh	5,81 €	37 kWh	5,51 €
15 14:00:00 bis 15:00:00	13 kWh	1,93 €	42 kWh	6,34 €	42 kWh	6,36 €	43 kWh	6,44 €	42 kWh	6,23 €
16 15:00:00 bis 16:00:00	12 kWh	1,79 €	40 kWh	6,06 €	41 kWh	6,17 €	42 kWh	6,33 €	42 kWh	6,34 €
17 16:00:00 bis 17:00:00	12 kWh	1,78 €	40 kWh	6,06 €	42 kWh	6,21 €	41 kWh	6,21 €	42 kWh	6,33 €
18 17:00:00 bis 18:00:00	12 kWh	1,74 €	42 kWh	6,36 €	42 kWh	7,23 €	49 kWh	7,39 €	42 kWh	6,30 €
19 18:00:00 bis 19:00:00	12 kWh	1,73 €	51 kWh	7,69 €	52 kWh	7,86 €	51 kWh	7,68 €	52 kWh	7,77 €
20 19:00:00 bis 20:00:00	10 kWh	1,55 €	48 kWh	7,20 €	48 kWh	7,20 €	48 kWh	7,25 €	48 kWh	7,14 €
21 20:00:00 bis 21:00:00	12 kWh	1,81 €	26 kWh	3,94 €	24 kWh	3,59 €	27 kWh	4,09 €	27 kWh	3,99 €
22 21:00:00 bis 22:00:00	12 kWh	1,77 €	13 kWh	1,91 €	13 kWh	2,00 €	14 kWh	2,10 €	13 kWh	1,86 €
23 22:00:00 bis 23:00:00	12 kWh	1,85 €	14 kWh	2,03 €	13 kWh	2,00 €	14 kWh	2,12 €	13 kWh	2,02 €
24 23:00:00 bis 24:00:00	12 kWh	1,82 €	13 kWh	1,90 €	13 kWh	1,91 €	13 kWh	1,90 €	13 kWh	1,91 €
Total	767 kWh	43,08 €	714 kWh	987,17 €	783 kWh	105,49 €	718 kWh	107,64 €	727 kWh	105,10 €

Illustration: actual comparison of energy consumption

Procedures

In order to be able to create MS Excel solutions specific to the customer, Janitza electronics® needs a specification in which the functions of the MS Excel analysis tools are described. The costs are exclusively based on the time needed for programming. These costs can be kept low with active cooperation e.g. the customer provides prepared tables or building plans in MS Excel. Our sales team is pleased to support you and work together with you on a suitable and affordable solution.



Current transformers

Page 164

- Moulded case current transformer class 1
- Moulded case current transformer class 0.5
- Summation current transformer
- Cable split core current transformer
- Split core current transformer
- DIN rail current transformer
- Voltage transformer



Mechanical and electronic accessories

Page 176

- Adapters for DIN rail mounting
- Blank cover
- Connectors
- Terminal strips



IT/field bus components

Page 180

- USB to RS232 adapter cable converter
- RS 232 to RS 485 converter
- Star repeater
- WAGO I/O
- Field bus modules
- M-Bus converter
- Ethernet switch
- ISDN router
- PowerToStore (mini UPS)



NTP server

Page 192

- For time synchronisation of the measuring instruments



Database server

Page 194

- Individual server solutions



Touch panels (HMI)

Page 198

- For visualisation of measurement values and energy data at site from 3.5" to 15"



Accessories

The respective communication systems are necessary for the development of extensive energy management systems.

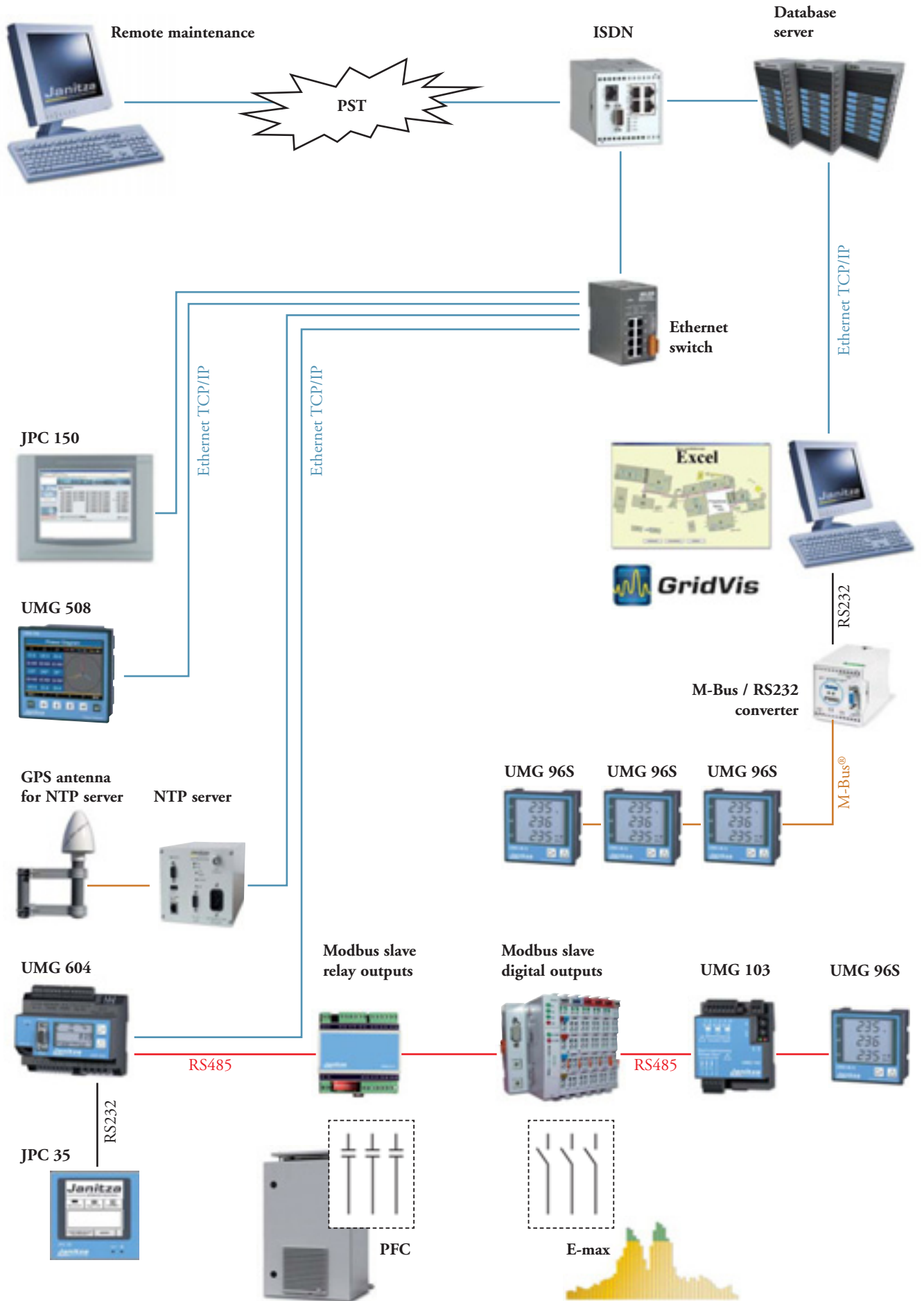
Janitza electronics® offers a wide range of field bus components such as converters and repeaters etc.

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.



Accessories



Current transformers



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:

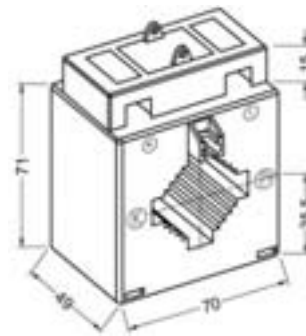
- Conversion of high primary currents into standardized secondary currents .../1A or .../5A
- Transformer classes 0.5 or 1 depending on the instrument
- Transformers are available for various bus bars and cables
- Moulded case type transformers for cable or bus bars
- Cable split core type transformers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

Applications

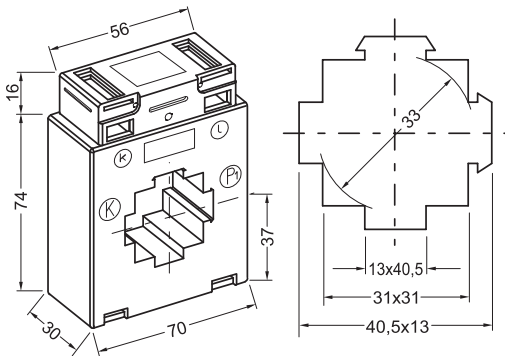
Current transformers are used when currents cannot be directly measured. They are a special form of transformers which transform the primary current into a (mostly) smaller secondary current and galvanically separate the primary and secondary circuits from each other. Due to the physically determined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

General mechanical properties

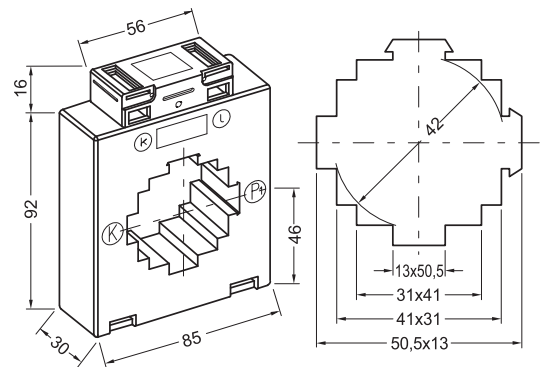
- Sturdy plastic housing made of polycarbonate
- Flame resistant in accordance with UL94VO and self extinguishing
- Nickel secondary clamps with positive-negative screws (2Nm)
- Integrated secondary clamp plates



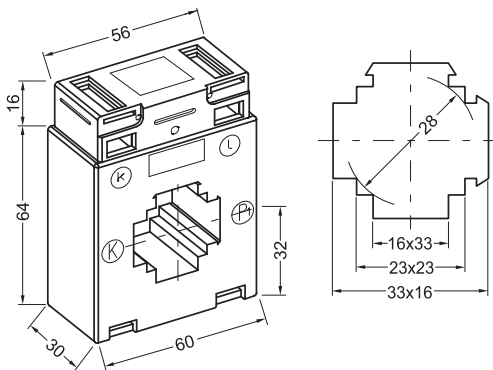
Dimensional drawing IPA40.5



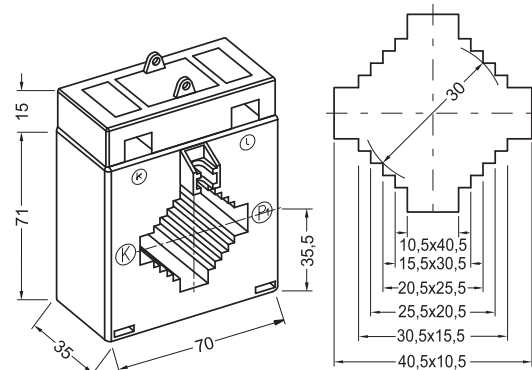
Dimensional drawing 7A412.3



Dimensional drawing 8A512



Dimensional drawing 6A315.3



Dimensional drawing IPA40

All dimensions stated in these drawings are in mm.

Moulded case current transformer class 1



Technical data

- Nominal frequency 50 Hz to 60 Hz
- Insulation class E (other classifications upon request)
- Thermal short-term current $I_{th} = 60 \times I_N/1s$
- Surge current $I_{dyn} = 2.5 \times I_{th}$, minimum 100kA for all bushing type current transformers
- Highest voltage for materials $U_m = 0.72kV$
- 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 (dimensional drawing pg 165)	Primary current in A	Secondary current in A	Power in VA	Class	Primary conductor	Circular conductor	Construction width	Item number
Current transformer 50/5 -1	IPA 40	50	5	2.5	1	40x10mm, 30x15mm, 25x20mm	30mm	70mm	09.05.110
Current transformer 75/5 -1	IPA 40	75	5	2.5	1	40x10mm, 30x15mm, 25x20mm	30mm	70mm	09.05.112
Current transformer 100/5 -1	6A315.3	100	5	2.5	1	30x15mm, 20x20mm	28mm	60mm	09.00.404
Current transformer 150/5 -1	6A315.3	150	5	5	1	30x15mm, 20x20mm	28mm	60mm	09.00.452
Current transformer 200/5 -1	6A315.3	200	5	5	1	30x15mm, 20x20mm	28mm	60mm	09.00.424
Current transformer 250/5 -1	6A315.3	250	5	5	1	30x15mm, 20x20mm	28mm	60mm	09.00.425
Current transformer 300/5 -1	6A315.3	300	5	5	1	30x15mm, 20x20mm	28mm	60mm	09.00.426
Current transformer 400/5 -1	6A315.3	400	5	5	1	30x15mm, 20x20mm	28mm	60mm	09.00.427
Current transformer 500/5 -1	6A315.3	500	5	5	1	30x15mm, 20x20mm	28mm	60mm	09.00.428
Current transformer 600/5 -1	6A315.3	600	5	5	1	30x15mm, 20x20mm	28mm	60mm	09.00.429
Current transformer 800/5 -1	7A412.3	800	5	5	1	40x12mm, 2x30x10mm	33mm	70mm	09.00.981
Current transformer 1000/5 -1	7A412.3	1000	5	5	1	40x12mm, 2x30x10mm	33mm	70mm	09.00.982
Current transformer 1250/5 -1	8A512.3	1250	5	5	1	50x12mm, 2x40x10mm	42mm	85mm	09.01.412
Current transformer 1500/5 -1	8A512.3	1500	5	5	1	50x12mm, 2x40x10mm	42mm	85mm	09.01.413
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.

Dimensional drawings – refer to page 165.

Technical data

- Nominal frequency 50 Hz to 60 Hz
- Insulation class E (other classifications upon request)
- Thermal short-term current $I_{th} = 60 \times I_N/1s$
- Surge current $I_{dyn} = 2.5 \times I_{th}$, minimum
100kA for all bushing type current transformers
- Highest voltage for materials $U_m = 0.72kV$
- 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 -0,5	IPA 40.5	50	5	2,5	0.5	40x10mm, 30x15mm, 25x20mm	30mm	70mm	09.05.250
Current transformer 75/5 -0,5	IPA 40.5	75	5	2,5	0.5	40x10mm, 30x15mm, 25x20mm	30mm	70mm	09.05.252
Current transformer 100/5 -0,5	IPA 40.5	100	5	5	0.5	40x10mm, 30x15mm, 25x20mm	30mm	70mm	09.05.234
Current transformer 150/5 -0,5	IPA 40.5	150	5	10	0.5	40x10mm, 30x15mm, 25x20mm	30mm	70mm	09.05.236
Current transformer 200/5 -0,5	6A315.3	200	5	3,75	0.5	30x15mm, 20x20mm	28mm	60mm	09.00.360
Current transformer 250/5 -0,5	6A315.3	250	5	5	0.5	30x15mm, 20x20mm	28mm	60mm	09.00.361
Current transformer 300/5 -0,5	6A315.3	300	5	5	0.5	30x15mm, 20x20mm	28mm	60mm	09.00.362
Current transformer 400/5 -0,5	6A315.3	400	5	5	0.5	30x15mm, 20x20mm	28mm	60mm	09.00.363
Current transformer 500/5 -0,5	6A315.3	500	5	5	0.5	30x15mm, 20x20mm	28mm	60mm	09.00.364
Current transformer 600/5 -0,5	6A315.3	600	5	5	0.5	30x15mm, 20x20mm	28mm	60mm	09.00.365
Current transformer 800/5 -0,5	7A412.3	800	5	5	0.5	40x12mm, 2x30x10mm	33mm	70mm	09.00.887
Current transformer 1000/5 -0,5	7A412.3	1000	5	5	0.5	40x12mm, 2x30x10mm	33mm	70mm	09.00.888
Current transformer 1250/5 -0,5	8A512.3	1250	5	5	0.5	50x12mm, 2x40x10mm	42mm	85mm	09.01.339
Current transformer 1500/5 -0,5	8A512.3	1500	5	5	0.5	50x12mm, 2x40x10mm	42mm	85mm	09.01.340

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

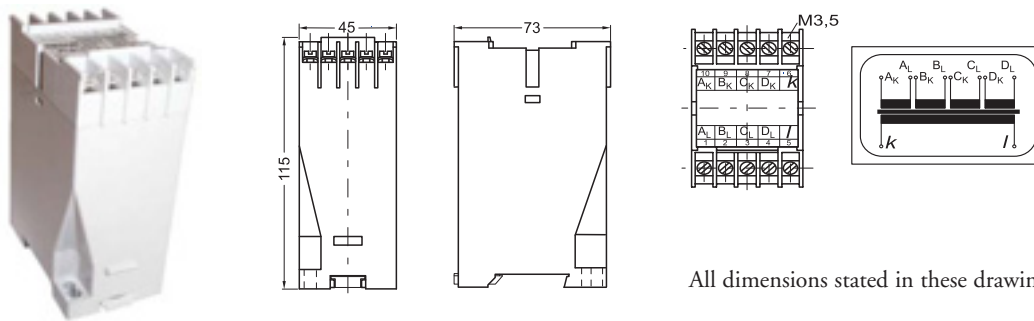
Dimensional drawings – refer to page 165.

Summation current transformers (CTs)



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.



All dimensions stated in these drawings are 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 $I_{th} = 60 \times I_N / 1s$
- Surge current $I_{dyn} = 2.5 \times I_N$
- Maximum operating voltage $U_m = 0.72kV$ (other voltages upon request)
- Calculation of insulation level (test voltage) 3kV/1min (other voltages upon request)
- Overvoltage limit factor FS5 or FS10

Overview of current transformers class 1

Description	Type	Primary current in A	Secondary current in A	Power in VA	Class	Item number
SCT 5+5 -1	IPS20	5+5	5	15	1	15.02.510
SCT 5+5+5 -1	IPS30	5+5+5	5	15	1	15.02.515
SCT 5+5+5+5 -1	IPS40	5+5+5+5	5	15	1	15.02.520

Overview of current transformers class 0.5

Description	Type	Primary current in A	Secondary current in A	Power in VA	Class	Item number
SCT 5+5 -0.5	IPS20	5+5	5	15	0.5	15.02.511
SCT 5+5+5 -0.5	IPS30	5+5+5	5	15	0.5	15.02.516
SCT 5+5+5+5 -0.5	IPS40	5+5+5+5	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**.

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

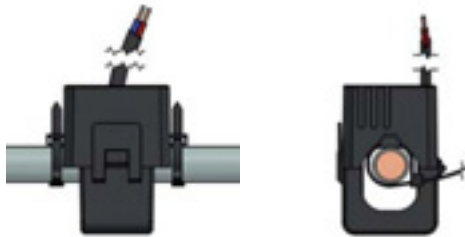
The cable split core CT, type KUW1 is a very compact current transformer and especially suitable for digital panel meters. The design of the CT provides correct mounting around the cable and is closed with a clearly audible „click“. The two delivered cable binders of UV-resistant material protect the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

Types KUW 2 and KUW4

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 18 mm cable diameter



...for 27 mm cable diameter



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
Primary conductor	Cable with max. 27mm diameter
Length of secondary conductor	5m, multicolour coded
Diameter	0.5mm ²
Version	PVC

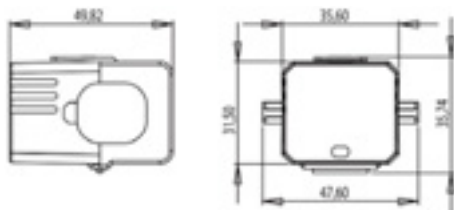
Cable split core CTs



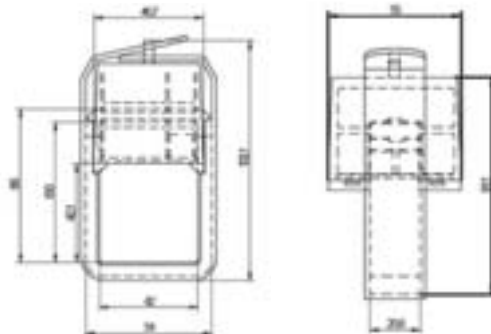
Overview of product variants						
Type	Primary current in A	Secondary current in A	Burden in VA after 5m	Accuracy class after 5m	Diameter of primary in mm	Item number
Type KUW1 for insulated cables, max. 18mm diameter						
KUW1-60	60	1	0.2	3	18	15.03.310
KUW1-75	75	1	0.2	3	18	15.03.311
KUW1-100	100	1	0.2	3	18	15.03.312
KUW1-125	125	1	0.2	3	18	15.03.313
KUW1-150	150	1	0.2	3	18	15.03.314
KUW1-200	200	1	0.2	3	18	15.03.315
Type KUW2 for insulated cables, max. 27mm diameter						
KUW2-60	60	1	0.6	3	27	15.03.350
KUW2-75	75	1	1	3	27	15.03.351
KUW2-100	100	1	2	3	27	15.03.352
KUW2-125	125	1	2.5	3	27	15.03.353
KUW2-150	150	1	3.75	3	27	15.03.354
KUW2-200	200	1	3.75	3	27	15.03.355
KUW2-250	250	1	3.75	3	27	15.03.356
KUW2-300	300	1	0.5 - 3.75	1 - 3	27	15.03.357
KUW2-400	400	1	2.5	1	27	15.03.358
KUW2-500	500	1	5	1	27	15.03.359
Type KUW4 for insulated cables, max. 42mm diameter						
KUW4-250	250	1	0.25 - 0.5	1	42	15.03.360
KUW4-300	300	1	0.25 - 0.5	1	42	15.03.361
KUW4-400	400	1	0.25 - 1.5	1	42	15.03.362
KUW4-500	500	1	0.25 - 2.5	1	42	15.03.363
KUW4-600	600	1	0.25 - 5	1	42	15.03.364
KUW4-750	750	1	0.25 - 5	1	42	15.03.365
KUW4-800	800	1	0.25 - 5	1	42	15.03.366
KUW4-1000	1000	1	0.25 - 5	1	42	15.03.367

Dimensional drawing

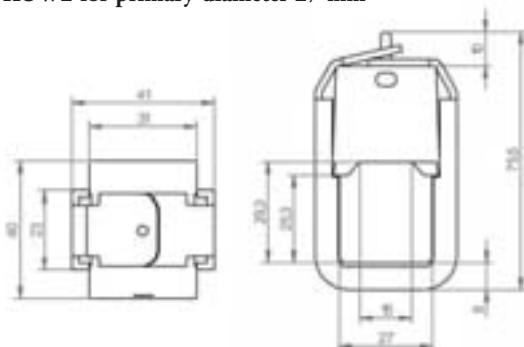
KUW1 for primary diameter 18 mm



KUW4 for primary diameter 42 mm



KUW2 for primary diameter 27 mm



All dimensions stated in these drawings are in mm.

Split core current transformer

For bus bars: 2 x 60 x 10mm

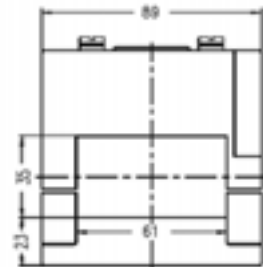
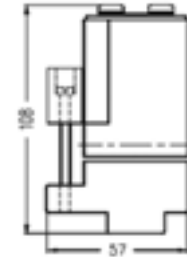
60 x 10(35)mm

For cables: Max diameter 35mm



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

Dimensional drawing

**Split core current transformer**

For bus bars: 2 x 80 x 10mm

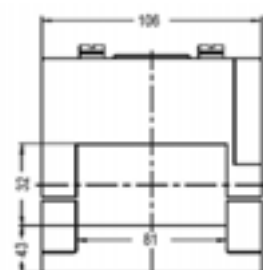
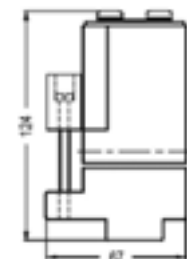
80 x 10(32)mm

For cables: Max diameter 32mm



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

Dimensional drawing



All dimensions stated in these drawings are in mm.

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.



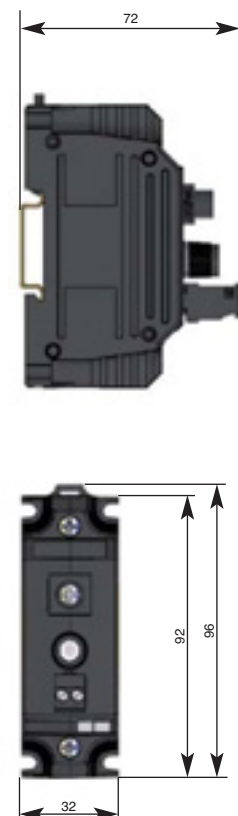
Technical data	
Generals	
Maximum voltage	690V
Insulation voltage	1890V / 50Hz 1min.
Rated current	67A
Maximum current (16 mm ²)	76A
Protection class	E
Protection	IP 20
Ambient temperature	-5 .. +40°C
Housing	PA, 30% glas
Screw terminal	Cross recess DIN 7962-H2
Series terminal	
Standard IEC60947-7-1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

CT variants			
CT ratio	Class	Power	Item number
35/1A	1	0.2VA	15.03.002
64/1A	0,5	0.2VA	15.03.003

Connection diagram



Dimensional drawing

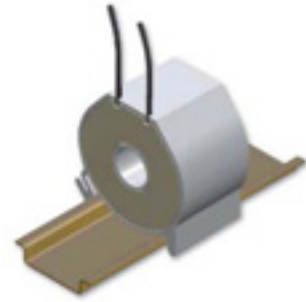


All dimensions stated in these drawings are in mm.

DINCT64/1/1 - DIN rail current transformers

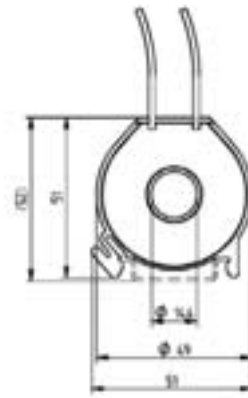
“Deeper” measurements (sub-distributions or loads/individual output) are more and more common in electrical installations. The nominal currents are, therefore, relatively low (64, 32 or 16A), the space is restricted and the accuracy of the current transformer must be sufficient for the power measurement (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.



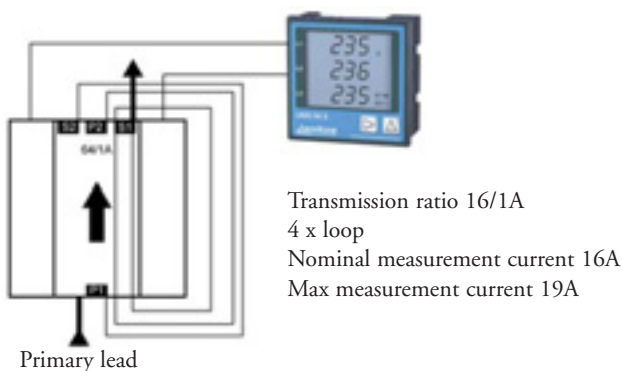
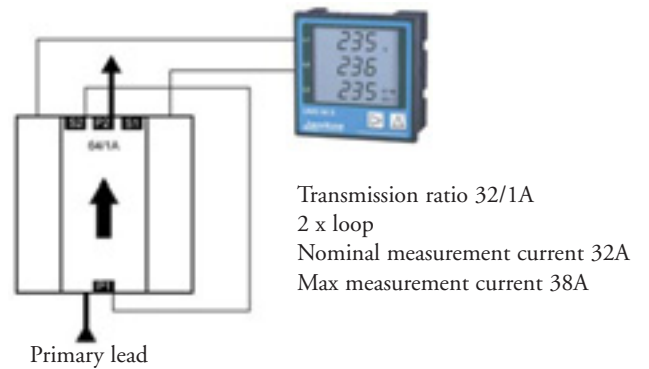
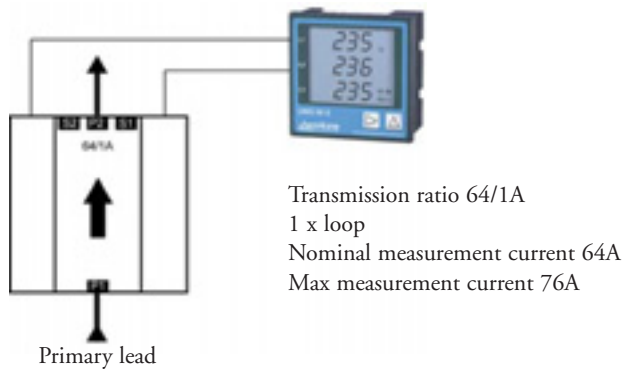
Technical data

Transmission ratio:	64/1A (32/1A & 16/1A)
Accuracy:	Class 1
Power:	0.5VA
I_{cth} ; continuous limit current:	120%
I_{th} ; thermal limit current:	$60 \times I_n / 1s$
Frequency:	50Hz
Secondary lead diameter:	0.5mm ²
Ambient temperature:	45°C max.
Standard:	IEC6000-44-1
Material:	PA6.6
Item number:	15.02.849



All dimensions stated in this drawing are in mm.

Applications



Voltage transformer



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 is too high for the measuring inputs.



Diag.: Voltage transformer closed with open connection terminals



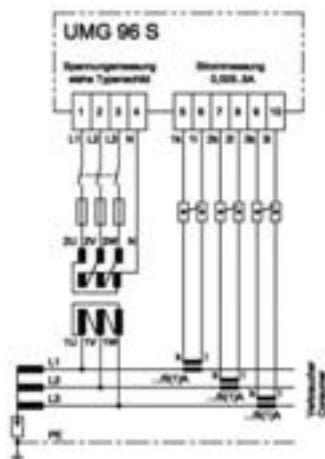
Diag.: Voltage transformer without cover with fuses

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

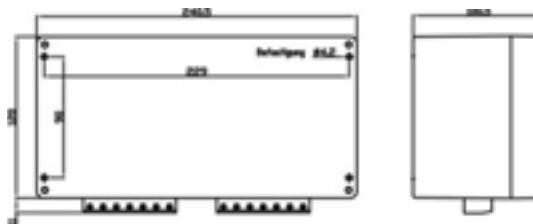
Overview of product variants						
Description	Type	Voltage primary	Voltage secondary	Fuse primary	Rated power	Item number
Voltage transformer	BV	525V AC	400V AC	0,032A	5VA	15.04.035
Voltage transformer	BV	705V AC	400V AC	0,032A	5VA	15.04.036

Connection example

Measurement in IT-grids without neutral conductor with voltage- and current-transformers (VTs and PTs)



Dimensional drawing



All dimensions stated in this drawing are in mm.

Voltage taps

A fast voltage tap is often required for measurement tasks. With the ZK4S and ZK4B voltage taps, the tap can take place directly from a copper rail.

ZK4S

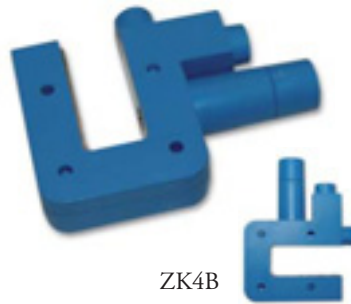
Colour: black
 Connection measurement cable = 4mm²
 Fuse: 250V 6,3A
 For bus bars 4 - 15mm
Item number: 10.11.525



ZK4S

ZK4B

Colour: blue
 For bus bars 4 - 15mm
Item number: 10.11.526



ZK4B

1 set of voltage taps

Consisting of 3 x voltage taps ZK4S (item number 10.11.525) and 1 x voltage tap ZK4B (item number 10.11.526)

Item number: 10.11.527

ZK4R

Isolated Tool for fixing the taps
 1000V EN/IEC60900:2004

Item number: 10.11.528

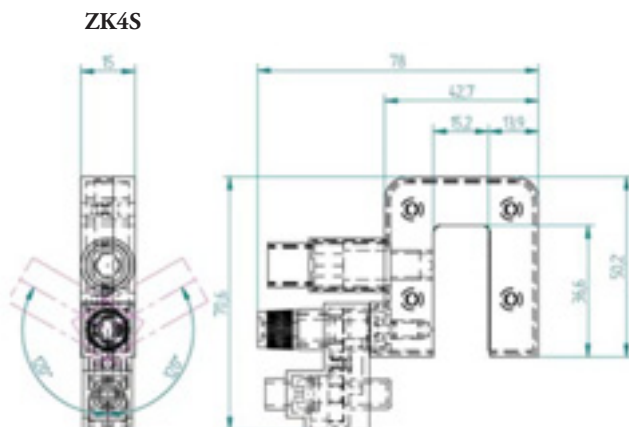


Technical specification	
Max operating voltage	690V
Test voltage/pulse	3kV/50Hz 6kV
I _n max	10A
Insulation material class	E (max 120°)
Fuse type	5x25mm (with alarm) 10A SIBA DIN41576-2
Short-circuit resistance	10kA@400V/50Hz
Protection class	IP20
Environmental temperature	-5...+40°C ¹⁾
Temperature increase on rails	Max 75K ¹⁾
Primary connection	M8 interior Allen screw
Interior Allen wrench	Number 6
Maximum rail thickness	15mm / 4mm
Housing	Polyamide (PA6.6)
Clamp material	Nickel plated brass

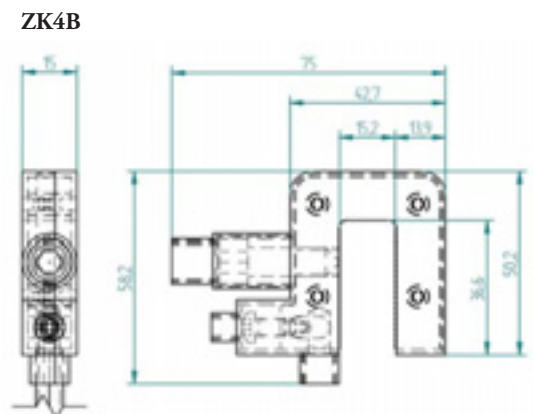
¹⁾ Max temperature of primary rail 120°C (sum of environmental temperature and temperature increase of the rail)

Dimensional drawings

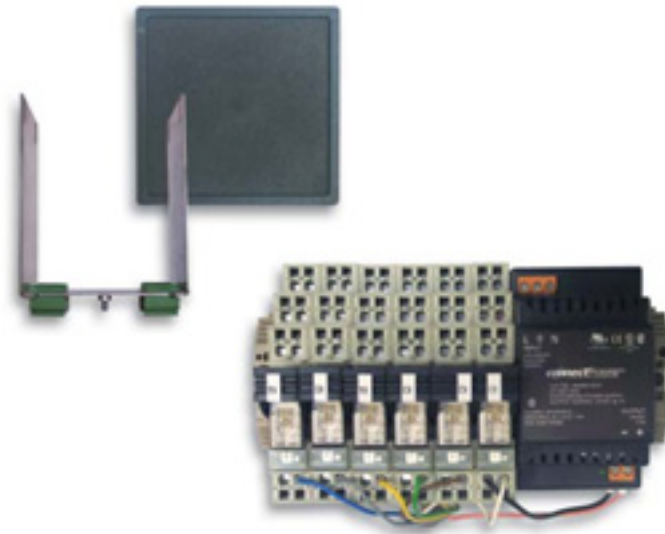
All dimensions stated in these drawings are in mm.



ZK4S



ZK4B



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
Calibration protocol UMG (available for all UMG except UMG 96L)			33.03.300
Adapter for DIN rail mounting UMG 96L / UMG 96 / UMG 96S Dimensions: W x H x D = 85 x 113 x 90 mm		AH96	52.09.201
Adapter for DIN rail mounting UMG 96S with Profibus Dimensions: W x H x D = 85 x 113 x 90 mm		AH96P	52.09.202
Adapter for DIN rail mounting UMG 505 / 503 / 507, Prophi® Dimensions W x H x D = 160 x 80 x 80 mm		AH144	52.07.666
Sealing (front protection class to IP65) for UMG 96-96S 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

Mechanical accessories

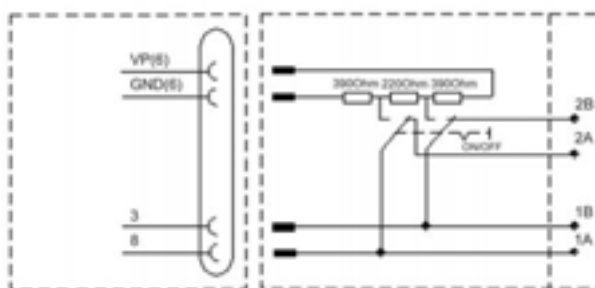





Accessories for universal measuring instruments			
Description		Type	Item number
Profibus connector 9 pole, SUBCON-PLUS-ProfIB/AX/SC		AX/SC	13.10.539


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, the Profibus connector is also used for the Modbus.



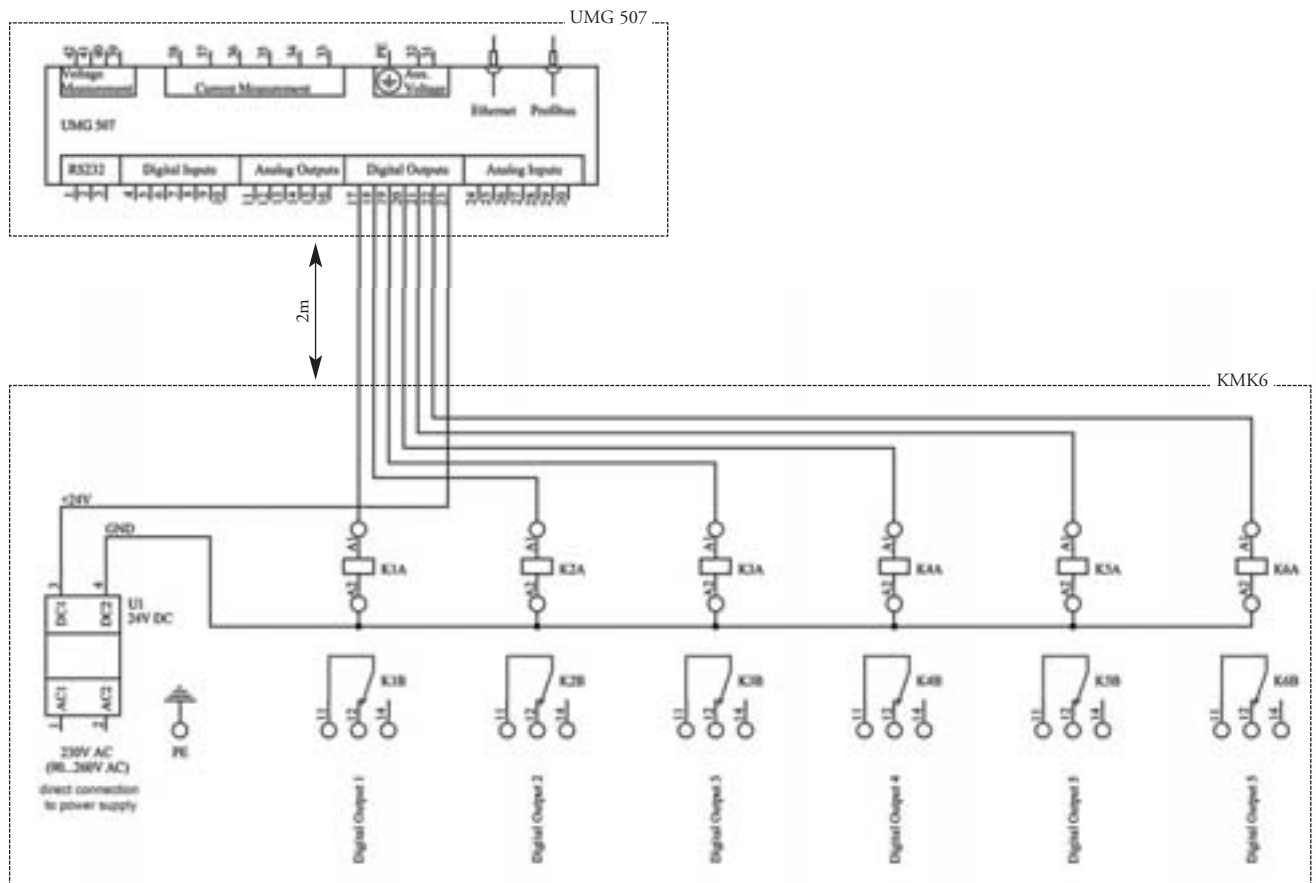
Accessories for universal measuring instruments			
Description		Type	Item number
Ethernet front feed-through with extension frame and RJ45 socket type VS-08-BU-RJ45/BU		EFD	13.080.16
Protective cover; flat design for covering the RJ45 contact insert in the extension frame		EFDD	13.080.17
Grid filter for the UMG 96		NF96	52.09.200

Accessories for universal measuring instruments			
Description		Type	Item number
Function module mounted on DIN rails for the UMG 507, digital outputs on coupler relay (potential free converter) with power supply and 2m cable (ready to use)		KMK6	52.15.200

Extra: KMK6-UMG 507

- Function module mounted on a DIN rail for the UMG 507
- Digital outputs on coupler relay (potential free converter) with 24V DC power supply and 2m cable (ready to use)
- Power supply input voltage: 115 ... 230V AC
- Nominal power per relay: 8A / 250V AC
- Application: maximum demand monitoring of UMG 507 for 6 loads; a WAGO module is required for more than 6 loads

Extra: circuit diagram



IT and field bus components

IT and field bus components



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.

De-centralized fieldbus IO-modules series FBM10

The FBM10 series is a cheap alternative to the WAGO I / O system. 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 Fieldbuses

The fieldbus 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 fieldbus modules, a connection to each Modbus master device such as the UMG 604, UMG 605, UMG 508 or UMG 511 is necessary.

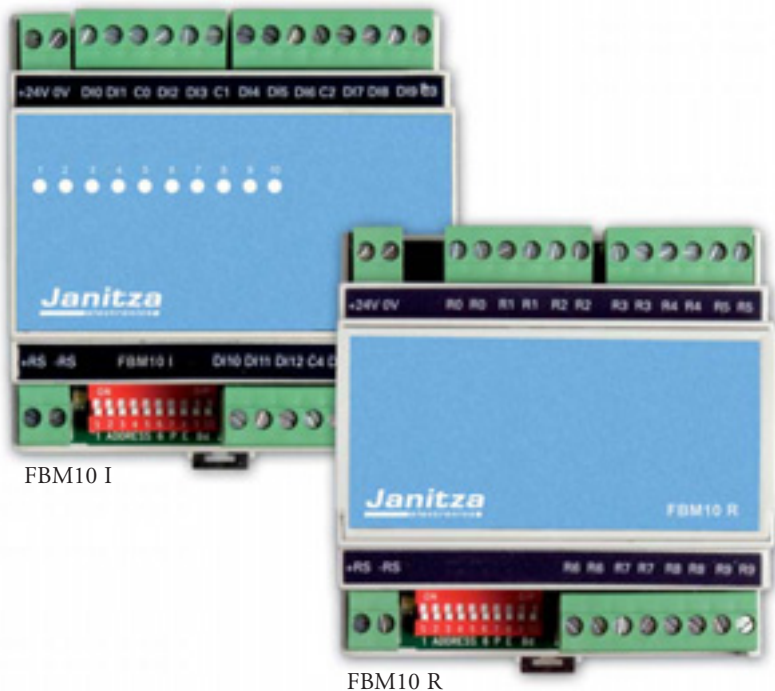
With the inclusion of the remote I/O modules are to two different versions available. The user can basically integrate all data points in his Janitza® system. In this case the Janitza® system is no longer limited only on electrical parameters. In principle, other values such as process data, status, 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 using the outputs

- E-Max-Outputs (max. 64)
- Limit outputs for values

Example of use of inputs

- E-Max blocking or release
- Tariff change
- Set point E-Max
- Synchronization of measuring period
- Alarms
- Status messages





Overview I/O fieldbus series FBM10

Type	Relais-Ausgänge	Digital-Eingänge	Artikel-Nr.
FBM10R	10	-	15.06.075
FBM10I	-	10	15.06.076

Technische Daten

Auxiliary voltage	24V DC ±20%
Load current	20mA
Bus protocol	RS485, Modbus-RTU
Transmission rate	9600 bis 38.400Bit/s
Digital Input	24V DC, 5mA
Relay outputs	250V AC/6A-AC1 / 2A-AC3 potential free
Ambient temperature	-10...+50°C
EMC according to	EN 61326
Terminals	Plug-in terminals up to 1.5 mm ²
Case	45mm DIN rail mounted system H x W x D 90 x 88 x 58 mm
Mounting	DIN rail
Humidity	<95° r.H. noncondensing
Protection	IP20
Standards	CE conformity

Application

RS-485, Modbus-RTU



De-centralized WAGO/I system for UMG 507, UMG 604, UMG 605, UMG 508 and UMG 511

Assembly

The decentralised field bus couplers of the WAGO I/O system are controlled using the RS485 Modbus RTU or using the Ethernet TCP/IP. Communication takes place between the UMG and one or more bus couplers into which the respective inputs and outputs are plugged-in. The WAGO I/O system is fixed to a DIN rail. If the RS485 is used, a Profibus cable or a suitable cable e.g. Li2YCY (TP) 2x2x0.22 should be used whereby the maximum distance between the master and slave must not exceed 1000 m.



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:

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

Standard WAGO components	
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
Digital input terminal, 230VAC 2 channel	15.06.271
Analogue output terminal 2-channel, 0...20mA	15.06.261
Analogue input terminal PT100/PT1000 3 conductor connection	15.06.273
End terminal	15.06.251
Interface cable UMG bus coupler RS485, 5m length	08.02.424

Zuordnung Ausgangsmerker zu Wago Ausgangsklemme				
Karte Nr.	Marker UMG507	Zustand Ausgang	WAGO Ausgangsklemme	Typ 750-517
1	02	●	Klemme 1 (1,2,3)	Ausgang %Q0 0
	03	●	Klemme 2 (5,6,7)	Ausgang %Q0 1
2	04	●	Klemme 1 (1,2,3)	Ausgang %Q0 2
	05	●	Klemme 2 (5,6,7)	Ausgang %Q0 3
3	06	●	Klemme 1 (1,2,3)	Ausgang %Q0 4
	0	●	Klemme 2 (5,6,7)	Ausgang %Q0 5
4	0	●	Klemme 1 (1,2,3)	Ausgang %Q0 6
	0	●	Klemme 2 (5,6,7)	Ausgang %Q0 7
5	0	●	Klemme 1 (1,2,3)	Ausgang %Q0 8
	0	●	Klemme 2 (5,6,7)	Ausgang %Q0 9
6	0	●	Klemme 1 (1,2,3)	Ausgang %Q0 10
	0	●	Klemme 2 (5,6,7)	Ausgang %Q0 11
7	0	●	Klemme 1 (1,2,3)	Ausgang %Q0 12
	0	●	Klemme 2 (5,6,7)	Ausgang %Q0 13
8	0	●	Klemme 1 (1,2,3)	Ausgang %Q0 14
	144	●	Klemme 1 (1,2,3)	Ausgang %Q0 15

Application: diverse control tasks e.g. shutdown of consumers for maximum demand management or fault indication.




The Ethernet field bus coupler 15.06.204 is used if RS485 cabling is not desired or not possible. The coupler reads the UMG 507E/604/605/508 and UMG 511 marker status using the Ethernet and switches the output terminals 15.06.250 accordingly. The allocation of the marker to the WAGO output takes place through the web interface of the WAGO coupler.

Janitza electronics® takes over full configuration:

A program relating to the necessary outputs is loaded on to the coupler before delivery. The following data is required for the delivery: future IP address of the UMG 507/604/605/508/511 and WAGO coupler, gateway and SubNetMask and the number of required outputs. Delivery can only take place once this data is provided.



Accessories for universal measuring instruments			
Description		Type	Item number
<p>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;</p> <p>operating systems: Windows 2000/XP; software: PSW basic/professional; GridVis.</p> <p>Products: UMG 96S, UMG 103, UMG 104, UMG 503, UMG 505, UMG 507, UMG 604, UMG 605, ProData® and Prophi®</p>		K-2075	15.06.015
<p>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);</p> <p>Products: UMG 96S, UMG 103, UMG 104, UMG 503, UMG 505, UMG 507, UMG 604, UMG 605, ProData® and Prophi®</p> <p>Power supply “connectpower” is required.</p>		K-1075	15.06.024
<p>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.</p> <p>Products: UMG 96S, UMG 103, UMG 104, UMG 503, UMG 505, UMG 507, UMG 604, UMG 605, ProData® and Prophi®</p> <p>Power supply “connectpower” is required.</p>		K-1375	15.06.035
<p>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: PSW basic/professional; GridVis.</p> <p>Products: UMG 96S, UMG 103, UMG 104, UMG 503, UMG 505, UMG 507, UMG 604, UMG 605, ProData® and Prophi®</p>		K-6175	15.06.025
<p>RS485 star repeater IP65 1 x RS485 input and 5 x RS485 outputs for construction of a star-shaped RS485 network for wall mounting in a IP65 industrial-housing (260 x 160 x 95mm) with 230V AC power supply. Baud rate 9600 baud...153kBaud;</p> <p>Note: the star repeater is also suitable for Profibus.</p>		K-6585	15.06.017
<p>RS232 <-> RS485 star repeater IP65 1 x RS232 input and 5 x RS485 outputs for construction of a star-shaped RS485 network with RS232 PC connection for wall mounting in a IP65 housing (260 x 160 x 95mm) with 230V AC power supply.</p>		K-6532	15.06.018
<p>USB converter to RS232 adapter cable – converts USB-A output into a RS232 output, USB-A plug on to 9 pole sub plug, 1.8m, compatible with USB 1.1, compatible with Windows 2000/XP; software: PSW basic/professional, GridVis.</p> <p>Products: UMG 96S, UMG 103, UMG 104, UMG 503, UMG 505, UMG 507, UMG 604, UMG 605 and ProData®</p>		AD-232	15.06.032

Accessories for universal measuring instruments			
Description		Type	Item number
<p>Power supply for DIN rail mounting prim. 115-230V 50/60 Hz sec. 24VDC; 1A</p>		Connectpower	16.05.002
<p>DB-9 connection plug (with screw clamps)</p>		DB-9 plug	13.10.520
<p>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)</p>		PadPuls M1C	15.06.028

Field bus components

Field bus components



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

Applications

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.

General features

- 8 x 10/100 Mbps Ethernet-ports
- Shielded RJ-45 connections
- Automatic setting of the transfer rate
- Compatible with IEEE 802.3, 802.3u and 802.3x

Technical data

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



Hager switch, 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 508, UMG 511, UMG 604 and UMG 605.



JaTeNe Router-Modem-Switch

Remote maintenance solution by ISDN

The option of remote maintenance by ISDN offers a more cost effective alternative to an on-site visit. No matter whether you want to read the memory of the measuring instrument or if you are interested in the parameterisation of the peak demand management system. With the JaTeNe router, it is almost like being personally on-site. You can freely and flexibly organise online times. But the router can manage even more. In the case of a fault, e.g. short-term interruptions, you are automatically informed by e-mail.



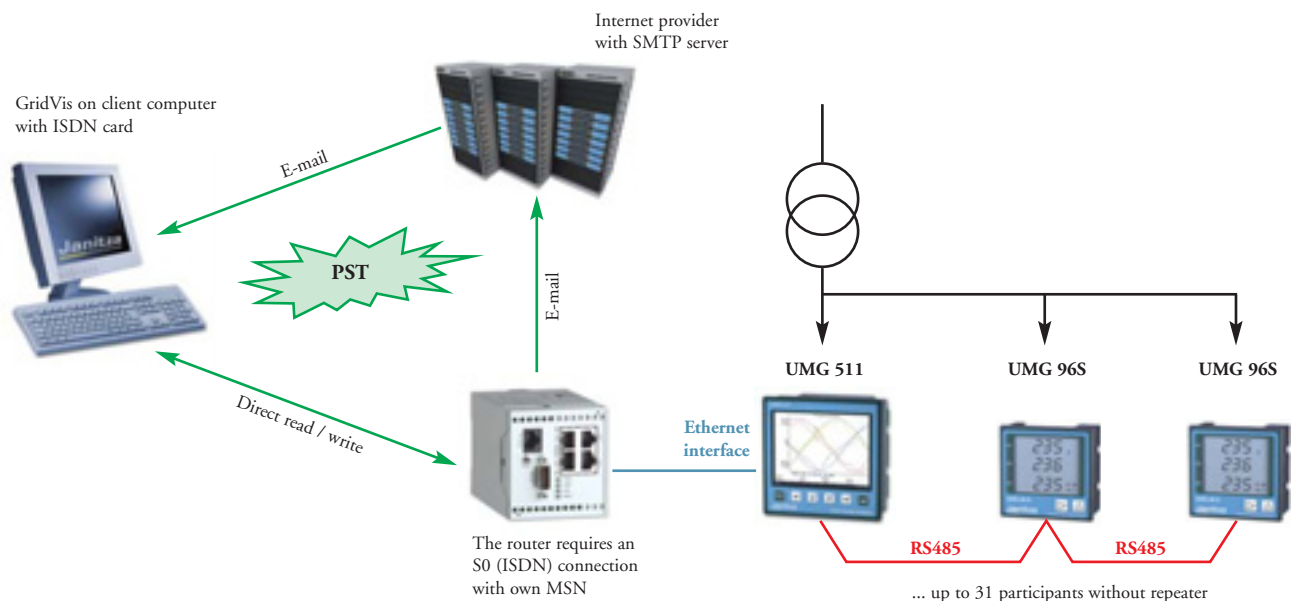
Areas of application

- Reading-out the memory of the measuring instruments
- Configuration changes for peak demand management
- Changes to memory configurations
- Support when creating and changing parameters
- Automatic e-mail despatch if faults occur
(UMG 507E, UMG 604E, UMG 605, UMG 508 and UMG 511)

Application:

The Janitza® Telephone Network router => JaTeNe router of Janitza electronics® combines an ISDN modem, a router and a 4-port switch. The dial-in and dial-out function allows remote maintenance and remote control of instruments which are found within the Ethernet network. The JaTeNe router is equipped with an integrated ISDN-TA. The integrated four port switch allows direct connection of up to 4 measuring instruments. The JaTeNe router can be easily and quickly configured using the web interface. The router has the following functions:

- Integrated communication module (ISDN TA)
- Dial in
- Dial out (dial on demand)
- 4 port switch with 10/100 MBit/s
- DHCP server and client
- Integrated configuration area with auxiliary function
- Authentication for up to 10 users (dial in)
- Selection filter for dial out
- Authentication using PAP, CHAP, MSCHAP, MS-CHAP 2
- Simple configuration
- Local or remote configuration
- Firmware update (local and remote)
- Buffered RTC (real-time clock)





Direct despatch of e-mails is also possible. The UMG 507E or UMG 604E can generate an e-mail when faults are reported (e.g. short-term interruptions). The e-mail is sent to the router which automatically registers itself with an Internet provider and sends the e-mail to the SMTP server. The configuration of the internet provider (dial out) and the e-mail SMTP configuration also take place using the convenient web-server of the router.

Prerequisites:

- On-site:
 - ISDN connection with its own MSN
 - 24 V DC supply to the router
- Computer:
 - ISDN card or USB ISDN modem (e.g. AVM)
 - ISDN connection

Technical data

- ISDN: Euro ISDN up to 64kBits/s
- Switch: 4 x RJ45, 10/100MBit/s
- Supply voltage: 10..60VDC
- Power consumption: ca. 3W
- Cable connections: Screw clamps
- Dimensions (WxLxD): 70x110x75mm
- Mounting: Fixing on DIN rail
- Housing: Plastic housing
- Operating temperature: 0..+55 °C
- Humidity: 0..95% (non-condensing)
- Degree of protection: Housing IP40, screw clamps IP20
- Weight: 300g
- Item number: 15.06.040

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.

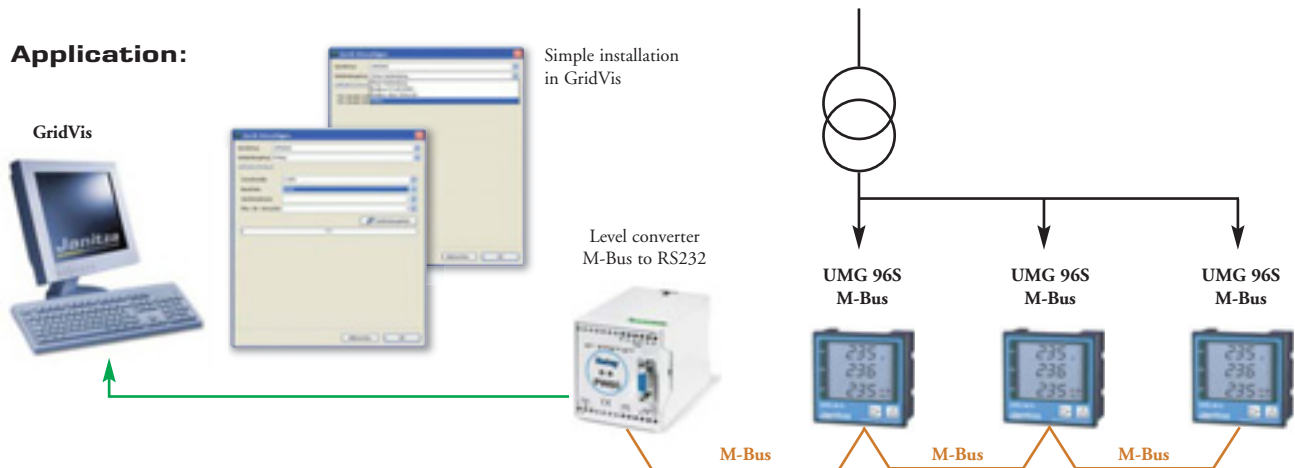
Using the signal process-controlled M-Bus level converter PW60, up to 60 x UMG 96S M-Bus can be connected to one PC (master). M-Bus software which is available on the market or the GridVis software can be used to analyse the data.



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.

Field bus components

Field bus components



PowerToStore 10F - mini UPS for UMG 604E

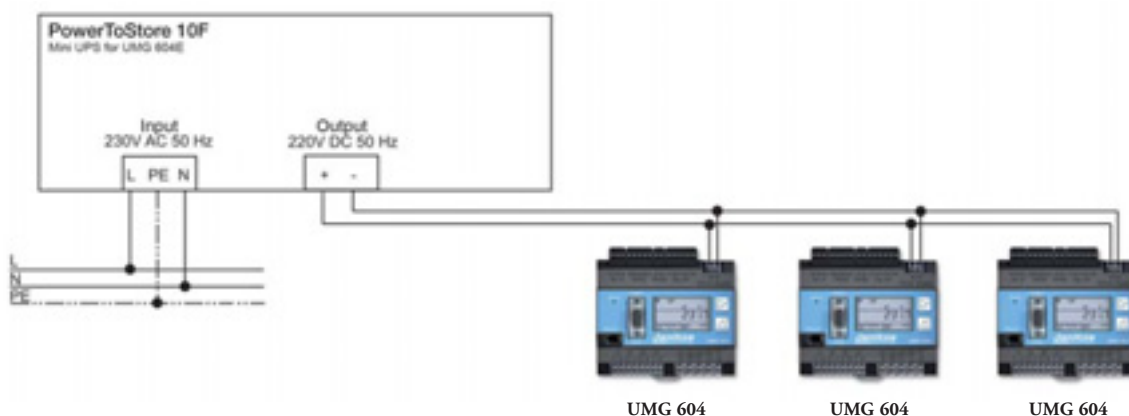
Capturing short-term interruptions is one of the strengths of the UMG 604/605/508/511. Due to the small construction and the large memory, the instrument is ideally suitable for monitoring transformer stations. The UMG 604's auxiliary voltage supply is provided through a switch mode power supply which 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 604E 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.

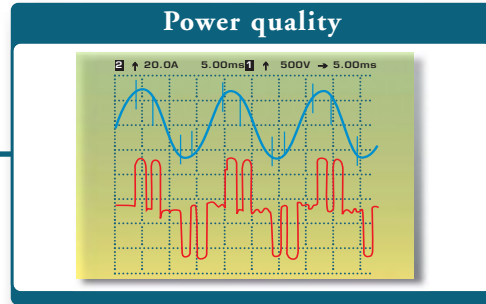
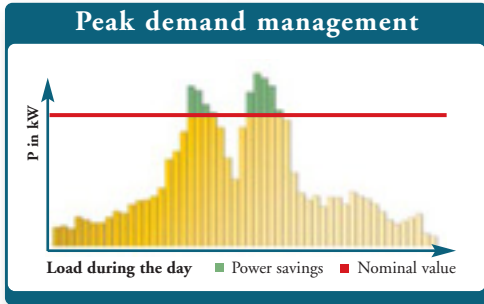


Technical data

- 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 at 40°C
- Degree of protection: IP54
- Weight: 1.5 kg
- Item number: 15.06.400

Application





Cost centre data collection

	Administration	Kitchen	Office...
January	275,99 kWh	38,79 kWh	529,32 kWh
February	375,89 kWh	57,44 kWh	254,22 kWh
March	422,59 kWh	24,53 kWh	458,33 kWh
April	312,77 kWh	85,45 kWh	754,65 kWh
May...	775,29 kWh...	61,23 kWh...	451,32 kWh...

Print Building plan Update current month



- ### UMG 604
- Power analyser (over 800 power parameters) for electricity supply
 - Energy consumption and cost centre data collection
 - Power quality monitoring
 - Peak demand controller
 - PLC function (7 free user programs)
 - Transient recorder
 - Event recorder and data logger

The UMG 604 offers internet access and automatic e-mail despatch for defined events. Visit the power analyser "LIVE" on the homepage

www.umg604.janitza.de





NTP Time Server LANTIME

There is often the need to provide synchronised time information for various power analysers. This is especially important in the field of power analysers because you want to compare voltage events and transients for various measuring points with each other. The measuring instruments must have the same clock setting if the events are to be clearly allocated. This means that any inaccuracies in the internal instrument clocks must be balanced out. This is where so-called time or NTP servers are used. They always provide precise time information thanks to the GPS antenna and wireless controls and can supply this information to the complete LAN network. LANTIME synchronises all systems which are either NTP or SNTP compatible. This means that the UMG 507 (E/EP), UMG 508, UMG 511, UMG 604 and UMG 605 of Janitza electronics® GmbH can be set to maintain a common time.

Installation

The corresponding GPSANT antenna and various accessories are part of the standard delivery. It can be installed 300m away from the LAN-TIME and in a position from which the most amount of unrestricted sky is available (e.g. roof of a house).



General technical data		
Supply voltage		110...240VAC / 18...72VDC
Power frequency		50/60Hz
Mounting		DIN rail
Working temperature range LANTIME		0...50 °C
Working temperature range GPSANT		-40...65°C
Protection class	In accordance with EN60529	IP 20
Item number	Type: LANTIME	15.06.051

Periphery		
Receiver type	6 channel GPS C7A code	1
LED	Fail (red), lock (green)	1 of each
Antenna type GPSANT	Remote fed GPS antennae	Included in delivery
Converter unit		Included in delivery
Plastic pipe, mast holder		Included in delivery
Distance	300m with RG58 standard cable	20m included in delivery

Communication		
Interfaces		
Ethernet TCP/IP	10/100 MBit with RJ45	Yes
USB	For update / back up configuration	Yes
RS232	For update / back up configuration	Yes
Protocols		
NTP, SNTP		
IPv4, IPv6, DAYTIME, DHCP, HTTP, HTTPS, FTP, SAMBA, SFTP, SSH, SCP, SYSLOG, SNMP, TIME, TELNET, W32TIME		Yes
TCR, UDP	Network protocol	Yes



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:

- Processor (dual core) AMD operton 2218
(Internal speed 2.6 GHz)
(External speed 1067 MHz)
- L2 cache (full speed) 2MB
- Memory (667 MHz SDRAM) 2GB ECC
- HDD controller SATA or SAS
- HDD - 3 x 146GB (HOT SWAP)
- Video - SVGA
- ServeRAID 8k
- RAID 5 over 3 x 146GB, 1 x 146GB Hot-Spare
- Ethernet controller 10/100/1000 Mbps
- DVD - CDRW (IDE)
- Power Supply with redundant power
- Auto restart
- System: XPprofessional or
SMALL business server 2003
- MySQL or MSSQL

Quotes are available upon request



Areas of application

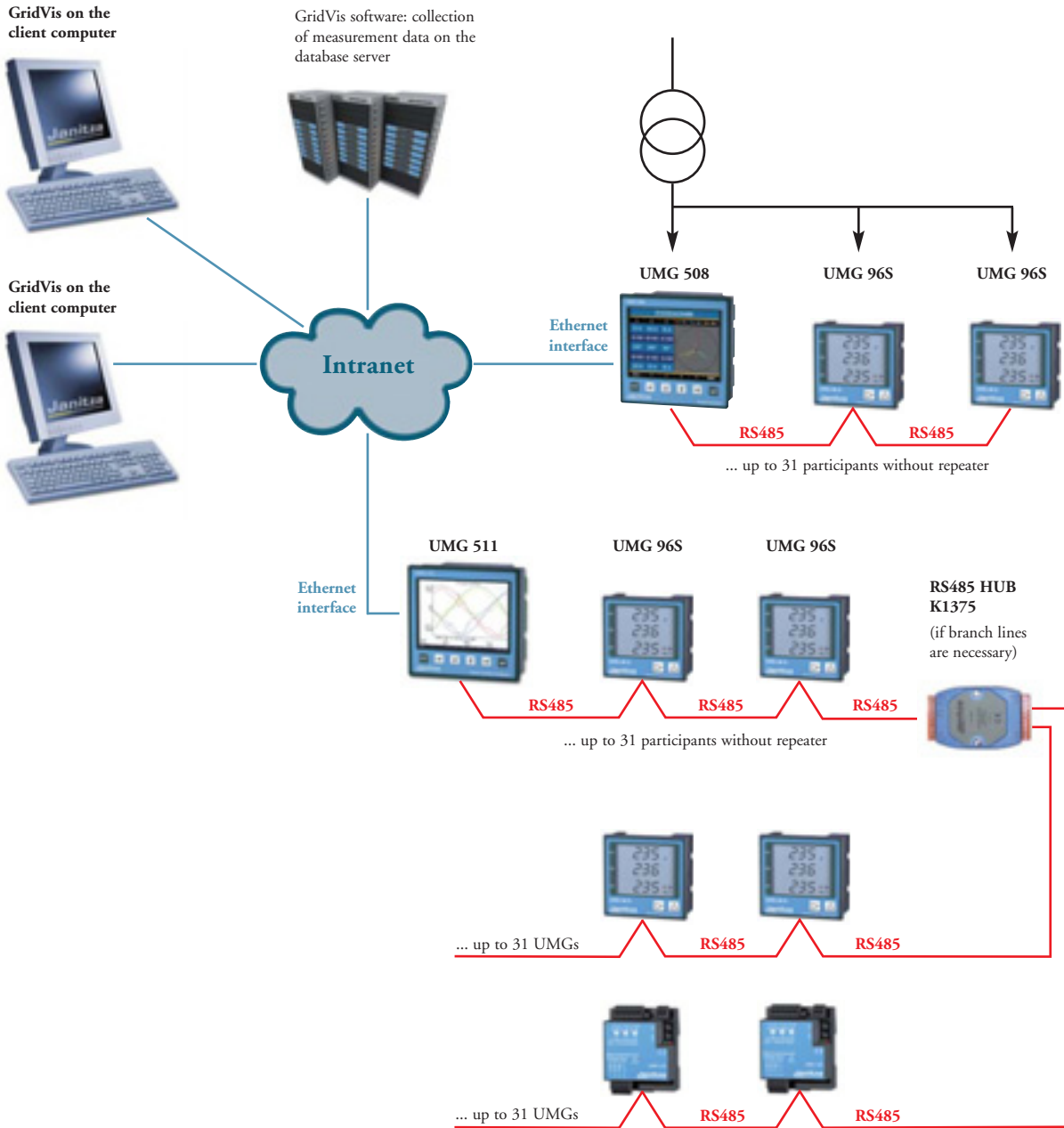
Recommended for larger projects with a high number of measuring instruments and everywhere where high data security and maximum performance is required. Systems can be individually configured for small and large sized companies.

Application

The GridVis software works with an additional program 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.

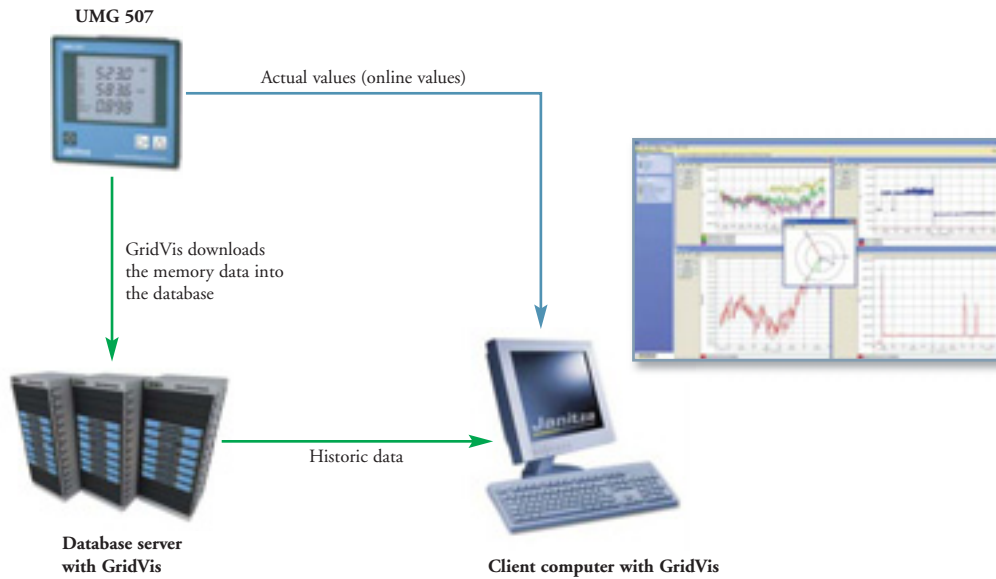


Application:



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 UMGs 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



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. Touch panels JPC104, JPC121 and 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.

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 JPC104, JPC121 and JPC150 models. The JPC35 has a RS485 or RS232 interface. The standard application for the visualisation of up to 15 x UMG103 is available for all touch panels. Larger projects are possible upon request.

JPC104 / JPC121 / JPC150 application

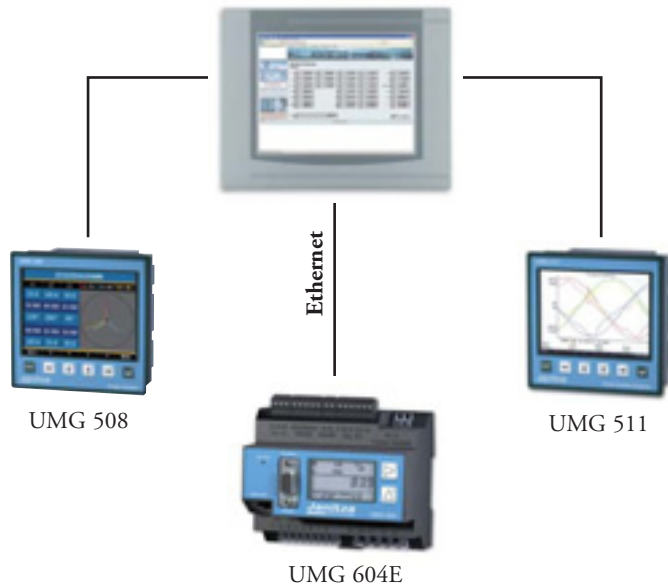
The 15", 12" and 10" touch panels have a pre-installed Windows embedded operating system. These panels serve the purpose of visually presenting the web pages of individual UMG instruments using a web browser (e.g. Firefox). The UMG 507, UMG 508, UMG 511, UMG 604 and UMG 605 can be configured with these web sites. In addition, the data is presented graphically and in tabular form. It is also possible to transfer customer-specific web sites. Customer specific applications can also be produced upon request by Janitza electronics®.

JPC35 application

The 3.5" touch panels can be configured close to the application for various uses. It is, therefore, possible to display several instruments (e.g. UMG 96S and UMG 103) on one screen. The standard menu guide is designed intuitively.



JPC150 application example



It is possible to view values from up to 31 instruments on one display.

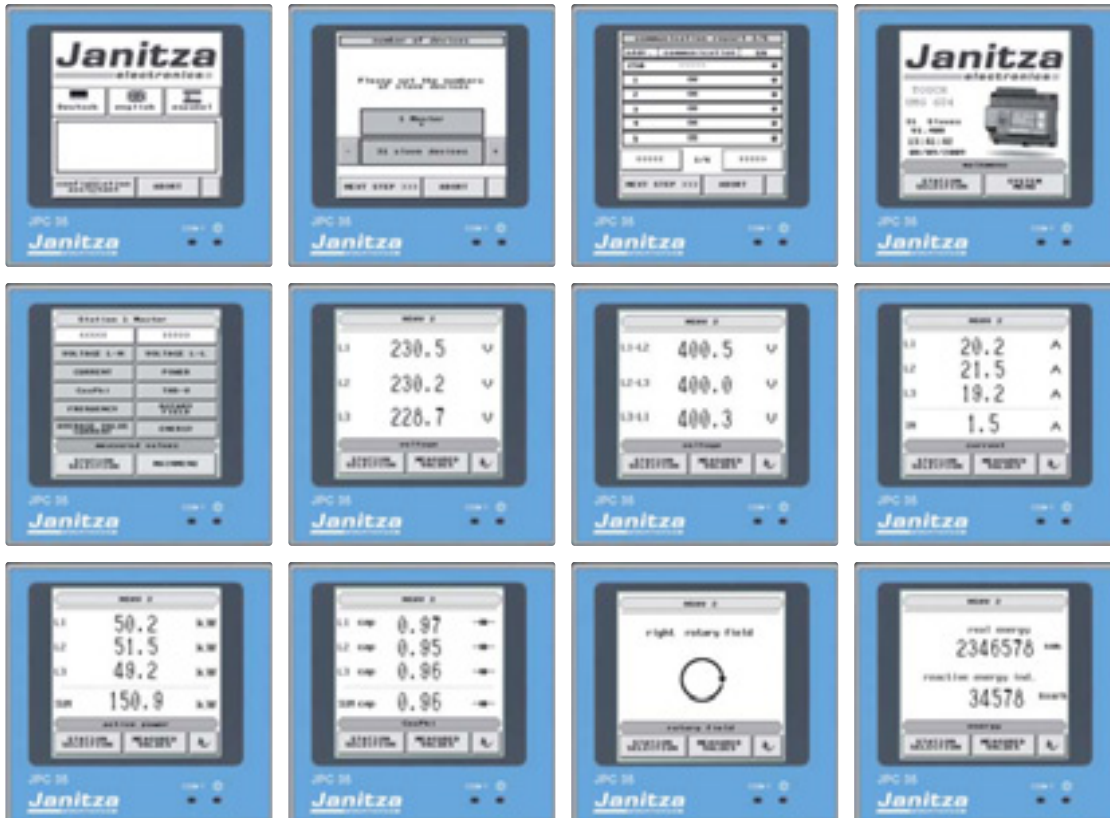
Specific applications such as configuration settings for the instruments, limit value monitoring, additional measurement values or measuring instrument headings can be configured and parameterised upon request. The Modbus RTU communication protocol transfers the measurement value data. The RS485 and RS232 are available as an interface for the JPC35.



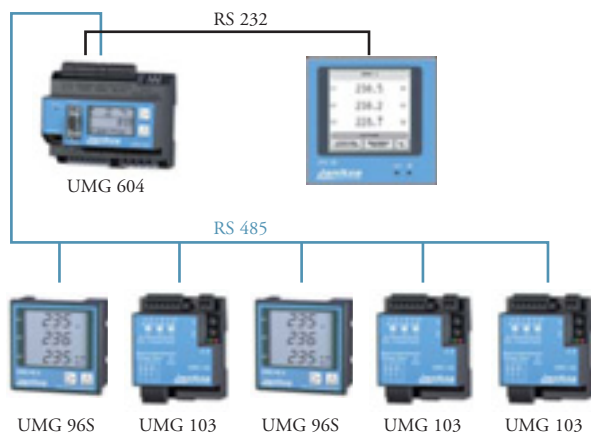
There are standard visualisations and menu guides (refer to table) for up to 31 slave instruments for the JPC35. Specific applications and options are available upon request.

Standard Version	
Measurement values	Display range
Voltage: L1, L2, L3 / L1-L2 ,L2-L3,L1-L3	0...999999.9V
Current: L1, L2, L3, current in N	0...999999.9A
Effective power: L1, L2, L3, sum	0...999999.9 kW
Apparent power: Sum	0...999999.9 kVA
Reactive power: Sum	0...999999.9 kvar
Cosphi: L1, L2, L3, sum	0,00 kap - 0,00 ind
THD: UL1, UL2, UL3	0 - 100%
Frequency	45 - 65 Hz
Rotating field	left / right
Average current	0...999999.9A with over line
Effective energy sum	0...99999999 kWh
Reactive energy ind. sum	0...99999999 kvarh
Special variants	
Specific features on request	- additional measurement values
Item no. 15.06.307	- Limit values - special headlines - customised menu

JPC35 display



Application with JPC35, Item no. 15.06.308



Prerequisite components:

- JPC35, Item no. 15.06.308
- 1 UMG604
- 1 up to 31 UMG103 or UMG96S

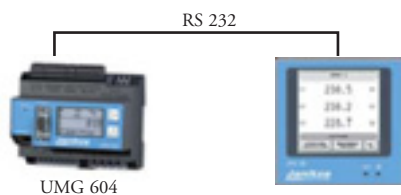
Topology:

The JPC35 is connected via RS232 interface to the UMG 604. All slave-devices like UMG103 and UMG96S are connected via RS485. For the different displays, an EGG (program extension) has to be installed or pre installed.

Features:

- 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, rotating field, AVG_I1, AVG_I2, AVG_I3, KWH, kvarh
- automatic monitoring of communication
- delete kWh / kVarh / kVAh (UMG604)
- Monitoring of limiting values (UL1, UL2, UL3, I1, I2, I3, P1, P2, P3, CosPhi1-3)
- Language selection (German, English, Spanish)
- Configuration assistant

Application with JPC35, Item no. 15.06.309



Prerequisite components:

- JPC35, Item no. 15.06.309
- 1 UMG604

Topology:

For this application the standard values of the UMG 604 are displayed. The communication is via interface RS232. For this application is no EGG (program extension) required.

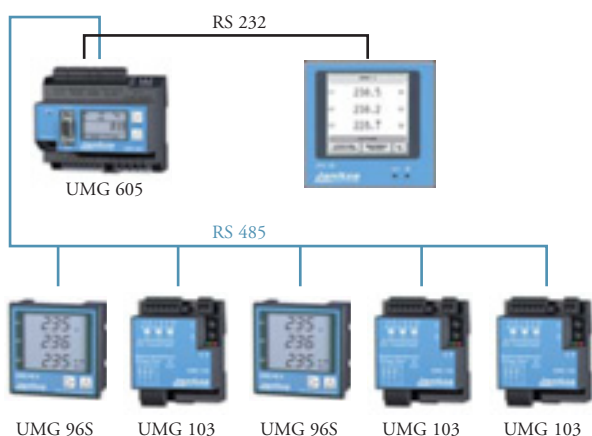
Features:

- 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, rotating field, AVG_I1, AVG_I2, AVG_I3, KWH, kvarh
- automatic monitoring of communication
- delete kWh / kVarh / kVAh (UMG604)
- Monitoring of limiting values (UL1, UL2, UL3, I1, I2, I3, P1, P2, P3, CosPhi1-3)
- Language selection (German, English, Spanish)
- Configuration assistant

Touch panels



Application with JPC35, Item no. 15.06.311



Prerequisite components:

- JPC35, Item no. 15.06.311
- 1 UMG605
- 1 up to 31 UMG103 or UMG96S

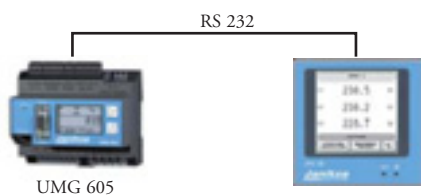
Topology:

The JPC35 is connected via RS232 interface to the UMG 605. All slave-devices like UMG103 and UMG96S are connected via RS485. For the different displays, an EGG (program extension) has to be installed or pre installed .

Features:

- 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, rotating field , AVG_I1, AVG_I2, AVG_I3, KWH, kvarh
- automatic monitoring of communication
- delete kWh / kVAh / kVAh (UMG604)
- Monitoring of limiting values (UL1, UL2, UL3, I1, I2, I3, P1, P2, P3, CosPhi1-3)
- Language selection (German, English, Spanish)
- Configuration assistant

Application with JPC35, Artikel-Nr. 15.06.312



Prerequisite components:

- JPC35, Item no. 15.06.312
- 1 UMG605

Topology:

For this application the standard values of the UMG 605 are displayed. The communication is via interface RS232. For this application is no EGG (program extension) required .

Features:

- 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, rotating field , AVG_I1, AVG_I2, AVG_I3, KWH, kvarh
- automatic monitoring of communication
- delete kWh / kVAh / kVAh (UMG604)
- Monitoring of limiting values (UL1, UL2, UL3, I1, I2, I3, P1, P2, P3, CosPhi1-3)
- Language selection (German, English, Spanish)
- Configuration assistant

Touch panels

Standard programming with 31 x UMG 96S / 103 is available for the larger touch panels. The UMG 604 E/EP or UMG 605 is used as a master. The application is fully created in FLASH and uses the web server of the UMG 604E/EP. FLASH adapts automatically to the various screen resolutions. Another major advantage is that the application can be called up within the network with any browser with FLASH plug-in. The view can be adapted to suit the specific customer requirements.

The “station selection” standard application contains 15 instruments but can be expanded customer request.



Illustration: UMG 604 main distribution



Illustration: Error report



Illustration: Station selection



Illustration: Communication error

Touch panels (HMI)



Functions and technical data

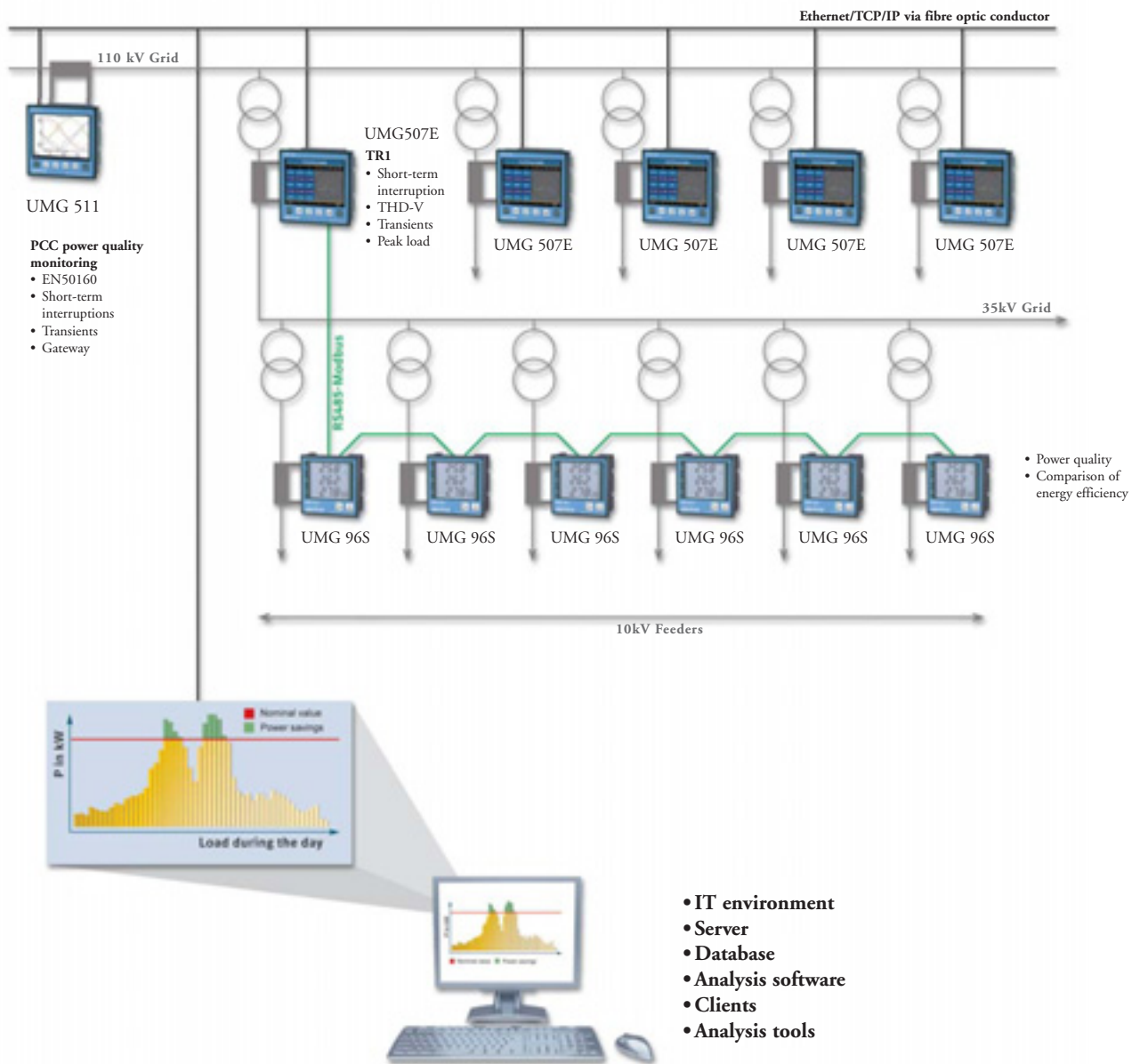


Overview of product variants				
Type	JPC35	JPC104	JPC121	JPC150
Item number	see application	15.06.300	15.06.301	15.06.302
Front panel				
Resolution [Pixel]	240 x 240	800 x 600	800 x 600	1024 x 768
Brightness [cd/m ²]	110	230	250	300
Number of colours	16 levels of grey	65,000 colours	65,000 colours	65,000 colours
Input	Resistive touch	Resistive touch	Resistive touch	Resistive touch
Screen diagonal	3,5"	10,4"	12,1"	15"
General technical data				
Voltage supply (external)	24 VDC ± 15%	24 VDC ± 20%	24 VDC ± 20%	24 VDC ± 20%
Weight [kg]	0,21	2,8	3,0	5,0
Operating temperature [°C]	0...50	0...50	0...50	0...50
Storage temperature [°C]	-10...60	-20...60	-20...60	-20...60
External measurements [mm]	96 x 96 x 40,6	318 x 244 x 81	364 x 296 x 74	452 x 357 x 86
Installation measurements [mm]	89,3 x 89,3	303 x 229	344 x 276	429 x 334
Front protection class	IP65	IP65	IP65	IP65
CPU				
Processor [MHz]	32 Bit RISC	300	300	300
Communication				
Interfaces				
Ethernet, RJ45	No	2	2	2
RS485	Yes	Option	Option	Option
RS232	Yes	Yes	Yes	Yes
USB	No	2	2	2
VGA	No	Yes	Yes	Yes
Keyboard/mouse	No	PS/2	PS/2	PS/2
Protocols				
Modbus RTU	Yes	No	No	No
Ethernet TCP/IP	No	Yes	Yes	Yes
Operating system				
XP embedded	No	Yes	Yes	Yes
Windows CE 4.1	No	Yes	Yes	Yes
Windows 2000	No	Yes	Yes	Yes
Applications (optional)				
Standard visualisation for 1-15 instruments (UMG 103 or UMG 96S)	Yes	Yes	Yes	Yes
Customer-specific applications	Yes	Yes	Yes	Yes
Web server	No	Yes	Yes	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 were 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.

for power factor correction

We provide general non-binding information about common practices in this table. Connection diameters and the fuse rating are dependent upon the nominal power of the PFC system, the national regulations, the cable material used and the environmental conditions. The recommendation for fuse amperage is only for short-circuit protection, HRC fuses are not suitable to protect PFC capacitors against overloading. The system manufacturer or the planning office is responsible for calculating and selecting cable diameters and fuses for each individual case.

PFC cable diameters, fuses (for 400V/50Hz) networks			
Power in kvar	Nominal current in A	Cable diameter NYY-J mm ²	HRC fuse A
5	7	4 x 2,5	16
7,5	10	4 x 4	20
10	14	4 x 4	25
12,5	18	4 x 6	35
15	22	4 x 6	35
17,5	25	4 x 10	50
20	29	4 x 10	50
25	36	4 x 16	63
30	43	4 x 16	80
37,5	54	4 x 25	100
50	72	3 x 35/16	125
55 - 65	79 - 94	3 x 35/16	160
70 - 85	101 - 123	3 x 70/35	200
86 - 100	124 - 145	3 x 95/50	250
101 - 125	146 - 181	3 x 120/70	250
126 - 160	182 - 231	2" 3 x 70/35	315
161 - 180	233 - 260	2" 3 x 95/50	400
181 - 200	261 - 289	2" 3 x 120/70	400
201 - 250	290 - 361	2" 3 x 150/70	500
251 - 300	362 - 434	2" 3 x 185/95	630

Connection diameters are only valid for the given capacitor power levels

PFC systems with a power level of more than 300 kvar have 2 separate bus bar systems and require 2 separate feeders. The table applies to conventional or de-tuned PFC systems. The actual valid regulations (e.g. DIN VDE 0298) must always be observed.

Important note: the bus bar separation must be allocated before extending any existing systems.



This selection table was created for calculating the necessary reactive power. On the basis of the actual power factor and the target power factor a multiplier can be determined from this table, which has to be multiplied with the effective power to be compensated. The result is the necessary reactive power for the PFC system. This table can also be found as an MS Excel document for online calculation on our homepage in the submenu "tools".

Cos-Phi selection table												
										Effective power P = 100 kW ACTUAL cosφ = 0.65 TARGET cosφ = 0.95 Factor F from table = 0.84 Compensation power Qc = P x (tanφ1 - tanφ2) P * F 100 x 0.84 84 kvar		
ACTUAL tanφ	cosφ	Target power factor cosφ										
		0.80	0.82	0.85	0.88	0.90	0.92	0.94	0.95	0.96	0.98	1.00
Factor F												
1.33	0.60	0.58	0.64	0.71	0.79	0.85	0.91	0.97	1.00	1.04	1.13	1.33
1.30	0.61	0.55	0.60	0.68	0.76	0.81	0.87	0.94	0.97	1.01	1.10	1.30
1.27	0.62	0.52	0.57	0.65	0.73	0.78	0.84	0.90	0.94	0.97	1.06	1.27
1.23	0.63	0.48	0.53	0.61	0.69	0.75	0.81	0.87	0.90	0.94	1.03	1.23
1.20	0.64	0.45	0.50	0.58	0.66	0.72	0.77	0.84	0.87	0.91	1.00	1.20
1.17	0.65	0.42	0.47	0.55	0.63	0.68	0.74	0.81	0.84	0.88	0.97	1.17
1.14	0.66	0.39	0.44	0.52	0.60	0.65	0.71	0.78	0.81	0.85	0.94	1.14
1.11	0.67	0.36	0.41	0.49	0.57	0.62	0.68	0.75	0.78	0.82	0.90	1.11
1.08	0.68	0.33	0.38	0.46	0.54	0.59	0.65	0.72	0.75	0.79	0.88	1.08
1.05	0.69	0.30	0.35	0.43	0.51	0.56	0.62	0.69	0.72	0.76	0.85	1.05
1.02	0.70	0.27	0.32	0.40	0.48	0.54	0.59	0.66	0.69	0.73	0.82	1.02
0.99	0.71	0.24	0.29	0.37	0.45	0.51	0.57	0.63	0.66	0.70	0.79	0.99
0.96	0.72	0.21	0.27	0.34	0.42	0.48	0.54	0.60	0.64	0.67	0.76	0.96
0.94	0.73	0.19	0.24	0.32	0.40	0.45	0.51	0.57	0.51	0.64	0.73	0.94
0.91	0.74	0.16	0.21	0.29	0.37	0.42	0.48	0.55	0.58	0.62	0.71	0.91
0.88	0.75	0.13	0.18	0.26	0.34	0.40	0.46	0.52	0.55	0.59	0.68	0.88
0.86	0.76	0.11	0.16	0.24	0.32	0.37	0.43	0.49	0.53	0.56	0.65	0.86
0.83	0.77	0.08	0.13	0.21	0.29	0.34	0.40	0.47	0.50	0.54	0.63	0.83
0.80	0.78	0.05	0.10	0.18	0.26	0.32	0.38	0.44	0.47	0.51	0.60	0.80
0.78	0.79	0.03	0.08	0.16	0.24	0.29	0.35	0.41	0.45	0.48	0.57	0.78
0.75	0.80		0.05	0.13	0.21	0.27	0.32	0.39	0.42	0.46	0.55	0.75
0.72	0.81		0.03	0.10	0.18	0.24	0.30	0.36	0.40	0.43	0.52	0.72
0.70	0.82			0.08	0.16	0.21	0.27	0.34	0.37	0.41	0.49	0.70
0.67	0.83			0.05	0.13	0.19	0.25	0.31	0.34	0.38	0.47	0.67
0.65	0.84			0.03	0.11	0.16	0.22	0.28	0.32	0.35	0.44	0.65
0.62	0.85				0.08	0.14	0.19	0.26	0.29	0.33	0.42	0.62
0.59	0.86				0.05	0.11	0.17	0.23	0.26	0.30	0.39	0.59
0.57	0.87				0.03	0.08	0.14	0.20	0.24	0.28	0.36	0.57
0.54	0.88					0.06	0.11	0.18	0.21	0.25	0.34	0.54
0.51	0.89					0.03	0.09	0.15	0.18	0.22	0.31	0.51
0.48	0.90						0.06	0.12	0.16	0.19	0.28	0.48
0.46	0.91						0.03	0.09	0.13	0.16	0.25	0.46
0.43	0.92							0.06	0.10	0.13	0.22	0.43
0.40	0.93							0.03	0.07	0.10	0.19	0.40
0.36	0.94								0.03	0.07	0.16	0.36
0.33	0.95									0.04	0.13	0.33
0.29	0.96										0.09	0.29
0.25	0.97										0.05	0.25



Selection table - fixed compensation of motors			
Motor power in kW	Capacitor power in kvar (dependent upon speed/minute)		
	1500	1000	750
1 - 1,9	0,5	0,6	0,7
2 - 2,9	1	1,2	1,3
3 - 3,9	1,5	1,7	2
4 - 4,9	2	2,3	2,5
5 - 5,9	2,5	2,8	3
6 - 7,9	3	3,5	4
8 - 10,9	4	4,5	5
11 - 13,9	5	6	7
14 - 17,9	6	7	8
18 - 21,9	7,5	8,5	10
22 - 29,9	10	11,5	12,5
30 - 39,9	ca. 40%	ca. 43%	ca. 50%
> 40	ca. 35%	ca. 38%	ca. 55%

Note:

- Values are guide values only
- The capacitor power should be approx 90% of the idle motor power
- Over-compensation must be avoided to prevent overexcitation

Guideline values for fixed motor compensation (PFC) according VDEW

Selection table for fixed compensation of transformers	
Transformer nominal power in kVA	Capacitor nominal power in kvar
100	5
160	6.25
200	7.5
250	10
315	12.5
400	15
500	20
630	25
800	30
1000	40
1250	50
1600	60
2000	80



Note:

- Values are guide values only
- Regional regulations of energy supply companies must be observed
- Pay attention to the respective back-up fuses and short-circuit proof cables



Overview of the available field buses and interfaces with the various UMG families:

Field buses & interfaces in the UMG family											
Protocol	UMG 103	UMG 104	UMG 96S	UMG 503	UMG 505	UMG 507	UMG 508	UMG 511	UMG 604	UMG 605	Interface
Modbus RTU	X <small>Without RS232</small>	X	X	X	X	X <small>DSub9</small>	X <small>Without RS232</small>	X <small>Without RS232</small>	X	X	RS232 RS485
Modbus TCP/IP	-	-	-	-	-	X	X	X	X	X	Ethernet RJ45
Modbus UDP	-	-	-	-	-	X	X	X	X	X	Ethernet RJ45
Profibus DPV0	-	X	X	-	-	X	X	X	X	X	DSub9
MBus	-	-	X	-	-	-	-	-	-	-	DSub9
LONBus	-	-	-	-	X	-	-	-	-	-	Lon Interface
BacNet	-	-	-	-	-	-	X	X	X	X	RS485 Ethernet RJ45

Direct connection via RS232 interface

Possible with:

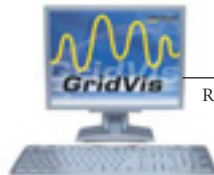
UMG 104 • UMG 503L, LG, OV, V • UMG 505 • UMG 507L, AD, P, E, EP • UMG 96S • Prodata®
UMG 604 • UMG 605

Neutral modem cable

- For UMG 503
- For UMG 505
- For UMG 96S

Item number

08.02.405
08.02.425
08.01.501



RS232

Neutral modem cable

RS232



Connection with RS485 interface

Possible with:

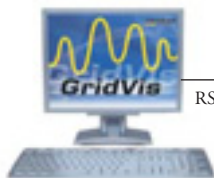
UMG 96S • UMG 103 • UMG 104 • UMG 503 • UMG 505 • UMG 507 • UMG 508 • UMG 511 • UMG 604 • UMG 605
ProData® • Prophi®

Item

RS485 converter K2075
RS485 repeater K1075
RS485 hub K1375

Item number

15.06.015
15.06.024
15.06.035



RS232



RS485 (without repeater max. 1000m)



Direct connection via Ethernet

Possible with:

UMG 507E, EP • UMG 508 • UMG 511 • UMG 604E, EP • UMG 605

Item

Cross-Patch-Kabel

Item number

08.01.506



Cross patch cable

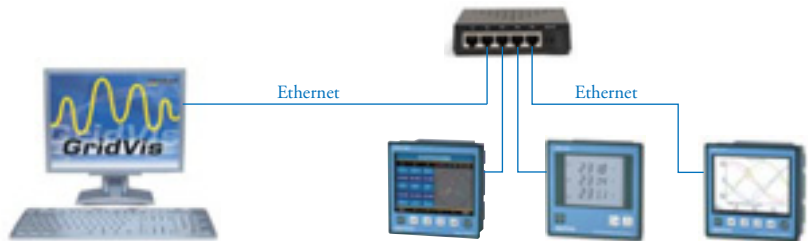


Connection via Ethernet (intranet)

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

Item
Patch cable

Item number
08.01.504

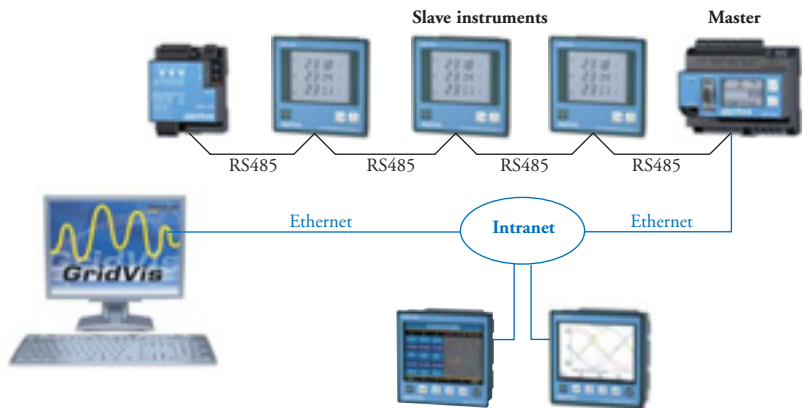


Modbus gateway (intranet)

Possible with master instrument types: UMG 507E, EP • UMG 508 • UMG 511 • UMG 604E, EP • UMG 605
Slave: UMG 503LS, S, OV, V • UMG 507L, AD, P, E, EP • UMG 505 • UMG 96S • ProData® • Prophi®
UMG 103 • UMG 104

Item
Patch-Kabel

Item number
08.01.504

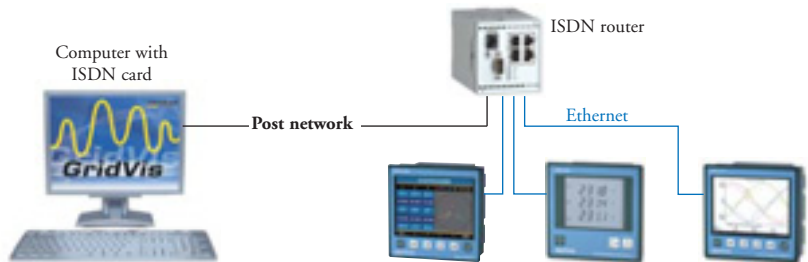


Connection via ISDN

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

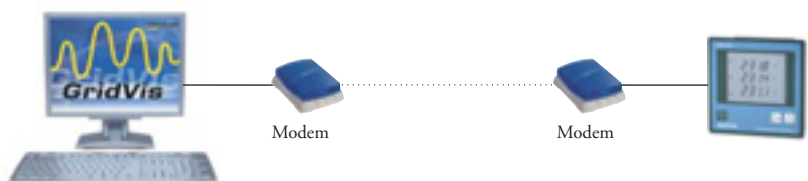
Item
ISDN router

Item number
15.06.040



Connection via modem

Possible with:
UMG 503L, LG, OV, V • UMG 96S • UMG 505 • ProData®



Request for information



Request form for documents

Janitza electronics GmbH
Vor dem Polstück 1
35633 Lahnu / Germany
E-mail: sales@janitza.com

FAX: 0049 6441 964230

Sender:

Company: _____

Name: _____

Street: _____

ZIP code / City: _____

Country: _____

Telephone: _____

Fax: _____

Mobile: _____

E-mail: _____



Please send me the following information:

- Main catalogue pcs
- Image brochure pcs
- Price list pcs
- UMG flyer pcs
- CD Rom software pcs
- AN1001 application report – PQM in power utilities pcs
- Application report pcs
- ISO9001 certificate pcs
- Miscellaneous: pcs

Please copy this page, fill out the form and fax it to: 0049 6441 964230

Cardboard packaging sizes

Shipping packaging

Type	Dimensions WxHxD in mm	Packaging weight in g			Net weight of unit in kg (incl. Operating manual etc)	Gross weight in kg	Device type	Number of units in package
		Box	Plastic	Sum				
Unit carton 1	180x85x145	98,05	2,45	105,00	0.275	0.38	UMG 96L / 96	1
Unit carton 1	180x85x145	98,05	2,45	105,00	0.455	0.56	UMG 96S	1
Unit carton 1	180x85x145	98,05	2,45	105,00	0.195	0.30	UMG 103	1
Unit carton 2	180x140x170	165,30	4,70	170,00	1.190	1.36	UMG 503-505	1
Unit carton 2	180x140x170	165,00	4,70	170,00	1.150	1.32	UMG 507	1
Unit carton 2	180x140x170	165,30	4,70	170,00	0.610	0.78	UMG 104/604/605	1
Unit carton 2	180x140x170	165,30	4,70	170,00	1.010	1.18	Prophi	1
Unit carton 2*1	180x140x170	165,30	4,70	170,00	1.500	1.67	UMG 508/511	1
Unit carton 3*2	150x210x240	285,50	8,50	294,00	1.500	1.79	UMG 508/511	1

Cardboard packaging sizes

Shipping packaging

Total weight in kg with the respective device type *3

Type	Dimensions LxWxH in mm	Packaging weight in kg	Unit carton 1 or 2, quantity per layer		Number of layers	Max number of unit carton 1 or 2		UMG 96 or UMG 96L	UMG 96S*3	UMG 103	UMG 503 or UMG 505	UMG 507	UMG 104 604 605	Prophi®	UMG 508 511
			1	2		1	2								
			Master carton 1	315x225x170		0.21	1								
Master carton 2	400x300x250	0.39	10	4	1	10	4	4.2	6.0	3.4	5.8	5.7	3.5	5.9	6.9
Master carton 3	340x240x280	0.28	7	4	1	7	4	2.9	4.2	2.4	5.7	5.6	3.4	5.0	6.8
Master carton 4	395x340x390	0.89	8	4	2	16	8	7.0	9.9	5.7	11.8	11.5	7.1	10.3	13.9
Master carton 5	440x395x390	0.86	13	6	2	26	12	10.8	15.5	8.7	17.3	16.8	10.3	15.1	20.4
Master carton 6	700x400x400	1.42	20	10	2	40	20	16.6	23.8	13.4	28.6	27.8	17.0	25.1	33.8
Master carton 7	800x400x400	1.52	23	10	2	46	20	19.0	27.3	15.3	28.7	27.9	17.1	25.1	33.9
Master carton 8 on pallet	800x600x400	7.25	36	15	2	72	30	34.6	47.6	28.9	48.1	46.9	30.7	42.7	55.9
Master carton 9 on pallet	1180x780x675	17.50	64	32	3	192	96	90.5	125.0	75.5	148.0	143.5	92.5	131.0	173.0
Master carton 10 on pallet	1180x780x905	18.60	64	32	4	256	128	115.9	162.0	95.4	192.7	187.6	118.4	169.6	226.0

*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. *3 – The weight of item number 52.13.025 has been applied to the UMG 96S. *4 – 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.



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:

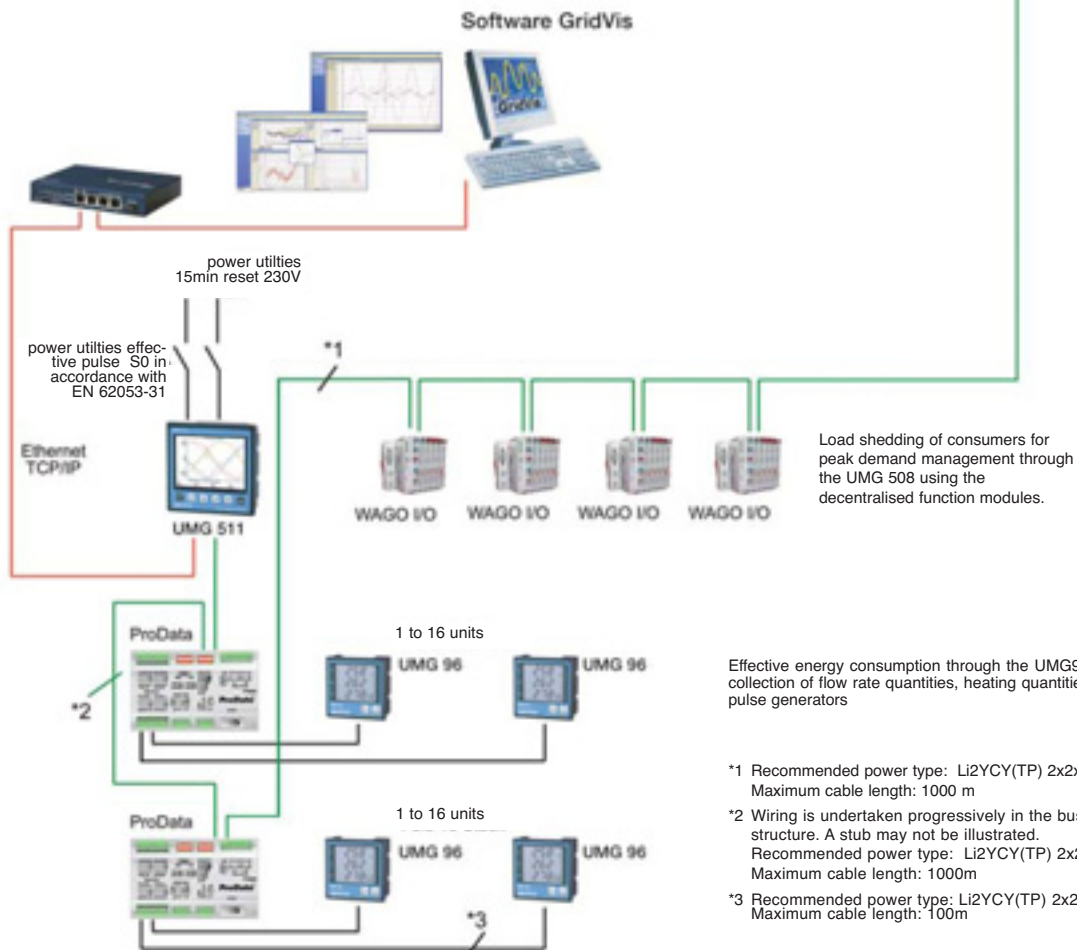
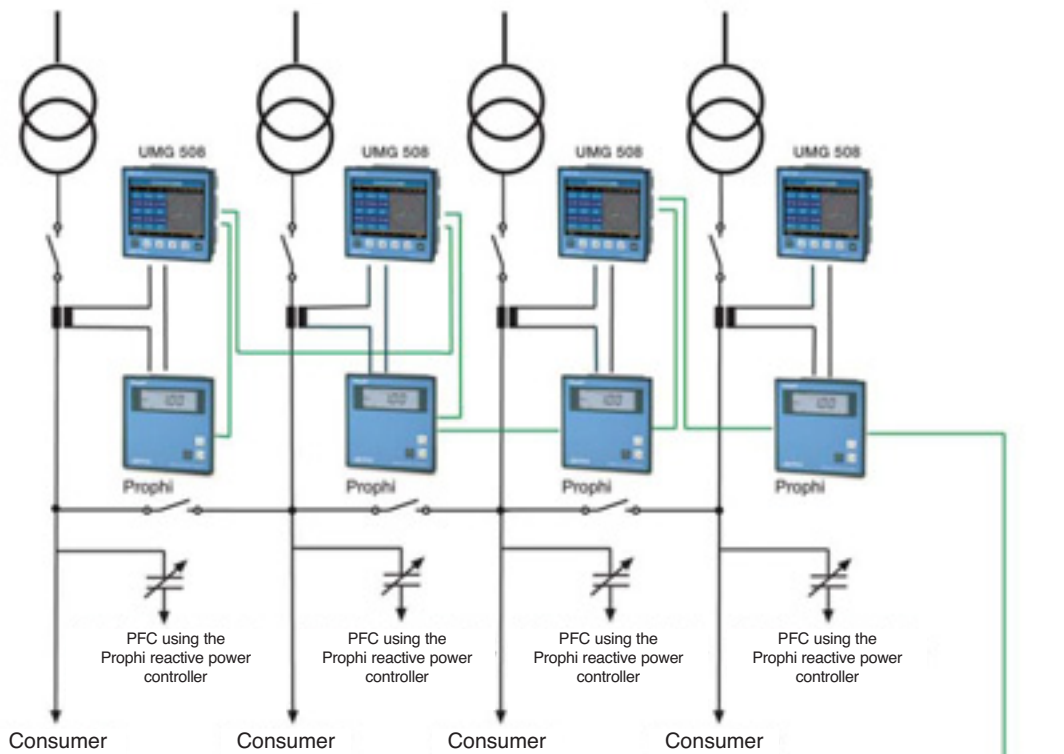
The UMG 96 of Janitza electronics®, which passes on the effective pulses to the ProData® data logger, was used as a meter for electrical energy consumption. Other pulse meters for compressed air and heating were also connected to the ProData® using the pulse outputs.

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.

Application example



Project description - supermarket

Project description - supermarket



The problem:

Despite very similar buildings and consumer structures, the consumption and loads in supermarket stores can be very different. The reason for this can be the various manufacturers of deep freezers, lighting and ventilation systems which often have very different levels of energy efficiency but it can also be due to the various sites with different weather conditions (snow, hours of sunlight etc), the number of customers each day or the environmental awareness of the employees. Furthermore, non-linear consumers frequently lead to serious problems with regard to power quality.

Therefore, it makes sense to measure consumption levels and loads together with the general power data in the stores, collect the data and benchmark the stores with each other.

The task:

A supermarket chain wanted to measure the loads, consumption data and power quality in the main feeders and several outputs in the respective stores and then collect the data in one main PC. With the help of concrete measurement data, stores with high consumption levels were intended to be identified in order to find reasons for the particularly high consumption and peak loads. The supermarket chain then wanted to reduce peak loads using peak demand management and monitor the power quality in the individual outputs with regard to harmonics, as produced by deep freezers for example. In addition, the consumption of gas and water was also to be measured and the data was to be provided to the facility management. The communication media was an ISDN connection.

The solution:

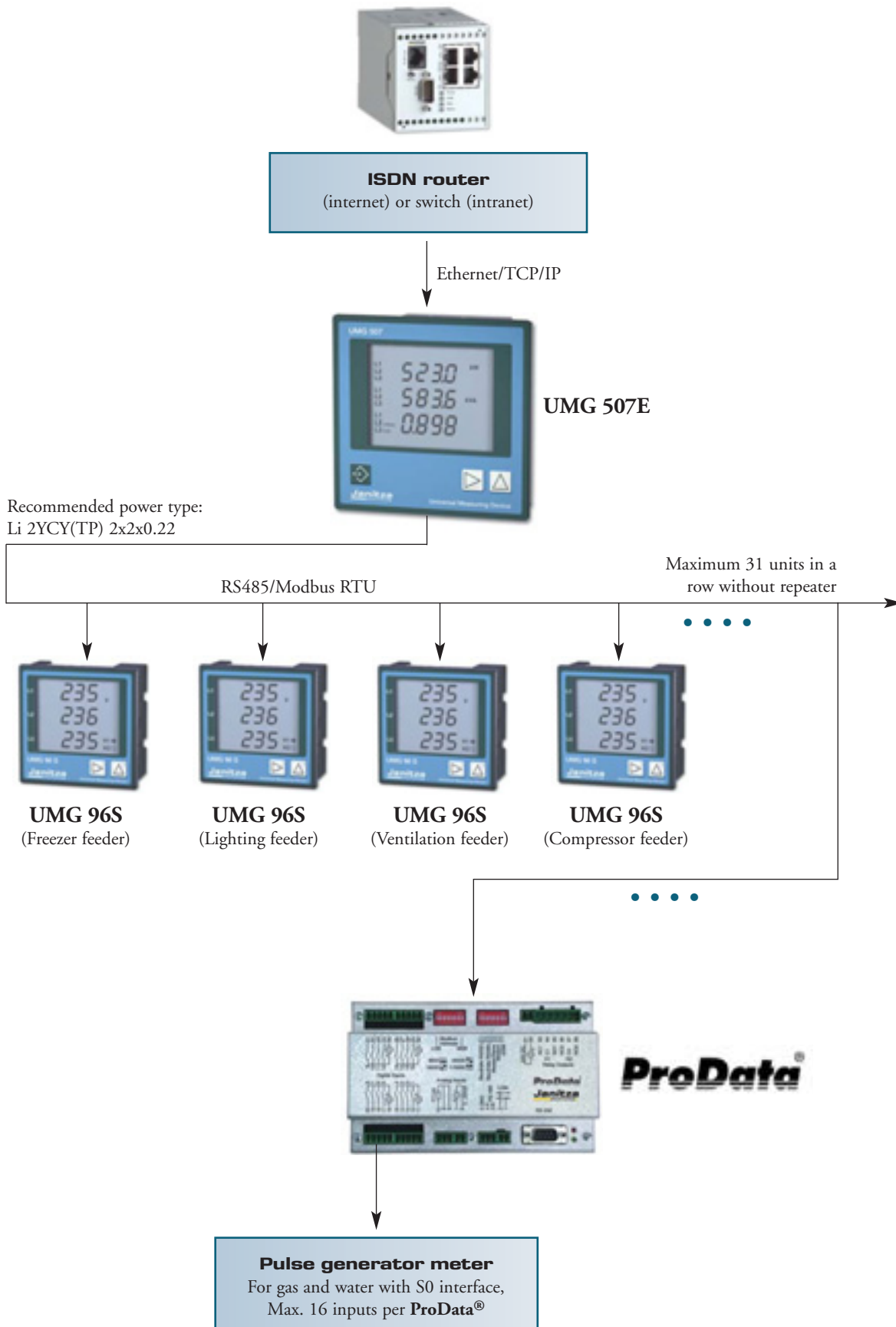
Stores:

A UMG 507E was deployed in the main feeder which enabled direct access through an ISDN router. On one hand, the device monitors power quality in the complete network and on the other hand, allows peak demand management for six sheddable loads using the Emax function. The unit can be extended by up to 32 Emax channels using an external WAGO module. Additional superfluous consumptions can be avoided using a time switch program e.g. automatic switch-off for lighting when the store closes. Voltage breaks and other events can be sent by e-mail with a document attachment upon request. The sub measurements are connected to the UMG 507E using an RS485 which also functions as a gateway. Data from four outputs (freezers, ventilation, lighting and compressors) are collected using four UMG 96S's with the clock and memory. The consumption of gas and water is measured using pulse meters and the pulse is passed on to the integral ProData®.

Headquarters:

The data is compiled on a main data server. The measurement value memory in the instruments is conveniently read-out using the PSW professional analysis software in the individual stores. Due to the number of stores, the instruments are only read once per month. The measurement data can easily be processed for the required time period comparison in MS Excel sheets. These are integrated using MS Excel macros which read the data produced by PSW professional into the database.

Application example





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:

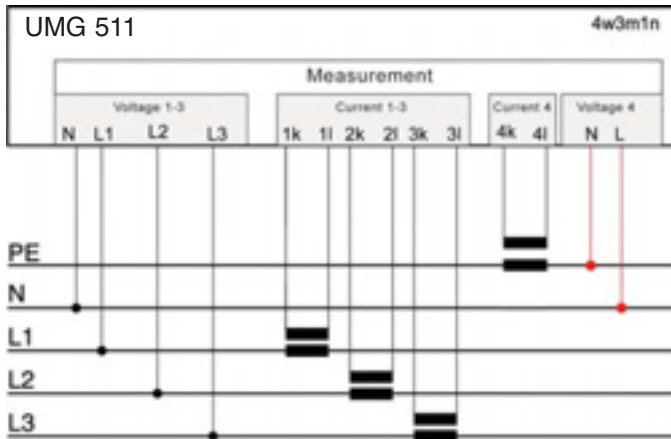
A total of 39 x UMG 511 were installed in the feeders and all important distributions for communication, such as in the server rooms etc. An important feature is the fourth current and voltage input on the instrument. Due to the installation of the fourth current transformer in the protective earth conductor, 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.

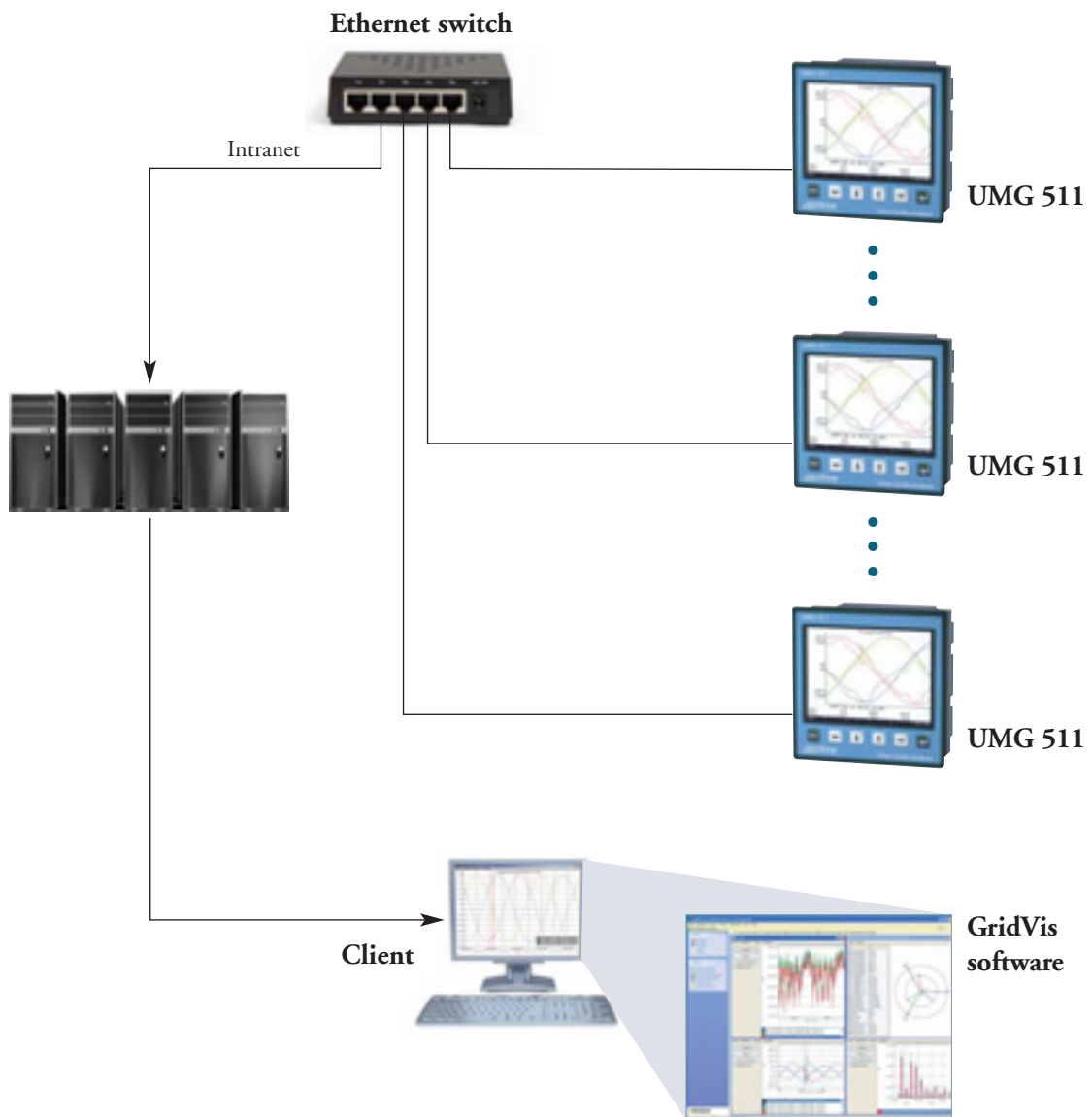
The reasons for the frequent loss of communication in the data network were found and important knowledge about the power quality was gained. The producers of harmonics could, therefore, be tracked down. Materials such as electronic controls or server supply units, which were previously destroyed due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

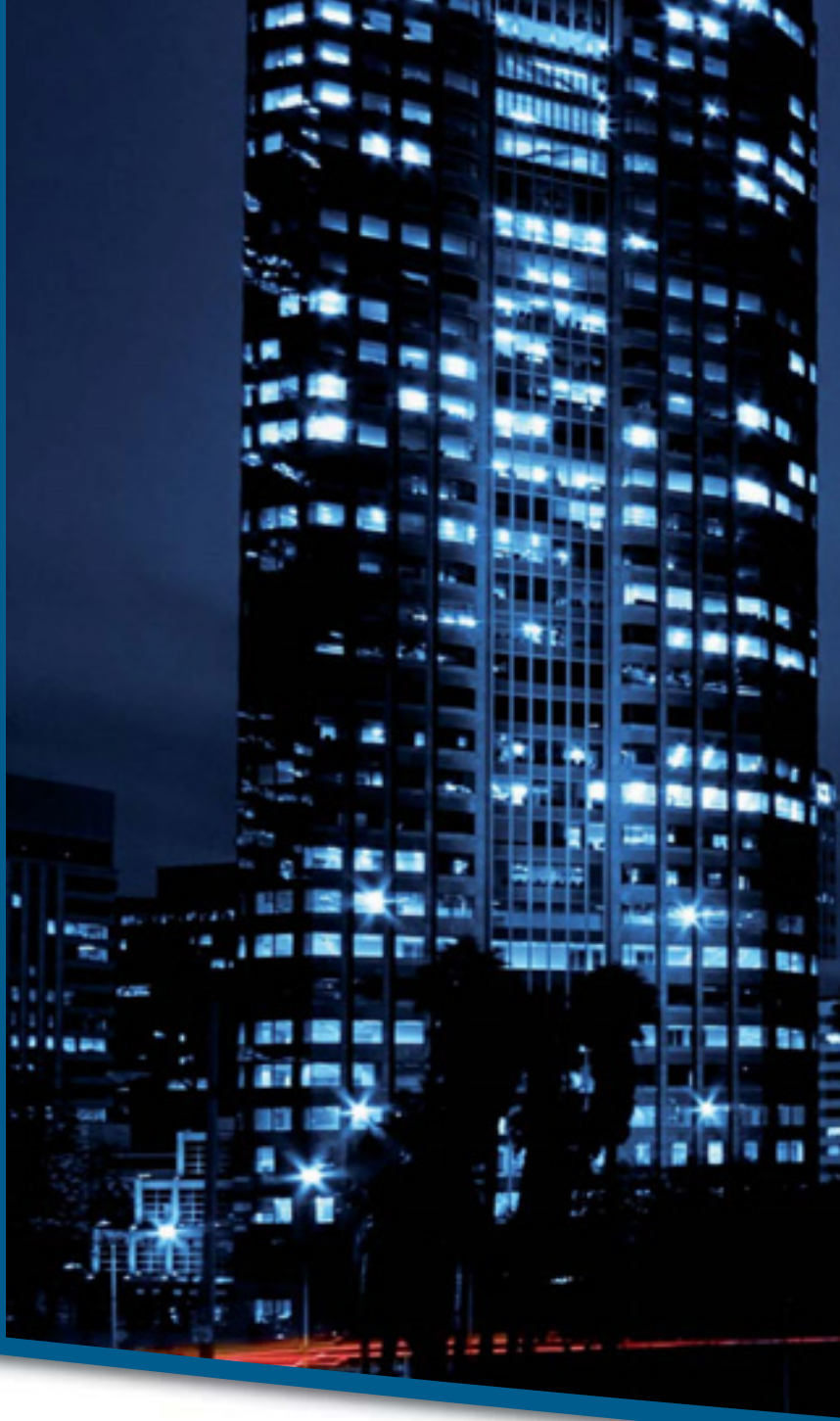
Application example



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



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