

USING ENERGY EFFECTIVELY



ENERGY MANAGEMENT

Comply with standards, save energy costs,
control supply quality

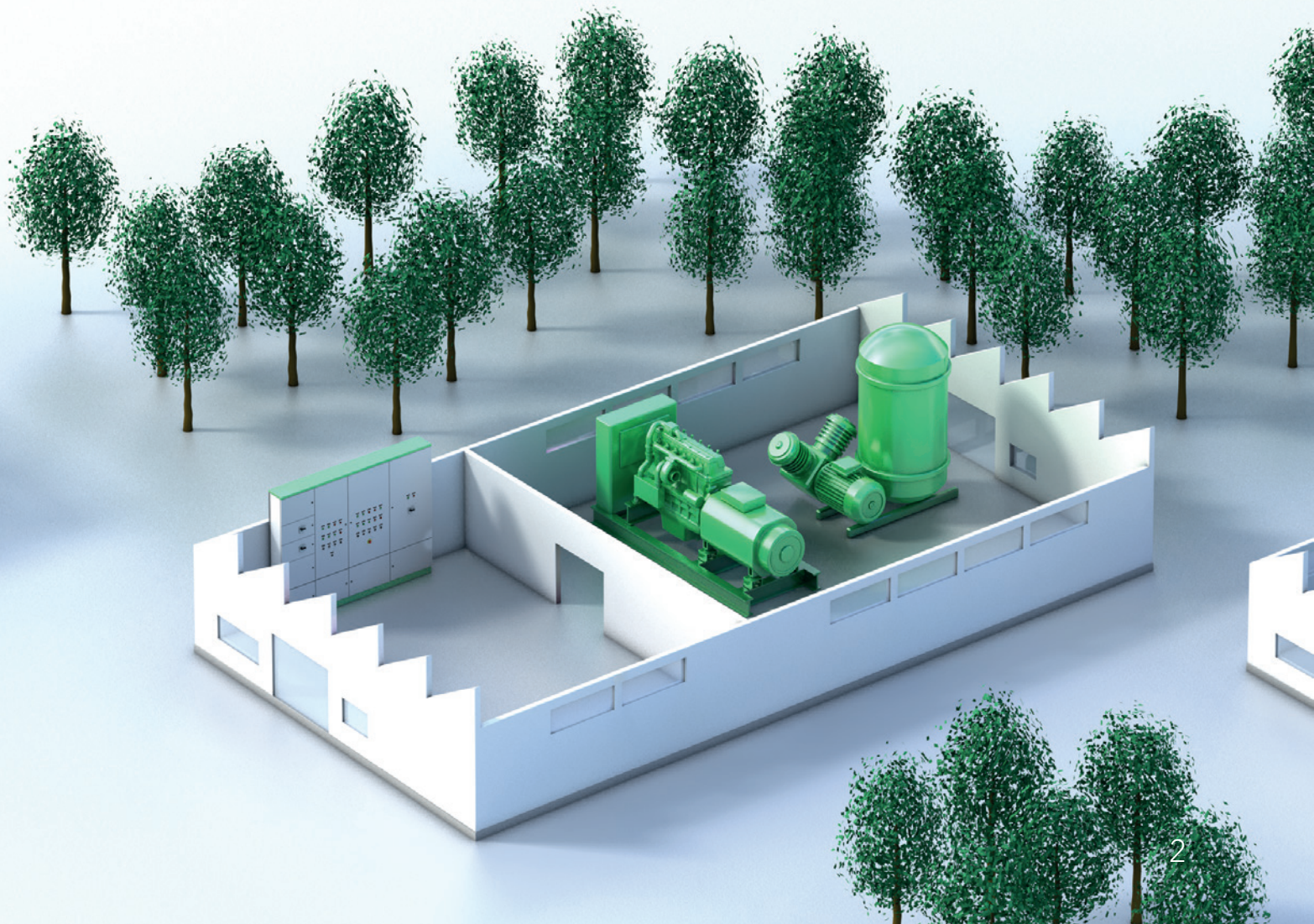
RETHINKING ENERGY MANAGEMENT

Many businesses and companies have already installed their own energy management systems, but the topic continues to be of relevance because of changes in regulations. New directives and standards, such as ISO 50006, have been introduced and the requirements, for example for the EEG levy reduction, have become stricter.

The current focus on environmental policy issues has also made energy management significantly more relevant, but at the same time, the area faces new challenges. All businesses would do well to keep these new require-

ments in mind. This is especially important, however, for companies that benefit from discounts and are ISO certified. And precisely here is where a flexible energy management system that can easily be expanded and adapted comes into play.

Energy data collected with Janitza energy measurement devices such as the UMG 801 or the UMG 96-PA series provides a good foundation for both current and future challenges. The measurement data from all devices can be stored, visualized and evaluated in the GridVis® software.





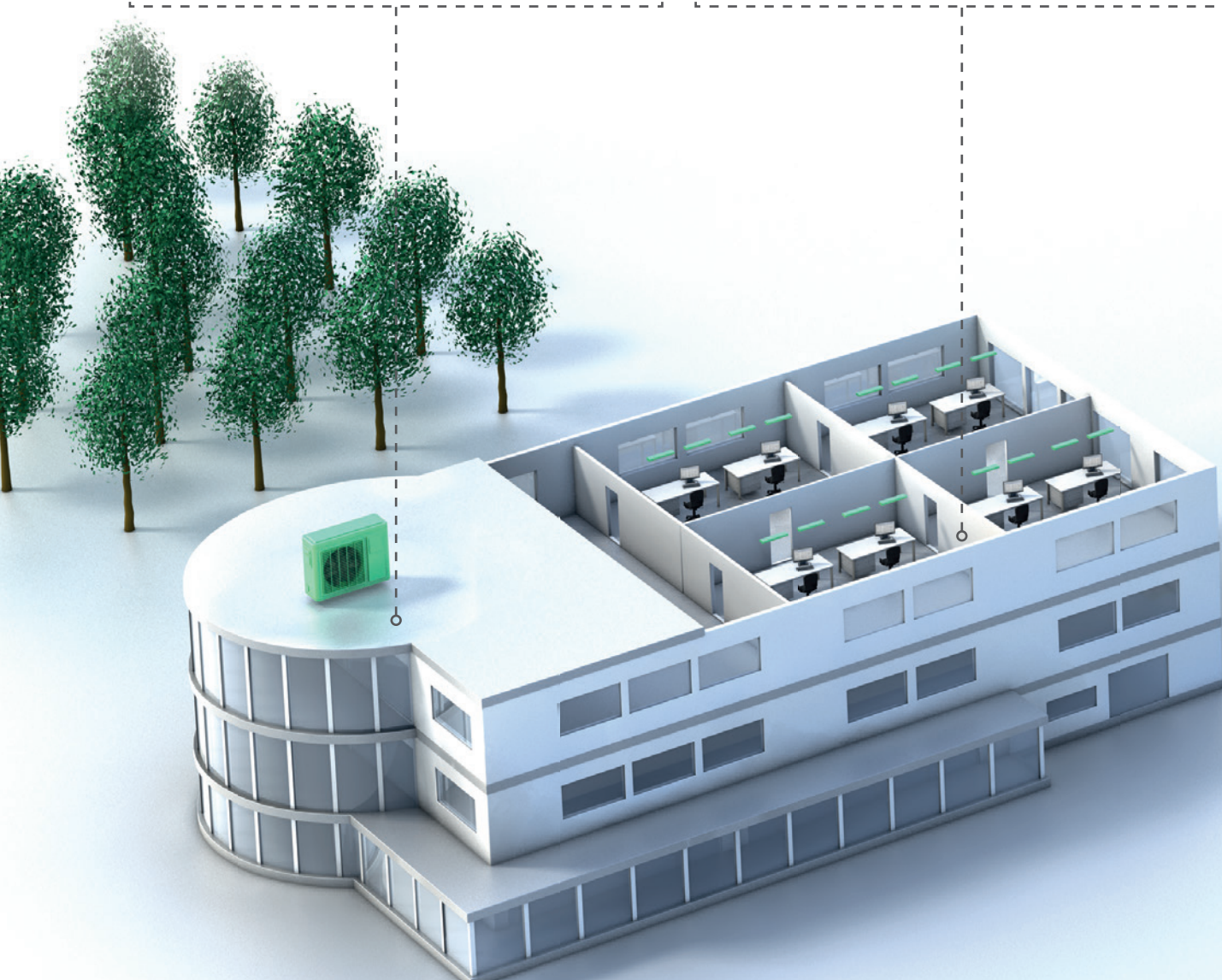
UMG 96RM

- Different interface variants
- 96 x 96 mm front panel
- Recording of load profiles



GridVis® SOFTWARE

- Visualization of live values
- Creation of standards-compliant reports
- Integration of third-party devices





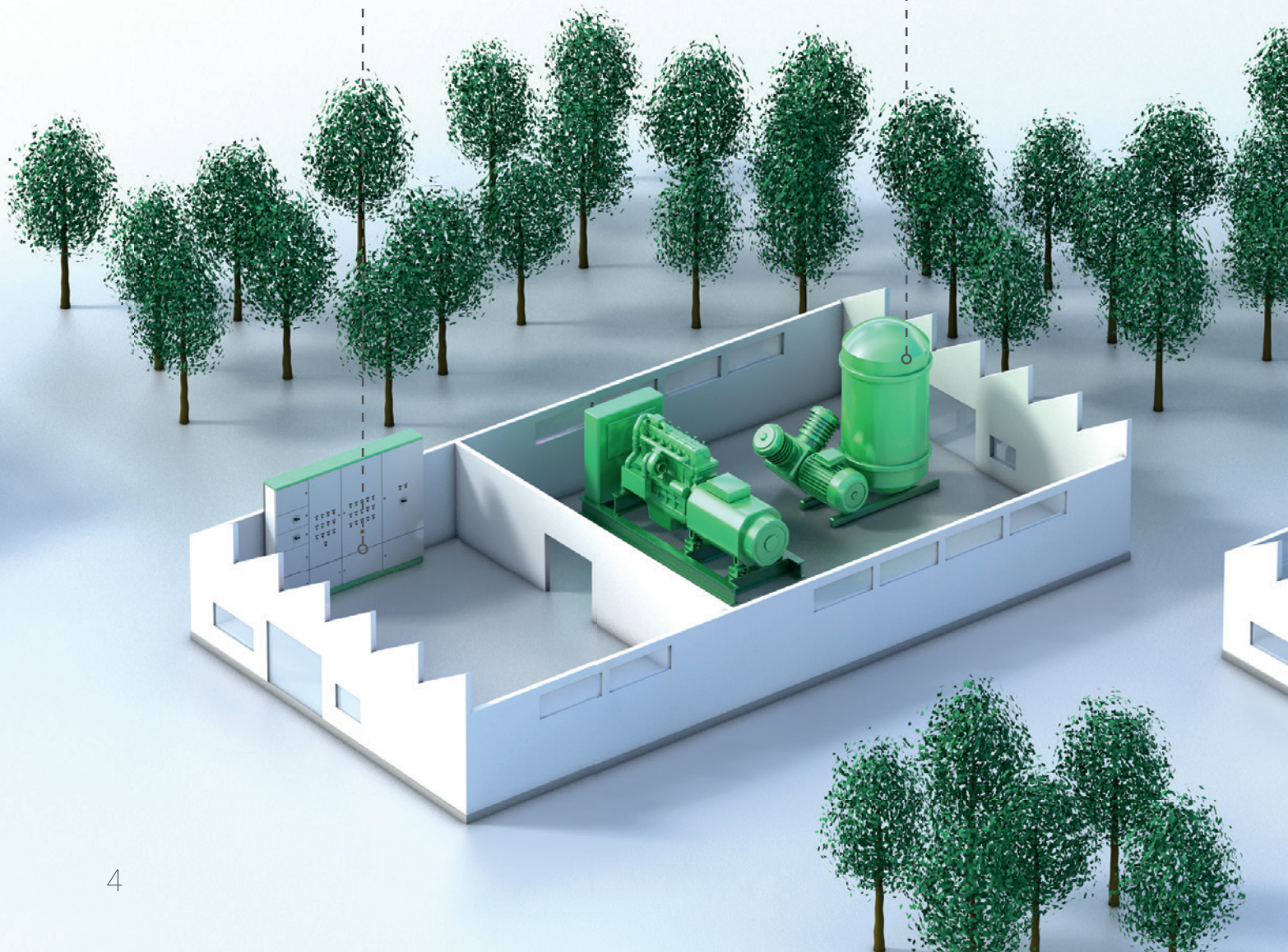
UMG 801

- Modularly expandable to 92 current measurement channels
- Overvoltage category, 1000 V CAT III
- High connectivity, such as OPC UA



UMG 96-PA-MID+

- MID certified measurement
- Modular expandability
- Meter reading cycle to PTB-A 50.7





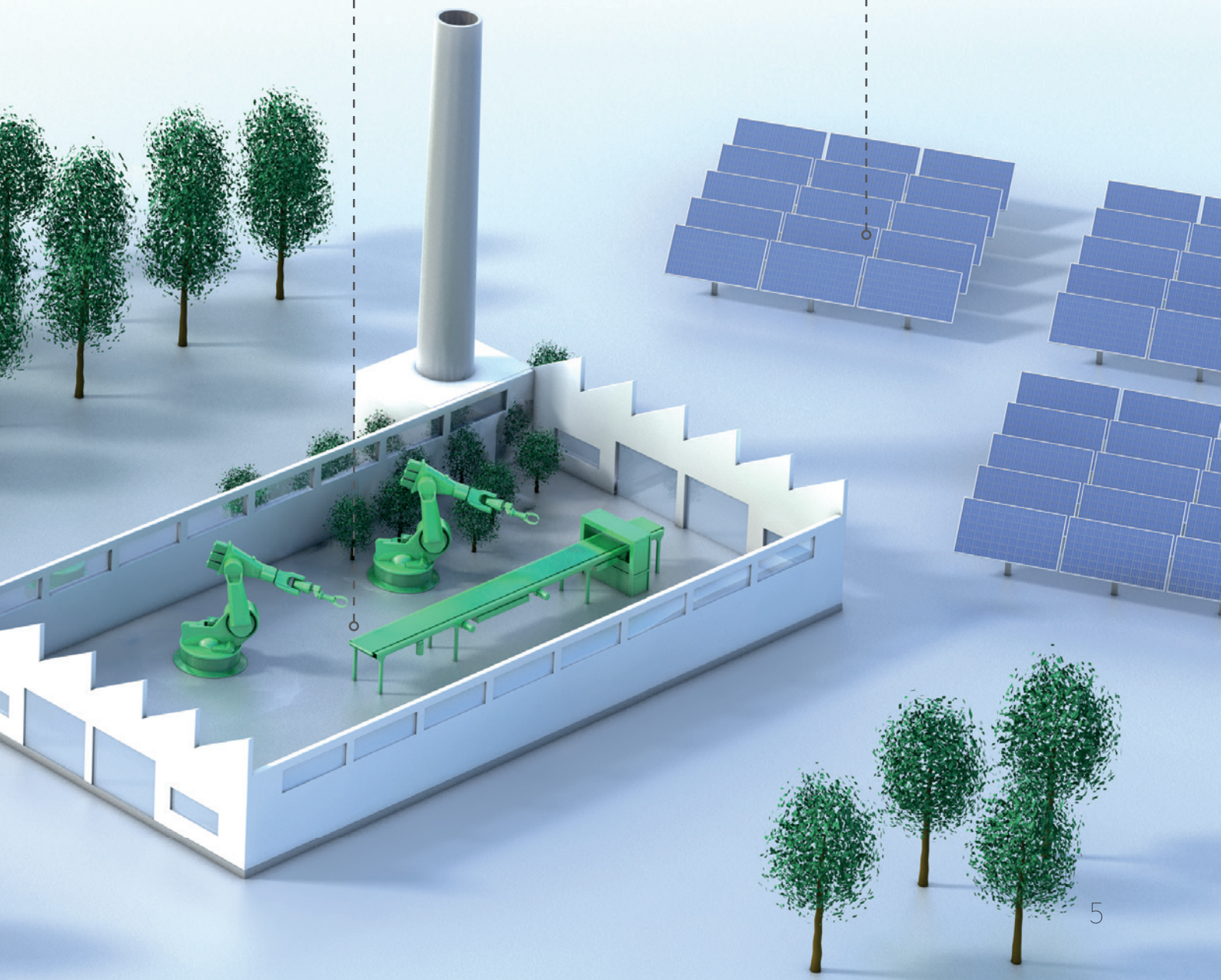
UMG 806

- Modular expandability
- Compact design
- Connection of external sensors



UMG 604-PRO

- Programmable
- Own device homepage
- Expandable with APPs



CHALLENGES AND RELEVANT STANDARDS

The energy policy framework and environmental policy have changed. Together with the increasing pressure on the economy, new regulations have emerged, which will continue to be adapted and expanded in the future. Further standards, such as ISO 50006 and 500015 have been added to ISO 50001. Today they define the requirements for modern energy management systems.

The technical framework has also evolved. New data acquisition options and communication standards such as OPC UA simplify the networking of different devices. Collected data can be stored, viewed and evaluated centrally.

Energy measurement devices from Janitza are available in different versions. In combination with the GridVis® network visualization software and the appropriate range of services, they make an important contribution to the fulfillment of the complex set of rules and regulations.

ISO 50001 (2018)

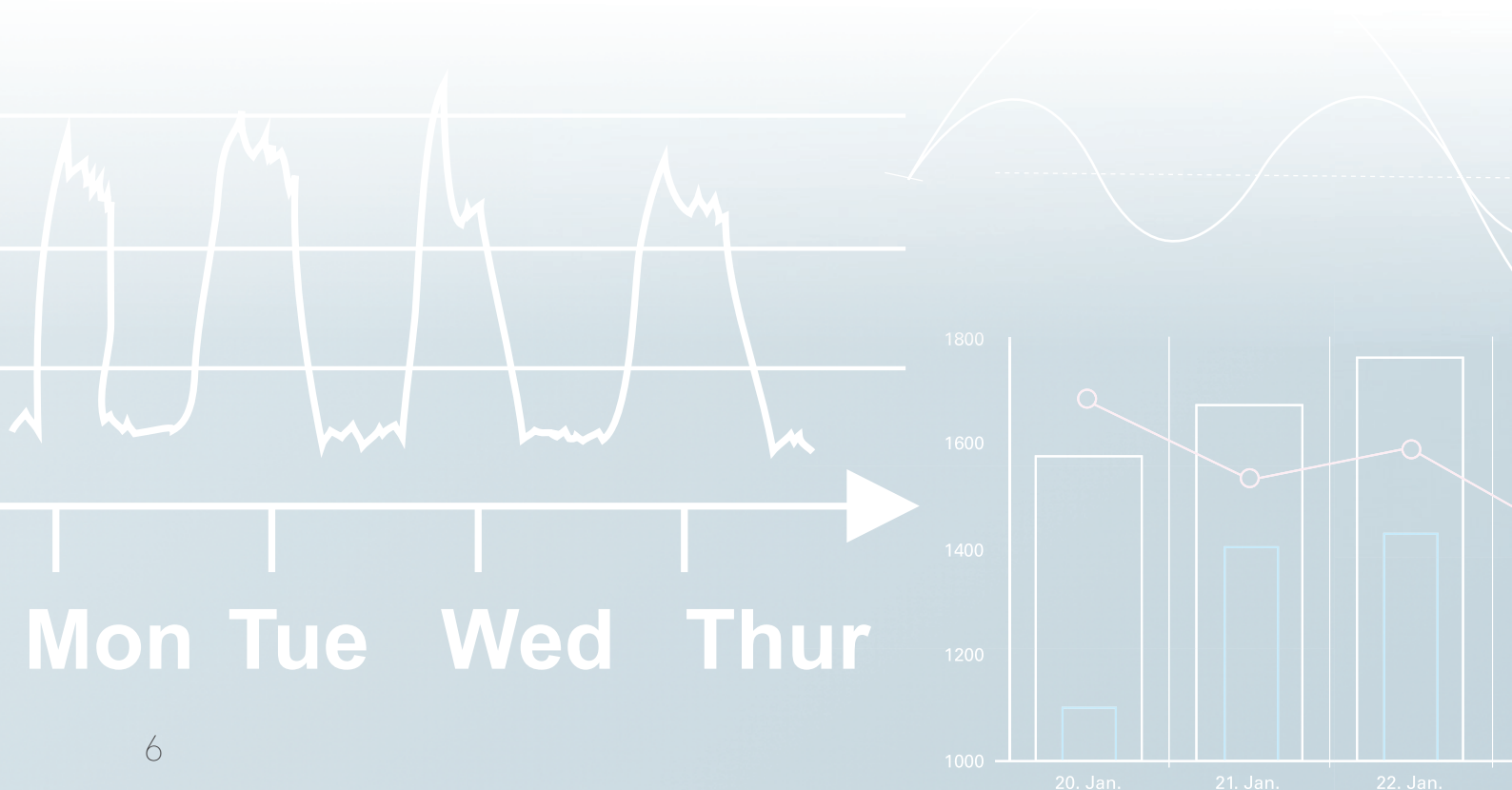
Energy management systems – requirements with guidance for use

DIN EN ISO 50001 is a management system standard that defines the requirements for an energy management system to enable organizations to increase their own energy efficiency. The last amendment included the introduction of energy performance indicators and more detailed requirements for the collection of energy data.

ISO 50002 (2014)

Energy audits – requirements with guidance for use

ISO 50002 describes the requirements for an energy audit, not to be confused with the audit of an energy management system. The focus is on the energy evaluation according to ISO 50001.



ISO 50003 (2016)

Energy management systems – requirements for bodies providing audit and certification of energy management systems

DIN ISO 50003 specifies requirements for the certification of energy management systems. It contains the process of auditing, the competence requirements for the personnel carrying out the audit, the duration of audits and the sampling inspections required to ensure proper certification.

ISO 50004 (2015)

Energy management systems – guidance for the implementation, maintenance and improvement of an energy management system

ISO 50004 provides support for the introduction, implementation and improvement of an energy management system and serves as a guide.

ISO 50006 (2017)

Energy management systems – measuring energy performance using energy baselines (EnB) and energy performance indicators (EnPI) – general principles and guidance

DIN ISO 50006 is a guide for the use of energy performance indicators (EnPIs) and energy baselines. Energy performance indicators serve as comparative figures to evaluate energy-related processes. Energy-related performance includes energy consumption, use and efficiency.

ISO 50015 (2018)

Energy management systems – measurement and verification of energy performance of organizations – general principles and guidance

DIN ISO 50015 is a set of principles and guidelines for the measurement and verification of energy-related performance and its improvement. It includes the preparation of a measurement and inspection plan, as well as measurement and verification. The focus is on controlling the improvement of energy-related performance, regardless of the type of energy used.



SYSTEMATIC ENERGY MANAGEMENT

To be able to react to new requirements, you need a system that can be easily adapted and reacts flexibly. This means it is an advantage if all components come from one source, as this eliminates compatibility problems. Janitza offers numerous measurement devices for all levels as well as the GridVis® network visualization software, with which all data can be viewed and analyzed in realtime. Third party devices can also be easily integrated into the system. Various services, from installation to the evaluation of energy data, together with the hardware and software, form a flexible system that can be adapted to individual requirements.

Advantages of a system solution with Janitza:

- Recording of other consumption types such as water, gas, temperature, etc.
- Integration of third-party devices
- Flexible expansion and retrofitting
- Recording of power quality parameters and residual currents
- Consulting throughout the entire project
- Integration of M-Bus data via a corresponding gateway



GridVis® – ANALYZE & VISUALIZE ENERGY DATA

Janitza GridVis® stands for certified energy management to ISO 50001. It offers the right functions for any energy management system. Measurement devices can be connected via Ethernet and RS232 interfaces and tariffs as well as various energy values such as active and reactive energy can be transferred to GridVis®. Third-party devices can also be integrated into GridVis® via Modbus and thus additional types of consumption, such as water and gas, can be recorded. The flexibility

gained in this way means that your energy measuring system can be expanded and adapted later on. Simple use and administration of data are ensured by numerous functions and evaluation options as well as various possibilities for data import and export. Both historical and live values are displayed, visualized and evaluated. Individual dashboards and overviews can be created intuitively, without programming knowledge. Consumption data and costs are transparent with GridVis®.



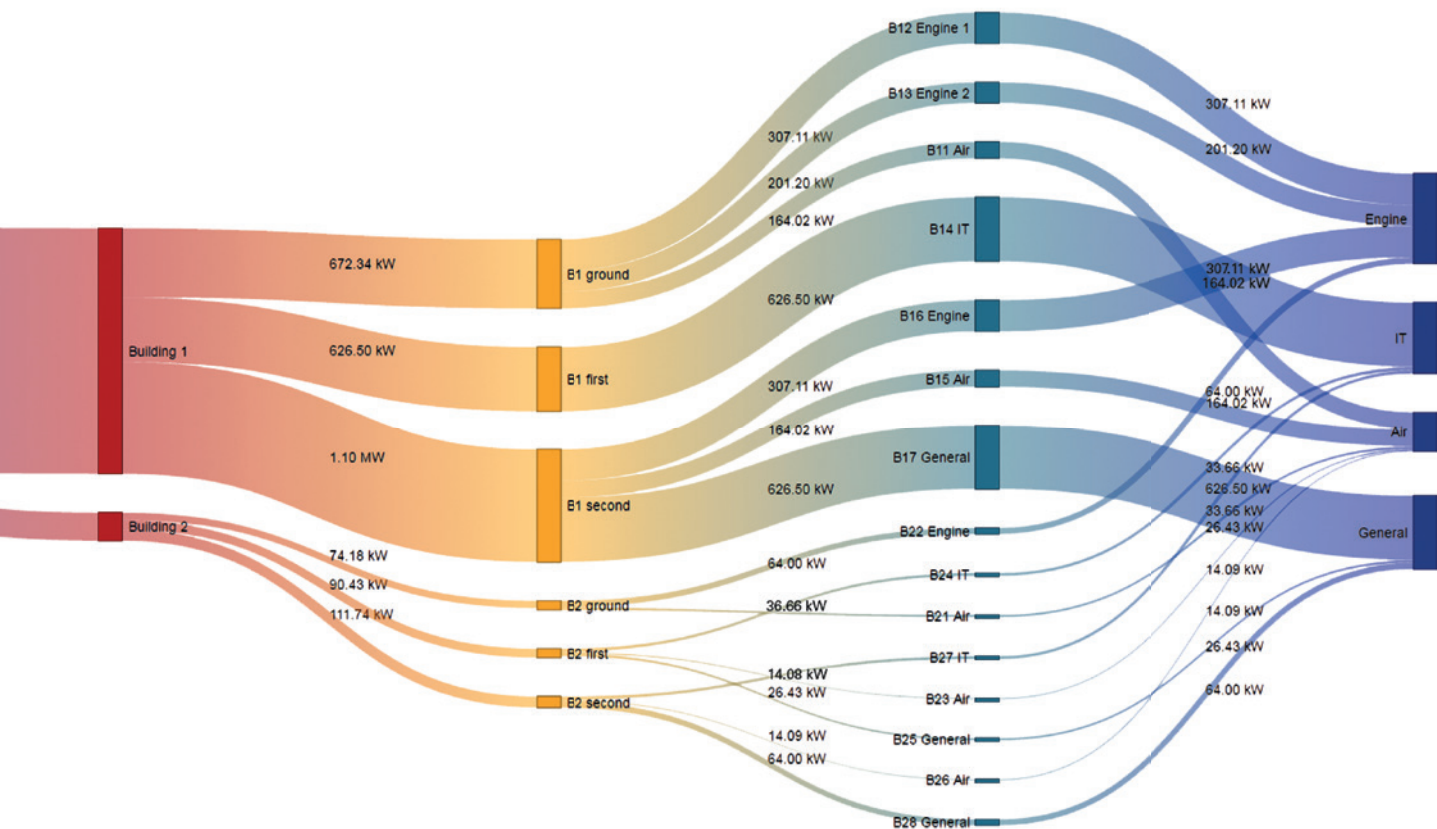
ENERGY CONSUMPTION – ALWAYS IN VIEW

Differentiated data collection is only a small part of energy management. The evaluation of the data and the implementation of appropriate measures are the real challenge. Sankey diagrams and KPIs help to keep track of the wealth of data and to derive concrete measures. They enable the visualization of energy flows and the comparison of measured values. Which means you always have an overview.

Sankey diagrams

- Uncluttered, clear display of historical values
- Read live values from the device and display them in the diagram
- Visualize the distribution and structure of the overall energy consumption
- Display energy flows of the entire company
- Customize interfaces and nodes

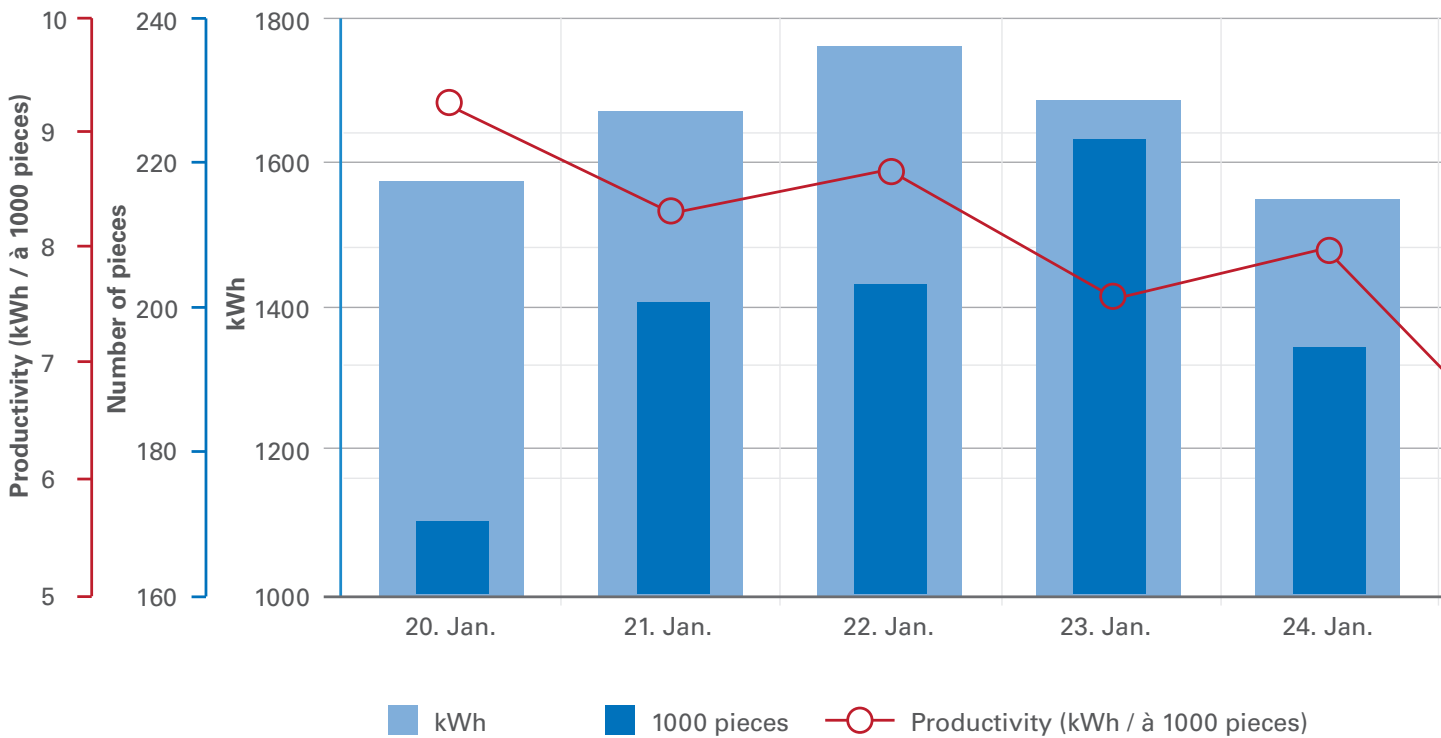
SANKEY DIAGRAM



Energy performance indicators (EnPIs)

- Create individual performance indicators
- Visualize the efficiency of the company
- Specify the energy baseline according to ISO 50006
- Create EnPIs according to ISO 50006
- Create product-related key performance indicators
- Display changes in performance indicators with the trend and evaluation system

KEY PERFORMANCE INDICATORS (KPIs)



REPORTING, ANALYSIS AND CONNECTIVITY

Reports

- Data exports optimized for energy management
- Energy billing
- Utilization report
- XLS, CSV and PDF output
- Standards-compliant reports for power quality and residual current

Data import

- CSV and MSCONS imports
- Integration of third-party devices via Modbus
- Interfaces such as OPC UA or REST API
- Support of numerous protocols such as COMTRADE

UTILIZATION REPORT



MODULAR ALL-IN-ONE ENERGY MONITORING SOLUTION

The compact UMG 801 is suited perfectly to record energy values within the framework of an energy management system and to increase the transparency of energy consumption and costs at all levels. In addition, power quality and residual currents can be recorded in fine granularity. The UMG 801 offers various communication interfaces and enables direct data transfer to higher-order systems via OPC UA.

The measuring system can be expanded to a maximum of 92 current measuring channels with the aid of the 800-CT8-A current measuring modules. Up to 10 modules can be integrated using a click system with no external cabling between the basic device and the current measuring modules. Power supply and data transfer are carried out via an integrated bus system. In addition, remote measurement points can be connected using the 800-CON transfer module.



For further information, please see:
<https://www.janitza.com/umg-801.html>



- Active energy class 0.2S (.../5 A)
- Measurement in TN, TT and IT systems
- Harmonics current up to the 127th harmonic
- High sampling rate of up to 51.2 kHz per channel
- Residual current detection, Type A, Type B and Type B+
- Multifunction channels for RCM, temperature or current measurement
- Future-proof software architecture due to OPC UA standard
- Expandable to 92 single-phase current channels
- High dielectric strength, 1000 V CAT III

METER READING CYCLE AND MID-CERTIFIED MEASUREMENT

The UMG 96-PA series is ideally suited for collecting and monitoring electrical measured values. With the recorded data, it is possible to monitor not only energy management but also power quality and residual currents in a single device. This allows residual currents to be detected at an early stage and equipment damage and production downtimes can be avoided. With the UMG 96-PA-MID variant, companies are able to record energy data relevant to billing

and to record MID-compliant energy values. Companies that fall under the special compensation scheme can use MID-compliant meters to meet the requirements for reducing the EEG levy. Furthermore, the UMG 96-PA-MID+ meets the legal requirements for the delimitation of self-generated energy over and against third-party consumers by means of the additionally certified meter reading cycle according to PTB-A 50.7.



For further information, please see:
<https://www.janitza.com/umg-96-pa.html>

- Practical 96 x 96 mm front panel size
- Modular design with Modbus gateway and optional Ethernet module
- Active energy class 0.2S
- MID certification to Directive 2014/32/EU
- Historical data – long-term monitoring of measured variables
- Fourth current transformer input (e.g. N conductor)
- Meter reading cycle according to PTB-A 50.7 for the delimitation of third-party consumers
- Two analog inputs: 0-20 mA analog inputs or RCM measurement inputs with cable break detection

○ **UMG 96-PA SERIES**

THE FUSION OF HARDWARE AND SOFTWARE

The UMG 604-PRO is more than just a multifunctional meter. It is capable of recording numerous energy and voltage values and analyzing harmonics current. It can also record a wide variety of events and transients. The freely configurable memory, which can hold up to 5 million measurement data items, allows all measured values to be saved and protected against loss if the data connection is interrupted.

The network analyzer has its own device homepage which enables control of the device – or control it directly via the device display. This ensures the data are available at any time (without installation of additional software). In addition, the UMG 604-PRO can be expanded using numerous APPs and is programmable via Jasic® so that it can be enhanced using proprietary functions.



For further information, please see:
<https://www.janitza.com/umg-604-pro.html>

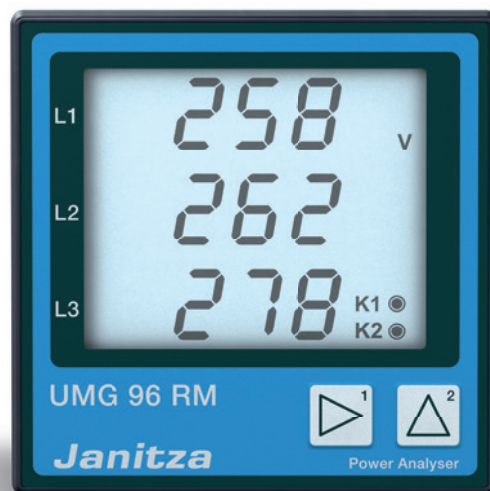
- Easy integration into different systems
- Recording of numerous power quality parameters
- Integrated power quality analysis
- Continuous availability of measurement data thanks to device homepage
- 128 MB measurement data memory
- Programmable
- Integrated APPs
- Ethernet Modbus gateway
- Overvoltage category, 300 V CAT III

○ UMG 604-PRO

CONNECTIVITY IN A COMPACT DESIGN

Measurement devices of the UMG 96RM series are primarily designed for use in low and medium-voltage distribution systems. The series is characterized by the practical front panel installation size of 96 x 96 mm, as well as the large number of interfaces that are provided. Janitza UMG 96RMs measure harmonics current up to the 40th harmonic and have rotating field components. The measurement devices have up to four digital inputs and six

digital outputs. Depending on the measurement device, a 256 MB measurement data memory is available for recording and can be operated or read out directly on site using two keys. The UMG96RM-E and the UMG 96RM-PN are additionally able to record residual currents. The entire series is characterized by a very good price-performance ratio.



For further information, please see:
<https://www.janitza.com/umg-96rm.html>

- Practical 96 x 96 mm front panel size
- Comprehensive interfaces and protocols
- Recording of load profiles
- 256 MB measurement data memory for continuous recording
- Recording of power quality parameters
- Tariff selection and cost center analysis
- Active energy class 0.5S
- Digital inputs and outputs

○ UMG 96RM SERIES

THE MODULAR SOLUTION FOR EVERY PURPOSE

The UMG 806 is suited perfectly for use as a universal measurement device for the recording of energy consumption and can be used to detect energy wasters. It is characterized by a compact design. Thanks to the modular design and the practical plug-in connection, the space in the switchboard cabinet can be used optimally. The powerful basic device records numerous energy values. In addition, it is possible to record harmonics current up to the

31st harmonic as well as the neutral conductor current. It can be operated either directly on site via the display and two buttons, or via Modbus/RTU. The interfaces of the device are also expandable thanks to the 806-EC1 Ethernet communication module. Analog inputs and outputs can be retrofitted via the 806-EI1 module, and digital inputs and outputs via the 806-ED1 module.



For further information, please see:
<https://www.janitza.com/modular-energy-measurement-device-umg-806.html>

- Expandable using modules
- Communication options include Modbus/RTU and Modbus/TCP
- Operate directly on the device
- Pulse output
- Suitable for DIN rail
- Connection of external sensors, 4-20 mA
- Recording of digital limit value parameters (e.g. temperature)
- Recording of power quality parameters
- Active energy class 0.5S

○ UMG 806

THE RIGHT CURRENT TRANSFORMER FOR EVERY APPLICATION



Current transformers act as a link between heavy current and measurement technology. They provide galvanic isolation and reduce the current at a defined ratio so it is suitable for the measurement device. Janitza's extensive portfolio

includes both pluggable and separable current transformers for a wide range of functions, including for billing or for operating current and residual current detection.

- Ideally suited for energy and power quality measurement devices
- High measuring accuracy up to class 0.2
- Long service life
- High overload capacity
- Break-proof plastic housing
- Versatile, space-saving and exceptionally fast installation
- High safety thanks to galvanic isolation between measuring circuit and measurement device
- Large selection for different primary conductors
- Low power dissipation even with high primary currents
- High interference resistance to external magnetic fields

○ CURRENT TRANSFORMER

THE RIGHT SUPPORT FOR EVERY CHALLENGE



Project groundwork

- Exclusive seminars for planners
- Consulting in all project phases

Courses & training

- GridVis® Basic courses
- GridVis® Expert courses

Commissioning

- Parameter configuration of measurement devices, data loggers and other components
- Installation and setup of the required functions
- Brief instruction of operating personnel

Support & field service

- Remote sessions
- Field service

Maintenance

- Energy and system check
- Calibration with calibration reports
- Remote maintenance contracts on an annual basis

International network

- On-site support
- Quality made in Germany

Measurement data analysis & rental equipment

- Measurement data analysis with final report
- PQ Quick Check
- Mobile network analyzers for temporary measurements and fault analysis

PFC annual check /

PFC daily check

- Inspection for economy aspects of a reactive power compensation
- Functional and safety test of the compensation system

From practical experience

AVOID LOAD PEAKS – REDUCE OPERATIONAL COSTS



The Janitza UMG 605-PRO network analyzer obtains the synchronization pulse directly from the energy supplier's electricity meter.

Load management in practice

Load management is an aspect of energy management that plays an important role in many companies. A southern Bavarian plastics company has placed its main focus on precisely this topic.

The company was struggling with high energy costs caused by peak loads. A peak load is the average value of a measuring period of 900 s. In order to reduce the costs for peak

loads, it is important to detect the peak load quickly enough to reduce the energy consumption before the 900 s have elapsed. To do so, the plastics company not only had to determine the sources of the load peaks, but also develop appropriate countermeasures in combination with the introduction of a system able to recognize the load peaks in good time so as to counteract them.

From practical experience



The GridVis® software provides an overview of the most important data on a single page in the system screen.

The sources and countermeasures were quickly determined by means of measurements. The heaters of the machines alone have a connected load of 60 kWh to 180 kWh, but are also insensitive to short-term shutdowns. The heaters can be switched off for up to three minutes without affecting operation. The only problem left for the plastics company was to identify the peak load early enough to be able to implement the measures in time. The solution was to install a Janitza UMG 605-PRO as close as possible to

the energy supplier's meter. The measurement device was programmed to immediately detect any imminent overrun of the power setpoint and to promptly switch off the heaters with immediate priority by means of fieldbus modules. This enabled the plastics company to significantly reduce its energy costs.



ENERGY MANAGEMENT OVERVIEW

Selection guide for energy management products

Energy management

Janitza®



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UMG 604-PRO
(UL certified)

UMG 605-PRO
(UL certified)

UMG 801
(UL certified)

800-CT8-A module
(UL certified)

Product designation

Part number

General

	E	EP		
Part number	52.16.202	52.16.201	52.16.227	52.31.001
Use in three-phase 4-conductor systems with grounded neutral conductor up to max.	277 / 480 V AC	277 / 480 V AC	277 / 480 V AC	347 / 600 V AC (UL) 480 / 830 V AC (IEC)
Use in three-phase 3-conductor systems ungrounded up to max.	480 V AC	480 V AC	480 V AC	690 V AC
Supply voltage	95 – 240 V AC; 135 – 340 V DC ^{*1}	95 – 240 V AC; 135 – 340 V DC ^{*1}	95 – 240 V AC; 135 – 340 V DC ^{*1}	24 – 48 V DC, PELV
Three conductor / four conductor (L-N, L-L)	• / •	• / •	• / •	• / •
Quadrants	4	4	4	4
Sampling frequency 50/60 Hz	20 kHz	20 kHz	20 kHz	51.2 kHz (V) / 25.6 kHz (A)
Meter reading cycle as per PTB-A 50.7	-	-	-	-
Effective value from periods (50/60 Hz)	10 / 12	10 / 12	10 / 12	10 / 12
Residual current inputs	-	-	-	4 ^{*4}
Current measuring channels	4	4	4	8
Thermistor input	1	1	1	4 ^{*4}
Harmonics current V / A	1st – 40th	1st – 63th	1st – 63th	1st – 127th / 1st – 63th
Distortion factor THD-U / THD-I in %	•	•	•	1st, 3rd, 5th ... 15th THD-I only
Unbalance	•	•	•	•
Short / long-term flicker	-	•	•	-
Transients	> 50 µs	> 50 µs	> 50 µs	-
Short-term interruptions	•	•	•	-
Accuracy V; A	0.2%; 0.25%	0.2%; 0.25%	0.2%; 0.25%	0.2%; 0.2%
Class A as per EN 61000-4-30	-	-	-	-
Active energy class	0.5S (.../5 A)	0.5S (.../5 A)	0.5S (.../5 A)	0.2S (.../5 A)
Digital inputs	2	2	2	4
Digital / pulse output	2	2	2	4
Analog output	-	-	-	1
Memory for min. / max. values	•	•	•	•
Memory size	128 MB	128 MB	128 MB	4 GB
Clock	•	•	•	•
Integrated logic	Jasic® (7 prg.)	Jasic® (7 prg.)	Jasic® (7 prg.)	-
Web server / Email	• / •	• / •	• / •	-
APPs: Measured value monitor, EN 50160 & IEC 61000-2-4 Watchdog	•	•	•	-
Fault recorder function	•	•	•	-
Peak load optimisation	• ^{*2}	• ^{*2}	• ^{*2}	-
Software for energy management and network analysis	GridVis®-Basic	GridVis®-Basic	GridVis®-Basic	GridVis®-Basic
Interfaces				
RS-232	•	•	•	-
RS-485	•	•	•	•
USB	-	-	-	•
D-Sub 9 plug (Profibus)	-	•	•	-
M-Bus	-	-	-	-
Ethernet	•	•	•	2
Protocols				
Modbus RTU	•	•	•	•
Modbus gateway	•	•	•	• ^{*10}
Profibus DP V0	-	•	•	-
Modbus TCP/IP, Modbus RTU over Ethernet	•	•	•	Modbus TCP/IP
SNMP	•	•	•	-
OPC UA	-	-	-	•
BACnet IP	• ^{*2}	• ^{*2}	• ^{*2}	-
Profinet	-	-	-	-

• : Included
- : Not included

*1 Other voltages are also available optionally
*2 Option

*3 Possible combinations of inputs and outputs:
a) 5 digital outputs
b) 2 digital outputs and 3 digital inputs

Energy management



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UMG 806

**UMG 806
Modules**

UMG 96RM
(UL certified)

UMG 96-PA
(UL certified)

UMG 96-PA Modules
(UL certified)

	UMG 806 Modules			UMG 96RM (UL certified)						UMG 96-PA (UL certified)			UMG 96-PA Modules (UL certified)		
	EC1	ED1	EI1	P	M	E	CBM	EL	PN	96-PA	96-PA-MID	96-PA-MID+	96-PA-RCM-EL	96-PA-RCM	
14.02.015	14.02.016	14.02.019	14.02.020	52.22.061	52.22.064	52.22.069	52.22.062	52.22.066	52.22.068	52.22.090	52.32.001 ^{*1}	52.32.003 ^{*8}	52.32.004 ^{*8}	52.32.010	52.32.011
230 / 400 V AC				277 / 480 V AC						347 / 600 V AC (UL) ^{*12} 417 / 720 V AC (IEC)					
400 V AC				480 V AC						-					
80 – 270 V AC; 80 – 270 V DC				90 – 277 V AC; 90 – 250 V DC ^{*1}						90 – 277 V AC; 90 – 250 V DC ^{*1}					
•/•				•/•						- / •					
4				4						4					
8 kHz				21.33/25.6 kHz						8.33 kHz					
-				-						-					
10 / 12				10 / 12						10 / 12					
1				-						-					
4	4 ^{*11}			3	4	3	4	4	3	4	3 ^{*7}			1	
1				-	-	-	2 ^{*4}	-	-	2 ^{*4}	-			1	
1st – 31th				1st – 40th						1st – 40th					
•				•						•					
•				-						-					
-				-						-					
-				-						-					
0.2%; 0.2%				0.2%; 0.2%						0.2%; 0.2%					
-				-						-					
0.5S (.../5 A)				0.5S (.../5 A)						0.2S (.../5 A)					
-	4			-	4	-	(3) ^{*3}	4	-	(3) ^{*3}	3				
1	2			2	6	2	(5) ^{*3}	6	-	(5) ^{*3*}	3				
-				-	-	-	-	-	-	-	1				
•				•						•					
4 MB				-	256 MB	-	256 MB	256 MB	-	-	8 MB				
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GridVis®-Basic	GridVis®-Basic			GridVis®-Basic						GridVis®-Basic			GridVis®-Basic		
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-				-	-	-	-	-	-	•	-				

^{*4} Combined function: optional analog / temperature / residual current input
^{*5} 2 pulse outputs
^{*6} SNMP for internal Profinet communication only
^{*7} With module + 1 current measurement channel
^{*8} MID certified
^{*9} On the basic device
^{*10} To query the slave devices
^{*11} These are 4...20 mA signal inputs
^{*12} 230 / 400 V AC (as per UL) for MID/MID+ models

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