Smart Energy &
Power Quality Solutions

UMG 508Emax peak demand management systems

Janitza®

UMG 508Emax peak demand management systems

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

Areas of application

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

UMG 508Emax - peak demand management systems

The intelligent reduction of effective power peaks

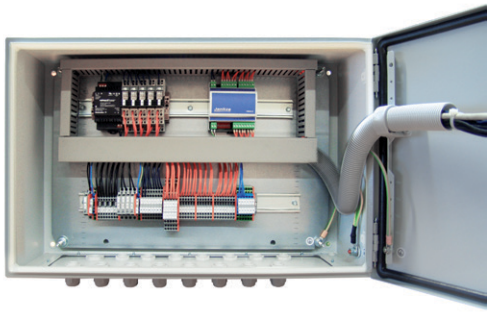
Emax applications for Jasic® devices continuously capture all electrical parameters. Integrated smart control algorithms calculate the effective power trend and compare it with the fixed target effective power. The trend calculation allows the Emax application for Jasic® devices to intervene in the operational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

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

Main features of the Emax APP

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

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



Example systems:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

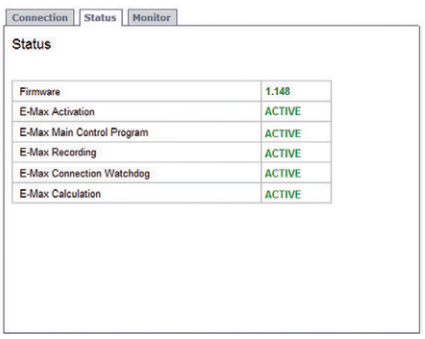


Illustration: Emax status display

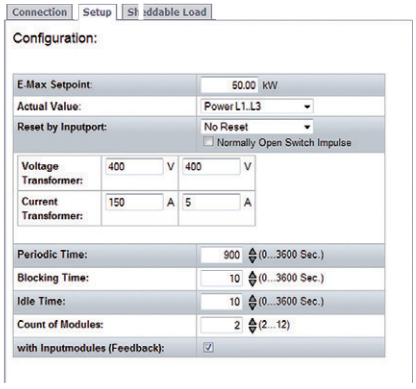


Illustration: Configuration of basic values

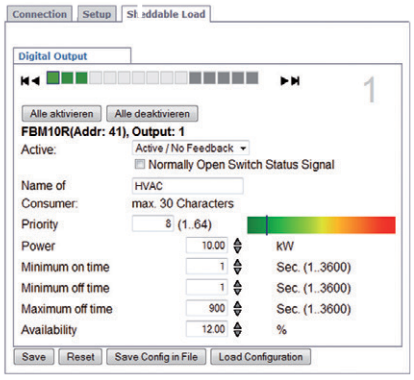
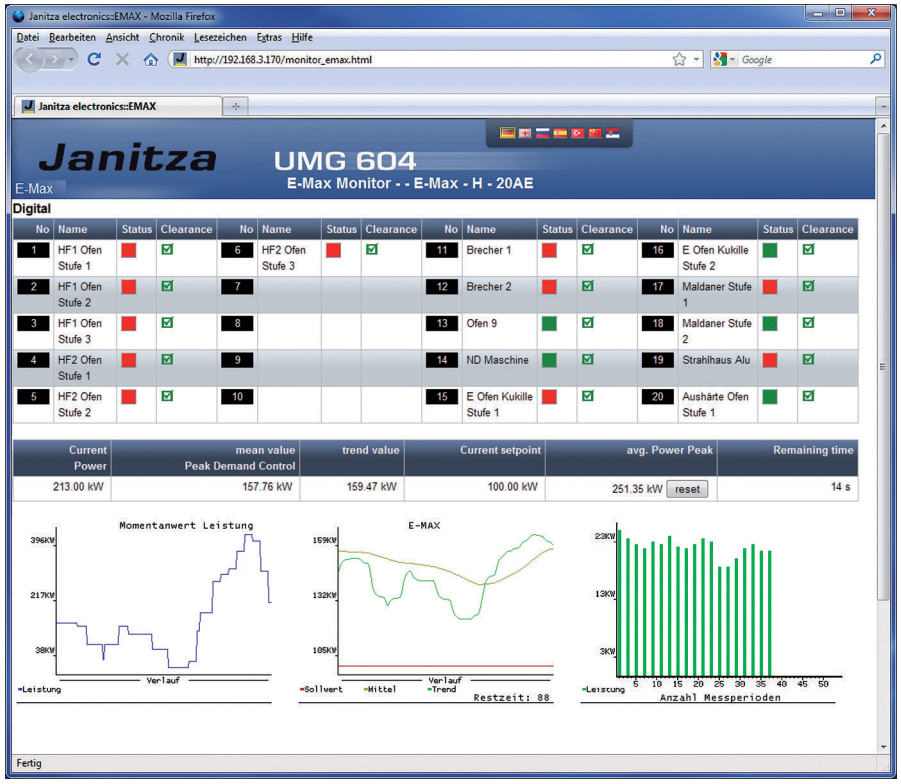


Illustration: Configuration of loads

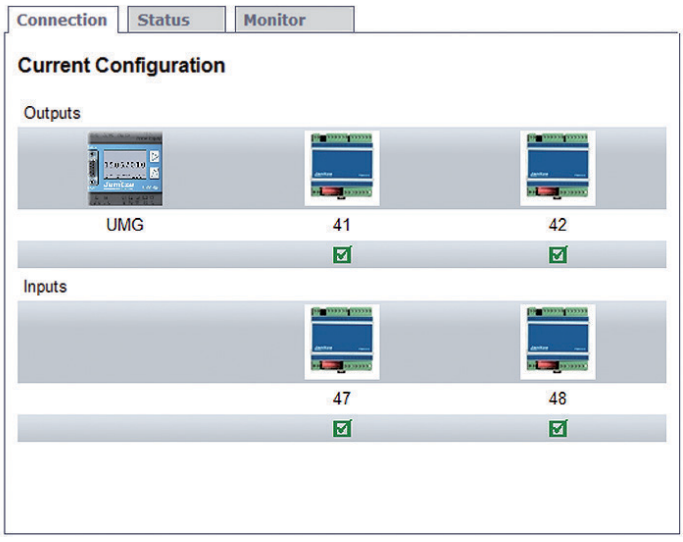


Status display of Emax measured quantities and status of the current switch-off actions, status of the release (feedback as to whether a load is on/off) via the device homepage.

The following measured quantities are saved to the device memory:

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

Analysis is performed with the GridVis.



Display of communication status between measurement device and function modules.

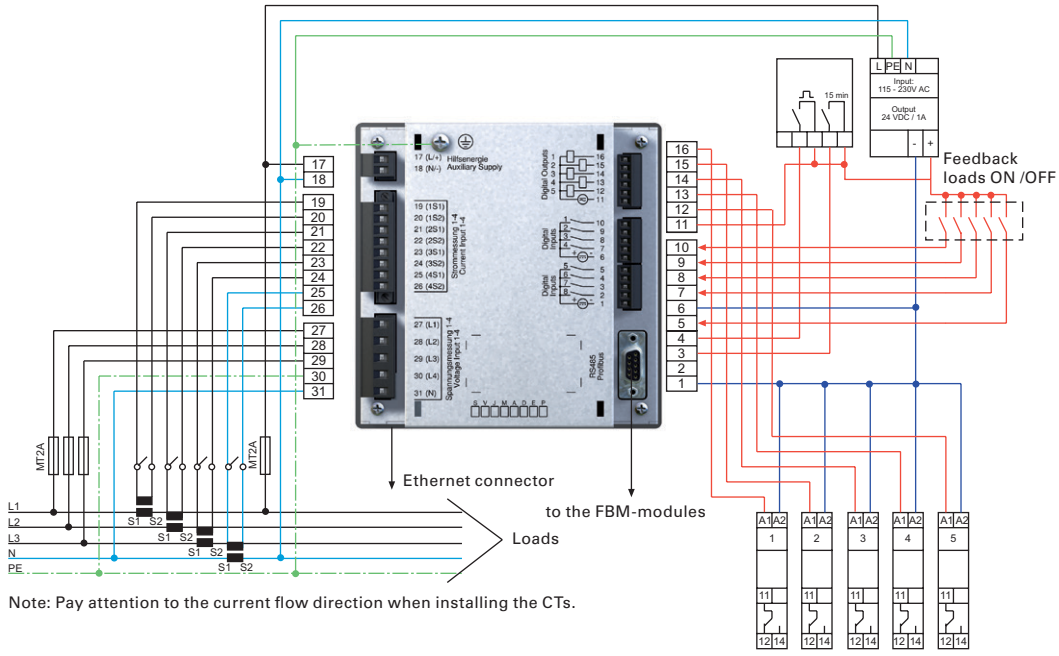
Overview of product variants UMG 508Emax

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

• = Included - = Not available

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

Typical connection



General technical data

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

Measurement range

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

Measured values

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

Power quality

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

Communication

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

*1 x DSUB-9 connector

Emax variants as APP

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

Emax APP for UMG 605/UMG 604 Item number 51.00.213

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

Emax APP for UMG 508/UMG 511 Item number 51.00.214

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

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

Emax APP SPS Communication Modbus/Profibus

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

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

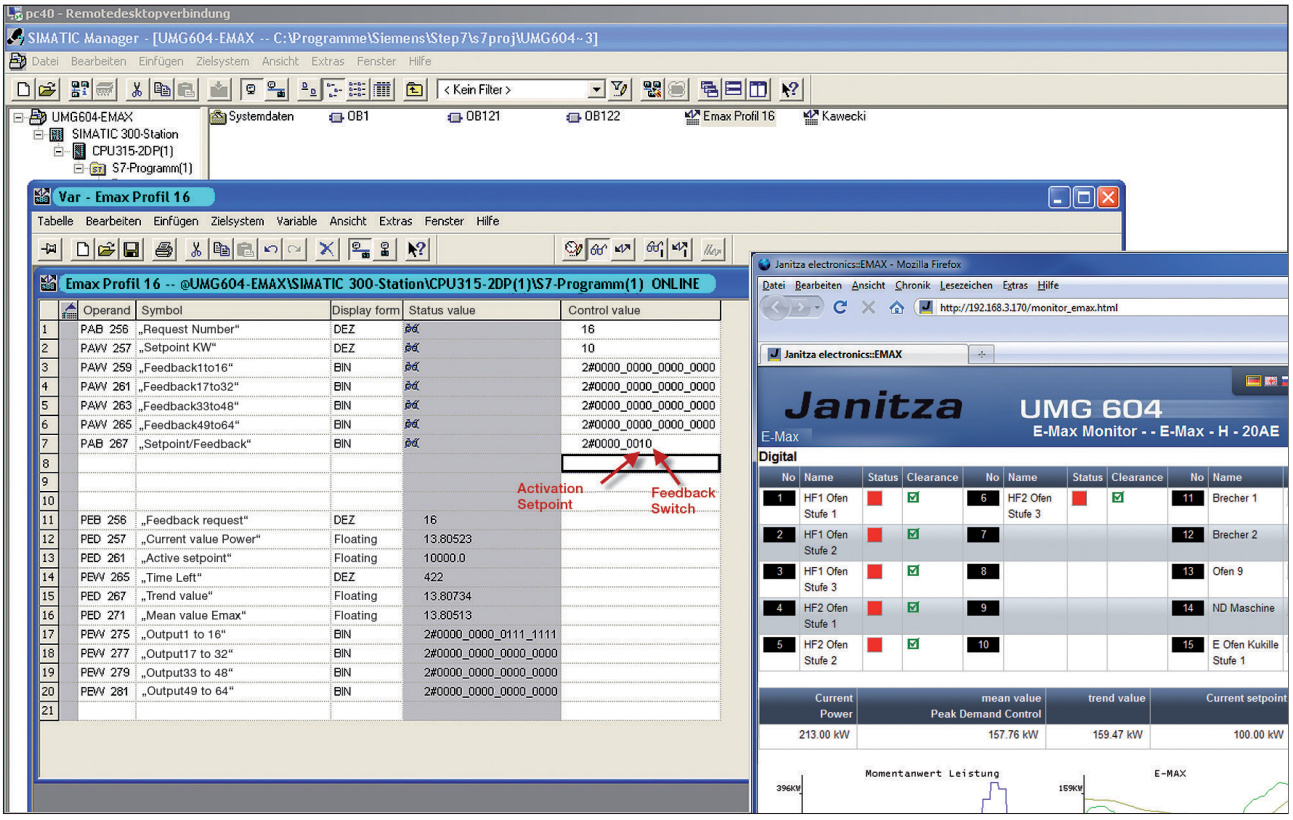


Illustration: Example of PLC profibus use