UMG 507Emax

Max Demand Load Shed Controller

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 ...

2

UMG 507Emax - peak demand management

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 507 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 PSW basic 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 PSW 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 56 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 during the day

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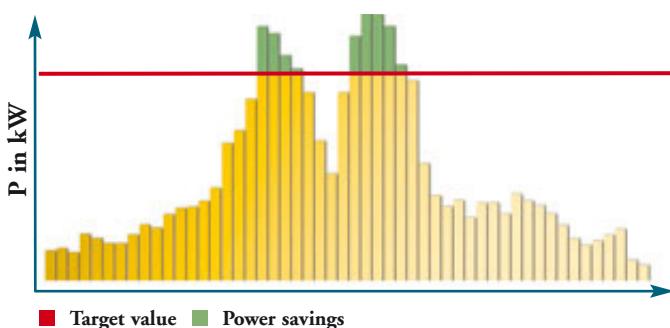
Involved loads:
Involved loads are given priority for shutdown. Only involved loads are included in the trend value calculation. This means that the Emax program tries to comply with the maximum demand by only using the "involved loads" under consideration of the switching times and load power. If this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

The intelligent reduction of power peaks

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.
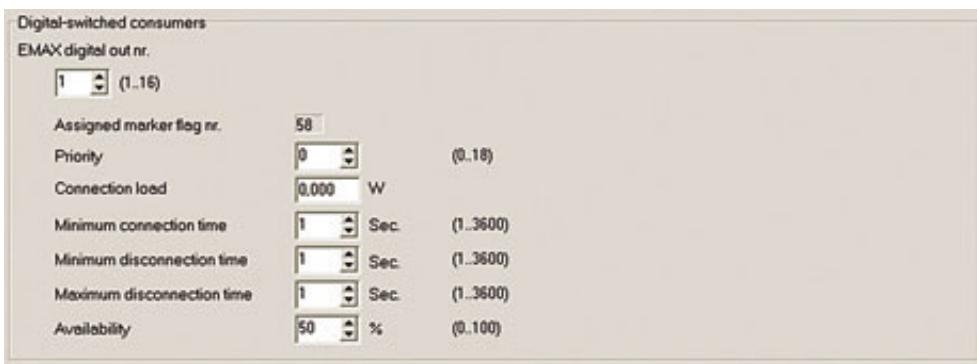

Illustration: programming using PSW software

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 unit.

Typical connection

For CT connection pay attention for current direction.
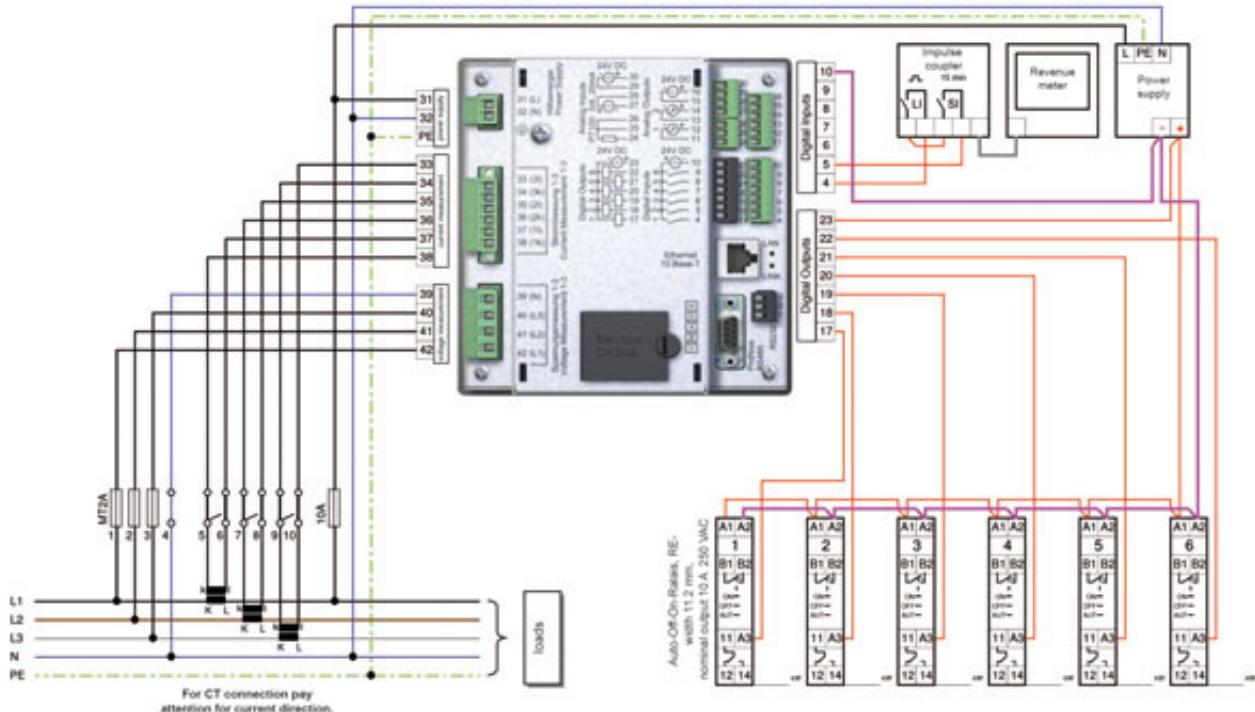
General technical data

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	PSWbasic (PSW professional is optional)
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, 1-15 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

BPC