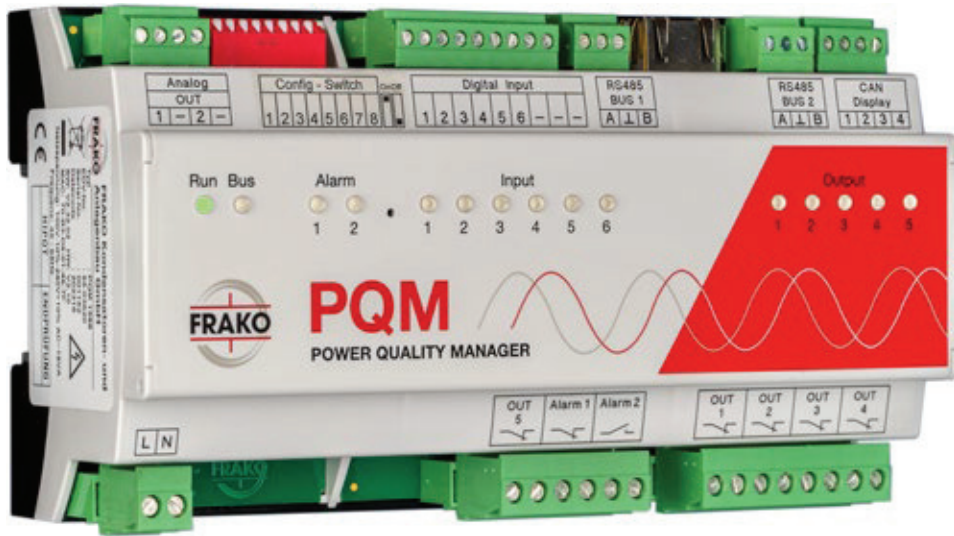


Devices of the PQ Series

Power Quality Manager



Version 3 –
Now even
better!

Including
6 x S0 pulse
inputs

PQM Power Quality Manager

With the new PQM 3.0 as a central unit, all requirements for capturing parameters related to energy and power quality are fulfilled. Version 3.0 impresses with higher computing power while simultaneously reducing energy consumption. This results in increased reliability and improved security in processing the invaluable energy data. Enhanced communication capabilities, in addition to the proven OPC-UA server and REST interface, include support for the MQTT protocol and the Influx-DB protocol. This further improves access to cloud systems and enhances IoT capability. The update of the operating system ensures an increase in IT security and secures the future viability of the FRAKO data acquisition system.

Description

The PQM Power Quality Manager is a versatile all-rounder that even just as a gateway offers a variety of uses. Its integrated RS-485 and RJ45 interfaces and its built-in flexibility enable the PQM to interpret diverse protocols and access fieldbus instruments through the communications network.

Protocol options for connection to measuring instruments:

- FRAKO Starkstrombus
- Modbus RTU
- Modbus TCP

Using an external coupler:

- M-BUS
- KNX

If additional system points are acquired, the Power Quality Manager will automatically activate its data collector function plus some other useful features:

- OPC UA server
- S0 pulse inputs (6x)

• Numerous alarm functions:

- Alarm limits (lower/upper) for registered metering and analogue channels
- Alarm function, individually or in groups via various alarm routes: contacts on the PQM, e-mail, alarm report

User benefits:

- EMVIS 3000 visualization software (included with appropriate system points)
- Web interface for basic configuration
- Software updates to expand range of functions
- Simple data exchange via OPC UA
- IoT compatible, REST interface (machine to machine)

A specified number of system points are required for collecting data from the measuring instruments. These devices can be combined at will up to the limiting number for each type of device.

Your easy access to Power Quality Management 4.0

PQM as bus gateway:

- FRAKO Starkstrombus
- Modbus RTU

PQM as universal data acquisition system:

- Reception and collection of measurement readings and other data from connected devices via Modbus, M-Bus, S0 pulses and TCP/IP
- Monitoring of data with individually configurable alarm limits
- Alerting when variables go outside set limits using various media such as alarm relays or e-mail
- Optimum scalability, providing solutions for all, from the smallest applications right up to major businesses

PQM as remote monitoring unit:

- Monitoring
- Generating alarms

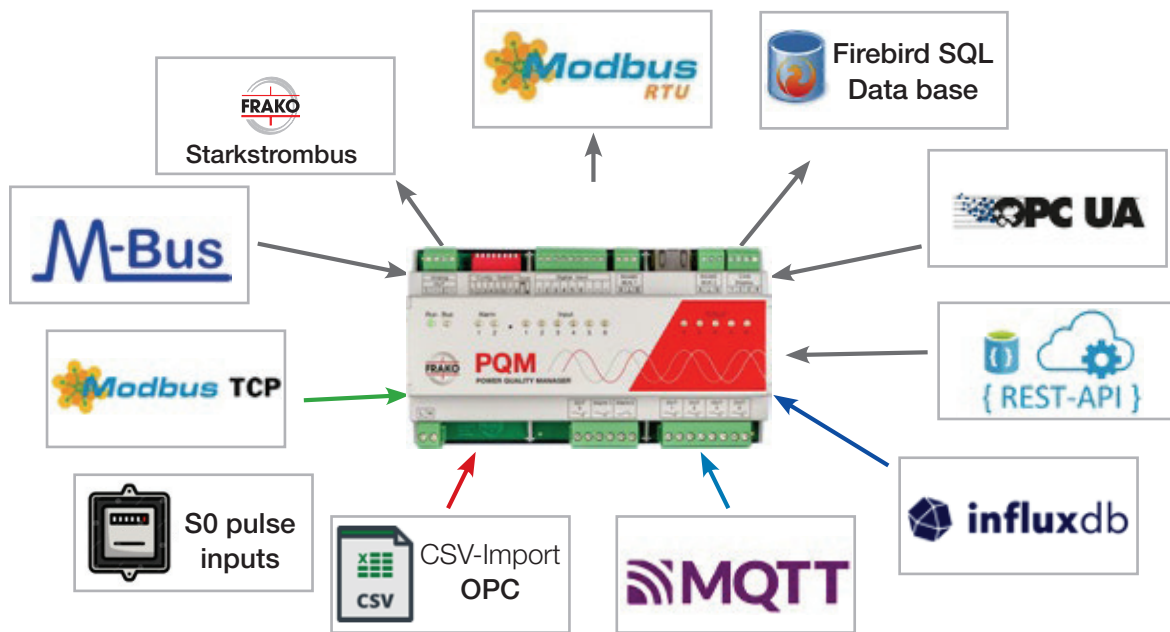
PQM as data collector incl. synchronization:

- Data transfer to third-party systems
- Collation of machine and energy data
- Visualization with any desired software

6 x S0 pulse inputs, freely programmable, can be used as/for:

- Meter
- Operating hours (seconds) counter
- Status channel
- Pulse input for time synchronization with utilities
- Collector of impulses from transducers which convert process variables into a frequency, for example, temperature, humidity mg/m² etc.
- Power calculation from meter pulses
- OPC UA Server (integrated in the device)
- To increase processing power – more stable data transfer via bus and Ethernet
- Pulse acquisition (S0 pulse inputs) for another PQM
- Complete small system incl. data collection of pulse meters

Interfaces such as OPC UA and REST



Software for the display/evaluation of the data:

- including EMVIS 3000 to enable total visualization
- Comprehensive data evaluation
- CSV export facility

**Software according to BAFA
suitable for EN 50001**



Interface for:

- Industry 4.0
- All types of data
- Free choice of database
- Free choice of visualization
- Customized solutions
- Third-party systems

Devices of the PQ Series

Power Quality Manager

Technical Data

Power Supply	
Supply voltage	100 V AC – 253 V AC (absolute limits), 230 V DC (absolute limits)
Frequency	45 up to 65 Hz
Power consumption	Max. 7 W / 18 VA
Fuse protection	Max. 2 A (slow acting) external protection required
Interfaces	
Ethernet interface	10/100 MBit/s, RJ45 RS-485 Bus 1 Modbus RTU RS-485 Bus 2 FRAKO Starkstrombus
Outputs	
Relay contact	5 contacts – bistable, 250 V / 2 A AC or 30 V / 2 A DC
Alarm contact	1 contact – bistable, 250 V / 2 A AC or 30 V / 2 A DC 1 NC, 250 V / 2 A AC or 30 V / 2 A DC
Inputs	
6 pulse inputs	S0 pulse inputs (DIN 43864) for connecting to volt-free contacts, Open-contact voltage: 15 V, Max. line resistance: 800 Ohm, Short-circuit current: 18 mA, Pulse frequency: 0.1 to 20 Hz
Connections	
via plug-in type screw terminals	Conductor cross-section max. 1.5 mm ² , min. 0.14 mm ² , Relay-, alarm contacts and supply: Conductor cross-section max. 2.5 mm ² , min. 0.2 mm ² , Rated value insulation: 250 V AC, 80 °C
Control elements	
DIP switch	8 pieces
Display elements	
LED	15 pieces
Mechanical Construction	
Dimensions	161.6 mm x 89.7 mm x 60.5 mm (W x H x D)
Installation	On standard rail 35 mm according to DIN EN 50022
Weight	approx. 0.4 kg without packaging
Ingress protection	Enclosure IP30, terminals IP10 according to DIN EN 60529 pollution degree 2 according to EN 61010-1:2011-07
Version	Enclosure protection class II according to DIN EN 61010
Housing	Flammability according to UL 94 V0 as declared by the manufacturer

Mechanical Construction	
EMV	EN 55022 Class B : 2010 + AC : 2011 EN 61000-3-2 : 2014 EN 61000-3-3 : 2013 EN 61000-6-3 : 2007 + A1 : 2011 EN 61000-6-2 : 2005 EN 61000-4-2 : 2009 EN 61000-4-3 : 2006 + A1 : 2008 + A2 : 2010 EN 61000-4-4 : 2012 EN 61000-4-5 : 2014 EN 61000-4-6 : 2014 EN 61000-4-8 : 2010 EN 61000-4-11 : 2004
Operating conditions	
Temperature range	0 °C...45 °C
Installation height	Geographical height max. 2000 m above sea level
Article-No.	20-10090 without system points
PC requirements for FRAKO-NET software package	
Hardware	<ul style="list-style-type: none"> • Min. Intel Core I5 • Main memory min. 4 GB RAM • 10 GB free hard drive space • Ethernet 10/100 Mbit/s network connection or/and one free serial interface • DVD drive • SVGA graphics adapter • Colour screen with minimum resolution of 1024 x 768
Software	<ul style="list-style-type: none"> • Microsoft® Windows®* 10 • Microsoft® Windows®* 7 (x32/x64) • Microsoft® Windows®* Server 2008 R2 • current browser for example, Mozilla Firefox <p>* Registered trademarks of Microsoft Corporation</p>

Optional accessories

Article-No.	Type	Description
20-10495	System points upgrading package	10 system points incl. system visualization EMMIS 3000
20-10496	PQM	50 system points
20-10497		100 system points

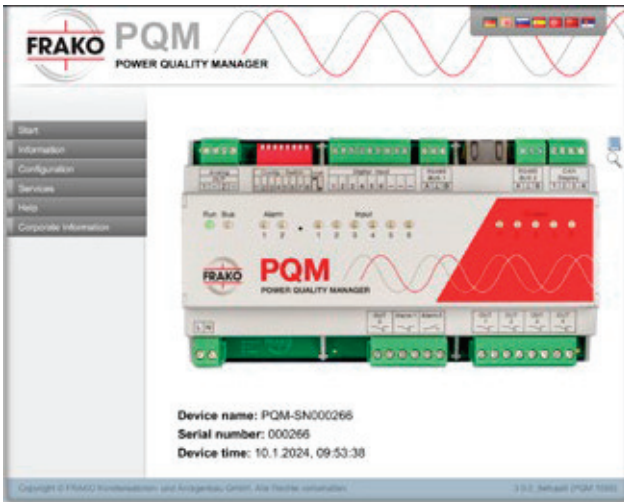
Devices of the PQ Series

Power Quality Manager

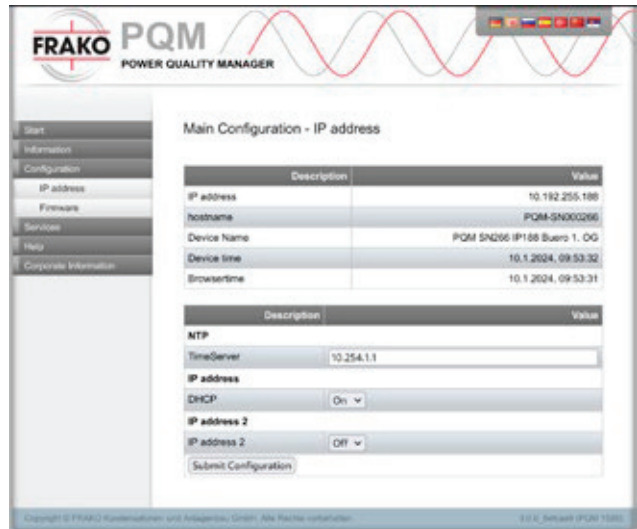
1

System points per integrated device	Upper limits
30 System points per EM-MC 2200	Max. 4 units EM-MC 2200 per PQM
15 System points per EM-PQ 2300	Max. 32 units EM-PQ 2300 per PQM in Slavemode, or max. 8 in Mastermode
15 System points per PQA 1101	Max. 32 units PQA 1101 per PQM
7 System points per PQC (single phase)	
10 System points per PQC (three phase)	
7 System points per EM-PQ 1500	Max. 32 units EM-PQ 1500 per PQM
1 System point per channel of EM-MC 2200, PQA 1101, EM-PQ, EMF 1102 or PQM	Max. 550 metering-, analogue-, status- or alarm channels per PQM
10 System points to activate the S0 function of the PQM	
7 System points per PQA 1500 Limit: Max. 32 points per PQM	

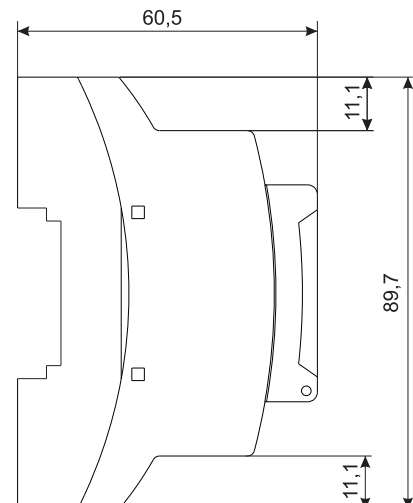
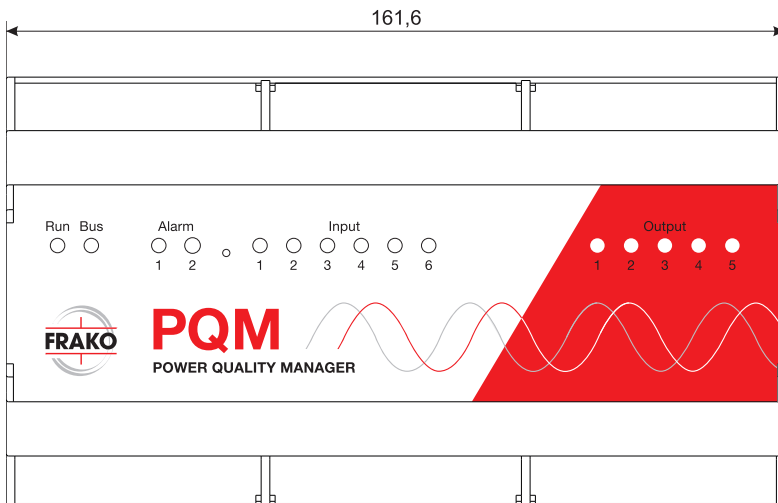
Web interface Start screen



Web interface Main Configuration – IP address



Dimensions



Dimensional drawing PQM

All dimensions in mm

Maximum Demand Control

Maximum Controller



3

EM-MC 2200 Maximum Controller

The contemporary styling of the EM-MC 2200 Maximum Controller accentuates its user-friendly energy management technology. It reduces power demand peaks with new additional functions. The self-adapting target demand function provides dynamic adjustment to the site's monthly operating characteristics. Reducing target demand at the beginning of the accounting period, together with automatic self-adaptation, enables additional savings to be made in months with lower demand peaks.

Designed to work as a stand-alone unit, the EM-MC 2200 is the ideal solution for small to medium-sized industrial and commercial operations, office buildings and hotels. With the FRAKO Starkstrombus or an ethernet interface it can be integrated into a FRAKO Energy Management System.

Switching off loads by intelligent terminals (Modbus over IP) or timers is only one of the helpful new features of the EM-MC 2200.

This is an investment with a short payback time even in the deregulated energy market, since exceeding the specified power peak limit still results in extra costs that can be avoided.

Description

Special contract customers whose demand exceeds the agreed maximum (subscribed demand) will face increased costs through entering a higher demand category.

Do you know how many measurement intervals there are in a year?

There are some 35 000 measurement intervals in a year, or about 2 900 in a month. As a rule, the calculation determining the price paid for power in a given month is based on the measurement interval with the greatest demand in that month.

The Maximum Controller EM-MC 2200 can help you to stay within

the set limits, since this unit cuts demand peaks by shedding those loads assigned a low priority or not considered absolutely essential. Loads are switched off for a short time whenever the subscribed demand appears likely to be exceeded. An individual order of priorities for switching loads off ensures that normal operation can continue without disruption despite this load shedding. The result: Instead of having to pay a higher maximum demand charge, the subscribed demand can even be reduced – and thus save costs!

The modular construction of the EM-MC 2200 makes it both simple and inexpensive to install. It is upgradable at any time by software updates and connecting local EMD 1101 add-on units.

Operation is of proven simplicity with a clear, menu-driven operator dialogue in plain language at the EM-FD 2500 display or by accessing the instrument from a PC.

The scope of supply includes the Device Manager software. This is used to enter and modify parameters and to display—or when needed print out—daily demand curves, load operating times and all basic and load-specific settings.

- Control of demand to limit the average power consumption in a

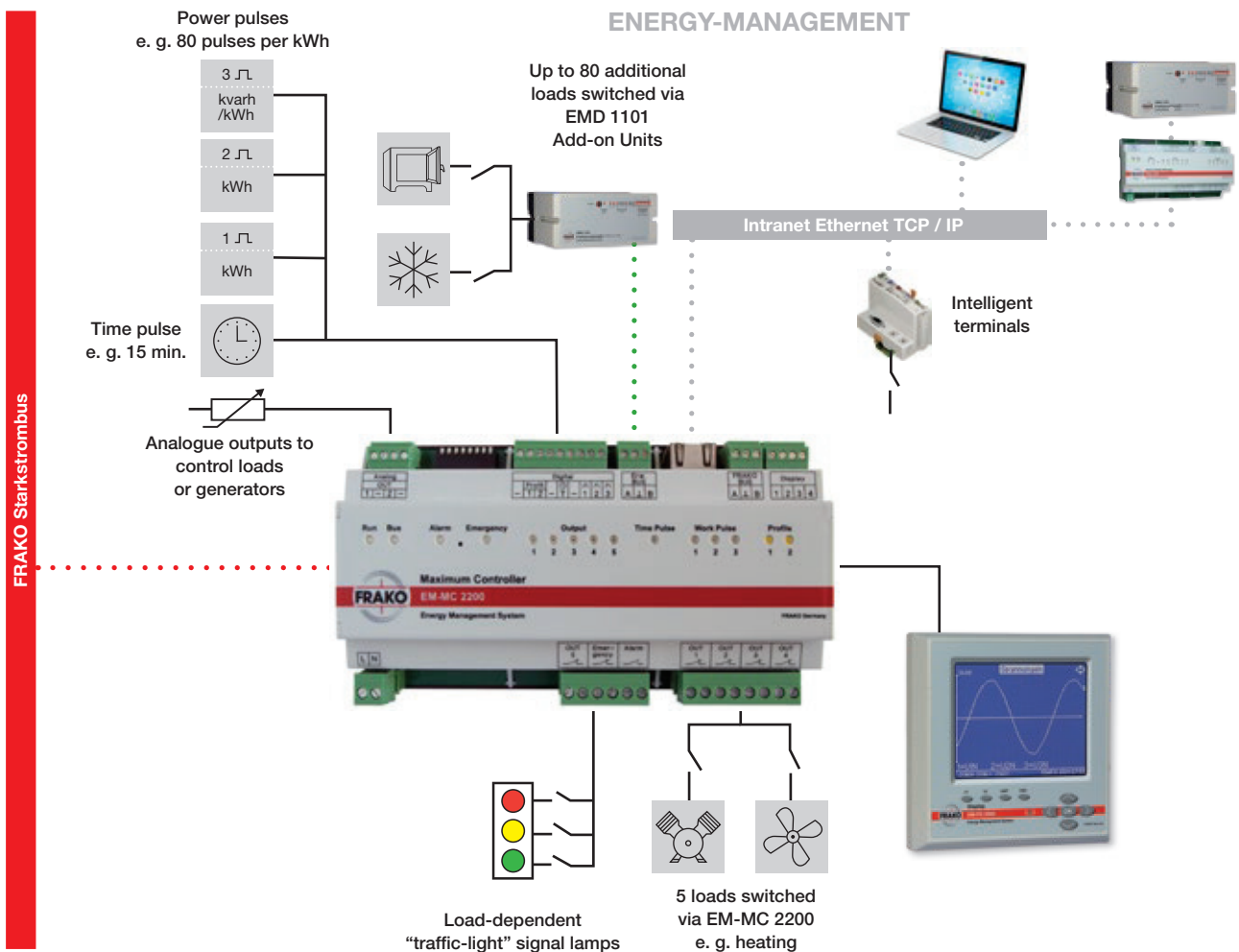
Maximum Demand Control

Maximum Controller

given interval to the set target demand. This is achieved by temporarily switching off individual loads

- Monitoring of demand peaks: if demand is too high, loads are immediately switched off to prevent the circuit breaker tripping
- Power-dependent control application point to prevent unnecessary load shedding at the start of the measurement
- Individual adjustment of the connected loads to suit operating conditions by setting priorities, min./max. OFF times and min. ON times per channel
- 4 profiles can be activated. Target demand and peak power, together with the load parameters priority, power, min./max. OFF times, min. ON times and priority type (time or power priority), can be set for each profile
- To make best use of seasonal demand fluctuations, the self-adapting target demand adjusts itself dynamically to suit the operating conditions of the month concerned. Reducing the target demand at the beginning of the accounting period combined with automatic self-adaptation makes additional savings possible in months with low peak loads
- Formation of switching channel groups for strict compliance with the set priorities
- 'Traffic light' function: 3 switching channels can be used for signal lamps as a visual guide to demand conditions
- Emergency load-shedding mode for keeping within maximum demand even with critical load constellations

- Connection of any desired Modbus TCP device with digital outputs to switch off loads (e.g. WAGO fieldbus controller with I/O terminals, SIEMENS PAC4200 with DI/DO module, plus many more). It is a prerequisite that the function codes 5 or 6 are supported.
- Timer for switching loads to a time schedule or to set time-scheduled target demands or profiles
- Storage of the following data in a ring memory:
 - Average values per interval over 20 000 intervals including the target power applicable at the end of the interval and time stamp
 - Daily maximum values over 500 days including time stamp
 - Monthly maximum values over 48 months
 - 10 000 switching cycles
- Configuration and presentation of momentary and historical measurement readings using the Device Manager software (included in scope of supply)
- Display of measurement readings and the power factor triangle (trend curve) via an integrated web interface or an EM-FD 2500 display, an optional graphic display instrument connected to the EM-MC 2200 Maximum Controller by a 4-core cable. Up to 7 additional EM devices can be viewed on one EM-FD 2500 display.



Maximum Demand Control

Maximum Controller

• Inputs:

- 3 inputs for active energy pulses or 2 for active and 1 for reactive energy pulses. These can be added, subtracted or used as meters. The self-adapting target demand function can be reset via a volt-free contact
- 1 input for time pulse; interval duration adjustable from 1 to 1 440 minutes
- 2 inputs for activating the 4 profiles. These adjust the target demand and/or the settings of the connected loads to suit site-specific factors such as regular and off-peak tariffs. Profile switching can be by the internal timer or an input to the EMF 1102 Cost Centre and Alarm Unit

• Outputs:

- 5 switching and 1 emergency load-shedding channel in the basic instrument (decentralized extendability: up to 85 switching channels possible by means of EMD 1101 add-on units, each with 8 relay contacts)
- 1 alarm contact to signal faults (alarm signal also possible at any desired output)
- 2 analogue outputs for 2 measurement readings (momentary, trend, target or corrective power, capacity utilization or remaining time) as 0/4–20 mA or 0–10 V signals, or for infinitely variable control of loads; fed by internal power supply

• Interfaces:

- RS-485 bus, FRAKO Starkstrombus protocol to connect to the FRAKO Energy Management System
- RS-485 extension bus to connect EMD 1101 add-on units
- Ethernet (RJ 45 jack) with the following functions:
 - Communication with the EMD 1101 add-on unit or the EMF 1102 Cost Centre and Alarm Unit via the PQM
 - Output of switching commands also via Modbus TCP
 - Communication with the PQM Central Unit
 - Communication with the configuration software at the PC
- The software (Device Manager) for configuring and displaying the saved measurement readings via Ethernet is included with the instrument

Easy installation with the DIN rail-mounted enclosure

The EM-MC 2200 is housed in an enclosure with a pin strip underneath it.

This system, consisting of pin and socket strips and DIN rail bus connectors, enables the individual modules to be easily fitted and connected to one another.

All connections are also available at external terminals for conventional wiring. Use of the 16-pin DIN rail bus connector provides automatic contact from instrument to instrument.

The bus connector enables the FRAKO Starkstrombus, extension bus and display bus to be connected. The pin and socket strips on the DIN rail ensure quick and easy installation of the instruments in parallel.

It is possible to plug individual instruments in or remove them without dismantling the modular assembly.

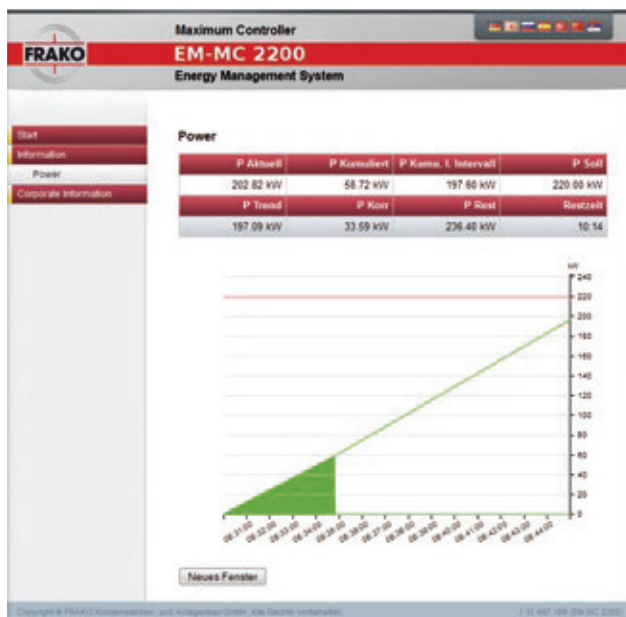


Maximum Demand Control

Maximum Controller

Data display on the EM-FD 2500

The EM-FD 2500 display has been developed as a physically separate LCD display and operator panel to work with all FRAKO Energy Management devices of the new generation that require this, such as the EM-PQ 2300 and EM-MC 2200 instruments. The display is connected to the EM instrument via 4 terminals: two wires for the instrument power supply and two for data transfer. A maximum of 8 instruments can be connected to a common display bus, with a bus length of up to 40 m to the display. The display is mounted on the control cabinet door or wall through a $\varnothing 22.5$ mm hole, thus greatly simplifying installation. Its orientation is fixed by a screw through the wall into a threaded bush. Alternatively, the display can also be mounted in any available 144 x 144 mm cut-out. For this purpose suitable adapters are available.



Data display via the integrated web interface

- Web server for the configuration and online display of all measurement readings
- Each user at any PC can view the most important measurement data via the intranet.

Device Manager –

Clear overview and straightforward programming

• Configuration

Configuration of the EM-MC 2200 is divided into two areas termed setting and configuration to distinguish them:

– Setting:

Setting covers all those adjustments that are necessary when commissioning the instrument itself or introducing add-on units.

– Configuration:

Configuration covers those adjustments that may have to be changed during ongoing operation.

The loads can be configured in a table giving a clear overview. Settings for the individual profiles can be hidden, if desired, to simplify this overview. Channels can be copied and their settings adopted in total or per channel for all profiles.

• Trend display

Device Manager is a convenient tool for displaying real-time parameters such as momentary power, cumulative power, the remaining time in the current measurement interval and the power triangle. In addition, the statuses of the loads, the current profile (regular/off-peak tariff) and the limit settings are displayed. Any alarms or faults present are immediately apparent.

Maximum Demand Control

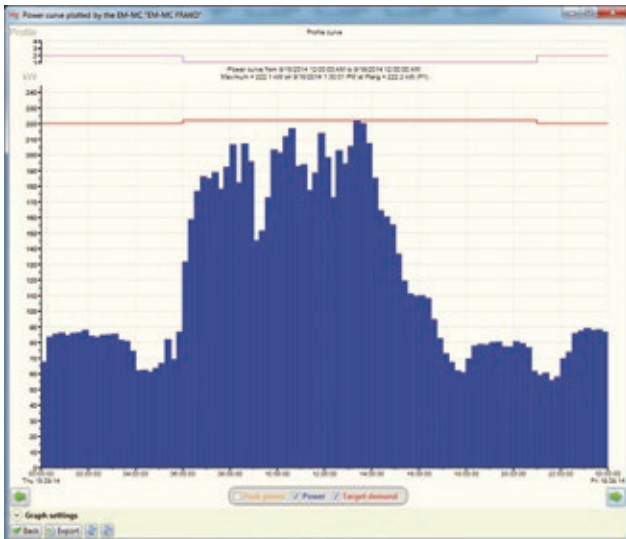
Maximum Controller

Switched status log

The switched status log offers a graphical display of the last 10 000 changes in the switched status of up to 85 controlled switching channels.

Documentation

The power demand in every measurement interval over the past 200 days is displayed as a chart and documented. Similarly, the demand peaks of the past 500 days and the past 48 months are saved, as are the switched statuses of up to 10 000 switching cycles. It is also no problem to export these recorded data to a spreadsheet program such as Excel.



Timer

A weekly timer function is incorporated in the EM-MC 2200. This makes up to 400 switching times available, in order to change the status of switching channels to 'Permanently ON', 'Permanently OFF' or 'Controlled' at scheduled times. In the 'Controlled' condition, the EM-MC 2200 controls the actual condition of the load through the target demand control function and the peak demand monitoring function.

In addition, the profile and the target demand can be controlled by the timer.

Technical Data

Power supply	
Supply voltage	100 V – 253 V AC or 100 V – 230 V DC
Frequency	45 up to 65 Hz
Power consumption	7 W / 18 VA
Overcurrent protection	Max. 2 A external fuse required
Inputs	
General	<ul style="list-style-type: none"> • S0 interfaces (DIN 43864) to connect volt-free contacts • Voltage with contact open: 15 V • Max. line resistance: 800 Ohm • Short circuit current: 18 mA • Pulse frequency: 0.1 to 20 Hz
3 Pulse inputs	To acquire the power data from 3 meters with pulse outputs. Input 3 can also be used for the acquisition of reactive power data.
1 Time pulse input	1...1 440 minutes
2 Profile switch inputs	To select from 4 profiles

Measurement data storage	
	256 MB onboard flash memory
Outputs	
5 Relay contacts (switching channels)	Bistable, 250 V / 2 A AC or 30 V / 2 A DC
1 Relay contact (emergency load shedding)	Bistable, 250 V / 2 A AC or 30 V / 2 A DC
1 Alarm contact	NC 250 V / 2 A AC or 30 V / 2 A DC
1 Extension bus interface	<ul style="list-style-type: none"> • To connect up to 10 EMD 1101 • Modbus TCP output instruments (fieldbus instruments, function code 5)
2 Analogue outputs	0-10 V / 0-20 mA / 4-20 mA + Steuerung-Verbraucher
'Traffic light' signal lamps	Visual guide to demand conditions

Maximum Demand Control

Maximum Controller

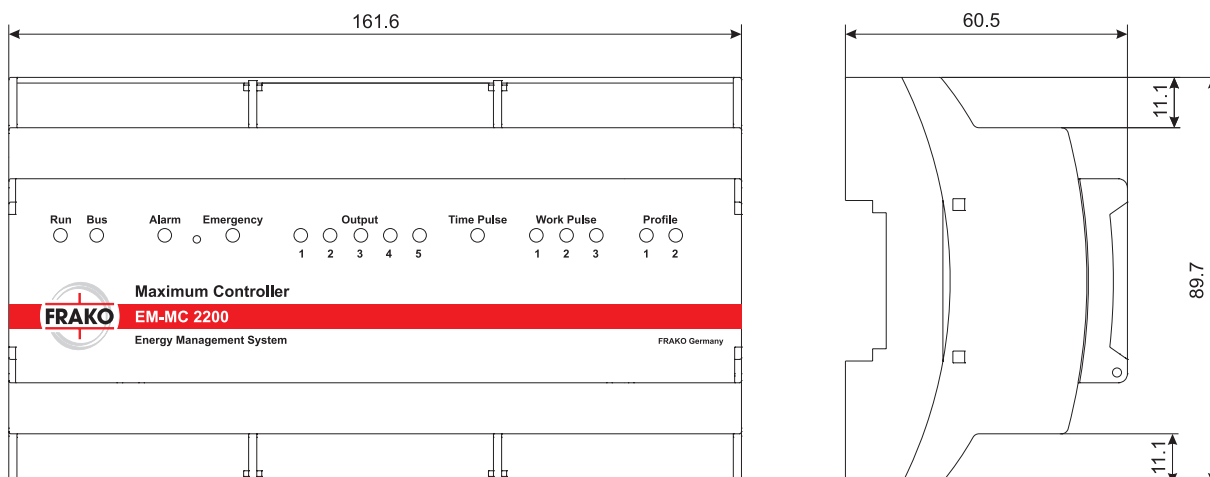
Technical Data

Interfaces	
1 FRAKO Starkstrombus interface	To connect to the FRAKO Energy Management System
1 Display bus interface	Optional connection of to up to 2 external EM-FD 2500 display instruments
Web server / E-mail / SNMP	• / • / •
Display and operation, connections	
User interface Art.-No. 20-30240	Operation via external EM-FD 2500 display instrument
Alarm system	•
Timer function	•
Annunciators	15 LEDs
Connections	Pin and socket strips; max. core cross section: max. 1.5 mm ²
Mechanical construction	
Dimensions	161.6 x 89.7 x 60.5 mm (W x H x D)
Ingress protection	IP30 (enclosure), IP10 (terminals)
Weight	Approx. 0.4 kg
Protection class	Class II according to EN 61010
Enclosure	Flame retardant UL 94-V0
Mounting	On standard 35 mm DIN rail according to EN 50022
Operating conditions	
Ambient temperature	0 °C up to +45 °C
Article No.	20-20071

Technical Data

PC requirements to run Device Manager	
Hardware	<ul style="list-style-type: none"> • PC: CPU mit with at least 2 GHz • 1 Gbyte RAM • 200 Mbyte free hard disc space
Software	<ul style="list-style-type: none"> • Microsoft® Windows®* XP, SP 2 with installed .NET-Framework 3.5 • Microsoft® Windows®* 7 (32 or 64 Bit) • Microsoft® Windows® 2008 Server R2 <p>* Registered trademark of Microsoft Corporation</p>

Dimensions



All dimensions in mm

System Components

Switching Module



EMD 1101 Switching Module

4

Switching module with 8 switching channels for connection to the extension bus or the FRAKO Starkstrombus.

The extension module with 8 switching channels can be connected selectively to:

- Maximum Controller EM-MC 2200 or Maximum Demand Controller EML 1101
- System Timer EMT 1101 via FRAKO Starkstrombus

Description

- Display of the switching status via LED
- LED display for bus access
- Definition of the switching status (on/off) of the individual switching channels in case of a failure.

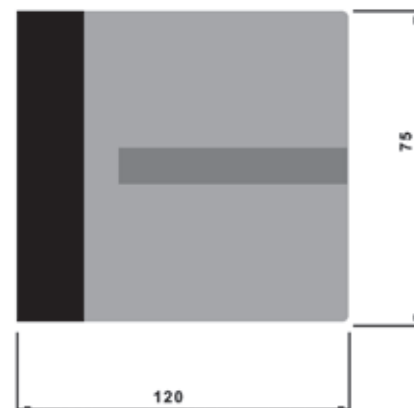
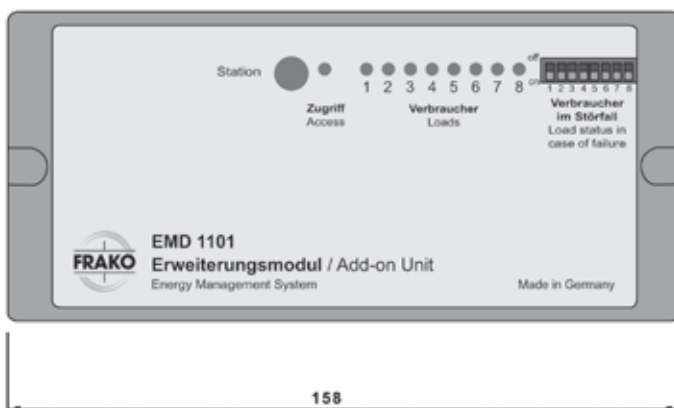
System Components

Switching Module

Technical Data

Power supply	
Mains voltage	230 V AC -15 % up to +10 %
Frequency	45 up to 65 Hz
Power consumption	4 VA
Fuse protection	Max. 2 A external prescribed
Outputs	
8 switching channels	Normal open contact 250 V AC / 4 A
1 extension bus / FRAKO Starkstrombus	2-wire-fieldbus, RS-485
Operating elements	8-fold DIP switching series, 10-level rotary switch
Display elements	9 LEDs
Connections	Via plug-in connector blocks within housing; conductor cross-section: max. 2.5 mm ²
Mechanical construction	
Dimensions	158 x 75 x 120 mm (W x H x D)
Ingress protection	IP40
Version	Protection class 2 according to DIN EN 61010
Housing	Flammability to UL94-V0 (according to the manufacturer)
Installation	Screw mounting or on standard rail 35 mm according to DIN EN 50022
Weight	Approx. 0.8 kg
Operating conditions	
Ambient temperature	0 up to +45 °C
Storage temperature	-20 up to +60 °C
Article-No.	20-21002

Dimensions



Dimensional drawing EMD 1101

All dimensions in mm

System visualization is **INCLUDED** if a PQM with system points is purchased!



Customer-specific evaluations based on EMVIS 3000 can be individually programmed.
Please ask our sales department for individual solutions.

suitable for evaluations according to EN 50001

Eligible for funding according to BAFA

2

EMVIS 3000 System-Visualization

In the Energy Management System, the measured variables, statuses and events in the entire in-house energy supply system are acquired, processed centrally and saved. They are presented graphically by the visualization facility and evaluated. The EMVIS 3000 software is a powerful tool for displaying and documenting all the measurement readings from the devices connected to the system. A client management function is available, which enables individual organizational system trees to be assigned to different users, who therefore receive exactly those data that they require for their separate purposes. There are two types of installation: either the single workstation or the server version, the latter with access to up to 5 clients simultaneously via a web browser, with no additional installation necessary in the client systems.

EMVIS 3000 comprises the following functional modules:

EMVIS 3000 Project

The project planning tool ...

- Unrestricted configuration and compilation of evaluations of all data processed by the system
- New functions such as alarm visualization, status, history, ranking
- Server version with access via browser
- User administration, the administrator defines user rights and accesses
- Calculation of **performance figures**
 Performance figures are virtual data points calculated from other data points, an arithmetic computation from measured or imported data, e.g.: "Active energy A x factor + Water quantity B x factor + Compressed air volume C x factor / No. of items D"
- Creation of **benchmarking** charts
 Benchmarking makes a direct comparison of measurement data or performance figures possible, e.g. energy costs of products or company sites
- Creation of **Sankey** diagrams
 A Sankey diagram gives a clear overview of any type of flow, e.g. the flow of utilities. The width of each stream into and out

of a location is proportional to the quantity flowing, absolute and percentage values also being stated

- Easy Customizing – individual planning of views – simple and intuitive (the basic package includes 3 views with up to 20 online data points in total)

EMVIS 3000 Report

The reporting tool ...

- To simplify navigation, a clear overview of the entire system is displayed in two system trees, either of which can be selected:
 - **Physical:** standard evaluations of all the instruments and channels registered with the system
 - **Organizational:** all evaluations that have been compiled with EMVIS 3000 Project
- Presentation of historical data for analysis and comparison purposes, e.g. different locations or different periods of time
- For example diagrams showing the time course or diagrams without timeline such as **carpetplot, scatter diagram and heatmap**
- The historical data can be exported directly from the chart or consumption table for further processing. Possible export formats are CSV, Excel, Word and PDF
- Direct access to the momentary readings of the connected instruments

PQ Analysis

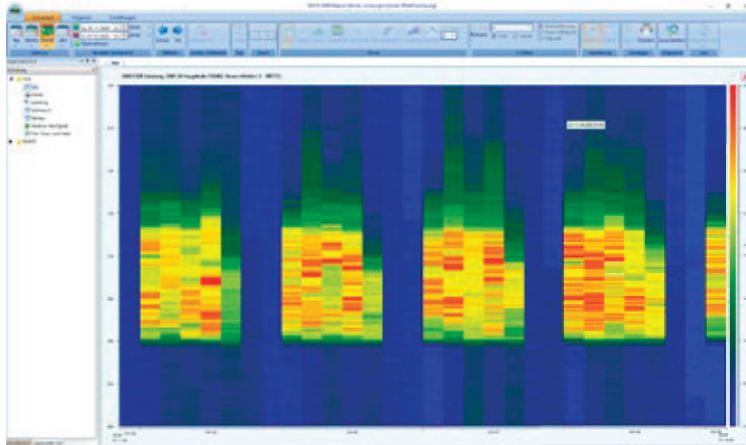
Visualization Software

- Visualization of the alarms occurred is possible through display of the status, history and statistical evaluation in the ranking

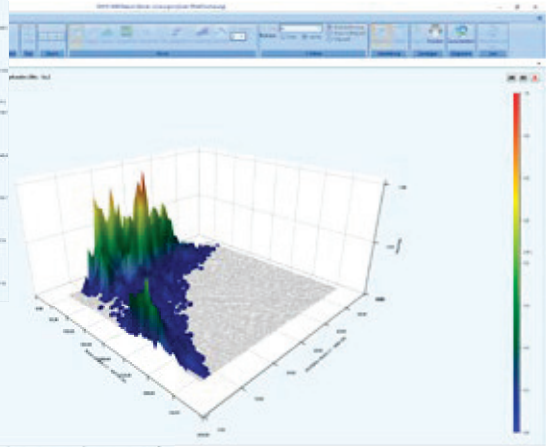
EMVIS 3000 Live

- Views created individually – from site layout drawings right down to the distribution board
 - Display of the momentary measurement readings and statuses
- The EMVIS 3000 license enables the software to be installed on several PCs (server and clients). It allows access to the Power Quality Manager PQM and the Central Unit EMIS1500.

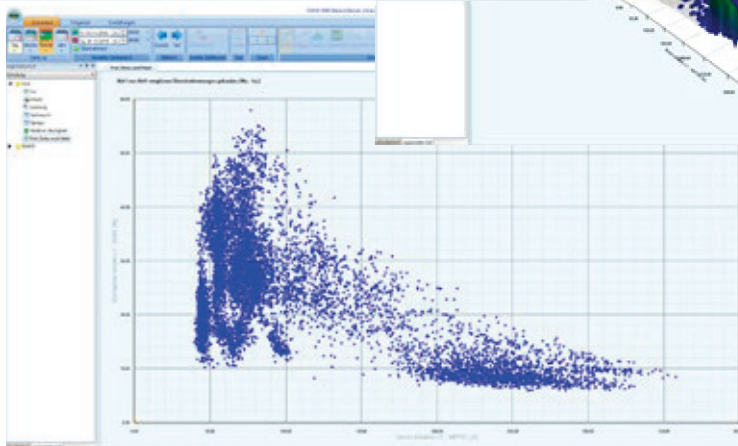
2



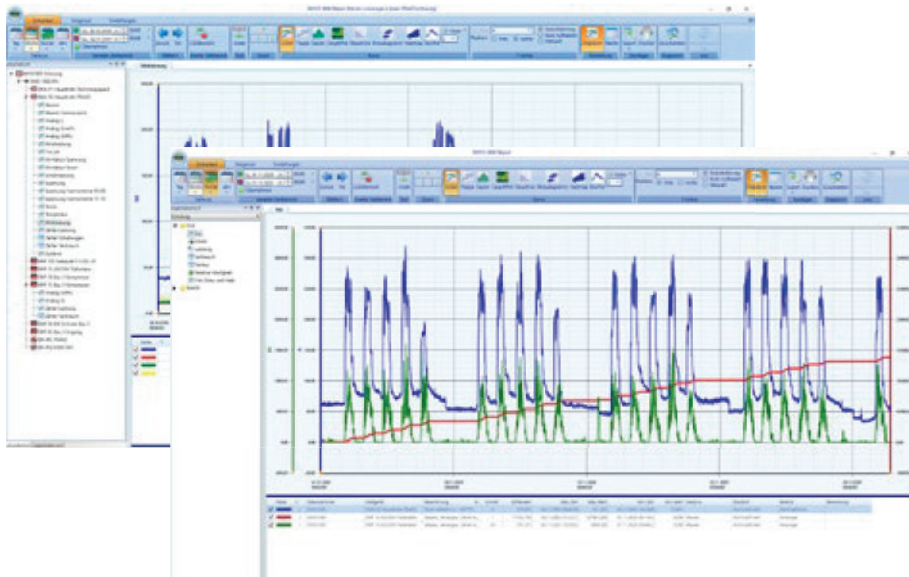
Carpetplot



Heatmap 3-D



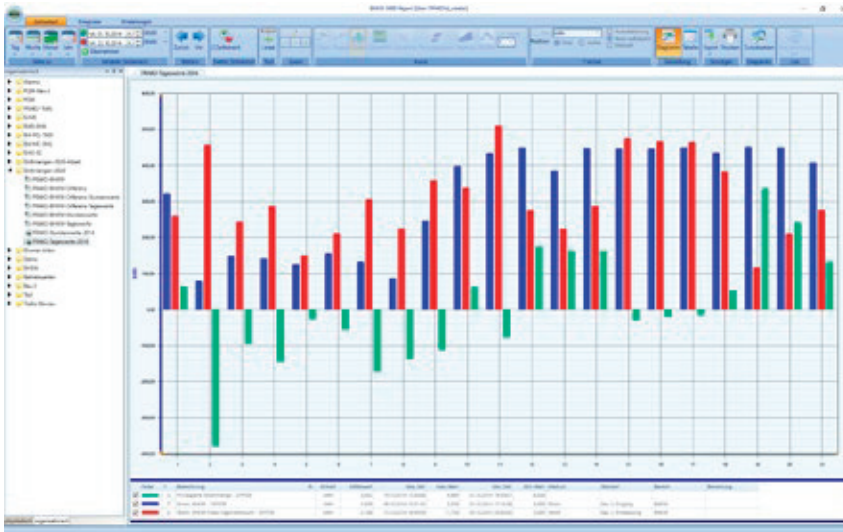
Scatter diagram 2-D



In the physical system tree prepared standard evaluations are deposited for all Energy Management devices. This allows the user to visualize the recorded historical data.

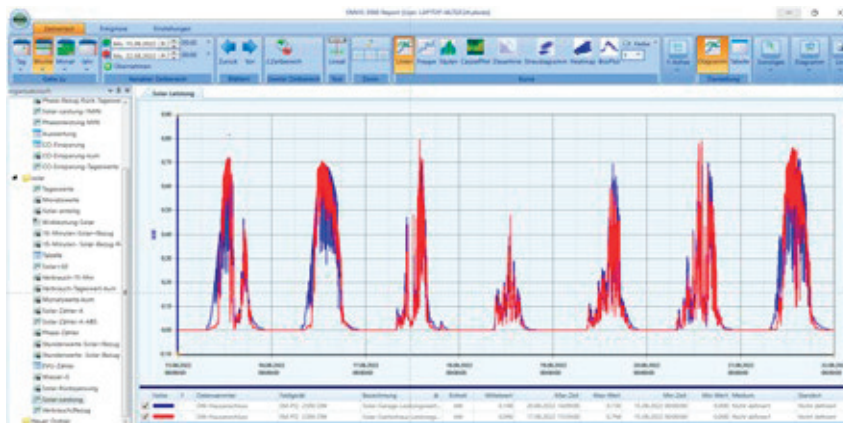
PQ Analysis

Visualization Software

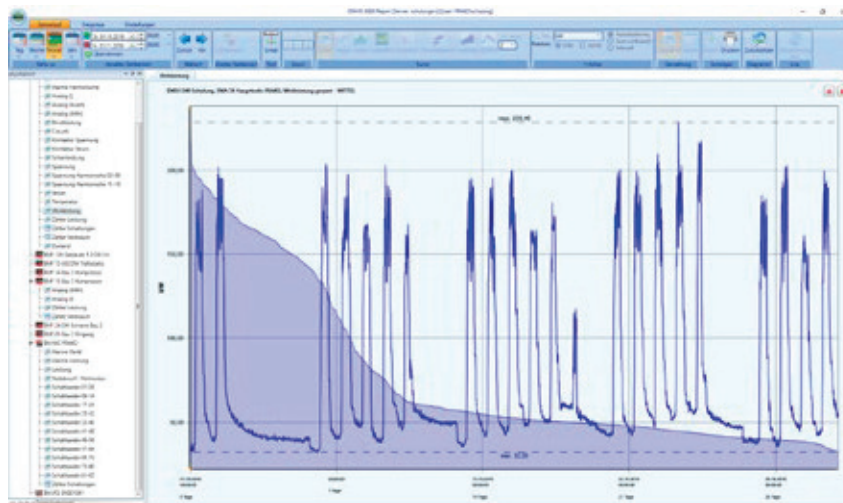


graphical representation of energy differences

2



Sankey graphic – shows the flow of energy



Continuous line graphic – shows the frequency of the variables within a period of time

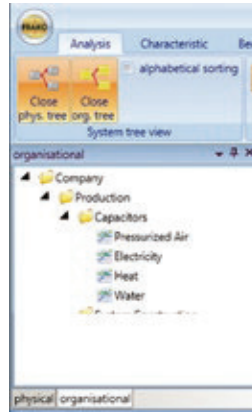
PQ Analysis

Visualization Software

2



Standard evaluations for each energy management device are stored in the physical system tree, enabling the user to visualize the recorded and momentary measurement data without the need for individual configuration.



Within the organizational system tree business specific structures are deposited. The business specific structures are projected in form of individual evaluation in the organizational system tree by the customer.

Technical Data

PC requirements for small and medium systems	
Hardware	<ul style="list-style-type: none"> • Min. Intel Core I3-Processor • User memory: 4 GB RAM • 1 GB free hard disk space • Graphics adapter: min. DirectX 9.0c support and 512 MB video memory
Software	<ul style="list-style-type: none"> • Microsoft® Windows®* 7 • Microsoft® Windows®* 8 • Microsoft® Windows®* 10 • Microsoft® Windows®* Server 2008 R2 • Microsoft® Windows®* Server 2012 R2 • Microsoft® Windows®* Server 2016 • Microsoft® .NET Framework 3.5 • Microsoft® .NET Framework 4.5 • FRAKO-NET (min. V1.40.0056 or higher) • Firebird V2.5.0 (included in FRAKO-NET) <p>* Registered trademark of Microsoft Corporation</p> <p>Please note: the server variant will only work with a 64-bit system</p>
Article-No.	20-10649

EMVIS 3000 Extension packages

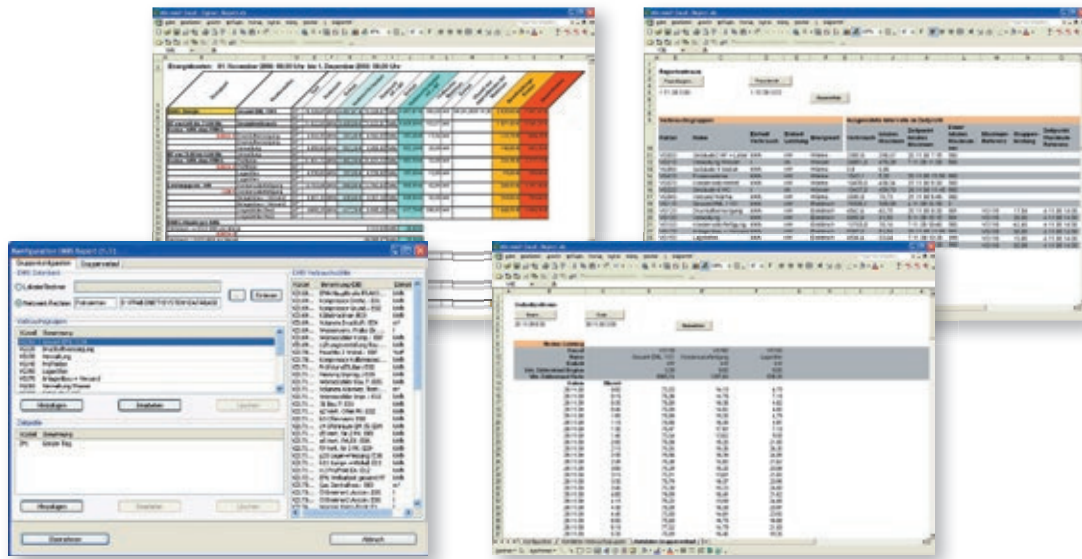
Article-No.	Type	Description
20-10650	EasyCustomizing-S	Individually designed views with up to 100 data points
20-10651	EasyCustomizing-M	Individually designed views with up to 200 data points
20-10652	EasyCustomizing-L	Individually designed views with up to 350 data points
20-10653	EasyCustomizing-XL	Individually designed views with up to 550 data points
20-10654	EasyCustomizing-XXL	Individually designed views with up to 1000 data points

EMVIS 3000 Software-Update

Article-No.	Type	Description
20-10555	EMVIS 3000 Software-Update	from version 3.0 to the latest version up to V3.XXX

PQ Analysis

Software for Cost Centre Analysis



2

EMIS[®] Report Software for Cost Centre Analysis

Energy analysis with EMIS[®] Report.

Software for automated analysis of energy consumption based on Microsoft[®] Excel*.

The consumption data recorded with the FRAKO Energy Management System can be imported to an Excel workbook from the SQL databases FRAKO-NET or FRAKO EMIS-DB.

The reporting period can be set as required.

Individual loads or metering units can be combined to load groups (e.g. cost centres) and evaluated with different time profiles.

Customer-specific reports can easily be generated by linking to appropriate cells.

By means of that you achieve an optimum transparency of the energy flows within the company.

With EMIS[®] report, data from the FRAKO database can be imported to an Excel sheet and are available for a customer specific analysis.

This makes it a very useful tool for the allocation of costs of the different company divisions and/or energy transfer media (electricity, gas, oil, etc.). It is also a useful data source for the financial controlling of a company.

Transparency of energy costs

- Assigning costs to the originators
- Transparency of all energy flows within the company
- Achieve the utmost efficiency
- Automatic evaluation through e-mail notification – also available as CSV-file

To achieve an optimized reduction of the energy costs it is essential to have information on how much energy was consumed when and where.

The knowledge of the energy consumption per cost centre is necessary to determine the potential for savings.

EMIS[®] Report provides a structured overview of the consumption of all types of energy of your company such as current, water, gas, compressed air etc. This enables you to financially evaluate those consumptions.

Individual loads or metering units can be combined into load groups or cost centres and evaluated according to different time schedules.

PQ Analysis

Software for Cost Centre Analysis

Thus, optimal transparency of energy flows is achieved in the company.

Functions:

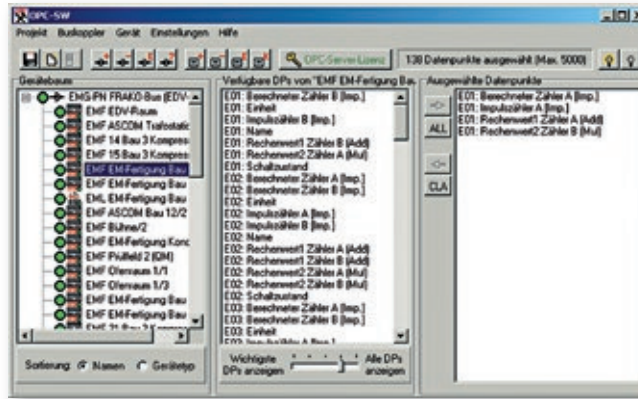
- Automatic evaluation and notification by e-mail
- Period covered by the report is freely definable (date, day, etc.)
- Determination of consumption (kWh, l, m³, ...)
- Consumption peaks within the reporting period
- Time of maximum demand (e.g. kWh)
- Demand by a load or a load group at the time of peak consumption of a reference unit
- Interval values (e. g. 15 minutes) of the reporting period for consumption or consumption rate (e.g. kW)
- Sum of the interval values of the reporting period
- Evaluation according to different time profiles

Technical Data

PC requirements	
Hardware	<ul style="list-style-type: none"> • Pentium, min. 2 GHz clock frequency • User memory: min. 1 GB RAM • 6 GB free hard disk space • Ethernet 10/100 Mbit/s network connection or/and one free serial interface • CD-ROM drive • SVGA graphics adapter • Colour screen, minimum resolution: 1024 x 768 Pixel
Software	<ul style="list-style-type: none"> • Microsoft® Windows®* 7 • Microsoft® Windows®* 8 • Microsoft® Windows®* 10 • Microsoft® Windows®* Server 2008 R2 • Microsoft® Windows®* Server 2012 R2 • Microsoft® Windows®* Server 2016 • Microsoft® Excel* (from version 2000) • FRAKO-NET database <p>* Registered trademark of Microsoft Corporation</p>
Article-No.	20-10488

Optional Accessories

Article-No.	Type	Description
20-10494	Software expansion for EMIS® Report	Software update for cost centre and analysis software EMIS® Report



EMG-OPC-Server

Software interface with the current OPC server.

OPC is an open software interface standard that enables a simple standardized interchange of data to take place between automation and control applications, SCADA systems (process visualization) and office applications (e.g. Microsoft® Excel*, Access*).

FRAKO EMG-OPC Server has been developed for visualization purposes on the basis of the **OPC Data Access Specifications 1.0, 2.0 and 3.0**, and uses the Microsoft® DCOM standard.

This enables the client and server to be separated at various PCs in a network. It is recommended, however, to use client and server on the same PC.

Benefits of the OPC interface

- Easy linking of FRAKO measurement devices, provided with the FRAKO Starkstrombus protocol, to PC software such as visualization systems or office applications
- Data interchange between applications from various suppliers through a common interface

Operating principle

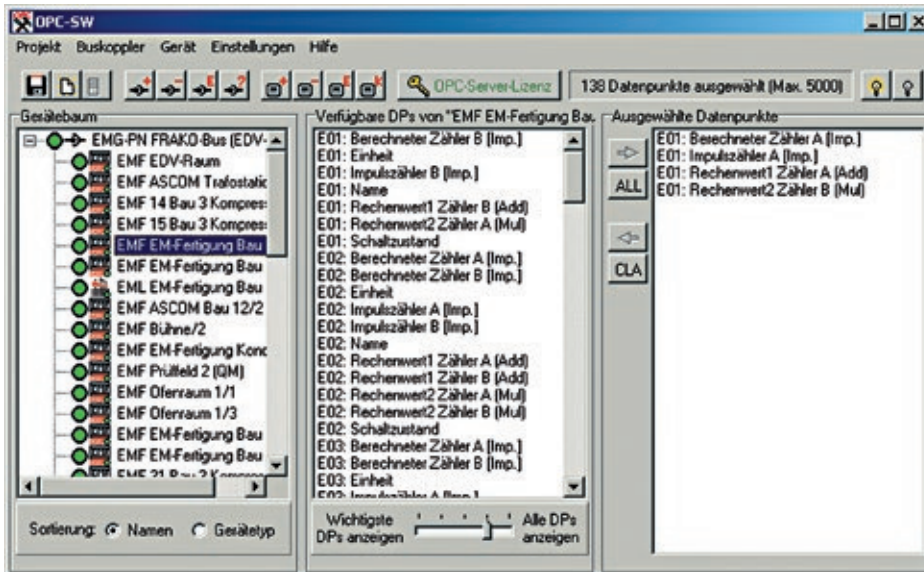
OPC works on the **client / server principle**. **EMG OPC Server** 'serves up' data from the FRAKO measurement devices, provided with the FRAKO Starkstrombus protocol, i.e. makes these available externally. The PC application as 'client' receives and processes the data.

Communication with the **FRAKO Starkstrombus** is via PQM or the internal gateway in the EMIS® 1500. Access to the gateways is via the site's own Ethernet network (TCP / IP).

The **OPC-SW** software creates the configuration files, which contain the data points for the namespace. This supplies a preselection of data points per gateway that can be provided by **EMG-OPC-Server**. These configuration files are loaded when **EMG-OPC-Server** is started. The OPC client then selects the data points to be provided by EMG-OPC-Server from the specified namespace.

Up to 8 PQM gateways or internal gateways of the EMIS® 1500 and a maximum number of 5000 data points can be registered per **EMG-OPC-Server**. The same system requirements apply as for the **FRAKO EMVIS 3000 visualization system**.

Configuration

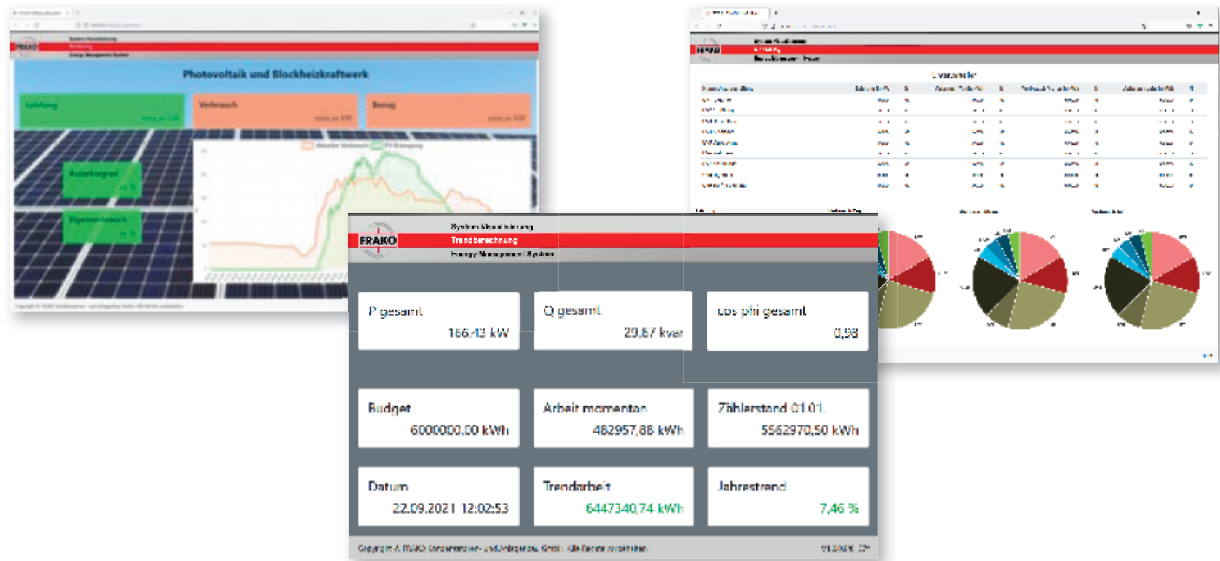


Technical Data

PC requirements	
Hardware	<ul style="list-style-type: none"> • 2 GHz Dual-Core processor • User memory: 2 GB RAM • 1 GB free hard disk space • Ethernet 10/100 Mbit/s network connection
Software	<ul style="list-style-type: none"> • Microsoft® Windows® 7 • Microsoft® Windows® 8 • Microsoft® Windows® 10 • Microsoft® Windows® Server 2008 R2 • Microsoft® Windows® Server 2012 R2 • Microsoft® .NET Framework 1.1 • Microsoft® .NET Framework 4.0 <p>* Registered trademark of Microsoft Corporation</p>
Article-No.	20-10491

PQ Analysis

Customized Software Tools



2

Customized Software Tools

Customer requirements that cannot be realized with the EMVIS 3000 software, can be individually programmed by special, customer-specific tools or services. The realization is web-based and can be realized at short notice depending on the requirements.

Examples:

- Online display of photovoltaics and CHP via web browser
- Proportional representation of the operating units in the circle diagram
- Online trend calculation of annual energy consumption
- Energy efficiency / display
- CO₂ balancing
- etc.