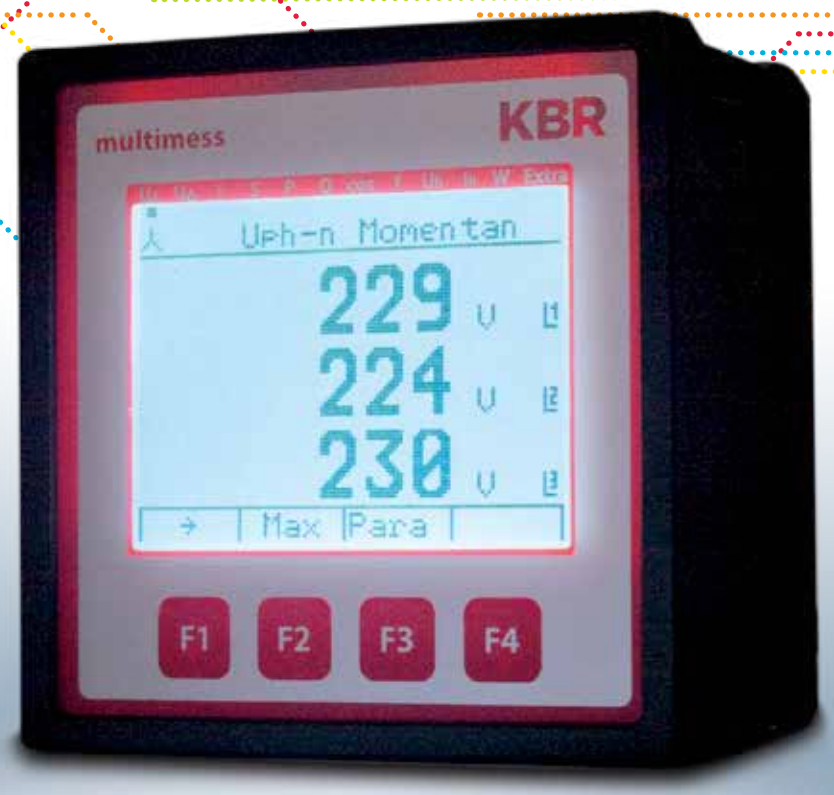
Signals and Energy Data

multimess
Energy measuring devices



One System. Best Solutions.

KBR Energy Management

Energy measuring devices

multimess

Monitoring

Recording

The multimess energy measuring devices provide an extensive overview of all important electrical parameters in energy distribution facilities.
A convenient user guidance makes operation simple, bright displays enable the relevant network parameters to be optimally read.

multimess 96 LCD
Compact network measuring device,
upgradable with optional interfaces.

multimess measuring module
For 1 or 3-phase measurements.

multimess basic/comfort 144 LED bus
Bright LED displays and intuitive operability.

multimess measuring module

Housing size (H x W x D in mm)	90 x 71 x 61
Data display	LCD*
Interface	KBR module bus

* via optional display 1F96-DS

Three-phase network measuring instrument

Highlights

- → Cost-efficient multimeter for mounting rail installation
- → No additional supply voltage necessary
- → No transformer cables to switchgear cabinet necessary
- → Up to 10 measuring modules per display
- → Network capable for application with multisio central module

An overall view of **technical details** can be found on page 10.
The **housing dimensions** are listed on page 14.

multimess 1D4 is a multimeter for top hat rail mounting. As an affordable output-side measuring device, it can measure all typical alternating and direct current parameters of consumers.
Connection of the optional multimess 1F96-DS display can be established with a ready-made RJ12 cable. This way, no complicated wiring of the voltage and most important of the current path from the converter to the door is necessary.

Up to 10 measuring modules can be read out and displayed. Connection between the modules is also established via ready-made RJ12 cables.
Power supply of the measuring device is provided by the measuring voltage. A separate control voltage is not necessary.
If connected to the **multisio** 6D6 instead of to the display, the former creates a load profile memory (P+ P-/ Q+ Q-) and an eBus interface. Five measuring modules can be connected to a central storage module.

Combination possibilities

DEVICE TYPES	multimess 1D4-BS with multimess 1F96-DS [1]	multimess 1D4-BS with multisys 2D2-ESBS	multimess 1D4-BS with multisio 6D6 and multisio 6F96-DS
LCD DISPLAY 96 X 96	■	–	■
NUMBER OF MEASURING MODULES	10 per display	no limit	5 per multisio 6D6
eBUS | eBUS TCP	– | –	■ | ■ [2]	■ | ■ [3]
INSTANTANEOUS VALUE DISPLAY Display | eBUS	■ | –	– | ■	■ | ■
LOAD PROFILE MEMORY Display | eBUS	– | –	– | – [4]	– | ■
CONTINUOUS COUNTER STATUS Display | eBUS	■ | –	– | ■ [4]	■ | ■

■ Standard version

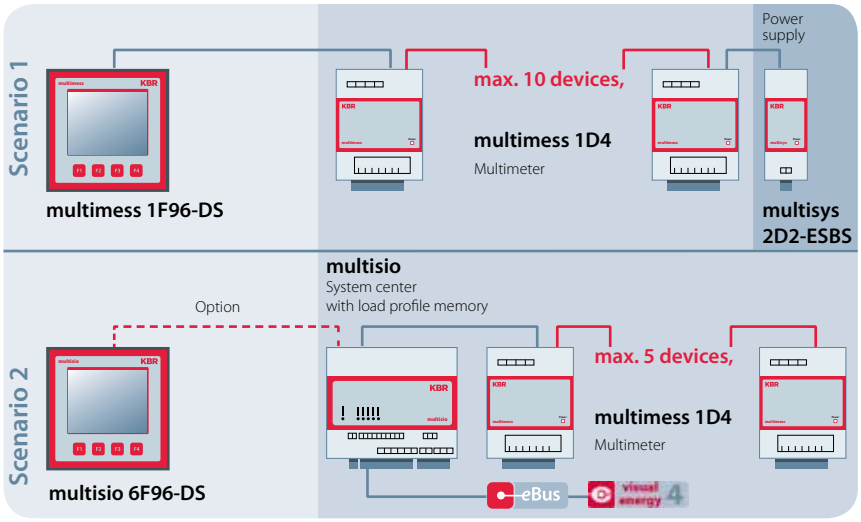
– Not available

[1] For operation of the display, an additional power supply unit is needed, e. g. the multisys 2D2-BSES.

[2] For application of the gateway multisys 2D2-BSET instead of 2D2-BSES

[3] Additional gateway multisys 3D2-ESET required.

[4] In connection with visual energy 4, daily consumption is automatically recorded. 15-min period values are supplementary values (daily consumption / 96)



multimess 96 LCD

Housing dimensions (H x W x D in mm)	96 x 96 x 55
Data display	LCD
Interface	KBR eBus * Modbus * Profibus * KBR eBus TCP * Modbus TCP *

* depends on respective device type

Three-phase network measuring instrument

Highlights

- → Compact construction, standard installation size 96 x 96 mm
- → Optionally upgradeable Interfaces for every possible application: eBus, eBus TCP, Modbus, Modbus TCP, Profibus DP
- → Convenient LCD display e. g. with bar graph for network harmonics
- → Graphical diagnosis of voltage and current levels after a defined EN 61000 event

An overall view of **technical details** can be found on page 11.
The **housing dimensions** are listed on page 15.

The electronic network measuring devices of the **multimess** 4F96 series measure and monitor all important parameters in a three-phase network and are available in different versions. All device versions include a pulse output. Aside from the 4F96-0… entry level model, the load profile (P+ P- / Q+ Q-) can be saved with all device versions and later be read out via eBus. Network voltage can be monitored in accordance with EN 61000-T4-30. In case of a violation, the voltage and current history is saved and among other things analyzed on the LCD display. Different optional interfaces and protocols allow various applications.

Input and output configuration

DEVICE TYPE	multimess 96 LCD [1] 4F96-0-LCD-US1 [2] 4F96-0-LCD-ESMS-US1 [3] 4F96-1-LCD-ESMS-2RO-US1	multimess 96 LCD TCP [1] 4F96-1-LCD-ET-2RO-US1 [2] 4F96-1-LCD-MT-2RO-US1	multimess 96 Profibus [1] 4F96-1-LCD-DP-US1
DIGITAL INPUTS	–	–	–
PULSE OUTPUT	1 (P+/ Q+)	1 (P+/ Q+)	1 (P+/ Q+)
RELAY OUTPUTS	[1] – [2] – [3] 2	2	–
INTERFACE	[1] – [2] RS485 [3] RS485	[1] Ethernet TCP/IP [2] Modbus TCP	RS485
KBR eBUS	[1] – [2] ■ [3] ■	–	–
KBR eBUS TCP	–	[1] ■ [2] –	–
MODBUS RTU/ACSII	[1] – [2] ■ [3] ■	–	–
MODBUS-TCP	–	[1] – [2] ■	–
PROFIBUS DP	–	–	■
POWER SUPPLY 85-265 V AC/DC; 15 VA	■	■	■
MEMORY/BATTERY	[1] – [2] – [3] ■	[1] ■ [2] ■	–

■ Standard version

– Not available

[1] Device in development

Well-arranged bar graph to display harmonics

Graphical displaying of I and U in case of a voltage dip

multimess basic / comfort 144 LED bus

Housing dimensions (H x W x D in mm)	144 x 144 x 60
Data display	LED
Interface	KBR eBus Modbus Profibus * KBR eBus TCP * Modbus TCP *

* depends on respective device type

Three-phase network measuring instrument

Highlights

- → Several performance classes for all fields of application
- → Extensive displays, functions and storage options
- → Optimum readability thanks to bright LED displays
- → Wide range of variety of inputs and outputs (digital/analog)
- → Small mounting depth of only 60 mm

An overall view of **technical details** can be found on pages 12/13.
The **housing dimensions** are listed on page 15.

The electronic network measuring devices of the **multimess basic/comfort 144 LED** series measure and monitor all important parameters in the three-phase network and are available in a wide range of performance classes.

The load profile of the facility measured in 15-minute measuring intervals can be saved for up to 365 days, depending on the model. The integrated event memory can log up to 4096 events, such as limit violations, power failures, drops in voltage and many other things. A bus capability of non-bus-capable devices can be implemented at a later date by means of an upgrade kit.

Rear side of multimess basic 144 LED bus

Rear side of multimess comfort 144 LED bus

Input and output configuration

	multimess basic 144 LED bus	**multimess comfort 144 LED bus**
DEVICE TYPE	4F144-1-LED-ESMS-US1/-US5 4F144-1-LED-ESMSET-US1/-US5 4F144-1-LED-ESMSMT-US1/-US5 4F144-1-LED-ESMSDP-US1/-US5	4F144-2-LED-ESMS-US1/-US5 4F144-2-LED-ESMSET-US1/-US5 4F144-2-LED-ESMSMT-US1/-US5 4F144-2-LED-ESMSDP-US1/-US5
DIGITAL INPUTS	1 synchronization, 1 HT / LT tariff	2 configurable
PULSE OUTPUT	1 (P+/ Q+)	1 (P+/ P-/ Q+/ Q-)
RELAY OUTPUTS	2 [1]	2 [2]
ANALOG OUTPUTS	–	3
INTERFACE	RS485	RS485
KBR eBUS	■ | ■	■ | ■
KBR eBUS TCP	☐	☐
MODBUS RTU/ACSII	■	■
MODBUS-TCP	☐	☐
PROFIBUS DP	☐	☐
POWER SUPPLY 85-265 V AC/DC; 15 VA	■	■
POWER SUPPLY 20-70 V AC/DC; 15 VA	☐	☐

■ Standard model

☐ Optionally available

– not available

[1] limits function

[2] additional all-or-nothing relay function via bus

multimess Technical details

MEASUREMENT PARAMETER (RMS)	**Voltage**	$U_{PH-N\ (L1-L3)}$	**DEVICE TYPE**	**multimess measuring module**
	Current	$I_{PH\ (L1-L3)}$		1D4-BS
	Average current	$I_{PH\ (L1-L3)}$ | 10 min or configurable		
	Apparent power	$S_{PH\ (L1-L3)}$ | S_{total}		
	Active power	$P_{PH\ (L1-L3)}$ | P_{total}		
	Frequency	$f_{network\ L1}$		

ADDITIONAL MEASURING PARAMETERS	**Distortion factor U, THD:** DF-$U_{PH\ (L1-L3)}$ | **Distortion current strength** $I_{d\ PH\ (L1-L3)}$	–
	Harmonics: Voltage (L1 – L3) | Current (L1 – L3)	3rd - 19th harm. U 3rd -19th harm. I [1]
	Rotary field control: Rotary field display in degrees	–
	Neutral conductor current: I_N | $I_{Naverage}$	■ | ■
	Performance factors fundamental harmonic | **Overall performance factors**	$\cos\varphi_{\ (L1-3)}$
	Q_1 = First harmonic reactive power | **Q = Fundamental harmonic reactive power** ($Q_1 + Q_D$)	$Q_{1\ (L1-3)}$ | $Q_{1\ total;\ total}$ $Q_{(L1-3)}$ | $Q_{1\ total;\ total}$
	Active energy | **Reactive energy**	Continuous counter display on device, $P_+ P_-$ Q_- Q_+ [1]
DISPLAYS	**Display type**	none or external display
MEASURING ACCURACY	**U, I** | **P, Q, S**	0.5 % | 1 %
	Update speed	< 1 sec [2]
MEMORY	**Load profile memory** P_{total} **/** Q_{total} (cumulated)	Energy consumption $P_+ P_{cum}$ Q_- Q_+ [1]
	Duration of storage of load profiles at 15-minute measuring interval	Ring buffer for 40 days [1]
	Daily power, active and reactive power (can be read out via bus)	Continuous counter status
	Extreme value memory (min./max.)	–
	Maximum indicator function	–
	Event memory	–
INPUTS	**Voltage path** U_{L1-L2} | U_{L2-L3} | U_{L3-L1}	3 x 87 V ... 400 V ... 460 V AC
	Current path I_{L1} | I_{L2} | I_{L3}	3 x 0.02 A ... 5 A ... 6 A
OUTPUTS	**Relay outputs** 250 V AC | 2 A	–
	Digital outputs	–
INTERFACES	**Serial interface**	RS485
	Ethernet TCP/IP	–
	Supported field bus protocol	KBR module bus
POWER SUPPLY	**Operating voltage** | **power consumption**	through measuring voltage | 3.2 VA / 1.3 W
DIMENSIONS	**Housing:** Switchboard installation (H x W x D)	–
	Housing: Mounting rail installation (H x B x D)	4 TE | 90 x 71 x 61 mm

■ Standard version
– Not available

[1] only in connection with multisio 6D6
[2] in connection with multimess 1F96-DS
[3] only via eBus
[4] neutral conductor has to be connected

multimess 96 LCD	**multimess 96 LCD**	**multimess 96 LCD TCP**	**multimess 96 Profibus**
[1] 4F96-0-LCD-US1 [2] 4F96-0-LCD-ESMS-US1	4F96-1-LCD-ESMS-2RO-US1	[1] 4F96-1-LCD-ET-2RO-US1 [2] 4F96-1-LCD-MT-2RO-US1	4F96-1-LCD-DP-US1
■ | ■			
3rd – 19th harm. U | 3rd – 19th harm. I			
■			
■ | ■			
$\cos\varphi_{(L1-3)}$ | $\lambda_{total;\,total}$ | $\lambda_{(L1-3)}$ only via bus			
$Q_{1\,(L1-3)}$ | $Q_{1\,total;\,total}$ $Q_{(L1-3)}$ | $Q_{1\,total;\,total}$			
Continuous counter display on device	Continuous counter display on device P_+ P_- | Q_+ Q_- [4]		
LCD			
0.5 % | 1 %			
≈ 400 ms			
Consumption and recovery P_+ P_- P_{cum} | Q_+ Q_- Q_{cum}			
–	Ring buffer for 40 days [4]		
–	1 year for energy consumption and recovery		
	For all displayed measured values + max. active and reactive power intervals average value P_{MPmax} and Q_{MPmax} with date and time (MP = measuring period)		
–	non-volatile		
–	**4096 events** with date, time and duration, e.g. limit overshoots and undershoots, power failures and overvoltage / undervoltage ≥ 20 ms at 100% measuring circuit voltage dip		
3 x 5 V ... 100 V ... 120 V AC and 3 x 20 V ... 500 V ... 600 V AC			
3 x 0.01 A ... 1 A ... 1.2 A AC and 3 x 0.05 A ... 5 A ... 6 A AC			
–	**2** relays for notification of limit violations		–
1 working pulse output, proportional to active or reactive energy			
[1] – [2] RS485	RS485	–	–
–	–	■	–
[1] – [2] eBus + Modbus (switchable)	eBus + Modbus (switchable)	[1] eBus TCP [2] Modbus TCP	Profibus DP
85 – 265 V AC / DC | 15 VA			
92 x 92 mm (cut-out) 96 x 96 x 75 mm (housing with terminals)			
–			

multimess Technical details

MEASUREMENT PARAMETER (RMS)	**Voltage**	$U_{PH-N\,(L1-L3)}$	**DEVICE TYPE**	**multimess basic 144 LED bus**
	Current	$I_{PH\,(L1-L3)}$		[1] 4F144-1-LED-ESMS-US1 / -US5
	Average current	$I_{PH\,(L1-L3)}$ | 10 min or configurable		[2] 4F144-1-LED-ESMSET-US1 / -US5
	Apparent power	$S_{PH\,(L1-L3)}$ | S_{total}		[3] 4F144-1-LED-ESMSMT-US1 / -US5
	Active power	$P_{PH\,(L1-L3)}$ | P_{total}		[4] 4F144-1-LED-ESMSDP-US1 / -US5
	Frequency	$f_{network\,L1}$		

ADDITIONAL MEASURING PARAMETERS	**Distortion U, distortion current strength I_d** | **THD:** DF-$U_{PH\,(L1-L3)}$ | $I_{d\,PH\,(L1-L3)}$	■ | ■
	Harmonics: Voltage (L1 – L3) | Current (L1 – L3)	3rd – 19th harm. U | 3rd – 19th harm. I
	Rotary field control: Rotary field display in degrees	■
	Neutral conductor current: I_N | $I_{Naverage}$	■ | ■ (flexible interval)
	Performance factors fundamental harmonic | **Overall performance factors**	$\cos\varphi_{(L1-3)}$ | $\lambda_{total;\,total}$ $\lambda_{(L1-3)}$ only via bus
	Q_1 = First harmonic reactive power | **Q = Fundamental harmonic reactive power** ($Q_1 + Q_D$)	$Q_{1\,(L1-3)}$ | $Q_{1\,total;\,total}$ $Q_{(L1-3)}$ | $Q_{total;\,total}$ only via bus
	Active energy | **Reactive energy**	P_+ | Q_+ (HT / LT) continuous counter display on device
DISPLAYS	**Display type**	LED
MEASURING ACCURACY	**U, I** | **P, Q, S** |	0.5 % | 1 %
	Update speed	≈ 400 ms
MEMORY	**Load profile memory P_{total} / Q_{total}** (cumulated)	Power supply P_+ P_{cum} | Q_+ Q_{cum}
	Duration of storage of load profiles at 15-minute measuring interval	Ring buffer for **40 days**
	Daily power, active and reactive power (can be read out via bus)	1 year for energy consumption
	Extreme value memory (min. / max.)	For all displayed measured values + max. active and reactive power intervals average P_{MPmax} and Q_{MPmax} with date and time (MP = measuring period)
	Maximum indicator function	non volatile
	Event memory	**4096 events** with date, time and duration, e.g. limit overshoots and undershoots, power failures and overvoltage / undervoltage ≥ 20 ms at 100% measuring circuit voltage dip
INPUTS	**Voltage path** U_{L1-L2} | U_{L2-L3} | U_{L3-L1}	3 x 5 V ... 100 V ... 120 V AC and 3 x 20 V ... 500 V ... 600 V AC
	Current path I_{L1} | I_{L2} | I_{L3}	3 x 0.01 A ... 1 A ... 1.2 A AC and 3 x 0.05 A ... 5 A ... 6 A AC
	Digital inputs	**1** input for synchronization to the energy supplier measuring period **1** tariff input for HT/LT switching
OUTPUTS	**Relay outputs** 250 V AC | 2 A	**2** relays for notification of limit violations
	Analog outputs 0 (4) – 20 mA	–
	Digital outputs	**1** working pulse output, proportional to active or reactive energy
INTERFACES	**Serial interface**	RS485
	Ethernet TCP/IP	□
	Supported field bus control	[1] eBus + modbus [2] eBus + modbus | eBus TCP/IP [3] eBus + modbus | modbus TCP/IP [4] eBus + modbus | Profibus DP
POWER SUPPLY	**Operating voltage** | **power consumption**	■ 85 – 265 V AC / DC | 15 VA □ 20 – 70 V AC / DC | 15 VA
DIMENSIONS	**Housing:** Switchboard installation, size in mm (H x W x D)	144 x 144 x 60

■ Standard version □ Optionally available – Not available

multimess comfort 144 LED bus

[1] 4F144-2-LED-ESMS-US1 / -US5
[2] 4F144-2-LED-ESMSET-US1 / -US5
[3] 4F144-2-LED-ESMSMT-US1 / -US5
[4] 4F144-2-LED-ESMSDP-US1 / -US5

■	■
3. – 19th harm. U	3rd – 19th harm. I
■	
■	■ (flexible interval)
$\cos\varphi_{(L1-3)}$	$\lambda_{total;\,total}$ $\lambda_{(L1-3)}$ only via bus
$Q_{1\,(L1-3)}$	$Q_{1\,total;\,total}$ $Q_{(L1-3)}$ $Q_{total.;\,total}$ only via bus
P_+ Q_+ P_- Q_- (HT / LT) continuous counter display on device	
LED	
0.5 %	1 %
≈ 400 ms	
Consumption and recovery P_+ P_- P_{cum} Q_+ Q_- Q_{cum}	
Ring buffer for **365 days**	
1 year for energy consumption and recovery	
For all displayed measured values + max. active and reactive power intervals average P_{MPmax} and Q_{MPmax} with date and time (MP = measuring period)	
non volatile	
4096 events with date, time and duration, e.g. limit overshoots and undershoots, power failures and overvoltage / undervoltage ≥ 20 ms at 100% measuring circuit voltage dip	
3 x 5 V ... 100 V ... 120 V AC and 3 x 20 V ... 500 V ... 600 V AC	
3 x 0.01 A ... 1 A ... 1.2 A AC and 3 x 0.05 A ... 5 A ... 6 A AC	
2 digital inputs, configurable, e.g. for acquiring states, synchronization, HT/LT	
2 relays, configurable	
3 analog outputs with shared GND, configurable on the device and via bus	
1 digital output, configurable, e.g. as working pulse output	
RS485	
□	
[1] eBus + modbus [2] eBus + modbus | eBus TCP/IP [3] eBus + modbus | modbus TCP/IP [4] eBus + modbus | Profibus DP	
■ 85 – 265 V AC / DC | 15 VA □ 20 – 70 V AC / DC | 15 VA	
144 x 144 x 60	

Measure like the professionals – with KBR measuring technology

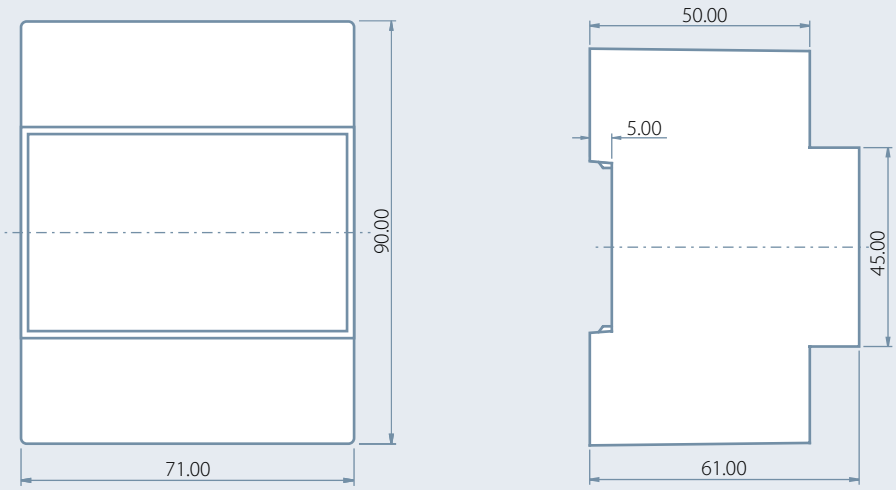
POWER QUALITY

POWER QUALITY – Mobile network analyzer for low, medium and high voltage networks

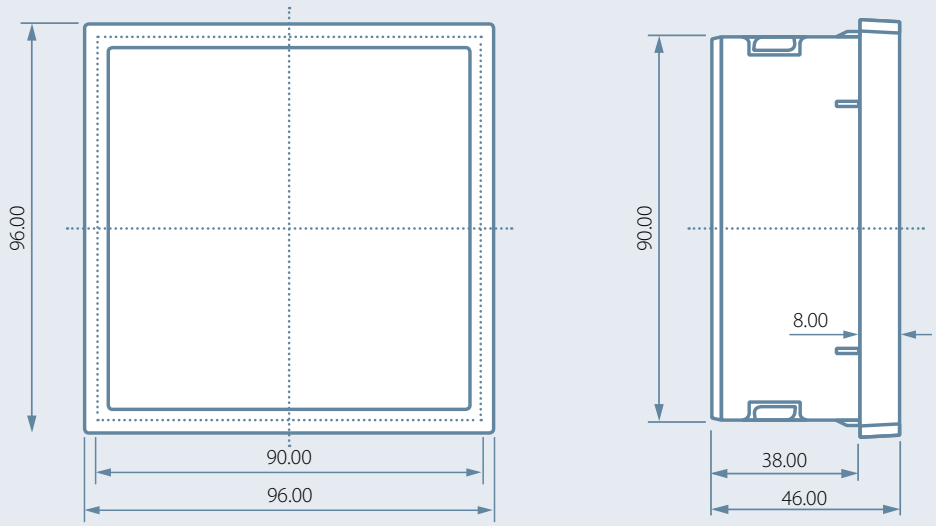
- → Full recording of all electrical parameters, in parallel and seamlessly
- → Measuring integrated with no prior configuration
- → Energy supply via measurement lines
- → Display information about the correct device connection and current measurement values
- → Assessment of voltage quality in accordance with EN 50160 and IEC 61000-2-2
- → Extensive and yet easy assessment functions
- → Company and project details on every printout
- → Precision class A in accordance with EN 61000-4-30

multimess Dimensions

multimess 1D4-BS

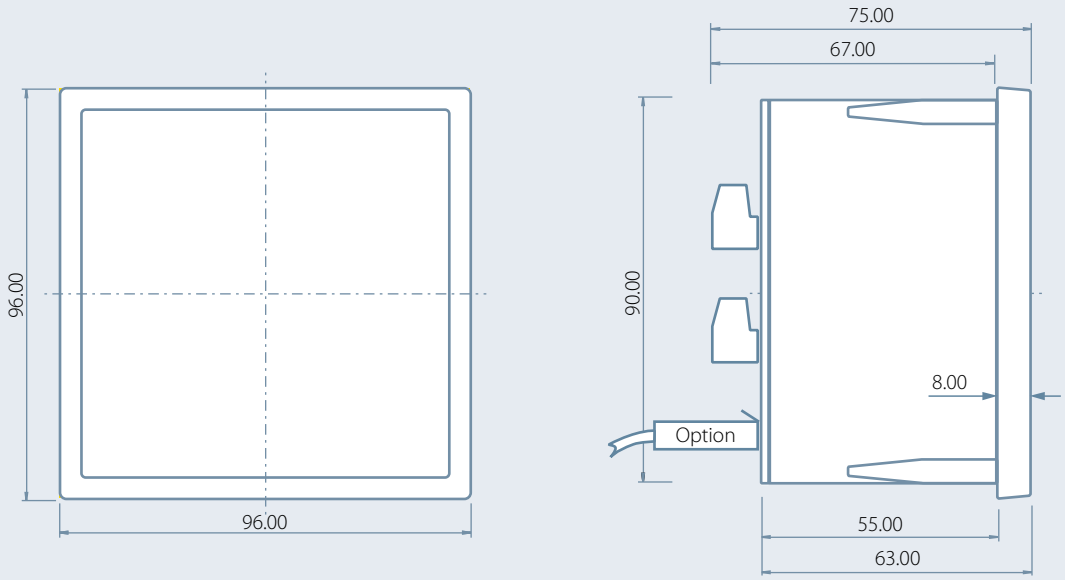


multimess 1F96-DS

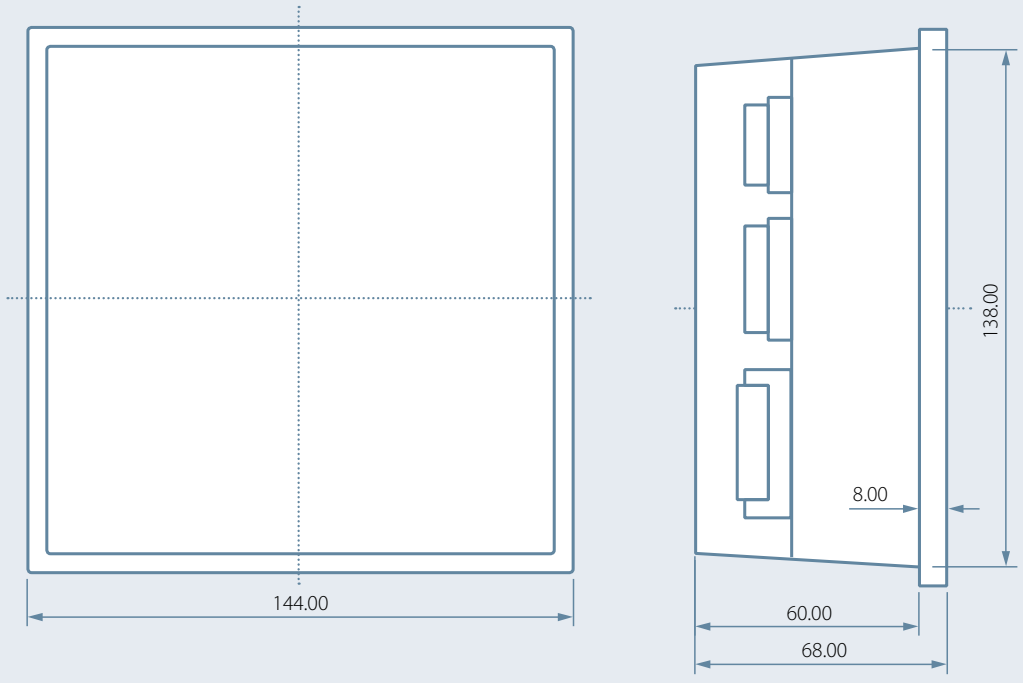


All dimensions in mm. Not suitable for taking measurements.

multimess 4F96



multimess basic / comfort 144 LED bus



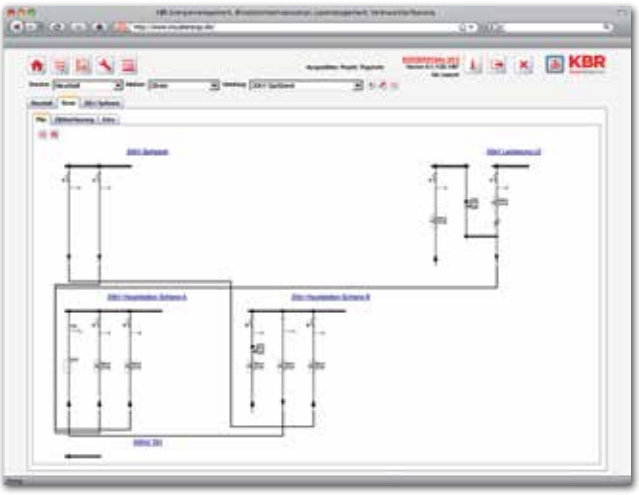
visual energy 4

Functional principle and applications

With **visual energy 4,** the meter points of a supply network can be recorded and precisely allocated. This allocation to the distribution structure allows the system to automatically generate plausible consumption reports. By means of the eBus, data from the device memories are read out and saved to the central energy database. MSCONS meter count or load profile import is also possible, along with the mobile recording and manual entry of reading meters. visual energy 4 subsequently represents these load profiles as bar, line or plane graphs.
The system is set up and configured in just a few minutes, thanks to predefined standard views. As soon as the connected bus devices appear in the so-called eBus list, communication with the devices is possible and current data can be displayed. visual energy 4 allows the allocation and evaluation of consumptions at cost centers. Alternatively, the energy benefits, e.g. consumption proportions for heating, cooling, lighting or process can be evaluated. The sums and proportions of individual network operators can be clearly seen.
visual energy 4 is fully scalable as a distributed application. Even the largest applications, with many users and meter points, can be covered by this without any problem.
A flexible licensing according to meter points ensures that the cost-benefit ratio is maintained.

Application overview

- **Energy data management for complex supply structures**
- **Cost center management and billing**
- **Time-controlled readout and archivingof measured data**
- **MSCONS meter count and load profile import**
- **Plausibility check**
- **Substitute value formation according to BDEW metering code**
- **Live updating and rendering of measured data**
- **Convenient configuration of measuring devices**
- **Monitoring preset limits and alarm function if limits are exceeded (notification via SMS or E-mail)**



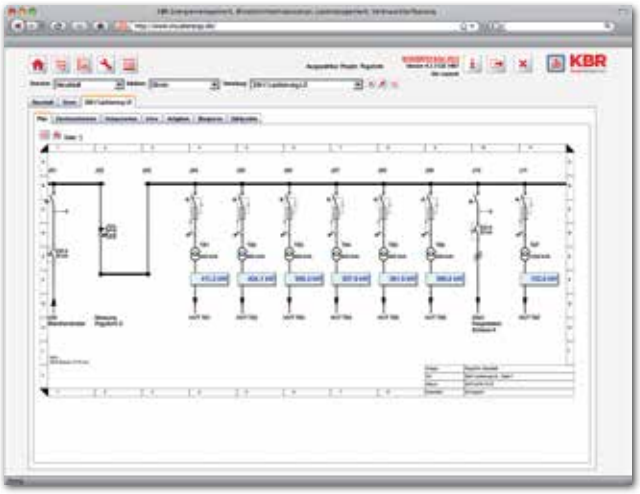
Graphic representation visual energy 4: Supply structure

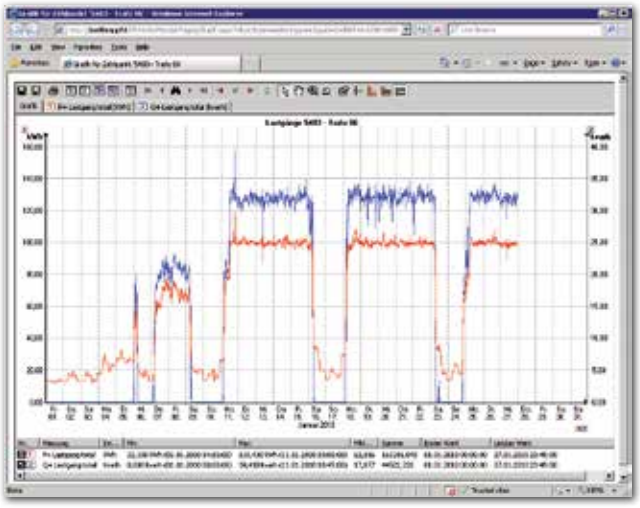
Visualization of measured data

visual energy 4 stands out through its clear and intuitive user interface. A library with drawing objects and icons forms the basis for quickly implementing more complex energy distribution structures. Live values and states provide a current overview of the energy supply structure at any time. This portrayal can be freely scaled in the Web browser.
A lot of additional information from the connected eBus devices can be quickly and easily read out and displayed. All important consumer data is documented without interruption. The causes of problems in the energy network, such as voltage fluctuations, harmonics or power failures, can also be quickly detected and uniquely assigned.
Due to the long-term storage of measured data, comparisons and analyses with historic data can be made: an important prerequisite for efficient energy management.
A component database that can be expanded by the user allows fuses, switches or other components to be selected, thereby ensuring that the current plan can be shown at any time.

Overview visualization

- → **Graphic representation of consumption values, peak load values and load profile data in freely definable periods**
- → **Representation of the complete energy supply as a topological diagram**
- → **Supports the illustration of the energy forms of electricity, gas, water and heat**
- → **Clear tab system with navigation elements for a quick and precise navigation**
- → **Multiple measured values can be combined and presented in a graph**
- → **Library for icons and drawing objects**
- → **Component database**





Graphic representation visual energy 4: Energy distribution (top) and load profile

Notes

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