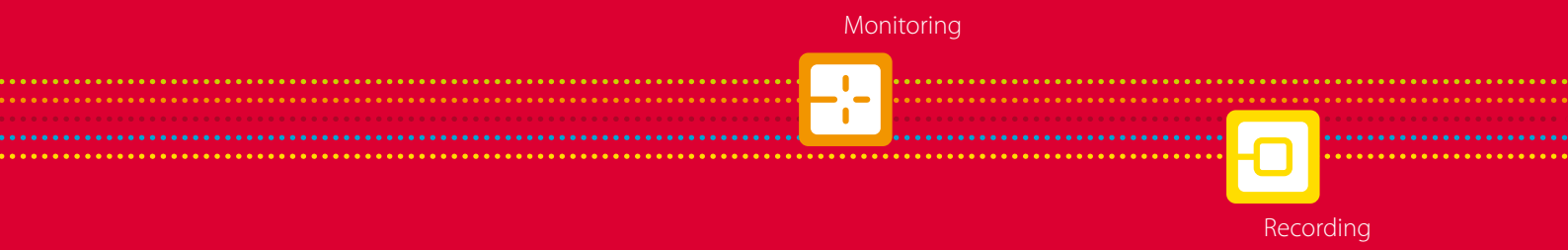
Energy measuring devices

multimess



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

multimess basic/comfort 144 LCD bus
With large, high-contrast LC display for measured value and text display, bus-capable.

multimess light / basic 96 LED
Ideal for use in low-voltage energy distributions. Optionally bus capable.

multimess eco 144 LED
The low-cost alternative to standard analog instruments. .

multimess light 144 LED
multimess basic/comfort 144 LED bus
Different performance classes for every field of application.

multimess light / basic 96 LED

Housing size (H x W x D in mm)	**96 x 96 x 92**
Data display	**LED**
Interface *	**KBR eBus**

* for multimess light 96 LED optionally through upgrade kit

3-phase network measuring instrument

Highlights

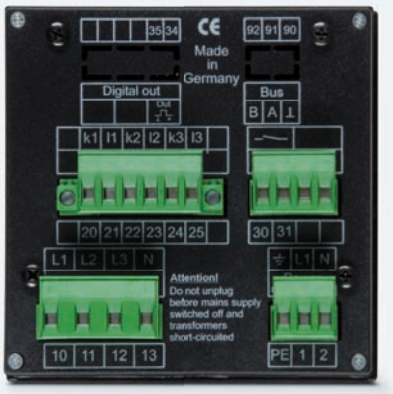
- → Ideal for use in low-voltage power distributions
- → Compact construction, standard installation size 96 x 96 mm
- → Display neutral conductor current
- → Active energy meter for energy consumption
- → Bright LED displays for optimal readability

An overall view of **technical details** can be found on pages 34/35.
The **housing dimensions** are listed on pages 38/39.

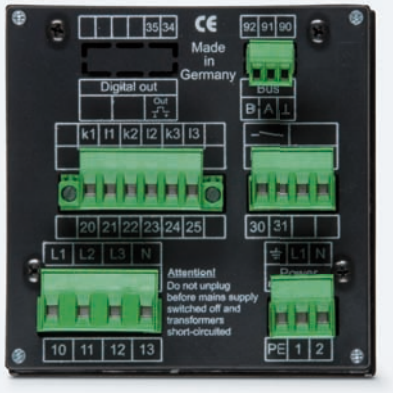
multimess light / basic 96 LED is a compact network measuring device for use in low-voltage power distribution facilities and serves to measure all important parameters in 3 and 4-phase networks. Apart from reactive power meters for energy consumption, the multimess light / basic 96 LED has an extreme value memory, as well as a relay with touch-up function. Three bright LED displays guarantee optimal readability, even in poor light conditions. For the bus capable version of multimess light / basic 96 LED, other measurement parameters can be read out in addition to the measured values displayed on the device – such as the inductive reactive power meter.

Note: You can upgrade the non bus capable version of multimess light / basic 96 LED later on without any problems, using a special **upgrade kit**.

Rear side of multimess light 96 LED



Rear side of multimess basic 96 LED



Input and output configuration

	multimess light 96 LED	**multimess basic 96 LED bus**
DEVICE TYPE	1F96-0-LED-NC-US1 1F96-0-LED-NC-US1-1DO	1F96-0-LED-ES-US1 1F96-0-LED-ES-US1-1DO 1F96-0-LED-MS-US1 1F96-0-LED-ET-US1 1F96-0-LED-MT-US1
INTERFACE	RS485 interface upgradable	RS485
KBR eBus	Upgrade option for KBR eBus	■
MODBUS RTU	–	□
PULSE OUTPUT	□ for active energy	□ for active or reactive energy
KBR eBus	–	□
MODBUS-TCP	–	□

■ Standard version □ Optionally available – Not available

multimess eco 144 LED

Housing size (H x W x D in mm)	**144 x 144 x 60**
Data display	**LED**

3-phase network measuring instrument

Highlights

- → Cost-effective alternative to standard analog instruments
- → Large, bright LED displays for optimal readability
- → Flexible use for low and medium-voltage facilities through switchable measuring ranges for U and I
- → Display neutral conductor current
- → Small mounting depth of only 60 mm

An overall view of **technical details** can be found on page 35.
The **housing dimensions** are listed on page 39.

multimess eco 144 LED is an affordable network measuring device for flush mounting, for the measurement of all important values in 3-phase networks. Because of its convincing price-performance ratio, the device represents a real alternative to the analog measuring devices used in energy distribution.

The device has an extreme value memory which saves, similar to a maximum indicator function, both a minimum and a maximum value for each measured value. The proven installation size of 144 x 144 mm and the large LED displays guarantee an optimal readability.

Rear side multimess eco 144 LED

multimess light 144 LED

Housing size (H x W x D in mm)	**144 x 144 x 60**
Data display	**LED**

3-phase network measuring instrument

Highlights

- → Use in low and medium-voltage facilities through switchable measuring ranges for U and I
- → Large, bright LED displays for optimal readability
- → Extensive displays, functions and storage options
- → Small mounting depth of only 60 mm

An overall view of **technical details** can be found on page 35.
The **housing dimensions** are listed on page 39.

multimess light 144 LED is a device in the lower price range and is suitable for measuring and monitoring all relevant measurement parameters in a 3-phase network. The device can be configured via a serial RS485 interface. multimess light 144 LED is equipped with an active and reactive energy meter for positive energy, as well as an extreme value memory for all measured values. The measured values are displayed on three large and bright LE displays. In addition, the phase field display is possible in degrees, dimension and text displays are possible via 4-digit segment displays.

Rear side of multimess light 144 LED

Input and output configuration

DEVICE TYPE	multimess light 144 LED 4F144-0-LED-EP-US1/-US5
DIGITAL INPUTS	–
PULSE OUTPUT	■ (Wp+; Wq+)
RELAY OUTPUTS	2 [1]
ANALOG OUTPUTS	–
INTERFACE	RS485 (only point to point communication)
KBR eBus	Upgrade option
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] Limiting value function [2] Additional switching relay function via bus

multimess basic / comfort 144 LED bus

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

* depends on respective device type

3-phase network measuring instrument

Highlights

- → Many performance classes for each field of application
- → Extensive displays, functions and storage options
- → Optimal readability due to bright LED displays
- → Wide variety range of inputs and outputs (digital/analog)
- → Small mounting depth of only 60 mm

An overall view of **technical details** can be found on pages 36/37.
The **housing dimensions** are listed on page 39.

The electronic network measuring devices of the **multimess basic/comfort 144 LED** series measure and monitor all important parameters in 3-phase networks and are available in a wide range of performance classes. Saving the load profile of the facility measured at a 15-minute measuring interval is, depending on the variation, possible up to 365 days. The integrated event memory can log up to 4096 events, such as limiting value violations, mains failures, drops in voltage and many other values. 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

DEVICE TYPE	multimess basic 144 LED bus 4F144-1-LED-ESMS-US1/-US5 4F144-1-LED-ESMSET-US1/-US5 4F144-1-LED-ESMSMT-US1/-US5 4F144-1-LED-ESMSDP-US1/-US5	multimess comfort 144 LED bus 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	■ (Wp+; Wq+)	■ (Wp+; Wp-; Wq+; Wq-)
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] Limiting value function [2] Additional switching relay function via bus

multimess basic / comfort 144 LCD bus

Housing size (H x W x D in mm)	**144 x 144 x 60**
Data display	**LCD**
Interface *	**KBR eBus** **Modbus** **Profibus**

* depends on respective device type

3-phase network measuring instrument

Highlights

- → Many performance classes for each field of application
- → Extensive displays, functions and storage options
- → Large LCD display for measured value and text displays
- → Wide variety range of inputs and outputs (digital/analog)
- → Small mounting depth of only 60 mm

An overall view of **technical details** can be found on page 37.
The **housing dimensions** are listed on page 39.

The electronic network measuring devices **multimess basic/comfort 144 LCD bus** are used to measure and monitor all important measuring parameters in 3-phase networks. They replace all analog instruments used in conventional low-voltage distribution systems and also provide a variety of additional functions. The large, high-contrast LC display is optimally readable and easy to handle with its interactive user guidance as a combination of value and text displays.

multimess basic/comfort 144 LCD bus offers a large range of functions. Extensive measured value displays, load profile or event memories are all available in the basic version. Recording measured data for energy consumption and recovery, sending specific parameters to analog outputs, a larger memory, as well as a more flexible use of the integrated digital inputs and outputs, is reserved for the larger models.

Rear side of multimess basic 144 LED bus

Rear side of multimess comfort 144 LCD bus

Input and output configuration

DEVICE TYPE	multimess basic 144 LCD bus 4F144-1-LCD-ESMS-US1/-US5 4F144-1-LCD-ESMSET-US1/-US5 4F144-1-LCD-ESMSMT-US1/-US5 4F144-1-LCD-ESMSDP-US1/-US5	multimess comfort 144 LCD bus 4F144-2-LCD-ESMS-US1/-US5 4F144-2-LCD-ESMSET-US1/-US5 4F144-2-LCD-ESMSMT-US1/-US5 4F144-2-LCD-ESMSDP-US1/-US5
DIGITAL INPUTS	1 synchronization, 1 HT/LT tariff	2 configurable
PULSE OUTPUT	■ (Wp+; Wq+)	■ (Wp+; Wp-; Wq+; Wq-)
RELAY OUTPUTS	2[1]	2[2]
ANALOG OUTPUTS	–	3
INTERFACE	RS485	RS485
KBR eBUS	■ | ■	■ | ■
KBR eBUS-TCP	□	□
MODBUS-TCP	□	□
MODBUS RTU/ACSII	■	■
PROFIBUS-DB	□	□
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] Limiting value function [2] Additional switching relay function via bus

multimess Technical details

MEASUREMENT PARAMETER (RMS)	**Voltage**	$U_{PH-N\ (L1-L3)}$	**DEVICE TYPE**	**multimess light 96 LED**
	Current	$I_{PH\ (L1-L3)}$		4F96-0-LED-NC-US1
	Avg. current value	$I_{PH\ (L1-L3)}$ 10 min or configurable		4F96-0-LED-NC-US1-1DO
	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:** KF-$U_{PH\ (L1-L3)}$ | **Dist. curr. strength** $I_{d\ PH\ (L1-L3)}$	–
	Harmonics: Voltage (L1 – L3) | Current (L1 – L3)	–
	Rotary field control: Rotary field display in degrees	■
	Neutral conductor current: I_N | $I_{N\text{-average}}$	■ | ■ (10 min.)
	Performance factors fund. harm. | **Overall performance factors**	$\cos\varphi_{(L1-3)}$ | $\lambda_{overall;\ total}$
	Q_1 = fundamental harmonic reactive power | **Q = fundamental and harmonic reactive power** ($Q_1 + Q_D$)	$Q_{1\ (L1-3)}$ | $Q_{1\ overall;\ total}$
	Active energy | **Reactive energy**	P_+ | – Continuous counter display on device
DISPLAYS	**Display type**	LED
MEASURING ACCURACY	**U, I** | **P, Q, S** | **cosφ, λ**	1 % | 2 % | 2 %
	Update speed	≈ 500 ms
MEMORY	**Load profile memory** $P_{overall}$ / $Q_{overall}$ (cumulated)	–
	Storage length of load profiles at 15-minute measuring interval	–
	Daily power, active and reactive power (can be read out via bus)	–
	Extreme value memory (min./max.)	For all displayed measured values + max. active power average value P_{15max}
	Maximum indicator function	Non-volatile
	Event memory	–
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	–
OUTPUTS	**Relay outputs** 250 V AC | 2 A	Touch-up relay
	Analog outputs 0 (4) – 20 mA 0 (2) – 10 V	–
	Digital outputs	□ **1** working pulse output, proportional to active energy
INTERFACES	**Serial port**	Upgradable
	Ethernet TCP/IP	–
	Supported field bus protocol	Upgrade option for KBR eBus
POWER SUPPLY	**Operating voltage** | **Power consumption**	85 – 265 V AC / DC | 15 VA
DIMENSIONS	**Housing:** front panel mounting, size in mm (H x W x D)	96 x 96 x 92 mm

■ Standard version □ Optionally available – Not available

multimess basic 96 LED [1] 1F96-0-LED-ES-US1 [2] 1F96-0-LED-ES-US1-1DO [3] 1F96-0-LED-MS-US1 [4] 1F96-0-LED-ET-US1 [5] 1F96-0-LED-MT-US1	**multimess eco 144 LED** 4F144-0-LED-NC-US0E	**multimess light 144 LED** 4F144-0-LED-EP-US1 / -US5
–	■ | –	■ | –
–	3. – 19. Harm. U | –	3. – 19. Harm. U | –
■		
■ | ■ (10 min.)	■ | ■ (15 min.)	■ | ■ (flexible interval)
cosφ (L1 – 3) | $\lambda_{overall;\ total}$ | $\lambda_{(L1-3)}$ only via bus	cosφ (L1 – 3) | $\lambda_{overall;\ total}$	cosφ (L1 – 3) | $\lambda_{(L1-3)}$ | $\lambda_{overall;\ total}$
$Q_{1\ (L1-3)}$ | $Q_{1\ overall;\ total}$ $Q_{(L1-3)}$ | $Q_{overall.;\ total}$ only via bus	$Q_{1\ (L1-3)}$ / $Q_{1\ overall;\ total}$	$Q_{1\ (L1-3)}$ | $Q_{1\ overall;\ total}$ $Q_{(L1-3)}$ | $Q_{(L1-3)}$
P_+ continuous counter display Q_- Q_+ can be read out via bus	– | –	P_+ | Q_+ (HT / LT) continuous counter display on device
LED		
1 % | 2 % | 2 %		0,5 % | 1 % | 1 %
≈ 500 ms		≈ 330 ms
–		
–		
–		
For all displayed measured values + max. active power average value P_{15max} Non-volatile	For all displayed measured values volatile	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
–		
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		
–		
Touch-up relay	–	**2** relays for notification of limiting value violations
–		
□ **1** working pulse output, proportional to active energy	–	**1** working pulse output, proportional to active or reactive energy
RS485	–	RS485
□	–	–
[1] eBus [2] eBus [3] modbus [4] eBus + modbus | eBus TCP/IP [5] eBus | modbus TCP/IP	–	Only point to point communication for device configuration. Upgrade option for KBR eBus
85 – 265 V AC / DC | 15 VA	115 / 230 V AC | 109 VA	■ 85 – 265 V AC / DC | 15 VA □ 20 – 70 V AC / DC | 15 VA
96 x 96 x 92 mm	144 x 144 x 60 mm	

Status: April 2010. All changes reserved.

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
	Avg. current value	$I_{PH\ (L1-L3)}$ 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, dist. current strength I_d** | **THD:** KF-$U_{PH\ (L1-L3)}$ | $I_{d\ PH\ (L1-L3)}$	■ | ■
	Harmonics: Voltage (L1 – L3) | Current (L1 – L3)	3. – 19. Harm. U | 3. – 19. Harm. I
	Rotary field control: Rotary field display in degrees	■
	Neutral conductor current: I_N | $I_{N\text{-average}}$	■ | ■ (flexible interval)
	Performance factors fund. harmonic | **Overall performance factors**	$\cos\varphi_{(L1-3)}$ | $\lambda_{overall;\ total}$ $\lambda_{(L1-3)}$ only via bus
	Q_1 = fundamental harmonic reactive power | **Q = fundamental and harmonic reactive power** ($Q_1 + Q_D$)	$Q_{1\ (L1-3)}$ | $Q_{1\ overall;\ total}$ $Q_{(L1-3)}$ | $Q_{overall;\ total}$ only via bus
	Wirkarbeit | **Blindarbeit**	P_+ | Q_+ (HT / LT) continuous counter display on device
DISPLAYS	**Display type**	LED
MEASURING ACCURACY	**U, I** | **P, Q, S** | **cosφ, λ**	0,5 % | 1 % | 1 %
	Update speed	≈ 330 ms
MEMORY	**Load profile memory $P_{overall}$ / $Q_{overall}$** (cumulated)	Energy consumption P_+ P_{cum} | Q_+ Q_{cum}
	Storage length of load profiles at 15-minute measuring interval	Ring memory 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 value 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. limiting value over- and undershoots, mains failures and over/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 synchr. to the energy supplier measuring period **1** tariff input for HT/LT switch
OUTPUTS	**Relay outputs** 250 V AC | 2 A	**2** relay for notification of limiting value violations
	Relay outputs 250 V AC | 2 A	–
	Digital outputs	**1** working pulse output, proportional to active or reactive ener
INTERFACES	**Serial port**	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:** front panel mounting, size in mm (H x W x D)	144 x 144 x 60

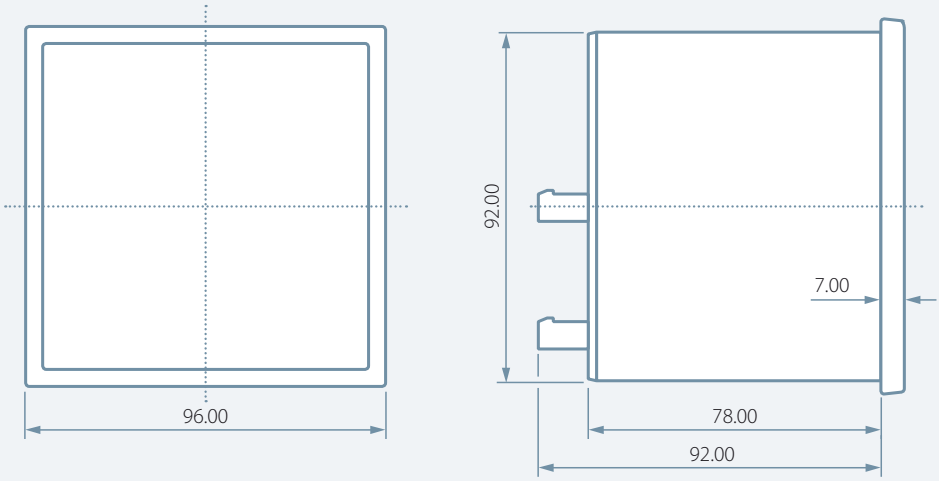
■ Standard version □ Optionally available – Not available

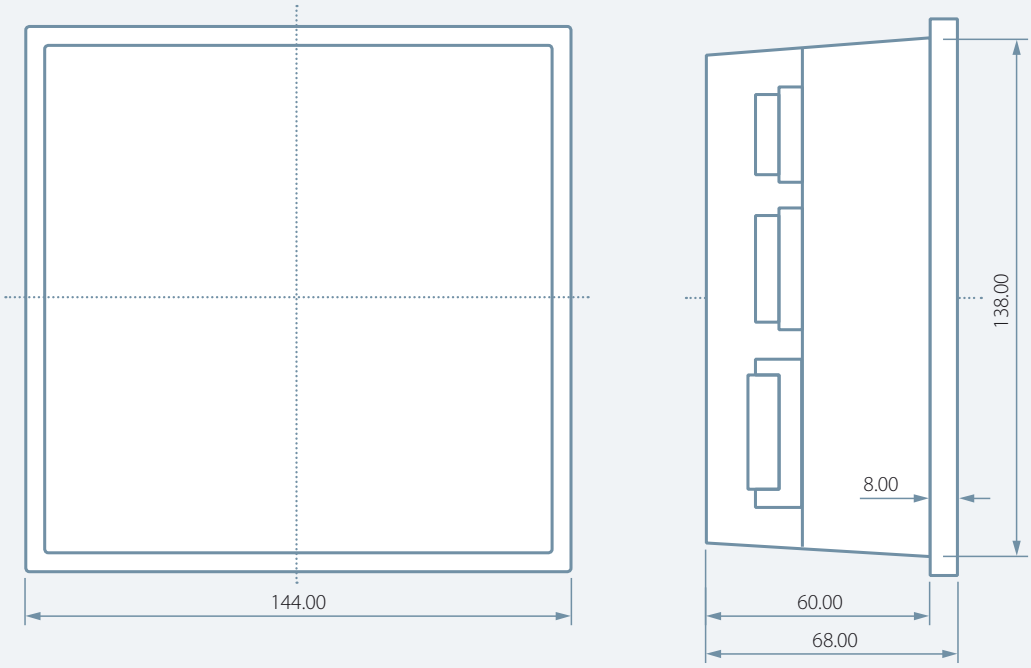
	multimess comfort 144 LED bus	**multimess basic 144 LCD bus**	**multimess comfort 144 LCD bus**
	[1] 4F144-2-LED-ESMS-US1 / -US5 [2] 4F144-2-LED-ESMSET-US1 / -US5 [3] 4F144-2-LED-ESMSMT-US1 / -US5 [4] 4F144-2-LED-ESMSDP-US1 / -US5	[1] 4F144-1-LCD-ESMS-US1 / -US5 [2] 4F144-1-LCD-ESMSET-US1 / -US5 [3] 4F144-1-LCD-ESMT-US1 / -US5 [4] 4F144-1-LCD-ESMSDP-US1 / -US5	[1] 4F144-2-LCD-ESMS-US1 / -US5 [2] 4F144-2-LCD-ESMSET-US1 / -US5 [3] 4F144-2-LCD-ESMSMT-US1 / -US5 [4] 4F144-2-LCD-ESMSDP-US1 / -US5
	■ ■		
	3. – 19. Harm. U | 3. – 19. Harm. I		
	■		
	■ ■ (flexible interval)		
	$\cos\varphi_{(L1-3)}$ | $\lambda_{overall;\,total}$ $\lambda_{(L1-3)}$ only via bus		
	$Q_{1\,(L1-3)}$ | $Q_{1\,overall;\,total}$ $Q_{(L1-3)}$ | $Q_{overall.;\,total}$ only via bus		
	P_+ | Q_+ | P_- | Q_- (HT / LT) continuous counter display on device	P_+ | Q_+ (HT / LT) continuous counter display on device	P_+ | Q_+ | P_- | Q_- (HT / LT) continuous counter display on device
	LED	LCD (interactive user guidance)	LCD (interactive user guidance)
	0,5 % | 1 % | 1 %		
	≈ 330 ms		
	Consumption and recovery P_+ P_- P_{cum} | Q_+ Q_- Q_{cum}	Energy consumption P_+ P_{cum} | Q_+ Q_{cum}	Consumption and recovery P_+ P_- P_{cum} | Q_+ Q_- Q_{cum}
	Ring memory for **365 days**	Ring memory for **40 days**	Ring memory for **365 days**
	1 year for energy consumption and recovery	1 year for energy consumption	1 year for energy consumption and recovery
	For all displayed measured values + max. active and reactive power intervals average value P MPmax and $Q_{MP\,Max}$ with date and time (MP = measuring period) Non-volatile		
	4096 events with date, time and duration, e.g. limiting value over- and undershoots, mains failures and over/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	**1** input for synchr. to the energy supplier measuring period; **1** tariff input for HT/LT switch	**2** digital inputs, configurable, e.g. for acquiring states, synchronization, HT / LT
	2 relay, configurable	**2** relay for notification of limiting value violations	**2** relay, configurable
	3 analog outputs with shared GND, configurable on the device and via bus	–	**3** analog outputs with shared GND, configurable on the device and via bus
gy	**1** digital output, configurable, e.g. as working pulse output	**1** working pulse output, proportional to active or reactive energy	**1** digital output, configurable via bus, 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	[1] eBus + modbus [2] eBus + modbus | eBus TCP/IP [3] eBus + modbus | modbus TCP/IP [4] eBus + modbus | Profibus DP	[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		

Status: April 2010. All changes reserved.

multimess Dimensions

multimess light / basic 96 LED



All measurement details in mm. Not suitable for taking measurements.

multimess eco 144 LED
multimess light 144 LED
multimess basic / comfort 144 LED bus
multimess basic / comfort 144 LCD bus