Signals and Energy Data

multimess

Energy measuring devices

One System. Best Solutions.

KBR Energy Management
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**

<table>
<thead>
<tr>
<th>DEVICE TYPES</th>
<th>multimess 1D4-BS with multimess 1F96-DS ¹</th>
<th>multimess 1D4-BS with multisys 2D2-ESBS</th>
<th>multimess 1D4-BS with multisio 6D6 and multisio 6F96-DS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCD DISPLAY 96 X 96</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>NUMBER OF MEASURING MODULES</td>
<td>10 per display</td>
<td>no limit</td>
<td>5 per multisio 6D6</td>
</tr>
<tr>
<td>eBUS</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>eBUS TCP</td>
<td>–</td>
<td>–</td>
<td>⁴</td>
</tr>
<tr>
<td>INSTANTANEOUS VALUE DISPLAY</td>
<td>Display</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>eBUS</td>
<td>–</td>
<td>²</td>
<td>–</td>
</tr>
<tr>
<td>LOAD PROFILE MEMORY</td>
<td>Display</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>eBUS</td>
<td>–</td>
<td>⁴</td>
<td>–</td>
</tr>
<tr>
<td>CONTINUOUS COUNTER STATUS</td>
<td>Display</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>eBUS</td>
<td>–</td>
<td>⁴</td>
<td>–</td>
</tr>
</tbody>
</table>

¹ Standard version
² Not available
³ For application of the gateway multisys 2D2-BSET instead of 2D2-BSES
⁴ Additional gateway multisys 3D2-ESET required.

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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

<table>
<thead>
<tr>
<th>Housing dimensions (H x W x D in mm)</th>
<th>96 x 96 x 55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data display</td>
<td>LCD</td>
</tr>
<tr>
<td>Interface</td>
<td>KBR eBus *</td>
</tr>
<tr>
<td></td>
<td>Modbus *</td>
</tr>
<tr>
<td></td>
<td>Profibus *</td>
</tr>
<tr>
<td></td>
<td>KBR eBus TCP *</td>
</tr>
<tr>
<td></td>
<td>Modbus TCP *</td>
</tr>
</tbody>
</table>

* 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

<table>
<thead>
<tr>
<th>DEVICE TYPE</th>
<th>multimeiss 96 LCD</th>
<th>multimeiss 96 LCD TCP</th>
<th>multimeiss 96 Profibus</th>
</tr>
</thead>
</table>

| DIGITAL INPUTS | – | – | – |
| PULSE OUTPUT   | 1 (P+ / Q+) | 1 (P+ / Q+) | 1 (P+ / Q+) |
| KBR eBUS       | [1] – | – | – |
|                | [2] | – | – |
|                | [3] | – | – |
| KBR eBUS TCP   | – | [1] | – |
|                | [2] | – | – |
|                 | [3] | – | – |
| MODBUS-TCP     | – | [1] – | – |
|                 | [2] | – | – |
| PROFIBUS DP     | – | – | – |
| POWER SUPPLY    | 85-265 V AC/DC, 15 VA | – | – |

- 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

**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

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.

**Housing dimensions (H x W x D in mm)**

<table>
<thead>
<tr>
<th></th>
<th>144 x 144 x 60</th>
</tr>
</thead>
</table>

**Data display**

- LED

**Interface**

- KBR eBus
- Modbus
- Profibus *
- KBR eBus TCP *
- Modbus TCP *

* depends on respective device type

An overall view of technical details can be found on pages 12/13. The housing dimensions are listed on page 15.
## Input and output configuration

<table>
<thead>
<tr>
<th>DEVICE TYPE</th>
<th><strong>multimess basic 144 LED bus</strong></th>
<th><strong>multimess comfort 144 LED bus</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4F144-1-LED-ESMS-US1/-US5</td>
<td>4F144-2-LED-ESMS-US1/-US5</td>
</tr>
<tr>
<td></td>
<td>4F144-1-LED-ESMSET-US1/-US5</td>
<td>4F144-2-LED-ESMSET-US1/-US5</td>
</tr>
<tr>
<td></td>
<td>4F144-1-LED-ESMSMT-US1/-US5</td>
<td>4F144-2-LED-ESMSMT-US1/-US5</td>
</tr>
<tr>
<td></td>
<td>4F144-1-LED-ESMSDP-US1/-US5</td>
<td>4F144-2-LED-ESMSDP-US1/-US5</td>
</tr>
</tbody>
</table>

### Digital Inputs
- **1** synchronization, 1 HT / LT tariff
- **2** configurable

### Pulse Outputs
- **1** (P+ / Q+)
- **1** (P+/ P- / Q+/ Q-)

### Relay Outputs
- **2**
- **2**
- **3**

### Analog Outputs
- **–**
- **–**

### Interface
- **RS485**
- **RS485**

### Power Supply
- **85-265 V AC/DC, 15 VA**
- **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
### Technical details

<table>
<thead>
<tr>
<th>MEASUREMENT PARAMETER (RMS)</th>
<th>DEVICE TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage ( U_{\text{PH}(1 \text{–} 3)} )</td>
<td>multimess measuring module</td>
</tr>
<tr>
<td>Current ( I_{\text{PH}(1 \text{–} 3)} )</td>
<td>1D4-BS</td>
</tr>
<tr>
<td>Average current ( I_{\text{average}} )</td>
<td></td>
</tr>
<tr>
<td>Apparent power ( S_{\text{PH}(1 \text{–} 3)} )</td>
<td></td>
</tr>
<tr>
<td>Active power ( P_{\text{PH}(1 \text{–} 3)} )</td>
<td></td>
</tr>
<tr>
<td>Frequency ( f_{\text{network L1}} )</td>
<td></td>
</tr>
</tbody>
</table>

### ADDITIONAL MEASURING PARAMETERS

- Distortion factor \( U_{\text{THD}} \)
- Distortion current strength \( I_{\text{THD}} \)
- Harmonics: Voltage \( (L1 \text{–} L3) \) and Current \( (L1 \text{–} L3) \) 3rd - 19th harm. \( U \) and 3rd - 19th harm. \( I \)
- Rotary field control: Rotary field display in degrees
- Neutral conductor current: \( I_{\text{N}} \)
- Performance factors fundamental harmonic
- Overall performance factors
- \( Q_1 \text{ total} \) and \( Q_1 \text{ total} \)
- Active energy
- Reactive energy

### DISPLAYS

- Display type: none or external display

### MEASURING ACCURACY

- Update speed: \( < 1 \text{ sec} \)
- \( 0.5 \% \)
- \( 1 \% \)

### MEMORY

- Load profile memory \( P_{\text{total}} / Q_{\text{total}} \) (cumulated)
- Energy consumption \( P_{\text{cum}} \) and \( Q_{\text{cum}} \)
- 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)
- Continuous counter status
- Extreme value memory (\( \min./\max. \))
- Maximum indicator function
- Event memory

### INPUTS

- Voltage path \( U_{\text{L1-L2}} \), \( U_{\text{L2-L3}} \), \( U_{\text{L3-L1}} \) 3 x 87 V..400 V..460 V AC
- Current path \( I_{\text{L1}} \), \( I_{\text{L2}} \), \( I_{\text{L3}} \) 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) 4 TE
- Housing: Mounting rail installation (H x B x D) 90 x 71 x 61 mm

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1. only in connection with multimess 1F96-DS
2. in connection with multimess 1F96-DS
3. only via ells
4. neutral conductor has to be connected
### multime 96 LCD

#### [1] 4F96-0-LCD-US1

#### [2] 4F96-0-LCD-ESM-US1

### multime 96 LCD

#### 4F96-1-LCD-ESM-2RO-US1

### multime 96 LCD TCP

#### [1] 4F96-1-LCD-ET-2RO-US1


### multime 96 Profibus

#### 4F96-1-LCD-DP-US1

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### 3rd – 19th harm. U

<table>
<thead>
<tr>
<th>3rd – 19th harm. I</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>cosφ (L1 – L3)</strong></td>
</tr>
<tr>
<td><strong>λ (L1 – 3)</strong></td>
</tr>
<tr>
<td><strong>Q1 (L1 – 3)</strong></td>
</tr>
<tr>
<td><strong>Q1 total</strong></td>
</tr>
<tr>
<td><strong>Q total</strong></td>
</tr>
</tbody>
</table>

This table contains information about the harmonic distortion and reactive power in the electrical system. The values provided are for the first to 19th harmonic components. The table includes columns for cosine phi for phases L1 to L3, lambda for total system (L1 to L3), reactive power (Q1 for L1 to L3), total reactive power (Q1 total), and total reactive power (Q total).

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### Consumption and recovery

- Ring buffer for 40 days
- 1 year for energy consumption and recovery
- For all displayed measured values + max. active and reactive power intervals, average value Pcum-max and Qcum-max 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

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### Signals and Energy Data

- **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**

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### Status: January 2014. All changes reserved.
### Technical details

<table>
<thead>
<tr>
<th>MEASUREMENT PARAMETER (RMS)</th>
<th>DEVICE TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage U&lt;sub&gt;PH–N (L1–L3)&lt;/sub&gt;</td>
<td>multimess basic 144 LED bus</td>
</tr>
<tr>
<td>Frequency f&lt;sub&gt;network&lt;/sub&gt;</td>
<td></td>
</tr>
</tbody>
</table>

#### ADDITIONAL MEASURING PARAMETERS

- **Distortion** U, distortion current strength I<sub>d</sub> | THD: \( \Delta U_{\text{THD-L1–L3}} \) | \( \Delta I_{\text{THD-L1–L3}} \)
- **Harmonics**: Voltage (L1 – L3) / Current (L1 – L3)
- **Rotary field control**: Rotary field display in degrees
- **Neutral conductor current**: I<sub>n</sub> / I<sub>average</sub>
- **Performance factors fundamental harmonic** | **Overall performance factors**
  - Q<sub>1</sub> = First harmonic reactive power | Q<sub>L1–L3</sub>
  - Q = Fundamental harmonic reactive power (Q<sub>1</sub> + Q<sub>2</sub>)
- **Active energy** | **Reactive energy**

#### DISPLAYS

- **Display type**: LED
- **Update speed**: 400 ms

#### MEASURING ACCURACY

- **Load profile memory** \( Q_{\text{cum}} / Q_{\text{total}} \) (cumulated)
- **Duration of storage 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.)
- **Maximum indicator function**
- **Event memory**
- **Voltage path**: U<sub>L1–L2</sub> / U<sub>L2–L3</sub> / U<sub>L3–L1</sub>
- **Current path**: I<sub>L1</sub> / I<sub>L2</sub> / I<sub>L3</sub>
- **Digital inputs**: 1 input for synchronization to the energy supplier measuring period
  - 1 tariff input for HT/LT switching
- **Relay outputs**: 250 V AC | 2 A
- **Analog outputs**: 0 (4) – 20 mA
- **Digital outputs**: 1 working pulse output, proportional to active or reactive energy

#### POWER SUPPLY

- **Operating voltage** | **power consumption**
  - 85 – 265 V AC/DC
  - 20 – 70 V AC/DC
  - 15 VA

#### DIMENSIONS

- **Housing**: Switchboard installation, size in mm (H × W × D)
  - 144 x 144 x 60

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- **Standard version**
- **Optionally available**
- **Not available**
### multime 144 LED bus

(HT / LT) continuous counter display on device

3. – 19th harm. U  |  3rd – 19th harm. I

- (Flexible interval)
- 

- cosφ (L1 – 3)
- THD:
- overwrite speed
- ≈ 400 ms

#### LED

- 0.5 %  |  1 %
- ≈ 400 ms

#### Consumption and recovery

P⁺, P−, Pcum | Q⁺, Q−, Qcum

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 AC ... 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

- [ ] eBus + modbus
- [ ] eBus + modbus | eBus TCP/IP
- [ ] eBus + modbus | modbus TCP/IP
- [ ] eBus + modbus | Profibus DP

- [ ] 85 – 265 V AC / DC  |  15 VA
- [ ] 20 – 70 V AC / DC  |  15 VA
- 144 x 144 x 60

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**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

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Status: January 2014. All changes reserved.
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 archiving of 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)
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

Attention!

visual energy 4 is only available at system partners of KBR