

Signals and Energy Data
multimes Energy measuring devices

MEASUREMENT MASTERMINDS!

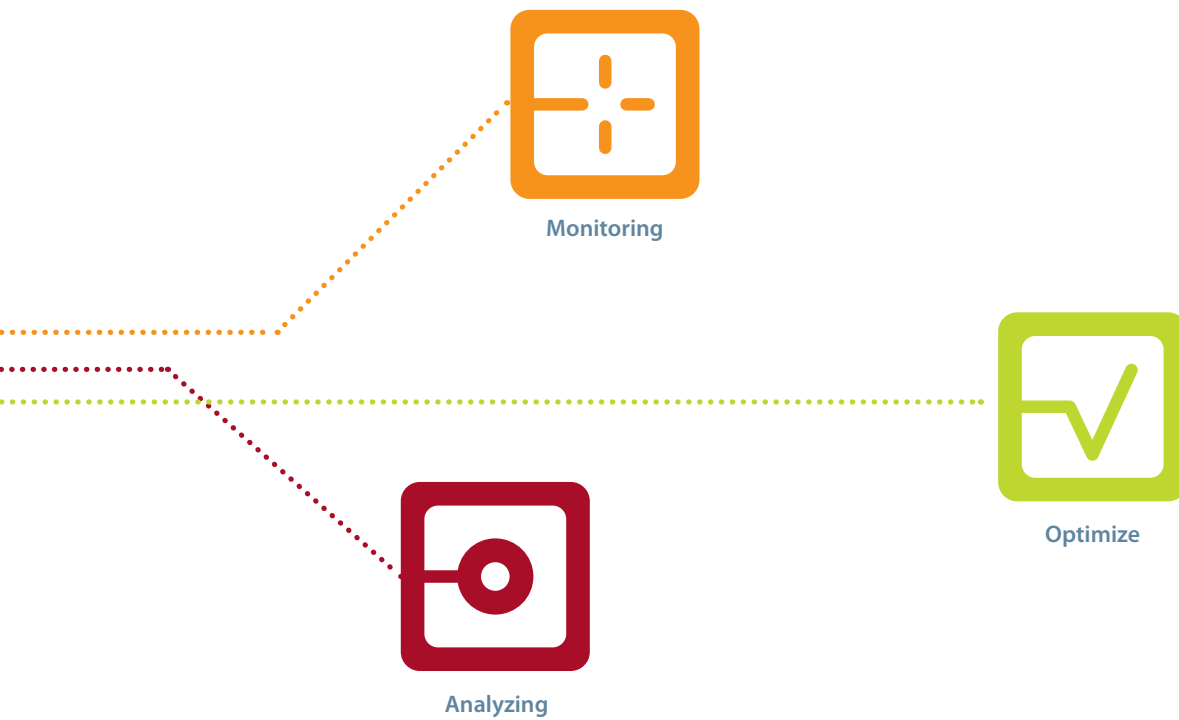
When measurement alone is not enough.



One System. Best Solutions.



KBR
Energy Management



MEASUREMENT DEVICES



MADE IN GERMANY

**Never let any valuable energy
information go to waste untapped.**

With future-proof technology and the highest possible measuring quality, **multimes** energy measuring devices form the basis for more transparency and efficiency in energy management.

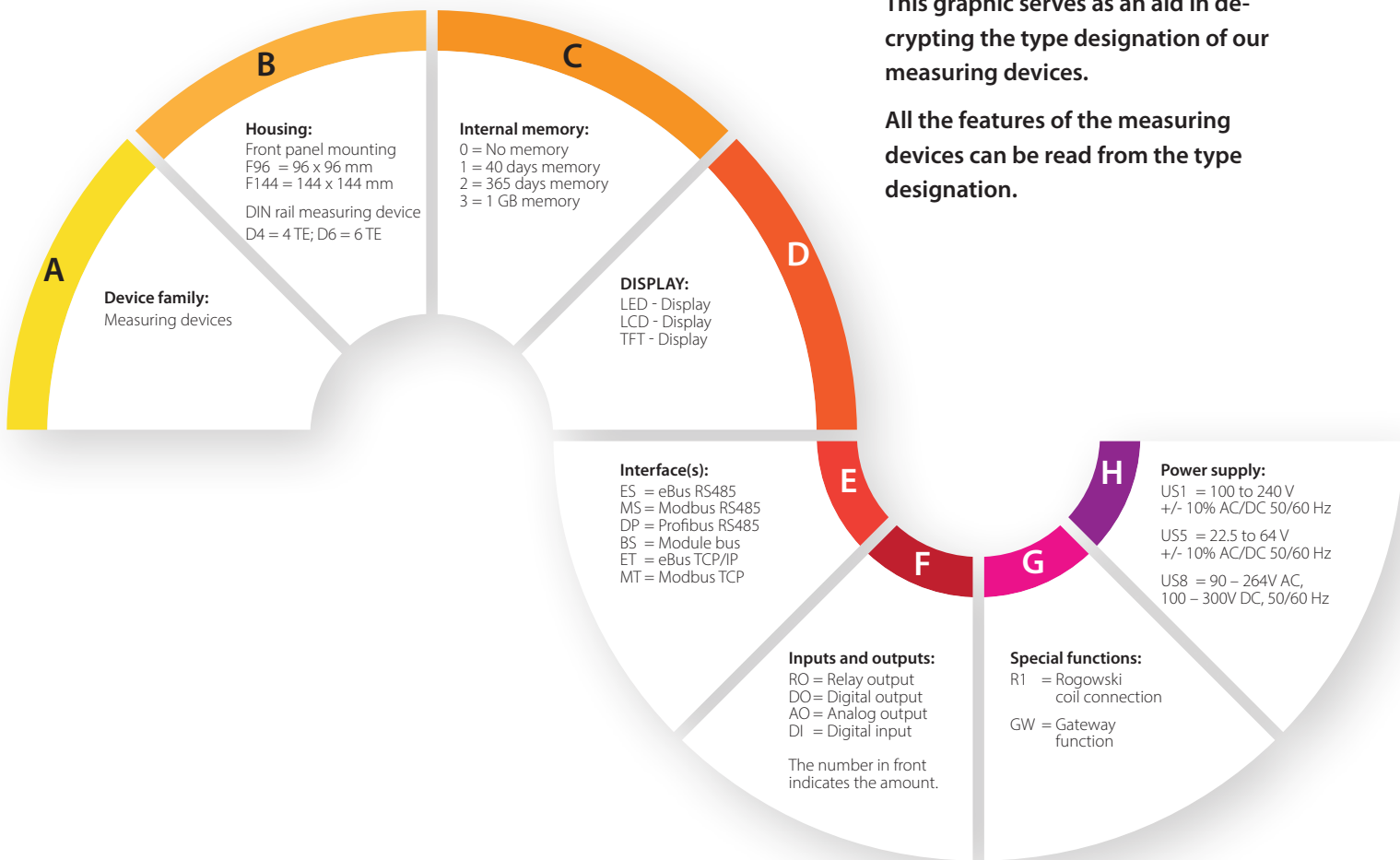
Energy Measuring Devices

multimes



The multimes **energy measuring devices** capture all important electrical parameters and provide a comprehensive overview of energy flows. The intuitive user menu makes operation easy. With the web-based visual energy analysis software, **you can** conveniently analyze and monitor **the instantaneous and long-term values of the bus-capable multimes devices**. Using the measured values of the network quality, potential malfunctions can be detected early on, before they cause damage.

Device type key



This graphic serves as an aid in decrypting the type designation of our measuring devices.

All the features of the measuring devices can be read from the type designation.

Hyphens divide the type designation into individual blocks.

multimes - F96 - 2 - TFT - MT - 2RO1DO - R1 GW - US1



multimes D4, single- and three-phase network measuring device p. 12



multimes D6, three-phase network measuring device p. 14



multicount D5, MID energy meter p. 16



multimes D9-PQ, network analyzer and fault recorder p. 18



multimes F144-PQ, network analyzer and fault recorder p. 20



multimes F96, three-phase network measuring device p. 22



multimes F144, three-phase network measuring device p. 28



THE MULTIMESS EXCELLENCE: MEASURE, MEASURE, MEASURE AND MORE ...



Comprehensive range of applications

Be it as a stand-alone device or in a system: multimesse is a superior multimeter available in several performance classes.

- V** Voltage **A** Current
- P** Active power
- Q** Reactive power **S** Apparent power
- kWh** Consumption **cosφ** Power factor
- Harmonic U** Harmonic Load profiles
- Hz** Frequency Limits Maximum values
- +** ... Oscilloscope, pointer diagram and much more



Future-proof technology

High measurement accuracy and a wide range of measurement parameters, as well as „made in Germany“ quality offer the best conditions for modern and durable measurement technology.

With our energy measuring devices, efficient energy management is very easy. We will be happy to advise you personally.

Product advice:
+49 (0) 9122 63730
info@kbr.de

Capturing and documenting energy data has never been more important. Whether it be standard and consumption values, load profiles or network quality according to applicable standards: KBR energy measuring devices meet the most diverse requirements with the highest level of safety and precision.

Flexible interfaces

Interfaces and load profile memory create the basis for efficient energy monitoring and safe electricity networks.



Intuitive operation

Clear, functional user interface design, as well as various displays, provide a good overview and easy operation.

Comfortable monitoring

Easy monitoring, evaluation and control of all captured energy data with the web-based visual energy analysis software.

THE MULTIMESS FLEXIBILITY: THE RIGHT TECHNOLOGY FOR EVERY TASK.



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Measuring and recording supply voltage

To be able to diagnose potential malfunctions early on, a company plans to implement an ongoing qualitative documentation of the voltage supply to various parts of the system.



© Narong Jongstirukul | Fotolia

Monitoring of several transformer stations in a utility company network

An energy provider wants to monitor its transformer stations for overload, network quality and triggered main switches.



Energy data recording for increased energy efficiency

To increase energy efficiency and identify energy that is consumed wastefully, energy managers need transparent energy flows.

Do you have any questions concerning a product or a special requirement? We will be happy to advise you personally.

Product advice:
+49 (0) 9122 63730
info@kbr.de

Your requirements are our driving force. Here's how our measurement technology ensures that you can implement your measurement tasks even more efficiently. High-quality technology and customer-oriented service – perfectly tailored to your requirements.



The KBR solution: The **multimes D9-PQ** or **multimes F144-PQ** measure values comprehensively and continuously. Automatically generated EN 50160 reports enable compliance with the standard to be checked at a glance. Long-term values, disturbance records and 10 ms recordings help to detect the causes of a malfunction faster.

The KBR recommendation
multimes D9-PQ → p. 18



The KBR solution: The transformer stations are monitored by the **multimes F96** and **F144** with a bus interface. The electrical measured values can be read on the display on site and simultaneously transmitted to the control room via the interface. The utilization of the transformer stations as well as, e.g., the tripping of section switches are automatically monitored.

The KBR recommendation
multimes F96 → p. 22
multimes F144 → p. 28



The KBR solution: By installing **multimes devices** the energy quantities as well as the load profile are measured and stored in the device. The data is transmitted to the **visual energy** analysis software via interfaces. This allows the energy manager to create analyses and take measures.

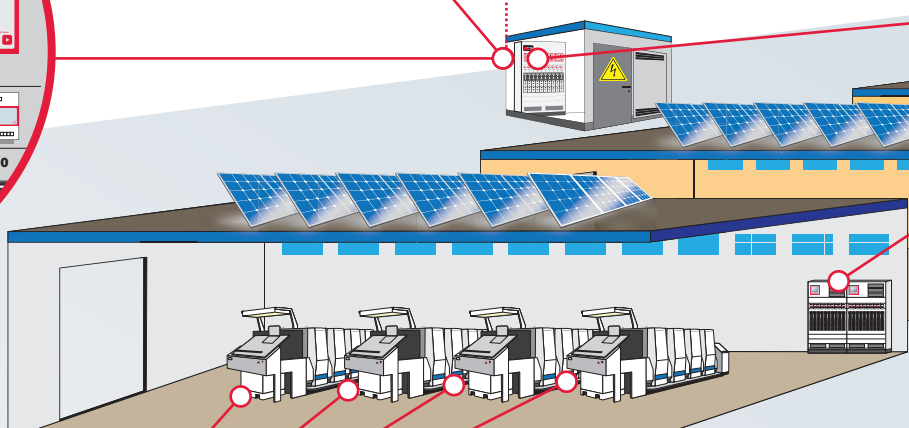
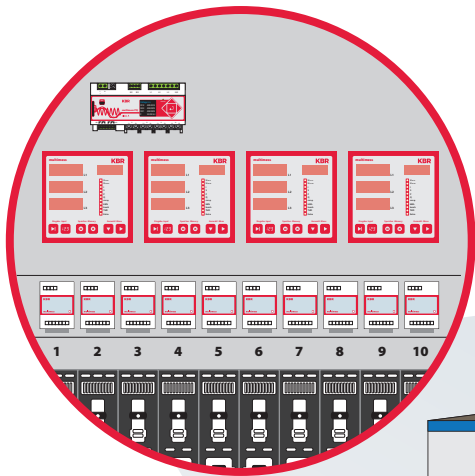
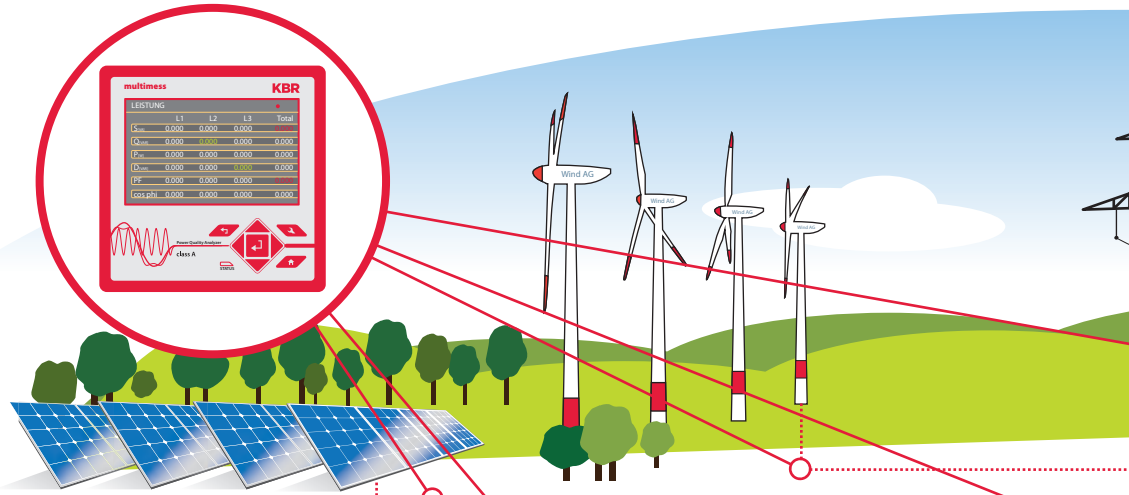
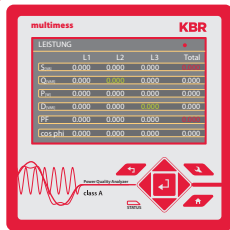
The KBR recommendation
multimes F96 P. 22
multimes F144 P. 28
multimes D6 P. 14
multimes D4 P. 12
visual energy P. 41



THE MULTIMESS INTELLIGENCE: UNIVERSAL MEASUREMENT MASTERMINDS FOR ANY SECTOR.

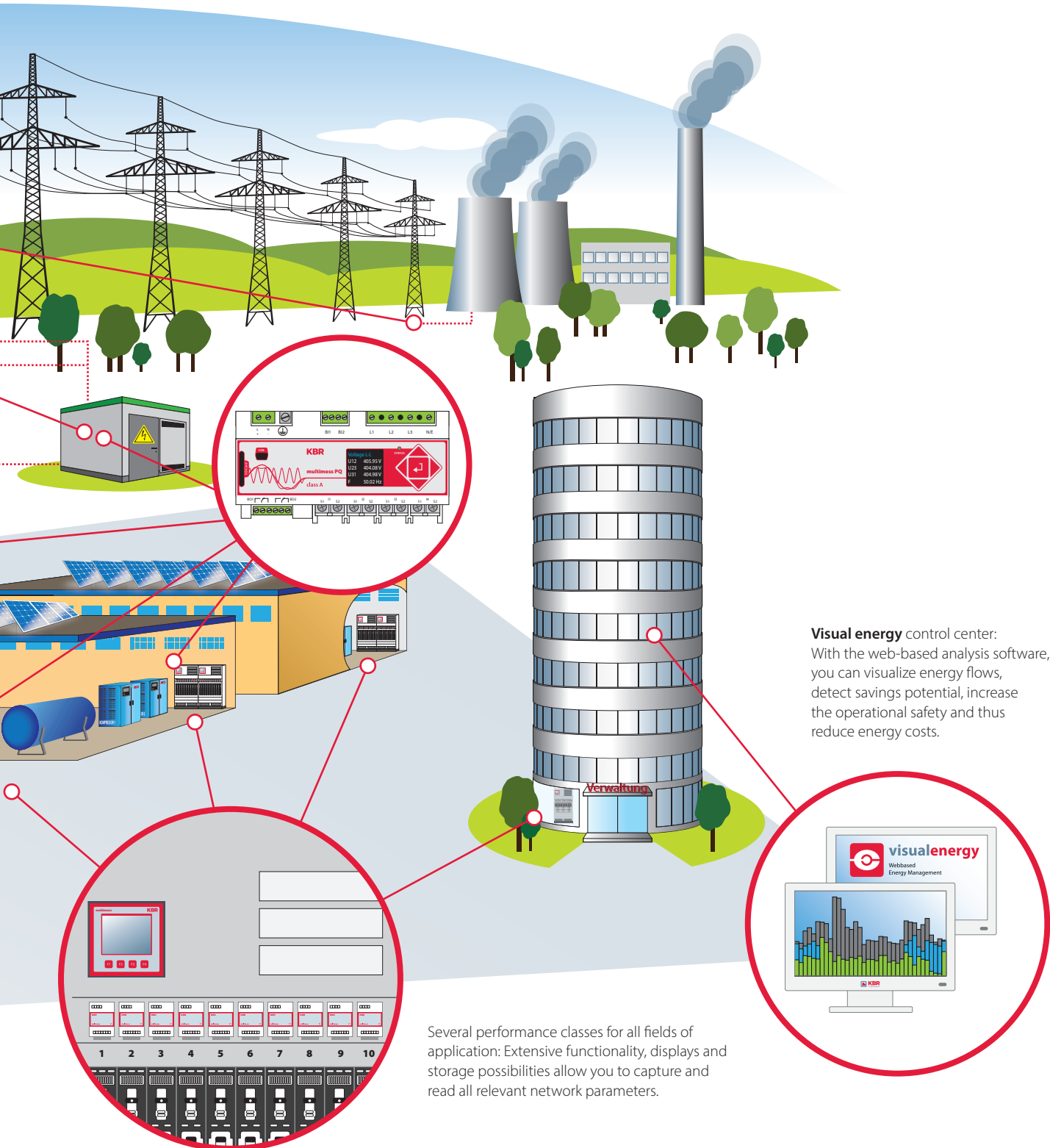
Network quality:

The Class A PQ network analyzers **multimes D9-PQ** and **multimes F144-PQ** record all the data in the internal memory. Perfect for detailed monitoring, analysis and documentation of voltage quality according to the standard (EN 50160, 61000-2-2, 61000-2-4, VDE 05839).



Ideal for use directly in machines and systems: **multimes D6** with integrated load profile memory and interface.

The multimes energy measuring devices can be used as multimeters for any application. Load profile memory, bus compatibility and network quality recording create the basis for efficient energy monitoring and safe electricity networks.



Visual energy control center: With the web-based analysis software, you can visualize energy flows, detect savings potential, increase the operational safety and thus reduce energy costs.

Several performance classes for all fields of application: Extensive functionality, displays and storage possibilities allow you to capture and read all relevant network parameters.

multimes D4-BS

Housing dimensions
(H x W x D in mm)

90 x 71 x 61

Data display

LCD*

Interface

**KBR
module bus**



* optional F96-DS display

Three-phase black box measuring point

- Highlights**
- Affordable black box measuring point for energy data management
 - No external energy supply required
 - Space saving through small size
 - Pluggable RJ 12 module bus interface

An overview of the **technical details** can be found on pages 30 to 33.

The **multimes D4** is a multimeter for DIN rail mounting. The **multimes D4** can measure one three-phase or three single-phase alternating current outputs.

The bus connection between the modules is established via a supplied and ready-made RJ12 cable. This eliminates the time-consuming wiring of the bus connection.

A connection for the power supply is not necessary, as the power supply for the measuring device's own requirements is provided by the measuring voltage. If the **multimes D4** is connected to the **multisio D6** a load profile memory for all four measurement quadrants (P+|P-|Q+|Q-) can be stored in the central storage unit. The interface to the eBus is via the **multisio D6**. Five measuring modules can be connected to each central storage module.

Combination possibilities

DEVICE TYPES	multimes D4-BS with multimes F96-DS ¹	multimes D4-BS with multisys D2-BSES	multimes D4-BS with multio D6 and multio F96-DS
LCD display 96 x 96	■	–	■
Number of measuring modules	10 per display	No limitation Power supply unit required from the 12th, 24th, 36th, nth measuring module. Up to 12 measuring modules can be operated per power supply unit or gateway.	5 per multio D6
eBUS | eBUS TCP	– | –	■ | ■ ²	■ | ■ ³
Instantaneous value display Display | eBUS	■ | –	– | ■	■ | ■
Load profile memory Display | eBUS	– | –	– | –	– | ■
Continuous counter Display | eBUS	■ | –	– | ■ ⁴	■ | ■

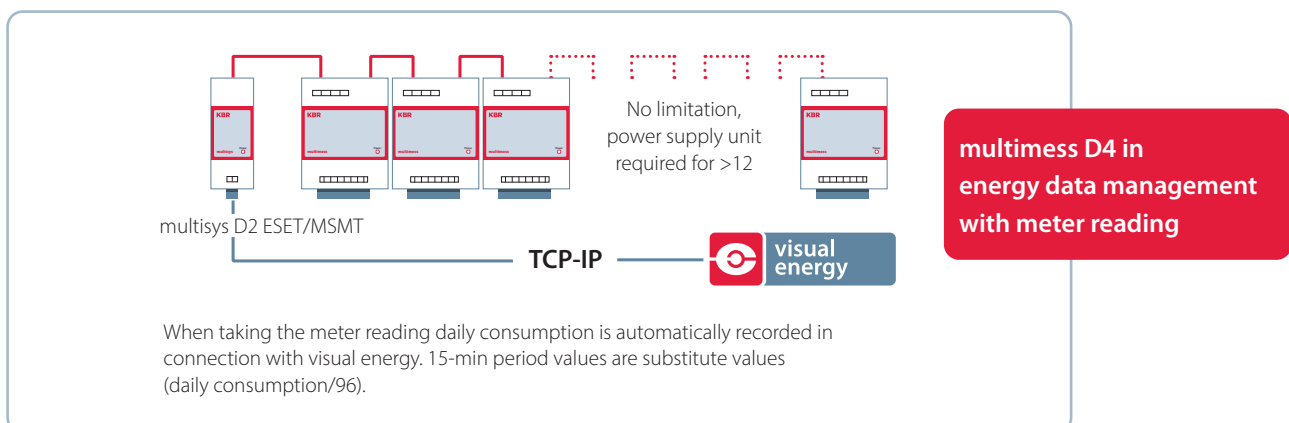
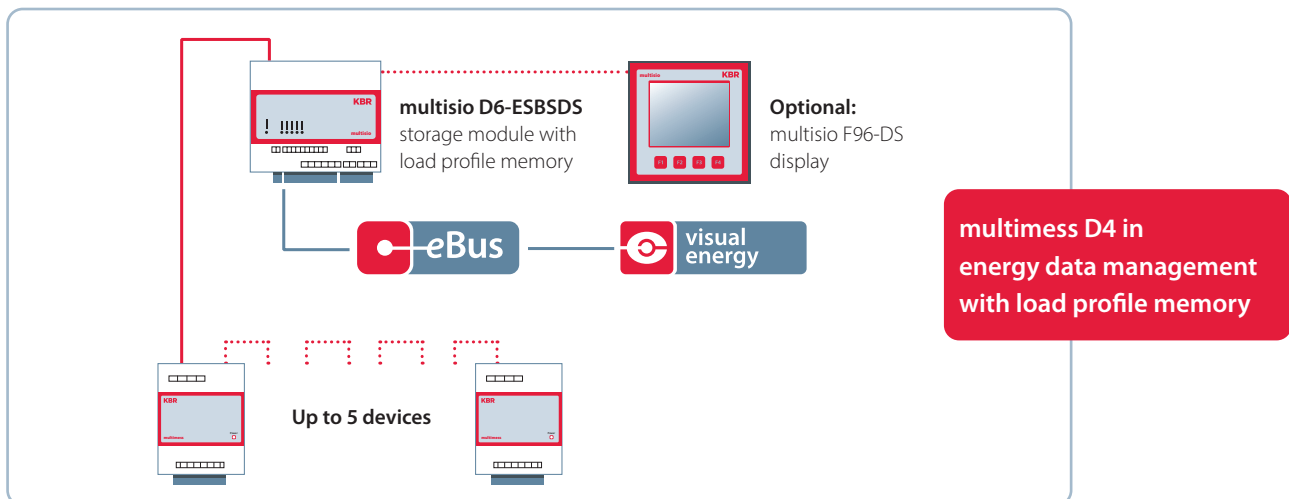
■ Standard – Not available

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

² For use of the multisys D2-BSET gateway instead of D2-BSES.

³ Additional gateway multisys D2-ESET/MSMT required.

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



multimes D6

Housing dimensions
(H x W x D in mm)

90 x 106 x 61

Data display

LCD display

Interface

**KBR eBUS
Modbus**



Three-phase network measuring device

Highlights

- Deployable in 3-wire or 4-wire networks
- Modbus and eBus interface
- 40 day load profile memory (P+ | P- | Q+ | Q-)
- Annual energy memory for daily values of active and reactive energy (P+ | P- | Q+ | Q-)
- Event memory for recording tariff switching commands. Power failures, error messages etc.

An overview of the **technical details** can be found on pages 30 to 33.

The **multimes D6** DIN rail measuring device is ideal for reliable use in 3-wire and 4-wire networks. It is equipped with a bus connection and internal non-volatile data memory for a 4-quadrant load profile. The active and reactive energy is stored separately for energy consumption and recovery (4-quadrant measurement). In addition to the internal and external tariff control for two tariffs, as well as various synchronization possibilities, the device features a

pulse output with programmable pulse value. To display measured values, the device has a 6-digit LCD display as well as 6 status LEDs. The KBR eBUS lets you retrieve the energy consumption data of the energy memory along with advanced measurement functions.

The standards DIN EN 61036 (IEC 1036) and DIN 61268 (IEC 1268) were used when developing this measuring device.

Active energy or reactive energy proportional pulses can be output via a programmable output laid out as an S0 interface. The pulse output type (proportional to active or reactive energy for consumption or recovery) as well as the pulse value (number of pulses per kWh or per kvarh) and the pulse length can be configured.

Memory functions:

- 4-quadrant load profile memory to record the cumulated active and reactive power (consumption and recovery)
- Memory to record the daily energy values for 365 days
- Memory for the previous month's maximum measurement period
- Event memory (4096 entries), for logging actions of the meter such as mains failures, tariff switches, delete functions, etc.

Your power supply in good hands

- ✓ Measurement technology
- ✓ Energy optimization
- ✓ Energy data collection
- ✓ Third-party quantity limitation
- ✓ Reactive current compensation
- ✓ Network quality/network interference



One System. **Best Solutions.**



KBR
Energy Management

multicount D5

Housing dimensions
(H x W x D in mm)

90 x 90 x 67

Data display

LCD display

Interface

KBR eBUS



MID energy meter

Highlights

- Compliant with measurement and calibration law
- ↖ MID approval (B+D) for billing purposes
- 600 day meter reading and load profile measurement
- 4-quadrant counter ($P+ | P- | Q+ | Q-$)
- ↖ Meter for delimitation of third-party quantities
- eBus interface

An overview of the **technical details** is provided on page 17.

The **multicount D5** sets new standards for DIN rail energy meters. A variety of measured values can be transmitted via the KBR eBus interface. The **multicount D5** is available as a direct measurement meter up to 75 A and as a transformer meter.

The load profile of all four quadrants ($P+ | P- | Q+ | Q-$) can be read and analyzed via the energy data management software visual energy.

The **multicount** is excellently suited for industrial system and commercial use, cost center billing and sub-measurements as well as delimitation of third-party quantities.

Like all **KBR products**, MID energy meters are designed for maximum performance, durability, functionality, and sophisticated measuring tasks.

Device types

Type [1]	multicount D5-3P-1/5A-MID • Transformer meter 1 A and 5 A Item No. 23821
Type [2]	multicount D5-3P-1/75A-MID • Direct measurement meter Item No. 24193
Type [3]	MULTICOUNT D5-2-ES-3P-1/5A-MID • Transformer meter 1 A and 5 A • With eBus interface Item No. 24194
Type [4]	multicount D5-2-ES-3P-75A-MID • Direct measurement meter • With eBus interface Item No. 24195

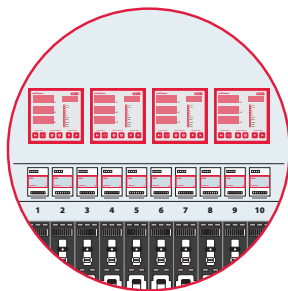
TYPE		[1]	[2]	[3]	[4]
standard rail mounting		■	■	■	■
Transformer measurement		■	–	■	–
Direct measurement		–	■	–	■
MID certified according to MID module B + D		■	■	■	■
Meter reading load profile memory > 600 days		–	–	■	■
Illuminated LCD display, accuracy class B (1%)		■	■	■	■
Measuring voltage U_m 230/400 V (+/- 20%)		■	■	■	■
Measuring current I_m	3 x 0.01...6 A AC	■	–	■	–
	Direct connection up to 75 A	–	■	–	■
Current transformer ratio 5/5 to 20,000/5A or 1/1 to 4,000/1A		■	–	■	–
Interface	KBR eBus RS485	–	–	■	■
Working pulse outputs S0		1 ¹	1 ¹	4 ²	4 ²
Protection type		Terminals IP 20 / Housing IP 51, SK II			
Size 5 TE H x W x D		90 x 90 x 67 mm			

¹Working pulse output for active energy consumption (kWh)

²4 Working pulse outputs for supply and consumption of active and reactive energy

Cost savings through increased efficiency

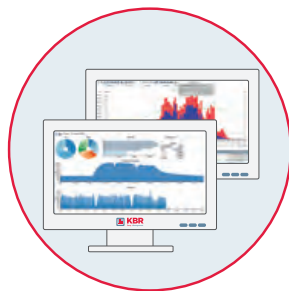
Our solutions for contemporary energy management.



When measurement alone is not enough

Capturing and documenting energy data has never been easier. Standard and consumption values, load profiles or easily recording countless forms of energy, media, and states – our measuring devices meet the most diverse requirements with the highest level of safety and precision.

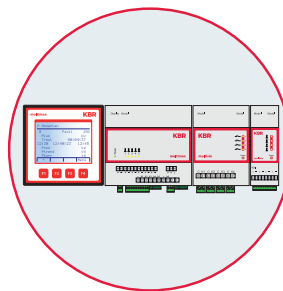
Measuring



We make energy visible

With its impressive functionality, visual energy allows for transparent and efficient energy management. You can easily capture, monitor, analyze and process the most diverse energy information from networks or systems. This helps you track your energy costs.

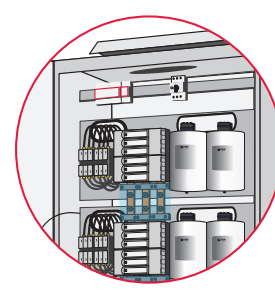
Visualization



Intelligent load distribution that pays off in several ways

The key to successful energy optimization is the perfect coordination of reliable product technology and intelligent load control. With its system architecture and comprehensive functionality, the system is highly efficient for the most diverse applications.

Optimizing




Spot-on network quality


The use of compensation systems does not only reduce the reactive current costs but also the load on a company's lines and distributions. Intelligent controllers, innovative components, as well as the perfectly matched construction considerably increase the operating life as well as your profit.

Control

multimes D9-PQ: POWER QUALITY NETWORK ANALYZER FOR ALL NETWORK LEVELS.

CLASS A Class A measuring device

 Automatic reporting according to EN 50160

 Free-of-charge analysis software included

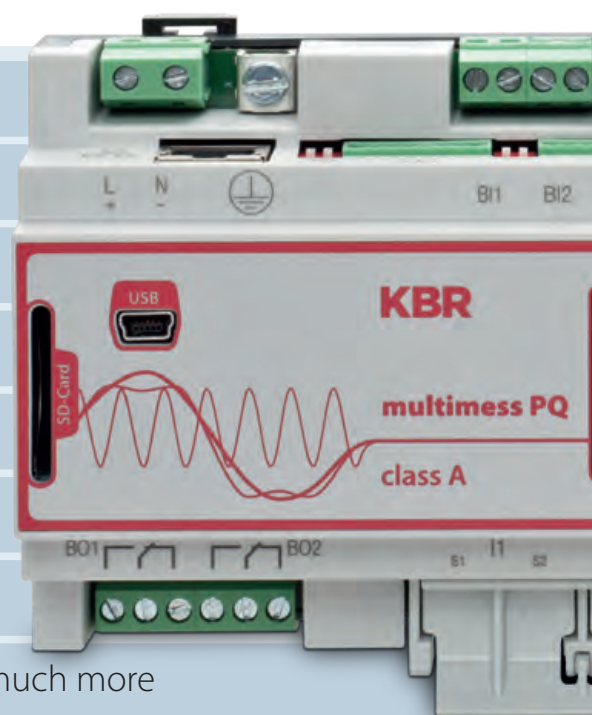
V A 4 voltage and current measurement inputs each

10 ms Oscilloscope and 10 ms report on trigger thresholds

GB Large internal 1 GB memory, expandable to up to 32 GB

kHz Harmonic measurement up to 9 kHz (optional)

+ ...and much more



Power Quality Analyzer and Fault Recorder

The **multimes D9-PQ** power quality analyzer and fault recorder is suitable for any measurement task required in electrical networks. You can use it as a power quality interface in accordance with network quality standard EN 50160 and as a measuring device for all physically defined measured values in alternating current networks. Additionally, it provides all consumption values required for energy data management.

In addition to standard evaluations, the **multimes D9-PQ** also features a high-speed fault recorder with a recording rate of 40.96 kHz/10.24 kHz as well as a 10 ms RMS effective value recorder. This makes a detailed evaluation of network interferences possible.

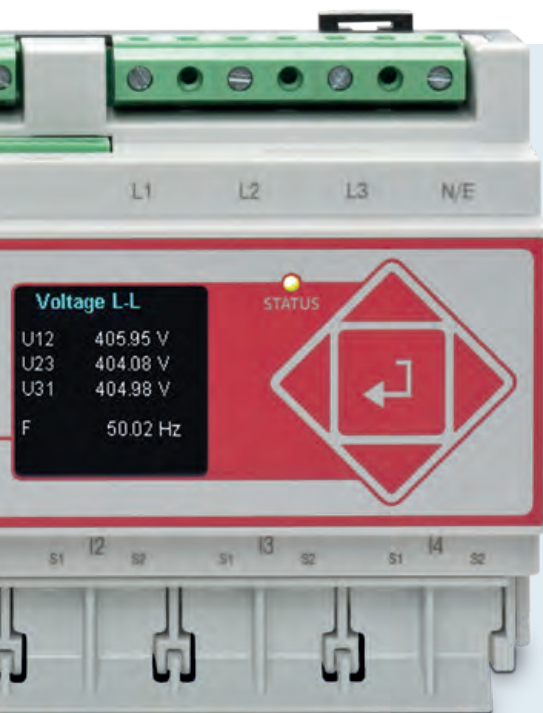
The network analyzer is primarily suitable for monitoring and recording quality agreements between energy providers and customers and making them available for evaluation or storage.

“Did you know?”

Voltage quality measuring devices operate according to the IEC 61000-4-30 standard. This standard defines measurement methods to create a comparable basis for the user. Devices of different manufacturers operating according to this standard necessarily have to obtain the same measuring results.

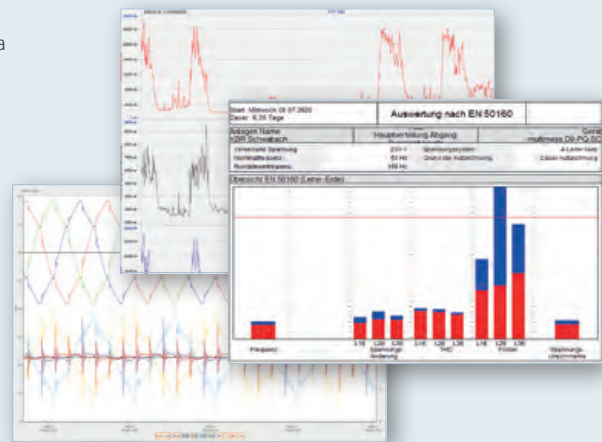
The **multimes D9-PQ** helps you to analyze the causes of malfunctions in electrical systems and machines. By permanently monitoring and controlling network quality, you can detect possible malfunctions early on.

POWER QUALITY
MADE IN GERMANY



Integrated into the energy data management system **visual energy** it provides a weekly EN 50160 network quality report for the required consumption values fully automatically.

When used as a power quality interface, the **multimes D9-PQ** provides comprehensive evaluations in accordance with the network quality standard DIN EN 50160



Technical Data

- 1.7-inch color display
- Class A measured data processing
- IEC 61000-4-30
- Recording of power quality events according to DIN EN 50160; IEC 61000-2-2; -2-12;-2-4
- Automatic EN 50160 network quality report
- 1 GB internal memory
- Input channel bandwidth 20 kHz
- 4 voltage inputs, measuring range end value: 480 V L-N, accuracy < 0.1%
- 4 current inputs
- Simultaneous processing of scanned and calculated voltages and currents
- Voltage and current oscillograph sampling rate: 40.96 kHz / 10.24 kHz
- Half-cycle recorder: network frequency, RMS voltage and current, voltage and current pointer, power recording rate: 10 ms (50 Hz)/8.33 ms (60 Hz)
- Powerful triggering

multimes F144-PQ: STATIONARY NETWORK POWER QUALITY ANALYZER AND FAULT RECORDER.



Voltage quality in accordance with EN 50160 and IEC 61000-2-2/2-4



IEC 61000-4-30 Class A



Fault recorder (oscilloscope, RMS value, event)



Convenient WinPQ visualization software



Control system connection (TCP/IP, IEC 61850)



Residual current measurement



Harmonic measurement up to 9 kHz optional



... and many other advantages



Power Quality Analyzer and Fault Recorder multimes F144-PQ

Detect possible malfunctions before they lead to a loss of production or defects in plant components. The **multimes F144-PQ** measures and monitors the network quality. It can be used as a power quality interface according to network quality standards, such as IEC61000-2-2 / EN50160 or to check technical connection guidelines, such as DIN VDE AR 4110 and DIN VDE 4120.

The network analyzer is designed primarily for measurements in industrial environments with up to 690 V (L-L) measurement voltage as well as for measurements in public networks.

The fifth (5th) current transformer input for measuring the residual current (RCM) as well as the fre-

quency measurement of voltage and current harmonics in accordance with IEC 61000-4-7 from 2 kHz to 9 kHz are available as options. This measurement is especially existential, since many clock frequencies of converters and inverters exist in this range.

Besides the possibility of standard evaluations, the **multimes F144-PQ** also has a high-speed disturbance recorder with a recording rate of 40.96 kHz/10.24 kHz as well as a 10ms RMS rms recorder. This makes an even more detailed evaluation of network interferences possible.

In addition, it is possible to freely program response thresholds for alarm messages or warnings.

The power quality analyzer and fault recorder multimes F144-PQ for low, medium and high voltage networks is the central component of a system that can be used to solve all measurement tasks in electrical networks.

POWER QUALITY

MADE IN GERMANY



Integrated into the energy data management **visual energy**, it provides a weekly EN-50160 network quality report fully automatically for the required consumption values.



When used as a power quality interface, the **multimes F144-PQ** provides comprehensive evaluations in accordance with the network quality standard DIN-EN-50160.

Technical Data

- 5 inch color display
- IEC 61000-4-30, Class A measurement data processing
- Acquisition of power quality events according to DIN EN 50160; IEC 61000-2-2; -2-12; -2-4
- 1 GB internal memory (expandable to 32 GB)
- Bandwidth 20 kHz
- Residual current measurement RCM
- 4 voltage inputs, accuracy < 0.1%
- 5 Current inputs
- Simultaneous processing of sampled and calculated voltages and currents
- Voltage and current oscillograph sampling rate: 40.96 kHz / 10.24 kHz
- Half-cycle recorder: Network frequency, rms voltages and currents (RMS), pointer for voltage and current, power recording rate: ~10 ms (50 Hz) / ~8.33 ms (60 Hz)
- Powerful triggering

multimess F96 TFT

Housing dimensions
(H x W x D in mm)

96 x 96 x 55

Data display

TFT

Interface

KBR eBus*
Modbus*
KBR eBus TCP*
Modbus TCP*

* depending on the respective device type.



Three-phase network measuring device

Highlights

- Measurement accuracy in accordance with DIN EN 61557-12
- Voltage quality in accordance with DIN EN 61000-4-30
- Color TFT display, individually adjustable by the user
- Optionally upgradeable interfaces
- Easy and intuitive operation
- Graphic representation with pointer diagram and oscilloscope, as well as bar chart of network harmonics up to 63rd harmonic
- Version with direct Rogowski bands connection

An overview of the **technical details** can be found on pages 30 to 33.

Do you have any questions concerning a product or a special requirement? We will be happy to advise you personally.

Product advice:
+49 (0) 9122 63730
info@kbr.de

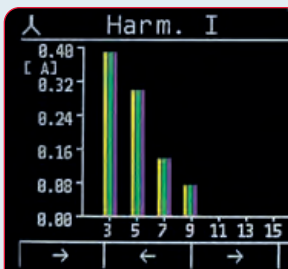
The electronic network measuring devices of the **multimess F96** series measure and monitor all important parameters in a three-phase network and are available in different versions. The measurement function for *harmonics of the voltage and current harmonics* as well as the graphic evaluation of waveforms and the analysis of voltage dips can be used



Device types multimes F96...

Device types multimes F96...	...-0-TFT-1DO-US1 / -US5	...-0-TFT1DO-R1-US1 / -US5	...-0-TFT-ESMS-1DO-US1 / -US5	...-0-TFT-ESMS-1DO-R1-US1 / -US5	...-2-TFT-ESMS-2RO1DO-US1 / -US5	...-2-TFT-ESMS-2RO1DO-R1-US1 / -US5	...-2-TFT-MS-2RO1DO-US1 / -US5	...-2-TFT-MS-2RO1DO-R1-US1 / -US5	...-2-TFT-ET-2RO1DO-US1 / -US5	...-2-TFT-ET-2RO1DO-R1-US1 / -US5	...-2-TFT-MT-2RO1DO-US1 / -US5	...-2-TFT-MT-2RO1DO-R1-US1 / -US5	...-2-TFT-ESET-2RO1DO-GW-US1 / -US5	...-2-TFT-ESET-2RO1DO-R1-GW-US1 / -US5
Pulse inputs 1 (P+/Q+/P-/Q-)	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Relay outputs	-	-	-	-	2	2	2	2	2	2	2	2	2	2
KBR eBus RS485	-	-	■	■	■	■	-	-	-	-	-	-	■	■
Modbus RS485	-	-	■	■	■	■	■	■	-	-	-	-	-	-
KBR eBus TCP/IP	-	-	-	-	-	-	-	-	■	■	-	-	■	■
ModbusTCP/IP	-	-	-	-	-	-	-	-	-	-	■	■	-	-
Power supply	US1: 1 to 240 V +/- 10% AC/DC 50/60 Hz, 8 VA, 4 W													
Power supply	Optional US5: 22.5 to 64 V +/- 10% AC/DC 50/60 Hz, 8 VA, 4 W													
Gateway function	-	-	-	-	-	-	-	-	-	-	-	-	■	■
Rogowski connection	-	■	-	■	-	■	-	■	-	■	-	■	-	■

Harmonics



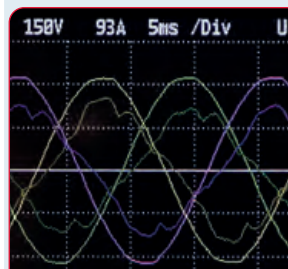
Bar chart for graphical representation of the harmonics up to the 63rd Voltage and current harmonics

Voltage dip diagnosis



Graphical diagnosis of voltage and current history in case of a voltage dip according to EN 61000-4-30

Oscilloscope



Oscilloscope analysis function of the three-phase and alternating current values

Phasor diagram



Pointer diagram of voltage and current for phase angle analysis

to evaluate the voltage quality with this affordable measuring device.

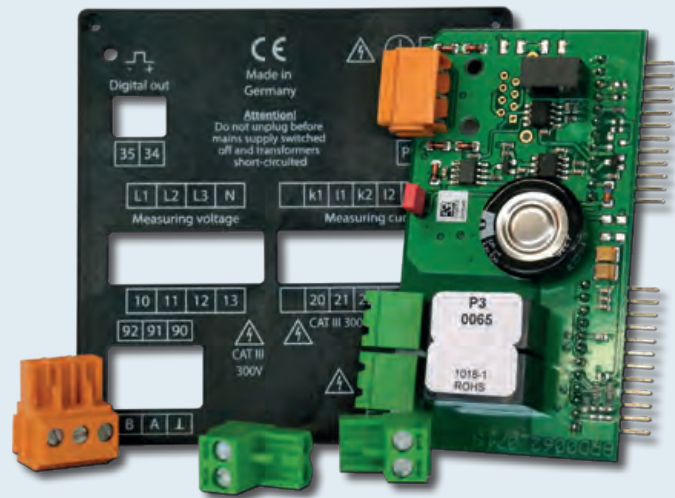
All device versions are equipped with a pulse output. Aside from the **F96-0** entry level model, the load profile (P+|P-|Q+|Q-) can be saved with all device versions and later read out via eBus. The network voltage can be mon-

itored in accordance with EN 61000-4-30. In case of a limit violation, the voltage and current history is saved. This history can be conveniently analyzed using the color TFT display. Different optional interfaces and protocols allow various applications.

multimes F96 interfaces

Interfaces

KBR eBus*
Modbus*
KBR eBus TCP*
Modbus TCP*



* depending on the respective device type.

Upgradeable interfaces

Highlights

- Comfortably upgradeable interfaces
- Different interfaces and outputs allow various extension and application options
- Straightforward on-site installation of the PCB
- PCB exchange is possible for any device version
- The device mounting depth remains the same

An overview of the **technical details** can be found on pages 30 to 33.

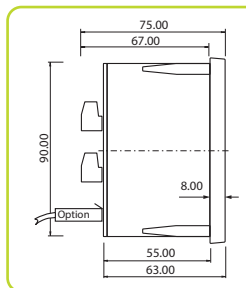
The optional PCBs are upgradeable interfaces for the **multimes F96** measuring devices and enable you to react flexibly to different measurement tasks. With our clever set-up, the **multimes F96 series** measuring devices can be upgraded from a base device to a high-end device with the required interface and relay outputs in only a few steps. It is very easy to install or exchange PCBs on-site. The device mounting depth remains the same.

With different upgrade kits, you can extend the functionality with **Modbus serial**, **Modbus TCP**, **eBus serial** or **eBus TCP**. With these options, you can count on future-proof, efficient and sustainable measurement technology which meets all certification criteria for **energy data management in accordance with ISO 50001**.

Upgrade kits: turn a base device into a high-end device in the blink of an eye

Base device multimes F96-0-TFT-1DO-US1 / -US5	Optional PCB upgrade kit *	Available interface(s)	Additional functions	Item no.
	 multimes F96-2-TFT-MS-2RO1DO-US1 / -US5	Modbus RS485	Real-time clock, 2 x relay outputs	23765
	 multimes F96-2-TFT-MT-2RO1DO-US1 / -US5	Modbus Ethernet	Real-time clock, 2 x relay outputs	23763
	 multimes F96-2-TFT-ESMS-2RO1DO-US1 / -US5	KBR eBus RS485 Modbus RS485	Real-time clock, 2 x relay outputs	23761
	 multimes F96-2-TFT-ET-2RO1DO-US1 / -US5	KBR eBus Ethernet	Real-time clock, 2 x relay outputs	23762
	 multimes F96-0-TFT-ESMS-1DO-US1 / -US5	KBR eBus RS485 Modbus RS485	–	23760

*The optional PCB can be exchanged for any **multimes F96** version. The technical details and device versions of the **multimes F96** are listed on page 20.



The device mounting depth remains the same even when the PCB is inserted!

Retrofitting made easy: Just 3 steps in 3 minutes



Short-circuit the transformer and unplug the connector. Remove the four Phillips screws and remove the rear panel of the device.

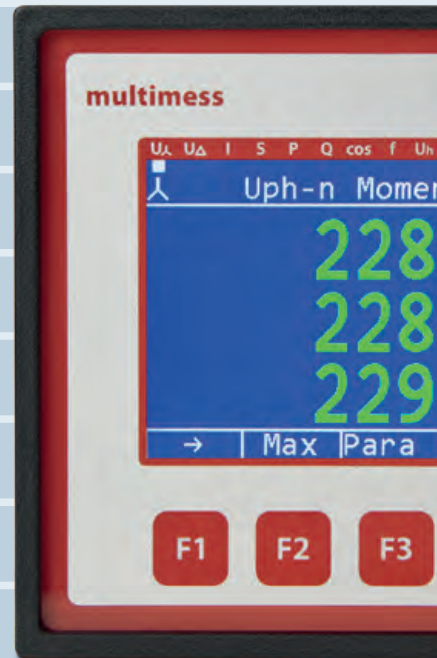
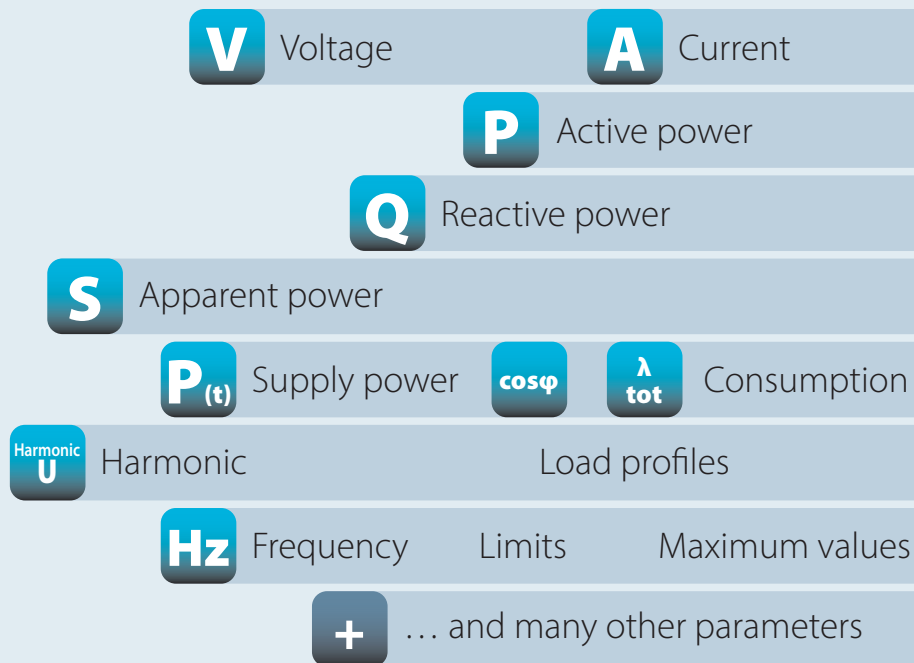


Slide the optional board into the guide provided.



Fasten the new rear panel of the device with the four Phillips screws – done.

MULTIMESS F96 ROGOWSKI: RETROFITTING SWITCHGEARS



RETROFIT

multimes F96 Rogowski.
IMPROVES YESTERDAY FOR THE DAY AFTER TOMORROW.

With our energy measuring devices, efficient energy management is very easy. We will be happy to advise you personally.

Product advice:
+49 (0) 9122 63730
info@kbr.de

Retrofitting current transformers into existing switchgears is always a difficult task. With the use of Rogowski bands, this work can be done quickly. Transformers can be installed without the hassle of shutting off the system under voltage. The bands can be used in virtually any distribution thanks to their flexible, narrow design. and can even be installed

in tiny spaces between individual conductors without a problem. Rogowski bands are usually the only way to retrofit a measurement when parallel connections or copper rails are involved. The KBR Rogowski band's special structure allows it to be installed in any position, without changing the measurement sensor.

The multimes F96 measuring devices with Rogowski bands are the best solution for retrofitting switchgears. If measuring devices have to be retrofitted in switchgears, the subsequent installation of current transformers is the biggest challenge. A multimes F96 and its flexible Rogowski bands can solve that challenge easily, quickly, and efficiently.



multimes F96 with Rogowski bands: The easy way to a modern switchgear
Optional upgradeable interfaces make the multimes F96 reliable for the future. Save time and expense.

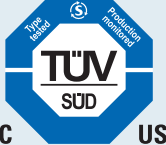


Subsequent assembly made easy, even in the tightest spaces, your switchgear will always be "up to date."


multimes F144 LED

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

* depending on the respective device type.



Also available with NRTL certification for USA and Canada



Three-phase network measuring device

Highlights

- Measurement accuracy in accordance with DIN EN 61557-12
- Voltage quality in accordance with DIN EN 61000-4-30
- Optimum readability thanks to bright LED displays
- Current transformer input for N conductor measurement
- ↩ NRTL-certified versions available for USA and Canada
- Narrow mounting depth of only 60 mm

An overview of the **technical details** can be found on pages 30 to 33.

The electronic network measuring devices of the **multimes F144 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 measured system is stored for all four quadrants for 366 days. The integrated event memory can log up to 1500 events, such as limit violations, power failures, voltage dips and much more.

There are measuring devices with NRTL approval for the USA and Canada.

With our energy measuring devices, efficient energy management is very easy. We will be happy to advise you personally.

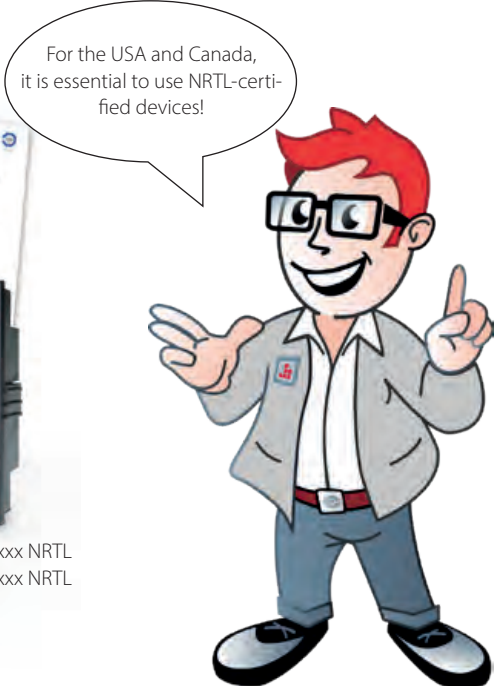
Product advice:
+49 (0) 9122 63730
info@kbr.de



Device types multimes F144...

		...-0-LED-EP-2RO1DO-US1 / -US5	...-0-LED-ESMS-2RO1DO-US1 / -US5	...-0-LED-ESMSDP-2RO1EDO-US1 / -US5	...-0-LEESMSET-2RO1DO-US1 / -US5	...-2-LED-ESMSMT-2RO1DO-US1 / -US5	...-2-LED-ESMS-2RO1DO3AO-US1 / -US5	...-2-LED-ESMSDP-2RO1DO3AO-US1 / -US5	...-2-LED-ESMSET-2RO1DO3AO-US1 / -US5	...-2-LED-ESMSMT-2RO1DO3AO-US1 / -US5	...-0-LED-EP-2RO1DO-US1 / -US5 NRTL	...-2-LEED-ESMS-2RO1DO-US1 / -US5 NRTL	...-2-LED-ESMSET-2RO1DO-US1 / -US5 NRTL	...-2-LED-ESMSMT-2RO1DO-US1 / -US5 NRTL	...-2-LED-ESMS-2RO1DO3AO-US1 / -US5 NRTL	...-2-LED-ESMSMT-2RO1DO3AO-US1 / -US5 NRTL
Pulse input	1 (P+/Q+)	■	-	-	-	-	-	-	-	-	■	-	-	-	-	-
	1 (P+/Q+/P-/Q-)	-	■	■	■	■	■	■	■	■	-	■	■	■	■	■
Digital inputs		-	2 ■	2 ■	2 ■	2 ■	2 ■	2 ■	2 ■	2 ■	-	2 ■	2 ■	2 ■	2 ■	2 ■
Analog outputs		-	-	-	-	-	3	3	3	3	-	-	-	-	3	3
Relay outputs		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
KBR eBus RS485		1 ■	■	■	■	■	■	■	■	■	1 ■	■	■	■	■	■
Modbus RS485		-	■	■	■	■	■	■	■	■	-	■	■	■	■	■
KBR eBus TCP/IP		-	-	-	■	-	-	-	■	-	-	-	■	-	-	■
Modbus TCP/IP		-	-	-	-	-	-	-	-	■	-	-	-	-	-	■
Profibus DP		-	-	■	-	-	■	-	-	-	-	-	-	-	-	-
NRTL certification		-	-	-	-	-	-	-	-	-	■	■	■	■	■	■
Power supply		US1: 1 to 240 V +/- 10% AC/DC 50/60 Hz, 8 VA, 4 W														
Power supply		Optional US5: 22.5 to 64 V +/- 10% AC/DC 50/60 Hz, 8 VA, 4 W														

■ Standard - Not available ¹ Bus address (1) permanently set ² 1 synchronization, 1 HT/NT tariff



multimes F144-0-LED-xxx NRTL
multimes F144-2-LED-xxx NRTL

multimes Device matrix



Device types multimes ...

DIN rail				
...D4-BS	...D6-1-LED-ESMS-2DI1DO-US1	...D9-PQ-3-LCD-MSMT-US8	...F96-0-TFT-1DO-US1 (US5)	...F96-0-TFT-1DO-R1-US1 (US5)

			...D4-BS	...D6-1-LED-ESMS-2DI1DO-US1	...D9-PQ-3-LCD-MSMT-US8	...F96-0-TFT-1DO-US1 (US5)	...F96-0-TFT-1DO-R1-US1 (US5)
MEASURED VALUES	Voltage	U Ph - N (L1 - L3) | U Ph - Ph	■	■	■	■	■
	Current	I Ph (L1 - L3)	■	■	■	■	■
	Average current value	I Ph (L1 - L3)	■	■	■	■	■
	Neutral conductor current	I_N | I_N -average	-	■	■	■	■
	Apparent power	S Ph (L1 - L3) | S total	■	■	■	■	■
	Active power	P Ph (L1 - L3) | P total	■	■	■	■	■
	Fundamental reactive power ind./cap.	Q (L1 - L3) | Q1 overall; total	■	■	-	■	■
	Fundamental and harmonic reactive power Q	Q (L1 - L3) | Q1 overall; total	-	-	■	-	-
	Frequency	f (L1)	■	■	■	■	■
	Rotary field control:	Rotary field display in degrees	-	-	■	■	■
	Phasor diagram	Graphic display	-	-	-	■	■
	Power factors ind./cap.	Fundamental component $\cos\phi$ (L1 - L3)	■	-	■	■	■
		Total power factor λ (L1 - L3) | λ total	-	■	■	■	■
	Electrical energy	Continuous counter for active energy P+ | P-	■	-	■	■	■
		Continuous counter for reactive energy Q+ | Q-	■	-	■	■	■
Tariffs	HT / NT	-	-	-	■	■	
MEMORY	Load profile memory P+ | P- | Q+ | Q-	Ring buffer for 40 days	-	■	-	-	-
		Ring buffer for 365 days	-	-	■	-	-
	Daily, active and reactive energy	P+ | P- | Q+ | Q-	-	■	■	-	-
	Maximum indicator function (min./max.)		-	■	■	-	-
	Operation logbook		-	■	-	-	-
Event memory		-	■	-	-	-	
PQ ANALYSIS	Harmonics	THD-U (L1 - L3) %	-	-	■	■	■
		Sum of current harmonics I_d (L1 - L3) A	-	-	■	■	■
		3rd - 63rd Harmonic. (L1 - L3) voltage %	-	-	-	■	■
		3rd - 50th (180th) Harmonic. (L1 - L3) voltage %	-	-	■	-	-
		3rd - 63rd Harmonic. (L1 - L3) current A	-	-	-	■	■
		3rd - 50th (180th) Harmonic. (L1 - L3) current A	-	-	■	-	-
	Bar chart	THD-U | THD-I	-	-	-	■	■
	Oscilloscope / pointer diagram	Graphic display	-	-	-	■	■
	Oscilloscope recorder	With trigger function	-	-	■	-	-
	RMS recorder	With trigger function	-	-	■	-	-
	Event recorder		-	-	■	-	-
	Permanent recorder		-	-	■	-	-
Software includes reporting according to EN 50160		-	-	■	-	-	
All measured values in accordance with class A		-	-	■	-	-	

Switchboard installation 96 x 96 mm														Switchboard installation 144 x 144 mm													
... F96-0-TFT-ESMS-1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...	... F144-0-LED-EP-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...
... F96-0-TFT-ESMS-1DO-R1-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMS-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-ESMS-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMS-2RO1DO3AO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-ESMS-2RO1DO-R1-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMSDP-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-ET-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMSMT-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-ET-2RO1DO-R1-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMSMT-2RO1DO3AO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-ESET-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...	... F144-PQ-3-TFT-MSMT-US8	...	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-ESET-2RO1DO-R1-GW-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...	
... F96-2-TFT-MS-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...	
... F96-2-TFT-MS-2RO1DO-R1-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...	
... F96-2-TFT-MT-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...	
... F96-2-TFT-MT-2RO1DO-R1-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	...	

multimes

Device matrix



Device types multimes ...

DIN rail				
...D4-BS	... D6-1-LED-ESMS-2DI1DO-US1	...D9-PQ-3-LCD-MSMT-US8	...F96-0-TFT-1DO-US1 (US5)	...F96-0-TFT-1DO-R1-US1 (US5)

		...D4-BS	... D6-1-LED-ESMS-2DI1DO-US1	...D9-PQ-3-LCD-MSMT-US8	...F96-0-TFT-1DO-US1 (US5)	...F96-0-TFT-1DO-R1-US1 (US5)
HOUSING	DIN rail 4 TE	■	-	-	-	-
	DIN rail 6 TE	-	■	-	-	-
	DIN rail 9 TE	-	-	■	-	-
	Front panel mounting 96 x 96 mm	-	-	-	■	■
	Front panel mounting 144 x 144 mm	-	-	-	-	-
DISPLAY	LCD	-	■	■	-	-
	TFT	-	-	-	■	■
	LED	-	-	-	-	-
VOLTAGE MEASURING INPUTS	3 x 30 ... 400 ... 480 V AC	■	■	-	-	-
	3 x 5 ... 500 ... 600 V AC	-	-	-	■	■
	3 x 0 ... 690 V AC	-	-	■	-	-
CURRENT MEASURING INPUTS	Current transformer 3 x 1 (5) A	■	■	-	■	-
	Current transformer 4 x 1 (5) A	-	-	■	-	-
	Rogowski band 3 x 1000 A	-	-	-	-	■
	Rogowski band 3 x 3000 A	-	-	-	-	■
INTERFACES	RS 485 KBR eBus configuration interface	-	-	-	-	-
	RS 485 KBR module bus	■	-	-	-	-
	RS 485 Modbus	-	■	■	-	-
	RS 485 KBR eBus	-	■	-	-	-
	RS 485 Profibus DP	-	-	-	-	-
	TCP/IP Modbus	-	-	■	-	-
	TCP/IP eBus	-	-	-	-	-
	TCP/IP eBus and RS 485 with gateway function	-	-	-	-	-
OUTPUTS	2 x relay outputs	-	-	-	-	-
	1 x 50 digital output	-	■	-	■	■
	3 x analog output 0 (4) – 20 mA, 0 (2) – 10 V	-	-	-	-	-
POWER SUPPLY	Via measuring voltage	■	-	-	-	-
	US1: 100 to 240 V; AC/DC; 50/60 Hz	-	■	-	■	■
	US5: 22.5 to 64 V; AC/DC; 50/60 Hz	-	-	-	□	□
	US8: 90 to 264 V; AC; 50/60 Hz; 100 to 350 V DC	-	-	■	-	-

Switchboard installation 96 x 96 mm													Switchboard installation 144 x 144 mm												
... F96-0-TFT-ESMS-1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	... F144-0-LED-EP-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...
... F96-0-TFT-ESMS-1DO-R1-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMS-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-ESMS-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMS-2RO1DO3AO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-ESMS-2RO1DO-R1-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMSDP-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-ET-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMSDP-2RO1DO3AO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-ET-2RO1DO-R1-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMSET-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-ESET-2RO1DO-GW-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMSET-2RO1DO3AO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-ESET-2RO1DO-R1-GW-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMSMT-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-MS-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	... F144-2-LED-ESMSMT-2RO1DO3AO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-MS-2RO1DO-R1-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...	... F144-PQ-3-TFT-MSMT-US8	...	...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-MT-2RO1DO-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...
... F96-2-TFT-MT-2RO1DO-R1-US1 (US5)	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	...	...	...	...	...	...

multimes D4

multimes D6

multicount D5

multimes D9-PQ

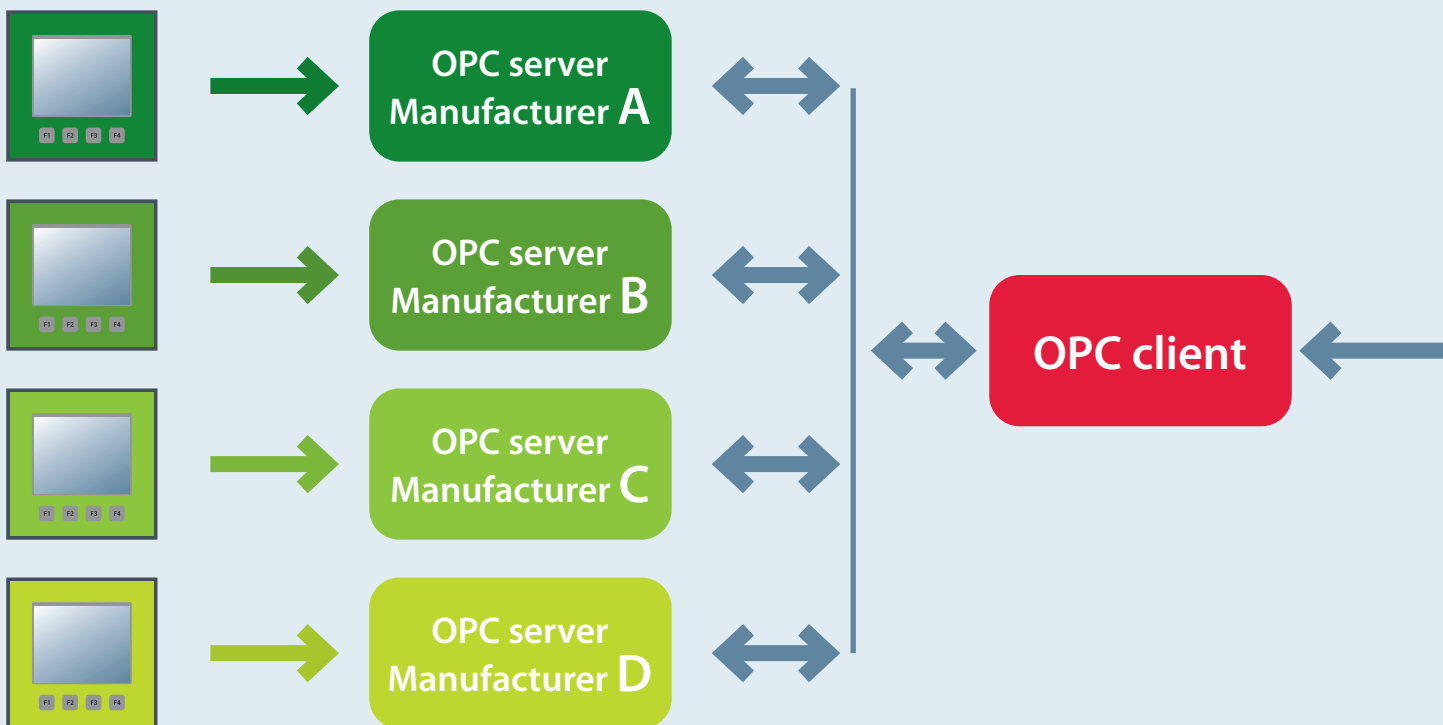
multimes F144-PQ

multimes F96

multimes F144

OPC-UA AND OPC-DA:

CLIENT AND SERVER FROM KBR FOR PROTOCOL-INDEPENDENT COMMUNICATION

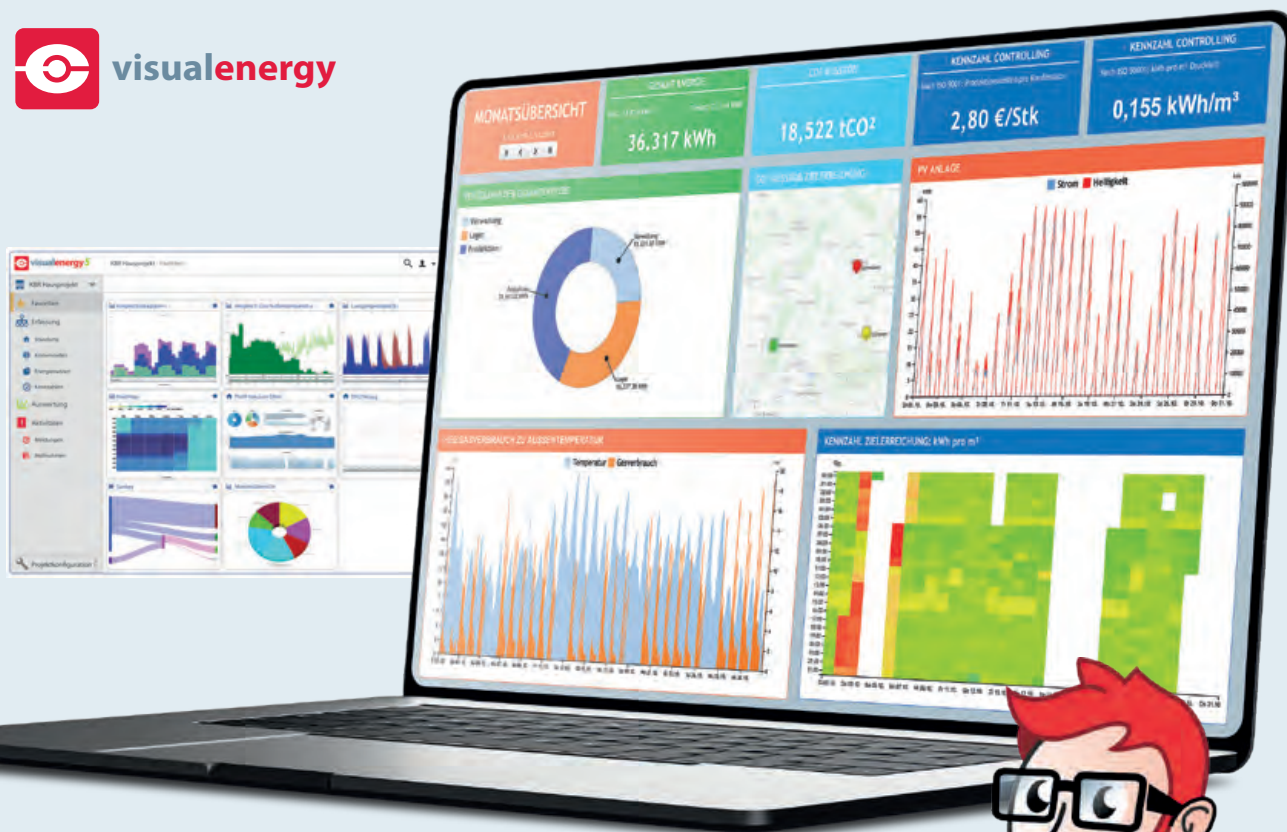


With our energy measuring devices, efficient energy management is very easy. We will be happy to advise you personally.

Product advice:
+49 (0) 9122 63730
info@kbr.de

OPC is used for standardized and manufacturer-independent data exchange, especially in industrial environments. Systems and control systems can thus communicate with higher-level software systems. On the one side, there are OPC clients that make requests, which are answered by OPC servers on the other. KBR offers both an eBus OPC server and a universal OPC client for energy data management. This allows instantaneous values and meter readings from KBR eBus devices to be transferred to third-party systems, as well as M-Bus meters to be integrated into the visual energy management system, for example. OPC servers exist for almost all bus systems and even manufacturers of proprietary systems often supply suitable OPC servers.

To enable data exchange between applications from different manufacturers (e.g. an energy data management system such as visual energy and measurement technology with different bus systems and protocols), they must speak the same "language". This is realized via Open Platform Communications, or OPC for short.



Two different OPC technologies exist. OPC-DA was the first implementation and is largely limited to Windows systems. The newer OPC-UA technology is based on current web technologies and can therefore be used more universally.

KBR can provide the server and the client for both technologies (OPC-DA and OPC-UA). This allows data from third-party systems, such as a PLC, a BMS or third-party devices to be read and analyzed with the visual energy data management system.



multilog 3:

ANALYZE NETWORKS WITH EASE USING MOBILE DE-



multilog 3 light/expert with many accessories and convenient transport case



IEC 61000-4-30 Class A



Voltage quality in accordance with EN 50160 and IEC 61000-2-2/2-4



Oscilloscope and RMS recorder



Analysis software for the PC



Online readings on the smartphone



Load analysis, energy measurements



Ripple-control signal analysis



... and many other advantages



IP65 OUTDOOR

Installation and operation also possible outdoors. Temperature range from -20 °C to +60 °C

Comprehensive measurement options

- Complete recording of more than 2000 measured data
- Simultaneous long-term and online measurements
- Storage capacity of 1 GB allows for long-term storage for up to one year
- All relevant interfaces available, for example RS232 for time synchronization or USB port for fast data transfer



multilog 3 is available in three versions:

multilog 3 basic

Base device for power measurements with many measurement parameters, data memory and function for online measurement and evaluation.

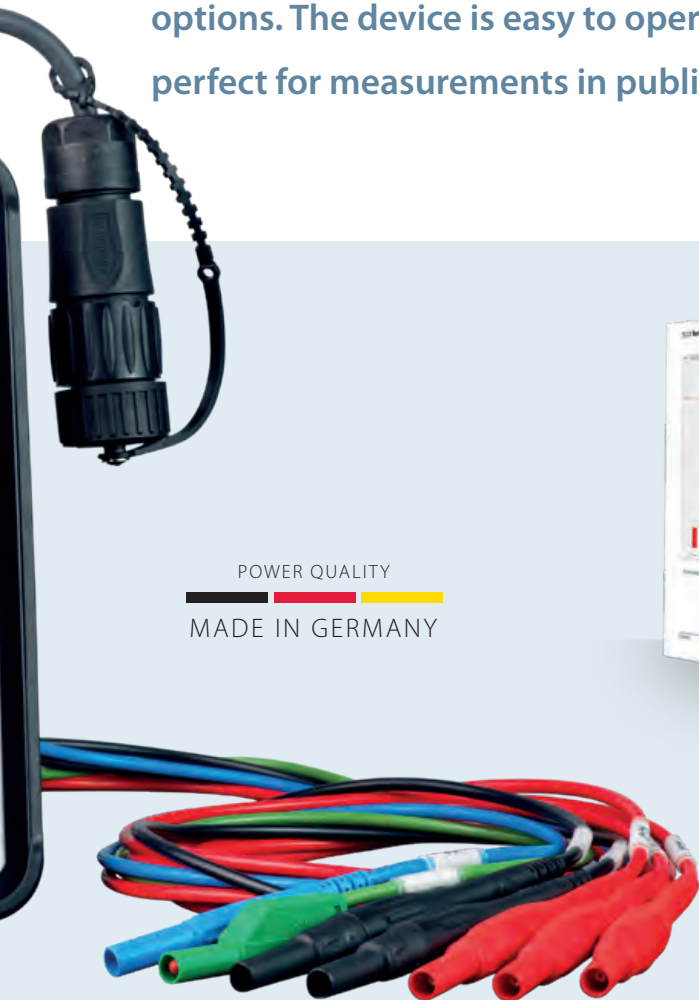
multilog 3 light

The powerful measuring device for comprehensive network analysis and storage of measured data. Upgradeable to the expert version with a license.

multilog 3 expert

With more comprehensive trigger functions than the light version. Fast oscilloscope images are recorded automatically.

The multilog 3 class A mobile network analyzer stands out with a strong performance range: Recording of more than 2000 measured values, numerous trigger functions as well as comprehensive analysis and archiving options. The device is easy to operate and mobile, which makes it perfect for measurements in public and industrial networks.



POWER QUALITY
MADE IN GERMANY



Clear design and standard compliance: Assessment of the voltage quality in accordance with EN 50160 and IEC 61000-2-2

Easy evaluation

- Output as EN 50160/IEC 61000-2-2 report for a fast and precise overview of voltage quality
- Online analysis software displays graphically and in real time current and voltage signals, as well as harmonics and interharmonics up to 10 kHz (software included)
- Analysis of ripple control signals (optional)
- Time synchronization for the correlation of measured data of different devices
- Fault recording as oscilloscope images and as 10 ms RMS reports to detect the causes of network interference
- Continuous recording of more than 2000 different measured values per measurement interval



multilog mobile App

A variety of online measurement values can be displayed on a smartphone or tablet via the free app for Android and iOS operating systems.

THE MULTIMAX FACTOR: HIGHLY FLEXIBLE AND EXTREMELY EFFICIENT.



Modular system

With the **multimes** and **multisio** modules, you can expand the load management system to control up to 80 consumers.



Electricity



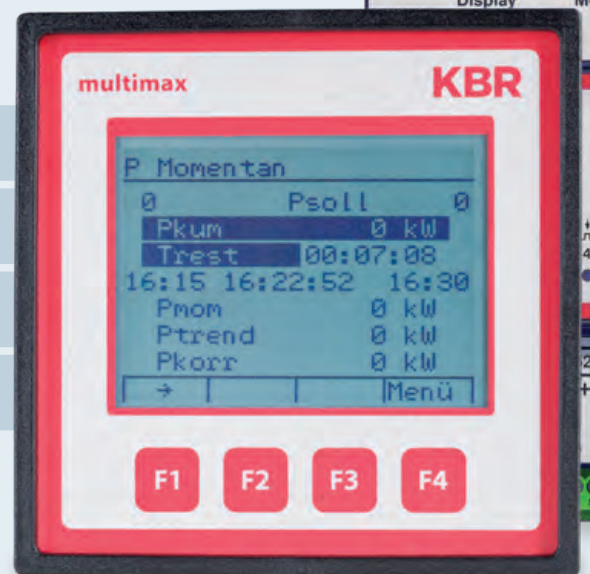
State detection



Gas



Electrical power



multimax D6 base device with multimax F96-DS display

Intelligent functions

Target value and instantaneous value monitoring, target value tracking, prewarning contact (alarm), timer programs, emergency shut-down, and much more.

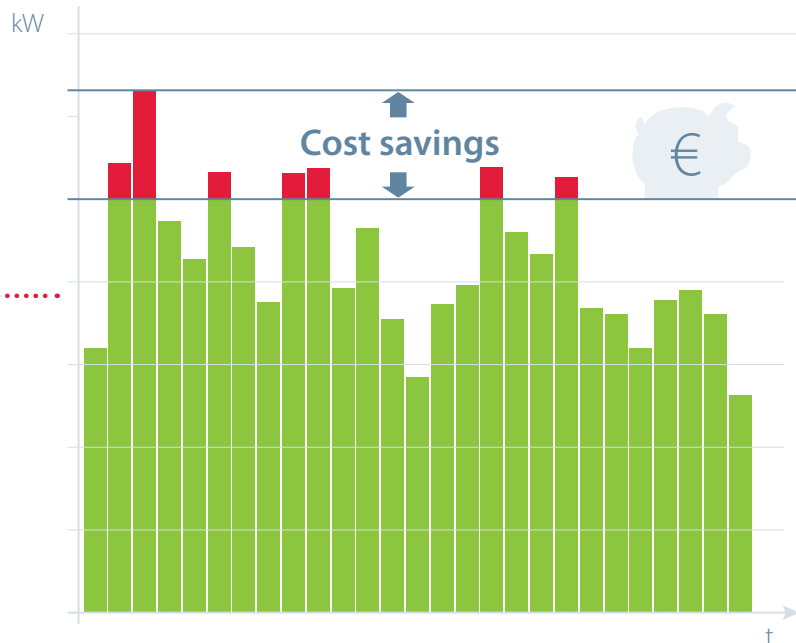
Energy optimization is an important aspect of modern energy management. We will be happy to advise you personally.

Product consulting:
+49 (0) 9122 63730
info@kbr.de

The key to successful energy optimization is the perfect coordination of reliable product technology and flexible load control. The multimax energy optimization system can be adapted to plants of any size due to its modular design.

Visualization

The **multimax IGW** is integrated into the network and runs immediately via Plug and Play, without installing any software. Analysis and programming can be performed from any PC with a default browser.



Meter inputs with pulse totalizer function

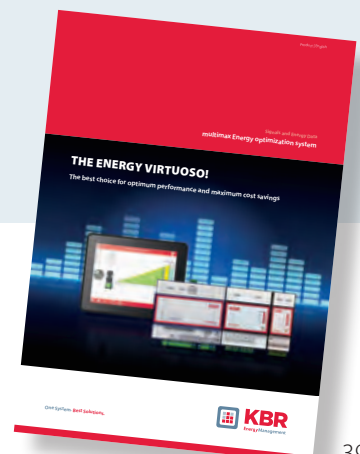
multimax D6 can capture the values of up to 5 meters. You can connect additional meters with the **multisio D2-4DI** module.

Use the enormous savings potential wisely with our energy flow and consumption optimization measures.



Find out about our product portfolio in our catalogs.

www.kbr.de/de/download-center/brochures



VISUAL ENERGY: EASY AND SAFE ENERGY DATA CONTROL



ENERGY RECORDING

- Modern energy data management in accordance with **ISO 50001**
- **Seamless recording** Seamless recording of all consumption, types and states of energy
- **100% plausible measurement** in accordance with **BDEW metering code** and **VDE application rule**
- **MSCONS format** for future-proof data import and secure communication with energy suppliers, network or meter point operators

ENERGY VISUALIZATION

- Continuous **visual analysis process** from data preparation to evaluation
- Comprehensive selection of custom and pre-made **diagrams** and **reports**
- Easy to create **meaningful key figures**
- **Favorites** for custom organization of the system: practical for direct access to the essentials
- **Interactive dashboards** for a fast and comprehensive overview



KBR online service: Up-to-date information on visual energy, downloads and much more can be found at visualenergy.de

With comprehensive functionality, this web-based visual energy software provides transparent and efficient energy management. You can easily record, monitor, analyze and process any energy information from networks or systems. This helps you keep track of network quality, supply structure and energy costs.



ENERGY MANAGEMENT

- User-defined **workflows** and **favorites**
- **Automatic monitoring** of network quality, consumption values, projected energy volumes and device parameters
- Additional security with **active early-warning system** and monitoring of outgoing fuses
- **reports** and **measures** for efficient control
- Reliable for **third-party quantity limitation** and **residual current measurements**

ENERGY EVALUATION

- **SEU reports, regression analysis, Sankey diagrams, heat maps, filter analysis and much more**
- **Individual key figures** with your production data integrated
- Standardized **report preparation**
- Secure data export in common data formats **such as PDF, CSV, MSCONS or OPC**
- New **unlimited user administration**

FOR YOU. ON SITE WORLDWIDE.





With a few clicks to the contact data of our partners:

www.kbr.de/en/contact/sales-partners

KBR provides you a dense network of quality and experienced business partners.

KBR DISTRIBUTION AND SERVICE POINTS:

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