multimess F96 TFT

lousing dimensions H x W x D in mm)	96 x 96 x 55
ata display	TFT
terface	KBR eBus* Modbus* KBR eBus TCP* Modbus TCP*
pending on the	respective device type.

Three-phase network measuring device

Highlights

- \rightarrow Measurement accuracy in accordance with IEC 61557-12
- → Voltage quality in accordance with IEC 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 coils 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

multimess F144

Image: Constrained state of the state o	0-TFT-1D0-US1 / -US5	0-TFT1D0-R1-US1 / -US5	0-TFT-ESMS-1DO-US1 / -US5	0-TFT-ESMS-1DO-R1-US1 / -US5	2-TFT-ESMS-2R01D0-US1 / -US5	2-TFT-ESMS-2R01D0-R1-US1 / -US5	2-TFT-MS-2R01D0-US1 / -US5	2-TFT-MS-2R01D0-R1-US1 / -US5	2-TFT-ET-2R01D0-US1 / -US5	2-TFT-ET-2R01DO-R1-US1 / -US5	2-TFT-MT-2R01D0-US1 / -US5	2-TFT-MT-2R01D0-R1-US1 / -US5	2-TFT-ESET-2R01D0-GW-US1 / -US5	2-TFT-ESET-2R01DO-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 2	40 V +/	- 10% A	C/DC 5	50/60 H	z, 8 VA,	4 W			
Power supply			0	ptional	US5: 22	2.5 to 64	4 V +/-	10% AC	/DC 50	/60 Hz,	8 VA, 4	W		
Gateway function	-	-	-	-	-	-	-	-	-	-	-	-		
Rogowski connection	-		-		-		-		-		-		-	

Harmonics	Voltage dip diagnosis	Oscilloscope	Phasor diagram
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	29.12.2019 00:01:33 U L1 L2 L3 400 V ← +21 →	158V 93A 5ms /Div U	400V 200A /2Div 6S U I I U U U U U U U U U U U U U
Bar chart for graphical representation of the harmonics up to the 63rd Voltage and current harmonics	Graphical diagnosis of voltage and current history in case of a voltage dip according to IEC 61000-4-30	Oscilloscope analysis function of the three-phase and alternating current values	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.

multimess F96 interfaces



Upgradeable interfaces

Highlights

- \rightarrow 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
- \rightarrow 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 **multimess F96** measuring devices and enable you to react flexibly to different measurement tasks. With our clever set-up, the **multimess 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 multimess F96-0-TFT-1DO-US1/-US5	Optional PCB upgrade kit *	Available interface(s)	Additional functions	ltem no.
	multimess F96-2-TFT-MS-2RO1DO- US1/-US5	Modbus RS485	Real-time clock, 2 x relay outputs	23765
	multimess F96-2-TFT-MT-2RO1DO- US1/-US5	Modbus Ethernet	Real-time clock, 2 x relay outputs	23763
	multimess F96-2-TFT-ESMS-2RO1DO- US1/-US5	KBR eBus RS485 Modbus RS485	Real-time clock, 2 x relay outputs	23761
	multimess F96-2-TFT-ET-2RO1DO- US1/-US5	KBR eBus Ethernet	Real-time clock, 2 x relay outputs	23762
	multimess F96-0-TFT-ESMS- 1DO- US1/-US5	KBR eBus RS485 Modbus RS485	-	23760

*The optional PCB can be exchanged for any **multimess F96** version. The technical details and device versions of the **multimess 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.

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multimess F144

MULTIMESS F96 ROGOWSKI: RETROFITTING SWITCHGEARS



RETROFIT

multimess 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 coils, 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 coils are usually the only way to retrofit a measurement when parallel connections or copper rails are involved. The KBR Rogowski coils special structure allows it to be installed in any position, without changing the measurement sensor. The multimess F96 measuring devices with Rogowski coils 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 multimess F96 and its flexible Rogowski coils can solve that challenge easily, quickly, and efficiently.



multimess F96 with Rogowski coils: The easy way to a modern switchgear Optional upgradeable interfaces make the multimess 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."

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multimess F144

multimess Device matrix

With and a set of the se		multimess F144-PQ	D	DIN rail							
Voltage UPh - N (L1 - L3) UPh	multi	UNDERSTORE TYPES MULTIN	D4-0-BS	D6-1-LED-ESMS-2DI1DO-US1	D9-PQ-3-LCD-MSMT-US8	F96-0-TFT-1DO-US1 (US5)	F96-0-TFT-1D0-R1-US1 (US5)				
CurrentIPh (11-13)IPh (1-13)IPh (1-13) <th< td=""><td></td><td>Voltage</td><td>U Ph - N (L1 - L3) U Ph - Ph</td><td></td><td></td><td></td><td></td><td></td></th<>		Voltage	U Ph - N (L1 - L3) U Ph - Ph								
Average current valueIPh (L1-L3)IPh (L1-L3)		Current	I Ph (L1 - L3)								
Netral conductor currenti, i, i, averagei.i.i.i.i.i.i.i.i.i.i.i.i.i.i.i.i.i.i.		Average current value	l Ph (L1 - L3)								
Apparent powerSPh (1 - 1.3) StataliiiiiActive powerPPh (1 - 1.3) P totaliiiiiiFundamental and harmonic ractive power (0)Q(11 - 1.3) (Q1 overall; totaliiiiiiFundamental and harmonic ractive power (0)Q(11 - 1.3) (Q1 overall; totaliii		Neutral conductor current	I _N I _N -average	-							
Active powerP h (1 - L3) [P totalIIIIIIFundamental reactive power ind / cap.Q (L1 - L3) [Q 1 overalit totalII <tdi< td="">II<!--</td--><td></td><td>Apparent power</td><td>S Ph (L1 - L3) S total</td><td></td><td></td><td></td><td></td><td></td></tdi<>		Apparent power	S Ph (L1 - L3) S total								
MAA- MULTESFundamental and harmonic reactive power QQ(L1 - L3) Q1 overall; totalGGGGGGFundamental and harmonic reactive power QG(L1 - L3) Q1 overall; totalGGG </td <td></td> <td>Active power</td> <td>P Ph (L1 - L3) P total</td> <td></td> <td></td> <td></td> <td></td> <td></td>		Active power	P Ph (L1 - L3) P total								
MEAP SURED VALUESFindumental and harmonic reactive power QQ(L1-L3) Q1 overall; totalRotary field control:Rotary field display in degrees		Fundamental reactive power ind./cap.	Q (L1 - L3) Q1 overall; total			-					
SURE VALUES VALUESFrequencyf(L1)Image of the transmission of the transmission of the transmission of transm	MEA-	Fundamental and harmonic reactive power Q	Q (L1 - L3) Q1 overall; total	-	-		-	_			
NLOUSRotary field control:Rotary field display in degreesIIIPhasor diagramGraphic displayIIIIIPower factors ind/cap.Fundamental component cosp (L1-L3) kotal-IIIIIIIElectrical energyContinuous counter for active energy P+ P-IIIIIIIIIIIIIIIIElectrical energyTriffsHT / NT-IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	SURED	Frequency	f (L1)								
Phasor diagramGraphic displayPower factors ind/cap.Fundamental component cosq (L1 - L3)111111Power factors ind/cap.Continuous counter for active energy P+ IP.00	VALUES	Rotary field control:	Rotary field display in degrees	-	-						
Power factors ind/cap.Fundamental component coso (L1 - L3) Total power factors ind/cap.Image: second sec		Phasor diagram	Graphic display	-	_	_					
Power factors ind/cap.Total power factor λ (L1-L3) λ totalHetrical energyContinuous counter for active energy P+ P <td></td> <td></td> <td>Fundamental component cosϕ (L1 - L3)</td> <td></td> <td>-</td> <td></td> <td></td> <td></td>			Fundamental component cos ϕ (L1 - L3)		-						
Performance Continuous counter for active energy P+ P- Image: Piece		Power factors ind./cap.	Total power factor λ (1- 3) λ total	_							
Electrical energyTended continuous counter for excive energy (+) (-)			Continuous counter for active energy P+ P-								
TariffsHT/NTIIIIIHarmonicsHT/NTIII <td< td=""><td></td><td>Electrical energy</td><td>Continuous counter for reactive energy $0 + 10$</td><td></td><td></td><td></td><td></td><td></td></td<>		Electrical energy	Continuous counter for reactive energy $0 + 10$								
Memory Perpending Ring buffer for 40 days Ring buffer for 365 days - - - Daily, active and reactive energy P+ P- Q+ Q- - - - - - - - Maximum indicator function (min./max.) -<		Tariffs	HT / NT	-							
Initial balance for 40 days Image balance for 40 days Image balance Image balance Network Ning balance for 40 days Image balance			Ding huffer for 40 days		_			-			
MEMORYDaily, active and reactive energyP+ P- Q+ Q-IIIIIIIMaximum indicator function (min/max.)P+ P- Q+ Q-III <t< td=""><td></td><td>Load profile memory P+ P- Q+ Q-</td><td>Ring buffer for 40 days</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></t<>		Load profile memory P+ P- Q+ Q-	Ring buffer for 40 days	-	-	-	-	-			
MEMORY Daily, active and reactive energy P+ P- (Q+ Q- - <th< td=""><td></td><td></td><td></td><td>-</td><td>-</td><td></td><td>_</td><td>-</td></th<>				-	-		_	-			
Maximum indicator function (min,/max.) Image: Note of the image: Not	MEMORY	Daily, active and reactive energy	P+ P- Q+ Q-	-			-	-			
Operation logbook Image:		Maximum indicator function (min./max.)		-		-	-	-			
PQ Bar chart THD-U (L1 - L3) % -		Operation logbook		-		-	-	-			
PQ Imbo (L1 - L3)% Imbo (L1 - L3)% Imbo (L1 - L3) No Imbo (L1 - L		Event memory		_		-	-	-			
PQ Aut Aut Aut Aut Aut PQ Aut Aut Aut Aut Aut PQ Aut Aut Aut Aut Aut Aut ANALYSIS Aut Aut Aut Aut Aut Aut Aut ANALYSIS Aut Aut Aut Aut Aut Aut Aut Aut ANALYSIS Aut Aut </td <td></td> <td></td> <td>THD-U (L1 - L3) %</td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td>			THD-U (L1 - L3) %	-	-						
PQ Bar chart 3rd - 63rd Harmonic. (L1 - L3) voltage% -			Sum of current harmonics Id (L1 - L3) A	-	-						
PQ Ard - 50th (180th) Harmonic. (L1 - L3) voltage% -		Harmonics	3rd - 63rd Harmonic. (L1 - L3) voltage %	-	-	-					
PQ ANALYSISBar chart3rd - 63rd Harmonic. (L1 - L3) current AIIIBar chartTHD-U THD-IIIIIIOscilloscope / pointer diagramGraphic displayIIIIIIOscilloscope recorderWith trigger functionIIIIIIIRMS recorderWith trigger functionIIIIIIIPermanent recorderIIIIIIIISoftware includes reporting according to EN 50160IIIIIIIIAll measured values in accordance with class AIIIIIIIII			3rd - 50th (180th) Harmonic. (L1 - L3) voltage %	-	-		-	-			
PQ Bar chart THD-U THD-I I <td></td> <td></td> <td>3rd - 63rd Harmonic. (L1 - L3) current A</td> <td>-</td> <td>-</td> <td>-</td> <td></td> <td></td>			3rd - 63rd Harmonic. (L1 - L3) current A	-	-	-					
PQ Bar chart THD-U [THD-I I I I I ANALYSIS Oscilloscope / pointer diagram Graphic display I<			3rd - 50th (180th) Harmonic. (L1 - L3) current A	-	-		-	-			
ANALYSIS Oscilloscope / pointer diagram Graphic display - - - I	PQ	Bar chart	THD-U THD-I	-	-	-					
Oscilloscope recorderWith trigger functionRMS recorderWith trigger functionEvent recorderPermanent recorderSoftware includes reporting according to EN 50160All measured values in accordance with class A	ANALYSIS	Oscilloscope / pointer diagram	Graphic display	-	-	-					
RMS recorderWith trigger functionEvent recorderPermanent recorderSoftware includes reporting according to EN 50160All measured values in accordance with class A		Oscilloscope recorder	With trigger function	-	-		-	-			
Event recorderPermanent recorderSoftware includes reporting according to EN 50160All measured values in accordance with class A		RMS recorder	With trigger function	-	-		-	-			
Permanent recorderSoftware includes reporting according to EN 50160All measured values in accordance with class A		Event recorder		-	-		-	-			
Software includes reporting according to EN 50160All measured values in accordance with class A		Permanent recorder		-	-		-	-			
All measured values in accordance with class A		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)	F96-0-TFT-ESMS-1D0-R1-US1 (US5)	F96-2-TFT-ESMS-2R01DO-US1 (US5)	F96-2-TFT-ESMS-2R01DO-R1-US1 (US5)	F96-2-TFT-ET-2R01DO-US1 (USS)	F96-2-TFT-ET-2R01D0-R1-US1 (US5)	F96-2-TFT-ESET-2R01D0-GW-US1 (US5)	F96-2-TFT-ESET-2R01D0-R1-GW-US1 (US5)	F96-2-TFT-MS-2R01D0-US1 (US5)	F96-2-TFT-MS-2R01D0-R1-US1 (US5)	F96-2-TFT-MT-2R01D0-US1 (US5)	F96-2-TFT-MT-2R01DO-R1-US1 (US5)	F144-0-LED-EP-2R01D0-US1 (US5)	F144-2-LED-ESMS-2R01DO-US1 (US5)	F144-2-LED-ESMS-2R01D03A0-US1 (US5)	F144-2-LED-ESMSDP-2R01DO-US1 (US5)	F144-2-LED-ESMSDP-2R01D03A0-US1 (US5)	F144-2-LED-ESMSET-2R01D0-US1 (US5)	F144-2-LED-ESMSET-2R01D03A0-US1 (US5)	F144-2-LED-ESMSMT-2R01DO-US1 (US5)	F144-2-LED-ESMSMT-2R01D03A0-US1 (US5)	F144-PQ-3-TFT-MSMT-US8
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multimess Device matrix

m	nultimess F144-PQ		DIN rai	il		
multimess D9-PQ	Image: With out of the set of the s	D4-0-BS	D6-1-LED-ESMS-2DI1D0-US1	D9-PQ-3-LCD-MSMT-US8	F96-0-TFT-1DO-US1 (US5)	F96-0-TFT-1DO-R1-US1 (US5)
	DIN rail 4 TE		-	-	-	-
	DIN rail 6 TE	-		-	-	-
HOUSING	DIN rail 9 TE	-	-		-	-
	Front panel mounting 96 x 96 mm	-	-	-		
	Front panel mounting 144 x 144 mm	-	-	-	-	-
	LCD	-			-	-
DISPLAY	TFT	-	-	-		
	LED	-	-	-	-	-
VOITAGE	3 x 30 400 480 V AC			-	-	-
MEASURING INPUTS	3 x 5 500 600 V AC	-	-	-		
	3 x 0 690 V AC	-	-		-	-
	Current transformer 3 x 1 (5) A			-		-
CURRENT	Current transformer 4 x 1 (5) A	-	-		-	-
MEASURING INPUTS	Rogowski band 3 x 1000 A	-	-	-	-	
	Rogowski band 3 x 3000 A	-	-	-	-	
	RS 485 KBR eBus configuration interface	-	-	-	-	-
	RS 485 KBR module bus		-	-	-	-
	RS 485 Modbus	-			-	-
INTERFACES	RS 485 KBR eBus	-		-	-	-
INTERNACES	RS 485 Profibus DP	-	-	-	-	-
	TCP/IP Modbus	-	-		-	-
	TCP/IP eBus	-	-	-	-	-
	TCP/IP eBus and RS 485 with gateway function	-	-	-	-	-
	2 x relay outputs	-	-	-	-	-
OUTPUTS	1 x S0 digital output	-		-		
	3 x analog output 0 (4) – 20 mA, 0 (2) – 10 V	-	-	-	-	-
	Via measuring voltage		-	-	-	-
POWER SUPPLY	US1: 100 to 240 V; AC/DC; 50/60 Hz	-		-		
. SWERSON EI	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	-	-		-	-

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	SWI	ichboa	ra insta	allatior	1 90 X 9	o mm						Switchboard Installation 144 x 144 mm									
F96-0-TFT-ESMS-1DO-US1 (US5)	F96-0-TFT-ESMS-1DO-R1-US1 (US5)	F96-2-TFT-ESMS-2R01DO-US1 (US5)	F96-2-TFT-ESMS-2R01D0-R1-US1 (US5)	F96-2-TFT-ET-2R01D0-US1 (US5)	F96-2-TFT-ET-2R01D0-R1-US1 (US5)	F96-2-TFT-ESET-2R01D0-GW-US1 (US5)	F96-2-TFT-ESET-2R01D0-R1-GW-US1 (US5)	F96-2-TFT-MS-2R01DO-US1 (US5)	F96-2-TFT-MS-2R01DO-R1-US1 (US5)	F96-2-TFT-MT-2R01DO-US1 (US5)	F96-2-TFT-MT-2R01DO-R1-US1 (US5)	F144-0-LED-EP-2R01D0-US1 (US5)	F144-2-LED-ESMS-2R01DO-US1 (US5)	F144-2-LED-ESMS-2R01D03A0-US1 (US5)	F144-2-LED-ESMSDP-2R01DO-US1 (US5)	F144-2-LED-ESMSDP-2R01D03A0-US1 (US5)	F144-2-LED-ESMSET-2R01DO-US1 (US5)	F144-2-LED-ESMSET-2R01D03A0-US1 (US5)	F144-2-LED-ESMSMT-2R01DO-US1 (US5)	F144-2-LED-ESMSMT-2R01D03A0-US1 (US5)	F144-PQ-3-TFT-MSMT-US8
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