

# Device Overview Main Catalogue

Edition 01/2023



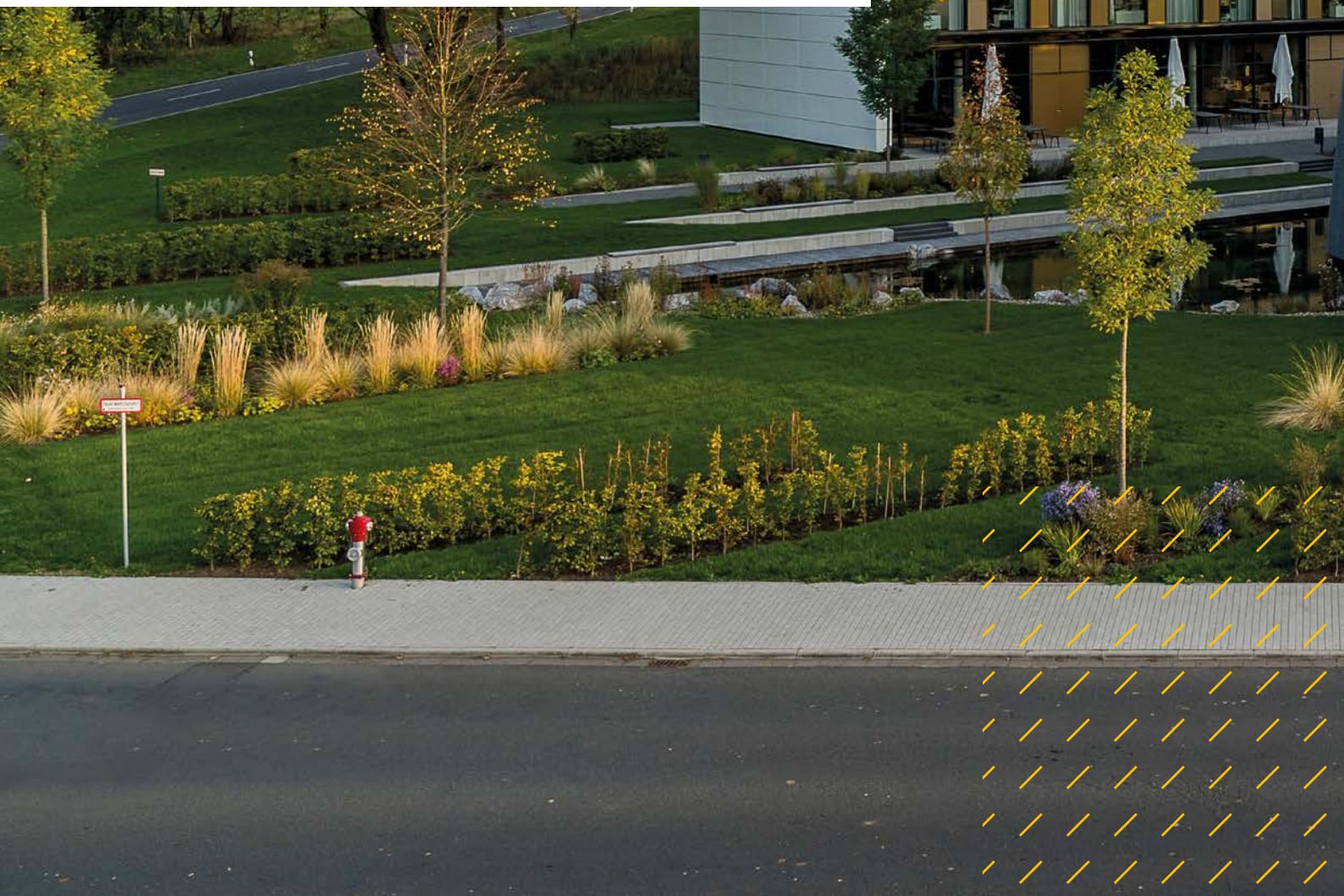
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of energy



In over 75 years we have learnt thinking ahead in a strategic and forward-looking way and to consider today what customers are going to need tomorrow.

Innovative solutions and service activities, excellent know-how global expertise when it comes to electrical safety provide answers to the challenges of various application areas.

With over 1200 employees we are globally present in over 100 countries.













**BENDER**



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Bender catalogue

# Device overview insulation monitoring devices ISOMETER®

					
	ISOMETER® iso685-...	ISOMETER® iso685-...-B	ISOMETER® iso685-...-P	ISOMETER® isoNAV685-D	
Catalogue page	12	16	20	26	
Special applications	–	–	–	Quick response to combined resistance and offset voltage measurement	
Circuits	Control circuits	✓	✓	✓	
	Auxiliary circuits	✓	✓	✓	
	Main circuits	✓	✓	✓	
Voltage system	3(N)AC	✓	✓	✓	
	AC	✓	✓	✓	
	AC/DC	✓	✓	✓	
	DC	✓	✓	–	
Nominal system voltage $U_n$	AC, 3(N)AC 0...690 V, DC 0...1000 V	AC, 3(N)AC 0...690 V, DC 0...1000 V	AC, 3(N)AC 0...690 V, DC 0...1000 V	AC, 3(N)AC 0...690 V (60 Hz)	
Tolerance of $U_n$	+ 15 %	+ 15 %	+ 15 %	+ 15 %	
System leakage capacitance $C_e$ $\mu$ F	$\leq 1000$	$\leq 1000$	$\leq 1000$	$\leq 1000$	
Response value $R_{an}$ k $\Omega$	1...10000	1...10000	1...10000	1...10000	
Coupled systems	–	✓	✓	–	
Locating current injector for insulation fault location	–	–	✓	–	
Installation	DIN rail	✓	✓	✓	
	Screw mounting	✓	✓	✓	
	Panel mounting/ wall fastening	✓	✓	✓	–
	Web server	✓	✓	✓	✓
Interfaces	Modbus	TCP/RTU	TCP/RTU	TCP/RTU	TCP
	BCOM	✓	✓	✓	✓
	BS	✓	✓	✓	✓
	BMS	–	–	–	–
	isoData	✓	✓	✓	–
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )					

	Type	C. p.	Suitable system components		
Coupling devices	FP200	49	✓	✓	✓
	AGH150W-4	363	✓	✓	–
	AGH204S-4	365	✓	✓	–
	AGH520S	366	✓	✓	–
	AGH675S-7	367	–	–	–
	AGH676S-4	369	✓	✓	–



**ISOMETER®  
isoNAV685-D-B**

31

De-energised loads/  
frequency converters

- ✓
- ✓
- ✓
- ✓
- ✓
- ✓
- ✓

offline  
(AC 0...690 V)  
(DC 0...1000 V)

–

≤ 1000

10...1000

–

–

✓

✓

–

✓

TCP

✓

✓

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**ISOMETER®  
isoHR685W-...-B**

36

Installations with  
a high level of  
insulation

- ✓
- ✓
- ✓
- ✓
- ✓
- ✓
- ✓

AC 0...1000 V,  
3AC 0...690 V,  
DC 0...1300 V

+ 15 %

≤ 1000

1...3000000

✓

–

✓

✓

✓

TCP/RTU

✓

✓

–

✓



**ISOMETER®  
isoRW685W-D**

41

Railway

- ✓
- ✓
- ✓
- ✓
- ✓
- ✓
- ✓

AC, 3(N)AC 0...690 V,  
DC 0...1000 V

+ 15 %

≤ 1000

1...10000

–

–

✓

✓

–

✓

TCP/RTU

✓

–

✓



**ISOMETER®  
isoRW685W-D-B**

45

Railway

- ✓
- ✓
- ✓
- ✓
- ✓
- ✓
- ✓

AC, 3(N)AC 0...690 V,  
DC 0...1000 V

+ 15 %

≤ 1000

1...10000

–

–

✓

✓

–

✓

TCP/RTU

✓

–

✓



**ISOMETER®  
IRDH275BM-7**

51

AC, DC or AC/DC  
medium voltage systems

- 
- 
- ✓
- ✓
- 
- ✓
- ✓

AC, 3(N)AC, DC  
0...15,5 kV (absolute)

+ 15 %

≤ 5

100...10000

–

–

✓

✓

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✓

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Suitable system components

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# Device overview insulation monitoring devices ISOMETER®

					
	ISOMETER® iso415R	ISOMETER® IR420-D4	ISOMETER® IR425	ISOMETER® iso1685DP	
Catalogue page	55	58	61	64	
Special applications	–	–	–	–	
Circuits	Control circuits	✓	✓	–	
	Auxiliary circuits	✓	✓	–	
	Main circuits	–	–	–	✓
Voltage system	3(N)AC	–	–	–	
	AC	✓	✓	✓	
	AC/DC	✓	–	✓	
	DC	✓	–	✓	
Nominal system voltage $U_n$	Depending on variant	AC 0...250 V	AC/DC 0...300 V	AC 0...1000 V, DC 0...1500 V	
Tolerance of $U_n$	-30%...+15 %	+20 %	+20 %	+10 %, +5%	
System leakage capacitance $C_e$ $\mu\text{F}$	$\leq 25$	$\leq 20$	$\leq 20$	$\leq 2000$	
Response value $R_{an}$ $\text{k}\Omega$	5...1000	1...200	1...200	0.2...1000	
Coupled systems	–	–	–	✓	
Locating current injector for insulation fault location	–	–	–	–	
Installation	DIN rail	✓	✓	–	
	Screw mounting	✓	✓	✓	
	Panel mounting/ wall fastening	–	–	–	–
Interfaces	Web server	–	–	–	
	Modbus	RTU	–	–	RTU
	BCOM	–	–	–	–
	BS	–	–	–	–
	BMS	–	–	–	✓
	isoData	–	–	–	–
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )					

	Type	C. p.	Suitable system components			
Coupling devices	FP200	49	–	–	–	–
	AGH150W-4	363	–	–	–	–
	AGH204S-4	365	–	–	–	–
	AGH520S	366	–	–	–	–
	AGH675S-7	367	–	–	–	–
	AGH676S-4	369	–	–	–	–



ISOMETER®  
isoHV1685D

ISOMETER®  
isoLR1685DP

ISOMETER®  
isoHR1685DW

ISOMETER®  
IR1575

ISOMETER®  
IR427

ISOMETER®  
isoMED427x-(PT)

64

64

68

71

74

78

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Induction furnace

insulated elevating  
work platforms

-

Medical locations

Medical locations

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AC 0...2000 V,  
DC 0...3000 V

AC 0...690 V,  
DC 0...690 V

AC 0...1000 V,  
DC 0...1500 V

AC, 3(N) AC 0...400 V  
DC 0...400 V

AC 70...330 V

AC 70...230 V

+10 %,  
+5%

+10 %  
+5%

+10 %,  
+5%

+ 20 %

+ 15%

+ 15 %

≤ 2000

≤ 2000

≤ 1

≤ 60

≤ 5

≤ 5

0.2...1000

0,02...100

100...1000

2...1000

50...500

50...500

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Suitable system components

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# Device overview insulation monitoring devices ISOMETER®

					
	<b>ISOMETER® isoLR275</b>	<b>ISOMETER® isoPV</b>	<b>ISOMETER® isoPV425</b>	<b>ISOMETER® isoPV1685RTU</b>	
<b>Catalogue page</b>	<b>81</b>	<b>84</b>	<b>88</b>	<b>92</b>	
<b>Special applications</b>	Installations with a low level of insulation	Photovoltaic	Photovoltaic	Photovoltaic	
<b>Circuits</b>	<b>Control circuits</b>	–	–	–	
	<b>Auxiliary circuits</b>	–	–	–	
	<b>Main circuits</b>	✓	✓	✓	
<b>Voltage system</b>	<b>3(N)AC</b>	✓	✓	✓	
	<b>AC</b>	✓	✓	✓	
	<b>AC/DC</b>	✓	✓	✓	
	<b>DC</b>	✓	✓	✓	
<b>Nominal system voltage <math>U_n</math></b>	via AGH-LR 3(N)AC 0...690 V DC 0...1000 V	via AGH-PV 3(N)AC 0...793 V DC 0...1000 V	DC 0...1000 V, AC 0...690 V, 15...460 Hz	AC 0...1000 V DC 0...1500 V	
<b>Tolerance of <math>U_n</math></b>	+ 15 % + 10 %	+ 10 %	+ 15 %	+ 6 %	
<b>System leakage capacitance <math>C_e</math> <math>\mu</math>F</b>	$\leq 500$	$\leq 2000$	$\leq 500$	$\leq 2000$	
<b>Response value <math>R_{an}</math> k<math>\Omega</math></b>	0.2...100	0.2...100	1...990	0.2...990	
<b>Coupled systems</b>	–	✓	–	–	
<b>Locating current injector for insulation fault location</b>	–	–	–	–	
<b>Installation</b>	<b>DIN rail</b>	✓	✓	–	
	<b>Screw mounting</b>	✓	✓	✓	
	<b>Panel mounting/ wall fastening</b>	–	–	–	–
<b>Interfaces</b>	<b>Web server</b>	–	–	–	
	<b>Modbus</b>	–	–	RTU	
	<b>BCOM</b>	–	–	–	
	<b>BS</b>	–	–	–	
	<b>BMS</b>	✓	✓	✓	✓
	<b>isoData</b>	–	–	✓	–
<b>Product details</b> (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )					

	Type	C. p.	Suitable system components			
<b>Coupling devices</b>	FP200	49	–	–	–	–
	AGH150W-4	363	–	–	–	–
	AGH204S-4	365	–	–	–	–
	AGH520S	366	–	–	–	–
	AGH675S-7	367	–	–	–	–
	AGH676S-4	369	–	–	–	–





ISOMETER®  
isoPV1685P

ISOMETER®  
isoPV1685DP

ISOMETER®  
IR420-D6

ISOMETER®  
IR423

ISOMETER®  
IR123

ISOMETER®  
isoGEN423

92

95

98

101

104

107

Photovoltaic

Photovoltaic

Disconnected loads

Mobile generators

Mobile generators

Generators acc. to standard  
DIN VDE 0100-551

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DC 0...1500 V

AC 0...1000 V  
DC 0...1500 V

offline  
(AC 0...400 V)

AC 0...250 V

AC 100...250 V

3(N)AC, AC 0...400V,  
DC 0...400V

+ 6 %

+10 %, +5%

–

+ 20 %

+ 20 %

+25 %

≤ 2000

≤ 4000

≤ 10

≤ 5

≤ 1

≤ 5

0.2...990

0.2...200

100...10000

1...200

46/23

5...200

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# Device overview insulation monitoring devices ISOMETER®

					
	<b>ISOMETER® isoRW425</b>	<b>ISOMETER® isoUG425</b>	<b>ISOMETER® isoES425</b>	<b>ISOMETER® isoHV425</b>	
<b>Catalogue page</b>	<b>110</b>	<b>113</b>	<b>116</b>	<b>119</b>	
<b>Special applications</b>	Railway	Unearthed DC systems	Energy storage VDE-AR-E 2510-2	–	
<b>Circuits</b>	<b>Control circuits</b>	–	–	–	
	<b>Auxiliary circuits</b>	–	–	–	
	<b>Main circuits</b>	✓	✓	✓	
<b>Voltage system</b>	<b>3(N)AC</b>	✓	–	✓	
	<b>AC</b>	✓	–	✓	
	<b>AC/DC</b>	✓	–	✓	
	<b>DC</b>	✓	✓	✓	
<b>Nominal system voltage <math>U_n</math></b>	AC/DC 0...400 V	DC 12...120 V	3 (N)AC, AC 0...400V, DC 0...400V	with AGH422 AC 0...1000 V, DC 0...1000 V	
<b>Tolerance of <math>U_n</math></b>	+ 25 %	+20 %	+25 %	+10 %	
<b>System leakage capacitance <math>C_e</math> <math>\mu</math>F</b>	$\leq 300$	$\leq 50$	$\leq 100$	$\leq 150$	
<b>Response value <math>R_{an}</math> k<math>\Omega</math></b>	1...990	2...100	2...990	11...500	
<b>Coupled systems</b>	–	–	–	–	
<b>Locating current injector for insulation fault location</b>	–	–	–	–	
<b>Installation</b>	<b>DIN rail</b>	✓	✓	✓	
	<b>Screw mounting</b>	✓	✓	✓	
	<b>Panel mounting/ wall fastening</b>	–	–	–	–
<b>Interfaces</b>	<b>Web server</b>	–	–	–	
	<b>Modbus</b>	RTU	RTU	–	
	<b>BCOM</b>	–	–	–	–
	<b>BS</b>	–	–	–	–
	<b>BMS</b>	✓	✓	✓	✓
	<b>isoData</b>	✓	✓	✓	✓
<b>Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a>)</b>					

	Type	C. p.	Suitable system components			
<b>Coupling devices</b>	FP200	49	–	–	–	–
	AGH150W-4	363	–	–	–	–
	AGH204S-4	365	–	–	–	–
	AGH520S	366	–	–	–	–
	AGH675S-7	367	–	–	–	–
	AGH676S-4	369	–	–	–	–



**ISOMETER®  
IR155**

**ISOMETER®  
isoEV425**

**ISOMETER®  
isoCHA425**

**ISOMETER®  
isoCHA425HV**

123

127

131

134

Electric mobility

Electric mobility

Electric mobility

Electric mobility

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✓

✓

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✓

DC 0...1000 V

DC 0...1000 V  
AC 0...690 V,  
15...460 Hz

DC 0...400 V

DC 0...1000 V  
with AGH420-1

+ 0 %

+ 10 %  
+ 15 %

+25 %

+10 %

≤ 1

≤ 5

≤ 5

≤ 5

100...10000

10...990

230  
48

600  
120

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**Suitable system components**

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# Device overview Equipment for insulation fault location ISOSCAN®

				
	ISOSCAN® EDS440	ISOSCAN® EDS441	ISOSCAN® EDS441-LAB	ISOSCAN® EDS440-LAF
Catalogue page	140	140	140	140
Special applications	–	–	High-resistance insulation faults in case of high system leakage capacitances and low test current value	Use with flexible strap transformers CTAF
Application	stationary	stationary	stationary	stationary
Circuits	Control circuits	–	✓	–
	Main circuits	✓	–	✓
Voltage system	3(N)AC	✓	–	✓
	AC	✓	✓	✓
	AC/DC	✓	✓	✓
	DC	✓	✓	✓
Nominal voltage $U_n$ max	see Locating current injector (e. g. ISOMETER® iso685-D-P)	AC 20...276 V, DC 20...308 V	AC 20...276 V, DC 20...308 V	see Locating current injector (e. g. ISOMETER® iso685-D-P)
System leakage capacitance $C_e$ $\mu$ F	acc. to characteristic curve	acc. to characteristic curve	acc. to characteristic curve	acc. to characteristic curve
Response value $R_{an}$ k $\Omega$	acc. to characteristic curve	acc. to characteristic curve	acc. to characteristic curve	acc. to characteristic curve
Installation	DIN rail	✓	✓	✓
	Screw mounting	✓	✓	✓
Interfaces	BB	EDS440-S	EDS441-S	–
	BS	EDS440-L	EDS441-L	✓
	BMS	–	–	–
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )				

	Type	C. p.	Suitable system components			
Suitable ISOMETER's with integrated PGH	iso685-D-P	20	✓	✓	✓	–
	isoMED427P	78	–	✓	–	–
	isoPV1685P	92	–	–	–	–
	iso1685DP	64	–	–	–	–
Measuring current transformers	CTAC...	342	✓	✓	–	–
	CTUB100	345	–	–	✓	–
	WR...S(P)	349	✓	–	–	–
	CTBS25	354	✓	–	–	–
	WS...	356	✓	–	–	–
	WS...-8000	356	–	✓	✓	–
Power supply unit	CTAF...	–	–	–	–	✓
	AN410	384	–	–	✓	–
	AN450	386	–	–	✓	–
	STEP-PS	381	–	–	✓	–
Relay module	IOM441	392	✓	✓	✓	✓



ISOSCAN®  
EDS150

147



ISOSCAN®  
EDS151

147



ISOSCAN®  
EDS30...













150

–	Medical locations	EDS3096PG for de-energised systems
stationary	stationary	portable
–	✓	✓
✓	–	✓
✓	–	✓
✓	✓	✓
✓	✓	✓
see Locating current injector (e. g. ISOMETER® iso685-D-P)	AC 20...276 V, DC 20...308 V	dependent on type
acc. to characteristic curve	acc. to characteristic curve	acc. to characteristic curve
acc. to characteristic curve	acc. to characteristic curve	acc. to characteristic curve
–	–	–
✓	✓	–
–	–	–
–	–	–
✓	✓	–












Suitable system components

–	–	✓
–	✓	✓
✓	–	✓
✓	–	✓
–	–	–
–	–	–
–	–	–
–	–	–
–	–	–
–	–	–
–	–	–
–	–	–
✓	✓	–
✓	✓	–
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–	–	–

# Device overview residual current monitors LINETRAXX®

					
	LINETRAXX® RCM420	LINETRAXX® RCMA420	LINETRAXX® RCMA423	LINETRAXX® SmartDetect RCMS410	LINETRAXX® RCMS460/RCMS490
Catalogue page	164	167	170	173	176
Special applications	-	-	-	-	-
Type of distribution system	TN/TT	✓	✓	✓	✓
	IT	-	-	-	-
Residual currents		✓	✓	✓	✓
		-	✓	✓	✓
Rated frequency range	42...2000 Hz	0...2000 Hz	0...2000 Hz	0...20000 Hz	0...2000 Hz
Number of measuring channels	1	1	1	4	12 (per device) 1080 (per system)
Response value	$I_{\Delta n1}$	50...100 % x $I_{\Delta n2}$	50...100 % x $I_{\Delta n2}$	10...100 % x $I_{\Delta n}$	10...100 % x $I_{\Delta n2}$ min. 5 mA
	$I_{\Delta n2}$	10 mA...10 A	10...500 mA	30 mA...3 A	10 mA...10 A (Type B) 6 mA...20 A (Type A)
Response delay $t_{on}$	0...10 s	0...10 s	0...10 s	0...10 s	0...99 s
Start-up delay $t$	0...10 s	0...10 s	0...10 s	0...999 s	0...99 s
Delay on release $t_{off}$	0...300 s	0...99 s	0...99 s	0...999 s	0...999 s
Operating principle, alarm relays	N/C operation or N/O operation	N/C operation or N/O operation	N/C operation or N/O operation	Multifunctional digital and analogue inputs and outputs	N/C operation or N/O operation
Installation	DIN rail	✓	✓	✓	✓
	Screw mounting	✓	✓	✓	✓
Interfaces	BMS	-	-	-	✓
	Modbus	-	-	-	✓
	NFC	-	-	-	✓
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )					












	Type	C. p.	Suitable system components			
Measuring current transformers	CTAC...	342	✓	-	-	✓
	CTUB100	345	-	✓	✓	✓
	WR...S(P)	349	✓	-	-	✓
	CTBS25	354	-	-	-	✓
	WS...	356	✓	-	-	✓
	WF...	360	✓	-	-	✓
RS-485 repeater	DI-1DL	389	-	-	-	✓
Power supply units	STEP-PS	381	-	-	-	✓

					
LINETRAXX® RCMS150 series	LINETRAXX® MRCDB423	LINETRAXX® MRCDB300 series	LINETRAXX® RCMB300 series	LINETRAXX® RCMB330	LINETRAXX® RCM410R-24/-2
183	186	190	194	198	201
Monitoring of final circuits, DGUV Regulation 3 (German Social Accident Insurance)	Additional protection (MRCD applications)	Additional protection (MRCD applications)	–	–	–
✓	✓	✓	✓	✓	✓
–	–	–	–	–	–
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
0...1000 Hz	0...2000 Hz	DC...100000 Hz	DC...100000 Hz	DC...100000 Hz	42...70 Hz
6 virtual 12	1	–	–	–	–
50...100 % x $I_{\Delta n2}$	50...100 % von $I_{\Delta n2}$	50...100 % x $I_{\Delta n2}$	50...100 % x $I_{\Delta n2}$	50...100 % x $I_{\Delta n2}$	50...100 % x $I_{\Delta n}$
3...300 mA (Type B) 3...300 mA (DC)	30 mA...3 A	30 mA...3 A	30 mA...3 A	30...500 mA	10 mA...30 A
0...600 s	0...10 s	0 s...60 min	50 ms...60 min	50 ms...60 min	0...10 s
0.5...600 s	1 s	0 s...60 min	0 s...60 min	0 s...60 min	0...999 s
0...600 s	–	0 s...60 min	0 s...60 min	0 s...60 min	0...999 s
–	N/C operation	N/C operation or N/O operation	N/C operation or N/O operation	–	N/C operation or N/O operation
✓	✓	partly	partly	✓	✓
✓	✓	✓	✓	✓	✓
✓	–	–	–	–	–
RTU	–	RTU	RTU	RTU	RTU
–	–	–	–	–	✓
					

Suitable system components

–	–	–	–	–	✓
–	✓	–	–	–	–
–	–	–	–	–	✓
–	–	–	–	–	–
–	–	–	–	–	✓
–	–	–	–	–	✓
✓	–	–	–	–	–
✓	–	✓	✓	✓	✓

# Device overview residual current monitors LINETRAXX®

						
		RCMB131-01	RCMB131-02	RCMB132-01	RCMB104	RDC104-4
Catalogue page		204	207	210	213	216
Special applications		Monitoring of final circuits, integration in power distribution units (PDUs)	Monitoring of final circuits, integration in power distribution units (PDUs)	Monitoring of final circuits, integration in power distribution units (PDUs)	Electric vehicle charging systems	Electric vehicle charging systems
Type of distribution system	TN/TT	✓	✓	✓	✓	✓
	IT	-	-	-	-	-
Residual currents		✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓
Rated frequency range		DC...2000 Hz	DC...2000 Hz	DC...2000 Hz	0...2000 Hz	0...2000 Hz
Number of measuring channels		-	-	-	-	-
Response value	$I_{\Delta n1}$	3,5...100 mA (DC)	3,5...100 mA (DC)	3,5...100 mA (DC)	DC 6 mA (RCMB104-1) r.m.s. 5 mA (RCMB104-2)	-
	$I_{\Delta n2}$	3,5...100 mA (r.m.s.)	3,5...100 mA (r.m.s.)	3,5...100 mA (r.m.s.)	r.m.s. 30 mA (RCMB104-1) r.m.s. 20 mA (RCMB104-2)	DC 6 mA
Response delay $t_{on}$		-	-	-	-	-
Start-up delay $t$		-	-	-	-	-
Delay on release $t_{off}$		-	-	-	-	-
Operating principle, alarm relays		-	-	-	-	-
Installation	DIN rail	✓	✓	✓	-	-
	Screw mounting	✓	✓	✓	-	-
Interfaces	BMS	-	-	-	-	-
	Modbus	RTU	-	RTU	-	-
	NFC	-	-	-	-	-
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )						

		Type	C. p.	Suitable system components		
Measuring current transformers	CTAC...	342	-	-	-	-
	CTUB100	345	-	-	-	-
	WR...S(P)	349	-	-	-	-
	CTBS25	354	-	-	-	-
	WS...	356	-	-	-	-
	WF...	360	-	-	-	-
RS-485 repeater	DI-1DL	389	-	-	-	-
Power supply units	STEP-PS	381	✓	✓	✓	-





**LINETRAXX®  
RCMB42...**

219

Fault current monitoring  
of electric vehicle AC  
charging stations



–



0...2000 Hz

1 (RCMB422EC) or  
2 (RCMB420EC)

DC 6 mA

RMS 30 mA

–

–

2 s (after reset)

N/C operation



–

–

–



–

–

–

–

–











–

–

–

–

## Device overview neutral grounding resistance monitoring (NGR) LINETRAXX®

					
		LINETRAXX® NGRM500	LINETRAXX® NGRM550	LINETRAXX® NGRM700	LINETRAXX® NGRM750
<b>Catalogue page</b>		224	224	229	229
<b>Special applications</b>		Neutral grounding resistance monitoring (NGR monitoring)	Neutral grounding resistance monitoring (NGR monitoring)	Neutral grounding resistance monitoring (NGR monitoring)	Neutral grounding resistance monitoring (NGR monitoring)
<b>System type</b>	HRG	✓	–	✓	–
	LRG	–	✓	–	✓
<b>Fault currents</b>		✓	✓	✓	✓
		✓	✓	✓	✓
<b>Phase monitoring L1, L2, L3</b>		–	–	✓	✓
<b>System voltage L-L*</b>		600...25000 V	600...25000 V	600...25000 V	600...25000 V
<b>Harmonic analysis</b>	RMS 0...32	✓	✓	✓	✓
	Analysis range	✓	✓	✓	✓
<b>Relay operating mode</b>		Configurable fail-safe or non-fail-safe	Configurable fail-safe or non-fail-safe	Configurable fail-safe or non-fail-safe	Configurable fail-safe or non-fail-safe
<b>Communication</b>		Webserver, BCOM, Modbus RTU, Modbus TCP	Webserver, BCOM, Modbus RTU, Modbus TCP	Webserver, BCOM, Modbus RTU, Modbus TCP	Webserver, BCOM, Modbus RTU, Modbus TCP
<b>Maximum altitude</b>		2000 m	2000 m	5000 m	5000 m
<b>Mounting</b>	Detachable HMI for front panel mounting	–	–	✓	✓
	DIN rail	✓	✓	–	–
	Screw mounting	–	–	✓	✓
<b>Product details</b> (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )					

\* Freely configurable in the device, taking suitable coupling devices into account.

# Device overview coupling devices for NGR monitoring

							
	CTUB103	RC48N	CD1000	CD1000-2	CD5000	CD14400	CD25000
Catalogue page	235	238	241	243	245	247	249
Special applications	AC/DC sensitive measuring current transformer	Ground-fault neutral-grounding monitor	Coupling device for HRG applications	Coupling device for HRG applications	Coupling device for HRG applications	Coupling device for HRG applications	Coupling device for HRG applications
System voltage L-L ( $U_{NGR}$ voltage)	–	–	Up to $U_{LL} = 690\text{ V}$ ( $U_{NGR} = 400\text{ V}$ )	Up to $U_{LL} = 1000\text{ V}$ ( $U_{NGR} = 600\text{ V}$ )	Up to $U_{LL} = 4300\text{ V}$ ( $U_{NGR} = 2500\text{ V}$ )	Up to $U_{LL} = 14400\text{ V}$ ( $U_{NGR} = 8400\text{ V}$ )	Up to $U_{LL} = 25\text{ kV}$ ( $U_{NGR} = 14.5\text{ kV}$ )
Mounting	Screw mounting	✓	✓	✓	✓	✓	✓
	DIN rail mounting	✓	✓	–	–	–	–
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )							

Recommended minimum value  $R_{NGR}$  (tripping level 50 %)

	CD1000			CD1000-2				CD5000		CD14400					CD25000
	400 V	600 V	690 V	400 V	600 V	690 V	1000 V	2400 V	4200 V	6 kV	6.6 V	7.2 kV	11 kV	14.4 kV	25 kV
$U_{sys}$	400 V	600 V	690 V	400 V	600 V	690 V	1000 V	2400 V	4200 V	6 kV	6.6 V	7.2 kV	11 kV	14.4 kV	25 kV
1 A	231 Ω	346 Ω	398 Ω	231 Ω	346 Ω	398 Ω	577 Ω	1386 Ω	–	–	–	–	–	–	–
5 A	46 Ω	69 Ω	80 Ω	46 Ω	69 Ω	80 Ω	115 Ω	277 Ω	485 Ω	693 Ω	762 Ω	831 Ω	1270 Ω	1663 Ω	–
10 A	(23 Ω)	35 Ω	40 Ω	(23 Ω)	35 Ω	40 Ω	58 Ω	139 Ω	242 Ω	346 Ω	381 Ω	416 Ω	635 Ω	831 Ω	1443 Ω
15 A	(15 Ω)	(23 Ω)	(27 Ω)	(15 Ω)	(23 Ω)	(27 Ω)	38 Ω	92 Ω	162 Ω	231 Ω	254 Ω	277 Ω	423 Ω	554 Ω	962 Ω
20 A	–	(17 Ω)	(20 Ω)	–	(17 Ω)	(20 Ω)	29 Ω	69 Ω	121 Ω	(173 Ω)	191 Ω	208 Ω	318 Ω	416 Ω	722 Ω
25 A	–	–	(16 Ω)	–	–	(16 Ω)	(23 Ω)	55 Ω	97 Ω	(139 Ω)	(152 Ω)	(166 Ω)	254 Ω	333 Ω	577 Ω
30 A	–	–	–	–	–	–	(19 Ω)	(46 Ω)	81 Ω	(115 Ω)	(127 Ω)	(139 Ω)	212 Ω	277 Ω	481 Ω
40 A	–	–	–	–	–	–	–	(35 Ω)	61 Ω	(87 Ω)	(95 Ω)	(104 Ω)	(159 Ω)	208 Ω	361 Ω
50 A	–	–	–	–	–	–	–	(28 Ω)	(48 Ω)	–	(76 Ω)	(83 Ω)	(127 Ω)	(166 Ω)	289 Ω
100 A	–	–	–	–	–	–	–	–	(24 Ω)	–	–	–	–	(83 Ω)	(144 Ω)

Temperature range  $-40 \dots +70\text{ °C}$ , field calibration at  $25\text{ °C}$

(Limited temperature range  $0 \dots +40\text{ °C}$ , field calibration at  $25\text{ °C}$ )



## Device overview charge controller













CC613



ICC1324

<b>Catalogue page</b>	254	258
<b>Modem</b>	4G modem (optional)	4G modem (optional)
<b>Integrated patented 6 mA DC fault current detection</b>	✓	✓
<b>Integrated Powerline Communication (PLC)</b>	✓	✓
<b>Emergency Opener</b>	✓	✓
<b>WiFi module</b>	–	✓ (optional)
<b>Integrated power supply unit</b>	–	✓
<b>Interface</b>	<b>Ethernet</b>	✓
	<b>Modbus</b>	✓
<b>Variant</b>	<b>Enclosure for DIN rail mounting</b>	–
	<b>PCB version</b>	–
<b>Product details</b> (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )		

## Device overview accessories charge controller

					
	CTBC17	DPM2x16FP	RFID105-L1	RFID114	RFID117-L1
Catalogue page	262	266	267	268	269
Special applications	Measuring current transformer	Display module	RFID module	RFID module	RFID module
For series	CC613	✓	✓	✓	✓
	ICC1324	✓	-	-	-
	RCMB104	✓	-	-	-
	RCD104	✓	-	-	-
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )					

# Device overview Universal Devices for Power Quality and Energy Measurement PEM



LINETRAXX®  
PEM353

	Catalogue page	272
Normative requirements	Accuracy class according to IEC 62053-22	0.5 s
	DIN EN 50160 (report)	–
	DIN EN 61000-4-7 (harmonic)	Class II
	DIN EN 61000-4-15 (flicker)	–
	DIN EN 61000-4-30 (PQ measurement method)	–
Parameters	Phase voltages/Line voltages	✓
	Phase currents	✓
	Neutral current $I_4$	✓ (PEM353-N only)
	Neutral current $I_4$ (calculated)	✓
	Frequency / phase angle	✓
	Reactive and active power import/ Reactive and active power export	✓
	Voltage unbalance/current unbalance	✓
	Power	per phase and total S in kVA, P in kW, Q in kvar
	Displacement factor $\cos(\varphi)$ /power factor $\lambda$	✓
	Total harmonic distortion (THDU/THDI)	up to the 31 <sup>st</sup>
	Harmonic components voltage	up to the 31 <sup>st</sup>
	Harmonic components current	up to the 31 <sup>st</sup>
	Transient detection	–
	Overvoltage (swell)	–
	Undervoltage (sag)	–
Flicker severity $P_{ST}$	–	
Features	Data recorder / HighSpeed data recorder	5/0
	Waveform recorder	–
	Digital inputs	4
	Digital outputs	2 (PEM353-P only)
Relay outputs (RO)	2 (PEM353, PEM353-N only)	
Technical aspects	Voltage supply	AC/DC 95...250 V (47...440 Hz)
	Sampling rate	3,2 kHz
	Temperature	-25...+55 °C
	Communication	Modbus RTU













Product details  
(Products on  
[www.bender.de/en](http://www.bender.de/en))



## Energy meter and Measuring current transformer for universal measuring devices

						
	ALD1	ALE3	AWD3	PCD07	CTB31/CTB41/CTB51	KBR18/KBR32
Catalogue page	280	280	280	280	277	277
Type	Energy meter	Energy meter	Energy meter	50 pulse counter	Measuring current transformer	Measuring current transformer
Description	1PH./32A MID MODBUS RTU	3PH./65A MID MODBUS RTU	3PH./6A MID MODBUS RTU	(four-fold) with MODBUS RTU	–	–
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )						

# Device overview measuring and monitoring relays LINETRAXX®







						
	LINETRAXX® VME420	LINETRAXX® VME421H	LINETRAXX® VMD258	LINETRAXX® ES258	LINETRAXX® VMD420	LINETRAXX® VMD421H
Catalogue page	286	289	292	295	296	299
Special applications	-	-	Power plant	Energy backup for device series VMD258	-	-
Application	Voltage monitoring	✓	✓	-	✓	✓
	Current monitoring	-	-	-	-	-
Voltage monitoring	AC	$U<, U>$	$U<, U>$	-	-	-
	3AC	-	-	$U<, U>$	-	$U<, U>$
	3(N)AC	-	-	-	$U<, U>$	$U<, U>$
	DC	$U<, U>$	$U<, U>$	-	-	-
Measuring range/ nominal system voltage $U_n$	AC/DC systems 0...300 V	VME421H-D-1 AC/DC systems 9,6...150 V VMD421H-D-2 70...300 V	3AC 690/500/480/440/ 400/230/110/100 V	-	(L-N) 0...288 V (L-L) 0...500 V	(L-N) 0...288 V (L-L) 0...500 V
Frequency	$f<, f>$	$f<, f>$	-	-	$f<, f>$	$f<, f>$
Phase sequence	-	-	-	-	✓	✓
Phase failure	-	-	-	-	✓	✓
Asymmetry	-	-	-	-	✓	✓
Supply voltage $U_s$	external	system	system	-	external	system
Current monitoring	1 AC with $U_s$	-	-	-	-	-
	3 AC with $U_s$	-	-	-	-	-
Special function	-	-	-	-	-	-
Installation	DIN rail	✓	✓	✓	✓	✓
	Screw mounting	✓	✓	✓	✓	✓
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )						






LINETRAXX® VMD423/VMD423H	LINETRAXX® VMD460-NA	LINETRAXX® VMD461	LINETRAXX® CME420	LINETRAXX® CMD420/CMD421	LINETRAXX® CMS460	LINETRAXX® GM420	RC48C
302	305	310	316	319	322	325	328
Interface Protection System/Decoupling protection relay	Interface Protection System/Decoupling protection relay	Interface Protection System/Decoupling protection relay	-	-	-	Loop monitoring	Residual current/loop monitoring
✓	✓	✓	-	-	-	-	-
-	-	-	✓	✓	✓	-	✓
-	$U<, U<<, U>, U>>, U_{10min}>$	$U<, U<<, U<<<, U>, U>>, U>>>$	-	-	-	-	-
-	$U<, U<<, U>, U>>, U_{10min}>$	$U<, U<<, U<<<, U>, U>>, U>>>$	-	-	-	-	-
$U<, U>, U_{10min}>$	$U<, U<<, U>, U>>, U_{10min}>$	$U<, U<<, U<<<, U>, U>>, U>>>$	-	-	-	-	-
-	-	-	-	-	-	-	-
(L-N) 0...288 V (L-L) 0...500 V	(L-N) 0...300 V (L-L) 0...520 V	<b>VMD461</b> (L-N) AC 50...260 V (L-L) AC 87...450 V (DC+/DC-) DC 50...450 V <b>VMD461 + CD440</b> (L-N) AC 250...690 V (L-L) AC 440...1200 V (DC+/DC-) DC 250...1200 V	-	-	-	-	-
$f<, f>$	$f<, f<<, f>, f>>$	$f<, f<<, f<<<, f>, f>>, f>>>$	-	-	-	-	-
✓	✓	✓	-	-	-	-	-
✓	✓	✓	-	-	-	-	-
✓	✓	✓	-	-	-	-	-
external (VMD423) system (VMD423H)	external	external	-	-	-	extern	extern
-	-	-	$I<, I>$	-	$I<, I>$	-	-
-	-	-	-	$I<, I>$	$I<, I>$	-	-
-	RS-485 interface, Islanding detection: -ROCOF (df/dt) -Vector shift	RS-485 interface, Islanding detection: -ROCOF (df/dt) -Vector shift	-	-	RS-485 interface	Monitoring of conductor loops for interruption	Monitoring of conductor loops for interruption and short circuit by using an termination device
✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓

# Device overview measuring current transformers







		 W0-S20...W5-S210, W10/600							 CTAC...					 CTUB100-CTBC...												
Catalogue page		340							342					345												
Characteristics																										
CT type																										
Dimensions (mm)	Inside diameter	W10/600	W0-S20	W1-S35	W2-S70	W3-S105	W4-S140	W5-S210	CTAC20(01)	CTAC35(01)	CTAC60	CTAC120	CTAC210	CTUB101-CTBC20(P)	CTUB101-CTBC35(P)	CTUB101-CTBC60(P)	CTUB101-CTBC120(P)	CTUB101-CTBC210(P)	CTUB102-CTBC20(P)	CTUB102-CTBC35(P)	CTUB102-CTBC60(P)	CTUB102-CTBC120(P)	CTUB102-CTBC210(P)	CTUB104-CTBC20(P)	CTUB104-CTBC35(P)	CTUB104-CTBC60(P)
	Width x height	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Strip length	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Device family	EDS440	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
	EDS441	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
	EDS441-LAB	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓
	RCM420	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-
	RCMA420	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-
	RCMA423	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-
	RCMS460/490	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
	RCMS410	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NGRM...	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )																										

																						
WR...S(P)				CTAS...			CTBS25	WS.../WS...-8000					WS...S				WF...					
349				351			354	356					358				360					
				split-core			split-core	split-core					split-core				flexible					
WR70x175S(P)	WR115x305S(P)	WR150x350S(P)	WR200x500S(P)	CTAS50/(01)	CTAS80/(01)	CTAS120/(01)	CTBS25	WS20x30	WS50x80	WS80x120	WS20x30-8000	WS50x80-8000	WS50x80S	WS80x80S	WS80x120S	WS80x160S	WF170	WF250	WF500	WF800	WF1200	WF1800
-	-	-	-	50	80	120	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70 x 175	115 x 305	150 x 350	200 x 500	-	-	-	-	20 x 30	50 x 80	80 x 120	20 x 30	50 x 80	50 x 80	80 x 80	80 x 120	80 x 160	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	170	250	500	800	1200	1800
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	✓	✓	✓	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-	-	-	-	-	-	-
✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-
-	-	-	-	✓	✓	✓	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
																						







## Device overview coupling devices

					
	AGH150W-4	AGH204S-4	AGH520S	AGH675S-7/ AGH675S-7MV	AGH676S-4
Catalogue page	363	365	366	367	369
Application	Extension of the nominal voltage range for ISOMETER <sup>®</sup> s	Extension of the nominal voltage range for ISOMETER <sup>®</sup> s	Extension of the nominal voltage range for ISOMETER <sup>®</sup> s	Extension of the nominal voltage range for ISOMETER <sup>®</sup> s	Extension of the nominal voltage range for ISOMETER <sup>®</sup> s
Nominal system voltage $U_n$	AC 0...1150 V, DC 0...1760 V	AC 0...1300 V / AC 0...1650 V	AC/3(N)AC 0...7200 V	AC, 3(N)AC, DC 0...7.2 kV AC, 3(N)AC, DC 0...15.5 kV	AC/3(N)AC 0...12 kV
Device family	IRDH275BM-7	-	-	✓	-
	IR420-D64	-	-	-	✓
	iso685-D	✓	✓	-	✓
	iso685-S	✓	✓	-	✓
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )					







## Device overview isolating transformers, transformers for operating theatre lights

			
	ES710	DS0107	ESL0107
Catalogue page	371	376	379
Application	Design of medical IT systems	Supply of three-phase loads in group 0, 1 or 2 medical locations	Supply of operating theatre luminaires
Type of distribution system	single-phase	three-phase	single-phase
Voltages	Input	3AC 400 V	AC 230 V ( $\pm 5\%$ , $\pm 10\%$ )
	Output	3NAC 230 V	AC 23...28 V
	Frequency range	50...60 Hz	50...60 Hz
Power	3150 VA 4000 VA 5000 VA 6300 VA 8000 VA 10000 VA	2000 VA 3150 VA 4000 VA 5000 VA 6300 VA 8000 VA 10000 VA	120 VA 160 VA 280 VA 400 VA 630 VA 1000 VA
Design type	vertical	✓	✓
	horizontal	✓	-
	encapsulated (protection class B)	✓	-
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )			

## Device overview power supply units

			
	STEP-PS	AN410	AN450
Catalogue page	381	384	386
Application	for measuring current transformers	for DC 24 V power supply	for voltage supply
Rated voltage	DC 24 V	DC 24 V	AC 20 V, 50...60 Hz
Rated input voltage $U_{IN}$	AC 85...264 V, 45...65 Hz DC 95...250 V	AC 90...264 V DC 120...370 V	AC 230 V, 50...60 Hz AC 127 V, 50...60 Hz
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )			

## Device overview measuring instruments

				
	7204	7220	9604	9620
Catalogue page	388	388	388	388
Input current	0...400 $\mu$ A	0...20 mA	0...400 $\mu$ A	0...20 mA
Dimensions (mm)	72 x 72	72 x 72	96 x 96	96 x 96
Device family iso685...	–	✓	✓	✓
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )				



## Device overview interface converters and repeaters



DI-1DL




DI-2USB

<b>Catalogue page</b>	<b>389</b>	<b>391</b>
<b>Application</b>	Interface repeater BMS bus	Interface converter BMS/USB
<b>Input</b>	<b>Input</b>	RS-485
	<b>Connection</b>	screw-type terminal
	<b>Cable length</b>	≤ 1200 m
<b>Output</b>	<b>Output</b>	RS-485
	<b>Connection</b>	screw-type terminal
	<b>Cable length</b>	≤ 1200 m
<b>Expansion of bus devices</b>	≤ 30	–
<b>Supply voltage <math>U_s</math></b>	AC 85...260 V, 50...60 Hz	via USB
<b>Particular features</b>	–	Driver CD
<b>Product details</b> (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )		











## Device overview relay module



IOM441

<b>Catalogue page</b>	<b>392</b>
<b>Application</b>	for extension of EDS44x applications
<b>Relay number</b>	12 N/O contacts
<b>Supply voltage <math>U_s</math></b>	via BB bus
<b>Interface</b>	BB bus
<b>Connection</b>	push-wire terminal / BBbus PCB
<b>Relay operation</b>	configurable
<b>Product details</b> (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )	

## Device overview condition monitors/gateways

					
	COMTRAXX® COM465IP	COMTRAXX® COM465DP	COMTRAXX® COM465ID	COMTRAXX® COM463BC	COMTRAXX® CP9...-I
<b>Catalogue page</b>	394	398	402	406	408
<b>Application</b>	Condition Monitor/Gateway	Condition Monitor/ PROFIBUS-Gateway	Condition Monitor/Gateway	Condition Monitor/Gateway	Condition Monitor/Gateway
<b>Protocol input</b>	BMS / BCOM / Modbus RTU/TCP	BMS / BCOM / Modbus RTU/TCP	isoData / Modbus TCP	BMS (extern) / BCOM	BMS (intern) / BCOM / Modbus RTU/TCP
<b>Protocol output</b>	Ethernet / Modbus RTU/TCP / SNMP / PROFINET	Ethernet / Modbus RTU/TCP / SNMP / PROFINET / PROFIBUS DP	Ethernet / Modbus TCP / OPC-UA <sup>5)</sup>	Ethernet	Ethernet / Modbus RTU/TCP / SNMP / PROFINET
<b>Display</b>	LED	LED	LED	LED	Display in 7" oder 15,6"
<b>Alarm messages</b>	✓ <sup>1,2)</sup>	✓ <sup>1,2)</sup>	✓ <sup>1,2)</sup>	✓ <sup>1,2)</sup>	✓ <sup>1,2,3)</sup>
<b>Measured values</b>	✓ <sup>1,2)</sup>	✓ <sup>1,2)</sup>	✓ <sup>1,2)</sup>	✓ <sup>1,2)</sup>	✓ <sup>1,2,3)</sup>
<b>Device parameter setting</b>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	—	✓ <sup>1)</sup>
<b>Device tests</b>	✓ <sup>1,2)</sup>	✓ <sup>1,2)</sup>	✓ <sup>1,2)</sup>	—	✓ <sup>1,2)</sup>
<b>Alarm list</b>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	—	✓ <sup>1,3)</sup>
<b>History memory</b>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	—	✓ <sup>1)</sup>
<b>Diagrams</b>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	—	✓ <sup>1,3)</sup>
<b>Visualisation</b>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	—	✓ <sup>1)</sup>
<b>E-mail notification</b>	✓ <sup>1,4)</sup>	✓ <sup>1,4)</sup>	✓ <sup>1,4)</sup>	✓ <sup>1,4)</sup>	✓ <sup>1,4)</sup>
<b>Data logger</b>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓ <sup>1)</sup>	—	✓ <sup>1)</sup>
<b>Connection</b>					
<b>BMS</b>	screw-type terminal	screw-type terminal	—	screw-type terminal	screw-type terminal
<b>Modbus RTU</b>	screw-type terminal	screw-type terminal	—	screw-type terminal	screw-type terminal
<b>isoData</b>	—	—	screw-type terminal	—	—
<b>Output</b>	RJ 45	RJ 45, Sub-D 9-pole	RJ 45	RJ 45	RJ 45
<b>System requirements</b>					
<b>Supply voltage <math>U_s</math></b>	AC/DC 24...240 V	AC/DC 24...240 V	AC/DC 24...240 V	AC/DC 24...240 V	DC 24 V
<b>Browser</b>	Google Chrome, Microsoft Edge, Mozilla Firefox	Google Chrome, Microsoft Edge, Mozilla Firefox	Google Chrome, Microsoft Edge, Mozilla Firefox	Google Chrome, Microsoft Edge, Mozilla Firefox	Google Chrome, Microsoft Edge, Mozilla Firefox
<b>Product details</b> (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )					

<sup>1)</sup> Functions available on the web server – accessible via a personal computer with browser









<sup>2)</sup> Available via the protocol

<sup>3)</sup> On the device's own LC display

<sup>4)</sup> TLS/SSL Support

<sup>5)</sup> Special OPC-UA profile stored for railway applications

## Device overview alarm indicator and test combinations


				
	COMTRAXX® CP9xx	COMTRAXX® CP305	COMTRAXX® MK2430	Visualisation
Catalogue page	411	414	418	421
Messages/ displays	MEDICS® systems	✓	✓	✓
	RCMS Residual current monitoring system	✓	✓	✓
	EDS insulation fault locator	✓	✓	✓
Installation type	Flush-mounting	✓	✓	✓
	Cavity wall mounting	✓	✓	✓
	Cable-duct mounting	–	✓	✓
	Panel mounting	✓	✓	✓
	Surface mounting	✓	✓	–
Inputs/outputs	Digital inputs (potential free)	12	12	0/12
	N/O or N/C operation	selectable	selectable	selectable
	Relay outputs	1	2	1
	N/O or N/C operation	programmable	programmable	programmable
	Common alarm	programmable	programmable	programmable
System fault alarm	programmable	programmable	programmable	
Parameter setting/text message	Languages selectable	> 25	> 25	20
	Standard display	Graphic LCD (7", 15.6", 24")	5" TFT touch display	4 x 20 characters
	Additional text display	✓	✓	3 x 20 characters
	Standard texts	✓	✓	✓
	Freely configurable text messages	✓	✓	200
	History memory, maximum number of data records	2000	1000	250
	Real-time clock	✓	✓	✓
	Parameterisation software	integrated	integriert	TMK-Set V 4.xx (USB, BMS)
	Messages/alarms, medical gases	acc. to EN475, EN737-3	acc. to EN475, EN737-3	acc. to EN475, EN737-8
Interfaces	RS-485 (BMS protocol)	✓	✓	✓
	BMS address range	1...150	1...90	1...150
	Master redundancy, BMS internal	✓	✓	✓
	Master redundancy, BMS external	–	–	–
	USB	✓	–	✓
	Ethernet (TCP/IP)	✓	✓	–
Supply voltage Us	DC 24 V/AC 250 V	AC 18...28 V/DC 18...30 V	AC/DC 24 V	–
Stored energy time in the event of power failure	≥ 15 s	≥ 2 s	≤ 15 s	–
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )				



# Device overview POWERSCOUT®



POWERSCOUT®

	Catalogue page	422
Functions	Multi-tenant	Unlimited
	User management	Unlimited
	Logger	Unlimited (all measured values)
	Web front end	✓
	Cloud	✓
	Max. number of devices/data points	Unlimited
	Creation of dashboards	✓
	Event aggregation on the main page	✓
	Configuration of an individual main page	✓
	Reporting	✓
	Export data	csv export
	Import data	csv import
	Virtual measuring point calculation	✓
	Login overview	✓
	Widgets	Graph
Event statistics		✓
Measurement statistics		✓
Text editor		✓
Table view		✓
Alarm state		✓
Event protocol		✓
Gauge		✓
Heat map		✓
Sankey diagram		✓
Bar graph	✓	
	Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )	



## Device overview ATICS® switchover and monitoring devices











ATICS®-...-ISO



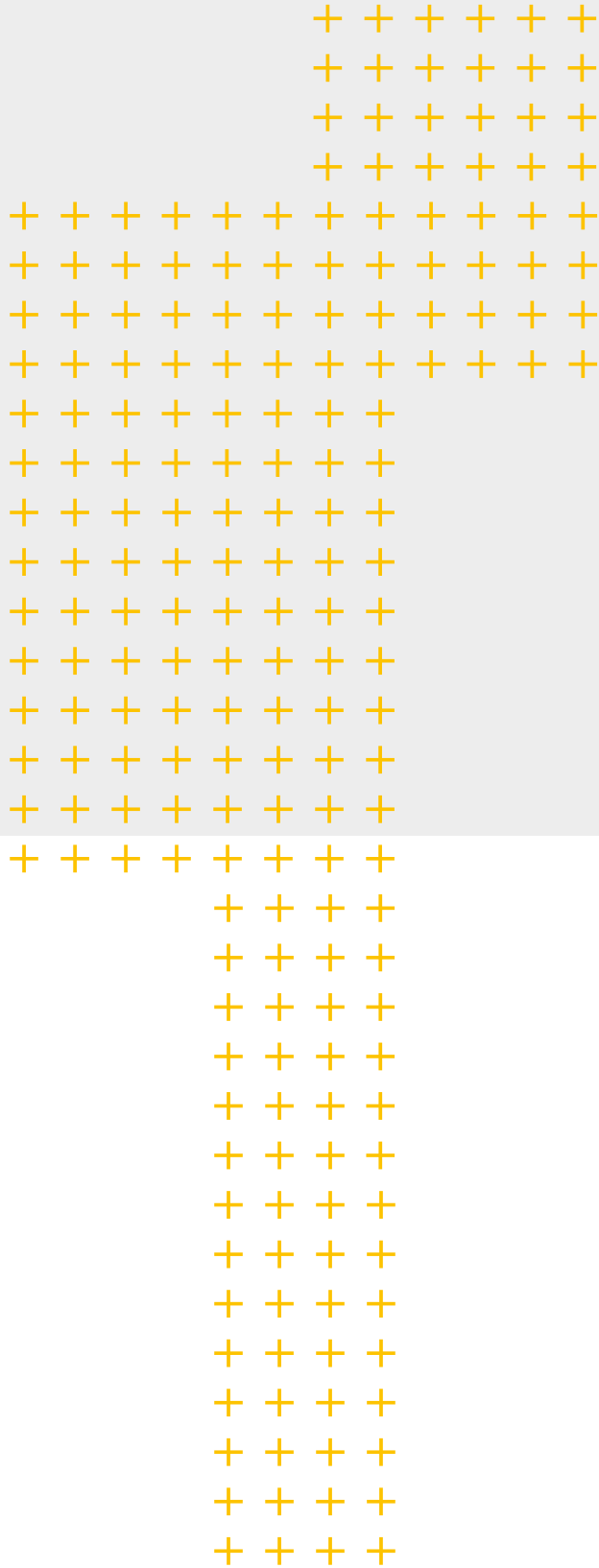
ATICS®-...-DIO

<b>Catalogue page</b>	<b>426</b>	<b>430</b>
<b>Application</b>	Unearthed safety power supplies	Safety power supplies
<b>Rated insulation voltage</b>	2-pole: 250 V	2-pole: 250 V 4-pole: 400 V
<b>Voltages</b>	<b>Nominal system voltage <math>U_n</math></b>	AC 230 V (AC 160...276 V)
	<b>Frequency range</b>	48...62 Hz
<b>Insulation monitoring Measuring range</b>	10 k $\Omega$ ...1 M $\Omega$	–
<b>Insulation monitoring Response value <math>R_{an1}</math></b>	50...500 k $\Omega$	–
<b>Digital inputs/relays</b>	1/1	4/4
<b>Interface/protocol</b>	RS-485/BMS	RS-485/BMS
<b>Connection</b>	<b>Pluggable screw terminals</b>	✓ (up to 125 A)
	<b>Screw terminals</b>	– (160 A)
<b>Installation</b>	<b>DIN rail</b>	✓
	<b>Screw mounting</b>	4 x M5
<b>Product details</b> (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )		

## Device overview UNIMET® test systems

				
	UNIMET® 300ST	UNIMET® 400ST	UNIMET® 610ST	UNIMET® 810ST
Catalogue page	436	439	443	446
Application	Electrical equipment	✓	✓	✓
	Electric hospital and care beds	✓	✓	–
	Medical electrical equipment	✓ <sup>1)</sup>	✓	–
	Electrical machines	–	–	✓
Voltages	Supply voltage $U_s$	AC 230 V	AC 230 V	AC 100...120 V, AC 220...240 V
	Voltage measurement Measuring range	AC 90...264 V	AC 90...264 V	AC 90...264 V
	Load current measurement	0.01...16 A	0.01...16 A	0.01...16 A
Test sequence	manual	✓	✓	✓
	semi-automatic	–	–	✓
	automatic	✓	✓	✓
Data exchange	UNIData300	UNIData300/400	UNIMET® 610ST Control Center	UNIMET® 810ST Control Center
Product details (Products on <a href="http://www.bender.de/en">www.bender.de/en</a> )				

<sup>1)</sup> Medical electrical equipment without patient connections



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