

AR5-L

Portable single and three-phase power analyzer



Description

- Measures all of the main electrical parameters of an electricity network
- Measurement in true root mean square
- Built-in energy meter
- With 4 voltage channels and 4 current channels (**AR5-L**)
- Configurable auto-trigger, depending on the parameters required
- Languages: Spanish and English
- Large backlit LCD display
- CAT III 600 V (**EN 61010**). **UL** Certificate
- Display of up to 30 electrical parameters on the screen
- Small size and reduced weight, only 800 g
- Independent files for each measurement
- Including the powerful analysis software:

POWER VISION PLUS

- Configurable with menus
- Optional operation with no external power supply, with an autonomy of up to 8 hours
- RS-232 Communications with PC
- Clamp auto-detection
- Auto-selection of parameters stored
- Calculation of the time remaining until the memory is full
- Linear or rotating memory (depending on the configuration)

Features

	AR5-L	
Power supply circuit		
Through an external power supply unit	100...240 V ac / 12 V dc	
Frequency	50...60 Hz	
Consumption	15 V·A	
Operating temperature	0...+40 °C	
Altitude	≤ 2000 m	
Humidity of operation	80 % for temperatures under 31 °C, with a linear decrease down to 50 % at 40 °C	
Measurement circuit	Three-phase (3 wires)	Three-phase (3 / 4 wires)
Contamination level	2	
Voltage circuit		
Measurement range	In accordance with the clamp, 0.01 A...20 kA	
Voltage and current transformation ratios	Programmable	
Measurement units	Automatic change of scale	
Internal memory	1 Mb	
Accuracy class (*)		
Voltage	0.5 % ± 2 digits	
Current	0.5 % ± 2 digits	
Active power	1 % ± 2 digits	
Power factor	1 % ± 2 digits	
Build features		
Housing	Reinforced insulation	
Keyboard / Display	On the front panel	
Display	LCD 160 x 160 pixels (backlit)	
Current clamp connector	3	3 / 4
Dimensions	220 x 60 x 130 mm	
Weight	800 g	
RS-232 Outputs	Series output	



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Application

Complete study of the installation where the analyzer is capable of gathering different types of records: harmonics, disturbances, meter verification, transients, flicker, etc.

Features

AR5-L	
Safety	Category III - 600 V, in accordance with 61010
Standards	
EN 61000-3-2 (1995), Harmonics	
EN 61000-3-3 (1995), Voltage fluctuations	
EN 61000-6-4 (2002), Industrial emissions EN 55011 (1994), Driven (EN 52022 – Class B) EN 55011 (1994), Radiated (EN 55022 – Class A)	
EN 61000-6-2 (2022), Industrial immunity EN 61000-4-2 (1995), Electrostatic discharge ENV 50140 (1993), Radiated electromagnetic field EN 61000-4-8 (1995), Rapid transient bursts ENV 50141 (1993), RF in common mode EN 61000-4-8 (1995), Magnetic field at 50 Hz	
EN 61000-6-1 (2002), Domestic immunity EN 61000-4-5 (1995), Shockwave EN 61000-4-11 (1994), Power supply interruptions	
(*) Accuracy is given by the following measurement conditions: Exclusion of errors produced by the clamps and external voltage transformers, with a range of temperature of 5 ... 45 °C and power factor of 0 ... 1	

References

Analyzer	Clamps	Program	Transport	Type	Code
Units					
AR5-L	-	Energy / Harmonics	Carrying Bag	AR5-L- Power analyzer with 4 current inputs	M80111
AR5-L Kits					
AR5-L	3 x CPR-1000 1 x CPR-500	Energy / Harmonics	Carrying Bag	3L AR5-L	M80811
AR5-L	3 x CPR-2000/200 1 x CPR-1000	Energy / Harmonics	Carrying Bag	4L AR5-L	M80821
AR5-L	3 x CPR-2000/200 1 x CPR-1000 3 x CP-5	Energy / Harmonics and Disturbances	Carrying Bag	5L AR5-L	M80832
AR5-L	3 x C-FLEX-45 cm 1 x CF-5	Energy / Harmonics and Disturbances	Carrying Bag	11L AR5-L-RBT	M80843
AR5-L	3 x C-FLEX-80 cm 1 x CF-5	Energy / Harmonics and Disturbances	Carrying Bag	12L AR5-L-RBT	M80853
AR5-L	3 x C-FLEX-45 cm 1 x CF-5	Energy / Harmonics and Disturbances	Case	11LM AR5-L-RBT	M80643
AR5-L	3 x C-FLEX-80 cm 1 x CF-5	Energy / Harmonics and Disturbances	Case	12LM AR5-L-RBT	M80653

The two analyzers include: 3 voltage cables + power supply

All kits include: 3 voltage cables + power supply + PowerVision software + energy / harmonics program + 3 clamps

Accessories

See page M.8-40

AR5-L

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Parameters measured

Three-phase system, 4 wires

Parameter	Symbol (unit)	L1	L2	L3	Three-phase value
phase-neutral voltage	V	Yes	Yes	Yes	-
Current	A	Yes	Yes	Yes	Yes
Neutral current (only AR5-L)	I_N	Yes			
Frequency	Hz	Yes	-	-	-
Active power	kW	Yes	Yes	Yes	Yes
Power factor L	kvarL	Yes	Yes	Yes	Yes
Power factor C	kvarC	Yes	Yes	Yes	Yes
Apparent power	kVA	-	-	-	Yes
Power factor	PF	Yes	Yes	Yes	Yes
Active energy	kW-h	Yes	Yes	Yes	Yes
Power factor L	kvar-h L	Yes	Yes	Yes	Yes
Power factor C	kvar-h C	Yes	Yes	Yes	Yes
Voltage harmonics		Yes	Yes	Yes	-
Current harmonics		Yes	Yes	Yes	-
Current harmonics on neutral		Yes			

Three-phase system, 3 wires

Parameter	Symbol (unit)	L1-L2	L2-L3	L3-L1	Three-phase value
phase-phase voltage	V	Yes	Yes	Yes	-
Current	A	Yes	Yes	Yes	Yes
Frequency	Hz	Yes	-	-	-
Active power	kW	Yes	Yes	Yes	Yes
Power factor L	kvarL	Yes	Yes	Yes	Yes
Power factor C	kvarC	Yes	Yes	Yes	Yes
Apparent power	kVA	-	-	-	Yes
Power factor	PF	Yes	Yes	Yes	Yes
Active energy	kW-h	-	-	-	Yes
Power factor L	kvar-h L	-	-	-	Yes
Power factor C	kvar-h C	-	-	-	Yes
Voltage harmonics		Yes	Yes	Yes	-
Current harmonics		Yes	Yes	Yes	-

Two-phase System

Parameter	Symbol (unit)	L1-N	L2-N	Two-phase value L1-L2
phase-phase voltage	V	Yes	Yes	Yes
Current	A	Yes	Yes	Yes
Neutral current (only AR5-L)	I_N	-		
Frequency	Hz	Yes	-	-
Active power	kW	Yes	Yes	Yes
Power factor L	kvarL	Yes	Yes	Yes
Power factor C	kvarC	Yes	Yes	Yes
Apparent power	kVA	-	-	Yes
Power factor	PF	Yes	Yes	Yes
Active energy	kW-h	-	-	Yes
Power factor L	kvar-h L	-	-	Yes
Power factor C	kvar-h C	-	-	Yes
Voltage harmonics		Yes	Yes	-
Current harmonics		Yes	Yes	-
Current harmonics on neutral		Yes		

Single-phase system

Parameter	Symbol (unit)	L1-N
phase-phase voltage	V	Yes
Current	A	Yes
Frequency	Hz	Yes
Active power	kW	Yes
Power factor L	kvarL	Yes
Power factor C	kvarL / (-C)	Yes
Apparent power	kVA	Yes
Power factor	PF	Yes
Active energy	kW-h	Yes
Power factor L	kvar-h L	Yes
Power factor C	kvar-h C	Yes
Voltage harmonics		Yes
Current harmonics		Yes

Programs

AR5-L

Portable single and three-phase power analyzer



Programs

Description	Equipment	Type	Code
Updating harmonics	AR5-L	Updating ARI	M80221
Flicker (PST and PLT assessment)	AR5-L	FL Program	M80223
Detection of network disturbances	AR5-L	PERTURB Program	M80224
CHECK METER, meter verification system	AR5-L	CM Program	M80225
Optic fibre sensor, shunts and CHECK METER program included	AR5-L	Optical check meter kit	M806B3
FAST CHECK, motor start-up	AR5-L	Fast Program	M80226
LEAK METER, detection and analysis of leakages	AR5-L	Leak Program	M80229
FILE VISION, display of files in AR5-L	AR5-L	Fil Vision Program	M8022A

Memory capacity example: In the Energy program, if you record 30 network parameters, with a registration period of 15 minutes, you obtain an autonomy of 80 days of memory.

Harmonics

The harmonics program can be used for the following:

- Analysis of all electrical parameters: voltage, current, power, energy, etc.
- Analysis of overheating in transformers, capacitors, etc.
- Detection of neutral current
- Wave shapes shown on the display in real time
- Zoom on a wave shape
- Harmonic decomposition display (30 or 50 harmonics)
- Calculation of the THD % in voltage and current

- Harmonic decomposition (up to order 50)
- True root mean square values for voltage and current
- It can be used to prepare tables and lists
- The direction of harmonics can be seen with software

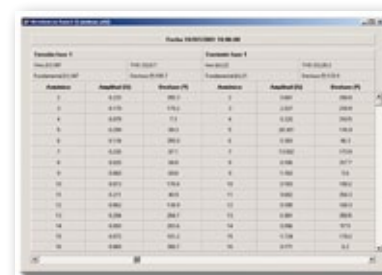
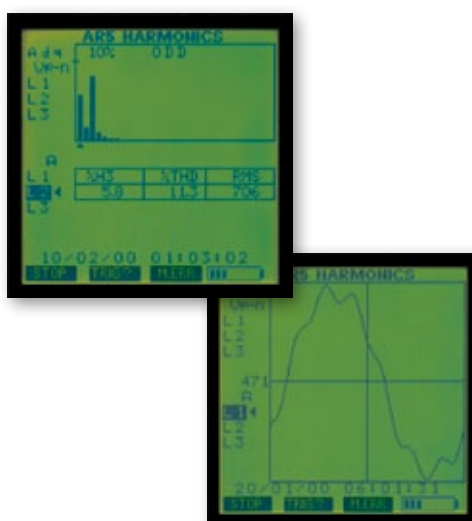
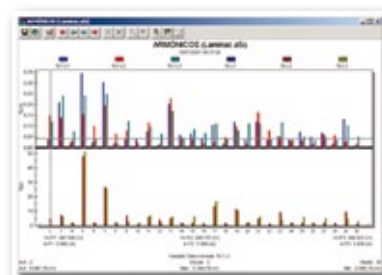
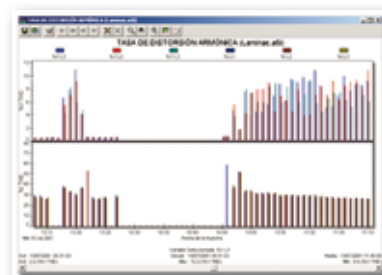
Type	Code
Updating ARI	M80221

Applications:

- Calculation of the diameter of cable required to support losses produced by harmonics
- Study of harmonic filtering applications
- Comparison of measurements taken, in accordance with the IEC standard
- Energy and billing study
- Study of installation consumption
- Analysis of the power factor compensation

Graphical representation of:

- Wave shapes and harmonic distortion
- Total harmonic distortion THD %



Programs

AR5-L

Portable single and three-phase power analyzer

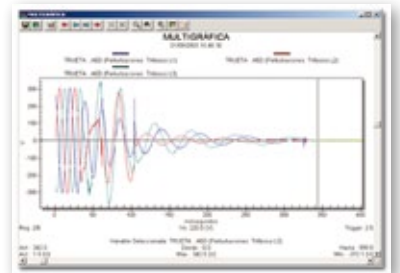
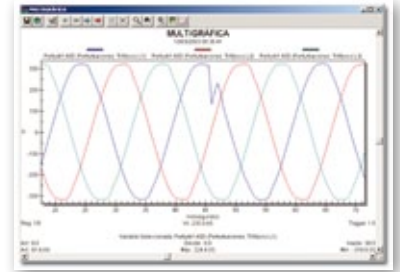


Network quality - Disturbances

Program applications:

- Detection of interruptions, gaps, micro-cuts, peaks, etc.
- Adjustment of the sensitivity for the capture of different types of disturbances
- Information about the number of disturbances detected
- Applications
- Check the effect of switching a load over various points of the installation
- Take "x-rays" of any installation with an AR5-L unit and a PC, in order to know everything about a supply network:
 - Evolution of the wave shape
 - Display of an alterationChecking the three phases during the alteration

Type	Code
PERTURB Program	M80224

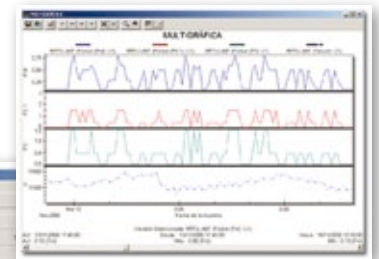


Flicker

The flicker program can be used to:

- Study the flicker present in the installation, whether it is instantaneous, PST or PLT (the latter via software)
- Carry out the same operations executed by the energy program
- Configuration of the times for the calculation of the flicker and energy
- Flicker parameters on a single screen
- Applications
- Determine the level of visual disturbance that can lead to a decrease in the performance of workers
- Study voltage fluctuations

Type	Code
FL Program	M80223

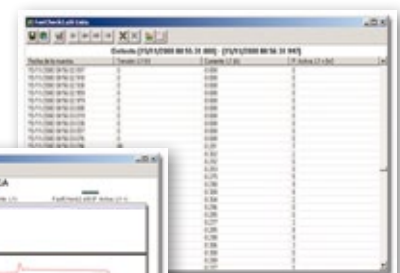


Motor start-up (Fast check)

This program can be used to:

- Perform studies on single or three-phase networks to capture the voltage, current, power and power factor during cycle periods
- Capture short voltages (for ex.: motor start-up, welding machines, etc.)
- Potential recording with a trigger
- Fixed or rotating memory

Type	Code
Fast Program	M80226



Programs

AR5-L

Portable single and three-phase power analyzer



Check-Meter

The program can be used to:

- Check the measurements of electronic and mechanical meters
- Carry out the tests with no energy cuts
- Carry out 30-second long tests
- Determine the error in active energy or power factor meters
- Programmed setup and percentage error on a single screen
- Up to 4000 records can be created
- Numerical table
- Export to .bmp format or to the clamp-board.

Applications Meter verification studies, creation of detailed reports in each measurement point

- Detection of errors that exceed 1 % (with the AR5-L-shunts calibrated set) in electricity meters
- Detect potential fraud situations

Optical reader kit

- For electronic meters or meters with verification LED
- Optic fibre cable used to check meters
- Communications and power supply cable connected to AR5-L
- Measures impulses with a longitude that exceeds 1 us
- Shock-proof plastic
- Reduced dimensions: 64x41x26 mm

Type	Code
CM optical kit (includes sensor, shunts, program and software)	M806C3



Type	Code
CM Program	M80225



Leak

- Measurement of leakage current, up to 10 A, with a transformer
- Measurement with current sensing clamp
- Measurement with earth leakage transformers
- Measurement scales with 2 mA ... 1 A clamp and 20 mA ... 10 A clamp
- Filtering of high frequencies to avoid the effect of switching systems
- Measurement of the true root mean square value during each period (20 ms)
- Continuous measurement with a record of each period of the programmed time
- Programmable record time 1 s ... 100 s
- Detection of the trip moment due to a voltage drop
- Detection of the trip moment, depending on the programmed leakage level

Applications Detection of the trip level of protection relays

- Checking leakages with no need for manual analysis on the site

Type	Code
Leak Meter Program	M80229

Programs

AR5-L

Portable single and three-phase power analyzer



File Vision

- On-site verification of records
- Display of records, with no need for a PC
- The screen has a cursor that indicates the position of the value of the variable selected, in terms of record time and parameter
- Auto-scalable axis of the parameter (adapted to the maximum and minimum values of all records)
- Permanent display of 32 records on the screen
- Display of the maximum and minimum value of the records
- You can browse through records easily and quickly
- Variables represented by the different programs:

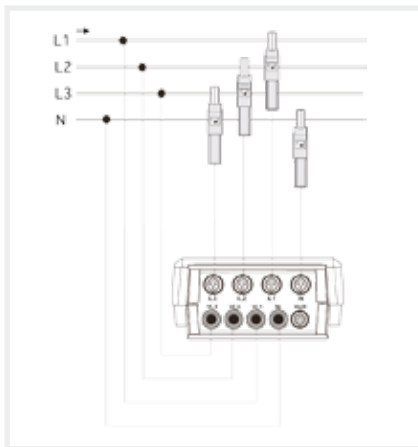
- Harmonics: V_{pp} , V_{pn} , A, W, var L, var C, PF, Hz, V·A, I_N , kW·h
- Check-Phase: V_{pp} , V_{pn} , A, W, var L, var C, PF, Hz, V·A, I_N , kW·h
- Flicker: V_{pp} , V_{pn} , A, W, var L, var C, PF, Hz, V·A, I_N , kW·h, Pst
- Fast-Check: V_{pp} , V_{pn} , A, W, var L, var C, PF, Hz, V·A, I_N



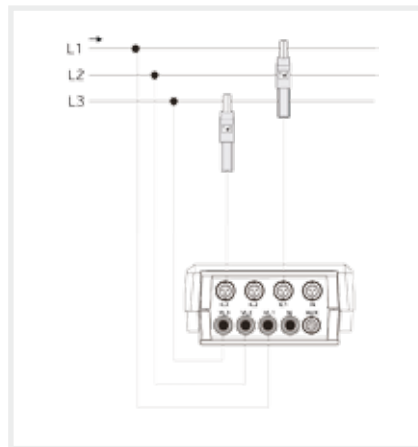
Type	Code
File Vision	M8022A

Connections

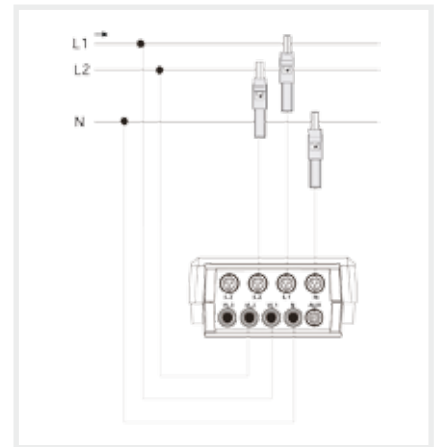
Three-phase system, 4 wires



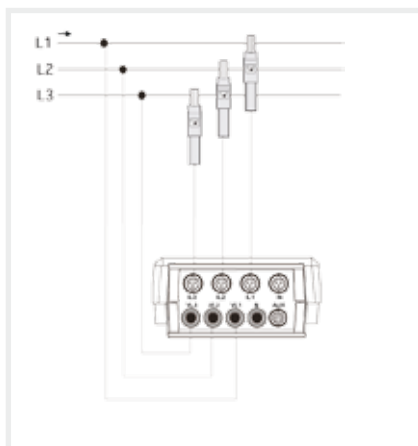
Three-phase system, 3 wires, ARON



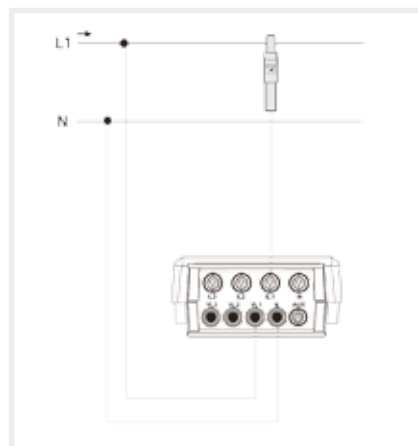
Two-phase System



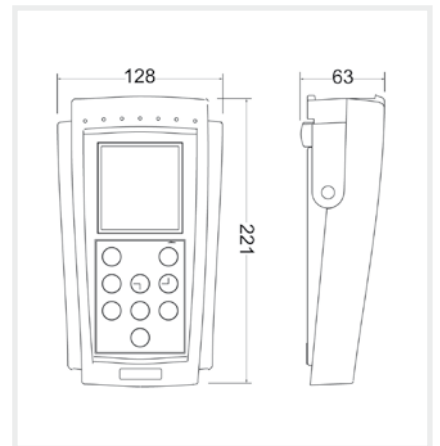
Three-phase system, 3 wires



Single-phase system



Dimensions



Clamps

AR5-L

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Clamps	CF-5	CF-10	CP-5	CP-100	CPR-500	CPR-1000	CP-2000/200
Measurement range	1...5 A ac	0.2 mA...10 A ac	0.05..0.5 A ac	1...100 A ac	1...500 A ac	1...1000 A ac	1...200 A ac 10...2000 A ac
Nominal frequency	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz	48...65 Hz
Output voltage	2 V ac	2 V ac	2 V ac	2 V ac	2 V ac	2 V ac	2 V ac
Dielectric rigidity	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min	5200 V, 50 Hz, 1 min
Scale base error	1 % (up to 0.1 A) 0.5 % (Up to 5 A)	-0,35 %	1 %	0,5 %	0,7 %	0,7 %	Scale 200: 0.5 % (+70 mA) Scale 2000: 0.5% (+100 mA)
Maximum conductor diameter	20 mm	100 mm	20 mm	20 mm	52 mm	52 mm	64 mm
Maximum busbar	1 - 50 x 5 mm or 4 - 30 x 5 mm	5 - 80 x 5 mm or 3 - 80 x 10 mm	20 x 5 mm	20 x 5 mm	1 - 50 x 5 mm or 4 - 30 x 5 mm	1 - 50 x 5 mm or 4 - 30 x 5 mm	5 - 125 x 5 mm or 3 - 100 x 10 mm
Description / Code	CF-5 Code M81331	CF-10 Code M81334	3 CP-5 Kit Code M81041	3 CP-100 Kit Code M81042 1 CP-100 Neutral clamp (blue) Code M81036	3 CPR500 Kit Code M81043 1 CPR-500 Neutral clamp (blue) Code M81037	3 CPR-1000 Kit Code M81044 1 CPR-1000 - Neutral clamp (blue) Code M81038	3 CP-2000/200 Kit Code M81045

Clamps
AR5-L

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Clamps C-FLEX 20000 / 2000 / 200 A-45

Longitude sensor	45 cm
Scales	200 A / 2000A / 20000 A or 100 A / 1000 A / 10000 A
Sensitivity in mV	Scale 200 or 100: 10 mV / A Scale 2000 or 1000: 1 mV / A Scale 20k or 10k: 0,1 mV / A
Measurement amplitude	5 A...20 kA
Bandwidth	10...20 kHz
Accuracy	1 %
Electrical safety	Double insulation IEC 1010 - 100 V - Cat III - Degree of contamination 2
Admissible output overvoltage	600 V (peak factor 1.5)
Ambient conditions	
Temperature	-10 ... +55 °C
Humidity	90 % HR (a 50 °C)

Scales	Type kit	Code
20 kA / 2000 A / 200 A	Kit 3 C-FLEX 20000/2000/200 A-45	M81141

Clamps C-FLEX 20000 / 2000 / 200 A-80

Longitude sensor	80 cm
Scales	200 A / 2000 A / 20000 A or 100 A / 1000 A / 10000 A
Sensitivity in mV	Scale 200 or 100: 10 mV / A Scale 2000 or 1000: 1 mV / A Scale 20k or 10k: 0,1 mV / A
Measurement amplitude	5 A...20 kA
Bandwidth	10...20 kHz
Accuracy	1 %
Electrical safety	Double insulation IEC 1010 - 100 V - Cat III - Degree of contamination 2
Admissible output overvoltage	600 V (peak factor 1.5)
Ambient conditions	
Temperature	-10 ... +55 °C
Humidity	90 % HR (a 50 °C)

Scales	Type kit	Code
20 kA / 2000 A / 200 A	Kit 3 C-FLEX 20000/2000/200 A-80	M81142

Clamps C-FLEX 20000 / 2000 / 200 A-120

Longitude sensor	120 cm
Scales	200 A / 2000 A / 20000 A or 100 A / 1000 A / 10000 A
Sensitivity in mV	Scale 200 or 100: 10 mV / A Scale 2000 or 1000: 1 mV / A Scale 20k or 10k: 0,1 mV / A
Measurement amplitude	5 A...20 kA
Bandwidth	10...20 kHz
Accuracy	1 %
Electrical safety	Double insulation IEC 1010 - 100 V - Cat III - Degree of contamination 2
Admissible output overvoltage	600 V (peak factor 1.5)
Ambient conditions	
Temperature	-10 ... +55 °C
Humidity	90 % HR (a 50 °C)

Scales	Type kit	Code
20 kA / 2000 A / 200 A	Kit 3 C-FLEX 20000/2000/200 A-120	M81143