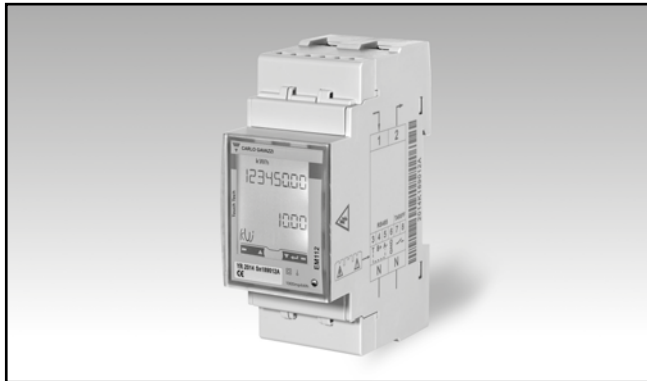# Energy Management
Energy Analyzer
Type EM112DINAV01XS1X08 for HUAWEI

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- Single phase energy analyzer
- Class 1 (kWh) according to EN62053-21
- Accuracy ±0.5% RDG (current/voltage)
- Direct current measurement up to 100AAC
- Backlit LCD display (3x 8-digit) with integrated touch key-pad
- Energy readout on display: 8 digit
- Variable readout on display: 4 digit
- Energy measurement: kWh and kvarh (imported/exported); kWh+ by 2 tariffs
- System variables, kW, kvar, V, A, PF, Hz, kWdmd, kWdmd peak
- Self power supply
- Dimensions: 2-DIN module
- Protection degree (front): IP51
- RS485 Modbus port
- Digital input (for tariff management)
- Easy connection or wrong current direction detection

Product description

Single-phase energy analyzer with backlit LCD dislapy with integrated touch keypad. Particularly indicated for active energy metering and for cost allocation in applications up to 100 A (direct connection), with dual tariff management availability. It can measure imported and exported energy or be programmed to consider only the imported one. Housing for DIN-rail mounting, with IP51 front degree protection. The analyzer is provided with RS485 Modbus port.

STANDARD

Not certified according to MID Directive. Cannot be used for fiscal (legal) metrology.

How to order   EM112-DIN AV0 1 X S1 X 08

Model
Range code
System
Power supply
Output
Option

Type Selection

Range code	System	Power supply	Output
AV0: 230VLN AC - 5(100)A (Direct connection)	**1:** 1-phase 2-wire	**X:** Self power supply -30% +20% of the rated measuring input voltage, 45 to 65Hz	**S1:** RS485 Modbus port

Option

X08: 1-PHASE ENERGY METER FOR HUAWEI

Input specifications

Rated Inputs	
Current type	1-phase loads, direct connection
Current range	5(100)A
Nominal voltage	230VLN AC

Accuracy	
(@25°C ±5°C, R.H. ≤60%, 45 to 65 Hz)	
Current	Imin=0.25A; Ib: 5A, Imax: 100A; Un: 230VLN -30% +20%
Energies	
Active energy	Class 1 according to EN62053-21
Reactive energy	Class 2 according to EN62053-23
Start-up current:	40mA positive or negative
	Self-consumption is not measured.
Start-up voltage	161VLN

Resolution	Display/serial communication
Current	0.1/0.001 A
Voltage	0.1/0.1 V
Power	0.01 kW or kVar/ 0.1 kW or kvar
Frequency	0.1 Hz/0.1Hz
PF	0.01/ 0.001
Energies (positive)	0.01 kWh or kvarh / 0.1 kWh or kvarh
Energies (negative)	0.01 kWh or kvarh / 0.1 kWh or kvarh

Energy additional errors	
Influence quantities	According to EN62053-21
Temperature drift	≤200ppm/°C
Sampling rate	4096 samples/s @ 50Hz
	4096 samples/s @ 60Hz

Display and touch key-pad	
Type	Backlit LCD, 3 rows by 8-digit each, h 5 mm
Read-out	Energy: 8 digit. Variables: 4 digit
Touch key	2 (Enter/DOWN and UP).

Max. and Min. indication	
Energies	Max. 99 999 999
	Min. 0.01
Variables	Max. 9999
	Min. 0.01

Memory energy storage	
Energy	10^10 cycles. Energy value is saved every time the less significant digit increases.
Programming parameters	10^10 cycles. When a parameter is modified, only the relevant memory cell is overwritten

LEDs	Flashing red light pulses according to EN50470-3, EN62052-11, 1000 imp./kWh (min. period: 90ms, max. frequency: 11 Hz) Fix orange light: wrong current direction (only with "B" measurement selection)

Current overloads	
Continuous	100A, @ 50Hz
For 10ms	3000 A

Voltage Overloads	
Continuous	1.2 Un
For 500ms	2 Un

Input impedance	
Voltage input 230VL-N	1.2Mohm
Current inputs: 5(100) A	< 1.25VA

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Digital input specifications

Digital inputs	Free of voltage contact	Overload	In case a voltage is erroneously applied to the digital input, the input is not damaged up to 30 V ac/dc.
Function	Tariff management (switch between 7-8)		
Number of inputs	1		
Contact measurement voltage	5 V		
Input impedance	≤ 1kohm		
Contact resistance	≥ 1kohm, close contact 100kohm, open contact		

Output specifications

RS485 serial port	RS485 by screw connection.
Function	For communication of measured data, programming parameters
Protocol	Modbus RTU (slave function)
Baud rate	9.6, 19.2, 38.4, 57.6, 115.2 kbaud, even or no parity,
Address	1 to 247 (default: 1)
Driver input capability	1/8 unit load. Maximum 247 transceivers on the same bus.
Data refresh time	1s
Read command	50 words available in 1 read command
Broadcast commands	Accepted without any replay frames. Compatible with HUWEI devices.
Rx/Tx indication	Rx segment on display is shown when a valid Modbus command is sent to that speci ic meter; Tx segment on display is shown when a valid Modbus reply is sent back to the master

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General specifications

Operating temperature	-25 to +65 °C, indoor, (R.H. from 0 to 90% non-condensing @ 40°C)	**Housing**	
		Dimensions (WxHxD)	35 x 63 x 90 mm
Storage temperature	-30°C to +80°C (R.H. < 90% non-condensing @ 40°C)	Material	PTB, self-extinguishing: UL 94 V-0
		Sealing covers	Included
Overvoltage category	Cat. III	**Mounting**	DIN-rail
Insulation (for 1 minute)	4000 VAC RMS between measuring inputs and digital/serial output (see table) 4000 VAC RMS	**Protection degree**	
		Front	IP51
		Screw terminals (cable inputs)	IP20
Dielectric strength	4000 VAC RMS for 1 minute	**Weight**	Approx. 160 g (packing included)
EMC	According to EN62052-11		
Standard compliance			
Safety	EN62052-11		
Metrology	EN62053-21, EN50470-3		
Approvals	CE		
Connections			
Cable cross-section area	Measuring inputs: max. 25 mm², min. 5 mm² with/without metallic cable ferrule; Max. screw tightening torque: 2.8 Nm		
Other terminals	1.5 mm², Min./Max. screws tightening torque: 0.5 Nm		

Power supply specifications

Self power supply	230VAC VL-N, -30% +20% 45-65Hz	**Power consumption**	≤ 1W, ≤ 8VA

Insulation (for 1 minute) between inputs and outputs

	Measuring input	Serial output	Digital input
Measuring input	-	4 kV	4 kV
Serial output	4 kV	-	0 kV
Digital input	4 kV	0 kV	-

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Accuracy (according to EN62053-21 and EN62053-23)

kWh, accuracy (RDG) depending on the current

Percentage error limits for class index B

+1.5%	
+1%	
0%	
-1%	
-1.5%	

PF=1   0.25A(I_{min})   0.5A(I_{tr})   5A(I_n)   100A(I_{max})
        0.05A(I_{ref})   (0,1I_{ref})

PF=L0.5   0.5A(I_{tr})   5A(I_n)   100A(I_{max})
or C0.8   (0,1I_{ref})

—— **Class 1 accuracy limits (Active energy)**
     5(100)A Start-up current: 40mA

kvarh, accuracy (RDG) depending on the current

Error

+2.5%	
+2%	
0%	
-2%	
-2.5%	

sinφ =1   0.25A   0.5A   5A(Ib)   100A(I_{max})
         (0.05Ib)   (0.1Ib)

sinφ=0.5   0.5A   1A   5A(Ib)   100A(I_{max})
         (0.1Ib)   (0.25Ib)

—— **Class 2 accuracy limits (Reactive energy)**
     5(100)A Start-up current: 40mA
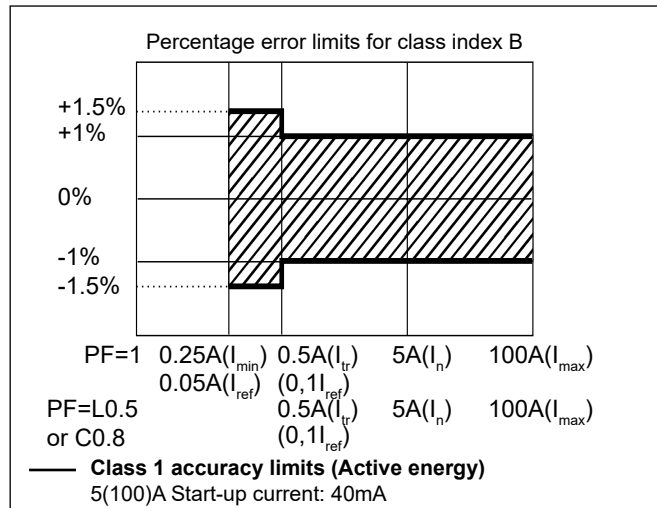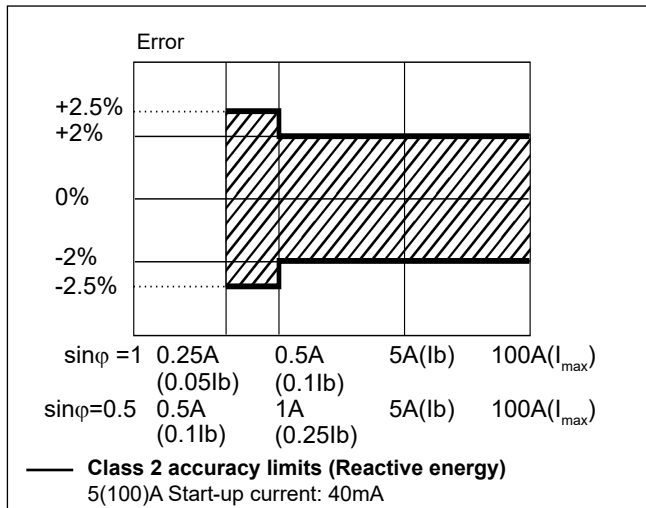
Display pages

No	1st row	2nd row	3rd row	"Full" mode	"Easy" mode	Note
0	kWh+ (imported)		kW	X	X	With Measurement menu set to "A", this is considering the total energy without considering the current direction.
1	kWh- (exported)		kW	X	X	With Measurement menu set to "B"
2	kWh+ (imported)		V	X	X	
3	kWh+ (imported)		A	X	X	
4	kWh+ (imported)		PF	X		
5	kWh+ (imported)		Hz	X		
6	kvarh+ (imported)		kvar	X		With Measurement menu set to "A", this is considering the total positive reactive energy without considering the current direction.
7	kvarh- (exported)		kvar	X		With Measurement menu set to "B"
8	kWh+ (imported)	kWdmd peak	kWdmd	X		
9	kWh (t1)	"t1"	kW	X		Only relevant to kWh+, with Tariff menu set to ON.
10	kWh (t2)	"t2"	kW	X		Only relevant to kWh+, with Tariff menu set to ON.

X= available

List of available menus

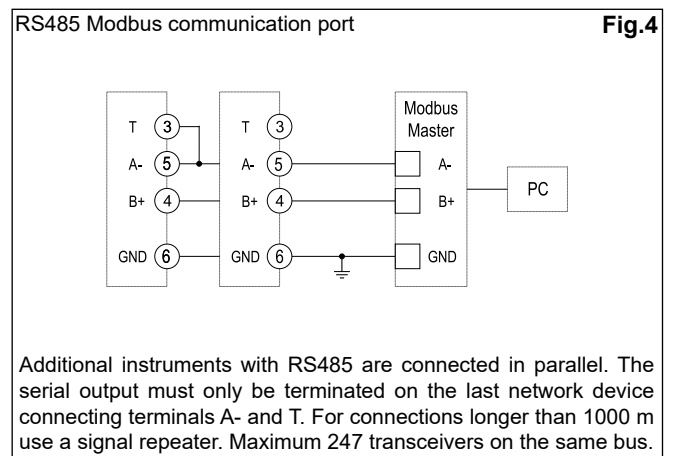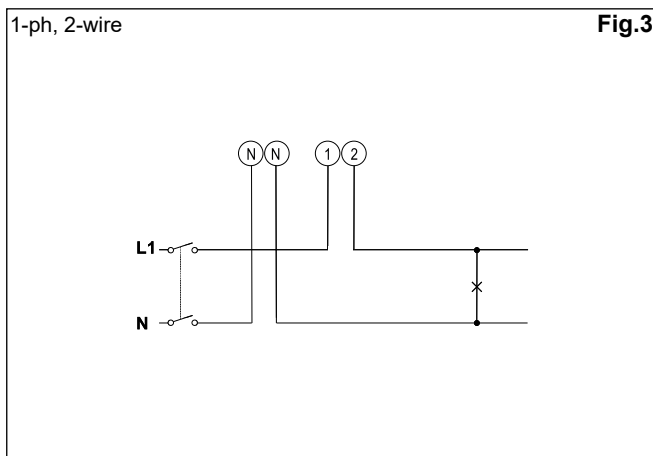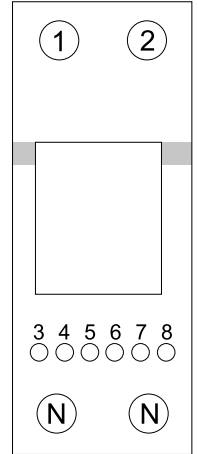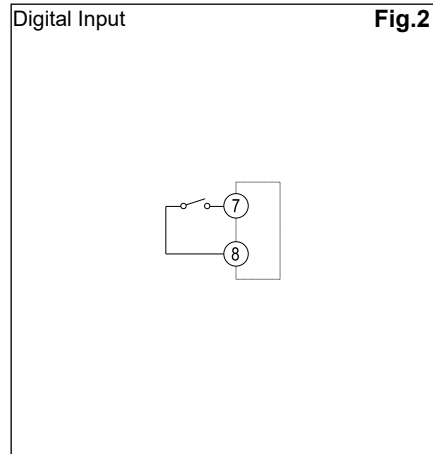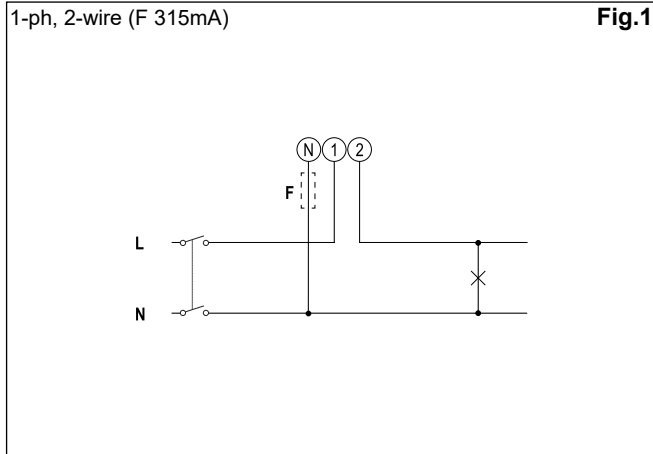| Menu name and description		Range	Default setting
PASS	Password request	From 0000 to 9999	0000
nPASS	New password	From 0000 to 9999	0000
Measure	Measurement type (A=easy connection; B=bidirectional, imported and exported energy).	A; b	A
P int	Integration time for Wdmd calculation	1 to 30 min	1
Mode	Selection of complete or simplified set of variables on display	Full or Easy	Full
Tariff	Tariff enabling	Yes/No	No
Home	Home page selection (default page at power-on and after 120 s time-out from other pages).	0 to 9	0
Address (S1 option)	Modbus serial address	1 to 247	01
Kbaud (S1)	Modbus baud rate	9.6; 19.2; 38.4; 57.6, 115.2 kbps	9.6
ParItY (S1)	Modbus parity	No/even	No
RESET	Allow the reset of tariff meters and W dmd peak (kWh/kvarh meter reset available only via serial communication)	Yes/No	No
End	Exit to measuring mode		

Note: after the confirmation of a new parameter value, the value is stored in the memory without the need to exit the programming mode.
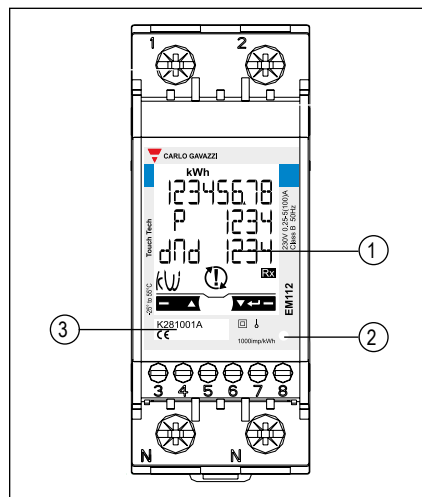
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Additional available information on the display (*)

Page	Code	Description
YEAr	InFO 1	Year of manufacture
SErIAL n	InFO 2	Serial number, corresponds to the one indicated on the front print
rEVISIon	InFO 3	Firmware revision – *XY.nn*:
PuLS Led	InFO 4	Front LED pulse weight
MEASurE	P3	Measurement type
P int	P4	Requested average power calculation interval
ModE	P5	Display mode
tArIFF	P6	Enabling tariff management and any current tariff
HoME	P7	Measurement page set as home page
AddrESS	P10	Modbus address
bAUd	P11	Baud rate
PArITY	P12	Parity
StoP bit	P12–2	Stop bit

(*) can be reached by pressing simultaneously the 2 touch keys

Specification are subject to change without notice EM112 spec 08 DS 140918

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Wiring diagrams

1-ph, 2-wire (F 315mA)	**Fig.1**

N 1 2

F

L

N

✕

Digital Input	**Fig.2**

7

8

① ②

3 4 5 6 7 8

N N

1-ph, 2-wire	**Fig.3**

N N 1 2

L1

N

✕

RS485 Modbus communication port	**Fig.4**

T 3   T 3   Modbus Master

A- 5   A- 5   A-

B+ 4   B+ 4   B+   PC

GND 6   GND 6   GND

Additional instruments with RS485 are connected in parallel. The serial output must only be terminated on the last network device connecting terminals A- and T. For connections longer than 1000 m use a signal repeater. Maximum 247 transceivers on the same bus.

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Front panel description

1. **Display**
    Backlit LCD display with touch key-pad.
    Right key: enter, down
    Left key: up

2. **LED**
    LED proportional to kWh reading

3. **Serial number**
    Area reserved to serial number

Dimensions (mm)