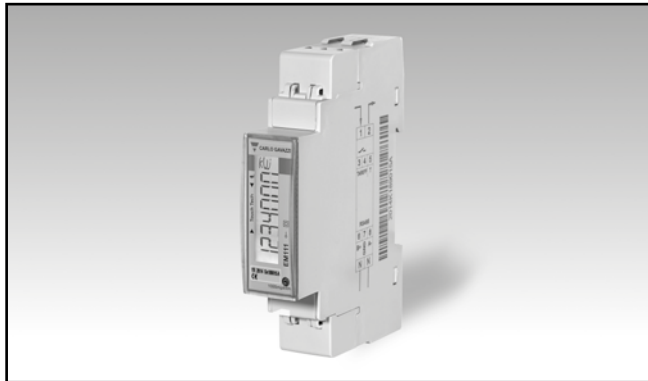# Energy Management
Energy Analyzer
Type EM111DINAV81XS1X08 for HUAWEI

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- Digital input (for tariff management)
- Easy connection or wrong current direction detection

- Single phase energy analyzer
- Class 1 (kWh) according to EN62053-21
- Accuracy ±0.5% RDG (current/voltage)
- Direct current measurement up to 32 AAC
- Backlit LCD display with integrated touch key-pad
- Energy readout on display: 7 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: 1-DIN module
- Protection degree (front): IP51
- RS485 Modbus port

Product description

Single-phase energy analyzer with backlit LCD display with integrated touch keypad. Particularly indicated for active energy metering and for cost allocation in applications up to 32 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 meter is provided with RS485 Modbus port.

STANDARD

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

How to order   EM111-DIN AV8 1 X S1 X08

Model
Range code
System
Power supply
Output
Option

Type Selection

Range code	System	Power supply	Output
AV8: 230VLN AC - 5(45)A (Direct connection up to 32 A)	**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

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Input specifications

Rated Inputs	
Current type	1-phase loads, direct connection up to 32 A
Nominal current range	5(45)A
	Ib 5 A
	Imax 45 A
Nominal voltage	230VLN AC (AV8 option).

Accuracy	
(@25°C ±5°C, R.H. ≤60%, 45 to 65 Hz)	
AV8	Imin=0.25A; Ib: 5A, Imax: 45A; Un: 230VLN -30% +20%
Energies	
Active energy	Class 1 according to EN62053-21
Reactive energy	Class 2 according to EN62053-23
Start-up current:	20mA (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 W or var
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, 7-digit, h 6 mm
Read-out	Energy: 7 digit. Variables: 4 digit
Touch key	2 (Enter and UP).

Max. and Min. indication	Max. 999 999.9 Min. 0.0

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 with "B" measurement selection

Current overloads	
Continuous	45A, @ 50Hz
For 10ms	1350 A
Voltage Overloads	
Continuous	1.2 Un
For 500ms	2 Un

Input impedance	
Voltage input 230VL-N	1.2 Mohm
Current inputs: 5(45) A	< 0.5 VA

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Digital input specifications

Digital inputs		Overload	In case a voltage is erroneously applied to the digital input, the input is not damaged up to 30 VAC/DC.
Function	Free of voltage contact Tariff management (switch between t1-t2)		
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.	Read command	50 words available in 1 read command
Function	For communication of measured data, programming parameters	Broadcast command	Accepted without any replay frames (compatible with Huawei devices).
Protocol	ModBus RTU (slave function)	Rx/Tx indication	Rx segment on display is shown when a valid Modbus command is sent to that specific meter
Baud rate	9.6, 19.2, 38.4, 57.6, 115.2 kbaud, even or no parity,		Tx segment on display is shown when a valid Modbus reply is sent back to the master
Address	1 to 247 (default: 01)		
Driver input capability	1/8 unit load. Maximum 247 transceivers on the same bus.		
Data refresh time	1sec		

General specifications

Operating temperature	-25 to +65 °C, indoor, (R.H. from 0 to 90% non-condensing @ 40°C)	**Standard compliance** Safety Metrology	 EN62052-11 EN62053-21, EN50470-3
Storage temperature	-30°C to +80°C (R.H. < 90% noncondensing @ 40°C)	**Approvals**	CE
Overvoltage category	Cat. III	**Connections** Cable cross-section area	 Measuring inputs: max. 6 mm^2 with/without metallic cable ferrule; Max. screw tightening torque: 1.1 Nm 1.5 mm², Min./Max. screws tightening torque: 0.4 Nm
Insulation (for 1 minute)	4000 VAC RMS between measuring inputs and digital/serial output (see table) 4000 VAC RMS	Other terminals	
Dielectric strength	4000 VAC RMS for 1 minute	**Housing** Dimensions (WxDxH) Material Sealing covers	 17,5 x 63 x 91,5 mm Noryl, self-extinguishing: UL 94 V-0 Included
EMC Electrostatic discharges Immunity to irradiated electromagnetic fields	According to EN62052-11 15kV air discharge; Test with current: 10V/m from 80 to 2000MHz; Test without any current: 30V/m from 80 to 2000MHz;	**Mounting**	DIN-rail
		Protection degree Front Screw terminals (cable inputs)	 IP51 IP20
Burst	On current and voltage measuring inputs circuit: 4kV	**Weight**	Approx. 80 g (packing included)
Immunity to conducted disturbances	10V/m from 150KHz to 80MHz		
Surge	On current and voltage measuring inputs circuit: 4kV;		
Radio frequency	According to CISPR 22		

Power supply specifications

Self power supply AV8	 230VAC VL-N, -30% +20% 45 to 65 Hz	**Power consumption**	≤ 1.0W, ≤ 8VA

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Insulation (for 1 minute) between inputs and outputs

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

Accuracy (according to EN62053-1 and EN62053-23)

kWh, accuracy (RDG) depending on the current

Percentage error limits for class index B

| PF=1 | 0.25A(I_{min}) 0.05A(I_{ref}) | 0.5A(I_{tr}) (0,1I_{ref}) | 5A(I_n) | 45A(I_{max}) |
| PF=L0.5 or C0.8 | | 0.5A(I_{tr}) (0,1I_{ref}) | 5A(I_n) | 45A(I_{max}) |

—— **Class 1 accuracy limits (Active energy)**
5(45)A Start-up current: 20mA

kvarh, accuracy (RDG) depending on the current

Error

| sinφ =1 | 0.25A (0.05Ib) | 0.5A (0.1Ib) | 5A(Ib) | 45A(I_{max}) |
| sinφ=0.5 | 0.5A (0.1Ib) | 1A (0.25Ib) | 5A(Ib) | 45A(I_{max}) |

—— **Class 2 accuracy limits (Reactive energy)**
5(45)A Start-up current: 20mA

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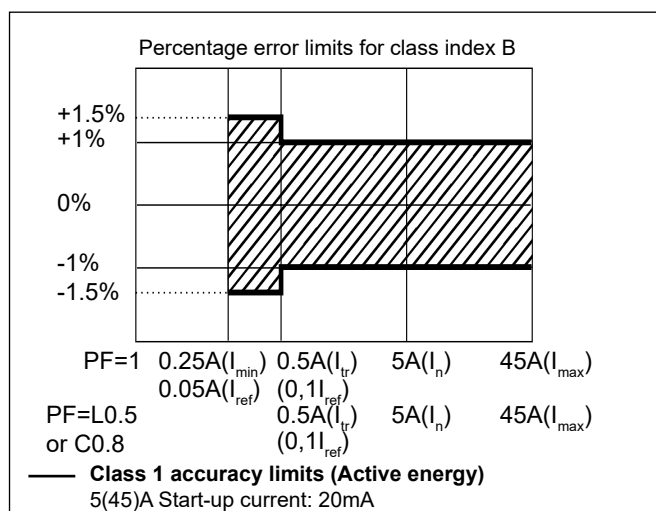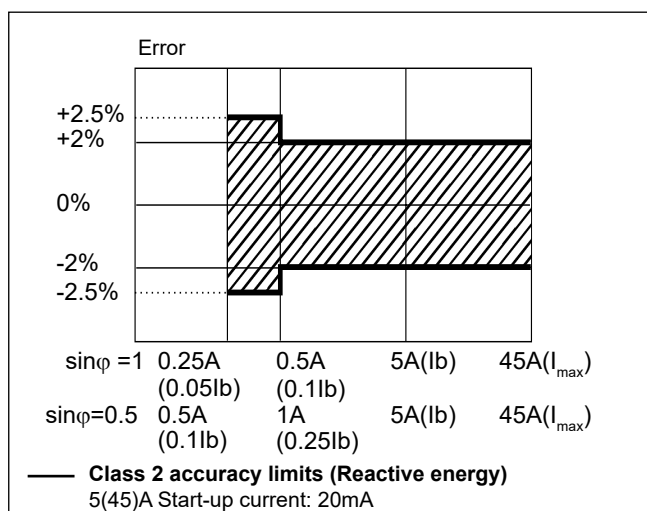
Display pages

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

X= available

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List of available menus

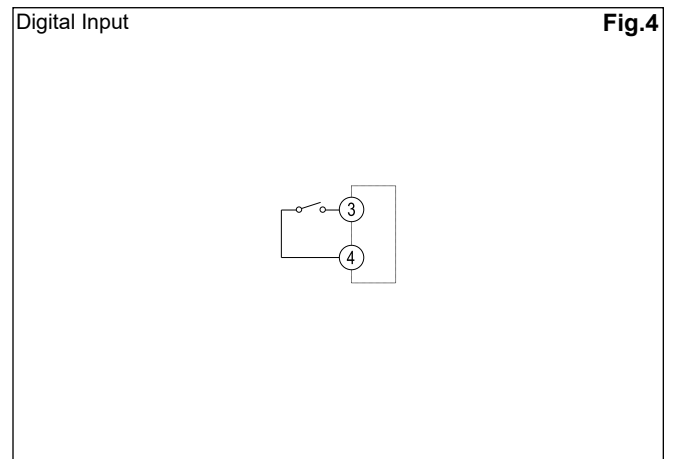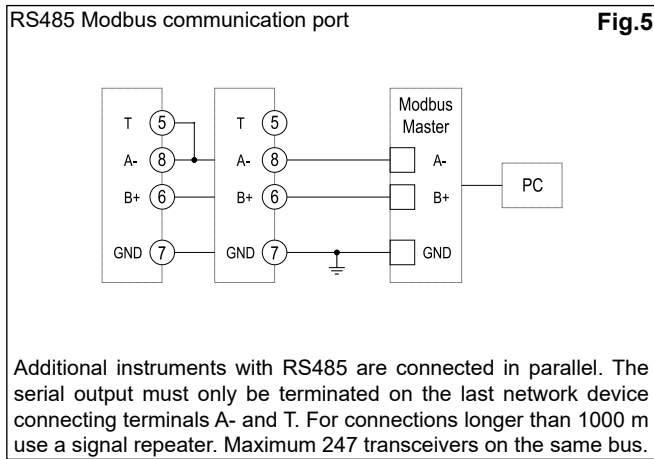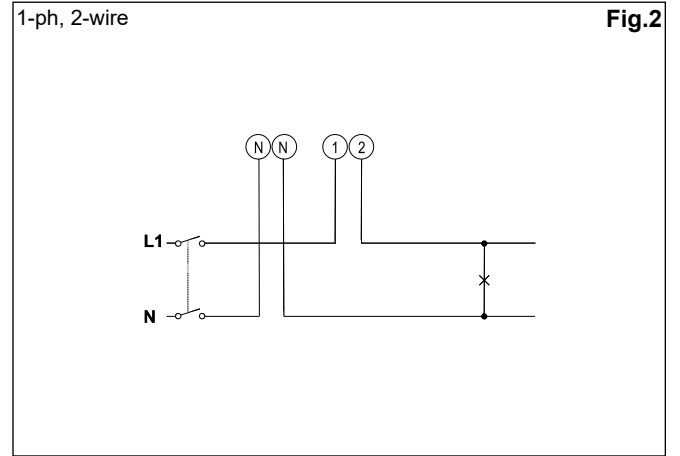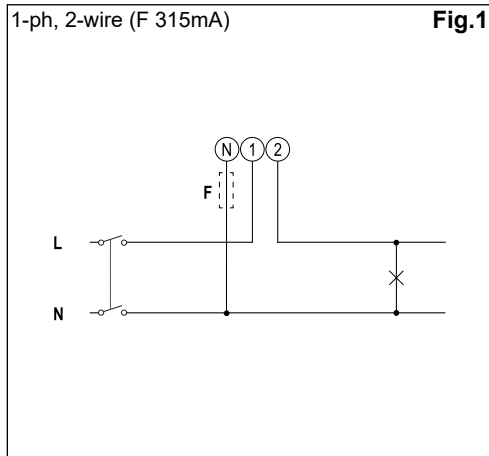| Menu name and description		Range	Default setting
PASS	Password request	From 0000 to 9999	0000
nPASS	New password	From 0000 to 9999	0000
Measure	Measurement type (A=easy connection; B=bidirectional, imported and exported energy).	A; b	A
P int	Integration time for Wdmd calculation	1 to 30 min	1
Mode	Selection of complete or simplified set of variables on display	Full or Easy	Full
Tariff	Tariff enabling	Yes/No	No
Address (S1)	Modbus serial address	1 to 247	01
Baud (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 and of the kWh/kvarh partial meter 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.
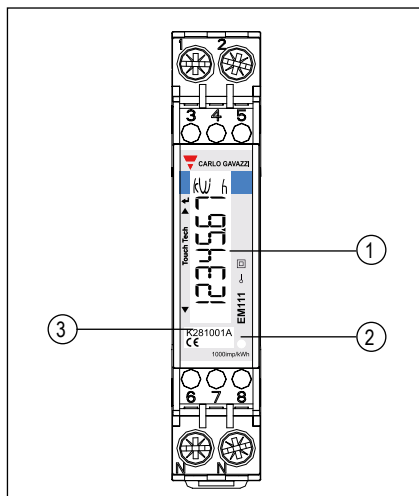
Additional available information on the display (*)

Type	Description	Note
Info page 1	YEAr (2013)	Year of production
Info page 2	SErIAL (dddnnnA)	Serial number (ddd= day of the year; nnn=progressive number; A= production line, internal use only)
Info page 3	rEV (A.01)	Firmware revision
Info page 4	MEASurE	Measurement type
Info page 5	P int	Integration time for Wdmd calculation
Info page 6	ModE	Set of variables on display
Info page 7	tArIFF	Tariff enabling
Info page 8 (S1)	AddrESS	Modbus serial address
Info page 9 (S1)	bAud	Modbus baud rate
Info page 10 (S1)	PArItY	Modbus parity

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

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Wiring diagrams

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

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

RS485 Modbus communication port   **Fig.5**

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.

Digital Input   **Fig.4**

Front panel description

1. **Display**
   Backlit LCD display with touch key-pad.
   Upper part: enter

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

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

Dimensions (mm)