Energy Management
Energy Transducer
Type ET112

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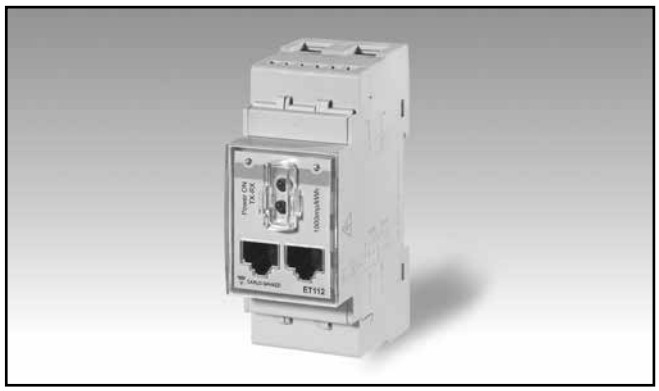

- **Single phase energy transducer**
- **Class 1 (kWh) according to EN62053-21**
- **Accuracy ±0.5% RDG (current/voltage)**
- **Direct current measurement up to 100AAC**
- **Energy measurement: kWh and kvarh (imported/ exported); kWh+ by 2 tariffs**
- **System variables, kW, kvar, V, A, PF, Hz, kWdmd, kWdmd peak**
- **Self power supply**
- **Dimensions: 2-DIN module**
- **Protection degree (front): IP20**
- **RS485 Modbus port (screw terminals and RJ45 connection)**
- **Optical port**
- **Digital input (for tariff management)**
- **Easy connection or wrong current direction detection**
- **Run hour meter**

Product description

Single-phase energy transducer. 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 IP20 front degree protection. The transducer is provided with RS485 Modbus port (available through screw terminals, dual RJ45 connectors or optical infrared communication port). A run-hour meter is available to link the energy to the relevant working hours.

How to order

ET112-DIN AV0 1 X S1 X

Model
Range code
System
Power supply
Output
Option

Type Selection

Range code

AV0: 230VLN AC - 5(100)A (Direct connection)

AV1: 120VLN AC - 5(100)A (Direct connection)

System

1: 1-phase 2-wire

Power supply

X: Self power supply -30% +20% of the rated measuring input voltage, 45 to 65Hz

Output

S1: RS485 Modbus port

Option

X: none

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Input specifications

Rated Inputs	
Current type	1-phase loads, direct connection
Current range	5(100)A
Nominal voltage	230VLN AC (AV0 option), 120 VLN (AV1 option)
Accuracy (@25°C ±5°C, R.H. ≤60%, 45 to 65 Hz)	
AV1	Imin=0.25A; Ib: 5A, Imax: 100A; Un: 120VLN -30% +30%
AV0	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 (AV0, AV1), positive or negative Self-consumption is not measured.
Start-up voltage	84VLN (AV1), 161VLN (AV0)
Resolution (via serial port)	
Current	0.001 A
Voltage	0.1 V
Power	0.1 W or var
Frequency	0.1Hz
PF	0.001
Energies (positive)	0.1 kWh or kvarh
Energies (negative)	0.1 kWh or kvarh
Run hour meter	0.01 h
Energy additional errors	
Influence quantities	According to EN62053-21
Temperature drift	≤200ppm/°C
Sampling rate	4096 samples/s @ 50Hz 4096 samples/s @ 60Hz
Max. and Min. data values	
Energies	Max. 99 999 999 Min. 0.01
Variables	Max. 9999 Min. 0.01
Run hour meter	Max 999 999.99 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	
Right LED	Flashing red light pulses according to EN62052-11, 1000 pulse per kWh (min. period: 90ms)
Left LED	Fix green light: power-on Blinking red light: power-on and communication in progress
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
Voltage input 120VL-N	1.2Mohm
Current inputs: 5(100) A	< 1.25VA

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Digital input specifications

Digital inputs	Free of voltage contact
Function	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

Overload	In case a voltage is erroneously applied to the digital input, the input is not damaged up to 30 VAC/ DC.

Output specifications

RS485 serial port	RS485 by screw connection or RS485 by standard female RJ45 connectors (not shielded).
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: 01)
Driver input capability	1/8 unit load. Maximum 247 transceivers on the same bus.
Data refresh time	1sec
Read command	50 words available in 1 read command
RJ45 pin-out	According to Modbus standard: A- (pin5), B+ (pin4), GND (pin8)
Other ports	All the Modbus ports (screw terminals, two RJ45) are in parallel. Only one port at a time can be used.
Optical port	
Description	Frontal bi-directional infrared optical coupling with CG optical reader device “Opto-prog”
Function	For remote communication of measured data and setting of programming parameters
Protocol	ModBus RTU (slave function)

Baud rate	9.6, 19.2 kbaud, even or no parity
Address	1
Data refresh time	1 sec
Read command	50 words available in 1 read command
Optical port LEDs	
LED axial distance	6.5 mm
LED function	- Upper LED is a receiver (from the master to the transducer - Lower LED is a transmitter (from the trasducer 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)
Storage temperature	-30°C to +80°C (R.H. < 90% noncondensing @ 40°C)
Overvoltage category	Cat. III
Insulation (for 1 minute)	4000 VAC RMS between measuring inputs and digital/serial output (see table) 4000 VAC RMS
Dielectric strength	4000 VAC RMS for 1 minute
EMC	According to EN62052-11
Electrostatic discharges	15kV air discharge;
Immunity to irradiated electromagnetic fields	Test with current: 10V/m from 80 to 2000MHz; Test without any current: 30V/m from 80 to 2000MHz;
Burst	On current and voltage measuring inputs circuit: 4kV
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

Standard compliance	
Safety	EN62052-11
Metrology	EN62053-21
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
Housing	
Dimensions (WxHxD)	35 x 63 x 90 mm
Material	Noryl, self-extinguishing: UL 94 V-0
Sealing covers	Included
Mounting	DIN-rail
Protection degree	
Front	IP20
Screw terminals (cable inputs)	IP20
Weight	Approx. 160 g (packing included)

Power supply specifications

Self power supply	
AV0	230VAC VL-N, -30% +20% 50/60Hz
AV1	120VAC VL-N, -30% +30% 50/60Hz
Power consumption	≤ 1.0W, ≤ 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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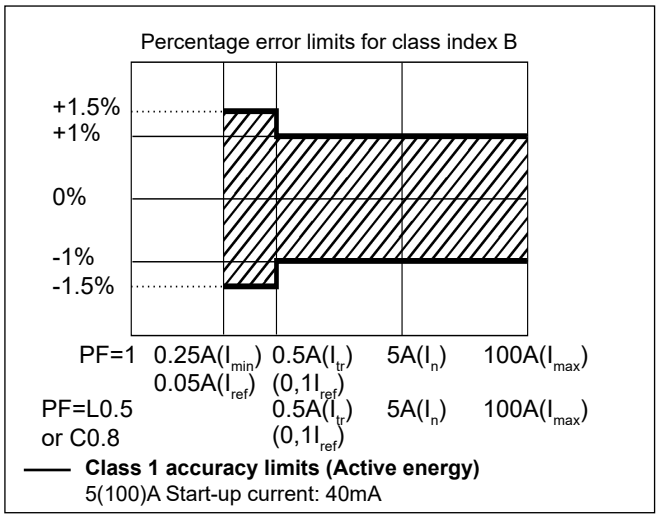
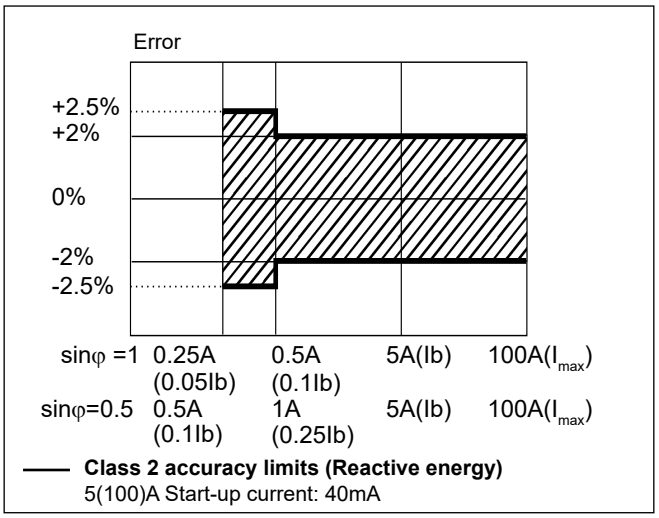
Accuracy (according to 62053-21 and EN62053-23)

kWh, accuracy (RDG) depending on the current



kvarh, accuracy (RDG) depending on the current



Available variables

1	kWh+ (imported)
2	kWh- (exported)
3	kWh (t1 and t2)
4	kW
5	kW dmd
6	kW dmd peak
7	kvar
8	kVA
9	V
10	A
11	PF
12	Hz
13	Run hour meter

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List of programming parameters

Menu name and description		Range	Default setting
Measure	Measurement type (A=easy connection; B=bidirectional, imported and exported energy). Not available in PFA and PFB versions (MID)	A; b	A
P int	Integration time for Wdmd calculation	1 to 30 min	1
Tariff	Tariff enabling	Yes/No	No
Address	Modbus serial address	1 to 247	01
Kbaud	Modbus baud rate	9.6; 19.2; 38.4; 57.6, 115.2 kbps	9.6
ParItY	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

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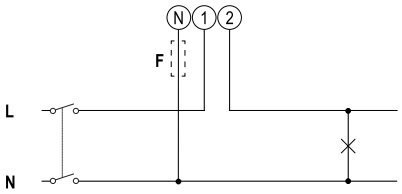
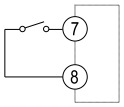
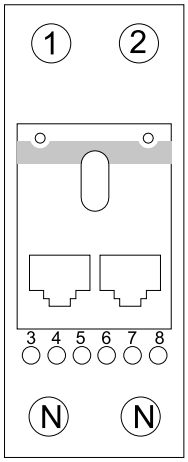
Wiring diagrams

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

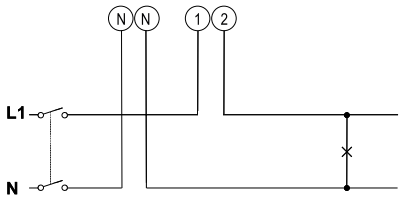


Digital Input **Fig.2**

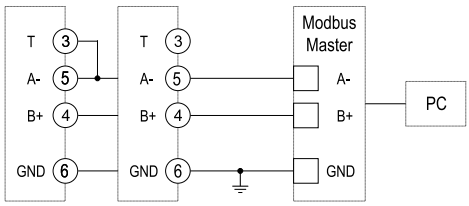




1-ph, 2-wire (F 315mA) **Fig.3**

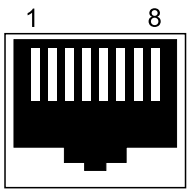


RS485 (screw terminals) Modbus communication port **Fig.4**



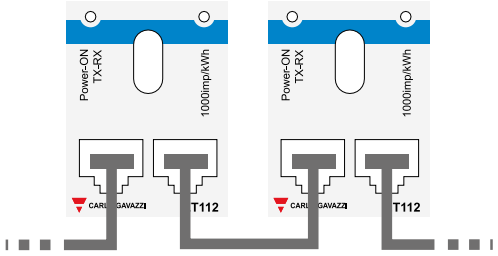
Additional instruments with RS485 are connected in parallel. The serial output must only be terminated on the last network device connecting terminals A- and T. For connections longer than 1000 m use a signal repeater. Maximum 247 transceivers on the same bus.

Modbus RJ45 female connector connection diagram **Fig.5**



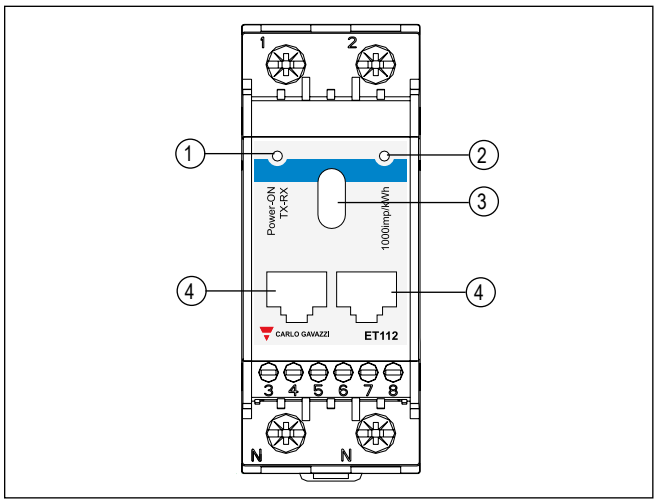
4	B+
5	A-
8	GND

RS485 (RJ45) Modbus connection **Fig.6**



The serial output must only be terminated on the last network device connecting terminals A- (5) and T (3). For connections longer than 1000 m use a signal repeater. Maximum 247 transceivers on the same bus.

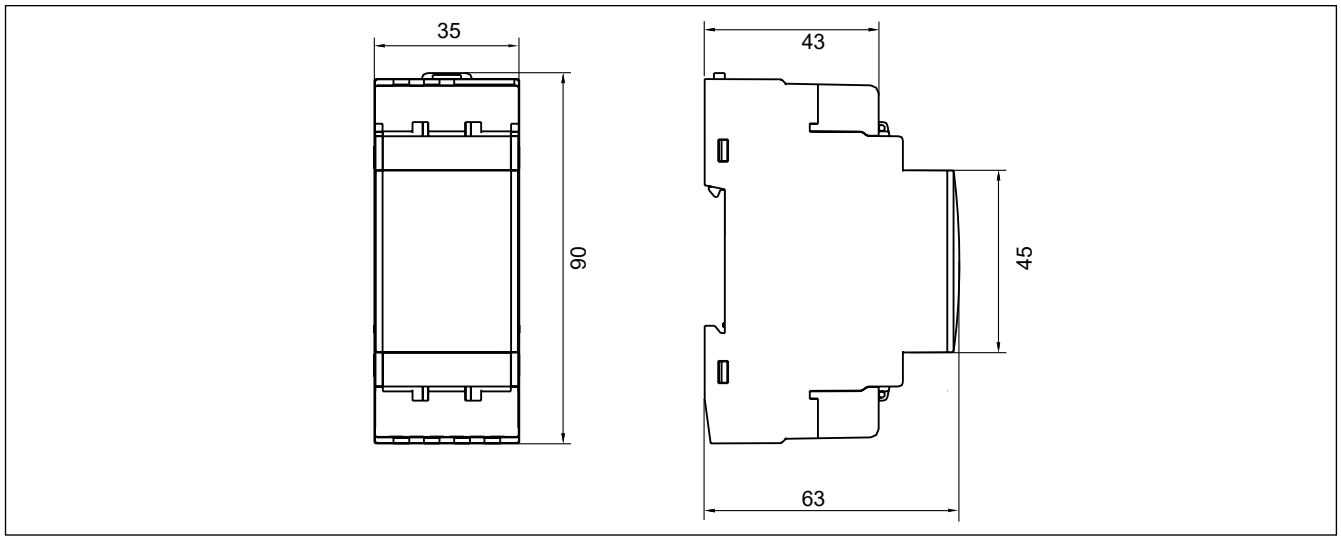
Front panel description



1. **LED**
   Power-ON LED with communication indication (when blinking)

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

3. **Optical port**
   Optical port for data transmission or programming

4. **RJ45 Modbus RTU ports (RS485)**
   Modbus ports for fast bus connection. The ports are in parallel. The screw terminals can be used as well (same Modbus port).

Dimensions (mm)