Energy Management
Energy Transducer
Type ET330

CARLO GAVAZZI

- **Three phase energy transducer**
- **Class 0.5S (kWh) according to EN 62053-22**
- **Accuracy ±0.5% RDG (current/voltage)**
- **Current measurement via CT**
- **Energy measurement: kWh and kvarh (imported/ exported); kWh+ by 2 tariffs; kWh per phase**
- **System variables: kW, kvar, kVA, VLL, VLN, PF, Hz, kWdmd, kWdmd peak**
- **Phase variables: kW, kvar, kVA, VLL, VLN, A, PF**
- **Auxiliary power supply**
- **Dimensions: 3-DIN module**
- **Protection degree (front): IP20**
- **RS485 Modbus port**
- **Run hour meter**
- **Neutral current calculation**
- **Digital input (for tariff management)**
- **Easy connection**

Product description

Three-phase energy transducer. Particularly indicated for active energy metering and for cost allocation (CT 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. The transducer is provided with RS485 Modbus port.

How to order

ET330 DIN AV5 3 H S1 X

- **Model**
- **Range code**
- **System**
- **Power supply**
- **Output**
- **Option**

Type Selection

Range code

AV5:	400 to 480 VLL ac - 5(6) A (CT connection) 230 to 277 VLN ac - 5(6) A (CT connection)

System

3:	3-phase, 3- or 4-wire; 2-phase 3-wire, 1-phase 2 wire

Power supply

H:	auxiliary power supply 100 to 240V ac/dc

Output

S1:	RS485 Modbus port

Option

X:	none

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Input specifications

Rated Inputs	
Current type	3-phase loads, CT connection
Current range	5(6)A
Nominal voltage	400 to 480 V LL ac
Max CTxVT	1000
Accuracy	
(@23°C ±2°C, 45 to 65 Hz)	0.01In=0.05A (kWh, PF=1) 0.05In=0.25A (kWh, PF=1) In: 5A, Imax: 6A; Un: 230 to 277 VLN (400 to 480 VLL)
Current	From 0.04In to 0.2In: ±(0.5%RDG+1DGT) From 0.2In to Imax: ±(0.5%RDG)
Phase-neutral voltage	In the range Un: ±(0.5% RDG)
Phase-phase voltage	In the range Un: ±(2% RDG)
Frequency	Range: 45 to 65Hz.
Active power	From 0.05 In to Imax, within Un range, PF=1: ±(1% RDG) From 0.1 In to Imax, within Un range, PF=0.5L or 0.8C: ±(1% RDG)
Power factor	±[0.001+1%(1.000 - "PF RDG")]
Reactive power	From 0.05 In to Imax, within Un range, sinphì=1: ±(2% RDG) From 0.1 In to Imax, within Un range, sinphì=0.5L or 0.8C: ±(2% RDG)
Energies	
Active energy	Class 0.5S according to EN 62053-22
Reactive energy	Class 2 according to EN 62053-23
Start-up current:	5 mA
Start-up voltage	90 V LN
Resolution	serial communication
Current	0.001 A
Voltage	0.1 V
Power	0.1 W or var or VA
Frequency	0.1Hz
PF	0.001
Energies (positive)	0.1 kWh or kvarh
Energies (negative)	0.1 kWh or kvarh
Run hour	0.01 hour
Energy additional errors	
Influence quantities	According to EN 62053-22/-23
Temperature drift	According to EN 62053-22/-23
Sampling rate	4096 samples/s @ 50Hz 4096 samples/s @ 60Hz

Memory	
Energy	10^12 cycles. Energy value is saved every time the less significant digit increases.
Programming parameters	10^12 cycles. When a parameter is modified, only the relevant memory cell is overwritten
LEDs	
Flashing red light pulses	Proportional to the product of the CT and VT ratios
Weight (pulses/kWh) 1	> 700,1 (CT x VT)
Weight (pulses/kWh) 10	70.1–700 (CT x VT)
Weight (pulses/kWh) 100	7.1–70 (CT x VT)
Weight (pulses/kWh) 1000	< 7.1 (CT x VT)
Duration	90ms
Fix orange light	wrong current direction (with "B" measurement selection)
Current overloads	
Continuous	6A, @ 50Hz
For 500ms	20 Imax
Voltage Overloads	
Continuous	1.2 Un
For 500ms	2 Un
Input impedance	
230VL-N	2.1 Mohm
5(6) A	< 1 VA

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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	10 Mohm
Contact resistance	≤1 kohm, close contact ≥100 kohm, open contact
Overload	In case a voltage is erroneously applied to the digital input, the input is not damaged up to 30 V ac/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,
Data format	even or no parity,
Address	1 to 247 (default: 1)
Driver input capability	1/8 unit load. Maximum 247 devices on the same bus.
Data refresh time	1 s
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 kbaud, no parity
Address	1
Data refresh time	1 s
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 (-13 to 149° F), indoor, (R.H. from 0 to 90% non-condensing @ 40°C)
Storage temperature	-30°C to +80°C (-22 to 176° F) (R.H. < 90% non condensing @ 40°C)
Overvoltage category	Cat. III
Insulation (for 1 minute)	4000 V ac RMS between measuring inputs and digital/serial output (see table) 4000 V ac RMS
Dielectric strength	4000 V ac RMS for 1 minute
EMC	
Immunity	According to EN 61000-6-2
Emission	According to EN 61000-6-3
Standard compliance	
Safety	EN 61010-1
Metrology	EN 62053-21
Approvals	CE, cULus (UL 61010-1)
Connections	
Voltage inputs	Cable cross-section area: max. 4 mm^2, min. 1 mm^2 with/without metallic cable ferrule; Max. screw tightening torque: 0.6 Nm
Other terminals	Cable cross-section area: 1.5 mm^2, Min./Max. screws tightening torque: 0.4 Nm

Housing	
Dimensions (WxHxD)	54 x 90 x 63 mm
Material	PBT, self-extinguishing: UL 94 V-0
Sealing covers	Included
Mounting	DIN-rail
Protection degree	
Front	IP20
Screw terminals	IP20
Weight	Approx. 240 g (packing included)

Power supply specifications

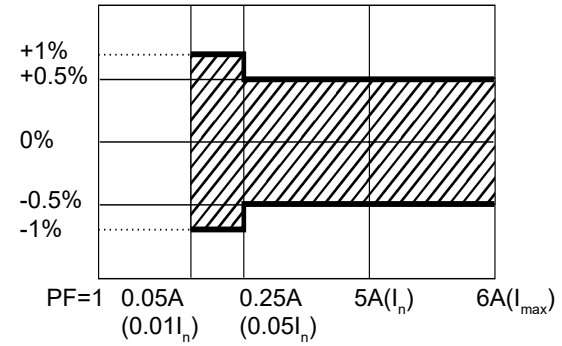
Auxiliary power supply	H: 100 to 240 V ac/dc
Power consumption	≤ 1W, ≤ 8VA

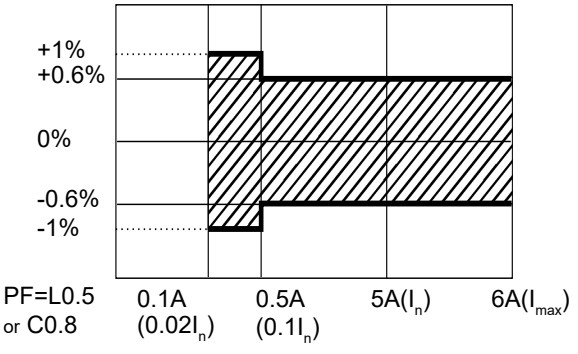
Insulation (for 1 minute) between inputs and outputs

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

Accuracy (according to EN 62053-22 and EN 62053-23)

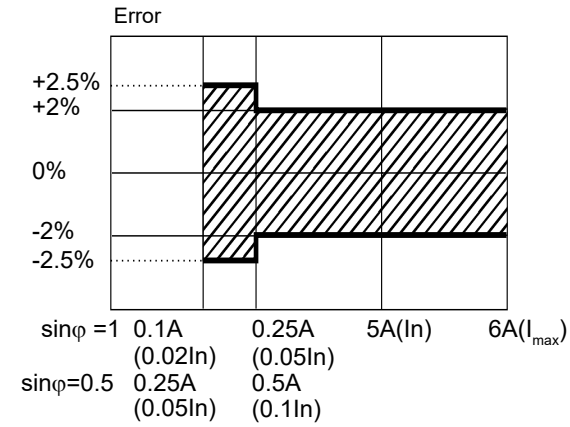
kWh, accuracy (RDG) depending on the current





—— **Class 0.5S accuracy limits (Active energy)**
5(6)A Start-up current: 5mA

kvarh, accuracy (RDG) depending on the current



—— **Class 2 accuracy limits (Reactive energy)**
5(6)A Start-up current: 5mA

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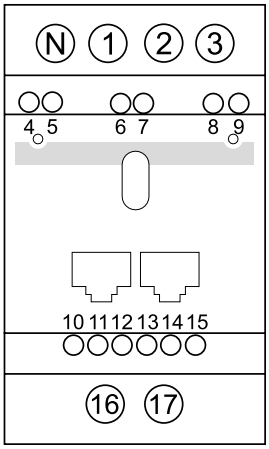
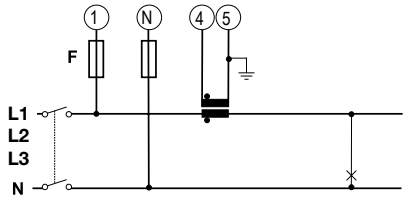
Wiring diagrams

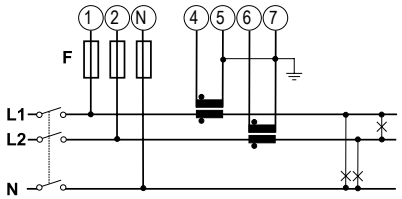


1-ph, 2-wire **Fig.1**



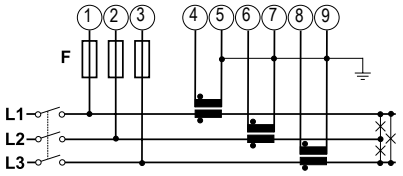
1-CT connection F=315 mA

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



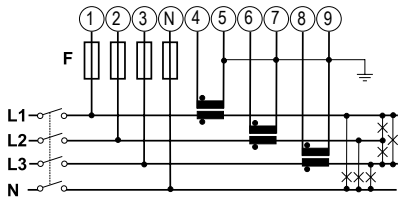
2-CT connection F=315 mA

3-ph, 3-wire, unbalanced load **Fig.3**



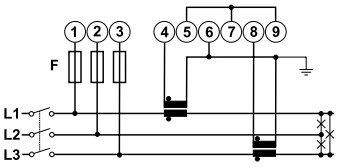
3-CT connection F=315 mA

3-ph, 4-wire, unbalanced load **Fig.4**



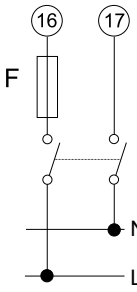
3-CT connection F=315 mA

3-ph, 3-wire **Fig.5**



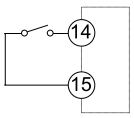
Aron 3-CT connection F=315 mA

Power supply **Fig.6**



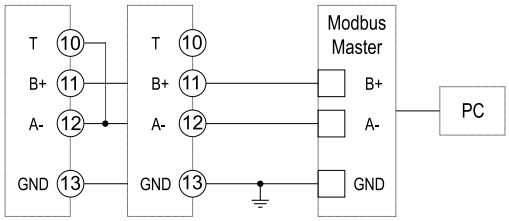
F=315 mA

Digital Input **Fig.7**



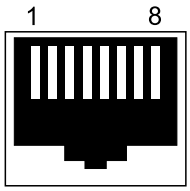
Wiring diagrams (cont.)

RS485 Modbus communication port **Fig.8**



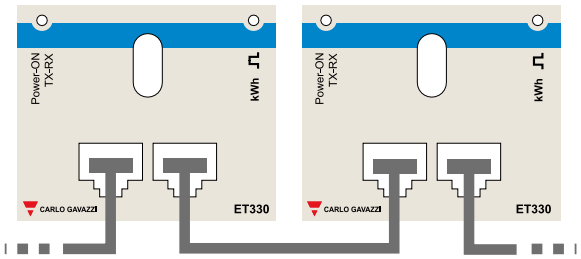
Additional instruments with RS485 are connected in parallel. The serial output must only be terminated on the last network device connecting terminals A- and T. For connections longer than 1000 m use a signal repeater. Maximum 247 transceivers on the same bus.

Modbus RJ45 female connector connection diagram **Fig.9**



4	B+
5	A-
8	GND

RS485 (RJ45) Modbus connection **Fig.10**



The serial output must only be terminated on the last network device connecting terminals A- (12) and T (10). For connections longer than 1000 m use a signal repeater. Maximum 247 transceivers on the same bus.