Energy Management
Compact Power Transducer
Type CPT-DIN "Advanced version"

CARLO GAVAZZI

- **One digital output and RS485 communication port (2 wires only)**
- **16 freely configurable alarms with OR/AND logic linkable to up to 2 digital outputs**
- **RS422/485/RS232 communication port (MODBUS-RTU), iFIX SCADA compatibility**
- **Class 1 (kWh), Class 2 (kvarh)**
- **Accuracy ±0.5 F.S. (current/voltage)**
- **Compact power transducer**
- **Instantaneous variables data format: 4 DGT**
- **Energies data format: 8+1 DGT**
- **System variables and phase measurements: V_{LL}, V_{LN}, A, A_{max}, An, A_{dmd}, $A_{dmd\ max}$, VA, VA_{dmd}, $VA_{dmd\ max}$, W, W_{dmd}, $W_{dmd\ max}$, W_{L1}-W_{L2}-W_{L3} max, var, PF, PF_{L1}-PF_{L2}-PF_{L3} min, Hz, ASY**
- **Four quadrant power measurement**
- **Energy measurements: total and partial kWh and kvarh (according to EN62053-21 and EN62053-23)**
- **Hour counter (5+2 DGT)**
- **TRMS meas. of distorted sine waves (voltages/currents)**
- **Universal power supply: 90 to 260 VAC/DC, 18 to 60 VAC/DC**
- **Dimensions: 45x83.5x98.5mm**
- **Voltage asymmetry, phase sequence, phase loss control**
- **Up to 3 analogue outputs (20mA or 10VDC)**
- **2 digital outputs**

Product Description

3-phase compact power transducer. Particularly recommended for the measurement of the main electrical variables also on board of machines.
Housing for DIN-rail mounting, with up to 3 analogue outputs, or RS485 communication port or alarm outputs or "Dupline" bus. Parameters programmable by means of CptASoft.

How to order

CPT-DIN AV5 3 H A3 AX

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

How to order CptASoft-kit

CptASoft: software to program the working parameters of the transducer and to read the energies and the instantaneous variables. The kit includes the communication cable.

Type Selection

Range codes

AV5: 400/690V_{L-L}/1/5(6)AAC
V_{L-N}: 185 V to 460 V
V_{L-L}: 320 V to 800 V
AV6: 120/208V_{L-L}/1/5(6)AAC
V_{L-N}: 45 V to 145 V
V_{L-L}: 78 V to 250 V
Phase current: 0.01A to 6A
Neutral current: 0.05A to 6A

System

3 : 1-2-3-phase, balanced/unbalanced load, with or without neutral
1 : 1-3-phase, balanced load (*)

(*) Note: the 3-phase balanced load measurement requires the connection of the neutral according to fig. 15 and 16 in the final part of this document.

Outputs

R2: 2-relay outputs
O2: 2-open collector outputs
RS: 1-reed relay output + RS485 port (2-wire)
A1: 1-analogue output: 0/4 to 20mA DC
A3: 3-analogue outputs: 0/4 to 20mA DC
V1: 1-analogue output: 0 to 10V DC
V3: 3-analogue outputs: 0 to 10V DC
S1: RS485/RS422 port
S2: RS232 port
DB: Dupline bus

Options

AX: advanced functions

Power supply

L: 18 to 60 VAC/VDC
H: 90 to 260 VAC/VDC

Input specifications

Rated inputs	System type: 3
Current	3 (internal current transformers)
Voltage	4
	System type: 1
Current	1 (internal CT)
Voltage	2
Accuracy (RS485) (@25°C ±5°C, R.H. ≤60%)	Imax: 6A, Vmax: 400V_{LN} (690V_{LL}), In: 5A, Vn: 230V_{LN} (400V_{LL}) CT: 1, VT (PT): 1
Range accuracy: 0.02In to 0.05In	
Current	±(0.5%FS) or ±(1%RDG+2DGT)
Neutral current	±(2%RDG+3DGT)
Phase-phase voltage	±(0.5%RDG+2DGT)
Phase-neutral voltage	±(0.5%RDG+2DGT)
Active and Apparent power,	±(1.5%RDG+3DGT)
Reactive power	±(3%RDG+3DGT)
Range accuracy: 0.05In to Imax	
Current	±(0.5%RDG+2DGT)
Neutral current	±(1%RDG+3DGT)
Phase-phase voltage	±(0.5%RDG+2DGT)
Phase-neutral voltage	±(0.5%RDG+2DGT)
Active and Apparent power,	±(1%RDG+3DGT)

Input specifications (cont.)

Reactive power	±(2%RDG+3DGT)
Active energy	Class 2 according to EN62053-21 (I start up: 10mA)
Reactive energy	Class 3 according to EN62053-23 (I start up: 10mA)
Frequency	±0.1Hz (48 to 62Hz)
Additional errors	
Humidity	≤0.3% FS, 60% to 90% RH
Frequency	≤0.3% FS (45 to 48Hz and 62 to 65Hz)
Temperature drift	≤ 200ppm/°C
Sampling rate	1600 samples/s @ 50Hz 1900 samples/s @ 60Hz
Measurement refresh time	200ms
Measurement format	(serial communication)
Instantaneous variables	4 DGT, max indication 9999
Energies	8+1 DGT, max indication 999 999 99.9
Hourcounter	5+2 DGT, max indication 9 999 9.99
Measurements	Current, voltage, power, power factor, frequency
Type	TRMS measurement of distorted waves.
Coupling type	Direct
Crest factor	< 3, max 10A peak
Input impedance	
400/690V_{L-L} (AV5)	1.6 MΩ ±5%
120/208V_{L-L} (AV6)	1.6 MΩ ±5%
Current	≤ 0.01Ω
Frequency	45 to 65 Hz
Overload protection	(max values)
Continuos voltage/current	AV5: 460V_{LN}/800V_{LL}/6A AV6: 145V_{LN}/250V_{LL}/6A
For 500ms: voltage/current	AV5: 800V_{LN}/1380V_{LL}/36A AV6: 240V_{LN}/416V_{LL}/36A

Output Specifications

Analogue Outputs	
Number of outputs	Up to 3
Accuracy (@ 25°C ±5°C, R.H. ≤60%)	±0.3% FS
Range	0 to 20mA or 0 to 10 VDC
Scaling factor:	Programmable within the whole range of retransmission; it allows the retransmission management of all values from: 0 and 20 mA, 0 and 10VDC
Response time	≤ 400 ms typical (filter excluded)
Ripple	≤ 1%, according to IEC 60688-1, EN 60688-1
Total temperature drift	≤ 500 ppm/°C
Load: 20 mADC	≤ 350 Ω
10 VDC	≥ 10KΩ
Insulation	By means of optocouplers, See table "Insulation between inputs and outputs"
Digital outputs	
Pulse	
Number of outputs	Up to 2
Type	Programmable from 0.01 to 500 pulses per kWh/kvarh (total counters) Outputs connectable to the total energy meters (Wh/varh)
Pulse duration	≥ 100ms <120msec (ON), ≥ 120ms (OFF) according to EN62053-31
Alarm	
Number of outputs	up to 2, independent
Alarm modes	Up alarm, down alarm, in window alarm, out window alarm. Start-up deactivation function at power-on for all kinds of alarm. All of them connectable to all variables (see the table "List of the variables that can be connected to")
Set-point adjustment	From 0 to 100% of the retransmitted scale
Hysteresis	from 0 to full scale
On-time delay	0 to 255s
Output status	Selectable; normally de-energized and normally energized
Min. response time	≤400ms, filters excluded and with alarm delay: "0 s"
Note	The 2 digital outputs can also work as one pulse output and one alarm output.
Static outputs	
Purpose	For alarm outputs or for pulse outputs
Signal	V_{ON} 1.2 VDC/ max. 100 mA V_{OFF} 30 VDC max.
Insulation	By means of optocouplers, See table "Insulation between inputs and outputs"
Relay outputs	
Purpose	For alarm outputs or for pulse outputs
Type	Relay, SPST type AC 1-5A @ 250VAC DC 12-5A @ 24VDC AC 15-1.5A @ 250VAC DC 13-1.5A @ 24VDC
Insulation	See table "Insulation between inputs and outputs"
Reed relay output	
Purpose	For alarm output or for pulse output
Type	Reed relay, SPST type NO
Switching voltage	Max 200VDC, peak AC resistive
Switching current	Max 0.5ADC, peak AC resistive
Carry current	Max 2ADC, peak AC resistive
Mechanical life	300x10^6 operations (1V/10mA)
Insulation	See table "Insulation between inputs and outputs"

Output Specifications (cont.)

RS422/RS485	(on request)
	Multidrop
	bidirectional (static and dynamic variables)
Connections	2 or 4 wires, max. distance 1200m, termination directly on the instrument
Addresses	From 1 to 255, selectable via software
Protocol	MODBUS/JBUS (RTU)
Data (bidirectional)	
Dynamic (reading only)	System and phase variables: see table “List of variables...”
Static (writing only)	All the configuration parameters.
Data format	1 start bit, 8 data bit, no parity,1 stop bit
Baud-rate	4800, 9600, 19200, 38400 bits/s
Insulation	By means of optocouplers, See table “Insulation between inputs and outputs”

RS232	Halfduplex communication
Type	Point to point connection
Connections	3-wire, max. distance 15m
Address	1 to 255 selectable via software
Protocol	MODBUS/JBUS (RTU)
Baud-rate	4800, 9600, 19200, 38400 bits/s
	other characteristics like R422/RS485 port
Dupline	
Bus	Full Dupline compatibility
Address	Programmable using CptASoft
Variables	kWh, kvarh + 8 variables chosen among the available ones.
Insulation	By means of optocouplers. See table “Insulation between inputs and outputs”

RS232 Configuration Bus

Connections	RJ12 (3-wire) for special cable
Baud-rate	4800 bits/s
Data format	1 start bit, 8 data bit, no parity, 1 stop bit
Insulation	By means of optocouplers, See table “Insulation between inputs and outputs”

CptASoft software: parameter programming and data reading

CptASoft	Multi language software to program the working parameters of the transducer and to read the energies and the instantaneous variables. Compatibility with Windows 95/98/98SE/2000/XP.
Working mode	Two different working modes can be selected: - management of a local RS485 network; - management of the communication from single instrument to PC (RS232);
Programming parameters	System selection: 1-2-3 phases CT/VT ratios Filtering parameters Alarm variables Alarm set-points and relevant parameters Variables to be connected to the analogue outputs Scaling of analogue outputs Energies to be connected to the pulse outputs Parameters related to the pulse outputs Reset function: max/min values, energies, dmd
Data access	By means of RS232 serial port, RS485 serial port or RS232 configuration port (RJ12)

Software functions

System selection	
System 3, unbalanced	3-phase (3-wire, 4-wire) 3-phase ARON 2-phase (3-wire)
System 3, balanced	1-phase (2-wire) 3-phase (3-wire, 4-wire) 3-phase (3-wire) “1CT+1VT” 3-phase (3-wire) “1CT+3VT”
System 1, balanced	3-phase (4-wire) “1CT+1VT” 3-phase (4-wire), phase to neutral voltage measurement 1-phase (2-wire)

Transformer ratio	
CT	1 to 60 000
VT (PT)	1.0 to 6 000.0
Filter	
Operating range	0 to 100% of the retransmitted scale
Filtering coefficient	1 to 32
Filter action	Measurements, alarms, serial output (fundamental variables: V, A, W and their derived ones).

Software functions (cont.)

Alarms			
Working mode	"OR" or "AND" or "OR+AND" functions (see "Alarm parameter and logic" page). The user can freely program up to 16 total alarms. (out1+out2). The alarms can be connected to any variables available in the table "List of the variables that can be connected to"		
Reset	The following resets are available by means of the configuration software: - all the maximum/min values:		- W dmd max, VA dmd max, A_1 max, A_2 max, A_3 max, W_{L1} max, W_{L2} max, W_{L3} max, W sys max, A_1 dmd max, A_2 dmd max, A_3 dmd max, VA sys dmd max, W sys dmd max, PF_1 min, PF_2 min, PF_3 min - all the counters: total kWh, partial kWh, total kvarh, partial kvarh, hour counters - reset of all the above mentioned variables in a single command

Power Supply Specifications

AC/DC voltage	90 to 260VAC/DC 18 to 60VAC/DC	**Power consumption**	AC: 2.5 VA DC: 2W

General Specifications

Front LED's			
Power on	Green		
Diagnostics			
RS485/RS422/RS232	TX data (Green) RX data (Red)		
Dupline bus	TX data (Green) RX data (Red)		
Alarm outputs	1st output activation (Green) 2nd output activation (Red)		
Pulse outputs	1st output activation (Green) 2nd output activation (Red)		
Analogue outputs	Output signal within the programmed scale (Green) Output signal exceeding 110% of full scale (Red)		
Operating temperature	0° to +50°C (32° to 122°F) (RH < 90% non condensing)		
Storage temperature	-10° to +60°C (14° to 140°F) (RH < 90% non condensing)		
Overvoltage category	Cat. III (IEC 60664, EN60664)		
Insulation (for 1 minute)	$4kVAC_{RMS}$ between measuring inputs and power supply. 4kVAC/DC @ I≥ 3mA between measuring inputs and RS485/RS232/ programming port (RJ12)		$4kVAC_{RMS}$ between power supply and RS485/RS232/programming port (RJ12)
		Dielectric strength	$4kVAC_{RMS}$ (for 1 min)
		EMC	
		Emissions	EN61000-6-3, EN60688 residential environment, commerce and light industry
		Immunity	EN61000-6-2 industrial environment.
		Pulse voltage (1.2/50µs)	EN61000-4-5
		Safety standards	IEC60664, IEC61010-1 EN60664, EN61010-1
		Mesurement standards	IEC60688, EN60688, EN62053-31, EN62053-23
		Approvals	CE, cURus
		Connections 5(6) A	Screw-type
		Max cable cross sect. area	2.5 mm^2
		Housing	
		Dimensions (WxHxD)	45 x 83.5 x 98.5 mm
		Material	ABS self-extinguishing: UL 94 V-0
		Mounting	DIN-rail
		Protection degree	IP20
		Weight	Approx. 200 g (pack. incl.)

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List of the variables that can be connected to:

- **RS485/RS422/RS232 communication port**
- **Analogue outputs (“max” variables, “energies” and “hour counter” excluded)**
- **Alarm outputs (“max” variables, energies and “hour counter” excluded)**
- **Pulse outputs (only “energies”)**
- **Dupline bus (only “total energies” + up to 8 selectable variables)**

No	Variable	1-phase system	2-phase system	3-ph. 4-wire balanced sys.	3-ph. 4-wire unbal. sys.	3-ph. 3-wire bal. sys.	3-ph. 3-wire unbal. sys.	Notes
1	V L1	x	x	x	x	o	o	
2	V L2	o	x	x	x	o	o	
3	V L3	o	o	x	x	o	o	
4	V L-N sys	o	x	x	x	o	o	Sys = system
5	V L1-2	o	x	x	x	x	x	
6	V L2-3	o	x	x	x	x	x	
7	V L3-1	o	o	x	x	x	x	
8	V L-L sys	o	x	x	x	x	x	Sys = system
9	A L1	x	x	x	x	x	x	#
10	A L2	o	x	x	x	x	x	#
11	A L3	o	o	x	x	x	x	#
12	Amax/ Admd max	x	x	x	x	x	x	◆Highest value among the 3-ph
13	An	o	x	x	x	x	x	
14	W L1	x	x	x	x	o	o	◆
15	W L2	o	x	x	x	o	o	◆
16	W L3	o	o	x	x	o	o	◆
17	W sys	o	x	x	x	x	x	Sys = system
18	var L1	x	x	x	x	o	o	
19	var L2	o	x	x	x	o	o	
20	var L3	o	o	x	x	o	o	
21	var sys	o	x	x	x	x	x	Sys = system
22	VA L1	x	x	x	x	o	o	
23	VA L2	o	x	x	x	o	o	
24	VA L3	o	o	x	x	o	o	
25	VA sys	o	x	x	x	x	x	Sys = system
26	PF L1	x	x	x	x	o	o	★
27	PF L2	o	x	x	x	o	o	★
28	PF L3	o	o	x	x	o	o	★
29	PF sys	o	x	x	x	x	x	Sys = system
30	Hz	x	x	x	x	x	x	
31	Phase seq.	o	o	x	x	x	x	
32	ASY L-N	o	x	x	x	x	x	
33	ASY L-L	o	x	x	x	x	x	
34	VA sys dmd	x	x	x	x	x	x	Sys = system ◆
35	W sys dmd	x	x	x	x	x	x	Sys = system ◆
36	A L1 dmd	x	x	x	x	x	x	dmd = (*)
37	A L2 dmd	o	x	x	x	x	x	dmd = (*)
38	A L3 dmd	o	o	x	x	x	x	dmd = (*)
39	VA L1 dmd	x	x	x	x	x	x	dmd = (*)
40	VA L2 dmd	o	x	x	x	x	x	dmd = (*)
41	VA L3 dmd	o	o	x	x	x	x	dmd = (*)
42	W L1 dmd	x	x	x	x	x	x	# dmd = (*)
43	W L2 dmd	o	x	x	x	x	x	# dmd = (*)
44	W L3 dmd	o	o	x	x	x	x	# dmd = (*)
45	kWh	x	x	x	x	x	x	Total and partial
46	kvarh	x	x	x	x	x	x	Total and partial
47	hours	x	x	x	x	x	x	

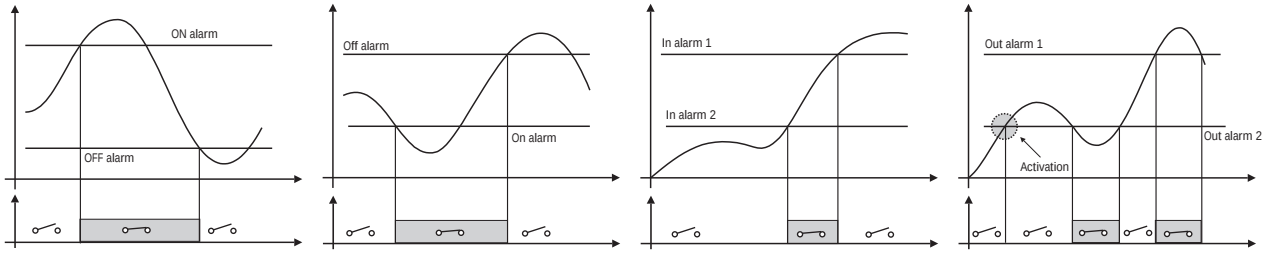
(x) = available (o) = not available

(◆) These variables are available also for the MAX values stored in the EEPROM when the instrument switches off.
(★) These variables are available also for the MIN values stored in the EEPROM when the instrument switches off.
(*) dmd value integrated in a programmed time interval.
(#) The variables are available also for the max values. When the instrument switches off, the values are not stored.

Alarm parameters and logic

- Block enable.
- Controlled variable (VLN, ...).
- Alarm type (up, down, in window alarm, out window alarm).
- Activation function.
- ON set-point.
- OFF set-point.
- ON delay.
- Logical function (AND, OR).
- Digital output (1, 2).

A, B, C... up to 16 parameter control blocks.



Up alarm
On alarm > Off alarm

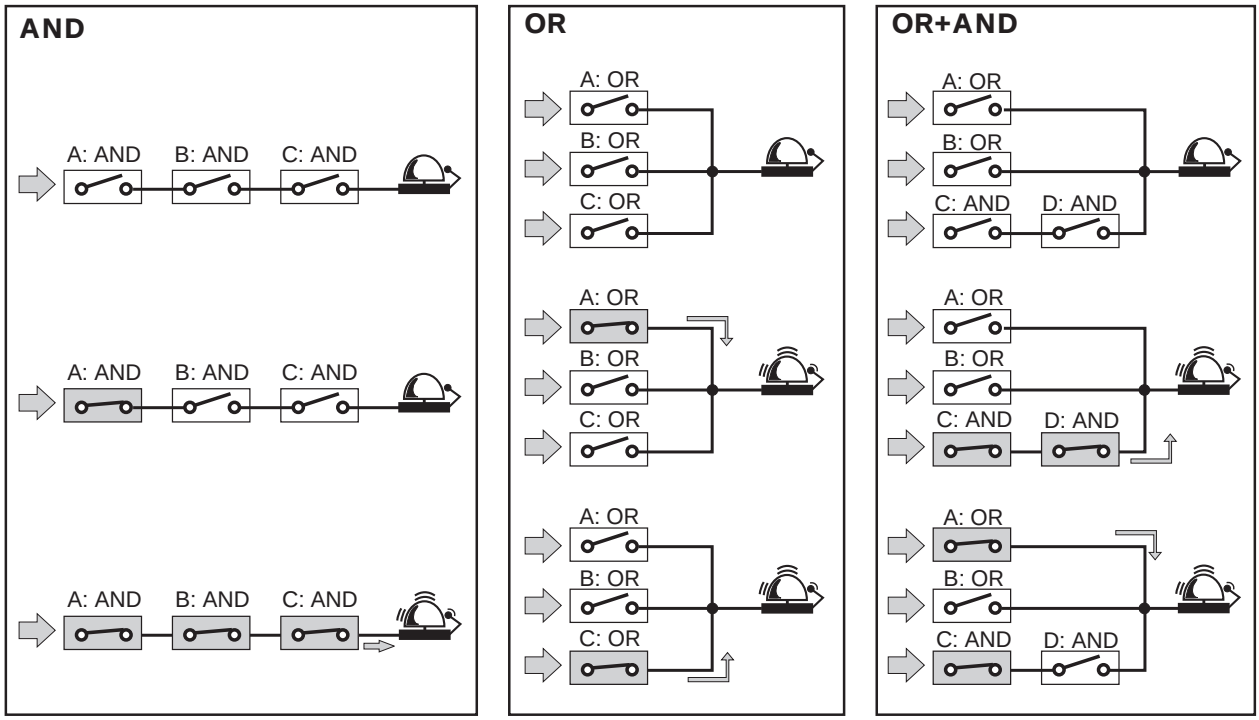
Down alarm
On alarm < Off alarm

In window alarm

Out window alarm with start up deactivation

Note: any alarm working mode can be linked to the “start up deactivation” function which disables only the first alarm after power on of the transducer.

AND/OR logical alarm examples:



Function Description

Input and output scaling capability. Working of the analogue outputs (y) versus input variables (x)

Figure A
The sign of measured quantity and output quantity remains the same. The output quantity is proportional to the measured quantity.

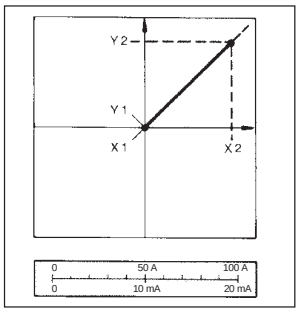


Figure C
The sign of measured quantity and output quantity remains the same. With the measured quantity being zero, the output quantity already has the value Y1 = 0.2 Y2.
Live zero output.

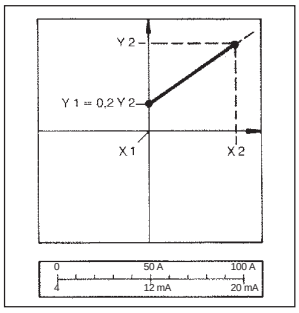


Figure B
The sign of measured quantity and output quantity remains the same. On the range X0...X1, the output quantity is zero. The range X1...X2 is delineated on the entire output range Y0 = Y1...Y2 and thus presented in strongly expanded form.

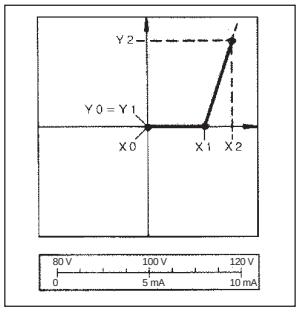
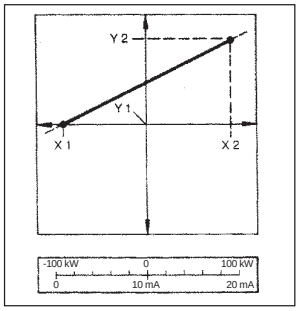


Figure D
The sign of the measured quantity changes but that of the output quantity remains the same. The output quantity steadily increases from value X1 to value X2 of the measured quantity.



Insulation between inputs and outputs

	Measuring Input	Relay Output	Open collector output	Reed relay	Dupline output	Analogue Output	RS232/ RS485	RS232 (RJ12)	90-260VAC/DC Power supply	18-60VCA/CC Power supply
Measuring input	-	4kV	2,5kV @ I≥ 3mA	2,5kV	2,5kV	2,5kV @ I≥ 3mA	2,5kV @ I≥ 3mA	2,5kV @ I≥ 3mA	4kV	4kV
Relay output	4kV	-	-	-	-	-	-	4kV	4kV	4kV
Open collector output	2,5kV @ I≥ 3mA	-	-	-	-	-	-	4kV	4kV	4kV
Reed relay	2,5kV	-	-	-	-	-	$100V_{RMS}$	4kV	4kV	4kV
Dupline output	2,5kV	-	-	-	-	-	-	2,5kV	2,5kV	2,5kV
Analogue output	2,5kV @ I≥ 3mA	-	-	-	-	-	-	4kV	4kV	4kV
RS232/ RS485	2,5kV @ I≥ 3mA	-	-	$100V_{RMS}$	-	-	-	4kV	4kV	4kV
RS232 (RJ12)	2,5kV @ I≥ 3mA	4kV	4kV	4kV	2,5kV	4kV	4kV	-	4kV	4kV
90-260 VACDC	4kV	4kV	4kV	4kV	2,5kV	4kV	4kV	4kV	-	-
18-60 VAC/DC	4kV	4kV	4kV	4kV	2,5kV	4kV	4kV	4kV	-	-

NOTE: in case of fault of first insulation the current from the measuring input to the ground is lower than 2mA.

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Waveform of the signals that can be measured

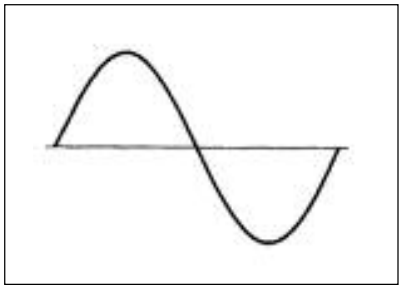


Figure A
Sine wave, undistorted
Fundamental content 100%
Harmonic content 0%
A_{rms} = 1.1107 | A |

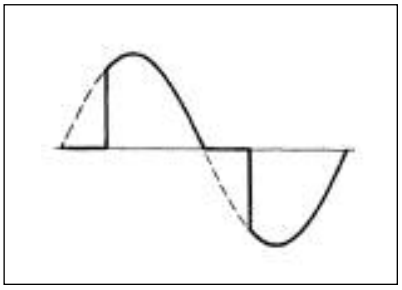


Figure B
Sine wave, indented
Fundamental content 10...100%
Harmonic content 0...90%
Frequency spectrum: 3rd to 16th harmonic
Additional error: <1% FS

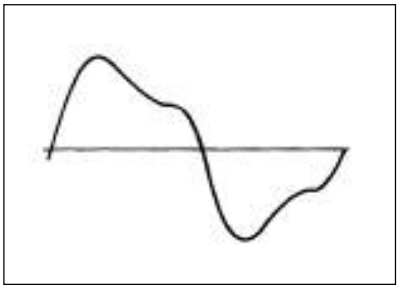
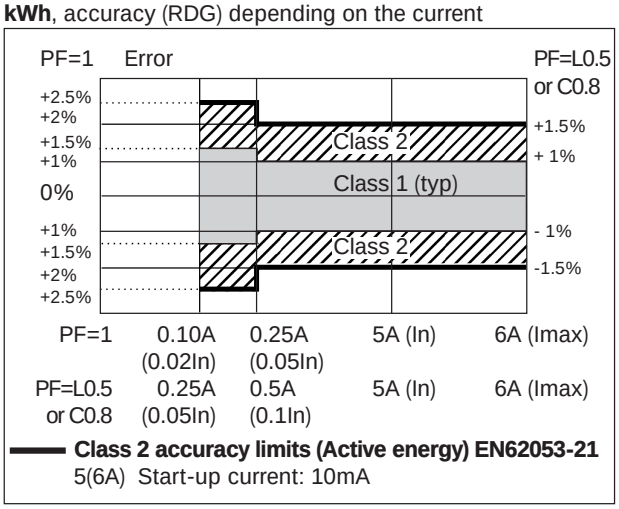


Figure C
Sine wave, distorted
Fundamental content 70...90%
Harmonic content 10...30%
Frequency spectrum: 3rd to 16th harmonic
Additional error: <0.5% FS

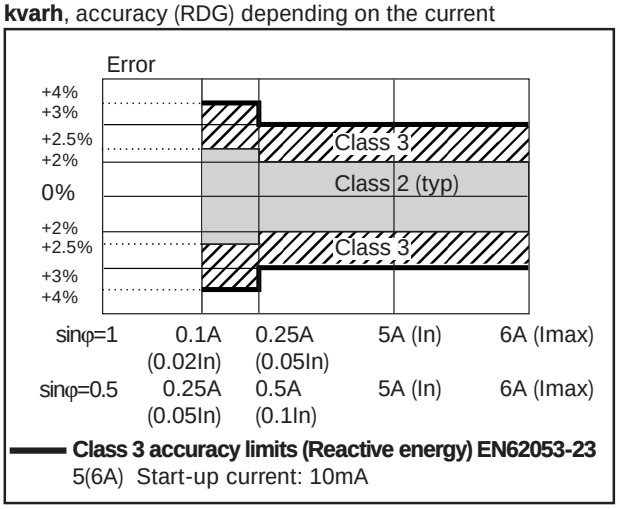
Accuracy

kWh, accuracy (RDG) depending on the current



Class 2 accuracy limits (Active energy) EN62053-21
5(6A) Start-up current: 10mA

kvarh, accuracy (RDG) depending on the current



Class 3 accuracy limits (Reactive energy) EN62053-23
5(6A) Start-up current: 10mA

Used calculation formulas

Phase variables

Instantaneous effective voltage

$$V_{1N} = \sqrt{\frac{1}{n} \cdot \sum_{1}^{n} (V_{1N})_i^2}$$

Instantaneous active power

$$W_1 = \frac{1}{n} \cdot \sum_{1}^{n} (V_{1N})_i \cdot (A_1)_i$$

Instantaneous power factor

$$\cos\phi_1 = \frac{W_1}{VA_1}$$

Instantaneous effective current

$$A_1 = \sqrt{\frac{1}{n} \cdot \sum_{1}^{n} (A_1)_i^2}$$

Instantaneous apparent power

$$VA_1 = V_{1N} \cdot A_1$$

Instantaneous reactive power

$$VAr_1 = \sqrt{(VA_1)^2 - (W_1)^2}$$

System variables

Equivalent three-phase voltage

$$V_\Sigma = \frac{V_{12} + V_{23} + V_{31}}{3}$$

Voltage asymmetry

$$ASY_{LL} = \frac{(V_{LL\,max} - V_{LL\,min})}{V_{LL}\,\Sigma}$$

$$ASY_{LN} = \frac{(V_{LN\,max} - V_{LN\,min})}{V_{LN}\,\Sigma}$$

Three-phase reactive power

$$VAr_\Sigma = (VAr_1 + VAr_2 + VAr_3)$$

Neutral current

$$An = \overline{A}_{L1} + \overline{A}_{L2} + \overline{A}_{L3}$$

Three-phase active power

$$W_\Sigma = W_1 + W_2 + W_3$$

Three-phase apparent power

$$VA_\Sigma = \sqrt{W_\Sigma^2 + VAr_\Sigma^2}$$

Three-phase power factor (TPF)

$$\cos\phi_\Sigma = \frac{W_\Sigma}{VA_\Sigma}$$

Energy metering

$$kWh_i = \int_{t_1}^{t_2} P_i(t)\,dt \cong \Delta t \sum_{n_1}^{n_2} P_{a,i}$$

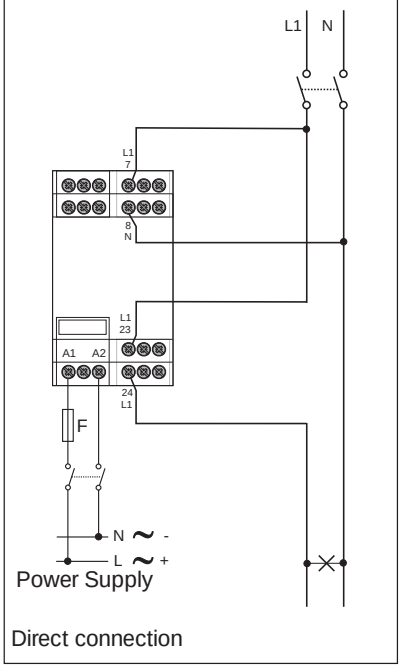
$$kVarh_i = \int_{t_1}^{t_2} Q_i(t)\,dt \cong \Delta t \sum_{n_1}^{n_2} Q_{a,i}$$

Where:

i= considered phase (L1, L2 or L3)
P= active power; **Q**= reactive power;
$\mathbf{t_1}$, $\mathbf{t_2}$ =starting and ending time points of consumption recording; **n**= time unit;Δ**t**= time interval between two successive power consumptions;
$\mathbf{n_1}$, $\mathbf{n_2}$ = starting and ending discrete time points of consumption recording

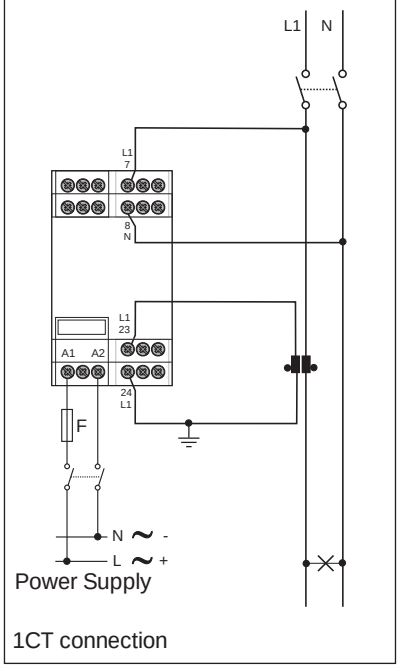
Wiring diagrams “system type selection: 3”

1-ph, 2-wire Fig. 1



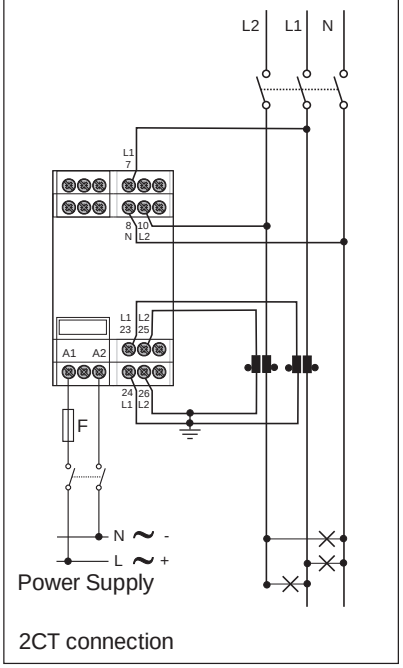
Direct connection

1-ph, 2-wire Fig. 2



1CT connection

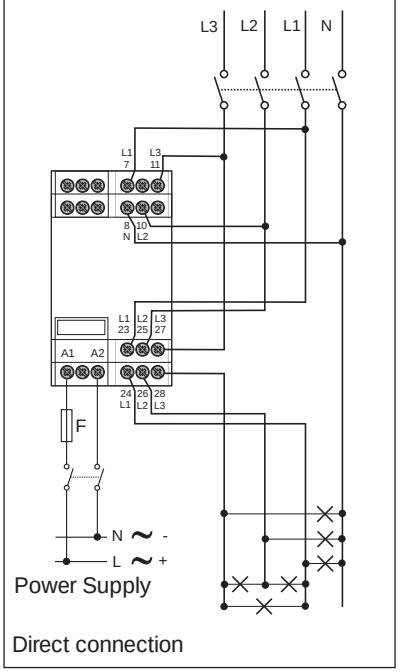
2-ph, 3-wire Fig. 3



2CT connection

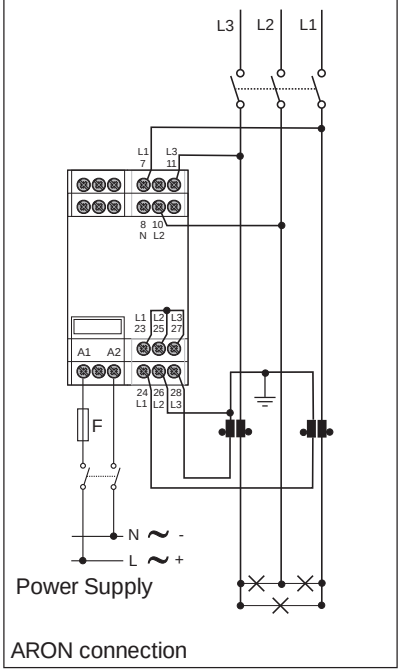
F= 630 mA T (18 to 60VAC/DC)
125 mA T (90 to 260VAC/DC)

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



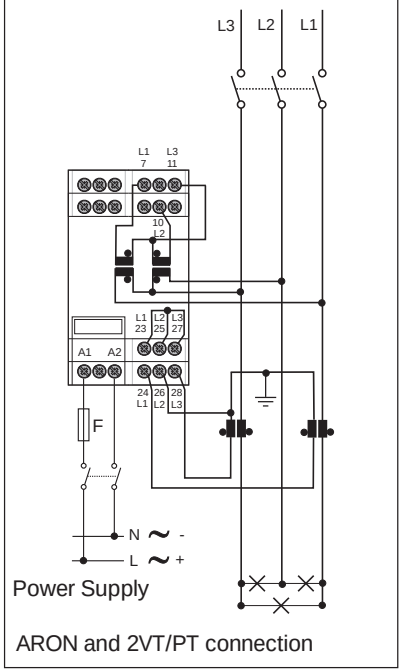
Direct connection

3-ph, 3-wire, unbalanced load Fig. 5



ARON connection

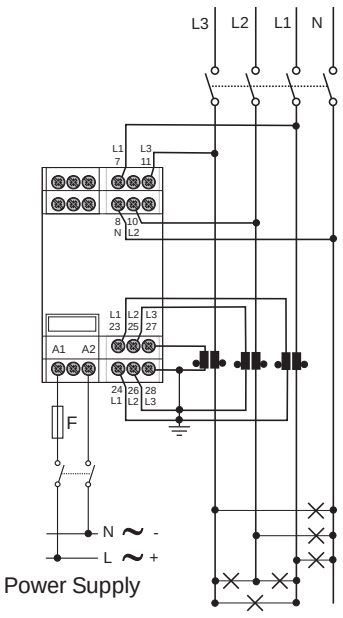
3-ph, 3-wire, unbalanced load Fig. 6



ARON and 2VT/PT connection

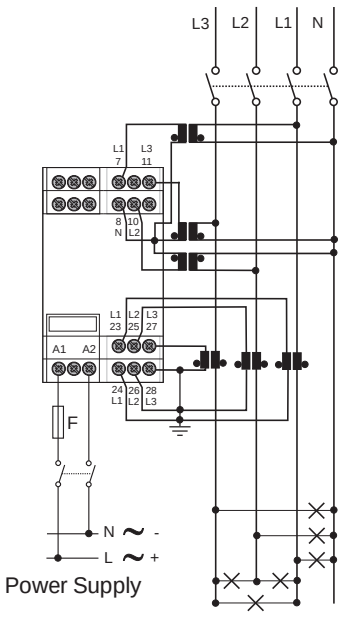
Wiring diagrams “system type selection: 3” (cont.)

3-ph, 4-wire, unbalanced load Fig. 7



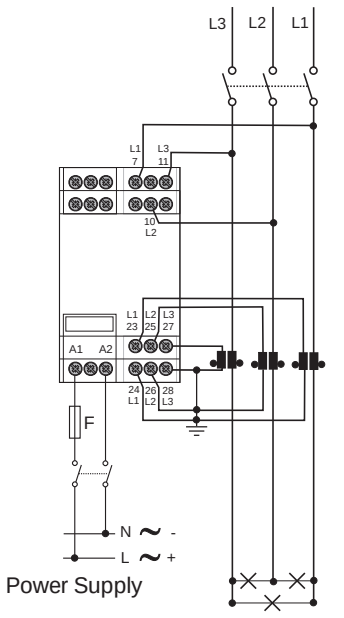
3CT connection

3-ph, 4-wire, unbalanced load Fig. 8



3CT and 3VT/PT connection

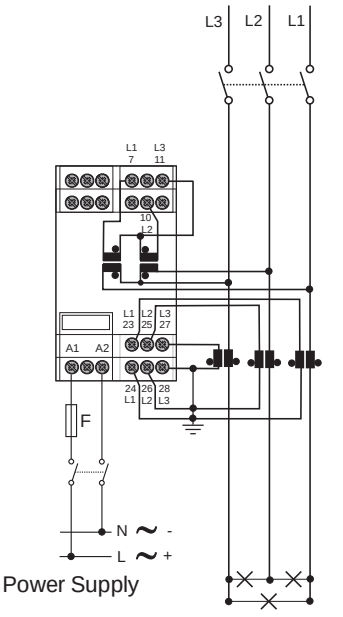
3-ph, 3-wire, unbalanced load Fig. 9



3CT connection

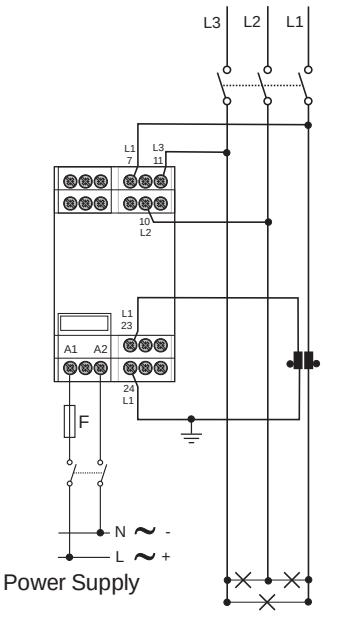
F= 630 mA T (18 to 60VAC/DC)
125 mA T (90 to 260VAC/DC)

3-ph, 3-wire, unbalanced load Fig. 10



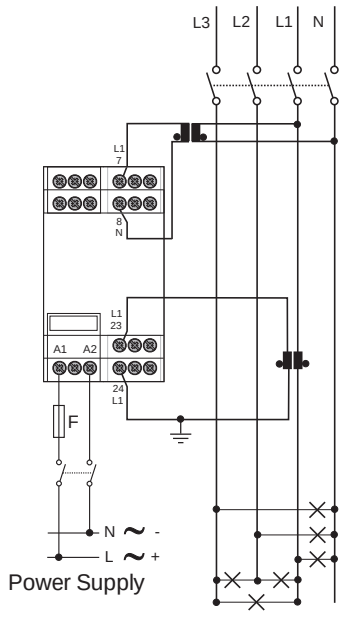
3CT and 2VT/PT connection

3-ph, 3-wire, balanced load Fig. 11



1CT connection

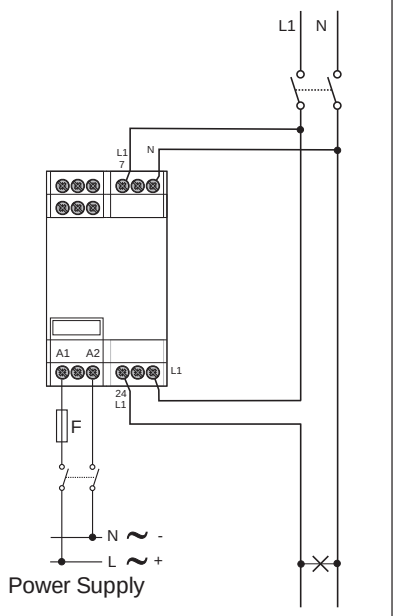
3-ph, 4-wire, balanced load Fig. 12



1CT and 1VT/PT connection

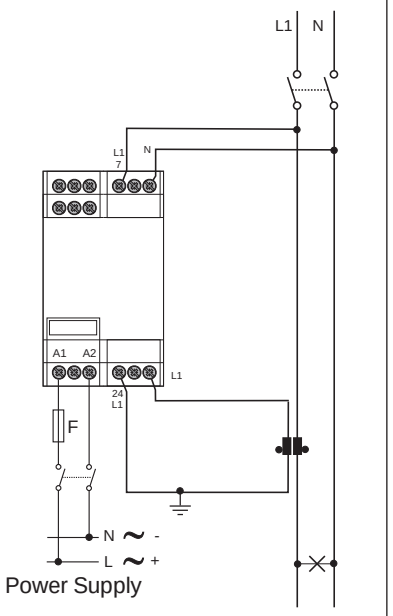
Wiring diagrams “system type selection: 1”

1-ph, 2-wire Fig. 13



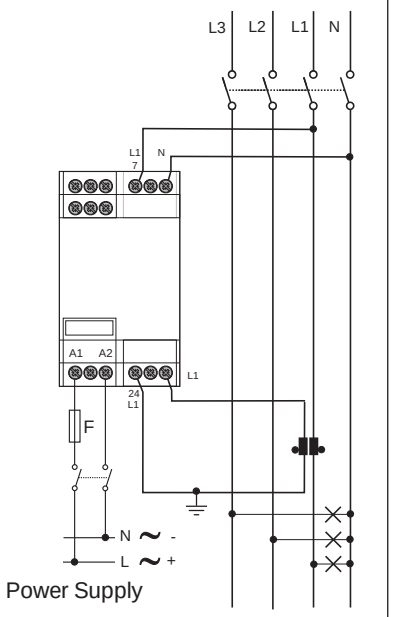
Direct connection

1-ph, 2-wire Fig. 14



1CT connection

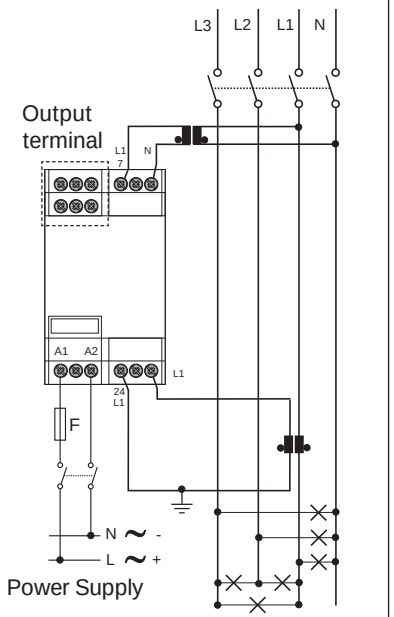
3-ph, 4-wire, balanced load Fig. 15



1CT connection

F= 630 mA T (18 to 60VAC/DC)
125 mA T (90 to 260VAC/DC)

3-ph, 4-wire, balanced load Fig. 16



1CT and 1VT/PT connection

Outputs

Analogue output 0-20mA

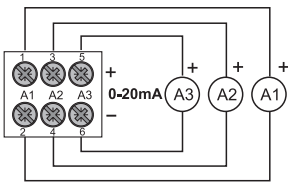


Fig. 17

Analogue output 0-10V

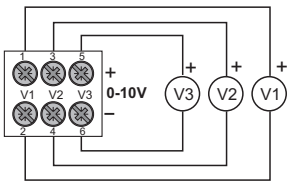


Fig. 18

Relay out.

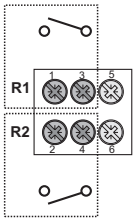


Fig. 19

NOTE: the analogue outputs are not insulated among each other.

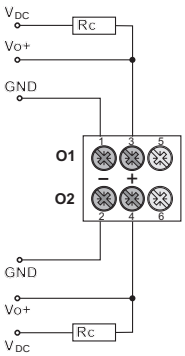


Fig. 20

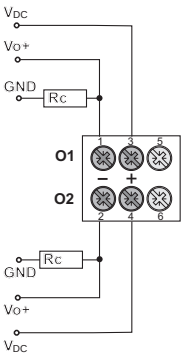
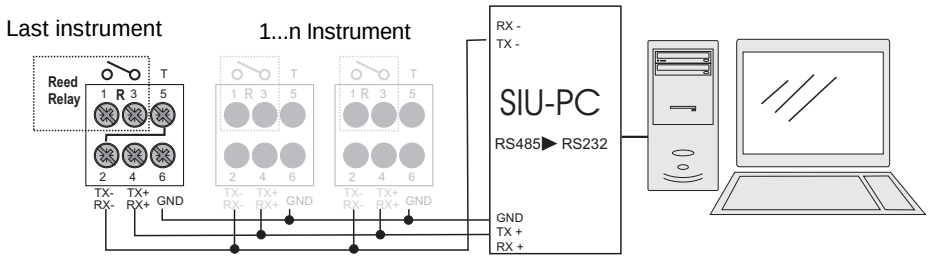


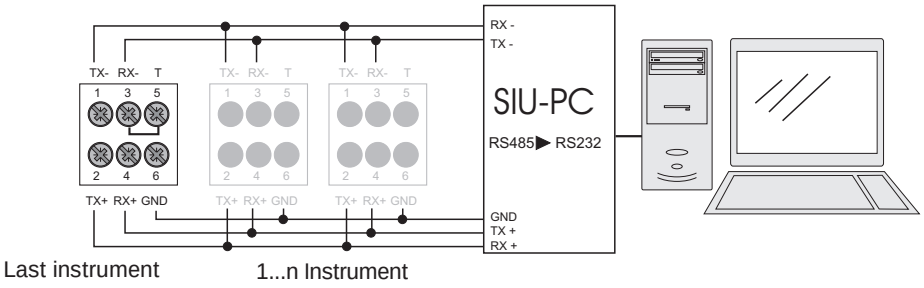
Fig. 21

Open collector outputs: The load resistance (Rc) must be calculated so that the closed contact current is lower than 100mA; the VDC voltage must be lower than or equal to 30V.
VDC: power supply voltage (external). Vo+: positive output contact (open collector transistor). GND: ground output contact (open collector transistor).

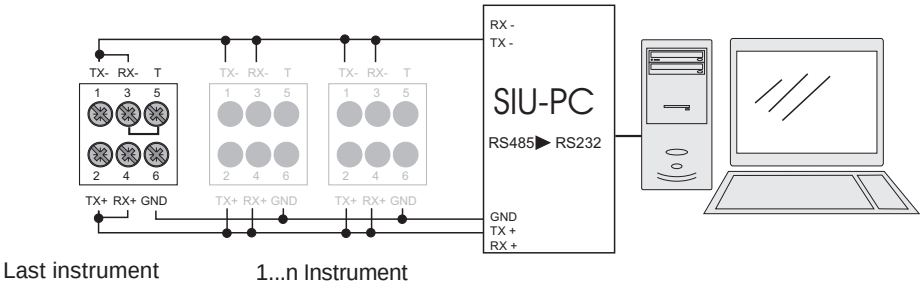
RS485 serial port and one relay connections



2-wire connection of RS485 serial port + one relay (R). The terminalization must be carried out only on the last instrument of the network

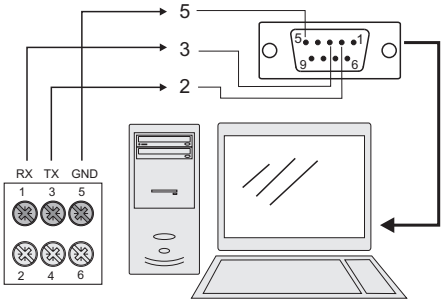


4-wire connection of RS485 serial port, the terminalization must be carried out only on the last instrument of the network



2-wire connection of RS485 serial port, the terminalization must be carried out only on the last instrument of the network

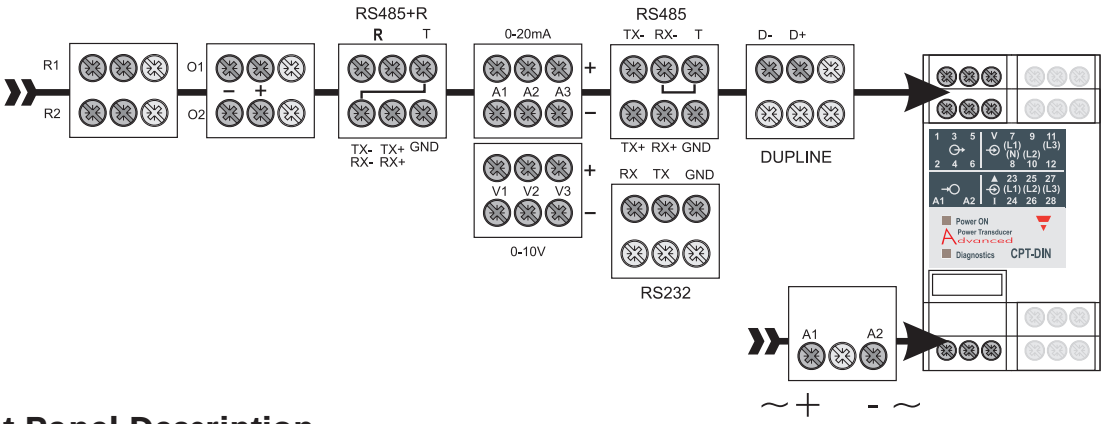
RS232 Serial port connection



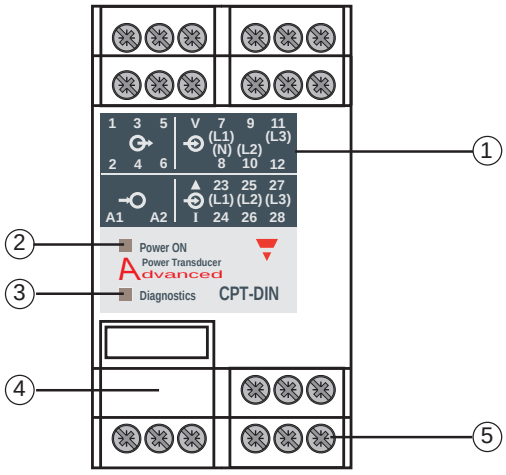
Easy programming

RJ12 communication port for parameters programming. The configuration of the transducer can be easily performed by means of CptASoft.
CptASoft-kit includes also 1m long connection cable (RJ12 6-pole / RS232 9-pole female).

Outputs connections



Front Panel Description



1. **Front panel**
2. **Power ON LED**
3. **Diagnostics LED**
4. **Configuration bus (RJ12 connector)**
5. **Connections screw terminals**

Dimensions