TRIAD 2
RANGE

Programmable digital transducers
with 1 to 4 analog outputs.
Programmable accuracy class.

- Up to 4 programmable analog outputs
- 4 kV insulation
- Configurable and modifiable:
  using the TRIADJUST 2 software
- Adjustable accuracy within Class 0.1 as per IEC 60688
- Digital output available as an option

MAIN SPECIFICATIONS

Quantities measured: 1, 2, 3, 4 to be chosen from I, V, U, F, PF, P, Q, S, cosφ, φ, φU, φV, tanφ

Configuration of TRIAD 2: in factory or by the user with the **TRIADJUST 2** software

Accuracy (programmable): class 0.1 / 0.15 / 0.2 / 0.5 / 1

Current inputs: 1 A and 5 A

Voltage inputs: 100 to 480 V (ph-ph)
or 100 / √3 to 480 / √3 V (ph-N)

Transfer curves: linear, 2 slopes or quadratic

Output signals: ± 1mA, ± 5mA, ± 20mA, ± 1V, ± 10V

Response time down to 50 ms

Operating frequency: 50 or 60 Hz

Auxiliary power supply with wide dynamic range:
80 to 265 V ac/dc or 19 to 58 Vdc

Compliance with CE directive

Digital technology

ZOOM

Multi-function, economical instrument with 4 functions in the same casing

Communication: Ethernet, RS 485 or optical head

Accessibility and safety: large-dimension terminals Insulated circuits

Ergonomic: easy mounting on DIN rail or switchboard

FACTORY-PROGRAMMABLE

- **The transducer delivered is ready to operate and can be connected to the electrical network in order to deliver output signals tailored for your installation.**
- To benefit from this, you simply need to know the exact specifications of your electrical installation:
  - Type of network: single-phase, split-phase, balanced or unbalanced three-phase, 3 or 4 wires.
  - Type of electrical connections.
  - Number of electrical quantities to be measured: 1, 2, 3 or 4.
  - Precise measurement ranges of the input/output quantities to be measured.

Users can modify a factory configuration at any time with the TRIADJUST 2 software if the specifications of the electrical network change.

PROGRAMMABLE VIA TRIADJUST 2

- **With the TRIADJUST 2 software and one of the 3 communication modes available (Ethernet, RS485 or optical head) you can program all the parameters characterizing a TRIAD 2 transducer.**
- To do so, simply choose a model which suits your electrical installation:
  - Type of network: split-phase, balanced or unbalanced three-phase, 3 or 4 wires.
  - Number of analog outputs required (1, 2 3 or 4).
  - Value of the auxiliary source.
- You are then free to configure the TRIAD 2 transducer delivered as you wish and to print out the stickers corresponding to the parameters programmed.

ENVIRONMENT AND STANDARDS

EMC immunity (standard of reference: IEC 60688, IEC 61326-1, IEC 61000-6-5)	
Shock voltage as per IEC 61000-4-5	2 kV in differential mode 4 kV in common mode
Oscillating wave as per IEC 61000-4-12	1 kV in differential mode 2.5 kV in common mode
Fast electrical transients in bursts as per IEC 61000-4-4	2 kV on power supply 2 kV on inputs/outputs
Electrostatic discharge as per IEC 61000-4-2	8 kV in the air 6 kV in contact
EM radiated field as per IEC 61000-4-3	10 V/m (80 Mhz to 3 GHz)
Voltage dips as per IEC 61000-4-11	30% reduction during 20 ms 60% reduction during 1 s
Voltage interruptions as per IEC 61000-4-11	100% reduction during 100 ms 100% reduction during 100 ms
EMC emissions	
Radiated and conducted	As per CISPR11
Climatic specifications (IEC 60068 2-1/2-2/2-30)	
Operating temperature	-10°C to +55°C
Storage temperature	-40°C to +70°C
Relative humidity	≤ 95% to 55°C
Safety specifications (IEC 61010-1)	
Installation category	3
Pollution level	2
Fire resistance	UL94, severity V0
Mechanical specifications (IEC 60068 2-6/2-27/2-29/2-32/2-63)	
Protection rating	IP 20
Mechanical shocks	IEC 60068-2-27
Vibrations	IEC 60068-2-6
Drop test with packaging	NF H0042-1

MOUNTING ACCESSORIES

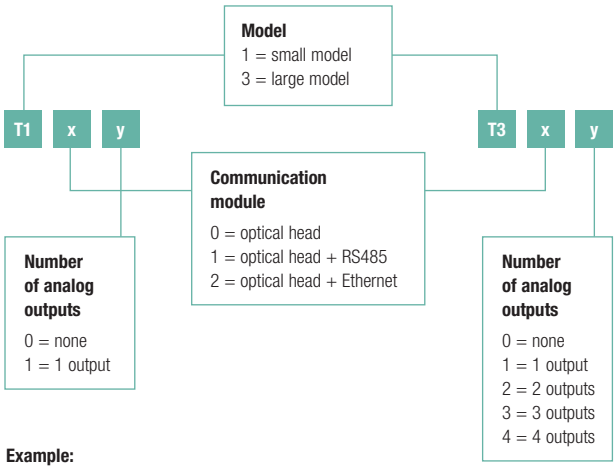
Model	Reference
Plate mounting for T1xy	ACCT 1007
Plate mounting for T3xy	ACCT 1006

CASING

Weight	320 g (T1xy) / 700 g (T3xy)
Mounting	DIN rail 43700 or plate mounting
Connection	Terminals with mobile stirrup clamp with screw for 4 single-wire 6 mm² conductors or 2 multi-wire 4 mm² conductors

HARDWARE IDENTIFICATION

The TRIAD 2 T1xy and T3xy are fully configurable with the TRIADJUST 2 software which allows users to modify the characteristics of their products right up to the last minute.



Example:

T314 = Large-model TRIAD 2 with optical head and RS485 + 4 analog outputs

Network	Function	T1xy model	T3xy model
Single-phase	V	■	■
	I	■	■
	F	■	■
	P	■	■
	Q	■	■
	S	■	■
	PF	■	■
	Tanφ	■	■
	Cosφ	■	■
	φ	■	■
	Energies*	■	■
Balanced 3-phase, 3 wires	U12, U23, U31	■	■
	I1, I2, I3	■	■
	F	■	■
	Pt	■	■
	Qt	■	■
	St	■	■
	PFt	■	■
	Tanφ	■	■
	Cosφt	■	■
	φt	■	■
	Energies*	■	■
Balanced 3-phase, 4 wires	V1, V2, V3	■	■
	U12, U23, U31	■	■
	I1, I2, I3	■	■
	F	■	■
	P1, P2, P3, Pt	■	■
	Q1, Q2, Q3, Qt	■	■
	S1, S2, S3, St	■	■
	PF1, PF2, PF3, PFt	■	■
	Tanφ	■	■
	Cos (φ1, φ2, φ3, φt)	■	■
	φ1, φ2, φ3, φt	■	■
	Energies*	■	■
Unbalanced 3-phase, 3/4 wires	V1, V2, V3		■
	U12, U23, U31		■
	I1, I2, I3		■
	F		■
	P1, P2, P3, Pt		■
	Q1, Q2, Q3, Qt		■
	S1, S2, S3, St		■
	PF1, PF2, PF3, PFt		■
	Tanφ		■
	Cos (φ1, φ2, φ3, φt)		■
	φ1, φ2, φ3, φt		■
	φ (U12/U23, U23/U31, U31/U12)		■
	φ (V1/V2, V2/V3, V3/V1)		■
	Current unbalance		■
	Energies*		■
Split-phase	V1, V2		■
	U12		■
	I1, I2		■
	F		■
	P1, P2, Pt		■
	Q1, Q2, Qt		■
	S1, S2, St		■
	PF1, PF2, PFt		■
	Tanφ		■
	Cos (φ1, φ2, φt)		■
	φ1, φ2, φt		■
	φ (V1/V2)		■
	I1 signed, I2 signed		■
	Energies*		■

* Accessible via the product's Modbus communication

TRIAD 2 Programmable model

ELECTRICAL SPECIFICATIONS

Voltage input		
Rated value	T1: from 57.7 Vac to 276 Vac max. T3: from 57.7 Vac to 480 Vac max.	
Frequency	50 Hz: 42.5...57.5 Hz 60 Hz: 51...69 Hz	
Max. measured voltage on primary	1 MV (ph-ph)	
Acceptable overloads	T1: 300 Vac permanent - 460 Vac / 10s T3: 520 Vac permanent - 800 Vac / 10s	
Consumption	< 0.2 VA	
Input impedance	400 kΩ	
Current inputs		
Rated value	0 to 10 A max.	
Max. measured current on primary	40,000 A	
Acceptable overload	50 In / 1 s	
Consumption	< 0.15 VA	
Auxiliary power supply		
High level	80 / 265 Vac (50/60 Hz) – 110 to 375 Vdc	
Low level	19 / 58 Vdc	
Consumption	High level	Low level
	T1: 3.3 VA to 8.5 VA max. T3: 9 VA to 20 VA max.	T1: 3.2 W to 5.5 W max. T3: 5.5 W to 11 W max.
Analog outputs		
Rated values	Current	Tension
	± 1mA, ± 5mA, ± 20mA	± 1 V, ± 10 V
Acceptable resistive load	15 V / Io (1)	≥ 1 kΩ
Acceptable capacitive load	0.1 µF	0.1 µF
Overrun	1.2 Io (1)	1.2 Uo (1)
Peak-peak residual wave	± 0.2 % of Io (1)	± 0.2 % of Uo (1)
Programmable response time	50 ms – 100 ms – 200 ms – 500 ms – 1 s	
Transfer curve	Linear, 2 slopes or quadratic	

(1) Io = output current, Uo = output voltage

COMMUNICATION

	Optical head	Ethernet	RS485
Connection	USB (PC) Optical (product)	RJ45	2 wires Half-duplex
Protocol	MODBUS RTU mode	MODBUS / TCP RTU mode	MODBUS / JBUS RTU mode
Speed	38,400 bauds	10 base T	2,400 to 115,200 bauds
Parity	-	-	Even, odd or none
JBus addresses	-	-	1 to 247
Transmission length	2 m	100 m	As per EIA 485

METROLOGICAL SPECIFICATIONS

Measurements	Accuracy class over measurement range (as per IEC 60688)				
	RT = 50 ms*	RT = 100 ms*	RT = 200 ms*	RT = 500 ms*	RT = 1s*
V, U, I, F, P, Q, S, PF, Tanφ, Cosφ, φ, φU, φV**	± 1 %	± 0.5 %	± 0.2 %	± 0.15 %	± 0.1 %

* RT: Response time for F = 50 Hz

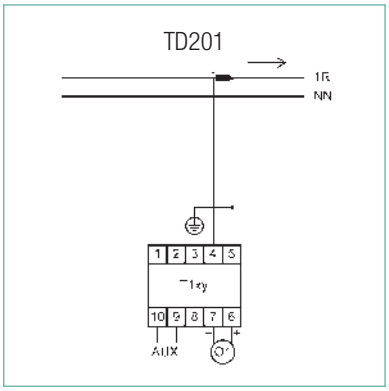
* These values may change according to the input and output measurement ranges

** Phase angle between voltages for φU and φV

ELECTRICAL CONNECTIONS - SINGLE-PHASE NETWORK

I1, F:

TD201



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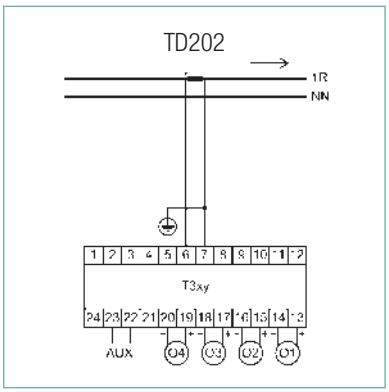
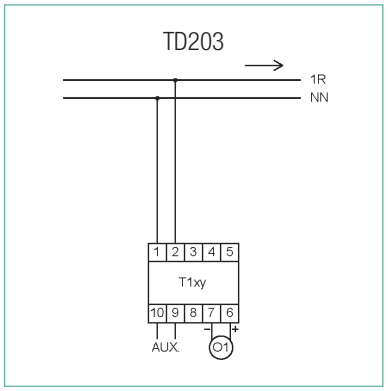


V1, F:

TD203



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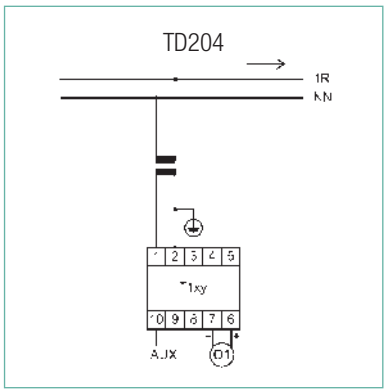

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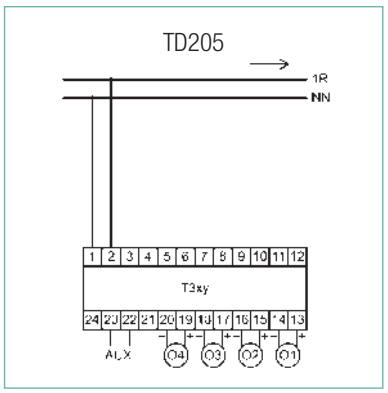

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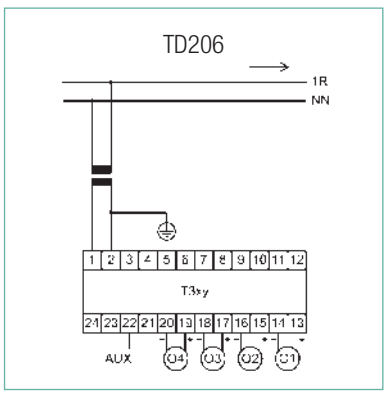
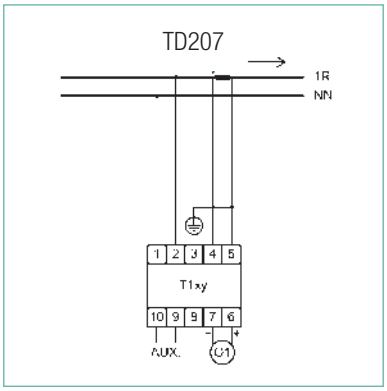


V1, I1, P1, Q1, S1, PF1, F, TANφ, Cosφ1, φ1:

TD207



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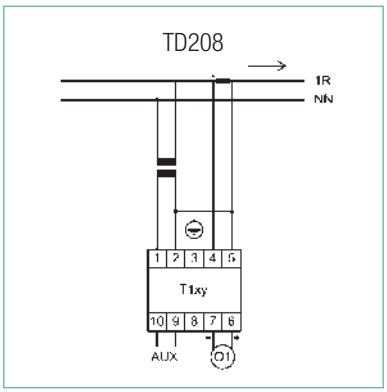

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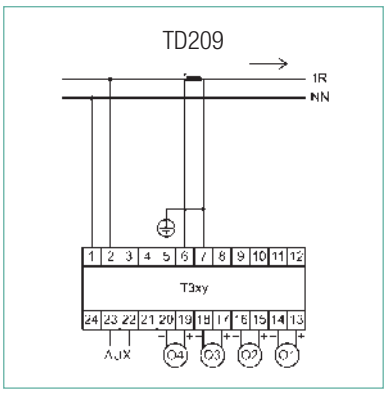
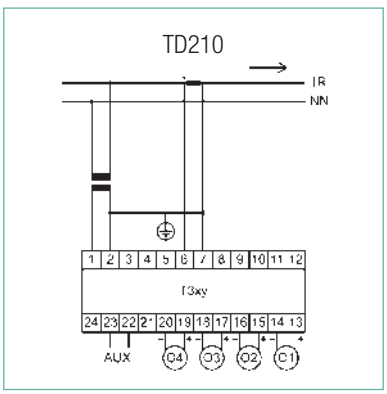


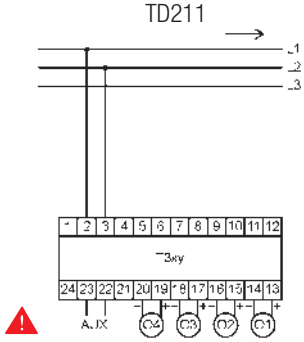
TD210



BALANCED 3-PHASE, 3-WIRE NETWORK

U12, U23, U31, F:

TD211



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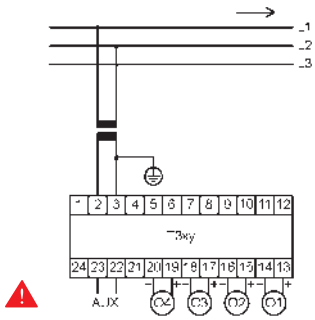

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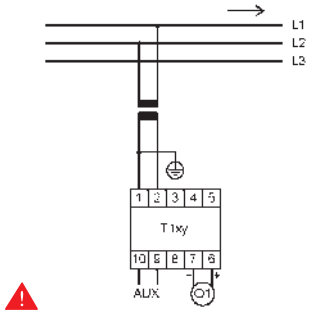
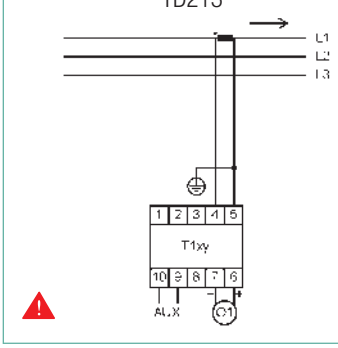


I1, I2, I3, F:

TD213



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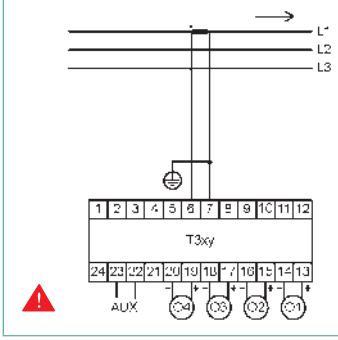
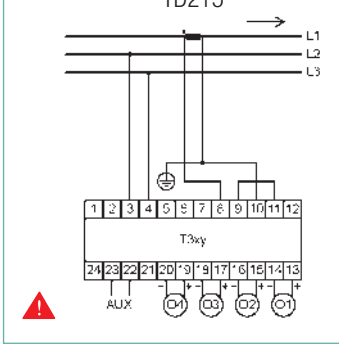


U12, U23, U31, I1, I2, I3, Pt, St, Qt, PFt, F, TANφ, Cosφt, φt:

TD215



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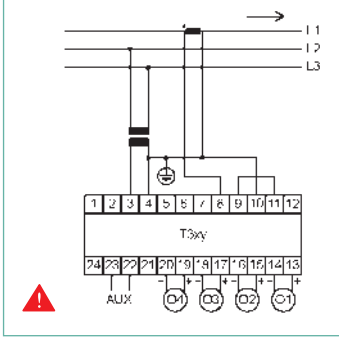

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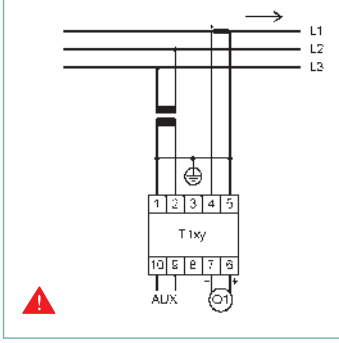
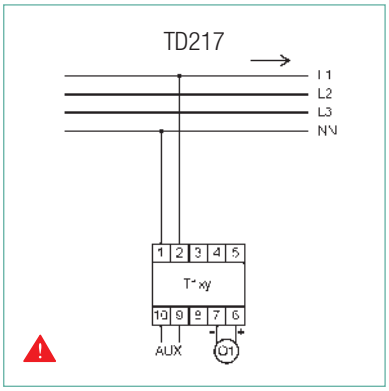


Phase rotation authorized

BALANCED 3-PHASE, 4-WIRE NETWORK

V1, V2, V3, U12, U23, U31 F:

TD217



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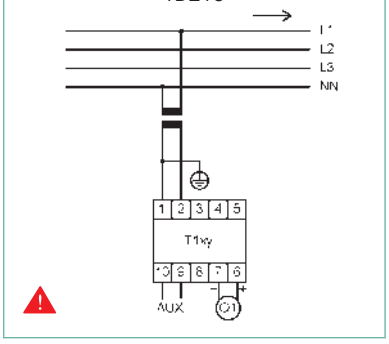

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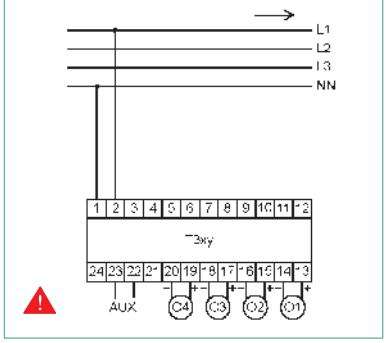

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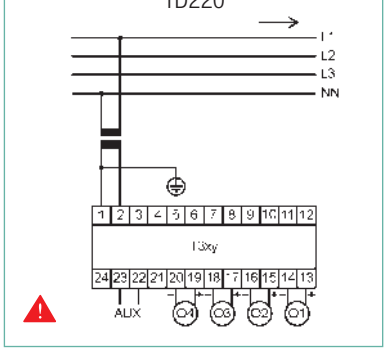
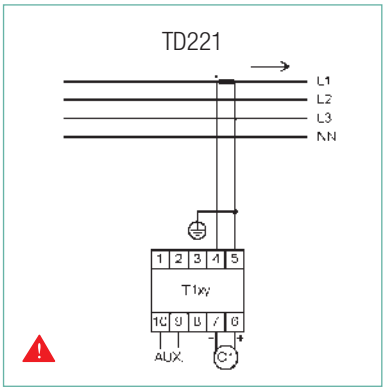


I1, I2, I3, F:

TD221



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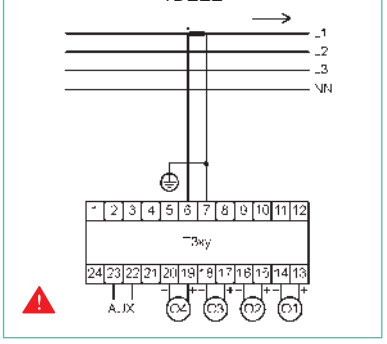
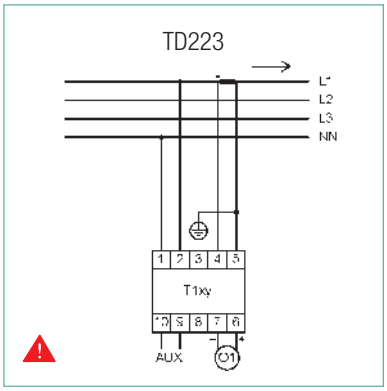


Phase rotation authorized

V1, V2, V3, U12, U23, U31, I1, I2, I3, P1, P2, P3, Pt, S1, S2, S3, St, Q1, Q2, Q3, Qt, PF1, PF2, PF3, PFt, F, TANφ, Cosφ1, Cosφ2, Cosφ3, Cosφt, φ1, φ2, φ3, φt:

TD223



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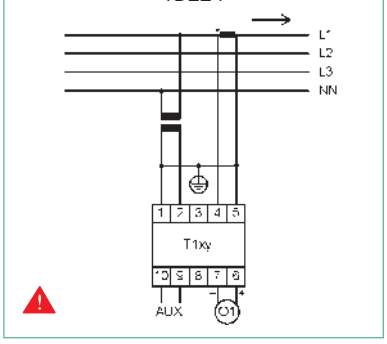

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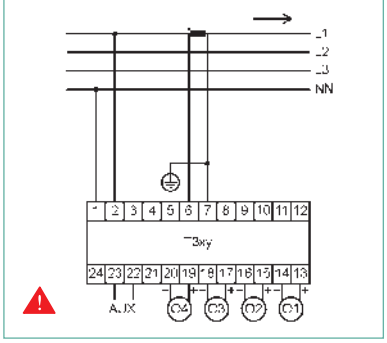

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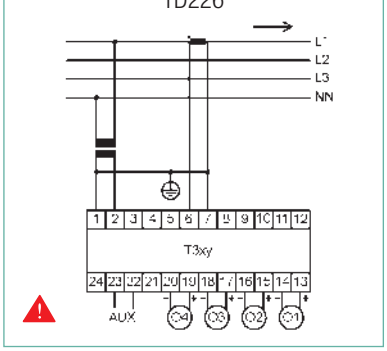
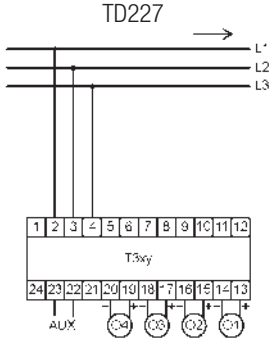


UNBALANCED 3-PHASE, 3-WIRE NETWORK

U12, U23, U31, F,
Angle (U12/U23, U23/U31, U31/U12):

TD227



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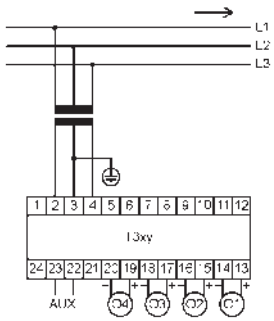
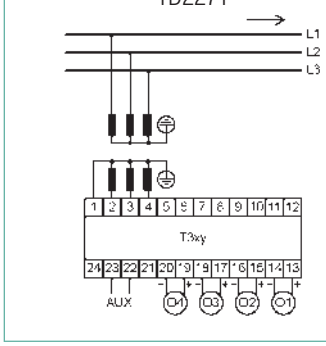


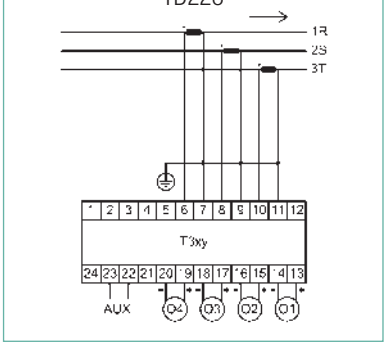
V1, V2, V3, U12, U23, U31, F,
Angle (V1/V2, V2/V3, V3/V1),
Angle (U12/U23, U23/U31, U31/U12):

TD227Y

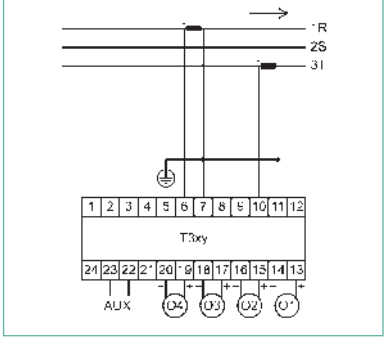


I1, I2, I3, F:

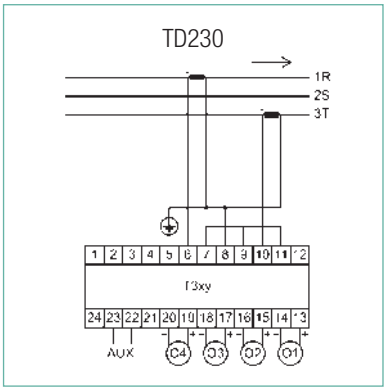
TD228



TD229



TD230

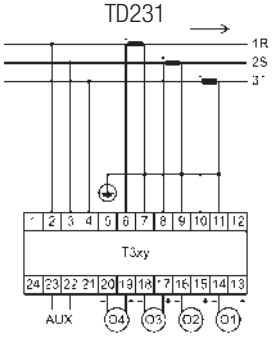


UNBALANCED 3-PHASE, 3-WIRE NETWORK (CONTINUED)

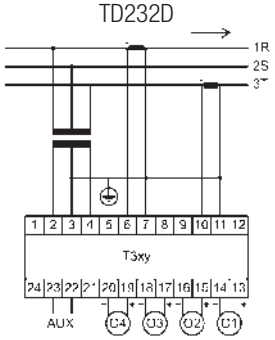
U12, U23, U31, I1, I2, I3, Pt, St, Qt, PFt, F, TANφ, Cosφt, φt, Angle (U12/U23, U23/U31, U31/U12):

V1, V2, V3, U12, U23, U31, I1, I2, I3, P1, P2, P3, Pt, S1, S2, S3, St, Q1, Q2, Q3, Qt, PF1, PF2, PF3, PFt, F, TANφ, Cosφ1, Cosφ2, Cosφ3, Cosφt, φ1, φ2, φ3, φt, Angle (V1/V2, V2/V3, V3/V1), Angle (U12/U23, U23/U31, U31/U12):

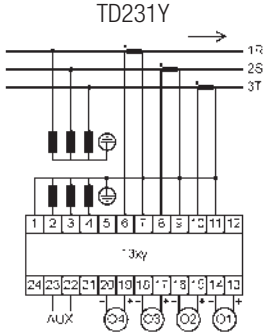
TD231



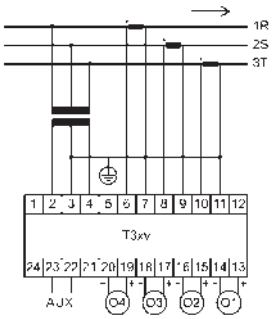
TD232D



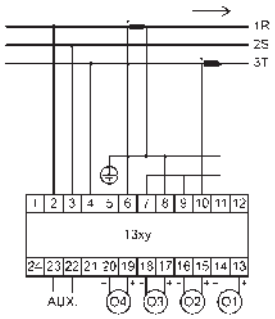
TD231Y



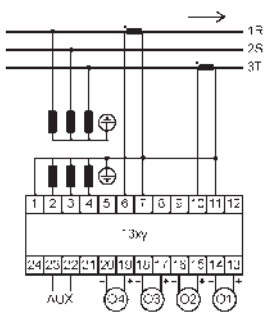
TD231D



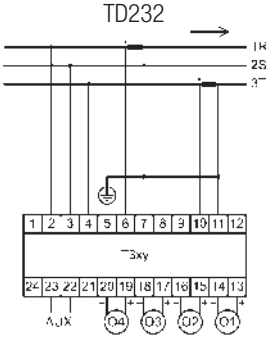
TD233



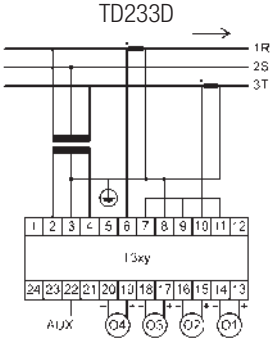
TD232Y



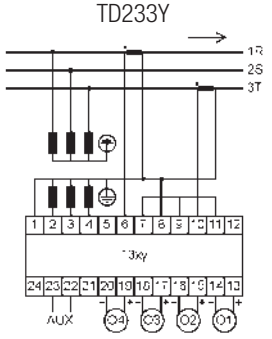
TD232



TD233D



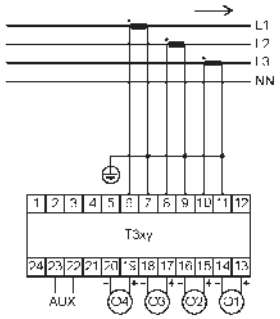
TD233Y



UNBALANCED 3-PHASE, 4-WIRE NETWORK

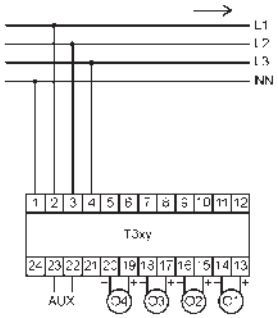
I1, I2, I3, F:

TD234

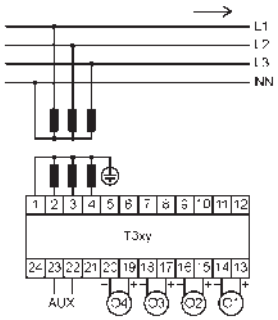


V1, V2, V3, U12, U23, U31, F,
Angle (V1/V2, V2/V3, V3/V1),
Angle (U12/U23, U23/U31, U31/U12):

TD235

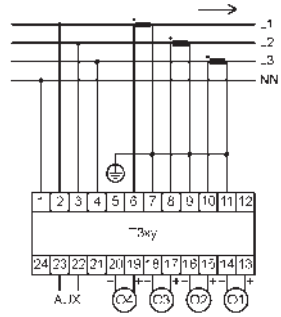


TD235Y

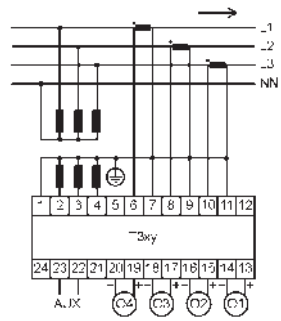


V1, V2, V3, U12, U23, U31, I1, I2, I3, P1, P2, P3, Pt, S1, S2, S3, St, Q1, Q2, Q3, Qt, PF1, PF2, PF3, PFt, F, TANφ, Cosφ1, Cosφ2, Cosφ3, Cosφt, φ1, φ2, φ3, φt
Angle (V1/V2, V2/V3, V3/V1),
Angle (U12/U23, U23/U31, U31/U12):

TD236



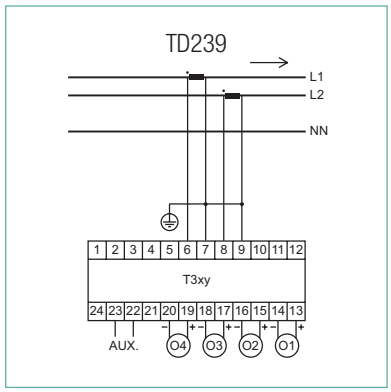
TD236Y



SPLIT-PHASE

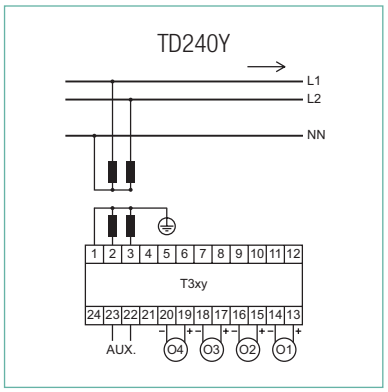
I1, I2, F:

TD239

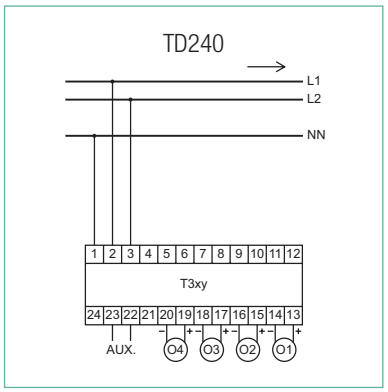


V1, V2, U12, F, Angle (V1/V2) rad, Angle (V1/V2) deg:

TD240Y

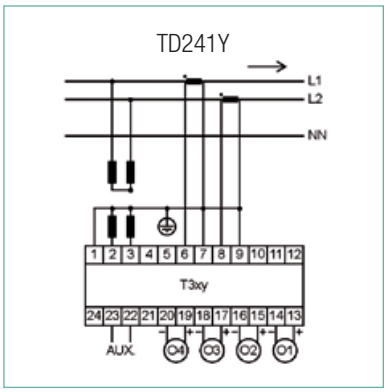


TD240

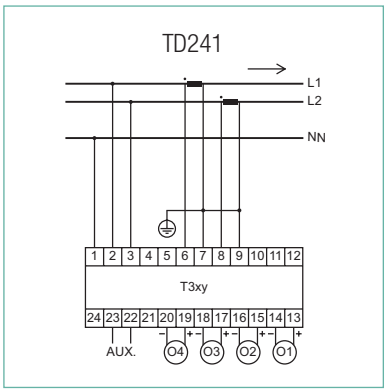


V1, V2, U12, I1, I2, P1, P2, Pt, Q1, Q2, Qt, S1, S2, St, PF1, PF2, PFt, F, tanφ, Angle (V1/V2) rad, Angle (V1/V2) deg, cos φ1, cos φ2, cosφt, φ1 Fund. rad, φ2 Fund. rad, φt Fund. rad, φ1 Fund. deg, φ2 Fund. deg, φt Fund.. deg, Angle V1/V2 Fund. deg, I1 (signed), I2 (signed):

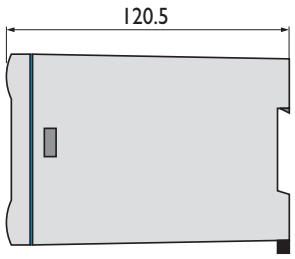
TD241Y



TD241

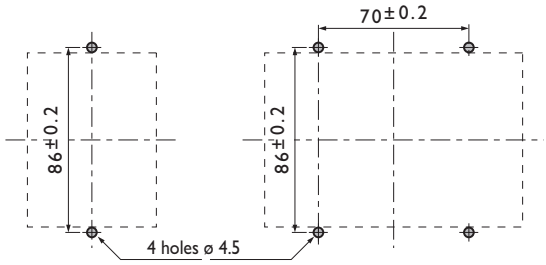


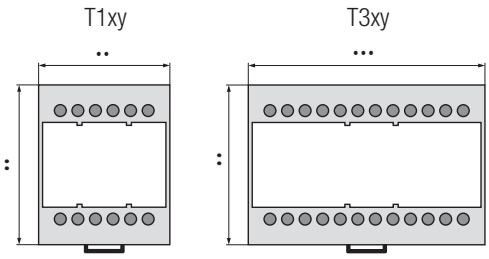
DIMENSIONS (IN MM)



All models

Panel drilling diagram for plate mounting

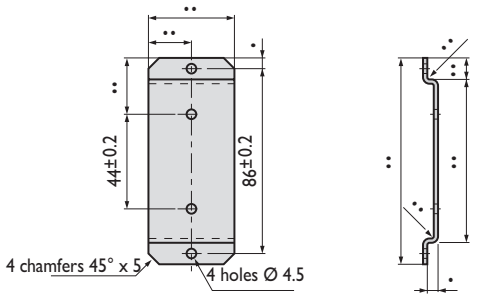




Weight: 320 g

Weight: 700 g

Accessory for plate mounting with screw (option)



TRIAD 2 PROGRAMMABLE VIA TRIADJUST 2

TO ORDER

			T1 – SMALL MODEL (60 x 81 x 120.5 mm)		T3 – LARGE MODEL (120 x 81 x 120.5 mm)							
			Without tropicalization	With tropicalization	Without tropicalization				With tropicalization			
			Number of outputs	Number of outputs	Number of outputs				Number of outputs			
Link	Output	Alimentation	1	1	1	2	3	4	1	2	3	4
Optical	± 20 mA	80 - 265 V AC/DC	P01380001	P01380002	P01380101	P01380103	P01380105	P01380107	P01380102	P01380104	P01380106	P01380108
		19 - 58 V DC	P01380003	P01380004	P01380109	P01380111	P01380113	P01380115	P01380110	P01380112	P01380114	P01380116
	± 10 V	80 - 265 V AC/DC	P01380005	P01380006	P01380117	P01380119	P01380121	P01380123	P01380118	P01380120	P01380122	P01380124
		19 - 58 V DC	P01380007	P01380008	P01380125	P01380127	P01380129	P01380131	P01380126	P01380128	P01380130	P01380132

TRIAD 2 FACTORY-PROGRAMMABLE

1 Model - Frequency

T1	Small model – 1 analog output
T3	Large model – 1 to 4 analog output(s)
0	50 Hz
1	60 Hz

2 Network

0	Single-phase
1	Balanced 3-phase, 3 wires
2	Balanced 3-phase, 4 wires
3	Unbalanced 3-phase, 3 wires
4	Unbalanced 3-phase, 4 wires
5	Split-phase

3 Communication - Connection

0	Without
1	RS485
2	Ethernet

Indicate the diagram number. E.g. TD204

4 Supply

0	80-265 Vac / 110-375 Vdc
1	19-58 V DC

5 Tropicalization

0	Without
1	With

6 Inputs

Voltage	Indicate direct voltage to be measured or the VT ratio
Current	Indicate direct current to be measured or the CT ratio

7 Number of analog outputs

0	Without (Choice of a minimum communication)
1	1 output
2	2 outputs (T3 model only)
3	3 outputs (T3 model only)
4	4 outputs (T3 model only)

8 Analog outputs

Indicate for each output:

a-	Quantity to be measured
b-	Transfer curve
c-	Input signal: Min – Breaking point - Max
d-	Measurement unit
e-	Output signal: Min – Breaking point - Max

9 Analog output ratings*

0	- 20 mA to + 20 mA
1	- 5 mA to + 5 mA
2	- 1 mA to + 1 mV
3	- 10 V to + 10 V
4	- 1 V to + 1 V

* Attention: option 0 is not suitable for use with the -5 mA to +5 mA and -1 mA to +1 mA ratings.
Option 3 is not suitable for use with the -1 V to +1 V rating.

To simplify the procedure when ordering you can send us the form on page 165.

FACTORY-PROGRAMMED TRIAD 2: ORDER FORM

1 - Model / Hz

☐ T1 or ☐ T3
☐ 50 Hz or ☐ 60 Hz

2 - Network

☐ Single-phase ☐ 3-wire unbalanced three-phase
☐ 3-wire balanced three-phase ☐ 4-wire unbalanced three-phase
☐ 4-wire balanced three-phase ☐ Split-phase

3 - Communication / Connection

☐ Ethernet or ☐ RS485
☐ Tropicalization
Connection diagram: TD ☐☐☐☐ cf: p.172

4 - Power supply

☐ 80 to 265 Vac (50/60 Hz) / 110 to 375 Vdc or ☐ 19 to 58 Vdc

5 - Tropicalization

☐ With ☐ Without

6 - Inputs

Current

With current transformer or Direct

Primary / Secondary: ____ / ____ A

Direct: ____ A

Voltage

With voltage transformer or Direct

Primary / Secondary: ____ / ____ V

Direct: ____ V

☐ Phase-phase ☐ Phase-neutral (√3)

Available quantities

V1 V2 V3 | U12 U23 U31 | I1 I2 I3 | F | P1 P2 P3 Pt | Q1 Q2 Q3 Qt
S1 S2 S3 St | PF1 PF2 PF3 PFt | TANφ | COSφ1 COSφ2 COSφ3 COSφt
φ1 φ2 φ3 φt | φU12/23 φU23/31 φU31/12 | V1/2 V2/3 V3/1 | I1 I2 I3 signed

7 - Number of analog outputs

☐ 0: Without (Choice of a minimum communication)
☐ 1: 1 output
☐ 2: 2 outputs (T3 model only)
☐ 3: 3 outputs (T3 model only)
☐ 4: 4 outputs (T3 model only)

8 / 9 - Analog outputs calibres

Output 1

Quantity and measurement range (x)

☐ Indicate quantity to be measured

Min | Breaking point | Max | Unit (1)

Transfer curve: ☐ Linear ☐ 2 slopes ☐ Quadratic

Output signal (y): Min | Breaking point | Max ☐ mA ☐ V

Accuracy class (2)

	50 Hz	60 Hz
☐ 0.1 %	1 s	0.8 s
☐ 0.15 %	0.5 s	0.4 s
☐ 0.2 %	0.2 s	0.16 s
☐ 0.3 %	100 ms	80 ms
☐ 1 %	50 ms	40 ms

Output 2

Quantity and measurement range (x)

☐ Indicate quantity to be measured

Min | Breaking point | Max | Unit (1)

Transfer curve: ☐ Linear ☐ 2 slopes ☐ Quadratic

Output signal (y): Min | Breaking point | Max ☐ mA ☐ V

Accuracy class (2)

	50 Hz	60 Hz
☐ 0.1 %	1 s	0.8 s
☐ 0.15 %	0.5 s	0.4 s
☐ 0.2 %	0.2 s	0.16 s
☐ 0.3 %	100 ms	80 ms
☐ 1 %	50 ms	40 ms

Output 3

Quantity and measurement range (x)

☐ Indicate quantity to be measured

Min | Breaking point | Max | Unit (1)

Transfer curve: ☐ Linear ☐ 2 slopes ☐ Quadratic

Output signal (y): Min | Breaking point | Max ☐ mA ☐ V

Accuracy class (2)

	50 Hz	60 Hz
☐ 0.1 %	1 s	0.8 s
☐ 0.15 %	0.5 s	0.4 s
☐ 0.2 %	0.2 s	0.16 s
☐ 0.3 %	100 ms	80 ms
☐ 1 %	50 ms	40 ms

Output 4

Quantity and measurement range (x)

☐ Indicate quantity to be measured

Min | Breaking point | Max | Unit (1)

Transfer curve: ☐ Linear ☐ 2 slopes ☐ Quadratic

Output signal (y): Min | Breaking point | Max ☐ mA ☐ V

Accuracy class (2)

	50 Hz	60 Hz
☐ 0.1 %	1 s	0.8 s
☐ 0.15 %	0.5 s	0.4 s
☐ 0.2 %	0.2 s	0.16 s
☐ 0.3 %	100 ms	80 ms
☐ 1 %	50 ms	40 ms

(1) Please indicate the unit of the measurement range, e.g. W, kW or MW.
(2) These values may change according to the input and output measurement ranges.

TRIADJUST 2
SOFTWARE

Designed for quick configuration and display of all the parameters of your TRIAD 2 transducers.

- Configuration via optical head, Ethernet or RS485
- Access to all the TRIAD 2 parameters
- Diagnosis of the installation
- Label printing on all types of laser printers

DESCRIPTION

The **TRIADJUST 2** software allows quick, unlimited programming of all your TRIAD 2's parameters.

Using a PC and the optical lead supplied in each kit, connect your product's auxiliary power supply to dialog with total security. Depending on your TRIAD 2's configuration, remote communication is possible via RS485 or Ethernet.
In the Windows™ environment, initialize or simply modify the quantities measured, the measurement ranges and the analog outputs on the transducers installed.
TRIADJUST 2 also offers other functions such as **DIAGNOSIS** of your network, instantaneous **DISPLAY** of the electrical quantities and **REAL-TIME RECORDING** of the measurements in an exported file.

You can also print labels indicating the configurations and connections of your products.

ZOOM

Configuration
- Inputs / Outputs
- Communication
- Connection diagram
- Response time

Diagnosis
- Voltage inputs
- Current inputs
- Cabling
- Phase order
- Analog outputs
- Fresnel

Display
- Instantaneous quantities (in digital or analog form)

Recording
- In real time in exported file

MINIMUM CONFIGURATION

Platform: PC
Operating system: Windows 2000 or XP
Processor: Pentium-compatible
RAM: 128 MB
Hard disk: 40 GB
Drive: CD-ROM
Communication port: Local: USB 1.1 minimum
Remote: RS485 and/or Ethernet

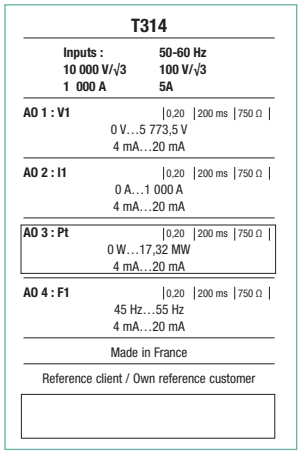
TRIADJUST 2 KIT

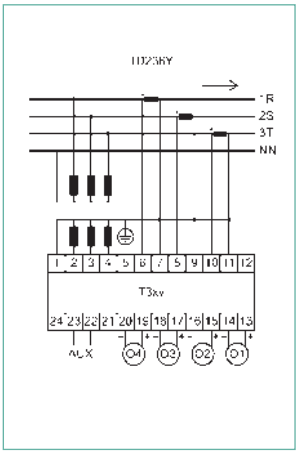
The TRIADJUST 2 configuration kit comprises:

- The TRIADJUST 2 software
- An optical / USB lead
- 30 sheets of blank labels
- A 230 x 185 x 45 mm carrying case

LABELS

A sheet contains two labels, one for the configuration of the inputs/outputs and the other for the programmed connection diagram. The labels can be printed on all types of laser printers.





TO ORDER

Model	Reference
TRIADJUST 2 kit	P01380410

Accessories	Reference
Set of 30 sheets of blank labels	P01380400
Optical/USB lead	P01330403

The TRIADJUST 2 software alone CAN BE DOWNLOADED FREE OF CHARGE from the support area of the www.chauvin-arnoux-energy.com website

ASSOCIATED PRODUCT

TRIAD 2

Configurable via TRIADJUST 2

Programmable digital transducers, 1 to 4 analog outputs. Configurable accuracy class.

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