Measurement and Instrumentation

Transducers and recorders

Overview of ranges p. 218
Info & advice p. 220
Selection guide p. 223
Digital technology
TRIAD 2 range p. 224
MICAR 2 range p. 240
Analogue technology
TSP2 range p. 248
T82 range p. 252
Industrial transducers p. 268
MODUL'M range
Process recorder p. 272
ENERTRACE range

Overview of ranges

TRIAD 2 - programmable digital transducers

1, 2, 3 or 4 configurable analogue outputs / Class 0.2
1 Ethernet or RS485 digital output

Factory-programmed TRIAD 2
AC quantities
► page 225

TRIAD 2 programmable via TRIADJUST 2
AC quantities
► page 236

Vac Uac Iac P Q S F FP Tanφ Cosφ φ φU φV

MICAR 2 - programmable multi-function digital transducers

2 or 4 configurable analogue outputs / Class 0.2
2 or 4 alarm/pulse outputs
1 Ethernet or RS485 digital output

Factory-programmed MICAR 2
AC quantities
► page 240

MICAR 2 programmable via E.view+
AC quantities
► page 246

Vac Uac Iac P Q S F FP Cosφ kWh kVArh kVAh

MODUL'M - industrial transducers

MTAC
Tachometer
► page 269

MTAC-t
Frequency
► page 269

MEA7, MEA3
Process, temperature
► pages 269-270

MSA4
Analogue outputs
► page 270

MES16
Logical inputs/outputs
► page 270

MREL5
Extension
► page 269

TSP 2 - self-powered analogue transducers
1 analogue output / Class 0.2

TSPU
Voltage measurement
► page 248

Vac Uac

TSPI
Current measurement
► page 248

Iac

T82 - analogue transducers
1 analogue output / Class 0.5

AC quantities

AC voltage
► page 256
Vac

AC current
► page 258
Iac

Frequency
► page 259
F

Power factor
► page 260
FP

Synchronization
► page 261
ΔU
Δφ

Power
► page 262
P
Q

DC quantities

DC voltage
► page 264
VDC
ΣVDC

DC current
► page 265
IDC
ΣIDC

Physical quantities

Temperature
► page 266
T°

Resistance
► page 267
Ω

ENERTRACE - process recorders

Plug & play
► page 273

Infos & advice

Transducers measure AC, DC or physical quantities and transmit them as a standard analogue signal (Vcc or mA).

FACTORY-PROGRAMMED OR USER-PROGRAMMABLE?

Factory-programmed

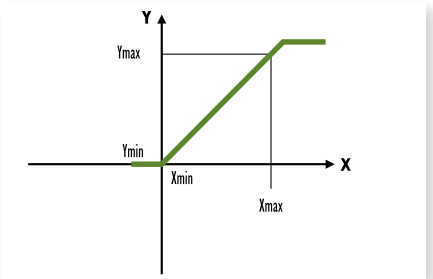
If the specifications of the measurements required are known, a **factory-programmed** transducer can be used.

User-programmable

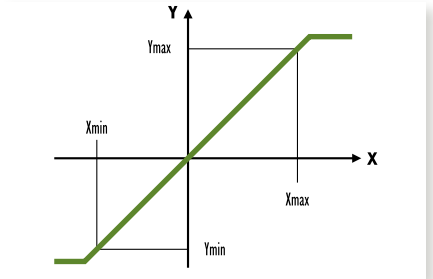
If the precise specifications of the measurements are not known, choose a **user-programmable** transducer. You can then program it accordingly when the specifications are known and you can modify the settings if these specifications change.

WHICH TRANSFER CURVES SHOULD YOU CHOOSE?

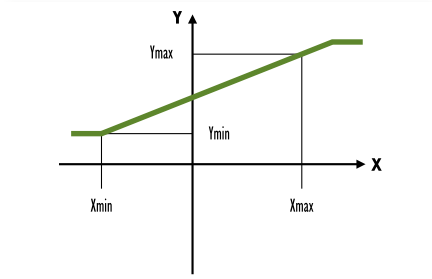
Linear



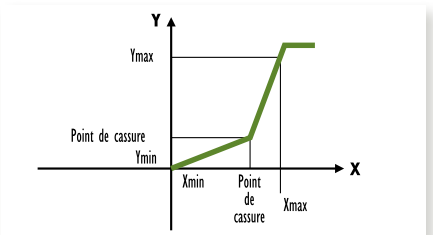
Linear without offset



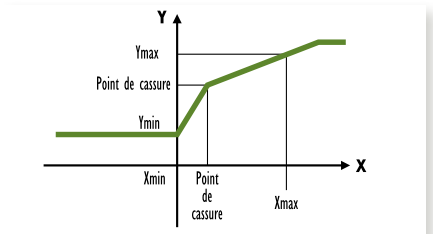
Linear with offset



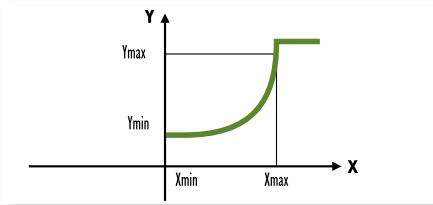
Linear with 2 extended slopes



Linear with 2 slopes



Quadratic



FOCUS

Accuracy class and IEC 688 standard

The IEC 688 standard defines the accuracy class as the limits of the intrinsic error expressed as a percentage of the output interval.
Example:
For a measurement range of 0 - 1,000 kW, an output interval of 16 mA (output 4-20 mA) and an accuracy class of 0.2, the intrinsic error is:

$$\frac{0.2}{100} \times 16 \text{ mA} = \pm 0.032 \text{ mA}$$

representing a measurement uncertainty of ±2 kW over the complete measurement range 0 - 1,000 kW.

Advantages of analogue outputs

- **Universality:** the nature of the output signal from the measurement transducer enables quick and easy connection to a wide range of instruments (recorders, controllers, calculators, analogue and digital panel meters, measurement relays, PLCs, RTUs, etc.).
- **Response time:** the response time of an analogue output enables real-time viewing of all electrical parameters (for example, SCADA application, dispatching, control and monitoring of industrial processes).
- **Resistance to disturbances:** analogue signals (current outputs in particular) are not significantly affected by electromagnetic disturbances. A single shielded-pair wire enables you to transmit the output signal over very long distances (several hundred meters without signal amplification).
- **Reliability:** analogue transducer technology offers the advantage of several decades of application and use, benefiting from wide experience in such varied fields as industry, building automation and electrical network supervision (dispatching).

Advantages of programmable transducers

The configuration software associated with transducers enables you to adapt transducer specifications to application needs at all times and stages of the application.

- **Reduction of stocks and maintenance costs**
  A programmable transducer can replace any other product as necessary, helping to reduce stocks for maintenance.
- **Quickly and easily replaceable products**
  Programmability makes it easy to replace products quickly, thus cutting maintenance time.
- **Adaptable to installation evolutions**
  The programmable transducer can be modified at all times, especially in the case of modification of initial specifications or information unavailable at the outset.

Advantages of digital outputs

- **Remote access for easy maintenance:** with digital outputs, it is possible to create a communicating network so that you can set the products' parameters remotely.
- **Remote meter-reading:** using the commands available in the ModBus mapping, a transducer can be operated via a digital supervision system and remote-read all the electrical quantities available per product on the same bus.
- **Extra functions:** the digital outputs on our transducers can be used to access functions which were previously unavailable, such as alarm, date-stamping or energy index functions.

Selection guide

	T82	TSP 2		TRIAD 2	MICAR 2
	► page 254	► page 248		► page 224	► page 240
					
		TSPU	TSPI		
Measurements					
Iac	•		•	•	•
Vac	•	•		•	•
Uac	•	•		•	•
V_{earth}					•
$I_{neutral}$					•
Idc	•				
I signed				•	
Vdc	•				
Σ Idc	•				
Σ Vdc	•				
P	•			•	•
Q	•			•	•
S				•	•
F	•			•	•
PF	•			•	•
Cosφ				•	•
Tanφ				•	
φ				•	
φ (U' – U'')	•			•	
Δ (U' – U'')	•				
T°	•				
Ω	•				
kWh					•
kVArh					•
kVAh					•
Options					
Number of analogue outputs	1	1	1	4	4
RS485				•	•
Ethernet				•	•
Pulse output					•
Alarm output					•
Programmable				•	•
Plug-in versions	•				
Version Rack	•				
Self-powered	•	•	•	(1)	(1)

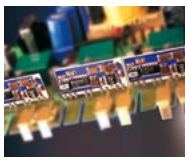
(1) By looping the input voltage

TRIAD 2 Range

Programmable digital transducers with 1 to 4 analogue outputs
Programmable accuracy class

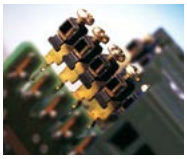
PRODUCT ADVANTAGES

- Up to **4 PROGRAMMABLE ANALOGUE OUTPUTS**
- **4 kV INSULATION**
- **CONFIGURABLE AND MODIFIABLE** using the TRIADJUST 2 software
- **ADJUSTABLE** accuracy within Class 0.1 as per IEC 60688
- **ADJUSTABLE RESPONSE TIME** down to 50 ms
- **DIGITAL OUTPUT** available as an **OPTION**



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

► Main specifications

Quantities measured: 1, 2, 3, 4 to be chosen from I, V, U, F, FP, 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, 5 A and 10 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: ± 1 mA, ± 5 mA, ± 20 mA, ± 1 V, ± 10 V
Response time in Class 0.2: 200 ms
Operating frequency: 50 or 60 Hz
Auxiliary power supply with wide dynamic range: 80 to 265 V ac/dc or 19 to 58 V dc
Compliance with CE directive
Digital technology

TRIAD 2 Programmable model

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: 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 analogue 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 0042-1

Mounting accessories

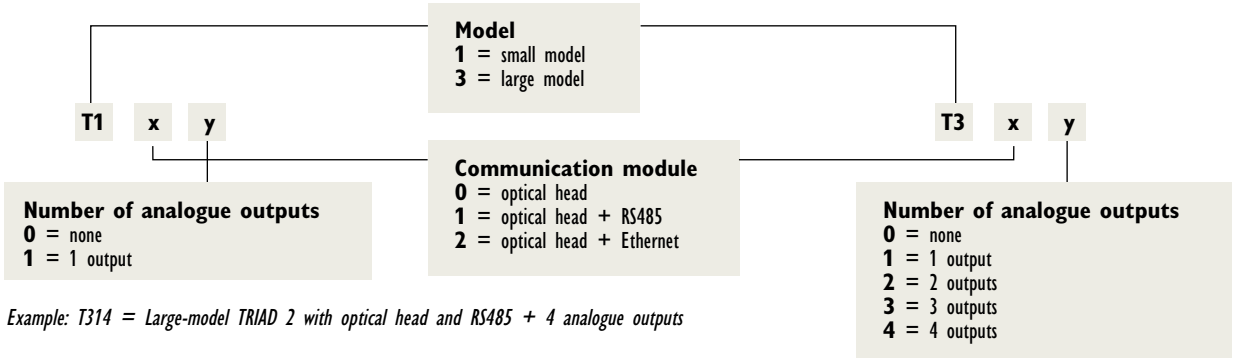
Model	Reference
Plate mounting for T1xy	ACCT 1007
Plate mounting for T3xy	ACCT 1006

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 analogue outputs

TRIAD 2 Range

Network	Function	T1xy model	T3xy model
Single-phase	V	•	•
	I	•	•
	F	•	•
	P	•	•
	Q	•	•
	S	•	•
	FP	•	•
	Tanφ	•	•
	Cosφ	•	•
	φ	•	•
Balanced 3-phase, 3 wires	U12, U23, U31	•	•
	I1, I2, I3	•	•
	F	•	•
	Pt	•	•
	Qt	•	•
	St	•	•
	FPt	•	•
	Tanφ	•	•
	Cosφt	•	•
	φt	•	•
	I1, I2, I3 signed	•	•
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	•	•
	FP1, FP2, FP3, FPt	•	•
	Tanφ	•	•
	Cos (φ1, φ2, φ3, φt)	•	•
	φ1, φ2, φ3, φt	•	•
	I1, I2, I3 signed	•	•
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		•
	FP1, FP2, FP3, FPt		•
	Tanφ		•
	Cos (φ1, φ2, φ3, φt)		•
	φ1, φ2, φ3, φt		•
	φ (U12/U23, U23/U31, U31/U12)		•
	φ (V1/V2, V2/V3, V3/V1)		•
	I1, I2, I3 signed		•
Split-phase	V1, V2		•
	U12		•
	I1, I2		•
	F		•
	P1, P2, Pt		•
	Q1, Q2, Qt		•
	S1, S2, St		•
	FP1, FP2, FPt		•
	Tanφ		•
	Cos (φ1, φ2, φt)		•
	φ1, φ2, φt		•
	φ (V1/V2)		•
	I1 signed, I2 signed		•

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	1,000 kV (ph-ph)	
Acceptable overloads	T1: 300 Vac permanent - 460 Vac / 10s T3: 520 Vac permanent - 800 Vac / 10s	
Consumption	< 0.2 A	
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) – 80 / 265 Vdc	
Low level	19 / 58 Vdc	
Consumption	**High level**	**Low level**
	T1: 8.5 VA max. T3: 20 VA max.	T1: 5 W max. T3: 10 W max.
Analogue outputs		
Rated values	**Current**	**Voltage**
	± 1 mA, ± 5 mA, ± 20 mA	± 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 baud	10 base T	2,400 to 115,200 baud
Parity	-	-	Even, odd or none
JBus addresses	-	-	1 to 247
Transmission length	2 m	100 m	1.2 km as 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, FP, Tanφ, Cosφ, φ, φU, φV	± 1%	± 0.5%	± 0.2%	± 0.15%	± 0.1%

* RT: Response time for F = 50 Hz

** Phase angle between voltages

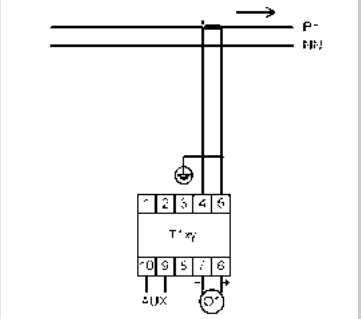
TRIAD 2 Range

Electrical connections

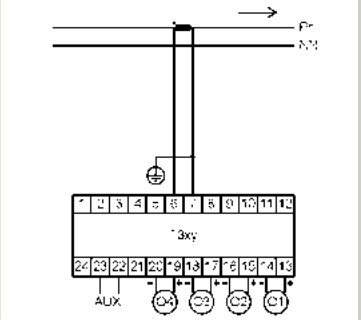
Single-phase network

I1, F:

TD201

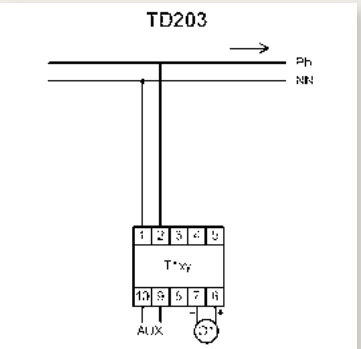


TD202

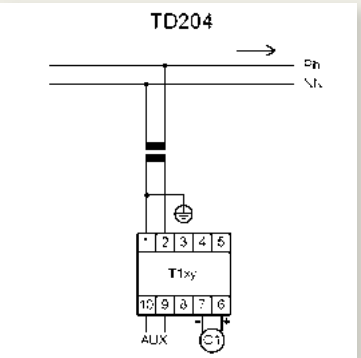


V1, F:

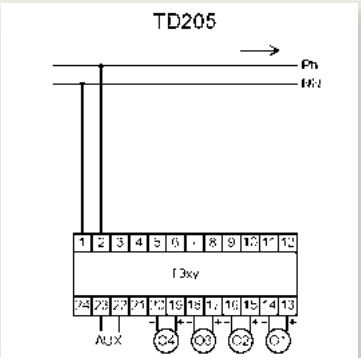
TD203



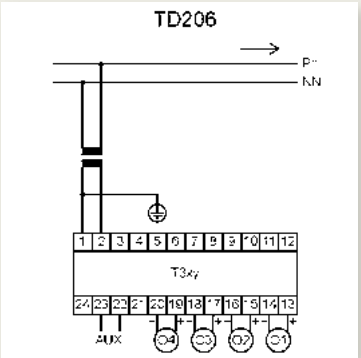
TD204



TD205

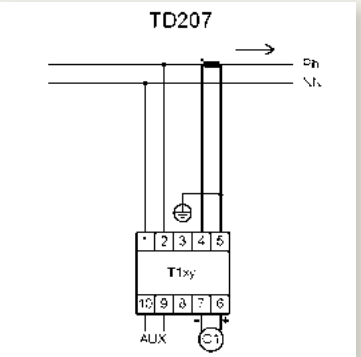


TD206

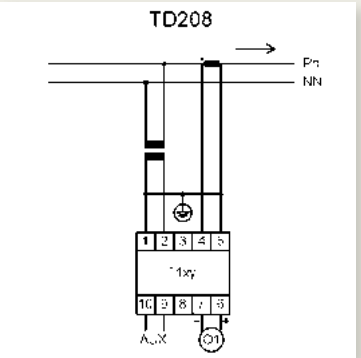


V1, I1, I1 signed, P1, Q1, S1, FP1, F, TANφ, Cosφ1, φ1:

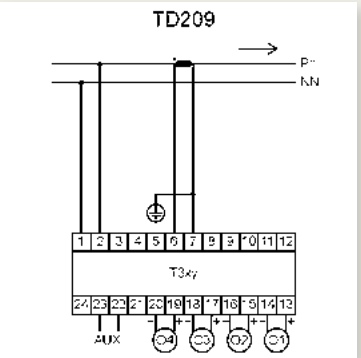
TD207



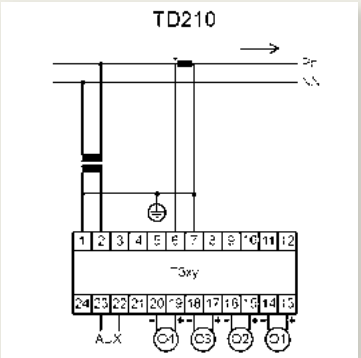
TD208



TD209

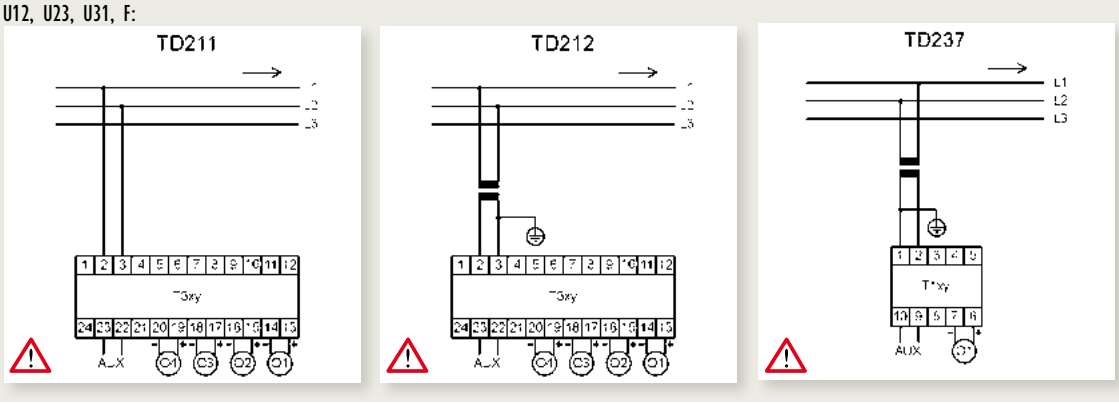


TD210

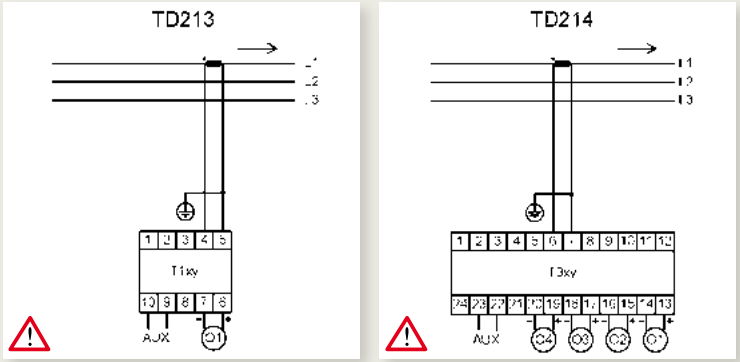


Balanced 3-phase, 3-wire network

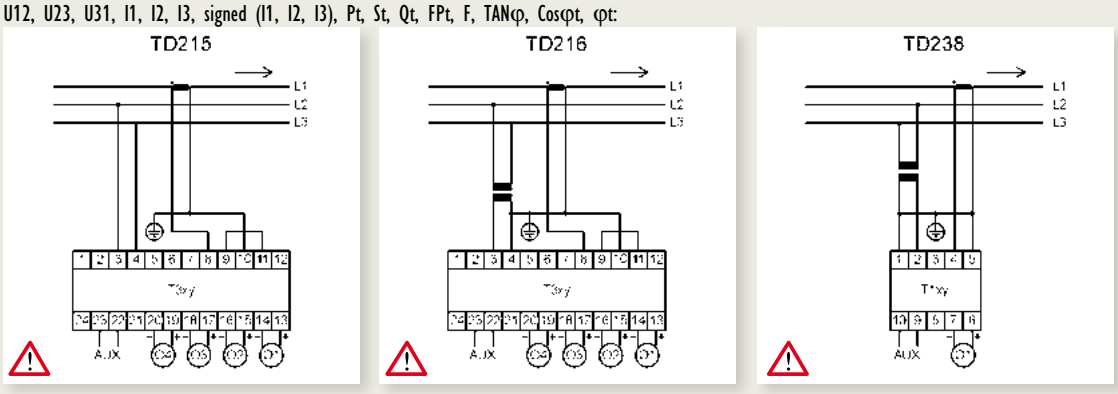
U12, U23, U31, F:



I1, I2, I3, F:



U12, U23, U31, I1, I2, I3, signed (I1, I2, I3), Pt, St, Qt, FPt, F, TANφ, Cosφt, φt:



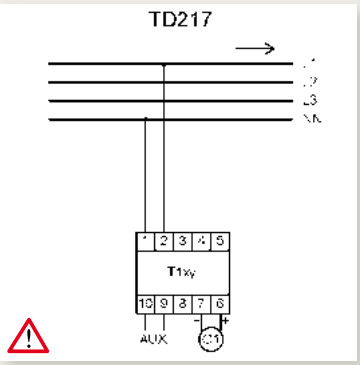
⚠ Phase rotation authorized

TRIAD 2 Range

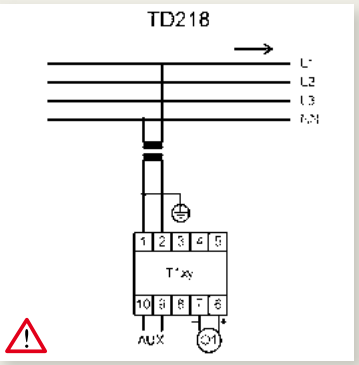
Balanced 3-phase, 4-wire network

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

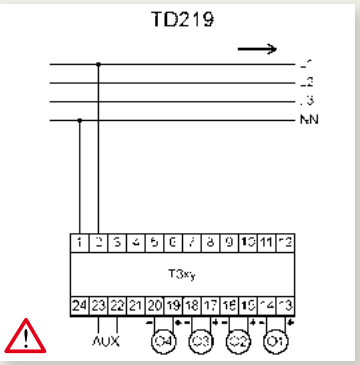
TD217



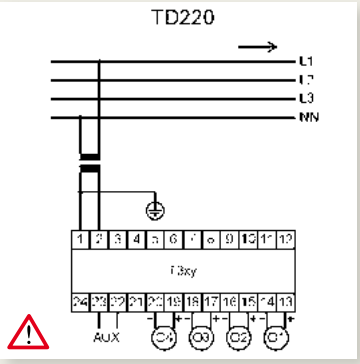
TD218



TD219

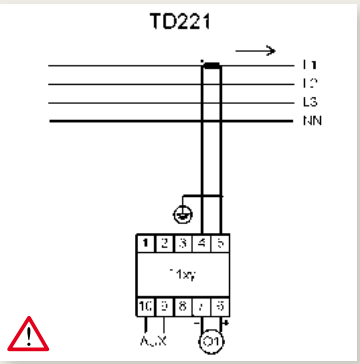


TD220

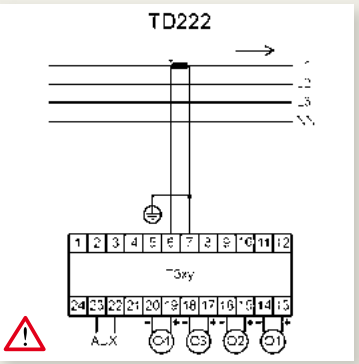


I1, I2, I3, F:

TD221



TD222

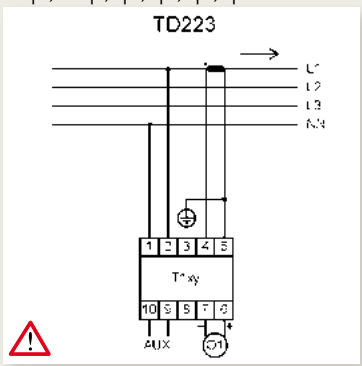


⚠ Phase rotation authorized

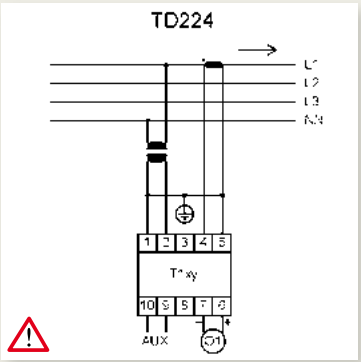
Balanced 3-phase, 4-wire network (continued)

V1, V2, V3, U12, U23, U31, I1, I2, I3, signed (I1, I2, I3), P1, P2, P3, Pt, S1, S2, S3, St, Q1, Q2, Q3, Qt, FP1, FP2, FP3, FPt, F, TANφ, Cosφ1, Cosφ2, Cosφ3, Cosφt, φ1, φ2, φ3, φt:

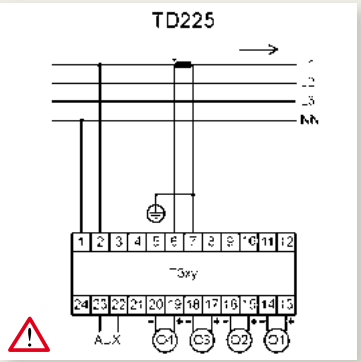
TD223



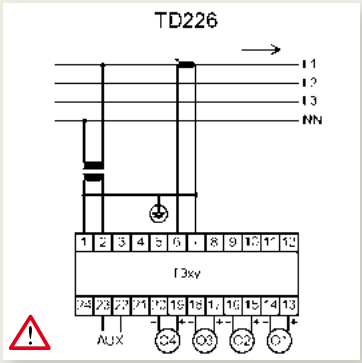
TD224



TD225



TD226

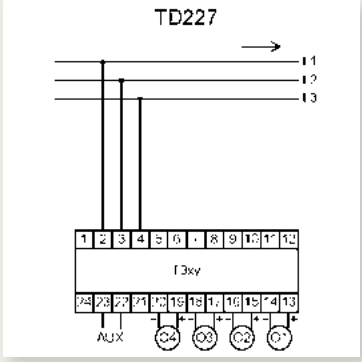


Phase rotation authorized

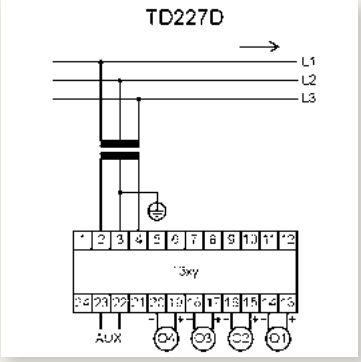
Unbalanced 3-phase, 3-wire network

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

TD227

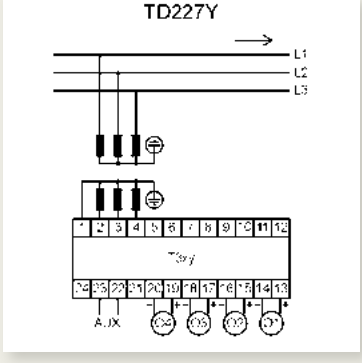


TD227D



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

TD227Y

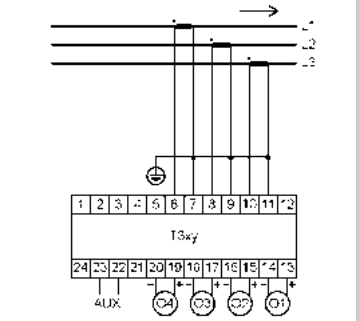


TRIAD 2 Range

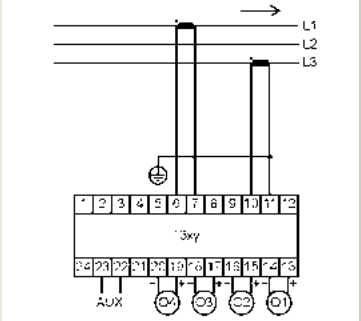
Unbalanced 3-phase, 3-wire network (continued)

I1, I2, I3, F:

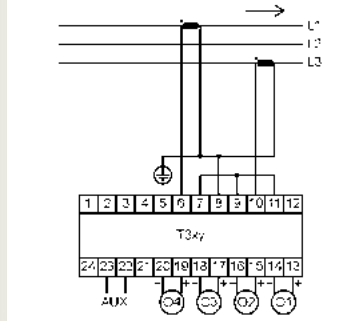
TD228



TD229

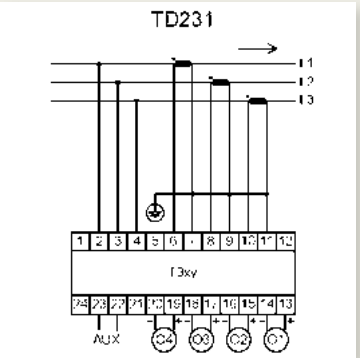


TD230

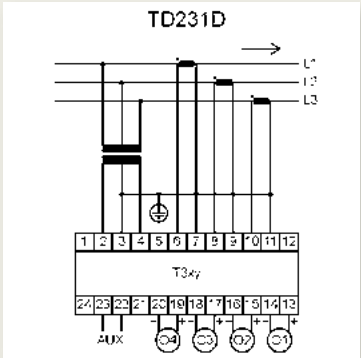


U12, U23, U31, I1, I2, I3, signed (I1, I2, I3), Pt, St, Qt, FPt, F, TANφ, Cosφt, φt, Angle (U12/U23, U23/U31, U31/U12):

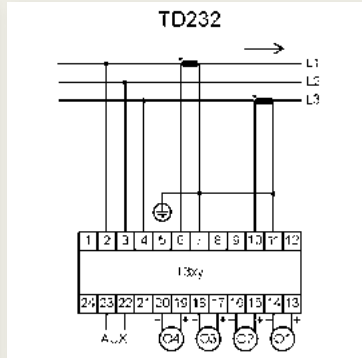
TD231



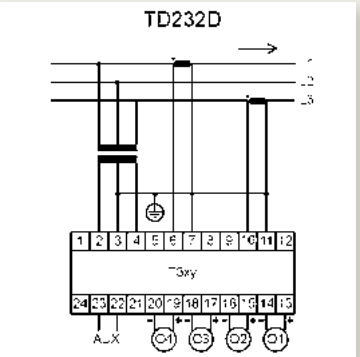
TD231D



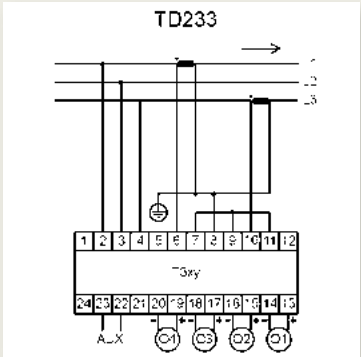
TD232



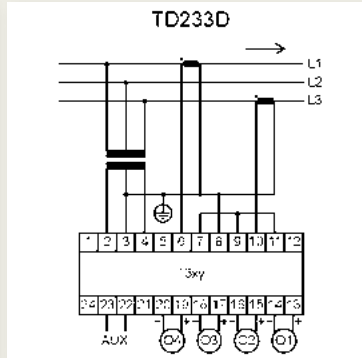
TD232D



TD233

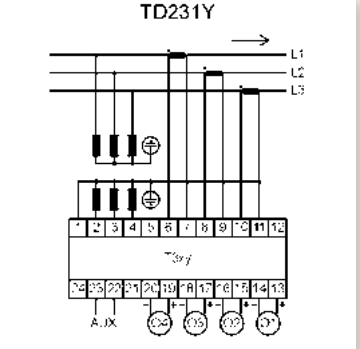


TD233D

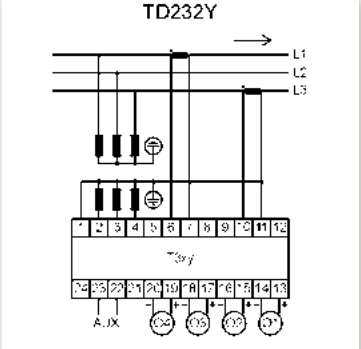


V1, V2, V3, U12, U23, U31, I1, I2, I3, signed (I1, I2, I3), P1, P2, P3, Pt, S1, S2, S3, St, Q1, Q2, Q3, Qt, FP1, FP2, FP3, FPt, F, TANφ, Cosφ1, Cosφ2, Cosφ3, Cosφt, φ1, φ2, φ3, φt, Angle (V1/V2, V2/V3, V3/V1), Angle (U12/U23, U23/U31, U31/U12):

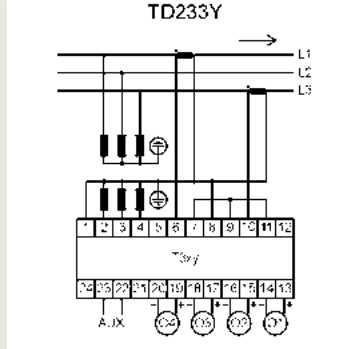
TD231Y



TD232Y



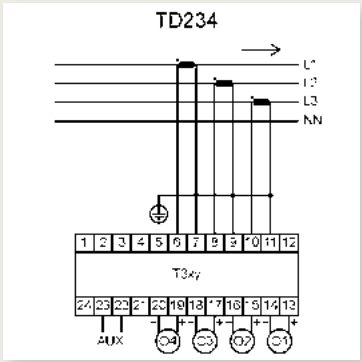
TD233Y



Unbalanced 3-phase, 4-wire network

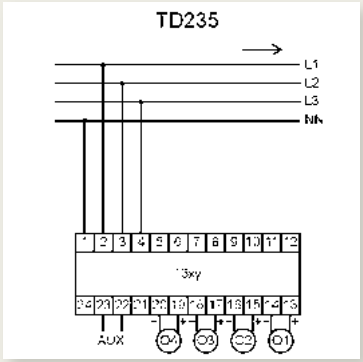
I1, I2, I3, F:

TD234

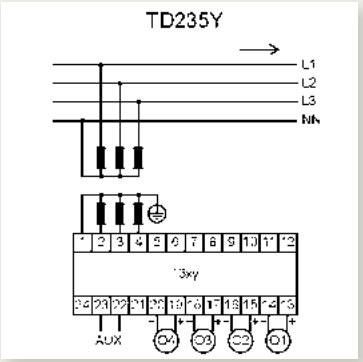


V1, V2, V3, U12, U23, U31, F, Angle (V1/V2, V2/V3, V3/V1), Angle (U12/U23, U23/U31, U31/U12):

TD235

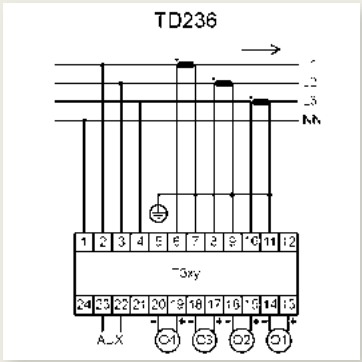


TD235Y

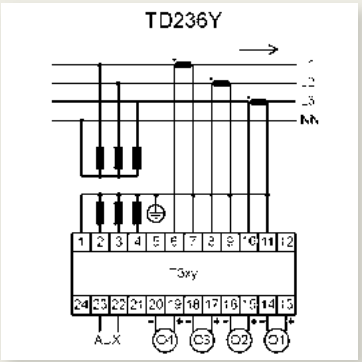


V1, V2, V3, U12, U23, U31, I1, I2, I3, signed (I1, I2, I3), P1, P2, P3, Pt, S1, S2, S3, St, Q1, Q2, Q3, Qt, FP1, FP2, FP3, FPt, F, TANφ, Cosφ1, Cosφ2, Cosφ3, Cosφt, φ1, φ2, φ3, φt
Angle (V1/V2, V2/V3, V3/V1), Angle (U12/U23, U23/U31, U31/U12):

TD236



TD236Y

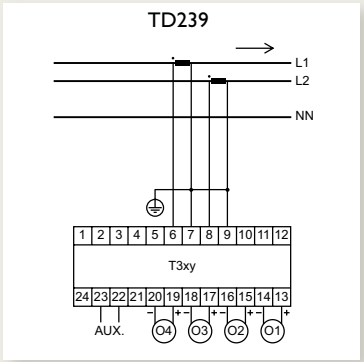


TRIAD 2 Range

Split-phase

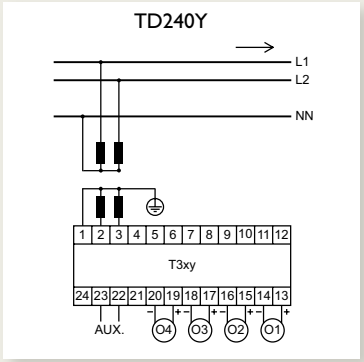
I1, I2, F:

TD239

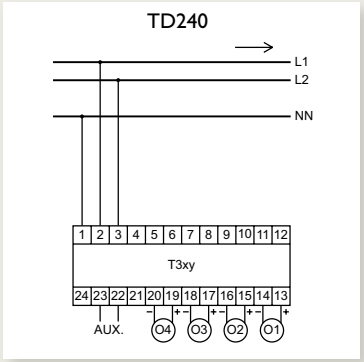


V1, V2, U12, F, Angle (V1/V2) rad, Angle (V1/V2) deg:

TD240Y

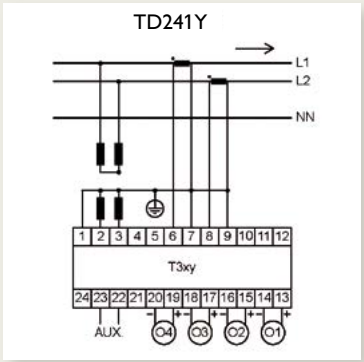


TD240

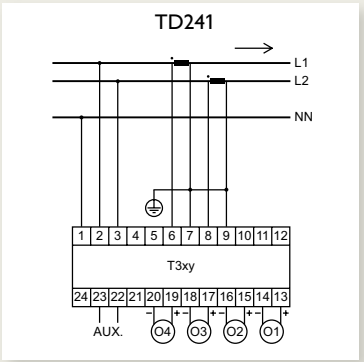


V1, V2, U12, I1, I2, P1, P2, Pt, Q1, Q2, Qt, S1, S2, St, FP1, FP2, FPt, F, tan φ, Angle (V1/V2) rad, Angle (V1/V2) deg, cos φ1, cos φ2, cosφt, φ1 Fonda rad, φ2 Fonda rad, φt Fonda rad, φ1 Fonda. deg, φ2 Fonda. deg, φt Fonda. deg, Angle V1/V2 Fonda deg, I1 (signed), I2 (signed):

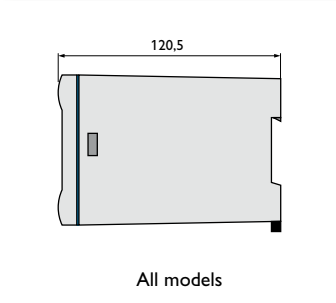
TD241Y



TD241

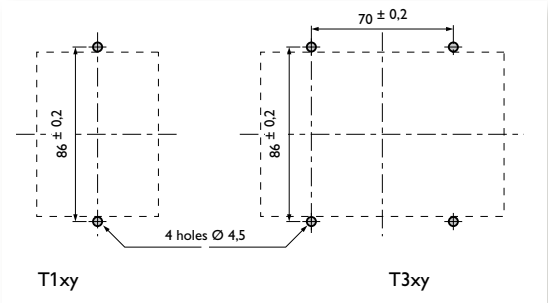


Dimensions (in mm)

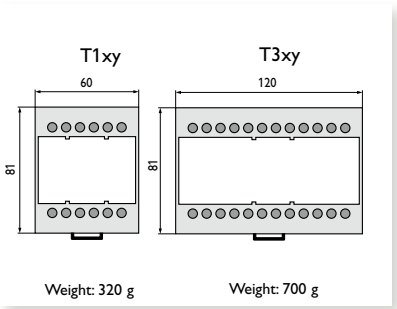


All models

Panel drilling diagram for plate mounting

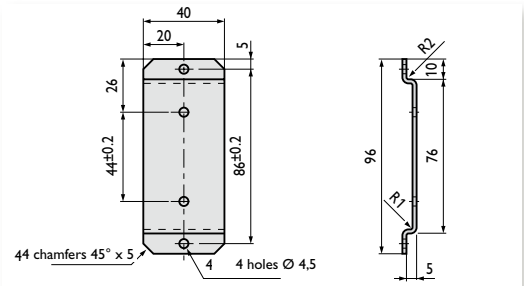


T1xy T3xy



Weight: 320 g Weight: 700 g

Accessory for plate mounting with screw (option)



TRIAD 2 Range

TRIAD 2 programmable via TRIADJUST 2

TO ORDER

T1 – SMALL MODEL (60 x 81 x 120.5 mm)

			Without tropicalization	With tropicalization
			Number of input	Number of input
Link	Output	Supply	1	1
Optical	± 20 mA	80-265 V AC/DC	P01380001	P01380002
		19-58 V DC	P01380003	P01380004
	± 10 V	80-265 V AC/DC	P01380005	P01380006
		19-58 V DC	P01380007	P01380008

T3 – LARGE MODEL (120 x 81 x 120.5 mm)

			Without tropicalization				With tropicalization			
			Number of input(s)				Number of output(s)			
Link	Output	Supply	1	2	3	4	1	2	3	4
Optical	± 20 mA	80-265 V AC/DC	P01380101	P01380103	P01380105	P01380107	P01380102	P01380104	P01380106	P01380108
		19-58 V DC	P01380109	P01380111	P01380113	P01380115	P01380110	P01380112	P01380114	P01380116
	± 10 V	80-265 V AC/DC	P01380117	P01380119	P01380121	P01380123	P01380118	P01380120	P01380122	P01380124
		19-58 V DC	P01380125	P01380127	P01380129	P01380131	P01380126	P01380128	P01380130	P01380132

TRIAD 2 factory-programmable

1 Model - Frequency
T1: small model – 1 analogue output
T3: large model – 1 to 4 analogue 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 V AC/DC
1: 19-58 V DC

5 Tropicalization
0: Without
1: With

6 Inputs
Indicate direct voltage to be measured or the VT ratio
Indicate direct current to be measured or the CT ratio

7 Number of analogue 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 Analogue outputs
Indicate for each output:

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

9 Analogue output calibres
0: -20 mA to +20 mA
1: -5 mA to +5 mA
2: -1 mA to +1 mA
3: -10 V to +10 V
4: -1 V to +1 V

To simplify the procedure when ordering you can send us the form on page 237.

Factory-programmed TRIAD 2: order form

1 - Model / Hz

☐ T1 or ☐ T3
☐ 50 Hz or ☐ 60 Hz

2 - Network

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

3 - Communication / Connection

☐ Ethernet or ☐ RS485

Connection diagram: TD ☐☐☐☐ cf: p226 to p232

4 - Power supply

☐ 80 to 265 Vac (50/60 Hz) / 80 to 265 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

FP1 FP2 FP3 FPt | 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 analogue 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 - Analogue 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

	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

	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

	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

	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

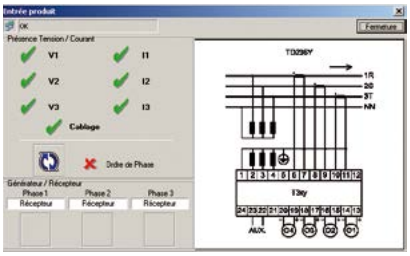
TRIADJUST 2 software

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

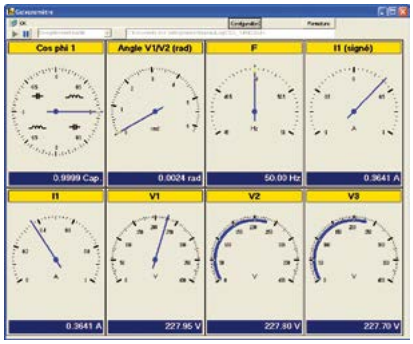
PRODUCT ADVANTAGES

- **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**

Configuration
- Inputs / Outputs
- Communication
- Connection diagram
- Accuracy class
- Set-up function protected by password



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



Display
- Instantaneous quantities (in digital or analogue form)

Recording
- In real time in exported file

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 dialogue 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 analogue 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.

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

KIT TRIADJUST 2

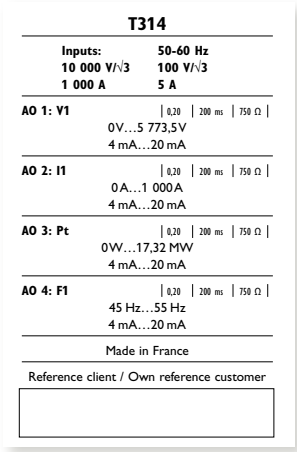
The **TRIADJUST 2 configuration kit** comprises:
- The TRIADJUST 2 software
- An optical / USB lead
- 30 sheets of blank labels
- A 230 x 185 x 45 mm carrying case

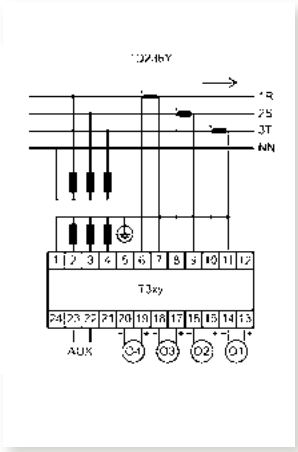
TRIADJUST 2 "PREMIER"

This module is a **complete tool** designed for distributors or any user needing to program a large number of transducers
The TRIADJUST 2 "PREMIER" configuration workstation comprises:
- The TRIADJUST 2 software
- An optical / USB lead
- A benchtop power-supply base
- 210 sheets of blank labels
- A 500 x 400 x 270 mm carrying case

Labels common to both kits

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
TRIADJUST 2 "PREMIER" workstation	P01380420
Accessories	
Set of 30 sheets of blank labels	P01380400
Optical/USB lead	P01330403

Associated product

TRIAD 2 programmable with TRIADJUST 2

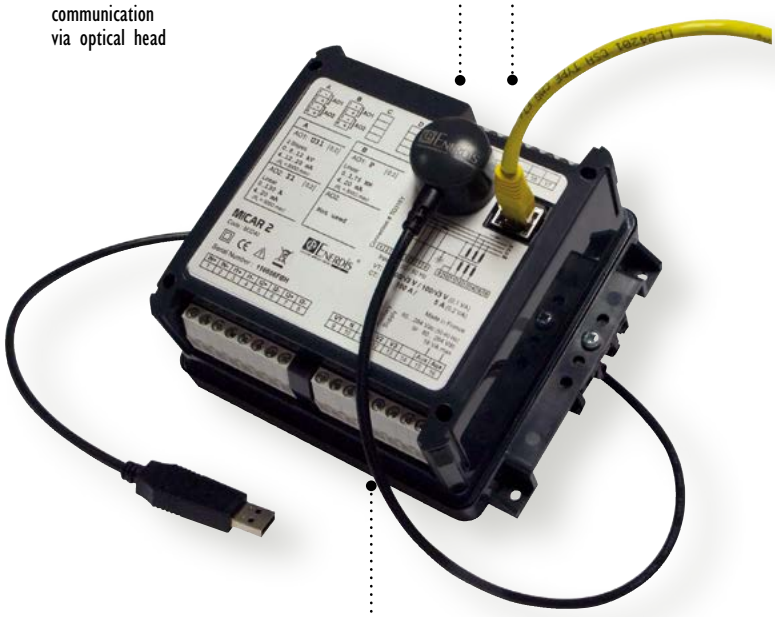
page 224

MICAR 2 Range

Multi-function digital transducers
2 or 4 analogue outputs / Class 0.2

Local communication via optical head

Remote communication via Ethernet network



Simplified connection with screw-on terminal strip

PRODUCT ADVANTAGES

- **CLASS 0.2** Insulation 4 kV
- Up to 4 **CONFIGURABLE ANALOGUE OUTPUTS**
- Option of 2 or 4 **ON-OFF** outputs
- **COMMUNICATION** and programming via optical head or remotely via Ethernet network or RS485 output
- **ELECTRICAL NETWORK SUPERVISION** and display of the energy values, harmonics and THD using the **E.view+** software

General specifications

Quantities measured:
Choice of 1, 2, 3 or 4 among 32 electrical quantities
Configuration: in factory or by user with the **E.view+** software
Accuracy: Class 0.2
Current inputs: 1 A and 5 A
Voltage inputs: 100 to 400 V (ph-ph) or 100 / √3 to 400 / √3 V (ph-N)
Transfer curves: linear, 2 slopes, quadratic
Output signal: configurable between - 20 mA and + 20 mA
Response time: 350 ms
Operating frequency: 50 or 60 Hz
Auxiliary source with wide dynamic range: 80 to 264 V ac/dc or 19 to 57 Vdc
Compliance with CE directive

Electrical specifications

Voltage inputs	
Rated value	100 V ≤ Un ≤ 400 V (ph-ph) 57.7 ≤ Vn ≤ 230 V (ph-N)
Frequency	50/60 Hz
Max. phase-to-phase voltage measured	650 kV (ph-ph)
Acceptable overvoltage	800 V for 24 hours. 552 V permanent
Consumption	< 0.2 VA
Input impedance	2 MΩ
Current inputs	
Rated value (In)	1 A and 5 A
Max. current measured on primary	25,000 A
Acceptable overload	6.5 A permanent, 250 A for 1 second, 5 times every 5 minutes
Consumption	< 0.15 VA
Auxiliary power supply	
High level (standard)	80 to 265 Vac / 80 to 264 Vdc (< 15 VA)
Low level (option)	19.2 to 57 Vdc
Pulse outputs or alarm relays	
Type	static relay
Operating voltage	24 to 110 Vdc ± 20% 24 to 115 Vac –10% +15%
Max. current	100 mA
Compliance with standard	IEC 62053-31
Analogue output	
Scale	Configurable between –20 mA and +20 mA
Acceptable load	500 Ω, 10 V/I output
Typical response time	350 ms
RS 485 output	
Connection	2 wires, half-duplex
Protocol	ModBus / JBus RTU mode
Speed (configurable)	2,400 – 4,800 - 9,600 – 19,200 – 38,400
Parity	even, odd or none
JBus addresses	1 to 247
Ethernet output	
Type	RJ45 – 8-pin
Protocol	ModBus/TCP
Speed (configurable)	Compatible with 10baseT

MICAR 2 Range

Metrological specifications

Analogue outputs

Type	Conditions	Accuracy class
-20...+20 mA	Measurement of I, U, V, P, S, FP and F	Class 0.2 according to IEC 60688
	Measurement of Q	Class 0.5 according to IEC 60688

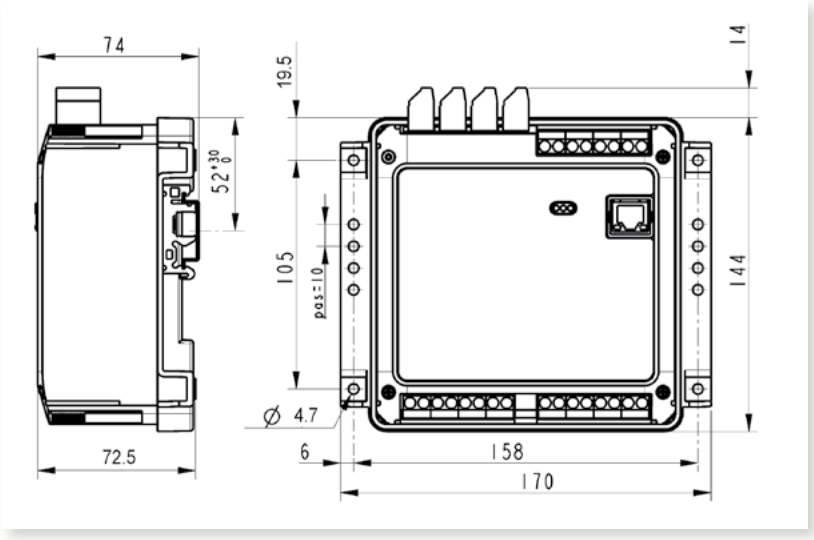
Digital communication output

Standard quantity	Conditions	Accuracy class
V	V between 10% and 120% of Vn(1)	±0.2% of V ±0.02% of Vn
U	U between 10% and 120% of Un(2)	±0.2% of U ±0.02% of Un
I	I between 5% and 130% of In	±0.2% of I ±0.02% of In
F	F between 42.5 Hz and 69 Hz	±0.1 Hz
P	FP between 0.5 inductive and 0.8 capacitive • U between 99% and 101% of Un(2) • I between 5% and 130% of In	±0.2% of P ±0.02% of Pn
Q	FP between 0.5 inductive and –0.5 capacitive • U between 99% and 101% of Un(2) • I between 5% and 130% of In	±0.5% of Q ±0.05% of Qn
S	U between 99% and 101% of Un(2) • I between 5% and 130% of In	±0.2% of S ±0.02% of Sn
FP, Cosφ	FP between 0.5 inductive and 0.5 capacitive * U between 99% and 101% of Un(2) * I between 5% and 130% of In	±0.02 counts

(1) Vn from 57.7 V to 230 V (2) Un from 100 V to 400 V

Special quantity	Accuracy class
Active energy	Class 0.5s according to IEC 62053-22
Reactive energy	Class 2 according to IEC 62053-23
Apparent energy	±0.5%
THD-I, THD-V and THD-U	±0.5 counts
Harmonics order by order on U, V and I	±0.5 counts

Dimensions



Environmental specifications

Climate specifications	
Operating temperature	-10°C to +55°C
Operating humidity	95% at 40°C
Storage temperature	-25°C to +70°C
Safety specifications	
Degree of pollution	2
Behaviour in fire	UL94, severity V1
Installation category	3
Mechanical specifications	
Protection rating	IP51 on front panel and IP20 on rear panel
Mechanical shocks	IEC 61010-1
Vibrations	IEC 60068-2-6 (method A)
Free fall with packaging	NF H 0042-1
Electromagnetic compatibility	
Generic standard	IEC 61326-1

Mounting accessories

Weight	700 g
Mounting	DIN 43700 rail or platen
Connection	Screw terminals for 6 mm² rigid or flexible wires on current measurement inputs and 2.5 mm² for the other accesses

Functions

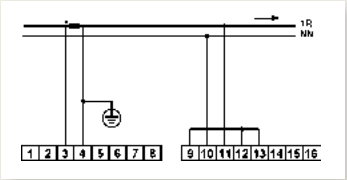
Measurement	Analogue output	On-off output: Alarm relay	On-off output: Pulse output	Communication output	Display with E.view+
V1, V2, V3, Vearth	•	•		•	•
U12, U23, U31	•	•		•	•
I1, I2, I3, In	•	•		•	•
P1, P2, P3	•			•	•
Pt	•	•		•	•
Q1, Q2, Q3	•			•	•
Qt	•	•		•	•
S1, S2, S3	•			•	•
St	•	•		•	•
FP1, FP2, FP3	•			•	•
FPt	•	•		•	•
Cosφ1, Cosφ2, Cosφ3,	•			•	•
Cosφt	•	•		•	•
Frequency	•	•		•	•
Crest factor V1, V2, V3				•	•
Crest factor I1, I2, I3				•	•
Unbalance U				•	•
Harmonics: V1, V2, V3, U12, U23, U31, I1, I2, I3				•	•
THD: V1, V2, U12, U23, U31, I1, I3				•	•
Active energy: receiver, generator			•	•	•
Reactive energy: Qcad1, Qcad2, Qcad3, Qcad4			•	•	•
Apparent energy: receiver, generator			•	•	•

Electrical connections

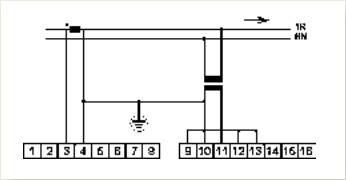
Configurations for single-phase networks

I1, V1, P1, S1, Q1, FP1, Cosφ1, F:

TD301 configuration



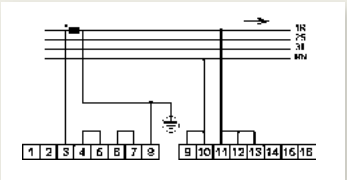
TD302 configuration



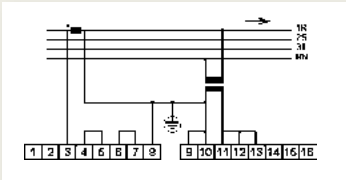
Balanced 3-phase network with 4 wires

I1, I2, I3, V1, V2, V3, P1, P2, P3, Pt, S1, S2, S3, St, Q1, Q2, Q3, Qt, FP1, Fp2, Fp3, FPt, Cosφ1, Cosφ2, Cosφ3, Cosφt, F:

TD303 configuration



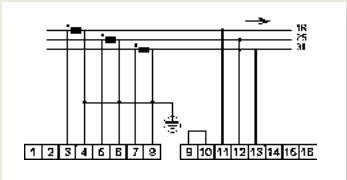
TD304 configuration



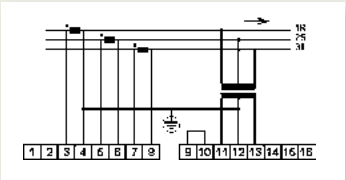
Unbalanced 3-phase network with 3 wires

I1, I2, I3, U12, U23, U31, P1, P2, P3, Pt, S1, S2, S3, St, Q1, Q2, Q3, Qt, FP1, FP2, FP3, FPt, Cosφ1, Cosφ2, Cosφ3, Cosφt, F:

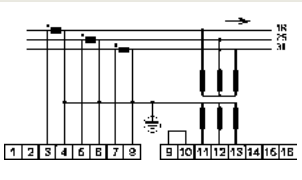
TD320 configuration



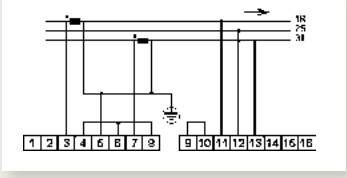
TD320D configuration



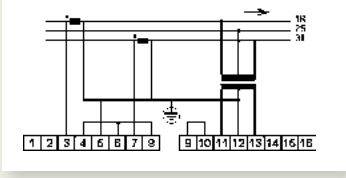
TD320Y configuration



TD324 configuration

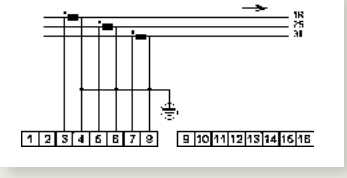


TD324D configuration

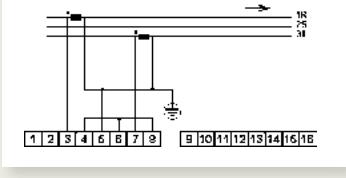


I1, I2, I3:

TD322 configuration

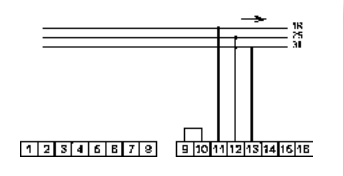


TD323 configuration

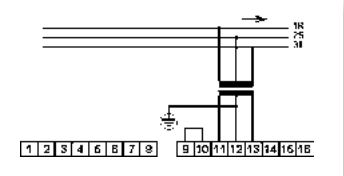


U12, U23, U31:

TD321 configuration



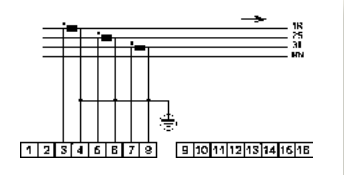
TD321D configuration



Unbalanced 3-phase network with 4 wires

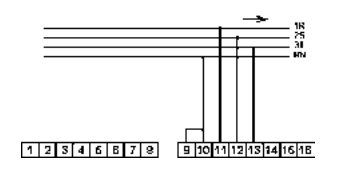
I1, I2, I3:

TD314 configuration

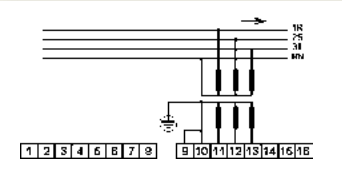


V1, V2, V3, U12, U23, U31, F:

TD317 configuration

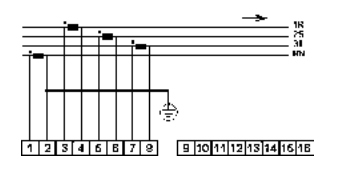


TD317Y configuration



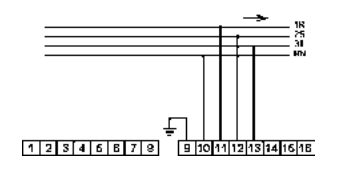
I1, I2, I3, Ineutral:

TD334 configuration

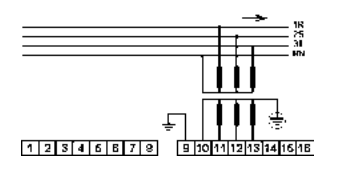


V1, V2, V3, Vearth, U12, U23, U31, F:

TD337 configuration

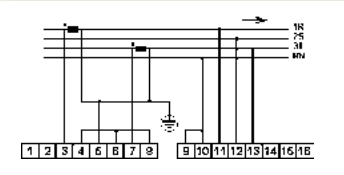


TD337Y configuration

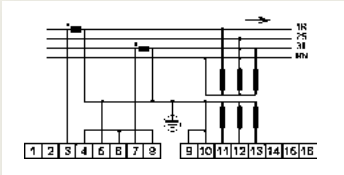


I1, I2, I3, V1, V2, V3, U12, U23, U31, P1, P2, P3, Pt, S1, S2, S3, St, Q1, Q2, Q3, Qt, FP1, FP2, FP3, FPt, Cosφ1, Cosφ2, Cosφ3, Cosφt, F:

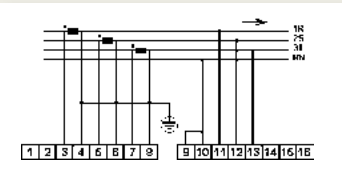
TD315 configuration



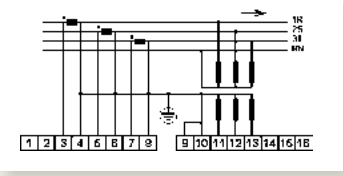
TD315Y configuration



TD318 configuration

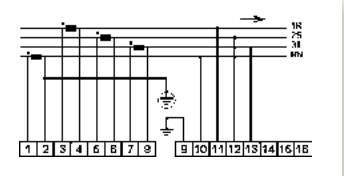


TD318Y configuration

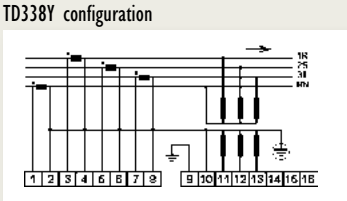


I1, I2, I3, Ineutral, V1, V2, V3, Vearth, U12, U23, U31, P1, P2, P3, Pt, S1, S2, S3, St, Q1, Q2, Q3, Qt, FP1, FP2, FP3, FPt, Cosφ1, Cosφ2, Cosφ3, Cosφt, F:

TD338 configuration

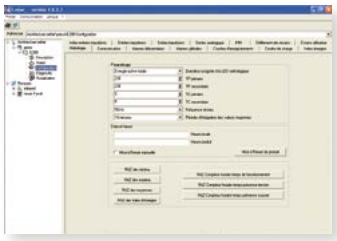


TD338Y configuration



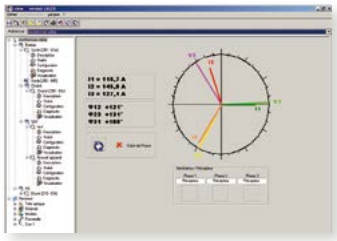
MICAR 2 Range

The **E.view+** software can be used with the **MICAR 2** range for configuration, installation diagnosis and display of the electrical quantities.



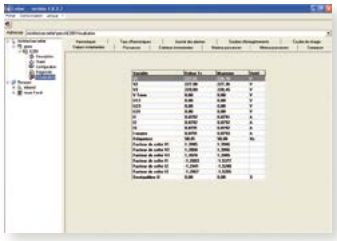
Configuration

- Configure your MICAR 2 transducers remotely via the RS485, Ethernet or local area network using the optical head
- Program the products' communication parameters and the configuration parameters (CT ratio, VT, alarm thresholds, etc.)



Diagnosis

- View the phase order and the Fresnel diagram
- Control the analogue and on-off outputs remotely



Display

- View the basic electrical quantities in real time
- View the harmonics in histogram format

TO ORDER

Product	Code
MICAR with tailored configuration	Complete the order form
Programmable MICAR 2, power supply 80-264 V AC/DC, RS485, 2 analogue outputs (without programming kit)	P01 330 840
Programmable MICAR 2, power supply 80-264 V AC/DC, RS485, 4 analogue outputs (without programming kit)	P01 330 841

Programming kit	Code
MICAR 2 – RS485 kit containing 1 optical head + 1 set of 50 labels + RS485 output + 1 E.view+ CD	P01 330 842
MICAR 2 – Ethernet kit containing 1 optical head + 1 set of 50 labels + Ethernet output + 1 E.view+ CD	P01 330 843

Accessories*	Code
Set of 50 labels for RS485 output	P01 330 844
Set of 50 labels for Ethernet output	P01 330 845

* labels printable only on laser printers

Associated products

Analogue panel meters
► page 179

Digital panel meters
► page 151

CT Current transformers
► page 101

E.view+ software
► page 49

Factory-programmed MICAR 2: order form

1 – Network

☐ Single-phase
☐ Balanced 3-phase, 3 wires
☐ Balanced 3-phase, 4 wires
☐ Unbalanced 3-phase, 3 wires
☐ Unbalanced 3-phase, 4 wires

2 – Frequency

☐ 50 Hz
or
☐ 60 Hz

3 – Connection options

☐ Ethernet (no RS485)
☐ Tropicalization
☐ 2 on-off outputs or ☐ 4 on-off outputs
Connection configuration: TD ☐☐☐☐

4 - Power supply

☐ 80 to 265 Vac (50/60 Hz) / 80 to 264 Vdc or ☐ 19 to 57 Vdc

5 – Inputs

Current

With current transformer or Direct
Primary / Secondary
/ A
A

Voltage

With voltage transformer or Direct
Primary / Secondary
/ V
V
☐ Phase-phase ☐ Phase-neutral

Quantities available

V1 V2 V3 Vearth | U12 U23 U31 | I1 I2 I3 Ineutral | P1 P2 P3 Pt | Q1 Q2 Q3 Qt | S1 S2 S3 St

FP1 FP2 FP3 FPt | COSφ1 COSφ2 COSφ3 COSφt | F

Output 1

Quantity and measurement range (x)

☐ Indicate the quantity to be measured

Min | Breaking point | Max | Unit (1)

Transfer curve

☐ Linear
☐ 2 slopes
☐ Quadratic

Output signal (y)

Min | Breaking point | Max
mA

Output 2

Quantity and measurement range (x)

☐ Indicate the quantity to be measured

Min | Breaking point | Max | Unit (1)

Transfer curve

☐ Linear
☐ 2 slopes
☐ Quadratic

Output signal (y)

Min | Breaking point | Max
mA

Output 3

Quantity and measurement range (x)

☐ Indicate the quantity to be measured

Min | Breaking point | Max | Unit (1)

Transfer curve

☐ Linear
☐ 2 slopes
☐ Quadratic

Output signal (y)

Min | Breaking point | Max
mA

Output 4

Quantity and measurement range (x)

☐ Indicate the quantity to be measured

Min | Breaking point | Max | Unit (1)

Transfer curve

☐ Linear
☐ 2 slopes
☐ Quadratic

Output signal (y)

Min | Breaking point | Max
mA

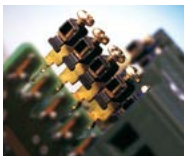
(1) Please indicate the unit for the measurement range, e.g. W, kW or MW.

TSP 2 Range

Self-powered version for applications requiring the conversion of a single AC current or voltage quantity. 1 analogue output class 0.2 for all type of electrical network

PRODUCT ADVANTAGES

- **SELF-POWERED**
- **CLASS 0.2**
- **WIDE CHOICE OF INPUTS CALIBRED**
- **RESPONSE TIME** of 100 ms for **TSPI** and 200 ms for **TSPU**



Accessibility and safety: large-dimension terminals Insulated circuits

Ergonomic: easy mounting on DIN rail or switchboard

► Main specifications

TSPU
Quantity measured: Vac, Uac
Accuracy: Class 0.2
Inputs: AC voltage: 57.5 V to 400 V (fixed calibres)
Analogue output calibres: 0-10 mA, 0-20 mA, 0-5 V, 0-10 V
Operating frequency: 45 to 65 Hz

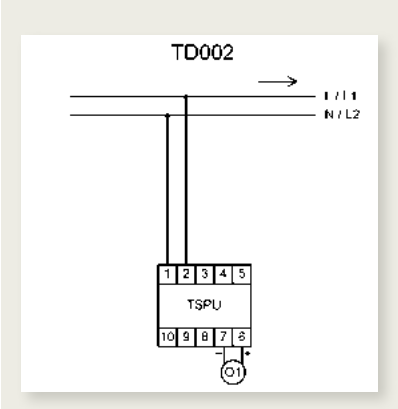
TSPI
Quantity measured: Iac
Accuracy: Class 0.2
Inputs: AC current: 1 A or 5 A (fixed calibres)
Analogue output calibres: 0-10 mA, 0-20 mA
Operating frequency: 45 to 65 Hz

Functions

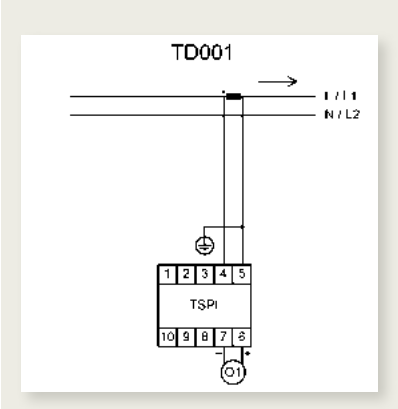
Network	Function	TSPI model	TSPU model
Single phase	V		•
	I	•	
Balanced 3-phase 3 wires	U12 or U23 or U31		•
	I1 or I2 or I3	•	
Balanced 3-phase 4 wires	V1 or V2 or V3 or U12 or U23 or U31		•
	I1 or I2 or I3	•	
Unbalanced 3-phase 3 wires	U12 or U23 or U31		•
	I1 or I2 or I3	•	
Unbalanced 3-phase 4 wires	V1 or V2 or V3 or U12 or U23 or U31		•
	I1 or I2 or I3	•	

Electrical connections

TSPU



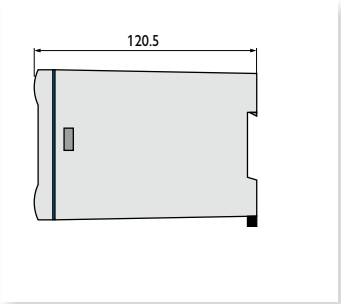
TSPI

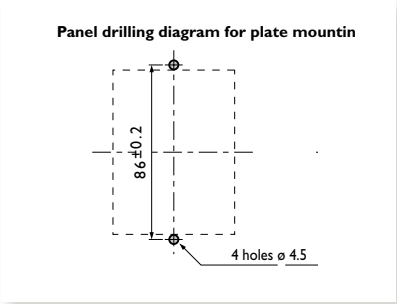


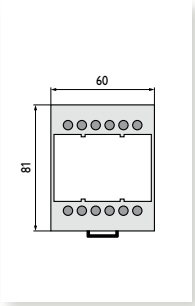
⚠ The terminal 1 can be connected either on the neutral or on one phase of the electrical network

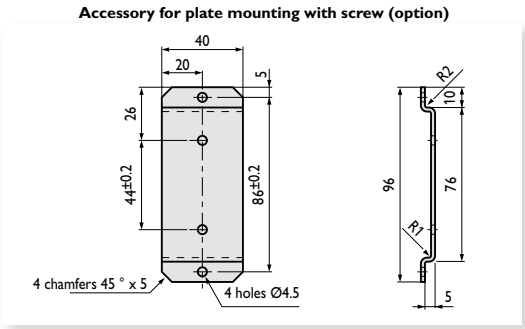
TSP 2 Range

► Dimensions (in mm)









► Environment and standards

Standard of reference: IEC 60688	
EMC IMMUNITY	
Shock voltage	IEC 61000-4-5
Oscillating wave	IEC 61000-4-12
Fast electrical transients in bursts	IEC 61000-4-4
Electrostatic discharge	IEC 61000-4-2
EM radiated field	IEC 61000-4-3

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% at 55°C
Safety specifications (IEC 61010-1)	
Installation category	3
Pollution level	2
Fire resistance	UL94, severity V0
Mechanical specifications	
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	ACCT 1007

► Casing

Weight	320 g
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

Electrical and metrological specifications

Model	TSPI I (rms)	TSPU U or V (rms)
Current or voltage input		
Rated value	In = 1 or 5 A	Vn = 100/√3, 110/√3, 120/√3 V Un = 100, 110, 120, 230, 400 V
Frequency Fn	46...65 Hz	46...65 Hz
Measurement range 0...Xmax	0...100% of In	0...100% of Un/Vn
Consumption	2 VA	2 VA
Maximum overloads	2 In permanent 20 In / 1 s 40 In / 0.5 s	1.5 Un permanent 2 Un / 1 s 4 Un / 0.5 s
Analogue output		
Transfer curve	linear	
0…Ymax	0...10 mA 0...20 mA	0...10 mA 0...20 mA 0...5 V 0...10 V
Accuracy	Class 0.2: 10…100% of In	Class 0.2: 50…100% of Vn / Un
Response time	< 100 ms	< 200 ms
Operating resistance	15 V /Is	≥ 1 kΩ
Peak-peak residual wave	40 µA	20 mV
Auxiliary power supply		
Self-powered	•	•

Parameters to be indicated when ordering

TO ORDER

TSPI

Input	Output	Tropicalization with	Tropicalization without
0…1 A	0…10 mA	P01 3751 01	P01 3751 05
	0…20 mA	P01 3751 02	P01 3751 06
0…5 A	0…10 mA	P01 3751 03	P01 3751 07
	0…20 mA	P01 3751 04	P01 3751 08

TSPU

Input	Output	Tropicalization with	Tropicalization without
0…57.7 V	0…10 mA	P01 3752 01	P01 3752 33
	0…20 mA	P01 3752 02	P01 3752 34
	0…5 V	P01 3752 03	P01 3752 35
	0…10 V	P01 3752 04	P01 3752 36
0…63.5 V	0…10 mA	P01 3752 05	P01 3752 37
	0…20 mA	P01 3752 06	P01 3752 38
	0…5 V	P01 3752 07	P01 3752 39
	0…10 V	P01 3752 08	P01 3752 40
0…69.3 V	0…10 mA	P01 3752 09	P01 3752 41
	0…20 mA	P01 3752 10	P01 3752 42
	0…5 V	P01 3752 11	P01 3752 43
	0…10 V	P01 3752 12	P01 3752 44
0…76.2 V	0…10 mA	P01 3752 65	P01 3752 66
0…100 V	0…10 mA	P01 3752 13	P01 3752 45
	0…20 mA	P01 3752 14	P01 3752 46
	0…5 V	P01 3752 15	P01 3752 47
	0…10 V	P01 3752 16	P01 3752 48

TSPU

Input	Output	Tropicalization with	Tropicalization without
0…110 V	0…10 mA	P01 3752 17	P01 3752 49
	0…20 mA	P01 3752 18	P01 3752 50
	0…5 V	P01 3752 19	P01 3752 51
	0…10 V	P01 3752 20	P01 3752 52
0…120 V	0…10 mA	P01 3752 21	P01 3752 53
	0…20 mA	P01 3752 22	P01 3752 54
	0…5 V	P01 3752 23	P01 3752 55
	0…10 V	P01 3752 24	P01 3752 56
0…230 V	0…10 mA	P01 3752 25	P01 3752 57
	0…20 mA	P01 3752 26	P01 3752 58
	0…5 V	P01 3752 27	P01 3752 59
	0…10 V	P01 3752 28	P01 3752 60
0…400 V	0…10 mA	P01 3752 29	P01 3752 61
	0…20 mA	P01 3752 30	P01 3752 62
	0…5 V	P01 3752 31	P01 3752 63
	0…10 V	P01 3752 32	P01 3752 64

T82 Range

Analogue transducers for AC/DC electrical quantities or physical quantities, class 0.5

PRODUCT ADVANTAGES

- **AVAILABLE IN 3 VERSIONS:** plate mounting, plug-in or rack
- **CONFIGURABLE ON REQUEST:** input quantities, transfer curve, output signal, etc.
- **WIDE RANGE OF MEASURABLE QUANTITIES:** AC/DC electrical quantities and physical quantities

Plug-in version with special socket for plate mounting or DIN rail mounting

Rack version for 19" - 3U: model supplied rack-mounted or separately, comes with connections

Description

The **T82** range of transducers measures AC/DC electrical quantities and physical quantities and converts them into a standard low-level direct signal (current or voltage) (for example: 4...20 mA).

They are normally used in conjunction with analogue or digital measuring instruments (panel meters, recorders, etc.), supervision equipment (PLCs, SCADA and building management automation systems) and are also incorporated in control and measurement loops.

Electrical specifications

Inputs
- Input U: 1.5 Un permanent
  2 Un during 10 s
  4 Un during 0.5 s
- Input I: 2 In permanent
  10 In during 5 s
  30 In during 3 s
  50 In during 1 s
- Frequency: 50 Hz (45…55 Hz)
  60 Hz (55…65 Hz)
  400 Hz (350…450 Hz)

Analogue output
- Accuracy: class 0.5 as per IEC 60688
- Response time: 0.3 s at 95% of output current
- Permitted overloads:
  Current output: 1.1 Is
  Voltage output: 1.1 Us
- Operating resistance:
  Current output: 20 V/ Is
  Voltage output: 1 kΩ
- Influence of operating resistance:
  ± 0.1% from 0 to Max operating resistance
- Repeat accuracy: 0.1%
- Peak-to-peak ripple: 0.4%

Auxiliary supply
- Operating range:
  ± 20% from 100/√3 to 127 Vac
  ± 10% from 220 to 440 Vac
  ± 20% from 24 to 220 Vdc
- Consumption:
  ≤ 3 VA from 100/√3 to 440 Vac
  ≤ 3 W from 24 to 220 Vdc

Reference standards

IEC 60688
(Electrical measurement transducers)

Electromagnetic compatibility
EMC(89/336/EEC)
- Shock voltage as per IEC 61000-4-5:
  5 kV in common mode (wave 1.2 / 50 µs)
- Attenuated oscillation wave as per IEC 61000-4-12:
  1 kV in differential mode
  2.5 kV in common mode

Low voltage directive: 73/23/EEC

Insulation and dielectric strength: IEC 61010-1
- Between the input circuits, auxiliary supply and output circuits: 2 kV - 50 Hz - 1 min
- Between auxiliary supply and other terminals:
  2 kV - 50 Hz - 1 min
- Between circuits and earth: 4 kV - 50 Hz - 1 min

Mechanical shocks: IEC 60068-2-27
- Acceleration: 50 g
- Number of shocks: 3 x 6

Vibrations: IEC 60068-2-6
- Frequency: 10-55 Hz
- Amplitude: 1.5 mm
- Number of cycles: 12

Operating environment:
- Operating temperature: -10°C to +60°C

Casing

Screw connection terminals 2 x 2.5 mm^2
or 1 x 6 mm^2

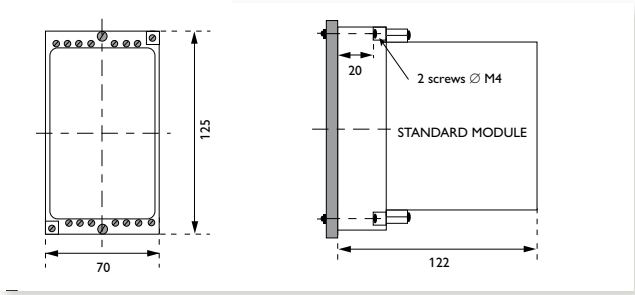
IP20 protection rating as per IEC 60529

Weight
0.60 to 0.85 kg (Socket: 0.25 kg)
Mesurack 5E socket: 0.35 to 0.5 kg
Mesurack 10E socket: 0.6 to 0.7 kg

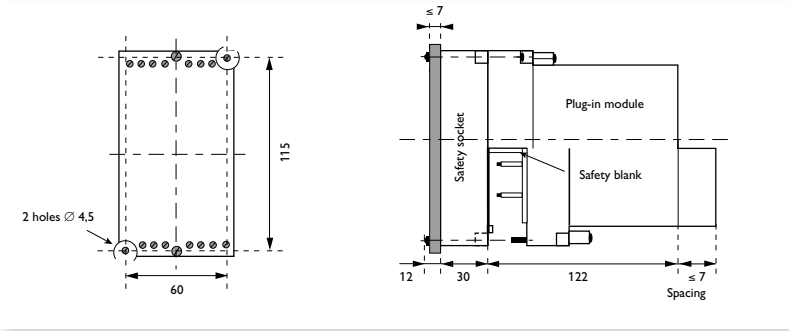
T82 Range

Dimensions (in mm)

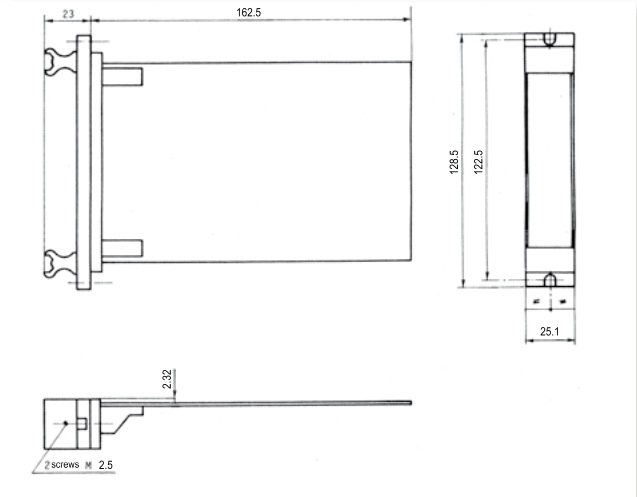
T82 plate-mounting module



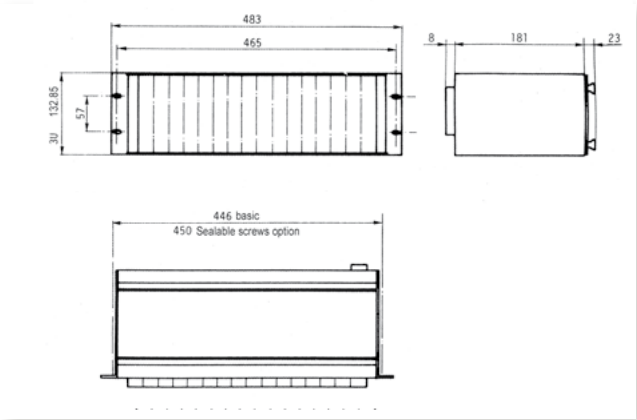
T82 plug-in module



T82 rack



19" - 3U rack



Mounting accessories

Connection socket for plug-in module

Model	Connection socket	
	Type	Reference
UAN 1210B	2	EMBB 4002
UAR 1210B	5	EMBB 4005
UAX 1210B	5	EMBB 4005
UAZ 1220B	2	EMBB 4006
UAZ 1210B	6	EMBB 4002
UER 1210B	5	EMBB 4005
UQR 1210B	5	EMBB 4005
UQX 1210B	5	EMBB 4005
UEX 1210B	5	EMBB 4005
IAN 1210B	1	EMBB 4001
IAR 1210B	4	EMBB 4004
IER 1210B	4	EMBB 4004
IQR 1210B	4	EMBB 4004
IAR 1211B	4	EMBB 4004

Model	Connection socket	
	Type	Reference
FAR 1210B	5	EMBB 4005
FCR 1210B	5	EMBB 4004
JAR 1211B	4	EMBB 4004
JAR 1221B	5	EMBB 4005
UAR 1221B	7	EMBB 4007
PAR 1211B	4	EMBB 4004
PAR 1231B	4	EMBB 4004
PAR 1232B	3	EMBB 4003
PAR 1233B	9	EMBB 4009
PAR 1234B	10	EMBB 4010
PAR 1235B	4	EMBB 4004
QAR 1211B	4	EMBB 4004
QAR 1232B	3	EMBB 4003
QAR 1233B	9	EMBB 4009
QAR 1234B	10	EMBB 4010

Model	Connection socket	
	Type	Reference
UCR 1220B	5	EMBB 4005
UCR 1420B	5	EMBB 4005
UCR 1230B	5	EMBB 4005
UCR 1216B	7	EMBB 4007
ICR 1220B	5	EMBB 4005
ICR 1420B	5	EMBB 4005
ICR 1230B	5	EMBB 4005
ICR 1216B	7	EMBB 4007
TCL 1220B	6	EMBB 4006
RCL 1220B	6	EMBB 4006
RCR 1211B	6	EMBB 4006

Mounting on DIN rail for plate-mounting or plug-in module

Model	Reference
Mounting on symmetrical DIN rail	PDIN SYME
Mounting on asymmetrical DIN rail	PDIN ASYM

Electrical connections

See document MS 0/1-7343.

T82 Range

AC RMS voltage

VAC

Model	UAN 1210 B	UAR 1210 B	UAX 1210 B	UAZ 1210 B	UAZ 1220 B
Transfer curve					
Linear	•	•			
Expanded (1 slope)			•	•	
Expanded (2 slopes)					•
Module					
Plate mounting	0.6 kg	0.7 kg	0.7 kg	0.7 kg	0.7 kg
Plug-in	0.6 kg	0.7 kg	0.7 kg	0.7 kg	0.7 kg
Rack	10 E / 0.5 kg	5 E / 0.3 kg	5 E / 0.3 kg		
Measurement input					
Voltage Un	Direct or on VT: 100/√3 110/√3 115/√3 132/√3 90 100 110 115 127 132 138 180 220 250 300 360 380 440 Vac				
Frequency	50, 60 or 400 Hz				
Measurement range 0…Xmax	0…1.25 Un	0…1.25 Un	0.8 Un…1.2 Un	0.8 Un…1.2 Un	0.8 Un…1.2 Un
Consumption	< 2 VA	1 kΩ / V	1 kΩ / V	< 2 VA	< 2 VA
Analogue output					
Current 0…Ymax	0…1 mA 0…2.5 mA 0…5 mA 0…10 mA 0…20 mA				0…0.1…1 mA 0…0.25…2.5 mA 0…0.5…5 mA 0…1…10 mA 0…2…20 mA
Current Ymin…Ymax		1…5 mA 2…10 mA 4…20 mA			
Voltage 0…Ymax	0…1 V 0…5 V 0…10 V				
Voltage Ymin…Ymax		1…5 V 2…10 V			
Accuracy	0.5 % of 0.5 Un…Un	0.5%			
Auxiliary supply					
Alternating current		100/√3 110/√3 115/√3 100 110 115 127 Vac 220 230 240 380 400 440 Vac			idem UAR 1210 B
Direct current		24 48 110 125 220 Vdc			idem UAR 1210 B
Self-powered	•			•	
Protection rating					
Plate mounting	IP 20				
Plug-in	IP 20				
Rack	IP 20				

Parameters to be specified when ordering

TO ORDER

Model	Module	Measurement range	Frequency	Analogue output	Auxiliary supply	Protection	Tropicalization	Reference
UAN 1210 B	Fixed	0...100 V	50 Hz	0...20 mA	self-powered	IP 20	without	UANA 3002
		0...380 V	50 Hz	0...20 mA	self-powered	IP 20	without	UANA 3001
UAR 1210 B	Fixed	0...100 V	50 Hz	4...20 mA	220 Vac	IP 20	without	UARD 3002
		0...100/√3 V	50 Hz	4...20 mA	220 Vac	IP 20	without	UARD 3004
		0...380 V	50 Hz	4...20 mA	220 Vac	IP 20	without	UARD 3003

Customized products

	Model	Module	Direct or on VT	Measurement range	Frequency	Analogue output	Auxiliary supply	Protection	Tropicalization
Example	UAN 1210 B	FIXED	Direct 100 Vac	0…120 Vac	50 Hz	4-20 mA	220 Vac	IP 20	☑

AC true RMS voltage

VAC

Model	UER 1210 B	UQR 1210B	UQX 1210B	UEX 1210B
Transfer curve				
Linear	•			
Expanded				•
Quadratic		•		
Expanded quadratic			•	
Module				
Plate mounting	0.6 kg	0.7 kg	0.7 kg	0.7 kg
Plug-in	0.6 kg	0.7 kg	0.7 kg	0.7 kg
Rack	10 E / 0.5 kg	5 E / 0.3 kg	5 E / 0.3 kg	5 E / 0.3 kg
Measurement input				
Un Voltage	Direct or on VT: 100/√3 110/√3 115/√3 132/√3 90 100 110 115 127 132 138 180 220 250 300 360 380 440 Vac			
Frequency	50, 60 or 400 Hz			
Measurement range 0...Xmax	0...1.25 Un	0...1.25 Un	0.8 Un...1.2 Un	0.8 Un...1.2 Un
Consumption	1 kΩ / V	500 Ω / V	500 Ω / V	1 kΩ / V
Analogue output				
Current 0...Ymax	0...1 mA 0...2.5 mA 0...5 mA 0...10 mA 0...20 mA			
Current Ymin...Ymax	1...5 mA 2...10 mA 4...20 mA			
Voltage 0...Ymax	0...1 V 0...5 V 0...10 V			
Voltage Ymin...Ymax	1...5 V 2...10 V			
Accuracy	0.5%			
Auxiliary supply				
Alternating current	100/√3 110/√3 115/√3 100 110 115 127 Va 220 230 240 380 400 440 Vac			
Direct current	24 48 110 125 220 Vdc			
Protection rating				
Plate mounting	IP 20			
Plug-in	IP 20			
Rack	IP 20			

▭ Parameters to be specified when ordering

TO ORDER

► Customized products

	Model	Module	Direct or on VT	Measurement range	Frequency	Analogue output	Auxiliary supply	Protection	Tropicalization
Example	**UER 1210 B**	**FIXED**	**Direct 100 Vac**	**0...120 Vac**	**50 Hz**	**4...20 mA**	**220 Vac**	**IP 20**	☑

► Associated products

19" rack
for rack modules

► page 252

Socket connection
for plug-in modules

► page 255

DIN rail mounting
(fixed panel or plug-in)

► page 255

T82 Range

AC RMS and true RMS Current

IAC

Model	IAN 1210 B	IAR 1210 B	IER 1210 B	IQR 1210 B	IAR 1211 B
Measurement					
RMS	•	•			
True RMS			•	•	
Motor scale					•
Transfer curve					
Linear	•	•	•		
Expanded					•
Quadratic				•	
Module					
Plate mounting	0.6 kg	0.7 kg	0.7 kg	0.7 kg	0.7 kg
Plug-in	0.6 kg	0.7 kg	0.7 kg	0.7 kg	0.7 kg
Rack	10 E / 0.5 kg	5 E / 0.3 kg	5 E / 0.3 kg	5 E / 0.3 kg	
Measurement input					
Current In	Direct or on CT: 0.5 0.6 1 1.2 1.3 1.5 2.5 5 6 6.5 7 7.5 10 A				Direct or on CT: 1 or 5 A
Frequency Fn	50, 60 or 400 Hz				
Measurement range 0...Xmax	0...Xmax In < Xmax < 1.3 In				0...1...3 A 0...5...15 A
Consumption	≤ 2 VA	≤ 0.2 VA			
Analogue output					
Current 0...Ymax	0...1 mA	0...2.5 mA 0...5 mA 0...10 mA 0...20 mA			0...7...10 mA
Current Ymin...Ymax		1...5 mA 2...10 mA 4...20 mA			4...15...20 mA
Voltage 0...Ymax		0...1 V 0...5 V 0...10 V			
Voltage Ymin...Ymax		1...5 V 2...10 V			0...7...10 V
Accuracy	0.5 % of 0.5 Un...Un	0.5%			0.5% / 0.1%
Auxiliary supply					
Alternating current		100/√3 110/√3 115/√3 100 110 115 127 220 Vac 230 240 380 400 440 Vac			100 110 115 127 220 Vac 230 240 380 400 440 Vac
Direct current		24 48 110 125 220 Vdc			
Self-powered	•				
Protection rating					
Plate mounting	IP 20				
Plug-in	IP 20				
Rack	IP 20				

Parameters to be specified when ordering

TO ORDER

Model	Module	In	Measurement range	Frequency	Analogue output	Auxiliary supply	Protection	Tropicalization	Reference
IAN 1210 B	Fixed	Direct: 5 A	0...5 A	50 Hz	0...10 mA	self-powered	IP 20	without	IANA 3001
		Direct: 5 A	0...5 A	50 Hz	0...10 mA	self-powered	IP 20	without	IANA 3002
IAR 1210 B	Fixed	Direct: 5 A	0...5 A	50 Hz	4...20 mA	220 V / 50 Hz	IP 20	without	UARD 3001

► Customized products

	Model	Module	Direct or on VT	Measurement range	Frequency	Analogue output	Auxiliary supply	Protection	Tropicalization
Example	IAR 1210 B	FIXED	1000 / 5 A	0...1300 A	50 Hz	4...20 mA	48 Vdc	IP 20	✓

► Associated products

19" rack for rack modules
► page 252

Socket connection for plug-in modules
► page 255

DIN rail mounting (fixed panel or plug-in)
► page 255

CT Current transformers
► page 101

Frequency

F

Model	FAR 1210 B	FCR 1210 B
Measurement		
Measurement type	RMS value	
Input type		Tachometer sensor or mains supply
Module		
Plate mounting	0.7 kg	0.6 kg
Plug-in	0.7 kg	0.6 kg
Rack	5 E / 0.3 kg	-
Measurement input		
Voltage Un	Direct or on VT: 100/√3 110/√3 Vac 115/√3 100 110 115 Vac 127 230 240 380 400 440 Vac	Direct on VT: 50 to 440 V RMS
Measurement range Xmin…Xmax	45…55 Hz 48…52 Hz 49…51 Hz 350…450 Hz 55…65 Hz 58…62 Hz 59…61 Hz 380…420 Hz	F1 ≥ 30 Hz F1…F2 with 40 Hz <F2<10 kHz and F2/F1 ≥ 1.3
Consumption	1 kΩ / V	
Analogue output		
Transfer curve	Linear	
Current 0…Ymax	0…1 mA 0…2.5 mA 0…5 mA 0…10 mA 0…20 mA	
Current Ymin…Ymax	1…5 mA 2…10 mA 4…20 mA	
Voltage 0…Ymax	1…5 V 2…10 V	
Voltage Ymin…Ymax	0…1 V 0…5 V 0…10 V	
Accuracy	0.5%	
Auxiliary supply		
Alternating current	100/√3 110/√3 115/√3 100 Vac 110 115 127 220 230 Vac 240 380 400 440 Vac	100 110 115 127 220 Vac 230 240 380 400 440 Vac
Direct current	24 48 110 125 220 Vdc	24 48 110 125 220 Vdc
Self-powered	•	
Protection rating		
Plate mounting	IP 20	
Plug-in	IP 20	
Rack	IP 20	

Parameters to be specified when ordering

TO ORDER

Model	Module	Un	Measurement range	Fn	Analogue output	Auxiliary supply	Protection	Tropicalization	Reference
FAR 1210 B	Fixed	Direct: 380 V	45…55 Hz	50 Hz	4…20 mA	220 Vac	IP 20	without	FARD 3000

Customized products

Model	Module	Direct or on VT	Measurement range	Analogue output	Auxiliary supply	Protection	Tropicalization
Example **FAR 1210 B**	**FIXED**	**Direct 100 Vac**	**45…55 Hz**	**4...20 mA**	**220 Vac**	**IP 20**	☑

Associated products

19" rack
for rack modules
► page 252

Socket connection
for plug-in modules
► page 255

DIN rail mounting
(fixed panel or plug-in)
► page 255

T82 Range

Power factor

FP

Model	JAR 1211 B	JAR 1231 B
Network + connection		
Single-phase	1 V - 1 I	
Balanced three-phase 3/4 wires		1 U - 1 I
Module		
Plate mounting	0.7 kg	0.7 kg
Plug-in	0.7 kg	0.7 kg
Rack	5 E / 0.3 kg	5 E / 0.35 kg
Measurement input		
Current In	Direct or on VT: 1 or 5 or 10 A	
Voltage Un	Direct or on VT: 100/√3 110/√3 115/√3 100 110 115 Vac 127 230 240 380 400 440 Vac	Direct or on VT: 100 110 115 127 230 240 380 400 440 Vac
Measurement range 0...Xmax	0.5 CAP...1... 0.2 IND	0.5 CAP...1...0.5 IND 0.8 CAP...1...0.2 IND
Frequency	50, 60 or 400 Hz	
Consumption	Input I: 0.3 VA Input U: 1 kΩ /V	
Analogue output		
Transfer curve	Linear	
Current 0...Ymax	0...1 mA 0...2 mA 0...2.5 mA 0...5 mA 0...10 mA 0...20 mA	
Current Ymin...Ymax	4...20 mA	
Voltage 0...Ymax	0...1 V 0...5 V 0...10 V	
Voltage Ymin...Ymax	1...5 V 2...10 V	
Accuracy	1%	
Auxiliary supply		
Alternating current	100/√3 110/√3 115/√3 100 110 115 127 220 230 240 380 400 440 Vac	
Direct current	24 48 110 125 220 Vdc	
Self-powered	•	
Protection rating		
Plate mounting	IP 20	
Plug-in	IP 20	
Rack	IP 20	

Parameters to be specified when ordering

TO ORDER

Model	Version	In	Un	Measurement range	Fn	Analogue output	Auxiliary supply	Protection	Tropicalization	Reference
JAR 1231B	Fixed	Direct: 5 A	Direct: 220 V	0.5 CAP...1...0.2 IND	50 Hz	4...20 mA	220 V / 50 Hz	IP 20	without	JARE 3001

Customized products

	Model	Module	Direct or on CT	Direct or on CT	Measurement range	Analogue output	Auxiliary supply	Protection	Tropicalization
Example	JAR 1211 B	FIXED	TC 1000 / 5 A	Direct: 100 Vac	0.5 AV...1...0.5 AV	4...20 mA	220 Vac	IP 20	☑

Associated products

19" rack for rack modules
page 252

Socket connection for plug-in modules
page 255

DIN rail mounting (fixed panel or plug-in)
page 255

CT Current transformers
page 101

Synchronization

Δφ ΔU

Model	JAR 1221 B	UAR 1221 B
Measurement		
Measurement type	Phase shift between two Uac inputs	
Input type		Differential between two Uac inputs (Vac and V²)
Module		
Plate mounting	0.7 kg	0.7 kg
Plug-in	0.7 kg	0.7 kg
Rack	5 E / 0.35 kg	-
Measurement input		
Voltage Un	100/√3 110/√3 115/√3 100 110 115 Vac 127 230 240 380 400 440 Vac	
Frequency 0…Xmax	45…55 or 55…65 or 350…450 Hz	
Measurement range	60…0…60° 120…0…120° 150…0…150°	ΔV = ± (V1-V2)
Consumption	1 kΩ / V	
Analogue output		
Transfer curve	Linear	
Current 0…Ymax	0…0.5…1 mA 0…1.25…2.5 mA 0…2.5…5 mA 0…5…10 mA 0…10…20 mA	
Current Ymin…Ymax	4…12…20 mA -1…0…1 mA -2.5…0…2.5 mA -5…0…5 mA -10…0…10 mA -20…0…20 mA	-1…0…1 mA -2.5…0…2.5 mA -5…0…5 mA -10…0…10 mA -20…0…20 mA
Voltage 0…Ymax	0…0.5…1 V 0…2.5…5 V 0…5…10 V	
Voltage Ymin…Ymax	1…3…5 V -1…0…1 V -5…0…5 V -10…0…10 V 2…6…10 V	-1…0…1 V -5…0…5 V -10…0…10 V
Accuracy	1%	
Auxiliary supply		
Alternating current	100/√3 110/√3 115/√3 100 110 115 127 220 230 240 380 400 440 Vac	
Direct current	24 48 110 125 220 Vdc	
Self-powered	•	
Protection rating		
Plate mounting	IP 20	
Plug-in	IP 20	
Rack	IP 20	

☐ Parameters to be specified when ordering

TO ORDER

Customized products

	Model	Module	Direct or on CT	Direct or on CT	Measurement range	Analogue output	Auxiliary supply	Protection	Tropicalization
Example	JAR 1221 B	FIXED	TC 1000 / 5 A	Direct: 100 Vac	60…0…60°	4...20 mA	220 Vac	IP 20	☑

Associated products

19" rack
for rack modules
► page 252

Socket connection
for plug-in modules
► page 255

DIN rail mounting
(fixed panel or plug-in)
► page 255

T82 Range

Active power

P

Model	PAR 1211B	PAR 1231B	PAR 1232B	PAR 1233B	PAR 1234B	PAR 1235B
Network + connections						
Single	1V - 1I					
Balanced three-phase 3 wires		1U - 1I			1U - 2I	2U - 1I
Unbalanced three-phase 3 wires			2U - 2I			
Balanced three-phase 4 wires	1V - 1I					
Unbalanced three-phase 4 wires			2U - 3I	3V - 3I		
Model version						
Plate mounting	0.850 kg	0.850 kg	0.850 kg	0.850 kg	0.850 kg	0.850 kg
Plug-in	0.850 kg	0.850 kg	0.850 kg	0.850 kg	0.850 kg	0.850 kg
Rack	5 E / 0.5 kg	10 E / 0.5 kg	10 E / 0.6 kg	10 E / 0.7 kg	5 E / 0.35 kg	5 E / 0.35 kg
Measurement inputs						
Current In	Direct or on CT: 1. 5 or 10 A					
Voltage Un	Direct or on VT: 100/√3 110/√3 115/√3 230 100 110 115 127 220 240 380 400 440	Direct or on VT: 100 110 115 Vac 127 230 240 380 400 440 Vac		Direct or on VT: 100/√3 110/√3 Vac 115/√3 230 Vac	Direct or on VT: 100 110 115 Vac 127 230 240 380 400 440 Vac	
Frequency	50, 60 or 400 Hz					
Measurement range	0…Xmax or Xmin…Xmax with 0.5 Sn ≤ Xmax ≤ 1.35 Sn (1)					
Consumption	Input I: 0.2 VA Input U > 500 Ω / V					
Analogue output						
Transfer curve	Linear					
Current 0…Ymax	0…1 mA 0…2.5 mA 0…5 mA 0…10 mA 0…20 mA					
Current Ymin…Ymax	-1…0…1 mA -2.5…0…2.5 mA -5…0…5 mA -10…0…10 mA -20…0…20 mA 1…5 mA 2…10 mA 4…20 mA 1…3…5 mA 2…6…10 mA 4…12…20 mA					
Voltage 0…Ymax	0…1 V 0…5 V 0…10 V					
Voltage Ymin…Ymax	-1…0…1 V -5…0…5 V -10…0…10 V 1…5 V 2…10 V					
Accuracy	Class 0.5: 0.75 Sn ≤ Xmax ≤ 1.35 Sn Class 1: 0.5 Sn ≤ Xmax < 0.75 Sn					
Auxiliary supply						
Alternating current	100/√3 110/√3 115/√3 100 110 115 127 220 230 240 380 400 440 Vac					
Direct current	24 48 110 125 220 Vdc					
Self-powered	•	•	•	•	•	•
Protection rating						
Plate mounting	IP 20					
Plug-in	IP 20					
Rack	IP 20					

(1) Sn = V x I x cos φ (single-phase network) Sn = 3 x V x I x cos φ (Balanced three-phase, Unbalanced three-phase 4 wires)
Sn = √3 x U x I x cos φ (Balanced three-phase,Unbalanced three-phase 3 wires)

Parameters to be specified when ordering

TO ORDER

Model	Version	Direct or on CT	Direct or on VT	Measurement range	Frequency	Analogue output	Auxiliary supply	Protection	Tropicalization	Reference
PAR 1232	B Panel mounted	Direct: 5 A	Direct: 380 V	0…3 kW	50 Hz	4...20 mA	220 V / 50 Hz	IP 20	without	PQRE 3001
PAR 1232	B Panel mounted	Direct: 5 A	Direct: 100 V	0…866 W	50 Hz	4...20 mA	220 V / 50 Hz	IP 20	without	PQRE 3002
PAR 1233	B Panel mounted	Direct: 5 A	Direct: 380 V	0…3 kW	50 Hz	4...20 mA	220 V / 50 Hz	IP 20	without	PQRF 3001
PAR 1233	B Panel mounted	Direct: 5 A	Direct: 380 V	0…3 kW	50 Hz	4...20 mA	220 V / 50 Hz	IP 20	without	PQRC 3003
PAR 1235	B Panel mounted	Direct: 5 A	Direct: 220 V	0…1 kW	50 Hz	4...20 mA	220 V / 50 Hz	IP 20	without	PQRC 3001
PAR 1211	B Panel mounted	Direct: 5 A	Direct: 220 V	0…3 kW	50 Hz	4...20 mA	220 V / 50 Hz	IP 20	without	PQRC 3002

► Customized products

	Model	Network	Module	Direct or on CT	Direct or on VT	Measurement range	Frequency	Analogue output	Auxiliary supply	Protection	Tropicalization
Example	PAR 1211 B	Bal. 3ph 4 wires	Fixed	TC 1000 / 5 A	TT 20 kV / 100 V	0...2.77 MW	50 Hz	4...20 mA	220 Vac	IP 20	✓

Reactive power

Q

Model	QAR 1211B	QAR 1211B	QAR 1232B	QAR 1233B	QAR 1234B
Network + connections					
Single	1V - 1I				
Balanced three-phase 3 wires		1U - 1I			1U - 2I
Unbalanced three-phase 3 wires			2U - 2I		
Balanced three-phase 4 wires	1V - 1I				
Unbalanced three-phase 4 wires			2U -3I	3U - 3I	
Model version					
Plate mounting	0.850 kg	0.850 kg	0.850 kg	0.850 kg	0.850 kg
Plug-in	0.850 kg	0.850 kg	0.850 kg	0.850 kg	0.850 kg
Rack	5 E / 0.5 kg	10 E / 0.5 kg	10 E / 0.6 kg	10 E / 0.7 kg	5 E / 0.35 kg
Measurement inputs					
Current In	Direct or on CT: 1. 5 or 10 A				
Voltage Un	Direct or on VT: 100/√3 110/√3 115/√3 230 single-phase only: 100 110 115 127 220 240 380 400 44	Direct or on VT: 100 110 115 127 230 240 380 400 440 Vac			Direct or on VT: 100/√3 110/√3 Vac 115/√3 230 Vac
Frequency	50, 60 or 400 Hz				
Measurement range Xmin…Xmax	0…Xmax or Xmin…Xmax with 0.5 Sn ≤ Xmax ≤ 1.35 Sn (1)				
Consumption	Input I: 0.2 VA Input U > 500 Ω / V				
Analogue output					
Transfer curve	Linear				
Current 0…Ymax	0…1 mA 0…2.5 mA 0…5 mA 0…10 mA 0…20 mA				
Current Ymin…Ymax	-1…0…1 mA -2.5…0…2.5 mA -5…0…5 mA -10…0…10 mA -20…0…20 mA 1…5 mA 2…10 mA 4…20 mA 1…3…5 mA 2…6…10 mA 4…12…20 mA				
Voltage 0…Ymax	0…1 V 0…5 V 0…10 V				
Voltage Ymin…Ymax	-1…0…1 V -5…0…5 V -10…0…10 V 1…5 V 2…10 V				
Accuracy	Class 0.5: 0.75 Sn ≤ Xmax ≤ 1.35 Sn Class 1: 0.5 Sn ≤ Xmax < 0.75 Sn				
Auxiliary supply					
Alternating current	100/√3 110/√3 115/√3 100 110 115 127 220 230 240 380 400 440 Vac				
Direct current	24 48 110 125 220 Vdc				
Self-powered	•	•	•	•	•
Protection rating					
Plate mounting	IP 20				
Plug-in	IP 20				
Rack	IP 20				

(1) Sn = V x I x sin φ (single-phase network) Sn = 3 x V x I x sin φ (Balanced three-phase, Unbalanced three-phase 4 wires)
Sn = √3 x U x I x sin φ (Balanced three-phase, Unbalanced three-phase 3 wires)

Parameters to be specified when ordering

TO ORDER

Model	Version	Direct or on CT	Direct or on VT	Measurement range	Frequency	Analogue output	Auxiliary supply	Protection	Tropicalization	Reference
QAR 1232 B	mounted	Direct: 5 A	Direct: 380 V	0…3 kvar	50 Hz	4...20 mA	220 V / 50 Hz	IP 20	without	PQRE 3003
QAR 1232 B	mounted	Direct: 5 A	Direct: 100 V	0…866 var	50 Hz	4...20 mA	220 V / 50 Hz	IP 20	without	PQRE 3004

Customized products

	Model	Network	Module	Direct or on CT	Direct or on VT	Measurement range	Frequency	Analogue output	Auxiliary supply	Protection	Tropicalization
Example	QAR 1211 B	3-phase 4-wires	Fixed	TC 1000 / 5 A	TT 20 kV / 100 V	-1.73...+1.73 Mvar	50 Hz	4...20 mA	220 Vac	IP 20	☑

Associated products

19" rack for rack modules
► page 252


Socket connection for plug-in modules
► page 255


DIN rail mounting (fixed panel or plug-in)
► page 255


CT Current transformers
► page 101


T82 Range

DC Voltage / Summation

VDC ΣVDC

Model	UCR 1220 B	UCR 1420 B (1)	UCR 1230 B	UCR 1216 B
Measurement				
DC Voltage	•	•	•	
Summation of DC voltage				•
Transfer curve				
Linear	•	•		•
Extended			•	
Module				
Plate mounting	0.7 kg	0.7 kg	0.7 kg	0.7 kg
Plug-in	0.7 kg	0.7 kg	0.7 kg	0.7 kg
Rack	5 E / 0.3 kg	5 E / 0.3 kg	5 E / 0.3 kg	5 E / 0.3 kg
Voltage inputs				
Voltage Un	5 mV ≤ Un ≤ 650 Vdc	5 mV ≤ Un ≤ 1500 Vdc	5 mV ≤ Un ≤ 130 Vdc	Summation of 2 to 6 inputs U with 0.1 V ≤ Un ≤ 20 Vdc or 1…5 V 2…10 Vdc
Measurement range 0…Xmax	0…±Un or Un1…Un2 with Un2 > 2 x Un1		0…Un…5 Un	Un1+Un2+Un3+Un4+Un5+Un6
Input resistance				> 100 kΩ
Analogue output				
Transfer curve	Linear			
Current 0…Ymax	0…1 mA 0…2.5 mA 0…5 mA 0…10 mA 0…20 mA			
Current Ymin…Ymax	1…5 mA 2…10 mA 4…20 mA			
Voltage 0…Ymax	0…1 V 0…5 V 0…10 V			
Voltage Ymin…Ymax	1…5 V 2…10 V			
Accuracy	Class 0.5	Class 0.5	Class 0.5 / 1	Class 0.5
Auxiliary supply				
Alternating current	100 110 115 127 220 230 240 380 Vac			
Direct current	24 48 110 125 220 Vdc			
Protection rating				
Plate mounting	IP 20			
Plug-in	IP 20			
Rack	IP 20			

(1) insulation: 4 kV

Parameters to be specified when ordering

TO ORDER

Model	Version	Measurement range	Analogue output	Auxiliary supply	Protection rating	Tropicalization	Reference
UCR 1220 B	Fixed	0…10 Vdc	0…10 Vdc	220 V / 50 Hz	IP 20	without	UCRG 3001

Customized products

	Model	Measurement range	Analogue output	Auxiliary supply	Protection rating	Tropicalization
Example	UCR 1220 B	-100…+100 V	-10…10 mA	220 Vac	IP 20	☑

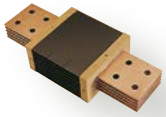
Associated products

19" rack for rack modules
page 252

Socket connection for plug-in modules
page 255

DIN rail mounting (fixed panel or plug-in)
page 255

Shunts
page 145



DC Current / Summation

IDC ΣIDC

Model	UCR 1220 B	UCR 1420 B (1)	UCR 1230 B	UCR 1216 B
Measurement				
DC current	•	•	•	
Summation of DC current				•
Transfer curve				
Linear	•	•		•
Extended			•	
Module				
Plate mounting	0.7 kg	0.7 kg	0.7 kg	0.7 kg
Plug-in	0.7 kg	0.7 kg	0.7 kg	0.7 kg
Rack	5 E / 0.3 kg	5 E / 0.3 kg	5 E / 0.3 kg	5 E / 0.3 kg
Current inputs				
Current In	5 µA ≤ In ≤ 100 mA		5 µA ≤ In ≤ 20 mA	Summation of 2 to 6 inputs I with 1 mA ≤ I ≤ 20 mA or 1…5 mA 2…10 mA 4…20 mA
Measurement range 0…Xmax	0…±In		0…In…5In	In1+In2+In3+In4+In5+In6
Input resistance	0.1 V/In			1V/In
Analogue output				
Transfer curve	Linear			
Current 0…Ymax	0…1 mA 0…2.5 mA 0…5 mA 0…10 mA 0…20 mA			
Current Ymin…Ymax	1…5 mA 2…10 mA 4…20 mA			
Voltage 0…Ymax	0…1 V 0…5 V 0…10 V			
Voltage Ymin…Ymax	1…5 V 2…10 V			
Accuracy	Class 0.5	Class 0.5	Class 0.5 / 1	Class 0.5
Auxiliary supply				
Alternating current	100 110 115 127 220 230 240 380 Vac			
Direct current	24 48 110 125 220 Vdc			
Protection rating				
Plate mounting	IP 20			
Plug-in	IP 20			
Rack	IP 20			

(1) insulation:4 kV

Parameters to be specified when ordering

TO ORDER

Model	Version	Measurement range	Analogue output	Auxiliary supply	Protection rating	Tropicalization	Reference
ICR 1220 B	Fixed	4 to 20 mA	4 to 20 mA	220 V / 50 Hz	IP 20	without	UCRG 3002

Customized products

Example

Model	Version	Measurement range	Analogue output	Auxiliary supply	Protection rating	Tropicalization
ICR 1220 B	Fixed	0…20 mA	4…20 mA	220 Vac	IP 20	☑

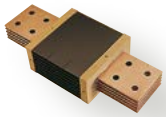
Associated products

19" rack for rack modules
► page 252

Socket connection for plug-in modules
► page 255

DIN rail mounting (fixed panel or plug-in)
► page 255

Shunts
► page 145



T82 Range

Temperature

T°

Model	TCL 1220 B							RCL 1220B	
Version									
Plate mounting	0.7 kg							0.7 kg	
Plug-in	0.7 kg							0.7 kg	
Rack	5 E / 0.3 kg							5 E / 0.3 kg	
Measurement input									
Type: thermocouple / probe	K	T	J	E	R	S	B	platinum	copper
Couple break protection	Max. output or min. output								
Mounting								2, 3 or 4 wires	
Measurement range Xmin…Xmax	-200…1,200°C	-200…350°C	-200…600°C	-200…1,000°C	0…1,750°C	600…1,800°C	600…1,800°C	0…500°C	0…200°C
Input resistance for CT	> 50 kΩ							-	-
Current in probe	-							2 mA max	3 mA
Line resistance	0 - 200							0 - 10 Ω	
Calibration resistance	100 Ω								
Analogue output									
Transfer curve	Linear								
Current 0…Ymax	0…1 mA 0…2.5 mA 0…5 mA 0…10 mA 0…20 mA								
Current Ymin…Ymax	1…5 mA 2…10 mA 4…20 mA								
Voltage 0…Ymax	0…1 V 0…5 V 0…10 V								
Voltage Ymin…Ymax	1…5 V 2…10 V								
Accuracy	Class 0.5 - Class 1 - Class 1.5							Class 0.5	
Auxiliary supply									
Alternating current	100/√3 110/√3 115/√3 100 110 115 127 220 230 240 380 400 440 Vac								
Direct current	24 48 110 125 220 Vdc								
Protection rating									
Plate mounting	IP 20								
Plug-in	IP 20								
Rack	IP 20								

Parameters to be specified when ordering

TO ORDER

Customized products

Model	Version	Thermocouple probe	Measurement range	Safety	Mounting	Line resistance	Analogue output	Auxiliary supply	Protection	Tropicalization
Example **TCL 1220 B**	**Fixed**	**J**	**0…500°C**	**Max. output**	**-**	**10 Ω**	**4...20 mA**	**48 Vdc**	**IP 20**	☑

Associated products

19" rack for rack modules
► page 252

Socket connection for plug-in modules
► page 255

DIN rail mounting (fixed panel or plug-in)
► page 255

Thermocouple/probe
► Pyrocontrole Catalogue

PYRO CONTROLE
CHAUVIN ARNOUX GROUP

Resistance

Ω

Model		RCR 1211 B	
Version			
Plate mounting		0.7 kg	0.7 kg
Plug-in		0.7 kg	0.7 kg
Measurement input			
Type		Potentiometer	Rheostat
Measurement range 0…Xmax		0…R with 1 kΩ ≤ R ≤ 5 kΩ	0…R with 100 ≤ R ≤ 5,000 Ω
Sensor break protection		Max. output or min. output	
Sensor current		3 mA for R ≤ 300 Ω or I = 1 V/R for R > 300 Ω	
High dead end resistance		Max. value: 10% of Xmax	
Low dead end resistance		Max. value: 10% of Xmax	
Analogue output			
Transfer curve		Linear	
Current	0…Ymax	0…1 mA 0…2.5 mA 0…5 mA 0…10 mA 0…20 mA	
	Ymin…Ymax	1…5 mA 2…10 mA 4…20 mA	
Voltage	0…Ymax	0…1 V 0…5 V 0…10 V	
	Ymin…Ymax	1…5 V 2…10 V	
Accuracy		Class 0.5	
Auxiliary supply			
Alternating current		100/√3 110/√3 115/√3 100 110 115 127 220 230 240 380 400 440 Vac	
Direct current		24 48 110 125 220 Vdc	
Protection rating			
Plate mounting		IP 20	
Plug-in		IP 20	

▭ Parameters to be specified when ordering

TO ORDER

Customized products

	Model	Version	Type	Measurement range	Resistance of "high"	non-active ends "low"	Open sensor	Analogue output	Auxiliary supply	Protection	Tropicalization
Example	RCR 1211 B	Fixed	Rheostat	0…500 Ω	1 Ω	1 Ω	min. output	4...20 mA	24 Vdc	IP 20	☑

Associated products

19" rack
for rack modules
► page 252

Socket connection
for plug-in modules
► page 255

DIN rail mounting
(fixed panel or plug-in)
► page 255

MODUL'M Range

Industrial transducers

PRODUCT ADVANTAGES

- Modular, **UPGRADABLE SYSTEM**
- Totally **USER-PROGRAMMABLE** via a PC
- Built-in **MAINTENANCE FUNCTIONS**
- **RS 485 MODBUS RTU COMMUNICATION** interface up to 38,400 bauds
- Quick, simple **DIN-RAIL OR WALL MOUNTING**

Large-size terminals ensure safety and accessibility

Each transducer is equipped with an internal fault relay

► Description

The industrial transducers in the **MODUL'M** range form a modular acquisition system made up of logical or analogue input-output modules.

Each module is equipped with a power supply isolated from its inputs-outputs and a digital communication link. This concept allows you to set up transducers as close as possible to the sensors so that the measurement data can then be circulated in digital form without alteration, even over long distances.

Each instrument includes an internal fault relay guaranteeing operating safety. This relay may be activated in the event of sensor breakage, interruption of the digital link or power outage.

MTAC Tachometry

- Speed measurement transducer
- Can be coupled with inductive or magnetic sensors to set up a tachometric measurement line with a threshold function
- 2 relays extendable to 7 with the MREL5 extension
- Transmission of speed / frequency in analogue form (U/I) and in digital form on the RS485 link

Model	Reference
MTAC	A25120

MTAC-t Frequency

- Frequency measurement transducer
- Connected to a 600 V (Cat. III) maximum AC link to set up a frequency acquisition line with a threshold function
- 2 relays extendable to 7 with the MREL5 extension
- Transmission of frequency in analogue form (U/I) and in digital form on the RS485 link

Model	Reference
MTAC-t	A25121

MREL5 Extension

- Relay or threshold extension unit
- 5 relays + 1 DI relay
- Programmable as a ModBus slave controlled by an MTAC module or a CM100 power monitor
- Programmable as a ModBus logic controller to read a measurement transducer and refresh the relay outputs via the RS485 link

Model	Reference
MIREL5	A25122

MEA3 Process, temperature 3 channels, 2 relays

- Multi-purpose acquisition unit
- 3 analogue channels (current, voltage, Pt100, thermocouples, etc.)
- Scaling of each measurement channel
- 2 relays for programmable monitoring threshold functions on each channel
- Transmission of the measurements in digital form on the RS485 link

Model	Reference
MEA3	A25123

Associated products

CM100 Digital data processors

► contact us

CM100D Meteorological data processors

► contact us

MEA7
Process, temperature 7 channels, 1 relay

- Multi-purpose acquisition unit
- 7 analogue channels (current, voltage, Pt100, thermocouples, etc.)
- Scaling on each measurement channel
- 1 relay for programmable monitoring threshold functions on each channel
- Transmission of the measurements in digital form on the RS485 link

Model	Reference
MEA7	A25124

MSA4
Analogue outputs

- Analogue output extension unit
- 4 U or I outputs
- Retrieval of the data from the digital link and conversion into analogue form
- Programmable as a ModBus slave controller by a PLC or a CM100 power monitor via the RS485 link
- Programmable as a ModBus logic controller to read a measurement transducer and refresh the analogue outputs via the RS485 link

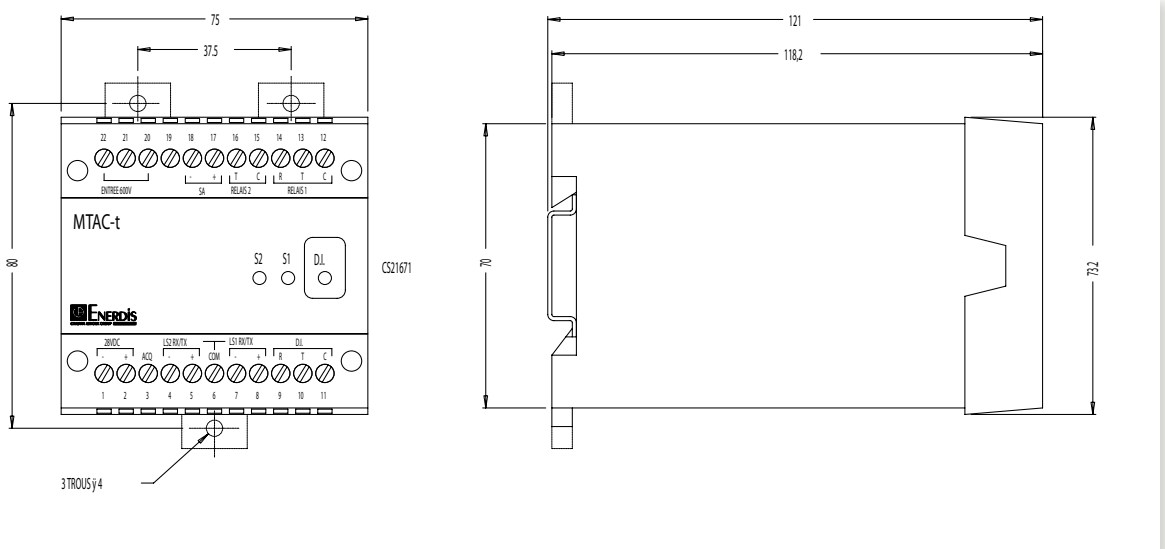
Model	Reference
MSA4	A25125

MES16
Logical inputs / outputs

- Logical input/output acquisition unit
- 16 configurable channels in groups of 4
- Seen as a ModBus slave controlled by a PLC or a CM100 power monitor via the RS485 link

Model	Reference
MES16	A25126

► Dimensions (in mm)



Technical specifications

Model	MTAC	MTAC-t	MREL5	MEA3	MEA7	MSA4	MES16
Input							
	1 speed input + 1 rotation-direction input	1 frequency input	-	3 programmable inputs	7 programmable inputs	-	16 programmable logical inputs
Resistance thermometer				200… +850°C 2/3 wires pt100	200… +850°C 2/3 wires pt100		
Thermocouple				B.E.J.K.N.R.S.T	B.E.J.K.N.R.S.T		
Cold junction compensation by Pt 100 assembly				on input 3	on input 7		
Current				0… ± 20 mA	0… ± 20 mA		
Voltage				0… ± 10 V	0… ± 10 V		
Tachometric input	Inductive or magnetic sensors for speed and rotation direction	Voltage from 5 to 600 V					
Output							
Analogue output programmable for voltage (0...± 10 V) or current (0… ± 20 mA)	1	1				4	
Logical outputs							16 programmable outputs
Relays: Internal fault Alarm	1 2	1 2	1 5	1 2	1 1	1 2	1 1
Digital link							
RS485 / ModBus RTU	slave	slave	master/slave	slave	slave	master/slave	slave
Auxiliary power supply							
DC	12 to 35 Vdc						
Consumption	3 W	3 W	3 W	3 W	3 W	4.5 W	3 W

Accuracy

Model	MTAC	MTAC-t	MREL5	MEA3	MEA7	MSA4	MES16
Input							
Pt 100 basic accuracy				0.05% end of scale ± 0.1°C	0.05% end of scale ± 0.1°C		
Basic accuracy in mA				2.10^{-4}	2.10^{-4}	0.1% end of scale	
Basic accuracy in Vdc				2.10^{-4}	2.10^{-4}	0.1% end of scale	
Tachometer accuracy	$0.5.10^{-4}$ end of scale	$0.5.10^{-4}$ end of scale					
Temperature coefficient	50 ppm°C	50 ppm°C		50 ppm°C	50 ppm°C	150 ppm°C	
Response time	20 ms	20 ms	programmable	100 or 420 ms	200 ms or 1 s	30 ms	Reading of input in 20 ms

Mechanical specifications

Model	MTAC	MTAC-t	MREL5	MEA3	MEA7	MSA4	MES16
Casing							
Material	Polycarbonate						
Dimensions L x D x H (mm)	75 x 120 x 73						
Mounting	Symmetrical DIN bar or wall-mounting						
Weight (kg)	0.3						
Connection	Screw terminals				Screw terminals and female 25-pin SUBD connector	Screw terminals	Screw terminals and male 25-pin SUBD connector

Environment

Operating temperature	-10 to +60°C
Storage temperature	-25 to +70°C
Leakproofing	IP20
EMC	Complies with the IEC 61326-1 standard

ENERTRACE Range

"Plug & Play" paperless recorder

PRODUCT ADVANTAGES

- **VERY-HIGH-RESOLUTION TFT VGA SCREEN,** 6.4", 256 colours
- Up to 18 **CONFIGURABLE MEASUREMENT CHANNELS**
- Data backup on Compact Flash card (up to 1 GB)
- **ETHERNET** link and **PROCESSING SOFTWARE** provided as standard

512 MB memory card as standard

6 slots for 3 types of input/output cards (logical, relay, analogue)

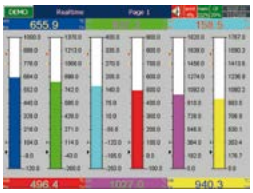
Portable version available

Description

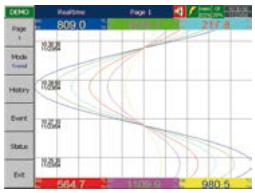
ENERTRACE is a "plug & play" paperless recorder suitable for all types of processes. It is equipped with an 18-bit converter for optimum measurement accuracy and a polling rate of 200 ms per channel.

- Inputs / outputs which can be configured and extended: up to 18 analogue measurement channels (mV,V,mA,T°,etc.) or 12 isolated and configurable logical inputs and up to 12 relay outputs, depending on the combinations.
- Computer processing of the data via a PC link
- Remote adjustment and configuration via an RS232, RS485 or Ethernet link
- Recording of data over a period of several months
- Simplified maintenance due to the absence of parts subject to wear or requiring replacement (paper, pens, etc.)
- Auxiliary power supply with broad dynamic range: 90 to 264 Vac / 11 to 370 Vdc

Display



Bargraph mode
Vertical display of 6 bargraphs.
Configurable scale for each bargraph.
Bars identified by colour and process label. High and low alarms marked "Hi/Lo".



Graphic curves mode
Vertical or horizontal display of 6 curves in real time
Simple switching from one page to another using the "Page" function
Constant display of the date and time, as well as a pictogram if there is an alarm or the memory is full.

Log of alarms
Display of all time / date-stamped alarms.
"Browse" function for choosing the alarms to be cleared.
Different colours for different alarm statuses.

Electrical specifications

Auxiliary power supply
Alternating current, operating domain and consumption: 90... 264 Vac, 47...63 Hz, 60 VA, 30 W max.
Direct current, operating domain and consumption: 11...370 Vdc, 60 VA, 30 W max.

Analogue input board
Channels: 3 per card
Resolution: 18 bits
Polling rate: 200 ms
Maximum value: -2 Vdc min., 12 Vdc max. (for standard board)
Temperature drift: ±1.5 µV/°C - except for mA inputs; ±3.0 µV/°C for mA inputs
Influence of line resistance: TC: 0.2 µV/Ω and 3-wire Pt100: 2.6°C/Ω. of difference between 2 branches
Sensor break-induced current: 200 nA
Common-mode rejection: 120 dB
Serial-mode rejection: 55 dB
Insulation voltage between channels: 430 Vac
Sensor failure detection: sensor open-circuit for TC, Pt100 and mV inputs - below 1 mA for the 4-20 mA input - below 1 mA for the 4-20 mA input - not applicable to the other inputs
Response time after sensor failure: 0.1 sec for 4-20 mA and 1.5 V and 10 sec for CT, Pt100 and mV

Type	Scale	Accuracy at 25°C	Impedance
Analogue input board, negative U/I			
-20 +20 mA	-22 ... +22 mA	± 0.1%	70.5 Ω
-60 +60 mVdc	-62 ... +62 mVdc	± 0.1%	2.2 MΩ
-2 + 2 Vdc	-2.2 ... +2.2 Vdc	± 0.1%	332 kΩ
20 +20 Vdc	-22 ... +22 Vdc	± 0.1%	332 kΩ
Standard analogue input board			
mV	-8 ... 70 mV	±0.05%	2.2 MΩ
mA	-3 ... 27 mA	±0.05%	70.5 Ω
V	-0.12 ... 1.15 V	±0.05%	332 kΩ
0/5 V	-1.3 ... 11.5 V	±0.05%	332 kΩ
1/5 V	-1.3 ... 11.5 V	±0.05%	332 kΩ
0/10 V	-1.3 ... 11.5 V	±0.05%	332 kΩ
J*	120 ... 1,000°C	±1°C	2.2 MΩ
K*	-200 ... 1,370°C	±1°C	2.2 MΩ
Pt100 (DIN)*	-210 ... 700°C	±0.4°C	1.3 kΩ

* Other types of temperature probes: please contact us

Logical input boards
Channels: 6 per board
Low level: -5 V minimum, 0.8 V max.
High level: 2 V minimum, 5 V max.
External pull-down resistance: 1 Ω max.
External pull-up resistance: 1.5 MΩ min.
Relay output boards
Relays: 6 per boards
Contact type: N.O (normally open)
Relay type: 5 A/240 Vac
Number of cycles: 200,000 resistive load
Analogue current output boards
Measurement input transcription card with function for possible multiplication, addition or subtraction of inputs
Type: 0-20 mA and 4-20 mA

Communication

Serial communication module	
Interface	RS232 - RS422 or RS485
Protocol	ModBus RTU
Address	1 to 247
Speed	0.3 to 38.4 kbits/s
Data bits	7 or 8 bits
Parity bit	none, even or odd
Stop bit	1 or 2 bits
ETHERNET communication module	
Protocol	ModBus TCP/IP, 10BaseT with automatic polarity correction
Ports	AUI and RJ-45 with auto-detection capability

Environment

Operating temperature	+5°C to +50°C
Storage temperature	-25°C to +60°C
Relative humidity	20 to 80% RH
Insulation resistance	20 MΩ min. (at 500 Vdc)
Dielectric strength	3 kVac at 50/60 Hz for 1 minute
Vibration resistance	10-55 Hz, 10 m/s^2 for 2 hours
Shock resistance	3 m/s^2 (3 g) in operation, 100 g during transport
Infrared sensor	detection of human presence up to 2 m away (screen saver)
Weight	1.9 kg

Standards

Safety	UL873 (11th edition 1994) CSA: C22.2 N° 24-93 CE: EN61010-1 (IEC 1010-1) Overvoltage category II, pollution degree 2
Protection class for indoor use	Cabinet front panel IP30, wiring IP20
EMC emission	EN50081-2. EN61326 (EN55011 class B. EN61000-3-2. EN61000-3-3)
Immunity	EN50082-2. EN61326 (EN61000-4-2. EN61000-4-3. EN61000-4-4. EN61000-4-5. EN61000-4-6. EN61000-4-11. EN50204)

Configuration software

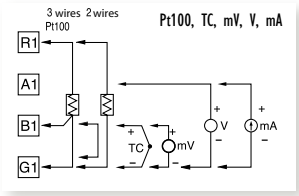
TracerManager 1: configuration and retrieval of historical data on PC
TracerManager 2: configuration, retrieval and display of real-time data on PC
Minimum configuration required: PC 200 MHz - 64 MB RAM

Internal memory: 8 MB

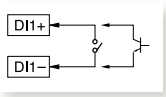
Compact Flash extension up to 4 GB

Electrical connections

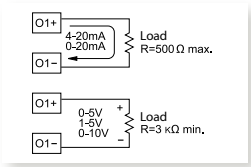
Analogue inputs



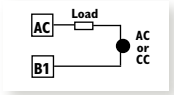
Logical inputs



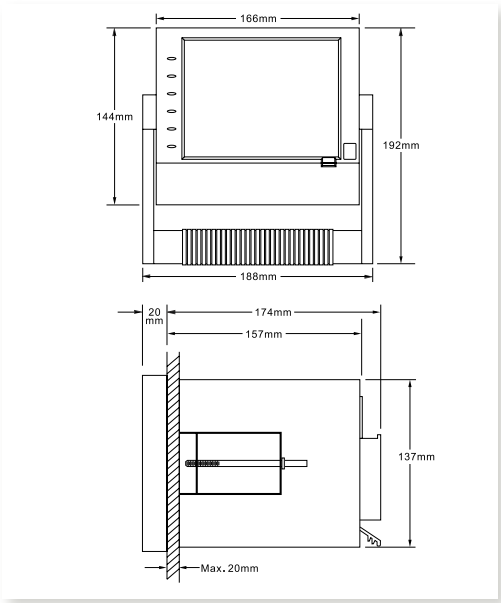
Analogue inputs



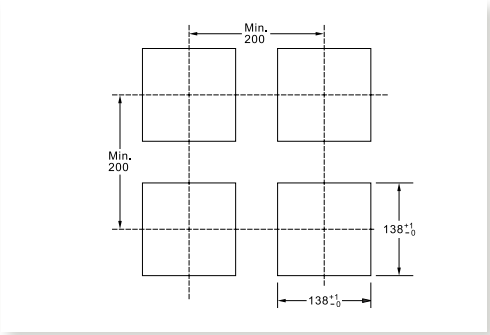
Relay outputs



Dimensions



Panel cut-outs



Associated products

Transducers

► page 218

CT Current transformers

► page 101

ENERTRACE Range

Paperless process recorder

TO ORDER

ENERTRACE

1	2	3	4		5	6	7	8		9	10	11	12

1 Power supply — Code

4	90-264 Vac 47-63 Hz /110-370 Vdc	**standard**
6	11-18 Vdc	
7	18-36 Vdc	
8	36-72 Vdc	

2 Analogue inputs — **LR00112-000***

0	no analogue input	0 slot
3	3 analogue inputs	1 slot
6	6 analogue inputs	2 slots
A	9 analogue inputs	3 slot
B	12 analogue inputs	4 slots
C	15 analogue inputs	5 slots
D	18 analogue inputs	6 slots

3 Logical inputs — **LR00113-000***

0	no logical input	0 slot
1	6 logical inputs	1 slot
2	12 logical inputs	2 slots

4 Relay outputs — **LR00114-000***

0	no relay	0 slot
1	6 relays	1 slot
2	12 relays	2 slots

5 Communication

0	via Ethernet	**standard**
1	RS232/422/485 (3 in 1) + Ethernet interface	

6 Configuration software

1	"TracerManager1"	**standard**

7 ENERTRACE software

0	basic version
1	calculation, counter and totalizer functions

8 Compact Flash

1	1 GB	**standard**

9 ENERTRACE mounting

1	version for cabinet mounting	**standard**
2	portable version with carrying handle	

10 Option

0	no option	
1	24 Vdc power supply for transmitters (6 max.) [1 slot]	**LR00115-000***

11 Analogue outputs — **LR00123-000***

0	no analogue output	0 slot
3	3 analogue mA outputs	1 slot
6	6 analogue mA outputs	2 slots
A	9 analogue mA outputs	3 slots

12 Negative U/I analogue inputs — **LR00128-000***

0	no negative U/I input	0 slot
3	3 negative U/I inputs	1 slot
6	6 negative U/I inputs	2 slots
A	9 negative U/I inputs	3 slots
B	12 negative U/I inputs	4 slots
C	15 negative U/I inputs	5 slots
D	18 negative U/I inputs	6 slots

ACCESSORIES:

"TracerManager2" software	**LR00132-000***
4 GB Compact Flash memory	**LR00121-000***
Flash/USB adapter	**LR00127-000***

*Can be sold separately