

MICAR 2

PROGRAMMABLE DIGITAL TRANSDUCER

- **Classe 0.2** / insulation 4 kV
- Up to 4 configurable analogue outputs
- Measurement of 32 electrical quantities
- Mounting on DIN rail or on cabinet backplate
- 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

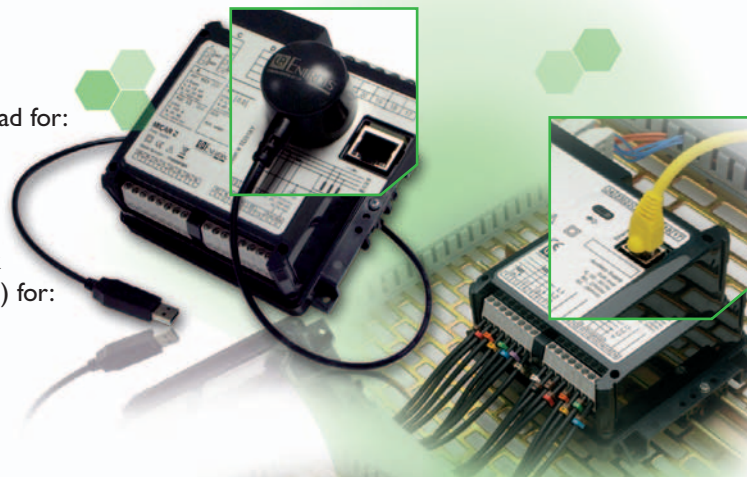


**ETHERNET
COMMUNICATION**

MICAR 2, the new generation of digital transducers from Enerdis, provides new functions: Ethernet remote communication, on-off outputs for energy metering applications, etc.

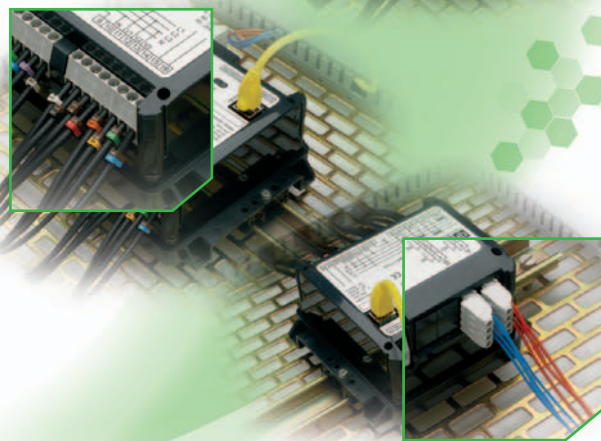
► Communication

- Local communication via multi-function optical head for:
 - programming,
 - data reading,
 - metrological verification.
- Remote communication via the Ethernet network (ModBus TCP/IP) or the RS485 link (ModBus/JBus) for:
 - programming,
 - data reading,
- The embedded software can be updated and upgraded via the optical head.



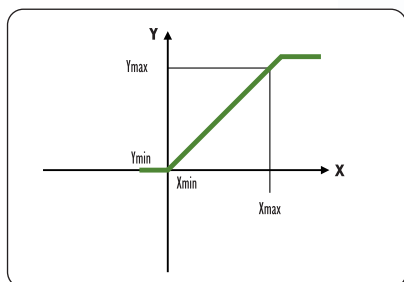
► Product advantages

- Simple upgrading of the embedded software.
- Programmable multi-criteria alarms.
- Time/date-stamped events log.
- Modulatable output boards.
- Acceptable overcurrent of 50 In for 1 second.
- Voltage measurement between earth and neutral.
- Screw terminals to simplify connection.

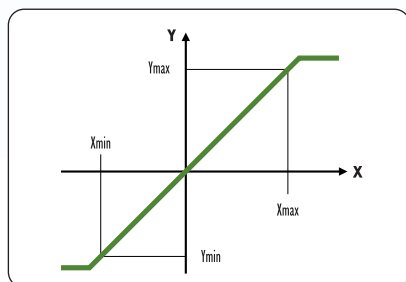


► Transfer curves

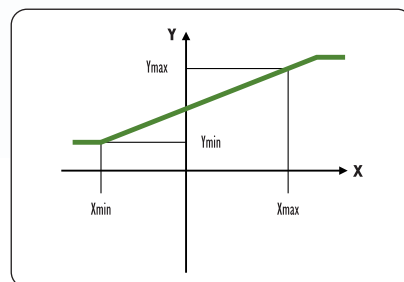
Linear curve



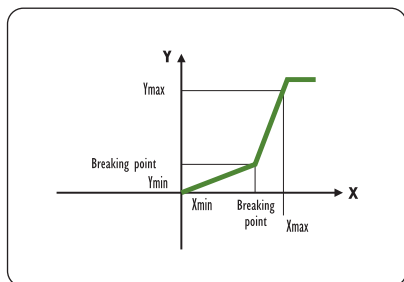
Non-offset linear curve



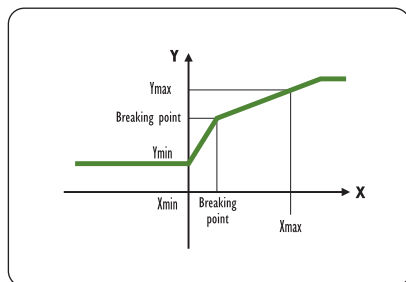
Offset linear curve



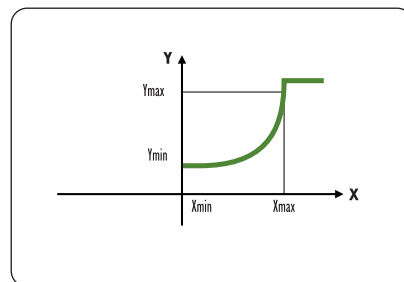
Dilated 2-slope linear curve



2-slope linear curve



Quadratic curve



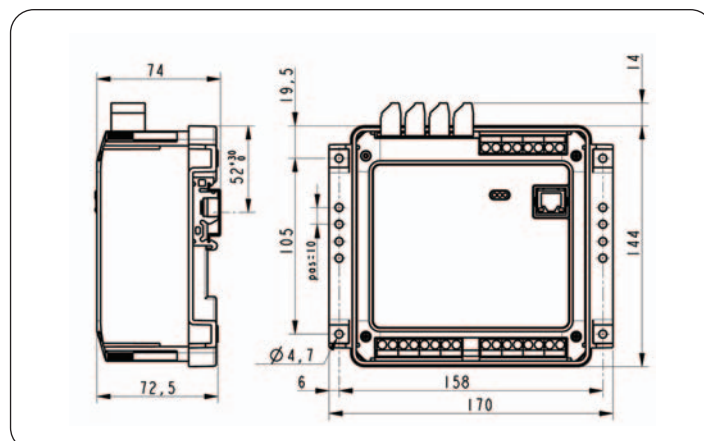
► Product specifications

Inputs	
Single-phase	•
Balanced 3-phase	3 or 4 wires
Unbalanced 3-phase	3 or 4 wires
Outputs	
Analogue	2 or 4
On-off	0, 2 or 4
Electrical quantities	
U, V, I, P, Q, S, FP, Cos φ , F	•
Specific measurements	
Earth voltage	measured
Neutral current	measured
Harmonics	up to the 25th order
Communication interface	
Optical head	•
Ethernet or RS485	•
Metrology LED	•

► Functions

Measurement	Analogue output	On-off output		Communication output	Display with E.view+
		Alarm relay	Pulse output		
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	•	•		•	
Cos φ 1, Cos φ 2, Cos φ 3,	•			•	
Cos φ t	•	•		•	
Fréquency	•	•		•	•
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			•	•	•

► Dimensions



► Electrical specifications

Voltage inputs	
Measurement range	10 to 120 % of V_n for $V_n = 230$ V (ph-N) 10 to 120 % of U_n for $U_n = 400$ V (ph-ph)
Frequency	50/60 Hz
Max. phase-to-phase voltage measurement	650 kV
Acceptable overvoltage	800 V for 24 hours 552 V permanent
Consumption	< 0.2 VA
Input impedance	2 M Ω
Current inputs	
Measurement range	5 to 130 % of I_n for $I_n = 5$ A
CT secondary (I_n)	1 to 5 A
Max. current measured	25,000 A
Acceptable overcurrent	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 \pm 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)	2400, 4800, 9600, 19200, 38400
Parity	even, odd or none
JBus addresses	1 to 247
Ethernet output	
Type	RJ45 - 8-pin
Protocol	Modbus/TCP
Speed (configurable)	Compatible with 10baseT

► Metrological specifications

• Analogue output

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 $V_n^{(1)}$	± 0.2 % of V ± 0.02 % of V_n
U	U between 10 % and 120 % of $U_n^{(2)}$	± 0.2 % of U ± 0.02 % of U_n
I	I between 5 % and 130 % of $I_n = 5$ A	± 0.2 % of I ± 0.02 % of I_n
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 $U_n^{(2)}$ • I between 10 % and 130 % of $I_n = 5$ A	± 0.2 % of P ± 0.02 % of P_n
Q	FP between 0.5 inductive and -0.5 capacitive • U between 99 % and 101 % of $U_n^{(2)}$ • I between 10 % and 130 % of $I_n = 5$ A	± 0.5 % of Q ± 0.05 % of Q_n
S	U between 99 % and 101 % of $U_n^{(2)}$ • I between 5 % and 130 % of $I_n = 5$ A	± 0.2 % of S ± 0.02 % of S_n
FP, Cos ϕ	FP between 0.5 inductive and 0.5 capacitive • U between 99 % and 101 % of $U_n^{(2)}$ • I between 5 % and 130 % of $I_n = 5$ A	± 0.02 counts

⁽¹⁾ V_n from 57.7 V to 230 V ⁽²⁾ U_n from 100 V to 400 V

Special quantity	Accuracy class
Active energy	Class 0.5 s 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

► 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

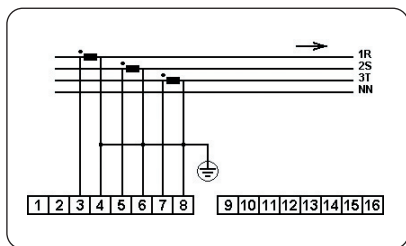
► Mechanical specifications

Weight	700 g
Mounting	DIN 43700 rail or platen
Connection	Screw terminals for 6 mm ² rigid or flexible wires on current measurement inputs and 2.5 mm ² for the other accesses

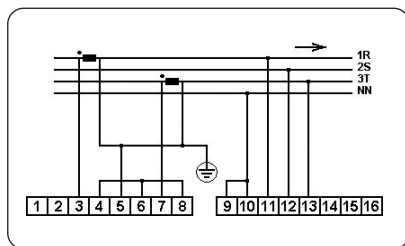
► Connection diagrams

• Configurations for unbalanced 3-phase networks with 4 wires

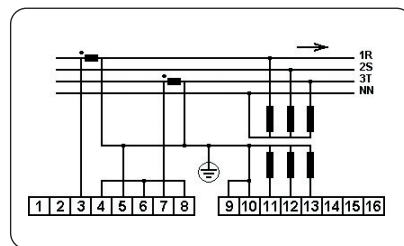
TD314 configuration



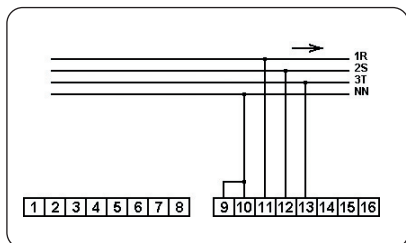
TD315 configuration



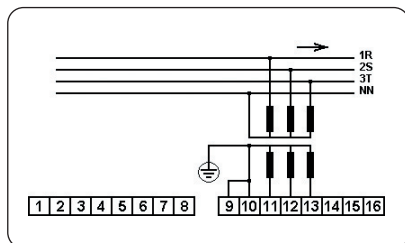
TD315Y configuration



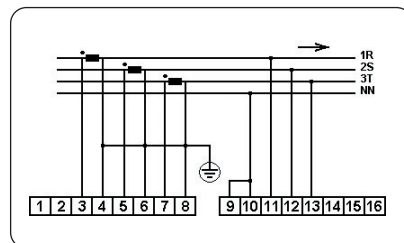
TD317 configuration



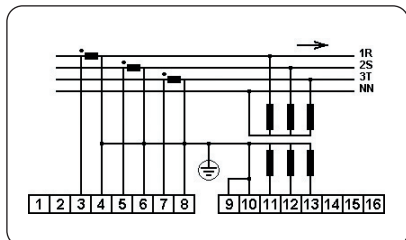
TD317Y configuration



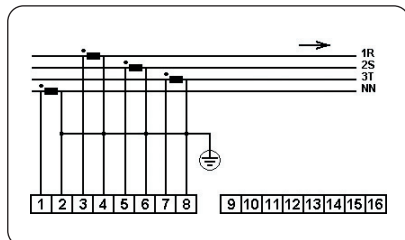
TD318 configuration



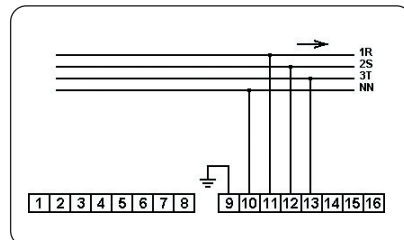
TD318Y configuration



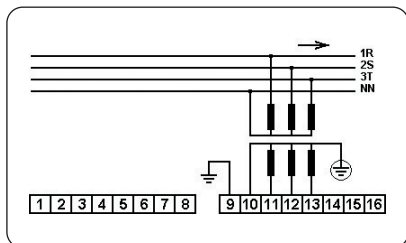
TD334 configuration



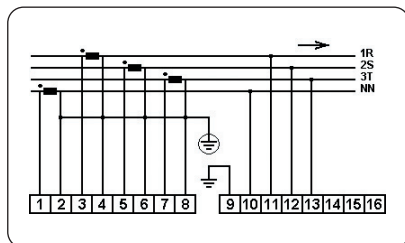
TD337 configuration



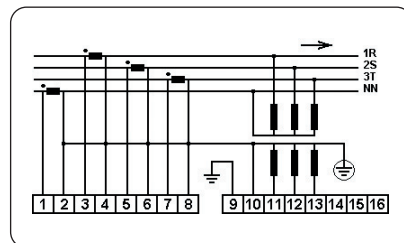
TD337Y configuration



TD338 configuration

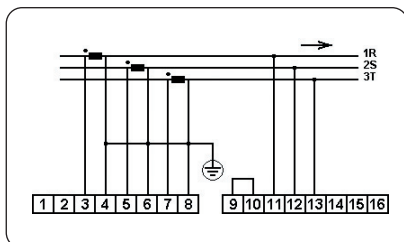


TD338Y configuration

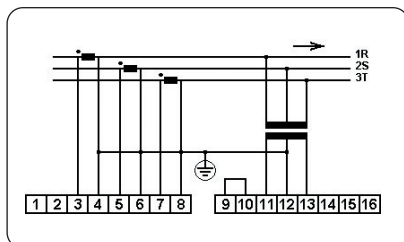


• Configurations for unbalanced 3-phase networks with 3 wires

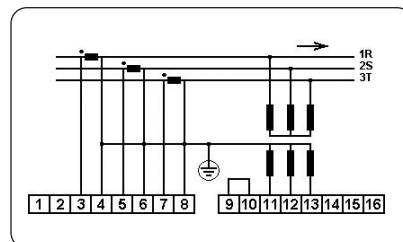
TD320 configuration



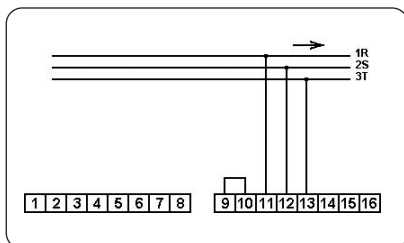
TD320D configuration



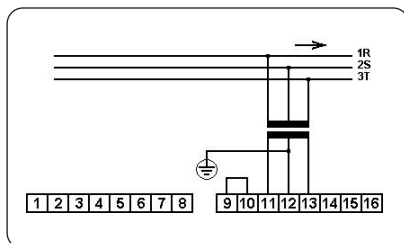
TD320Y configuration



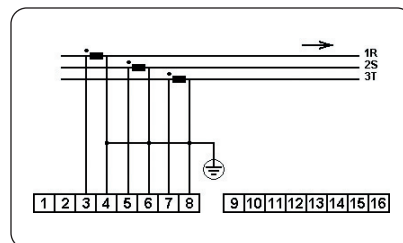
TD321 configuration



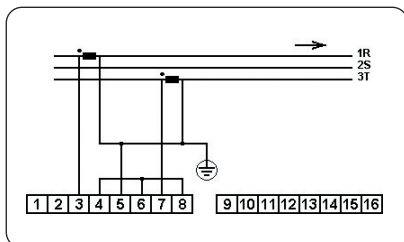
TD321D configuration



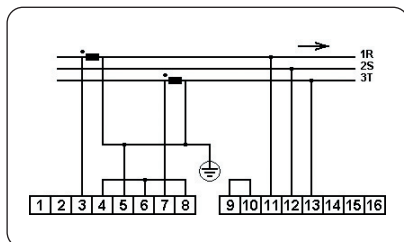
TD322 configuration



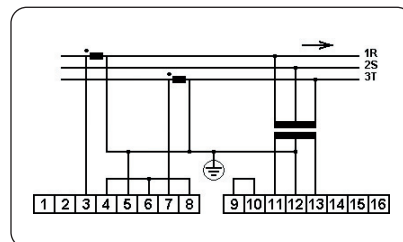
TD323 configuration



TD324 configuration

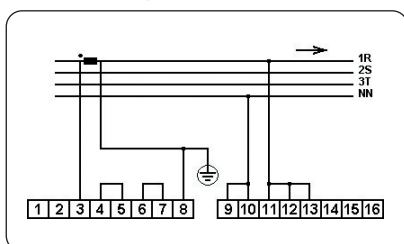


TD324D configuration

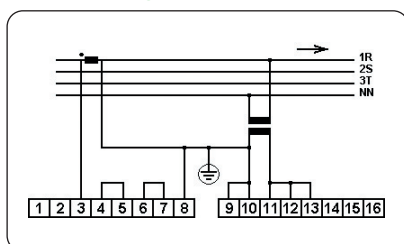


• Configurations for balanced 3-phase networks with 3 or 4 wires

TD303 configuration

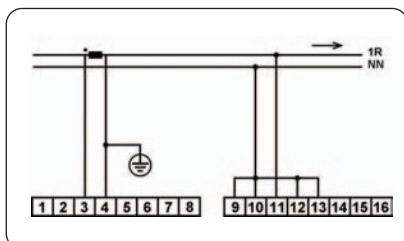


TD304 configuration

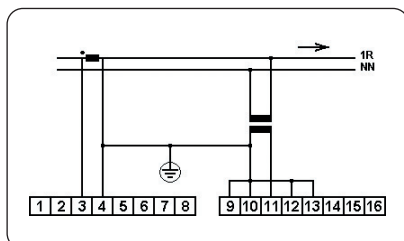


• Configurations for single-phase networks

TD301 configuration



TD302 configuration



► Form to be completed and attached to your order

Tailored transducer configuration

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 - Connection options

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

3 - 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

1st output

Quantity and measurement range (x)

☐ I ☐ U Min Breaking point Max
☐ V
☐ F
☐ P Unit (1)
☐ Q
☐ S
☐ FP

Transfer curve

- ☐ Linear
☐ 2 slopes
☐ Quadratic

Output signal (y)

mA
 or
 V

2nd output

Quantity and measurement range (x)

☐ I ☐ U Min Breaking point Max
☐ V
☐ F
☐ P Unit (1)
☐ Q
☐ S
☐ FP

Transfer curve

- ☐ Linear
☐ 2 slopes
☐ Quadratic

Output signal (y)

mA
 or
 V

3rd output

Quantity and measurement range (x)

☐ I ☐ U Min Breaking point Max
☐ V
☐ F
☐ P Unit (1)
☐ Q
☐ S
☐ FP

Transfer curve

- ☐ Linear
☐ 2 slopes
☐ Quadratic

Output signal (y)

mA
 or
 V

4th output

Quantity and measurement range (x)

☐ I ☐ U Min Breaking point Max
☐ V
☐ F
☐ P Unit (1)
☐ Q
☐ S
☐ FP

Transfer curve

- ☐ Linear
☐ 2 slopes
☐ Quadratic

Output signal (y)

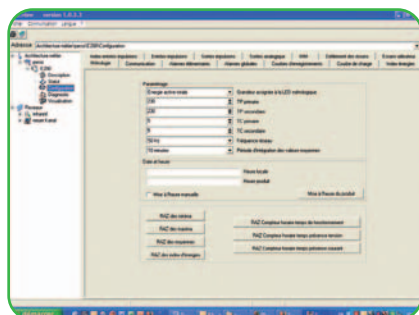
mA
 or
 V

4 - Power supply

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

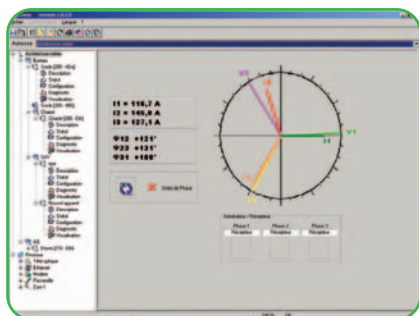
(1) Please indicate the unit for the measurement range, e.g. V, kW or MW.

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



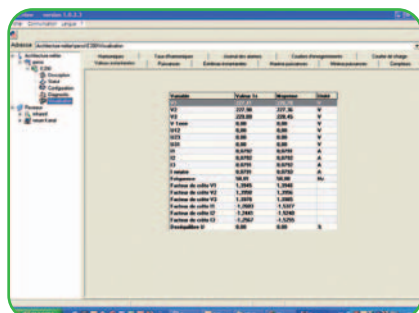
■ Configuration

- 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, PT, 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

T O O R D E R

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 RS485 output labels + 1 E.view+ CD	P01 330 842
MICAR 2 - Ethernet kit containing 1 optical head + 1 set of 50 Ethernet output labels + 1 E.view+ CD	P01 330 843
Accessories	Code
Set of 50 RS485 output labels	P01 330 844
Set of 50 Ethernet output labels	P01 330 845