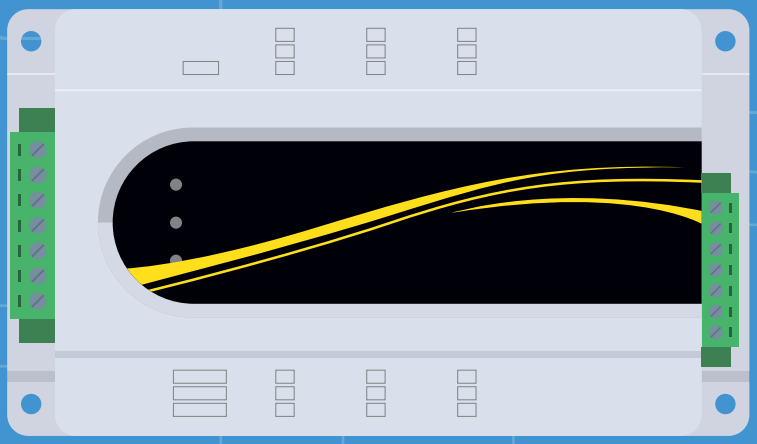
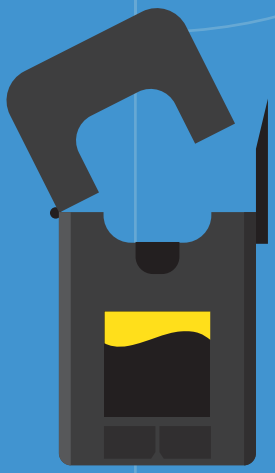
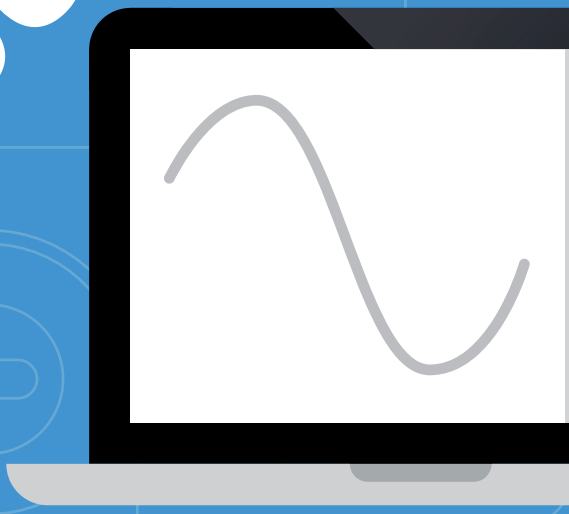
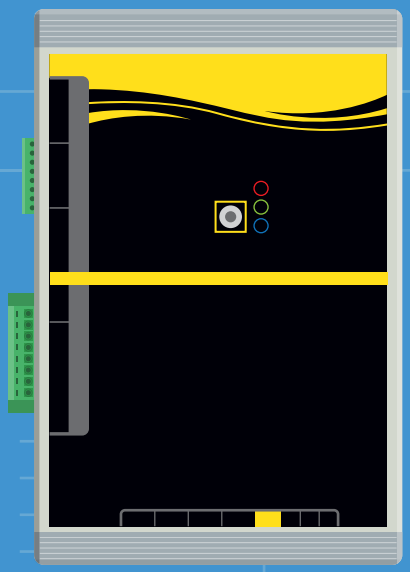
CHAUVIN ARNOUX
ENERGY

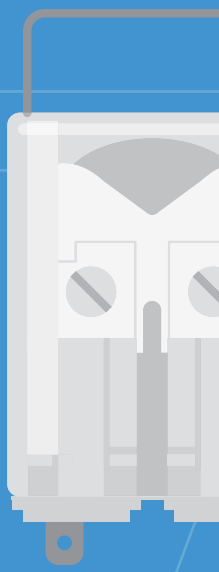


GENERAL CATALOG 2023









Measure up

ENERGY METERING PLAN

Remote data retrieval from meters
Energy saving
ISO 50001
Energy rebilling

METERS AND POWER MONITORS

PAGE 9

NETWORK ANALYZERS

PAGE 71

NETWORK SUPERVISION AND PHYSICAL MEASUREMENT

High-accuracy measurement
Network supervision
Severe environments
Multi-function
Accurate display

CURRENT TRANSFORMERS AND SHUNTS

PAGE 99

TRANSDUCERS

PAGE 145

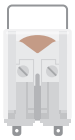
PANEL METERS AND SYNCHROCOUPLER

PAGE 179

CRITICAL AUXILIARY RELAYS

High breaking capacity
Railway applications
Nuclear qualification
Control of critical automated systems
EMC immunity

AUXILIARY RELAYS



PAGE 231

SERVICES AND TRAINING

Combined know-how

SERVICES AND TRAINING

PAGE 239

THE CHAUVIN ARNOUX GROUP MEASUREMENT EXPERTS

Founded in 1893 by Raphaël Chauvin and René Arnoux, CHAUVIN ARNOUX is an expert in measurement of electrical and physical quantities in the industrial and tertiary sectors. Total control of product design and manufacturing in-house enables the Group to propose its customers a very broad product and service offering which meets all their needs. The Group's quality policy ensures that the products delivered comply with its commitments and with both the national and international standards in terms of metrology, the environment and user safety.

A FEW FIGURES

100 million euros
in sales revenues

1,000
staff

8
production sites

10 subsidiaries
spread across the world

6 R&D departments
worldwide

11%
of revenues invested in R&D

ABOUT

Chauvin Arnoux Energy

Chauvin Arnoux Energy, a company in the Chauvin Arnoux Group, is specialized in fixed equipment for measuring and supervising electrical networks to meet the needs of cutting-edge industries for intensive use in severe environments

Our key sectors

ELECTRICAL POWER GENERATION

Chauvin Arnoux Energy meets the specific needs of the nuclear sector by providing expertise developed and acknowledged for more than thirty years.

ELECTRIC POWER TRANSMISSION AND DISTRIBUTION

Chauvin Arnoux Energy proposes solutions for energy billing and network balancing for the players in the power transmission and distribution sector.

RAIL

A major partner of the rail industry, Chauvin Arnoux Energy designs automation relays for the rolling stock and substations.

NAVAL

Chauvin Arnoux Energy produces customized solutions for navigation and control in the context of shipping applications.

A French brand with integrated production

Chauvin Arnoux Energy, a French company in the Chauvin Arnoux Group, handles all aspects of product manufacturing; from design through to final testing of the equipment. Our teams guarantee the quality and reliability of all the instruments we supply, as well as support lasting decades.

A long-term offering

Our thorough mastery of our industrial know-how in our factories in France and our ability to keep abreast of the changes in the markets (materials used in our equipment) enable us to guarantee constant quality and long-term availability for our products.

CHAUVIN ARNOUX ENERGY, NETWORK EXPERTS, FROM METERING TO SUPERVISION

The extensive CHAUVIN ARNOUX ENERGY offering in instrumentation, panel meters and processing software enables our teams to provide you with a global solution.
This couples measuring instruments and data processing software while interfacing with most of the existing systems. This offering is based around three major working areas:

ENERGY METERING PLAN

Considerable potential savings

Optimize energy consumption by eliminating waste: measure to identify sources of potential savings.

Monitor all the energy parameters in real time to react immediately to malfunctions or abnormal drift.

Rebill energy consumption precisely and fairly.

NETWORK SUPERVISION & PHYSICAL MEASUREMENT

Keep your installations in good health

Monitor the operation of your electrical network

Indicate your system's status in real time

Alert in the event of abnormal operation or drift

Record all the activity on your network

Analyze the events using frameworks

Present the analyses as standardized reports

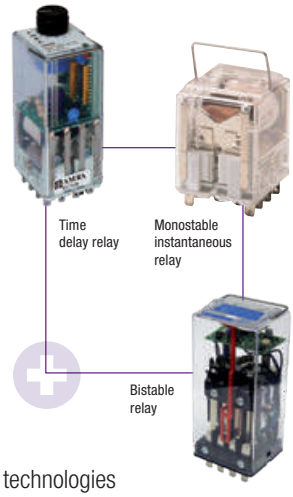
CRITICAL AUXILIARY RELAYS

Reliability and safety are not optional

Technology developed for **intensive use** in **severe environments**: nuclear, rail, transmission networks & energy generation

A wide range of instantaneous (multi-contact, bistable, fast-acting), time-delay and function relays. A choice of sockets with multiple connection technologies

Certifications: SNCF, RATP, EDF, ENEL, TERNA, K3



COMPLEMENTARY OFFERINGS
WITHIN THE GROUP

The Chauvin Arnoux Group is a worldwide player in measurement with all-round expertise in the electrical, thermal and energy management sectors and a complementary, comprehensive and innovative range of products.

Electrical energy quality

The quality of the electricity is a crucial technical characteristic to ensure that an electrical installation functions as rated. With Qualistar® network analyzers from CHAUVIN ARNOUX® for spot measurement campaigns and the MAP range from CHAUVIN ARNOUX ENERGY® for continuous measurements, you can perform a complete survey of the quality of the electricity supplied.

Energy diagnostics

Assessment of the consumption on an installation is essential to correctly size the points of consumption, establish the load profiles, clearly identify the types of energy and utilities to be generated and define detailed objectives (in financial or energy performance indices). Meters, power monitors, energy management software tools, power analyzers, hygrometers, luxmeters and infrared cameras all help to provide the most in-depth energy diagnosis possible.

Metrology and regulatory testing

To ensure long-term operation of your installations and guarantee their performance levels, the Chauvin Arnoux Group strives to offer you suitable solutions, whatever your sector of activity. Indeed, many parameters involved in the production processes may influence the results. This is why metrological verification, calibration and testing of the equipment are absolutely essential to ensure compliance with the quality standards. MANUMESURE, also part of the Group, provides these services in compliance with the standards and ensures traceability to the national reference standards.

Safety inspection on electrical installations with network analyzers

Infrared thermography with the latest-generation cameras from Chauvin Arnoux®

Temperature measurement and control with the sensors and recorders from Pyrocontrole®

ENERGY METERING PLAN

METERS AND POWER MONITORS

10 OVERVIEW OF THE RANGE
14 SELECTION GUIDE
24 SUBMETERS
44 MULTICHANNEL METERS
50 TARIFF METERS
54 POWER MONITORS

METERS AND POWER MONITORS

MEMO range of submeters for simple metering functions

Single-phase networks

MEMO MD32

32 A direct input
Class 1

Energy meter for single-phase networks with direct connection up to 32 A.

page 24

MEMO MD65

65 A direct input
Class 1

Energy meter for single-phase networks with direct connection up to 65 A.

page 26

Three-phase networks

MEMO TD80

80 A direct input
Classe 1

Energy meter for single-phase networks with direct connection up to 80 A.

page 28

ULYS range of submeters for advanced metering functions

Single-phase networks

ULYS MD45-M

45 A direct input
MID Class B
Built-in communication

Energy meter for single-phase networks with direct connection up to 45 A.

page 30

ULYS MD100-M

100 A direct input
MID Class B
Built-in communication

Energy meter for single-phase networks with direct connection up to 100 A.

page 32

Three-phase networks

ULYS TDA80-M

80 A direct input
MID Class B
Communication with ULYSCOM modules

Energy meter for three-phase networks with direct connection up to 80 A.

page 34

ULYS TTA-M

Connection to CT
MID Class B
Communication with ULYSCOM modules

Energy meter for three-phase networks with connection to CT.

page 36

ULYS TD80-M

80 A direct input
MID Class B
Built-in communication

Energy meter for three-phase networks with direct connection up to 80 A.

page 38

ULYS TT-M

Connection to CT
MID Class B
Built-in communication

Energy meter for three-phase networks, connection to CT.

page 40

ULYS FLEX

On Rogowski coils
Integrated communication

Energy meter for three-phase networks, measurement from 0.3 A to 20,000 A.

page 44

Metering solution

ULYS MCM

Connection on CT or Rogowski coil

Power monitor and multichannel energy metering.
Up to 18 three-phase measurement channels.

page 44

Tariff meter

ALTYS

Class 0.5s - MID

Connected to the MV network.
Takes into account all the tariff offers on the market.

page 50

Power monitors

96 x 96 mm format

MEMO P200

Class 0.5

Electrical energy.

page 54

ENERIUM 50

Class 0.5

Electrical energy.

page 56

ENERIUM 150

Class 0.5

Electrical energy.

page 56

144 x 144 mm format

ENERIUM 100

Class 0.5

Multi-energy.

page 56

ENERIUM 110

Class 0.5/0.2
Without display

Multi-energy.

page 56

ENERIUM 200

Class 0.5/0.2

Multi-energy.

page 56

ENERIUM 210

Class 0.5
Without display

Multi-energy.

page 56

ENERIUM 300

Class 0.2

Qualimetry.

page 56

ENERIUM 310

Class 0.2
Without display

Qualimetry.

page 56

Associated software

E.VIEW

Configuration and diagnostic software

Reading of the digital inputs and/or forcing of the digital and analog outputs.

page 68

MEMO Range

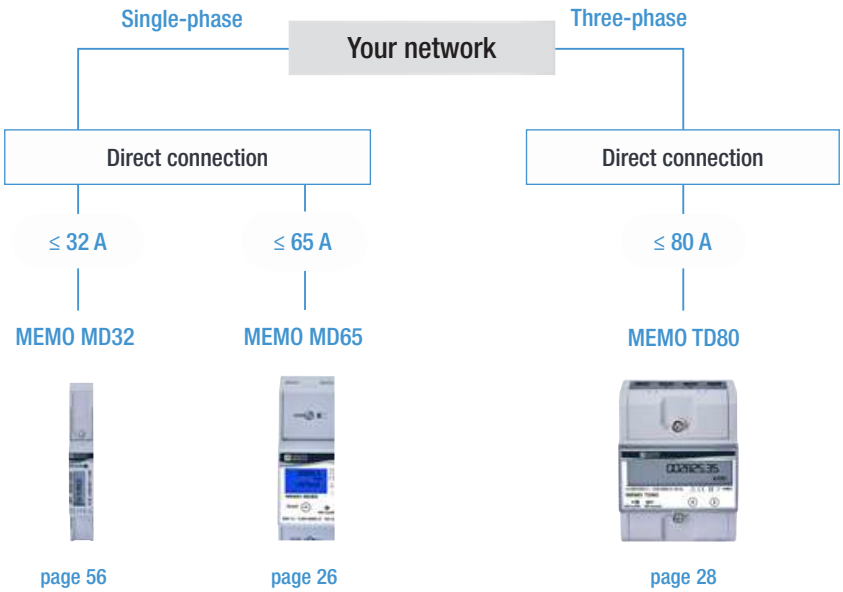
METERING ESSENTIALS

Optimized inventory
A limited number of references corresponding to the most widely-used electrical feeders.

Clear, simple display
Direct access to your consumption data.

No parameter settings
Operational as soon as it is powered up

IEC 62053-21
Monitoring and allocation of consumption



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page 26
page 28

	IEC	IEC	IEC
NON-COMMUNICATING	MEMO MD32 P01330740	MEMO MD65 P01330741	MEMO TD80 P01330745
RS 485 MODBUS	-	-	-
Ethernet Modbus/TCP	-	-	-

ULYS Range

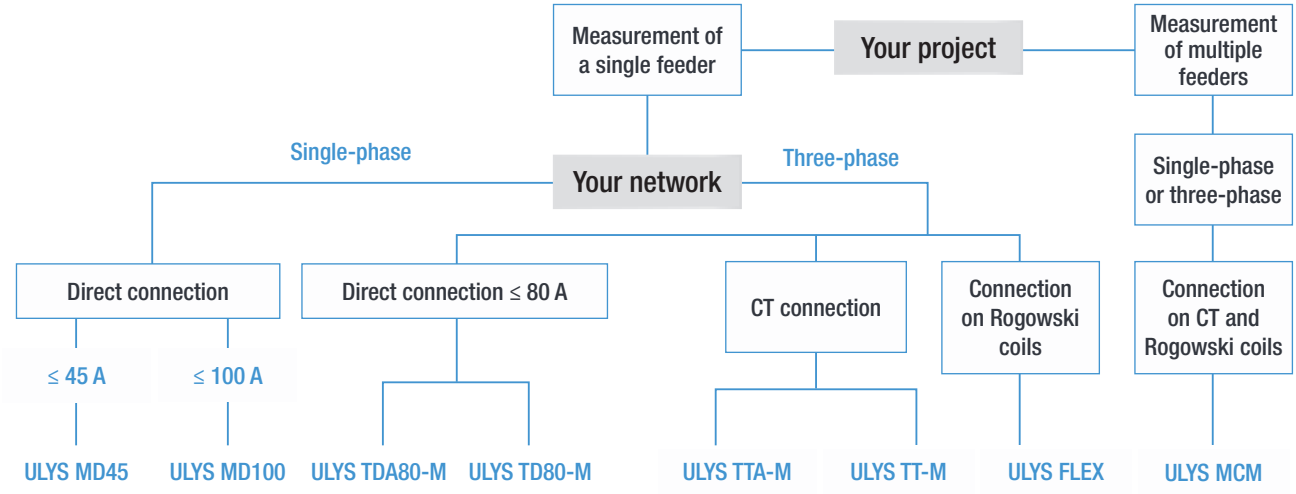
HIGH-PERFORMANCE, CONNECTED METERING PLAN

Interoperability
Built-in communication (Modbus, Ethernet) and pulse outputs in a highly compact casing.

Fair rebilling
MID, double tariff, partial metering.

Customizable multiple measurements
Configurable display. Local or remote access via web pages or FTP push.

Easy implementation
Wide choice of sensors for current measurement.



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MID	MID	MID	MID	MID	MID	IEC	IEC
ULYS MD45-M P01330754	ULYS MD100-M P01330760	ULYS TDA80-M P01331018	-	ULYS TTA-M P01331019	-	-	-
ULYS MD45-M Modbus P01330756	ULYS MD100-M Modbus P01330761	-	ULYS TD80-M Modbus P01331036	-	ULYS TT-M Modbus P01331037	ULYS FLEX Modbus P01331046 to P01331049	ULYS MCM 9 feeders P01331062
-	-	-	ULYS TD80-M Ethernet P01331040	-	ULYS TT-M Ethernet P01331041	-	ULYS MCM 18 feeders P01331064 See dedicated documentation

METER SELECTION GUIDE
BY FUNCTIONS

			MEMO range		
			Single-phase		Three-phase
		Model	MEMO MD32	MEMO MD65	MEMO TD80
			page 56	page 26	page 28
					
		Rating	32 A	65 A	80 A
		MID Certification	no	no	no
		Accuracy class	IEC Class 1	IEC Class 1	IEC Class 1
Installation	Format	DIN modules	1	2	4
	Power supply		Self-powered		
	Rated voltage		230 Vac	230 Vac	230/400 Vac
	Inputs	Direct/Sensors	Direct 32 A	Direct 65 A	Direct 80 A
Energy metering and management	Display and communication (if available)		Total kWh	Total and partial kWh	Total and partial kWh
Multimeasurement	Display and communication (if available)		-	-	-
Recordings / Push FTP			-	-	-
Inputs / Outputs	Pulse output(s)		1	1	1
	Tariff change input		-	-	-
Communication	RS485 Modbus		-	-	-
	Ethernet Modbus		-	-	-

ULYS range

Single-phase		Three-phase			Multi-feeder
ULYS MD45-M	**ULYS MD100-M**	**ULYS TDA80-M ULYS TD80-M**	**ULYS TTA-M ULYS TT-M**	**ULYS FLEX Modbus**	**ULYS MCM**
page 30	page 32	page 34 page 26	page 26	page 42	page 44
					
45 A	100 A	80 A	On TC 1/5 A	0,3 to 20000 A	Up to 3,000 A
yes	yes	yes	yes	no	no
MID Class B				IEC Class 1	IEC Class 0.5
1	2	4	4	4	8 (156x90x61)
Self-powered				85-265 Vac	100-240 Vac
230 Vac	230 Vac	230/400 Vac	230/400 Vac	10/17 to 285/495 Vac	25 to 400 Vac (P-P)
Direct 45 A	Direct 100 A	Direct 80 A	Isolated 1/5 A	On Rogowski coils	x9 or x18 feeders on CT or on Rogowski loops
Bidirectional, kWh, total kVArh and partial kWh	Bidirectional, kWh, total kVArh and partial kWh	Bidirectional, kWh, kVArh, kVAh, total, partial and per phase	Bidirectional, kWh, kVArh, kVAh, total, partial and per phase	Bidirectional, kWh, kVArh, kVAh, total, partial and per phase	kWhh, kVArh, kVAh per feeder
V, I, P, Q, S, F, PF	V, I, P, Q, S, F, PF	V, U, I, P, Q, S, F, PF, ΣP, ΣQ, ΣS	V, U, I, P, Q, S, F, PF, ΣP, ΣQ, ΣS	V, U, I, P, Q, S, F, PF, ΣP, ΣQ, ΣS	V, U, F, I, P, Q, S, PF, ΣP, ΣQ, ΣS per feeder
-	-	Ethernet model		-	-
1	2	2 on TDA80-M - 1 on TD80-M	2 on TTA-M - 1 on TT-M	1 (alarm or pulse)	1
ULYS MD45-M	ULYS MD100-M	1 (except Ethernet model)	1 (except Ethernet model)	no	no
ULYS MD45-M Modbus	ULYS MD100-M Modbus	ULYS TD80-M Modbus	ULYS TT-M Modbus	ULYS-FLEX Modbus	On all models
-	-	ULYS TD80-M Ethernet	ULYS TT-M Ethernet	-	

QUICK SELECTION GUIDE
FOR POWER MONITORS

MEMO

- All-in-one screen, particularly easy to read
- Simple to implement and operate
- Controlled inventory covering your main needs

ELECTRICAL

MEMO range

Standard functions

MEMO P200
page 54

Modbus RS485 communication

230 Vac aux. power supply
- MEMO P200
  Ref. P01330825

24 Vdc aux. power supply
- MEMO P200
  Ref. P01330826

ENERIUM range

Advanced functions

Enerium 50
page 56

Enerium 150
page 56

Modbus RS485 communication

Without Input/ Output
- ENERIUM 50
  Ref. P01330805
- ENERIUM 150
  Ref. P01330809

With Input/ Output
- ENERIUM 50 1E/1S
  Ref. P01330807
- ENERIUM 150 0E/2S
  Ref. P01330811

Ethernet Modbus TCP communication

Without Input/ Output
- ENERIUM 50
  Ref. P01330806
- ENERIUM 150
  Ref. P01330810

With Input/ Output
- ENERIUM 50 1E/1S
  Ref. P01330808
- ENERIUM 150 0E/2S
  Ref. P01330812

APPLICATION

MULTI-ENERGY

ENERIUM

- Accuracy suitable for the most critical MV/LV measurements
- The history and diagnostic tools to understand everything about your electrical feeder
- Unique on the market: up to 8 totally-integrated inputs/outputs (on-off or analog)
- Energy quality measurement at the heart of a power monitor

ENERIUM range

Installation supervision

Enerium 100
page 56

Multi-energy management

Enerium 200
page 56

Data logger

Enerium 210
page 56

Power quality

Enerium 300
page 56

Modbus RS485 communication

Without Input/Output

- ENERIUM 100
  Ref. P01330831
- ENERIUM 300
  Ref. P01330816 (STD power supply)
  Ref. P01330818 (BN power supply)

With Input/Output

- ENERIUM 100 2E/2S
  Ref. P01330832
- ENERIUM 200 4E/2S
  Ref. P01330833

Ethernet Modbus TCP communication

Without Input/Output

- ENERIUM 300
  Ref. P01330817 (STD power supply)
  Ref. P01330819 (BN power supply)

With Input/Output

- ENERIUM 200 2E/4S
  Ref. P01330834
- ENERIUM 210 8E
  Ref. P01330835
- ENERIUM 300 4E/2S

CHOOSING YOUR POWER MONITOR

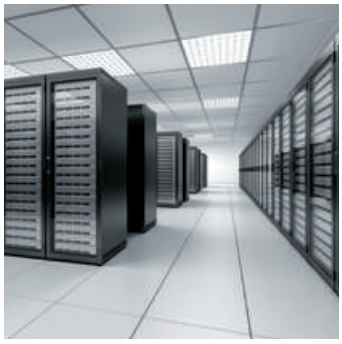
		MEMO	ENERIUM
		page 54	page 56
			
		MEMO P200	Enerium 50
Electrical energy management	Accuracy	0.5 %	0.5 %
	Measurement of V, U, I Inst. Min/Max Avg.	■	■
	Measurement of P, Q, S Inst. Min/Max Avg.	■	■
	Energy generated and consumed	■	■
	Consumption curves (10-min. average values)		8
Multi-energy management	Inputs for pulses from other meters (water, gas, etc.)		0, 1 or 2
	Inputs for analog quantities (temp., flow rate, pressure, insolation, etc.)		
Installation monitoring	Trend curves		
	Management of alarms on thresholds		16
	Alarms log (recordings)		64
	Graph (Fresnel)		
	Pulse or alarm outputs	1 (pulse)	0, 1 or 2
	Analog outputs		0 or 2
Power quality	THD / PF / Tan φ	■	■
	Harmonics by orders with graphical representation		25
	Waveform capture (U, V, I, In)		
	EN50160 analysis		
	Max. no. of input + output options	1	2
	RS485 - Modbus	■	■
	Ethernet - Modbus TCP		■
	Format (mm)	96 x 96	96 x 96
	Available in version without display		

ENERIUM

page 56 | page 56 | page 56 | page 56




Enerium 150	Enerium 100	Enerium 200	Enerium 300
0.5 %	0.5 %	0.2 %	0.2 %
■	■	■	■
■	■	■	■
■	■	■	■
8		8	8
0, 1 or 2	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8
	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8
4	4	4	4
16	16	16	16
64	64	64	64
■	■	■	■
0, 1 or 2	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8
0 or 2	0, 2, or 4	0, 2, or 4	0, 2, or 4
■	■	■	■
50	25	50	50
			16
			■
2	8	8	8
■	■	■	■
■	■	■	■
96 x 96	144 x 144	144 x 144	144 x 144
	ENERIUM 110	ENERIUM 210	ENERIUM 310



MID DIRECTIVE

WHAT IS THE MID?

The MID (Measuring Instruments Directive - 2004/22/CE) is a European Directive issued in 2004 which applies to devices and systems with a measuring function in order to protect the interests of consumers, particularly in the context of commercial transactions.
These measuring instruments may be active electrical energy meters (Annex MI003 of the Directive), water, gas or heat meters, weighing instruments, etc.

SCOPE

The MID covers three types of usage: *"Measurements of residential, commercial and light industrial use"*. A minimum meter accuracy class is imposed for each usage category as stipulated in the Directive 2004/22/CE:

- In **residential** use, "(…) any meter of at least Class A is sufficient (…) but a Class B meter is required in the following cases:
  - when the current Imax is greater than or equal to 45 A, in the case of a single-phase connection, or 15 A in the case of a three-phase connection;
  - when the meter records the consumption data corresponding to specific time slots in separate registers (…)".
- In **commercial** use or **light industry**"(…) a meter of at least Class B is required. A Class C meter may be required, however".

The MID does not however apply to *"Energy meters on which the [Ph-Ph] voltage between the connection terminals exceeds 600 V"*

REGULATORY CONTEXT

European directive on measuring instruments dated 31st March 2004

- Directive transposed into national law of each country in 2006
- 2 specific European standards (EN 50470-1/ EN 50470-3) for energy meters, stipulating the particular requirements and type tests for energy meters

CONDITIONS OF APPLICATION

In the European Union, the use of MID-certified meters on "private"[1] electrical networks has been made mandatory in the context of active energy billing based on consumption readings by index differences.

Typical examples include: camping sites, holiday rentals, student accommodation, office buildings, shopping centres, marinas, exhibition halls, electric vehicle recharging stations, etc.

As the MID is applicable to all European Union Member States, certification of a meter by a Notified Body (NB) means that no other testing by a national legal metrological service is required. So a MID-certified Chauvin Arnoux Energy meter can be used as an active energy billing meter in all European Union countries.

The Directive also imposes product certification according to the EN50470-1/-3 standard, as well as design certification (Module B) and manufacturing process certification (Module D) by a Notified Body, in order to ensure product traceability and guarantee its metrological value, thus helping to protect consumers.

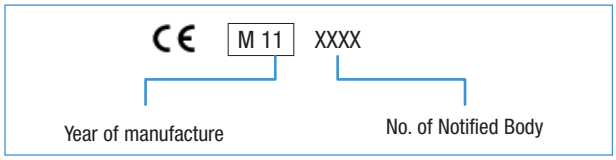
[1] Downstream of the meter at the network manager's point of supply.

ACCURACY CLASSES AND METER IDENTIFICATION

The EN50470-1/-3 defines three specific accuracy Classes: A, B and C. These are comparable to the IEC62053-21/-22 active energy metering standards: Class A is equivalent to 2 % accuracy, Class B to 1 % and Class C to 0.5 %.

For total compatibility with the Directive, there must be regulatory marking for meter traceability. In addition to the manufacturer's name and the product reference, this regulatory marking comprises:

- A reference to Module D certification



- A reference issued by the Notified Body certifying conformity with regard to the Module B design inspection
- The meter's serial number

A declaration of conformity is enclosed with each product sold.

CHAUVIN ARNOUX ENERGY PRODUCTS CONCERNED

- The active energy meters whose references end in "M", such as the **ULYS MD45-M**, also identified with the MID logo in our catalog, fully comply with the MID.
- The directive does not apply, in particular, to current transformers, power monitors and the additional functions (other than active energy measurement) offered by smart meters.

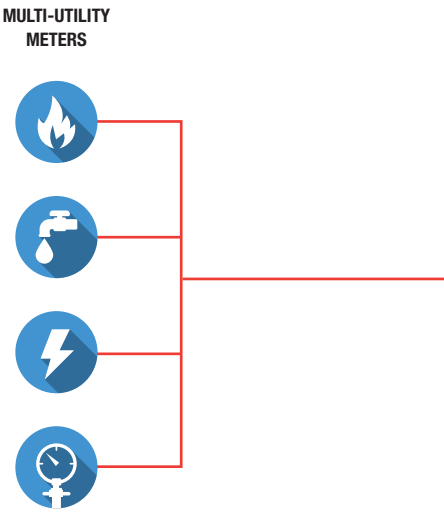
PERMANENT MEASUREMENT SYSTEM

KNOW ALL THE DETAILS: WHERE, WHEN, HOW, HOW MUCH?

SUPERVISING, MANAGING AND EXCHANGING

Metering and measurement

A full range of energy meters and power monitors that comply with the most demanding standards to ensure optimum accuracy.



METERING STATION

MAP network analyzer

LVGS

ENERIUM 300
Power monitor

ENERIUM 50
Power monitor

ENERIUM 150
Power monitor

Secondary switchboard

MEMO P200
Power monitor

ELOG
Data logger

ULYS
Submeter

MEMO 4
Submeter

Power supply control cabinet

ULYS
Submeter

MEMO MD32
SINGLE-PHASE 32 A

Energy meters for single-phase networks.
Direct connection up to 32 A.

GENERAL SPECIFICATIONS

The **MEMO** range of meters is the economical solution for measuring electrical consumption on a 230 V single-phase network.
Equipped with a digital display, the **MEMO MD32** offers Class 1 accuracy, in total compliance with the IEC 62053-21 standard.

- Mounting on DIN rail with direct connection up to 32 A
- Sealable cover (phase and neutral terminals)
- Pulse output as standard

+

- 32 A rated current
- Class 1 as per IEC 62053-21
- Compact: only one DIN module
- Pulse output as standard
- Sealing system on the phase and neutral terminals

ZOOM

Economical solution

Sealable terminal covers

Pulse output as standard

ELECTRICAL SPECIFICATIONS

Current input	
Type	Single-phase
Rated current (Imax)	(5) 32 A
Inrush current (Ist)	20 mA
Voltage input	
Rated voltage (Un)	230 Vac (± 20 %)
Consumption	≤ 8 VA - ≤ 0.4W
Rated frequency	50 / 60 Hz
Pulse output	
Duration	80 ms
Weight	1,000 pulses / kWh
Maximum voltage	12-27 Vdc
Maximum current	27 mA
Accuracy	
Active energy	Class 1 as per IEC 62053-21
Metrological LED	
Weight	1,000 pulses / kWh

MECHANICAL SPECIFICATIONS

Ingress protection	IP 50 front panel
Power circuit connection	Screw terminal strip up to 12 mm² for flexible wires (10 mm² for rigid wires)
Pulse output connection	Screw terminal strip for 1.5 mm² wires
Sealing system	On the phase and neutral terminals
Mounting	On 35 mm DIN rail
Weight	80 g

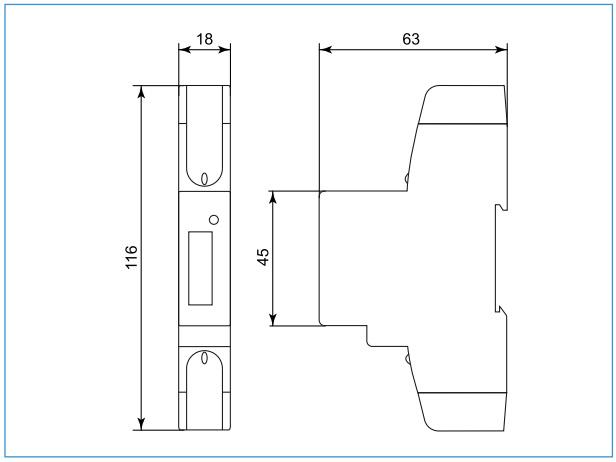
ENVIRONMENT

Operating temperature	-25 °C to +55 °C
Storage temperature	-25 °C to +70 °C
Relative humidity in operation	75 % max

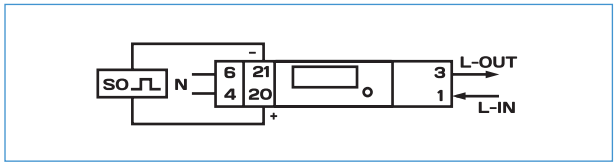
DISPLAY

Display	LCD, 5 + 2 digits
Total (kWh)	Indication of total consumption

DIMENSIONS (MM)

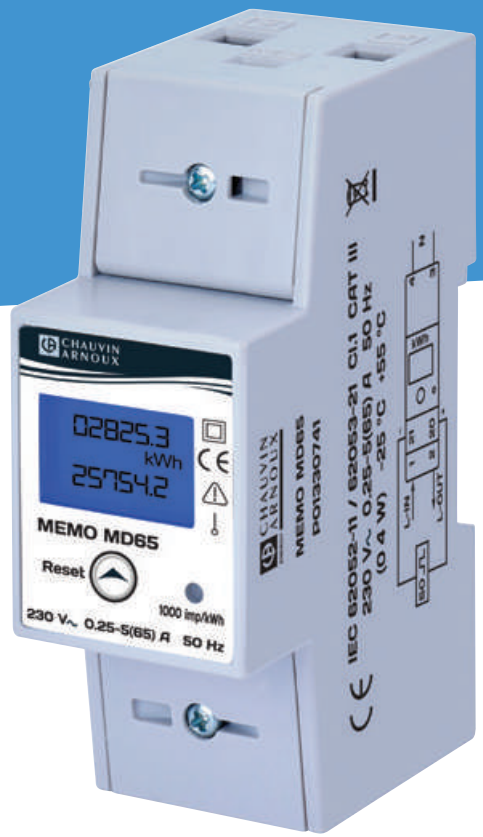


ELECTRICAL CONNECTIONS



TO ORDER

Model	Reference
MEMO MD32	P01330740



MEMO MD65
SINGLE-PHASE 65 A

Energy meter for single-phase networks.
Direct connection up to 65 A.

- Class 1 as per IEC 62053-21
- Compact: only 2 DIN modules
- Pulse output
- LCD screen

GENERAL SPECIFICATIONS

MEMO MD65 is a single-phase active energy meter specially designed for low-voltage applications.

Equipped with a 2-line digital display, the MEMO MD65 offers simultaneous display of the cumulated and partial index.

- Active energy measurement on single-phase networks
- 1 pulse output which can be connected to a data logger
- Direct current inputs up to 65 A
- Display of the total and partial active energy

ZOOM

Display of energy index on an LCD screen


Sealable terminal cover


Direct connection up to 65 A

ELECTRICAL SPECIFICATIONS

Current input	
Type	Single-phase
Rated current (Imax)	(5) 65 A
Inrush current (Ist)	20 mA
Voltage input	
Rated voltage (Un)	230 V (±30 %)
Consumption	≤ 8 VA
Frequency	50/60 Hz
Pulse output	
Duration	90 ms
Weight	1,000 pulses/kWh
Maximum voltage	12-27 Vdc
Maximum current	27 mA
Accuracy	
Active energy	Class 1 as per IEC 62053-21
Metrological LED	
Weight	1,000 pulses / kWh

MECHANICAL SPECIFICATIONS

Ingress protection	IP50
Power circuit connection	Screw terminal strip for 25 mm² wires
Pulse output connection	Screw terminal for 1.5 mm² wires
Mounting	On 35 mm DIN rail
Weight	160 g

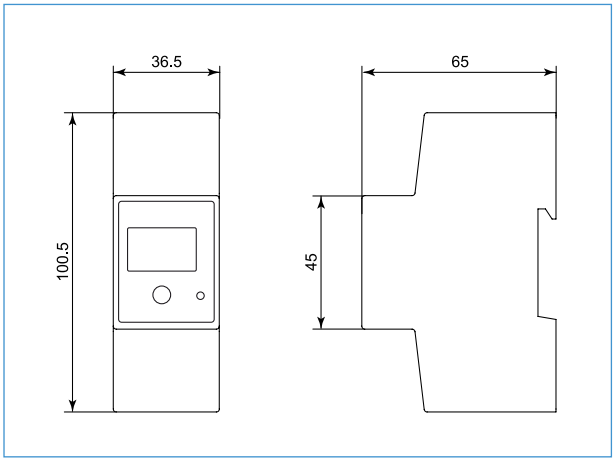
ENVIRONMENT

Operating temperature	-25 °C to +65 °C
Storage temperature	-25 °C to + 70°C
Relative humidity in operation	75 % max

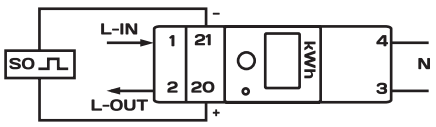
DISPLAY

Display	LCD
Number of digits	Total/partial Ea: 6+1

DIMENSIONS (MM)



ELECTRICAL CONNECTIONS



TO ORDER

Model	Reference
MEMO MD65	P01330741

MEMO TD80
THREE-PHASE 80 A

Energy meter for three-phase networks.
Direct connection up to 80 A.

- Class 1 as per IEC 62053-21
- 4 DIN modules
- Pulse output as standard

DESCRIPTION

MEMO TD80 is an energy meter for use on three-phase networks.

- 1 pulse output as standard
- Direct current inputs up to 80 A
- Multi-measurement: cumulated and partial index
- Sealable terminal covers

ZOOM

Display of the energy index on LCD screen

Sealable terminal covers

Direct connection up to 80 A

ELECTRICAL SPECIFICATIONS

Current input	
Type	Direct
Rated current (Imax)	(5) 80 A
Inrush current (Ist)	20 mA
Voltage input	
Rated voltage (Un)	3 x 230/400 Vac (±20%)
Consumption	≤ 8 VA - ≤ 0.4 W
Frequency	50/60 Hz
Pulse output	
Duration	30 ms
Weight	100 pulses/kWh
Maximum voltage	12-27 Vdc
Maximum current	27 mA
Accuracy	
Active energy	Class 1 as per IEC 62053-21
Metrological LED	
Weight	1,000 pulses / kWh 1,000 pulses / kVArh

MECHANICAL SPECIFICATIONS

Format	4 DIN modules
Mounting	On 35 mm DIN rail
Power circuit connection	Screw terminal strip for 35 mm² wires
Pulse output connection	Screw terminal strip for 1.5 mm² wires
Ingress protection	IP50 front panel

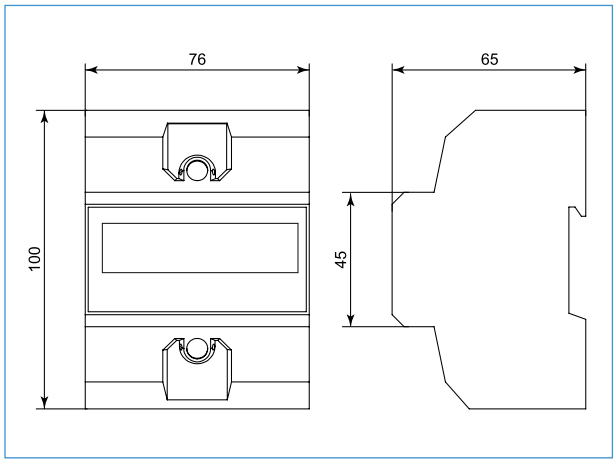
ENVIRONMENT

Operating temperature	- 25 °C to +65 °C
Storage temperature	- 25 °C to +75 °C
Relative humidity	Max. 85 % without condensation

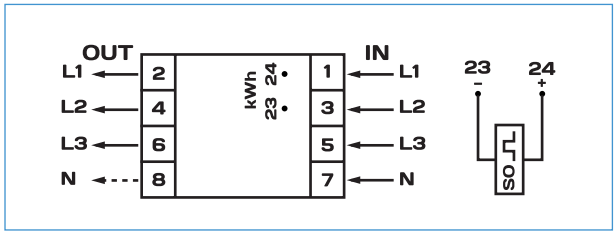
DISPLAY

Display	LCD
Number of digits	6+2

DIMENSIONS (MM)



ELECTRICAL CONNECTIONS



TO ORDER

Model	Reference
MEMO TD80	P01330745

ULYS MD45
SINGLE-PHASE 45 A

Energy meters for single-phase networks.
Direct connection up to 45 A.

GENERAL SPECIFICATIONS

- Display and parameters programmable using the touch-sensitive key on the front panel
- Power-off meter
- Tariff-change input on ULYS MD45-M
- 1 pulse output as standard (weight configurable)
- MID version for energy rebilling on private networks
- Multi-measurement:
  - Instantaneous quantities: V, I, P, Q, S, FPP and F
  - Instantaneous quantities and energy indices according to energy direction and tariff
- RS485 Modbus communication (ULYS MD45-M Modbus)
- Bidirectionality of the energy (consumed and generated)
- Reinitializable partial active energy index

When used with a remote meter-reading solution and energy management software, you can recover your energy consumption data remotely on your PC so that you can automatically generate consumption reports and allocate the consumption fairly.

+
- Built-in RS485 Modbus communication
- Reinitializable partial meter index
- Bidirectional metering
- Double-tariff metering
- Totally configurable on front panel or via optical head
- Customizable multi-measurement display
- MID Class B

ZOOM

Quick parameter modification using touch-sensitive button on front panel or optical head

Sealable terminal covers delivered as standard

Backlit LCD screen

ELECTRICAL SPECIFICATIONS

Current input	
Rated current (Imax)	45 A
Minimum current (Imin)	250 mA
Inrush current (Ist)	20 mA
Voltage input	
Rated voltage (Un)	230 Vac (-15% / +10%)
Consumption	≤ 2 W
Rated frequency	50 Hz (± 10%)
Tariff change input (ULYS MD45-M only)	
T1	0 V
T2	230 Vac
Metrological LED	
Weight	10,000 pulses / kWh
Pulse output	
Weight	Parameterizable (0.01 - 0,1 - 1 - 10 - 100 - 1,000 - 2,000 - 10,000 pulses / kWh)
Duration	≤ 5,625 W: 32 ms > 5,625 W: 11.2 ms
Accuracy	
Active energy	MID Class B as per EN 50470-1-3
Infrared output	
IR wavelength	900 - 1,000 nm
Protocol	IEC 62056-21:2002 (IEC 1107)
Communication (ULYS MD45-M Modbus only)	
Type of bus	RS485
Protocol	MODBUS RTU with 16-bit CRC
Transmission speed	1200, 2400, 4800, 9600 bauds/s (by default)
Addresses	0 - 247 (by default: last 2 digits of SN)
Maximum bus loads	60
Maximum distance	1,000 meters
Parameter settings	Using button on front panel and optical head

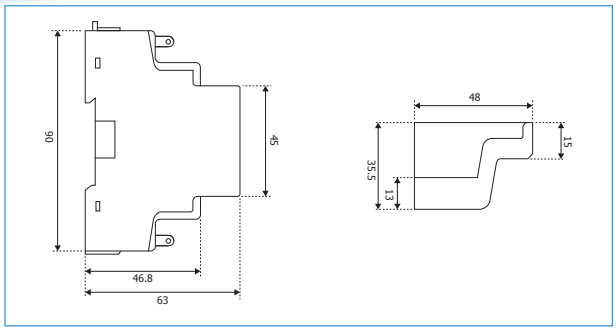
MECHANICAL SPECIFICATIONS

Ingress protection	IP 51 front panel
Power circuit connection	Max 10 mm²
Pulse output or communication connection	Max 1.5 mm²
Mounting	On 35 mm DIN rail
Weight	80 g

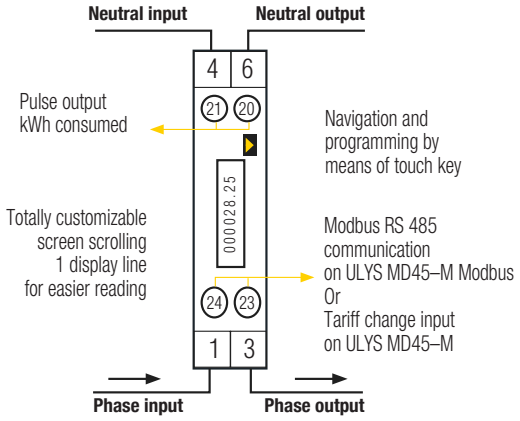
ENVIRONMENT

Operating temperature	-25 °C to +55 °C
Relative humidity in operation	≤ 75 %

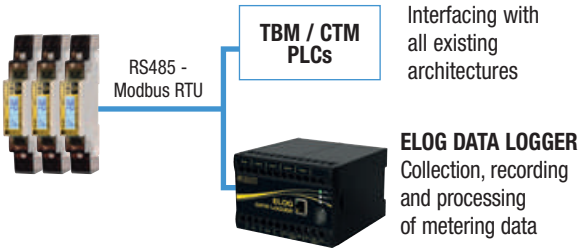
DIMENSIONS (MM)



ELECTRICAL CONNECTIONS



BLOCK DIAGRAM



TO ORDER

Model	Certification	Communication	Reference
ULYS MD45-M	MID	-	P01330754
ULYS MD45-M Modbus	MID	RS485 Modbus	P01330756

Accessories	Reference
USB optical head	P01330790

To simplify programming of the ULYS MD45 meters, an adapter is supplied with the optical head.

ULYS MD100
SINGLE-PHASE 100 A

Energy meter for single-phase networks.
Direct connection up to 100 A.

- MID Class B
- Built-in RS485 Modbus communication
- Reinitializable partial active energy index
- Bidirectional metering
- Double-tariff metering
- Entirely configurable on front panel or optical head
- Customizable multi-measurement display

DESCRIPTION

ULYS MD100 is an energy meter designed for use on single-phase networks.
It is the solution dedicated to applications for energy management or electricity rebilling on private networks (MID version).
It is particularly suitable for applications up to 100 A in buildings and shopping malls.

- 2 pulse outputs as standard (weight configurable)
- Direct current inputs up to 100 A
- MID version available for electricity rebilling on private networks
- Tariff-change input (ULYS MD100-M)
- RS485 Modbus communication (ULYS MD100-M Modbus)
- Multi-measurement:
  - Instantaneous quantities: V, I, P, Q, S, PF and F
  - Instantaneous quantities and energy index according to energy directionality and tariff
- Bidirectional energy (consumed and generated)
- Reinitializable partial active energy index

When used with a remùote data-retrieval solution and energy management software, your consumption data can be recovered remotely on your PC to automatically generate consumptioon reports and allocate the consumption fairly.

ZOOM

2 tariffs


Sealable terminal covers delivered as standard

Backlit LCD screen

ELECTRICAL SPECIFICATIONS

Current input	
Type	direct
Rated current (In)	100 A
Inrush current (Ist)	20 mA
Voltage input	
Rated voltage (Un)	230 Vac (-15% / +10%)
Consumption	≤ 2 W/Phase - ≤ 10 VA/Phase
Rated frequency	50 Hz ±10 %
Tariff change input (ULYS MD100-M only)	
T1	0 V
T2	230 Vac
Metrological LED	
Weight	10 000 pulses/kWh/kvarh
Pulse output	
Number	2 (kWh import / export)
Weight	10,000/2,000/1,000/100/10/1/0.1/0.01 pulses/kWh
Duration	1,000/100/10/1/0.1/0.01 pulses/kWh 31 ms 2,000 pulses/kWh ≤ 30 kW 31 ms 2,000 pulses/kWh > 30 kW 15 ms 10,000 pulses/kWh ≤ 6 kW 31 ms 10,000 pulses/kWh > 6 kW 15 ms 10,000 pulses/kWh >12 kW 5 ms
Accuracy	
Active energy	MID Class B as per EN 50470-1-3
Communication (ULYS MD100-M Modbus only)	
Type of bus	RS485
Protocol	MODBUS RTU with 16-bit CRC
Transmission speed	1200, 2400, 4800, 9600 bauds/s (by default)
Addresses	0 - 247 (by default: last 2 digits of SN)
Maximum bus loads	60
Maximum distance	1,000 meters
Parameter settings	Using button on front panel and optical head

MECHANICAL SPECIFICATIONS

Ingress protection	IP51 front panel
Format	2 DIN modules
Power circuit connection	Screw terminal strip for 35 mm² wires
Pulse output or communication connection	Max 1.5 mm²
Mounting	On 35 mm DIN rail
Weight	160 g

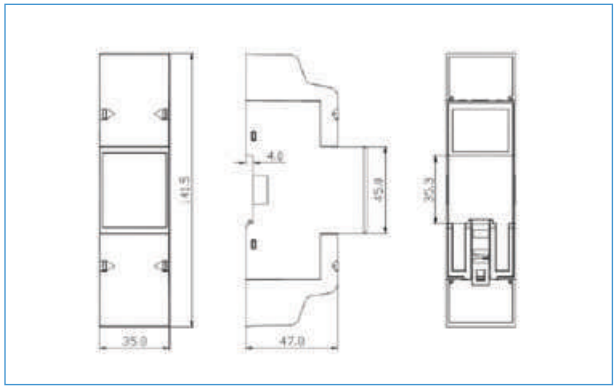
ENVIRONMENT

Operating temperature	- 25 °C to +55 °C
Relative humidity in operation	≤75%

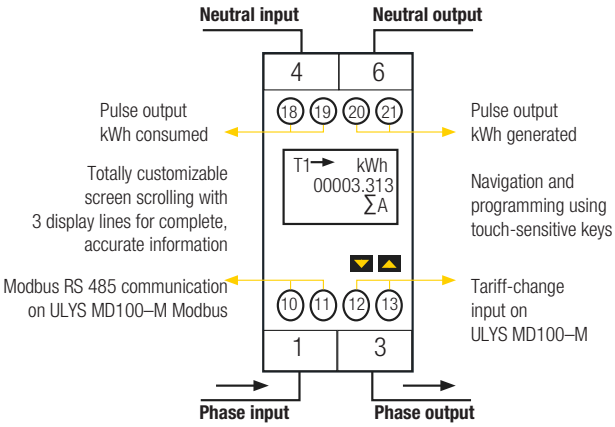
TO ORDER

Model	Certification	Reference
ULYS MD100-M	MID	P01330760
ULYS MD100-M Modbus	MID	P01330761

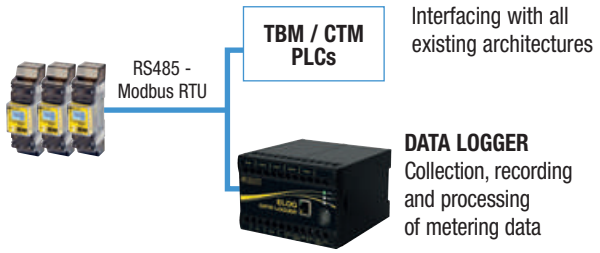
DIMENSIONS (MM)



ELECTRICAL CONNECTIONS



BLOCK DIAGRAM



ULYS TDA80-M
THREE-PHASE 80 A

Energy meter for three-phase networks.
Direct connection up to 80 A.
This MID meter is dedicated to energy management or electricity rebilling applications on private networks.

- MID Class B
- 4 quadrants
- Multi-measurement
- Compact: only 4 DIN modules

DESCRIPTION

ULYS TDA80 is an energy meter designed for use on three-phase networks.
It is the dedicated solution for energy management and electricity rebilling applications on private networks (MID version).
It is particularly suitable for 80 A applications in buildings and shopping malls.

- 2 pulse outputs as standard, assignable to Ea, Eq or Es
- Direct current inputs up to 80 A
- Connection error indicator
- MID version available for electricity rebilling
- Tariff-change input as standard (double tariff)
- Multi-measurement: instantaneous P, Q and S, cumulated and partial energy index (V, U, I, PF, F via ULYSCOM)
- Sealable terminal covers (delivered with seals for the MID version)

ZOOM


2 tariffs


Measurement in all 4 quadrants with energy balance indicator


2 pulse outputs as standard, assignable to Ea, Eq or Es

ELECTRICAL SPECIFICATIONS

Current input	
Type	direct
Rated current (In)	(5) 80 A
Inrush current (Ist)	20 mA
Voltage input	
Rated voltage (Un)	3 x 230/400 Vac… 3 x 240/415 Vac (+/- 20 %)
Consumption	7.5 VA max. per phase
Measurement range	0 to 9 999 999.9 kWh
Frequency	50/60 Hz
Tariff change input	
T1	No voltage
T2	80 Vac/Vdc to 276 Vac/Vdc max.
Pulse output	
Type	Optically isolated, 250 Vac/dc
Number	2 configurable as Ea, Eq, or Es
Weight	100 pulses/kWh, /kVArh, /kVAh
Duration	50 ms
Max. current	100 mA
Accuracy	
Active energy	MID Class B as per EN 50470-1-3
Reactive energy	Class 2 as per IEC 62053-23
Metrological LED	
Weight	1,000 pulses/kWh

MECHANICAL SPECIFICATIONS

Format	4 DIN modules
Mounting	On 35 mm DIN rail
Connection	Screw terminal strip for 35 mm² wires
Ingress protection	IP51 front panel

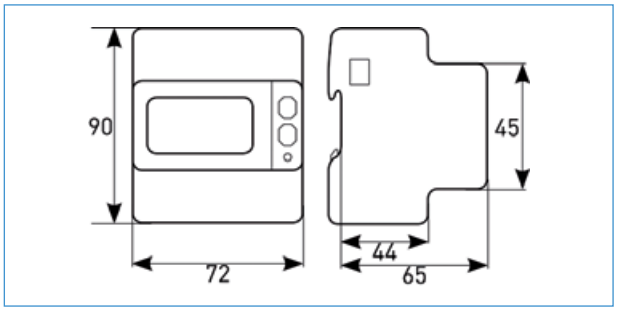
ENVIRONMENT

Operating temperature	- 25 °C to +55 °C
Storage temperature	- 25 °C to +75 °C
Relative humidity	Max. 80 % without condensation

TO ORDER

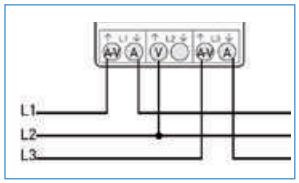
Model	Certification	Reference
ULYS TDA80-M	MID	P01331018

DIMENSIONS (MM)

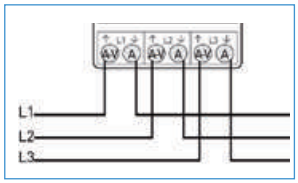


ELECTRICAL CONNECTIONS

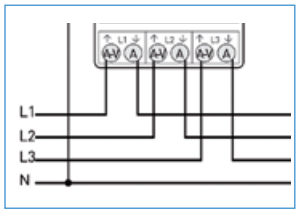
3 wires, 2 currents



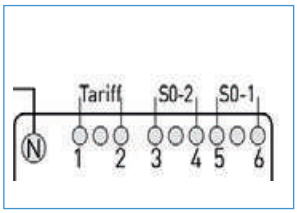
3 wires, 3 currents



4 wires, 3 currents



Tariff inputs & pulse outputs



ULYS TTA-M

THREE-PHASE WITH CT CONNECTION

Energy meter for three-phase networks.
CT connection.

- MID Class B
- Multi-measurement
- Compact: only 4 DIN modules

DESCRIPTION

ULYS TTA is an energy meter for use in three-phase networks. It is the dedicated solution for energy management applications or electricity rebilling on private networks (MID version).

- 2 pulse outputs as standard features assignable to Ea, Eq or Es
- 1 or 5 A isolated inputs
- Indication of connection errors
- MID version available for rebilling
- Tariff-change input as a standard feature (2 tariffs)
- Multiple measurements: instantaneous P, Q and S, cumulative and partial energy index (V, U, I, PF, F via ULYSCOM)
- Sealable covers (delivered with cable for MID version)

ZOOM

2 tariffs

Metering on all
4 quadrants with energy
balance indicator

2 pulse outputs
as standard assignable
to Ea, Eq or Es

ELECTRICAL SPECIFICATIONS

Current input	
Type	On CT, 1 or 5 A
Rated current (In)	5 A
Inrush current (Ist)	20 mA
Voltage input	
Rated voltage (Un)	3 x 230/400 Vac… 3 x 240/415 Vac (+/- 20 %)
Consumption	7.5 VA max. per phase
Measurement range	0 to 9 999 999.9 kWh
Frequency	50/60 Hz
Tariff change input	
T1	No voltage
T2	80 Vac/Vdc to 276 Vac/Vdc max.
Pulse output	
Type	Optically isolated, 250 Vac/dc
Number	2 configurable as Ea, Eq, or Es
Weight	Automatic adjustment according to CT ratio: from 1,000 pulses/kWh/kVArh to 0.1 pulses/kWh/kVAr/h
Duration	50 ms
Max. current	100 mA
Accuracy	
Active energy	MID Class B as per EN 50470-1-3
Reactive energy	Class 2 as per IEC 62053-23
Metrological LED	
Weight	1,000 pulses/kWh

MECHANICAL SPECIFICATIONS

Format	4 DIN modules
Mounting	On 35 mm DIN rail
Connection	Screw terminal strip for 6 mm² wires
Ingress protection	IP51 front panel

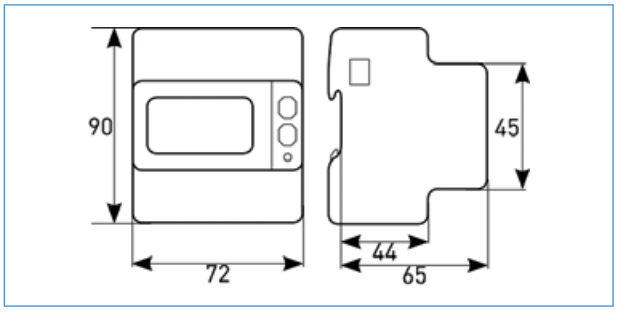
ENVIRONMENT

Operating temperature	- 25 °C to +55 °C
Storage temperature	- 25 °C to +75 °C
Relative humidity	Max. 80 % without condensation

TO ORDER

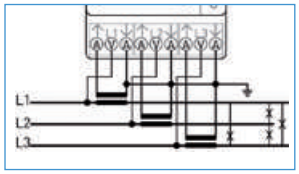
Model	Certification	Reference
ULYS TTA-M	MID	P01331019

DIMENSIONS (MM)

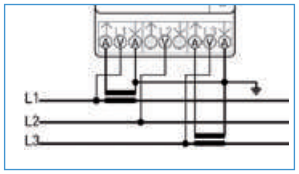


ELECTRICAL CONNECTIONS

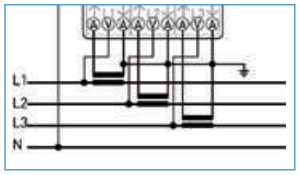
3 wires - 3 CTs



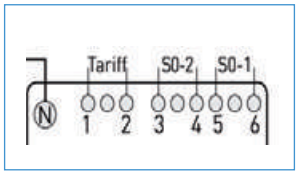
3 wires - 2 CTs



4 wires - 3 CTs



Tariff inputs & pulse outputs



ULYS TD80

THREE-PHASE 80 A

WITH INTEGRATED COMMUNICATION

Energy meter for three-phase networks.
Direct connection up to 80 A.

- Integrated communication depending on model: Ethernet, M-Bus, Modbus
- IEC class 1 / MID class B
- 4 quadrants
- Multiple measurements
- Compact: only 4 DIN modules

DESCRIPTION

The **ULYS TD80** is an energy meter designed for use on three-phase networks.
It is an ideal solution for energy management applications or for electricity rebilling on private networks (MID version).
It is particularly suitable for 80 A applications in buildings, shopping malls, etc.

- Integrated communication depending on model: Ethernet, M-bus or Modbus
- Small size (4 modules)
- Display customizable by means of predefined user profiles
- 1 pulse output as standard, configurable as P, Q or S
- Direct inputs for current up to 80 A
- Connection error indicator
- MID version available for electricity rebilling
- Tariff-change input as standard (double tariff) except on Ethernet model
- Direct display of multiple measurements: instantaneous P, Q and S, total and partial energy indices, V, U, I, PF, F
- Lead-sealable terminal covers (delivered with cable for MID version)

ZOOM

Built-in communication depending on model:
- Ethernet
- M-Bus
- Modbus

Customizable display of up to 15 electrical quantities

Measurement in all 4 quadrants with energy balance indicator

1 pulse output as standard, configurable as P, Q or S

ELECTRICAL SPECIFICATIONS

Current input	
Type	Direct
Rated current (In)	(5) 80 A
Istart current (Ist)	20 mA
Voltage input	
Rated voltage (Un)	3 x 230/400 Vac… 3 x 240/415 Vac (+/- 20 %)
Consumption	7.5 VA max. per phase
Frequency	50/60 Hz
Tariff change input (M-bus and Modbus models)	
T1	No voltage
T2	from 80 Vac/Vdc to 276 Vac/Vdc max.
Pulse output	
Type	Optically isolated 250 Vac/dc
Number	1 assignable to Ea, Eq, or Es
Weight	100 pulses/kWh, /kVArh, /kVAh
Accuracy	
Active energy	MID class B according EN 50470-1-3
Reactive energy	Class 2 according to IEC 62053-23
Metrological LED	
Weight	1,000 pulses/kWh
Communication	
Ethernet	IEEE 802.3 standard Modbus TCP, HTTP, NTP and DHCP protocols Integrated web pages
Modbus	EIA RS485 standard RS485 bus Modbus RTU / ASCII protocol Speed: 300… 57,600 bauds
M-bus	IEC 13757-1-2-3 standard M-bus protocol Speed: 300… 9,600 bauds

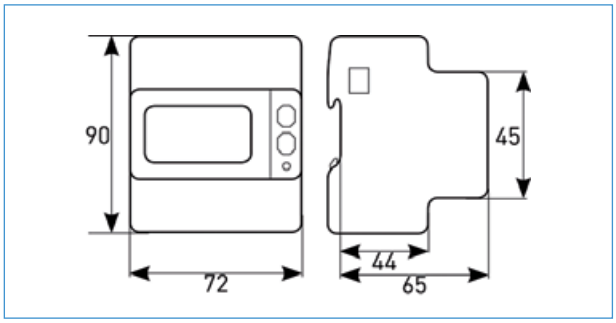
MECHANICAL SPECIFICATIONS

Format	4 DIN modules
Mounting	On 35 mm DIN rail
Connection	Screw-on terminal strip for 35 mm² wire
Protection	IP51 front panel

ENVIRONMENT

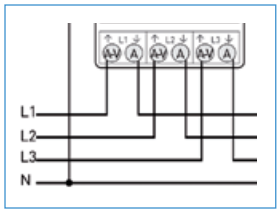
Operating temperature	- 25 °C to +55 °C
Storage temperature	- 25 °C to +75 °C
Relative humidity	Max 80% without condensation

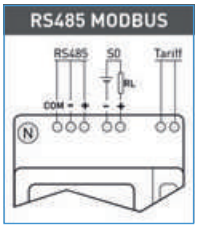
DIMENSIONS (MM)

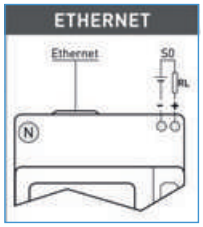


ELECTRICAL CONNECTIONS

4 wires, 3 currents
All models







TO ORDER

Model	Certification	Reference
ULYS TD80-M Modbus	MID	P01331036
ULYS TD80-M Ethernet	MID	P01331040

ULYS TT

THREE-PHASE CT CONNECTION

WITH INTEGRATED COMMUNICATION

Energy meter for three-phase networks.
Connection on CT.

- Integrated communication depending on model: Ethernet, M-Bus, Modbus
- IEC class 1 / MID class B
- 4 quadrants
- Multiple measurements
- Compact: only 4 DIN modules

DESCRIPTION

The **ULYS TT** is an energy meter designed for use on three-phase networks.
It is an ideal solution for energy management applications or for electricity rebilling on private networks (MID version).

- Integrated communication depending on model: Ethernet, M-bus or Modbus
- Small size (4 modules)
- Display customizable by means of predefined user profiles
- 1 pulse output as standard, assignable to Ea, Eq or Es
- 1 or 5 A isolated inputs
- Connection error indicator
- MID version available for electricity rebilling
- Tariff-change input as standard (double tariff) except on Ethernet model
- Direct display of multiple measurements: instantaneous P, Q and S, total and partial energy indices, V, U, I, PF, F
- Lead-sealable terminal covers (delivered with cable for MID version)

ZOOM

Built-in communication depending on model:
- Ethernet
- M-Bus
- Modbus

Customizable display of up to 15 electrical quantities

Measurement in all 4 quadrants with energy balance indicator

1 pulse output as standard, configurable as P, Q or S

ELECTRICAL SPECIFICATIONS

Current input	
Type	On CT 1 or 5 A
Rated current (In)	5 A
Istart current (Ist)	20 mA
Voltage input	
Rated voltage (Un)	3 x 230/400 Vac… 3 x 240/415 Vac (+/- 20 %)
Consumption	7.5 VA max. per phase
Frequency	50/60 Hz
Tariff change input (M-bus and Modbus models)	
T1	No voltage
T2	from 80 Vac/Vdc to 276 Vac/Vdc max.
Pulse output	
Type	Optically isolated 250 Vac/dc
Number	1 assignable to Ea, Eq, or Es
Weight	Automatic adjustment according to CT ratio: from 1,000 pulses / kWh / kVArh to 0.1 pulse / kWh / kVArh
Accuracy	
Active energy	MID class B according EN 50470-1-3
Reactive energy	Class 2 according to IEC 62053-23
Metrological LED	
Weight	1,000 pulses/kWh
Communication	
Ethernet	IEEE 802.3 standard Modbus TCP, HTTP, NTP and DHCP protocols Integrated web pages
Modbus	EIA RS485 standard RS485 bus Modbus RTU / ASCII protocol Speed: 300… 57,600 bauds
M-bus	IEC 13757-1-2-3 standard M-bus protocol Speed: 300… 9,600 bauds

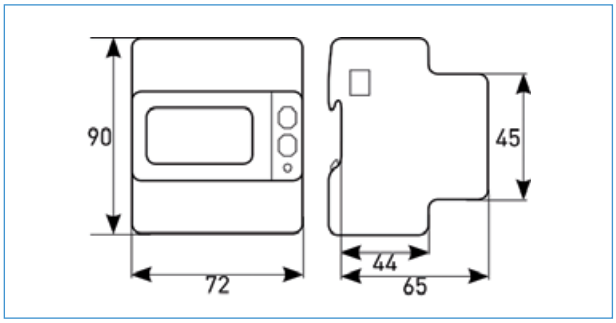
MECHANICAL SPECIFICATIONS

Format	4 DIN modules
Mounting	On 35 mm DIN rail
Connection	Screw-on terminal strip for 35 mm² wire
Protection	IP51 front panel

ENVIRONMENT

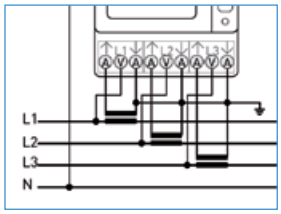
Operating temperature	- 25 °C to +55 °C
Storage temperature	- 25 °C to +75 °C
Relative humidity	Max 80% without condensation

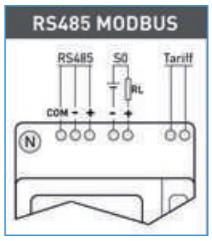
DIMENSIONS (MM)

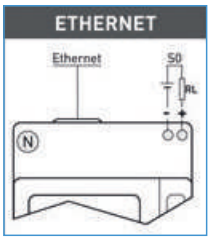


ELECTRICAL CONNECTIONS

4 wires, 3 currents - All models

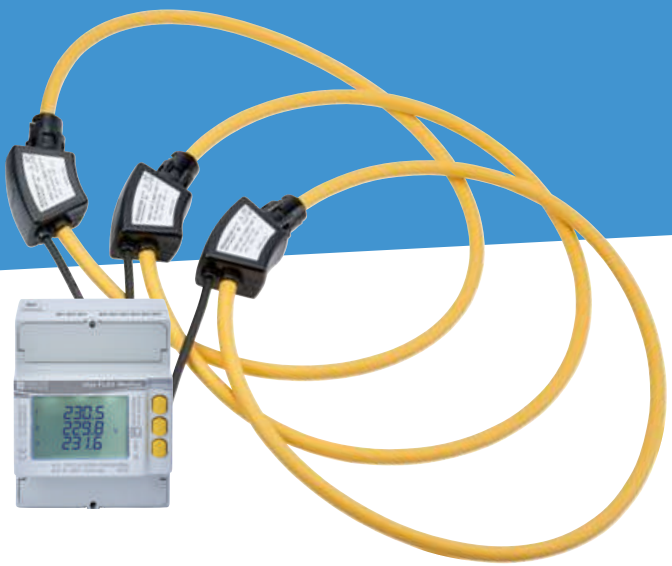






TO ORDER

Model	Certification	Reference
ULYS TT-M Modbus	MID	P01331037
ULYS TT-M Ethernet	MID	P01331041



ULYS FLEX
MODBUS

Metering solution on Rogowski coils.

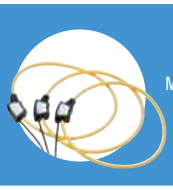
- Quick implementation
- Reduced installation costs
- Wide dynamic range for measurement (0.3 A to 20,000 A)
- RS485 Modbus RTU communication

DESCRIPTION

- Installation on busbars or conductors with large dimensions or cross-sections
- Possibility of inserting the flexible coils in confined spaces
- Mounting of the ULYS FLEX Modbus without cutting off the electrical feeder
- Accuracy class guaranteed across a large current measurement range (from 5 % to 100 % of full scale)

ZOOM

Built-in RS485 communication



Mounting without cutting off the electrical circuit

1 pulse output as standard, assignable to Ea, Eq or Es

ELECTRICAL SPECIFICATIONS

Auxiliary power supply	
Voltage range	85 ... 265 V_{AC}
Safety	300 V CAT III
Max. consumption	1,6 VA - 1W
Type-T fuse (for external mounting)	250 mA
Frequency	50/60 Hz
Voltage measurement	
Voltage range	3x10/17 ... 3x285/495 V_{AC} — 50/60 Hz
Safety	300 V CAT III
Min. voltage for FFT calculation	20/35 V_{AC} (multiplied by the VT ratio) with direct connection
Current measurement	
Maximum value	3 ratings (FSA) selectable: 500 A (700 A max), 4,000 A (5,600 A max) or 20,000 A (28,000 A max)
Inrush current (I_{ST})	0.3 A for FSA 500 A, 1 A for FSA 4,000 A, 10 A for FSA 20,000 A
Min. current for FFT calculation	70 A for FSA 500 A, 400 A for FSA 4,000 A, 1,500 A for FSA 20,000 A 2 % accuracy of harmonics ± 2 digits

Accuracy	
Voltage	± 0.2 % of reading in range from 10 % FS ... FS (FS = full-screen value)
Current	± 0.4 % lof reading from 5 % FS ... FS
Power	± 0.5 % of reading ± 0.1 % FS (PF=1)
Frequency	± 0.1 % of reading ± 1 digit in the range 45 ... 65 Hz
Active energy	Class 1 in compliance with IEC/EN 62053-21 (meter + coils)
Reactive energy	Class 2 in compliance with IEC/EN 62053-23 (meter + coils)
Screen & keyboard	
Display	Backlit LCD, 43 x 29 mm - 3 lines, 4 digits + symbols
Keyboard	3 keys + 1 protected button
Communication port	
Type	Optically isolated RS485
Protocols	MODBUS RTU/ASCII
Baud rate	300 ... 57,600 bps
Digital output (DO)	
Type	Passive optically-isolated polarized electronic output
Maximum values (compliant with IEC/EN 62053-31)	27 V_{DC} - 27 mA
Energy pulse length (for DO in Pulse mode)	50 ± 2 ms ON time
Maximum frequency	8 pulses per sec (8 Hz)
Maximum reaction time (for DO in Alarm mode)	1 s

MECHANICAL SPECIFICATIONS

Dimensions LxHxW	72 x 90 x 65 mm
Weight	436 g
Connection	Measurement terminal strip (A & V): 1.5 ... 6 mm² Terminal strips for digital output, power supply and RS485 port: 0.14 ... 2.5 mm²
Ingress protection	IP51 front panel - IP 20 terminal strips
Pollution degree	2

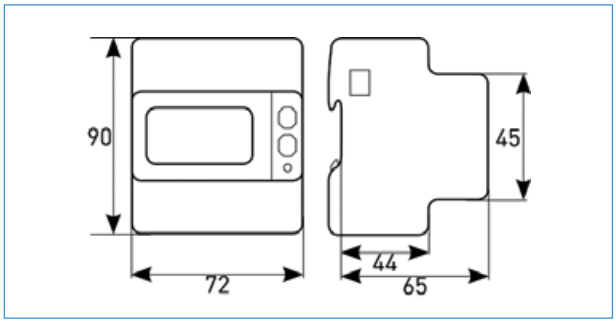
ENVIRONMENT

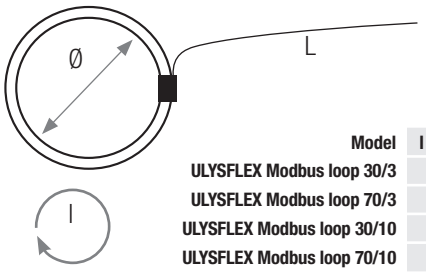
Operating temperature	- 25 °C to +55 °C
Storage temperature	25 °C to +75 °C
Relative humidity	Max. 80 % without condensation
Product operating altitude	< 2,000 m
Vibration or shock (sinusoidal amplitude)	50 Hz ± 0.075 mm

STANDARDS

Directives	2066/95/EC, 2004/108/EC
Safety	EN61010-1, EN 61010-2-030, EN 61010-2-032
Electromagnetic compatibility (EMC)	EN61326-1, EN 55011, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4 EN 61000-4-5 EN 61000-4-6, EN 61000-4-11, EN 61000-6-2

DIMENSIONS (MM)

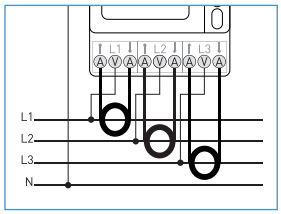




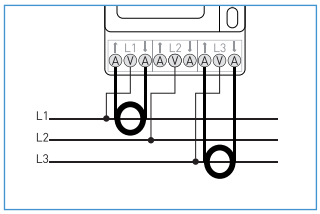
Model	l (cm)	Ø (cm)	L (m)
ULYSFLEX Modbus loop 30/3	30	10	3
ULYSFLEX Modbus loop 70/3	70	22	3
ULYSFLEX Modbus loop 30/10	30	10	10
ULYSFLEX Modbus loop 70/10	70	22	10

ELECTRICAL CONNECTIONS

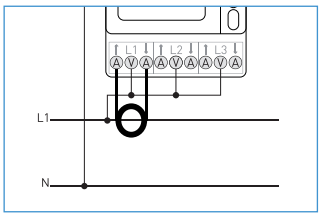
Three-phase 4 wires, 3 Rogowski coils



Three-phase 3 wires, 2 Rogowski coils



Single-phase, 1 Rogowski coil



TO ORDER	
Model	**Reference**
ULYSFLEX Modbus loop 30/3	P01331046
ULYSFLEX Modbus loop 70/3	P01331047
ULYSFLEX Modbus loop 30/10	P01331048
ULYSFLEX Modbus loop 70/10	P01331049

ULYS MCM
MULTI-CHANNEL METER

Multi-channel power monitor and and energy meter

DESCRIPTION

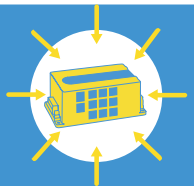
Ulys MCM is the innovative solution for centralizing measurements on multiple electrical feeders:

- Compact
- Compatible with all power ratings
- Quick connection
- Easy to integrate

The Ulys MCM is available in versions with 9 or 18 three-phase measurement channels.

- Compact: 18 meters in one!
- Quick to set up
- Wide range of sensors for any type of conductor and current
- Comprehensive measurement of all the electrical parameters
- Flexible communication

ZOOM


18 METERS IN ONE


COMPACT


COMPATIBLE WITH A LARGE NUMBER OF SENSORS

ACCESSORIES

CURRENT SENSORS

Clip-on current transformers (5 sizes available) and MiniFlex flexible sensors based on Rogowski technology.

ADAPTER FOR CURRENT SENSORS

Supplied directly when you purchase a pack of 3 current sensors.

SCREEN

Supplied directly when you purchase a pack of 3 current sensors

TECHNICAL SPECIFICATIONS

Feature		Specifications
Système électrique		1P2F, 3P3F, 3P4F
Nominal specifications of inputs	Voltage (Umin – Umax)	43-690 V~ between phases
	Voltage (Vmin – Vmax)	25-400 V~ between phases and neutral
	Measurement category	600 V Cat III
	Frequency	45-65 Hz
	Current	0-333 mV (max 0.5 V p-p) I Impedance: 20 kΩ
	On-off (DI)	1 point, 80-250 V~, external power supply
	NTC temperature	25°C, 10 kΩ, (β(25/85)=3 970°k)
Auxiliary power supply	Voltage	100-240 V~
	Frequency	50-60 Hz
	Max. voltage (L-N)	Short term: 1,440 V~ Long term: 490 V~
	onsumption	0,05-0,08 A
	Overvoltage category	300 V Cat II
Communication		Modbus RS485
		Modbus TCP
		RS232
On-off output contact (DO)		1 NO (normally open) SPST (single pole, single throw)

SOFTWARE

Ulys MCM UTILITY is the software for managing the ULYS MCM. It can be used for:

- Electrical configuration of the Ulys MCM (voltages and currents of each electrical feeder, etc.)
- Configuration of the Ulys MCM's communication (address, type of communication, etc.) and diagnostics
- Storage of the configuration file to import/ export them from one product to the other
- Real-time display of the general quantities and electrical values across all the channels

Ulys MCM UTILITY can be downloaded directly from our website.

MEASUREMENT PERFORMANCE SPECIFICATIONS

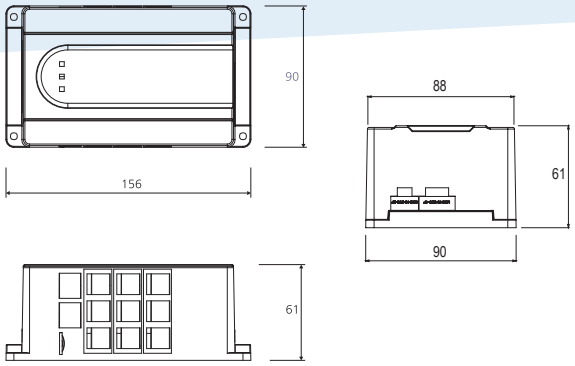
Quantity	Standard	ULYS MCM	ULYS MCM and MF300/MF300
Active power (P) measurements	IEC 61557-12: 2018	0.5	1
Active energy (Ea)	IEC 61557-12: 2018	0.5	1
	IEC 62053-21: 2003		
	IEC 62053-22: 2003		
Reactive power (Q) measurements	IEC 61557-12: 2018	1	2
Reactive energy (Er)	IEC 61557-12: 2018	2	2
	IEC 62053-23: 2003		
RMS line current (I) measurements	IEC 61557-12: 2018	0.2	0.5
RMS voltage measurements (U/V)	IEC 61557-12: 2018	0.1	0.1

ELECTRICAL QUANTITIES MEASURED

Quantity	Unit	Range
Phase-to-neutral voltage	V	0.00 - 9,999,999.99
Phase-to-phase voltage	V	0.00 - 9,999,999.99
Current	A	0.00 - 9,999,999.99
Active power	W	±0 - 999,999,999
Reactive power	Var	±0 - 999,999,999
Apparent power	VA	0 - 999,999,999
Frequency	Hz	45.00 - 65.00
Power factor	%	± 100.00
NTC temperature	°C	-20.0 - 100.00
Voltage unbalance	%	0.0 - 100.00
Current unbalance	%	0.0 - 100.00
Phase shift angle	°	0.0 - 360.00
Total Harmonic Distortion*	%	0.0 - 100.00
Active energy	KWh	0.0 - 9,999,999.9
Reactive energy	KVarh	0.0 - 9,999,999.9
Apparent energy	KVAh	0.0 - 9,999,999.9

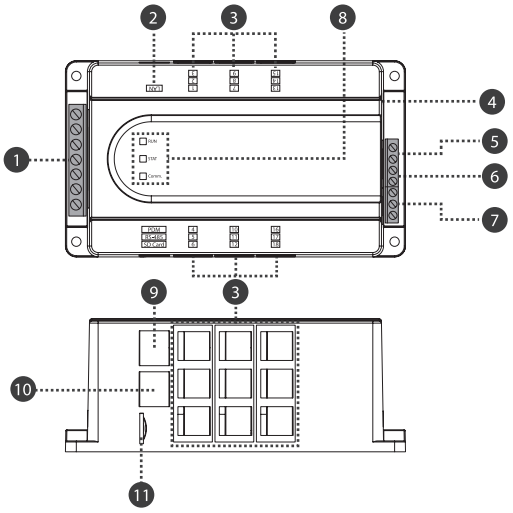
*Power equivalent: please refer to user's guide

INSTALLATION CONDITIONS



Description	Condition
Temperature	-10°C to +55°C (nominal operating range)
	-25°C to +70°C (storage range)
Relative humidity	5-80 % RH without condensation
Altitude	≤ 2,000 m
Degree of pollution	2
Location	Indoors

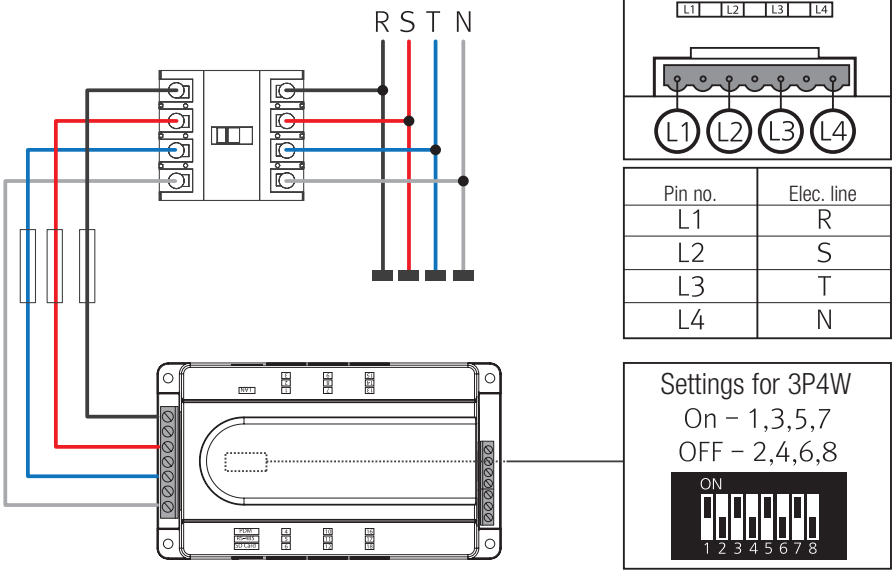
CONNECTION



N°	Designation	Description
1	Input voltage	Input voltage terminal for the measurements
2	Ethernet port	Communication with master (Modbus slave) Protocol: Modbus TCP/IP Speed: 10/100 Mbit/s
3	CT 1 to 18 port	RJ12 connectors for connection to the current sensor
4	Temperature sensor	NTC temperature sensor: NTC temperature measurement at the level of the port
5	Output	Borne de sortie TOR Spécifications nominales : 250 V~/5 A, 30 VCC/5A résistive
6	On-off input	Borne d'entrée TOR Spécifications nominales : tension d'entrée de verrouillage de 80-250 V~ requise
7	Auxiliary power supply	Fourniture de l'alimentation auxiliaire de l'ULYS MCM
8	Status LED	RUN: normal operation STAT: normal metering Comm: normal communication (flashing LED in normal status)
9	RS232 port	Communication with the PC or ULYS MCM D remote display
10	RS485 port	RS485 port for connecting the PC or an external PLC
11	SD card slot	Do not disconnect the card: the system makes use of it

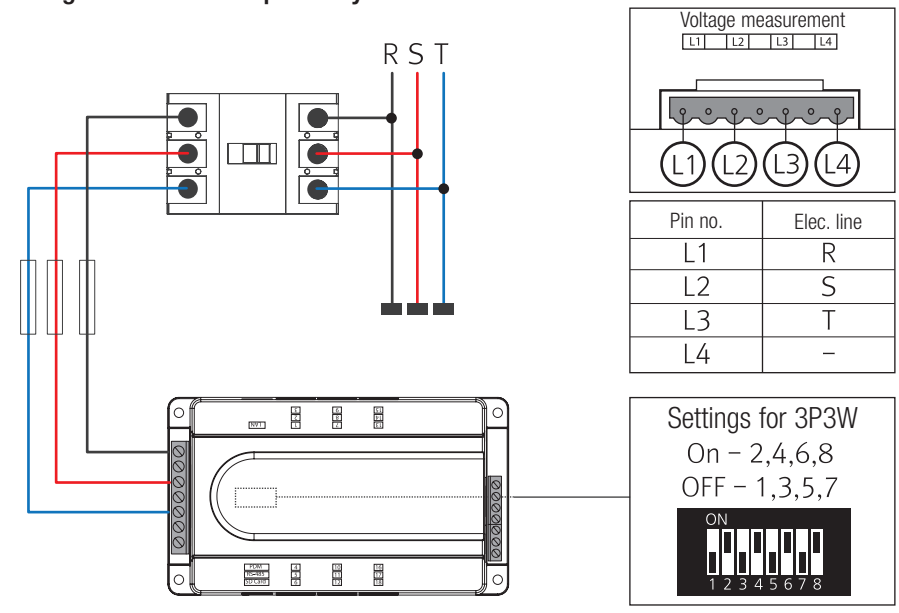
CONNECTION OF THE VOLTAGE MEASUREMENT INPUTS

Wiring of 4-wire three-phase system



Pin no.	Elec. line
L1	R
L2	S
L3	T
L4	N

Wiring of 3-wire three-phase system



Pin no.	Elec. line
L1	R
L2	S
L3	T
L4	–

TO ORDER

P01331062	ULYS-MCM9
P01331064	ULYS-MCM18

ACCESSORIES

CURRENT SENSORS

OUR SENSORS ARE DELIVERED IN PACKS OF 3 DIRECTLY CONNECTED TO THE CONNECTION ADAPTER (CODE P01379643)

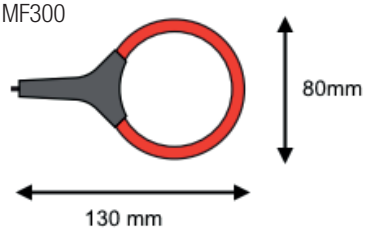
MF300 and MF3000 openable flexible current sensors (Rogowski coils)

GENERAL SPECIFICATIONS

Measurement range	MF300: 2.4 A to 600 A MF3000: 2.4 A to 3,000 A
Output	39.1 µV/A
Accuracy (current measurement)	Class 0.5 as per IEC 61557-12 (complete ULYS MCM measurement line and coils)
Output connections	HY-Y type

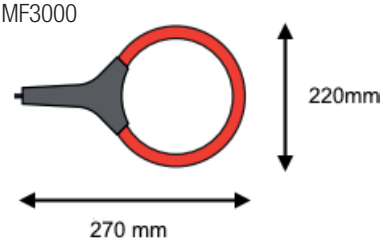
MECHANICAL SPECIFICATIONS

MF300



Thickness: 12 mm

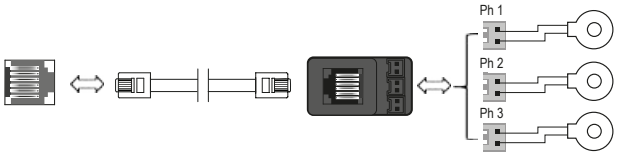
MF3000



Thickness: 12 mm

Clamping diameter	MF300: length = 250 mm; Ø = 70 mm MF3000: length = 350 mm; Ø = 200 mm
Length of linking cable (between the output connection and the coil)	1.5 meter
Protection provided by the enclosures	IP50 as per IEC 60529
Protection against mechanical impacts	IK04
Weight	MF300: 60 g approx. MF3000: 90 g approx.

TC CLIP sensors : TCC V 105, TCC V 161, TCC V 242, TCC V 364, TCC V 366

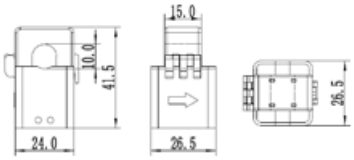


GENERAL SPECIFICATIONS

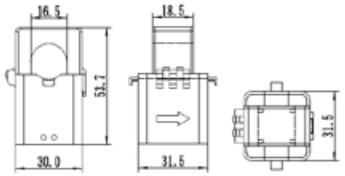
Nominal current (In)	TCC V 105: 5 A TCC V 1050: 50 A TCC V 161: 100 A TCC V 242: 250 A TCC V 364: 400 A TCC V 366: 600 A
Clamping diameter	TCC V 105: 10 mm TCC V 1050: 10 mm TCC V 161: 16 mm TCC V 242: 24 mm TCC V 364: 36 mm TCC V 366: 36 mm
Frequency	50-60 Hz
Output	333 mV
Accuracy (current measurement)	Class 0.5 from 100 to 120 % of In as per IEC 61869-2 Class 1 from 20 to 120 % of In
Output connections	HY-Y type
Length of connecting cable (between output connections and the loop)	1 meter

MECHANICAL SPECIFICATIONS

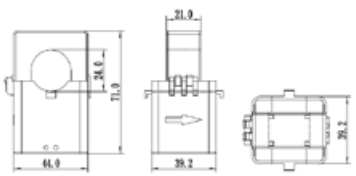
TCC V 105/1050



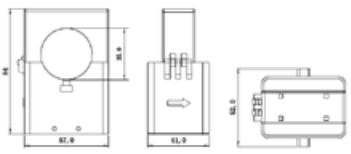
TCC V 161



TCC V 242

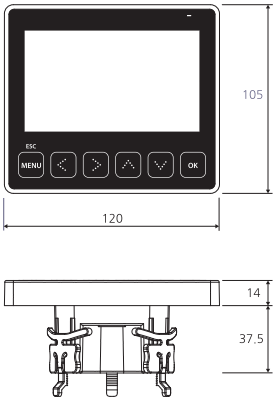


TCC V 364 and TCC V 366



ULYS MCM D REMOTE DISPLAY UNIT

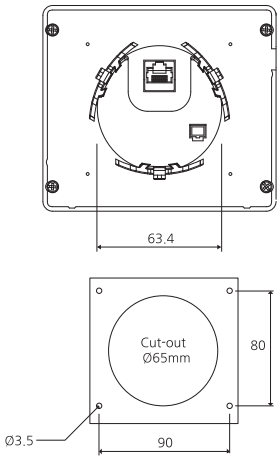
MECHANICAL SPECIFICATIONS



GENERAL SPECIFICATIONS

Feature		Specifications
Power supply		5 Vdc (self-powered by the ULYS MCM)
Electrical consumption		1.2 W
Dimensions (mm)		120 (L) x 105 (H) x 50 (P)
Weight		196 g
Mounting		Mounting on electrical cabinet / portable use
Operating conditions		Operating temperature: -10°C to +55°C Storage temperature: -25°C to +70°C Humidity range: 5 to 80 % without condensation Altitude: ≤ 2,000 m
Screen		4.3 inch LCD TFT screen (480 (W) x 272 (H) mm
Touche	ESC/MENU	Back to previous menu or cancel / Access parameters menu
	LEFT	Move left
	RIGHT	Move right
	UP	Move up
	DOWN	Move down
	OK	Modify the selection or display mode of the channel

CUT-OUTS



TO ORDER

WHICH SENSORS DO YOU WANT?

(may be different for each feeder, in kits of 3)		Ratio	Diameter
P01379616	PACK 3 TCC V 105	5A / 333mV	10mm
P01379626	PACK 3 TCC V 1050	50 A / 333mV	10mm
P01379618	PACK 3 TCC V 161	100A / 333mV	16mm
P01379620	PACK 3 TCC V 242	250A / 333mV	24mm
P01379622	PACK 3 TCC V 364	400A / 333mV	36mm
P01379624	PACK 3 TCC V 366	600A / 333mV	36mm
P01379631	PACK 3 MF300	600A / 39.1µV	70mm
P01379633	PACK 3 MF3000	3000A / 39.1µV	200mm

A pack contains 3 TCCLIPs or 3 Rogowski coils with the adapter for connection of the RJ12M-RJ12M extension (3 or 9 meters).

DO YOU WANT TO EQUIP YOUR ULYS MCM WITH A DISPLAY?

P01331065	ULYS MCM D	DISPLAY UNIT
P01379640	RJ45M-RJ45M M	Linking cable*

*Cable essential for connection of the display

WHAT WILL THE DISTANCE BE BETWEEN YOUR ULYS MCM AND YOUR SENSORS?

P01379641	RJ12M-RJ12M M	⩽ 3 meters
P01379642	RJ12M-RJ12M L	⩽ 9 meters

ALTYS
TARIFF METER

4-quadrant tariff meter for MV customers.

- MID class C
- Measurement on all 4 quadrants
- DLMS COSEM protocol
- Local upgrading of the application software
- 2 tariff frameworks
- Dynamic pricing
- Customer communication and customer information (CIS) outputs
- Calculation and storage of faults (dips, outages and voltage surges)
- Load and voltage curves

DESCRIPTION

The electronic **ALTYS** meter is intended for installation on consumer or producer sites connected to the MV electrical network.
The ALTYS meter should be viewed in the context of deregulation of the electricity market which led to the end of regulated pricing in France on 31/12/2015. It has been designed to handle tariff offers proposed by any electricity supplier.
The **ALTYS** meter offers the following main functions:

- Measurement of the energy values in both transit directions
- Management of two tariff frameworks independently: one Distributor framework and one Supplier framework
- Management of dynamic tariffs for each of the two tariff frameworks
- Storage of the load curves of the active and reactive energy consumed and produced, as well as the voltage supervision curve
- Simultaneous communication access to the distribution network manager and the customer

ZOOM

Customer communication access

High-speed optical interface

dlms Standardized protocol

GENERAL SPECIFICATIONS

Metrological functions

- Index of consumed and produced energy values by tariff item
- Calculation of the power and energy overrun values in relation to the contractual power values
- Calculation of the average power values (5 or 10 min interval)
- Calculation of the operating times in each tariff period, for consumption and production
- Integration of Joule and Core losses
- Presentation of the data on the display

Tariff functions

- 2 tariff frameworks (Distributor and Supplier)
- 8 tariff items definable per framework
- Management of dynamic pricing by external contact or by programming

Qualimetry functions

- Calculation of the types of faults (voltage dip, outage or surge) according to their amplitude and the contractual thresholds programmed
- Storage of the fault characteristics (start date, end date, duration)

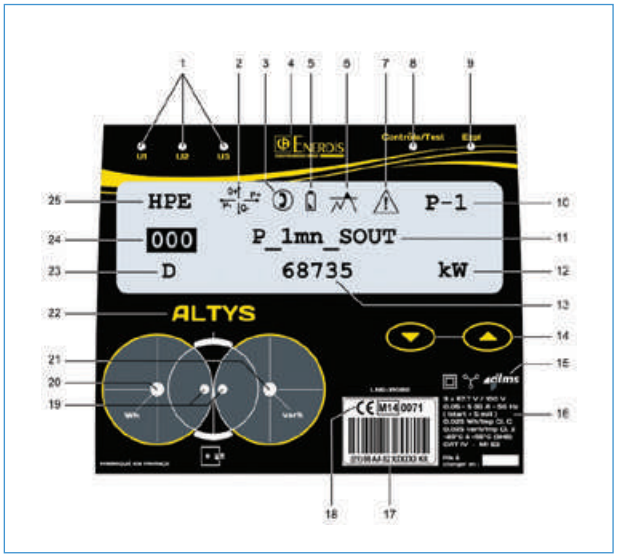
Interfaces

- DLMS Cosem operator communication
- Tariff change input
- Pulse outputs for active and reactive energy: CM, P+, P-, Q+, Q-
- Time pulse output: TP1- TP2
- DLMS Cosem customer communication
- Remote customer information (CIS)
- High-speed optical interface for programming, data retrieval and local upgrading of the meter's application software

LED indicators

- Voltage presence and energy flow direction LEDs per phase
- Control mode / test mode LED
- Fault LED
- Metrological LED for active energy
- Metrological LED for reactive energy

Display and LEDs



1 Voltage Presence LED - Fixed: Voltage present; Flashing: consumption
2 Current flow direction - Real flow, without correction
3 Communication pictogram - Fixed: in progress; Flashing: establishing
4 Manufacturer (Chauvin Arnoux Energy)
5 Low Battery pictogram - Please refer to the corresponding chapter
6 Overrun pictogram
7 No Tariff Application pictogram
If this pictogram lights up, contact your correspondent
8 Control Mode / Test Mode LED
9 Expl LED - LED reserved for the Operator
10 Data item period
11 Data item label
12 Data item unit
13 Data item value
14 Navigation buttons - Used to navigate among the data on the meter
15 Legal markings & Certification
16 Operating range
17 Serial number
18 CE & MID marking
19 Access to 62056-21 optical head
20 Active Energy metrological LED
In Wh, on the secondary, without taking the losses into account
21 Reactive Energy metrological LED
In varh, on the secondary, without taking the losses into account
22 Meter name
23 Framework to which the data item belongs
24 Number of data item
25 Current supplier tariff item

ELECTRICAL SPECIFICATIONS

Accuracy class	
Active energy	MID class C as per EN 50470-1-3
Reactive energy	Class 2 as per IEC 62053-23
Network	
Type	Three-phase, 4 wires
Current inputs	
Type	On CT
Rated current	5 A (6.5 A max.)
Inrush current	5 mA
Consumption	< 0.5 VA per phase
Voltage inputs	
Rated voltage	57.7 V / 100 V
Frequency	50 Hz
Operating range	75% to 110% of rated voltage
Consumption	2 W / 10 VA per phase
Auxiliary power supply	
Type	Self-powered
Tariff change input (C-C1)	
Characteristics	230 V – 50 Hz
Function	Application of a signal on this input will switch the meter to "dynamic" or "mobile peak" pricing
Pulse outputs	
Number	4
Quantities assigned	P+ / P- / Q+ / Q-
Characteristics	27 Vdc / 27 mA max.
Weight	1 pulse every 0.025 Wh This weight should be multiplied by the coefficient CT x VT to obtain a snapshot of the primary energy
Time pulse output	
Characteristics	230 V / 2 A – 50 Hz
Function	Closure for approx. 900 ms indicates that integration of the previous average power has been completed
Operator communication	
Connections	RJ45
Type	RS232 (specific cable not supplied with the meter)
Protocol	DLMS Cosem as per IEC 62056
Function	Reserved for Operator: Data retrieval and programming of the meter / Connection of an external modem (STN, GSM, GPRS, etc.)
Customer communication	
Connections	RJ45
Type	RS232 (specific cable not supplied with the meter)
Protocol	DLMS Cosem as per IEC 62056
Function	Reserved for Customer: Meter reading / Connection of an external modem (STN, GSM, GPRS, etc.)
Customer information (CIS)	
Connections	RJ45
Type	RS232
Characteristics	Min. 100 Ω / Max. 5 V
Communication mode	One-way
Function	Allows connection of an Energy Manager / cyclical generation of information for the customer
High-speed optical interface	
Reference standard	IEC 62056-21
Function	Retrieval of metering data, programming and local upgrading of the meter's application software

MECHANICAL SPECIFICATIONS

Format	330 mm x 180 mm x 100 mm
Weight	Meter alone: 2 kg / Meter in packaging: 3 kg
Mounting	Surface mounting / attached at 3 points
Ingress protection	IP 51
Access protection	By seals
Power terminal strip	Cable cross-section: 4 mm² / Max. tightening torque: 0.6 Nm
Input and output terminal strips	Collet capacity: 2.5 mm² / Max. tightening torque: 0.5 Nm

ENVIRONMENT

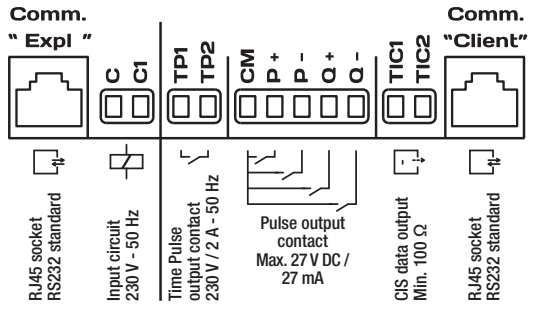
Climatic	
Rated operating temperature	-25°C to +55°C
Storage temperature	-28°C to +70°C
Relative humidity	Max. 80%
Electrical	
Overvoltage category	II

CONNECTIONS

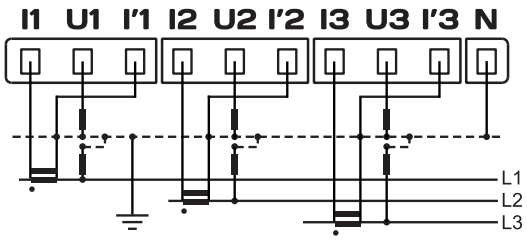
Operator access	
Terminals	**Functions**
"Expl" communication	Two-way "Operator" interface
C, C1	Input circuit for tariff change

Customer access	
Terminals	**Functions**
P+, P-, Q+, Q-, CM	Pulse output contacts
TP1, TP2	Time pulse output contacts
"Client" communication	Two-way "Customer" interface
"TIC"	One-way CIS customer information interface

Communication terminal strip

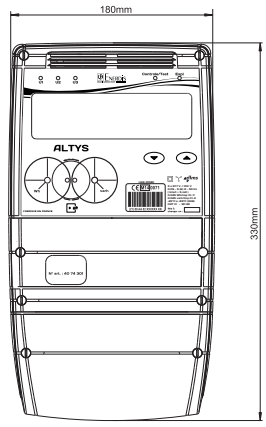


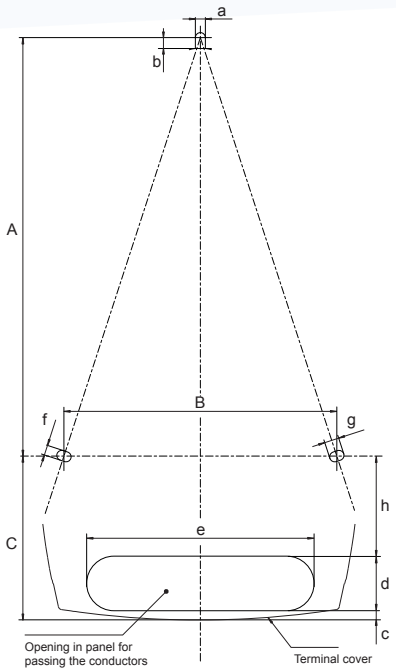
Power terminal strip



Terminals	Functions
I1	Phase 1 current input
U1	Phase 1 voltage input
I'1	Phase 1 current output
I2	Phase 2 current input
U2	Phase 2 voltage input
I'2	Phase 2 current output
I3	Phase 3 current input
U3	Phase 3 voltage input
I'3	Phase 3 current output
N	Neutral

DIMENSIONS / MOUNTINGS





with (in mm):

a = 5.5 ± 0.1
b ≥ 6
c ≥ 5
d = 20 ± 1
e = 125 ± 1
f = 5.5 ± 0.1
g = 8 ± 0.1
h = 55 ± 1
A = 230 ± 1
B = 150 ± 1
C = 90

TO ORDER

Model	Reference
ALTYS meter	P01331051

ASSOCIATED PRODUCTS

Low voltage current measurement transformers for tariff metering

page 95

USB optical head

P01330401

MEMO
RANGE

Power monitors for all types
of electrical networks compliant
with the IEC 61557-12 standard

- Built-in Modbus RS845 communication
- Easy-to-read all-in-one screen
- Management of 4 tariffs
- Only 2 models to cover all your supervision needs

DESCRIPTION

MEMO P200 est une gamme de 2 centrales de mesure simples et performantes apportant une vision claire et immédiate de votre réseau électrique.

- Measurement in all 4 quadrants
- Energy values: Ea, Eq, Es (import, export, cumulated, partial)
- Instantaneous values: V, U, I, THD-V, THD- I, F, crest factor, K factor, PF, P, Q, S
- Average max. values: I, P, Q, S
- Tariff metering: 4 tariffs with configurable tariff ranges (internal RTC clock)
- Relay outputs (on-off): Pulse mode, active energy or reactive energy (adjustable weight)

ZOOM

RS485 Modbus port: all the electrical measurements are transmitted in real time to the supervision system

4 tariffs: clear display of the current tariff

3 lines for easy-to-read display of the three-phase network

Total consumption displayed constantly

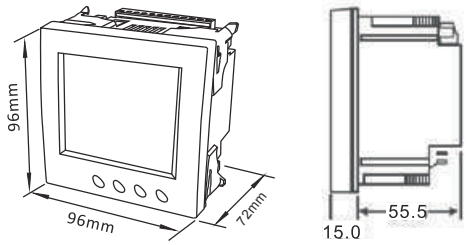
ELECTRICAL SPECIFICATIONS

Voltage inputs	
Primary VT	100 V to 500 kV – Secondary VT: 100 V à 480 V
Measurement range	5...120 % Un - 50/60 Hz (Un = 100/400 V)
Overvoltage	120 % of 400 V (permanent) - 1 kV (0.5 s)
Consumption	< 0.25 VA – Input impedance: 1 MΩ
Connection	3P3W - 3P4W - 1P2W
Current inputs (AC)	
Primary CT	1 A to 10,000 A – Secondary CT: 1 A to 5 A
Measurement range	1 % In...120 % In (In = 5 A)
Transient overload	120 A (0,5 s) – Permanent overload 6 A
Consumption	< 0.1 VA
Measurement accuracy	
Active power and energy	Class 0.5s (IEC 62053-22 & IEC 61557-12)
Reactive power and energy	Class 2 (IEC 62053-23 & IEC 61557-12)
Apparent power	1 % (IEC 61557-12)
Voltage / current	0.5 (IEC 61557-12)
Auxiliary power supply	
MEMO P200 ref. P01330825	85…275 VAC - 120…380VDC (< 2 W) - 50/60 Hz
MEMO P200 ref. P01330826	21…28 VDC (2 W)
RS485 output	
Protocol	Modbus RTU – Slave mode
Speed	2,400...38,400 bauds
On-off output	
Metering output	kWh / kVARh (IEC 62053-31)
Operating voltage	5...27 VDC
Max. current	27 mA

GENERAL SPECIFICATIONS

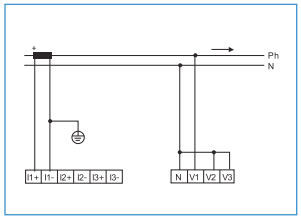
Dimensions L x H x P	96 x 96 x 55 mm
Weight	350 g
Connection	Up to 4 mm² (measurement inputs) and 2.5 mm² (others)
Operating temperature	-25 °C to +55 °C (K55)
Altitude	Up to 2,000 m

DIMENSIONS (MM)

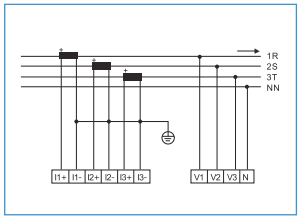


ELECTRICAL CONNECTIONS

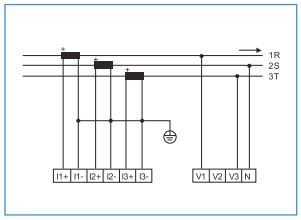
Single-phase



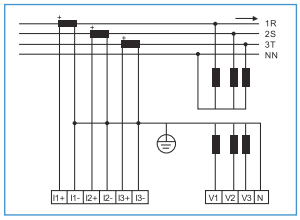
Unbalanced three-phase, 4 wires- 3 CTs



Unbalanced three-phase, 3 wires - 3 CTs



Example of connection to VT



TO ORDER

Model	Reference
MEMO P200 - 230 VAC aux. power supply	P01330825
MEMO P200 - 24 VDC aux. power supply	P01330826
DIN rail mounting kit	P01330360

ASSOCIATED PRODUCTS

Current transformers

Cable primary, busbar primary, closed core or split core, etc.

page 99

ENERIUM
RANGE

Power monitors ideal for the most critical MV/LV measurements in compliance with the IEC 61557-12 standard.

- 8 load curves
- 16 programmable alarms
- Graphics for easier data analysis
- Harmonic analysis up to the 50th order per phase on V, U, I and In
- Qualimetry according to EN50160 standard

DESCRIPTION

A complete range of 6 power monitors ideal for:

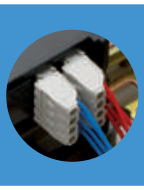
- LV/MV/HV network supervision
- installation sizing
- energy management
- electrical network quality applications

ZOOM

Optical head for:
- programming
- reading the data
- upgrading the firmware

Ethernet output (Modbus/TCP)
RS485 output (Modbus/Jbus RTU)

Screenless version for DIN-rail mounting or plate mounting



Up to 8 on-off or analog inputs/outputs

SCREEN DISPLAYS

Display
Real-time display of instantaneous, average values, etc. Time/date-stamped recording of min and max values.

Recording
Indices and consumption curves (electricity, water, gas). Temperature curves and trend curves. Critical parameters.

Harmonic analysis
Spectral analysis graph. THD measurement per phase on V, U, I and In. Up to 50th order.

Graphics
For easier data analysis. Fresnel diagram. Gauge for V, U, I, P.

Qualimetry
Log of events (dips, outages, overvoltages, overcurrents). Conformity graphs and statistics as per EN50160.

Customizable screens
3 screens with 4 display lines each to organize the information as you wish.

16 alarms
Programmable, viewing of alarms log, recording of the last 64 events, flashing of display if alarm.

Quick programming
Current transformer ratios and communication parameters can be set on the front panel or remotely.

Indication of connection errors at start-up

Preventive maintenance
Installation operating time.
Operating time of monitored equipment.

Power monitors

Flush-mounting 96 x 96

Flush-mounting 144 x 144



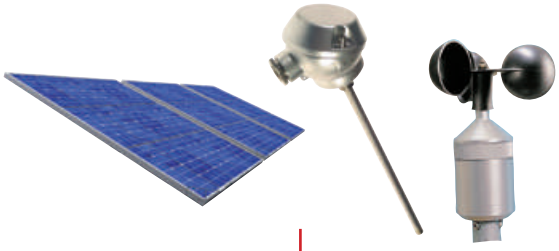


	Enerium 50	Enerium 150	Enerium 100	Enerium 200	Enerium 300
	ELECTRICAL ENERGY		MULTI-ENERGY		POWER QUALITY
Functional specifications					
Accuracy class (IEC61557-12)	0.5	0.5	0.5	0.5 or 0.2	0.2
Format	96 x 96 mm	96 x 96 mm	144 x 144 mm	144 x 144 mm	144 x 144 mm
Backlit LCD screen	■	■	■	■	■
Version without display			Enerium 110	Enerium 210	Enerium 310
Mounting	Flush-mounted, DIN rail* or plate-mounted*	Flush-mounted, DIN rail* or plate-mounted*	Flush-mounted, DIN rail* or plate-mounted (Enerium 110)	Flush-mounted, DIN rail* or plate-mounted (Enerium 210)	Flush-mounted, DIN rail* or plate-mounted (Enerium 310)
Harmonics					
Max. order	25	50	25	50	50
Recording functions					
8 load curves	■	■		■	■
4 trend curves		■	■	■	■
Alarms					
Number of alarms	16	16	16	16	16
Time/date-stamped events recorded	64	64	64	64	64
Qualimetry functions					
Qualimetry according to EN50160					■
V, U, I and In waveform capture					16
Storage of last 1024 events (dips, outages, overvoltages) with time/date-stamping					■
Inputs / outputs					
Max. number	2	2	8	8	8
Inputs (optional)					
On-off (pulse mode or alarm)	0,1 or 2	0,1 or 2	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8
Analog					
Outputs (optional)					
On-off (pulse mode or alarm)	0,1 or 2	0,1 or 2	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8
Analog	0 or 2	0 or 2	0,2 or 4	0,2 or 4	0,2 or 4
Graphics					
Fresnel		■	■	■	■
Gauges		■			
Histograms of harmonic orders		■		■	■
Communication interface					
Optical / USB	Front	Front	Front or rear	Front or rear	Front or rear
Ethernet or RS485	■	■	■	■	■
Metrological LED			■	■	■
Other functions					
Programming on front panel	■	■	■	■	■
Programming via software	■	■	■	■	■

* With mounting kit

EXAMPLE OF APPLICATIONS

ANALOG INPUTS

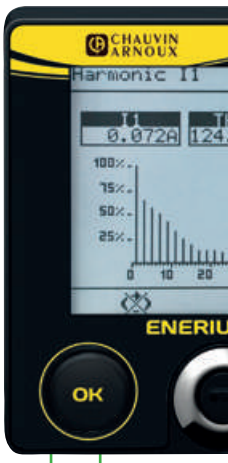


METERING INPUTS

water, gas, electricity

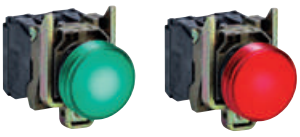
insolation, weather data, temperatures, etc.

CURRENT AND VOLTAGE INPUTS – LV/MV/HV NETWORKS



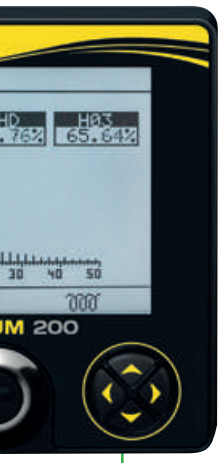
ANALOG OUTPUTS

ALARM RELAY OUTPUTS



SYNCHRO PULSE INPUTS

STORAGE OF STATUSES AND ALARMS



ENERGY MANAGEMENT SOFTWARE

PLCs FOR CTM/TBM SUPERVISION

PLC OUTPUTS (ALARM/PULSE)

Inputs

Communication

Outputs

Photos: Chauvin Arnoux - Schneider Electric.

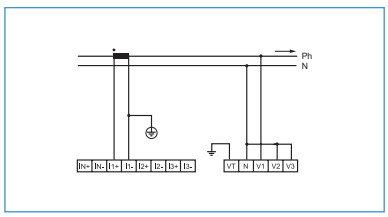
MEASUREMENTS

	1 S	min	max	average	min average	max average
V, U	■	■	■	■		■
Vearth	■	■	■	■		■
I	■	■	■	■		■
In (calculated or measured)[1]	■	■	■	■	■	■
P (4 quadrants)	■		■	■		
Pt (4 quadrants)	■	■	■	■		■
Q (4 quadrants)	■		■	■		
Qt (4 quadrants)	■	■	■	■		■
S	■		■	■		
St	■	■	■	■		■
PF (4 quadrants)	■			■		
PFt (4 quadrants)	■			■	■	■
Cosφ (4 quadrants)	■			■		
Cosφt (4 quadrants)	■	■	■	■	■	■
Tanφt (4 quadrants)	■			■	■	■
Frequency	■	■	■	■		
V crest factor	■			■		■
I crest factor	■			■		■
U unbalance	■			■		■
Harmonics on V, U, I	■					
Harmonics on In	■					
THD V, U, I	■			■		■
THD In	■		■	■		■
Active energy (receiver, generator)	■					
Reactive energy (Qcad1, 2, 3, 4)	■					
Apparent energy (receiver, generator)	■					
On-off input (pulse mode)	■					
Analog input (Enerium 100/200)	■	■	■	■	■	■
Voltage presence hour meter (U)	■					
Load hour meter (I)	■					
Auxiliary power supply hour meter	■					

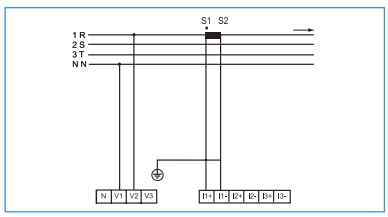
[1] On Enerium 30/50/150, calculated only

CONNECTION DIAGRAMS

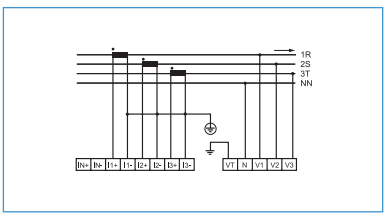
Single-phase



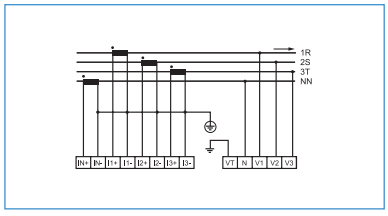
Balanced three-phase, 4 wires - 1 CT



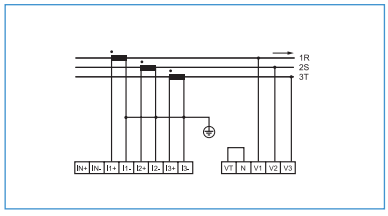
Unbalanced three-phase, 4 wires - 3 CTs



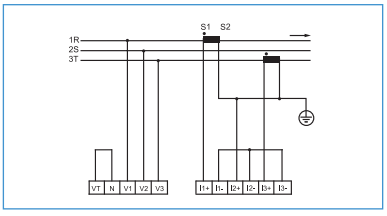
Unbalanced three-phase, 4 wires - 4 CTs
Except Enerium 50/150



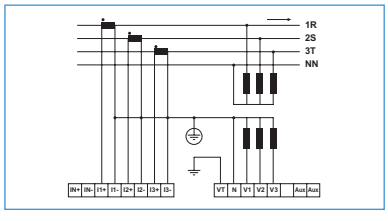
Unbalanced three-phase, 3 wires - 3 CTs



Unbalanced three-phase, 3 wires - 2 CTs



Example of connection to VT



TREND CURVES
(except on Enerium 50)

1S VALUES	
V, Vearth	■
U12, U23, U31	■
I1, I2, I3, In	■
Pt	■
Qt	■
St	■
PFt	■
U unbalance	■
THD V, U, I, In	■
Analog inputs (Enerium 100/200/300 only)	■
AVERAGE VALUES	
V1, V2, V3	■
U12, U23, U31	■
I1, I2, I3, In	■
Gen : P1, P2, P3, Pt	■
Rec : P1, P2, P3, Pt	■
Analog inputs (Enerium 100/200 only)	■
Gen : PF1, PF2, PF3, PFt	■
Rec : PF1, PF2, PF3, PFt	■
Gen : Cosφ1, Cosφ2, Cosφ3, Cosφt	■
Rec : Cosφ1, Cosφ2, Cosφ3, Cosφt	■
Tanφt	■
Frequency	■
Crest factor V1, V2, V3	■
Crest factor I1, I2, I3	■
THD U12, U23, U31	■
THD I1, I2, I3, Ineutral	■
THD V1, V2, V3	■

LOAD CURVES
(except on Enerium 100 and 110)

AVERAGE VALUES	
Pt Gen, Pt, Rec	■
Qcad1, Qcad2, Qcad3, Qcad4,	■
St Gen, St Rec	■
On-off inputs	■
Analog inputs (Enerium 200 only)	■

ALARMS

1S VALUES	
V1, V2, V3	■
Vearth	■
U12, U23, U31	■
I1,I2, I3, In	■
Pt	■
Qt	■
St	■
PFt	■
Cosφt	■
Tanφt	■
Frequency	■
U unbalance	■
THD V, U, I, In	■
3 hour meters: network presence, on-load presence, aux. source	■
Analog inputs (Enerium 100/200 only)	■
AVERAGE VALUES	
Pt Gen, Pt Rec	■
Qt Gen, Qt Rec	■
St	■
Tanφt (except on Enerium 30/50/150)	■
Analog inputs (Enerium 100/200/300 only)	■
ON-OFF INPUTS (Enerium 100/200/300 only)	■

ANALOG OUTPUTS (OPTION)

1S VALUES	
V1, V2, V3, Vearth	■
U12, U23, U31	■
I1, I2, I3, In	■
Pt	■
Q1, Q2, Q3	■
Qt	■
S1, S2, S3	■
St	■
PF1, PF2, PF3	■
PFt	■
Cosφ1, Cosφ2, Cosφ3	■
Cosφt	■
Tanφt	■
Frequency	■

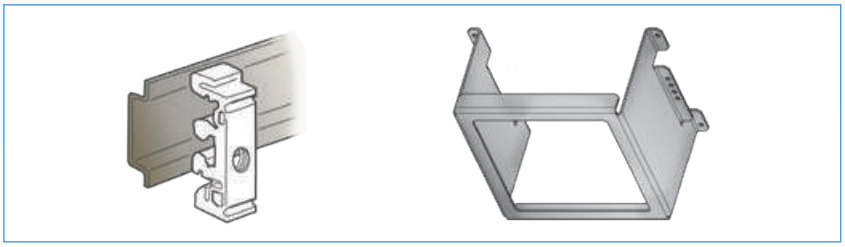
SPECIFICATIONS

	ENERIUM 50/150 Class 0.5s	ENERIUM 100 Class 0.5s	ENERIUM 200 Class 0.2s	ENERIUM 300 Class 0.2s
Electrical network				
Max. phase-to-phase voltage measured	650 kV			
VT ratio	VT primary : 100 V to 650 kV VT secondary : 100 V to 480 V			
Max. current measured	25,000 A			
CT ratio	CT primary : 1 A to 25,000 A CT secondary : 1 A or 5 A			
Max. power measured	2 GW			
Voltage inputs (AC)				
Measurement range	5 to 130 % of Vn for Vn = 57.7 / 230 V (ph-N) 5 to 130 % of Un for Un = 100 / 400 V (ph-ph)			
Crest factor	2			
Measurement accuracy (U and V)	0.2 % from 20 % to 130 % of Un/Vn			
Overvoltage	Transient U = 800 V for 24 hours Permanent 130 % of 400 V = 520 V			
Frequency	50/60 Hz or 400 Hz	50/60 Hz	50/60 Hz or 400 Hz	50/60 Hz
Consumption	< 0.15 VA	< 0.1 VA		
Input impedance	0.44 MΩ	1 MΩ		
Current inputs (AC)				
Measurement range	1 % to 130 % of In for In = 5 A			
Crest factor	3			
Measurement accuracy	0.2 % from ≥ 10 % to ≤ 130 % 0.5 % from ≥ 5 % to ≤ 10 % 1 % from ≥ 1 % to ≤ 5 %			
Acceptable overload	Transient I = 250 A for 1 second Permanent 130 % of 5 A = 6.5 A			
Consumption	< 0.15 VA			
Compliance with standards				
IEC 62053-21/22 IEC 62053-23/24	Active energy class 0.5s		Active energy class 0.2s	Active energy class 0.2s
	Reactive energy class 0.5s			
IEC61557-12 PMD SD/SS	V,I class 0.2 P,S class 0.5	class 0.5	class 0.2	class 0.2
	Active energy class 0.5 Reactive energy class 0.5		Active energy class 0.2 Reactive energy class 0.5	Active energy class 0.2 Reactive energy class 0.2
Multi-measurement (accuracies)				
Active power and energy	0.5 % for 5 % In ≤ I ≤ Imax		0.2 % for 5 % In ≤ I ≤ Imax	
Reactive power and energy	0.5 % for 5 % In ≤ I ≤ Imax			
Apparent power and energy	0.5 % for 5 % In ≤ I ≤ Imax			
Power factor (PF) and cosφ	± 0.02 counts when 0.5 inductive < PF < 0.5 capacitive ± 0.05 counts when 0.2 inductive < PF < 0.2 capacitive			
Frequency	± 0.1% from 42.5 to 69 Hz			
Sampling frequency	6.4 kHz to 50 Hz			
THD-I. THD-V and THD-U	± 0.5 counts			
Harmonics order by order	± 0.5 counts			

	ENERIUM 50/150 Class 0.5s	ENERIUM 100/200 Class 0.5s	ENERIUM 200 Class 0.2s	ENERIUM 300 Class 0.2s
RS485 output				
Connection	2 wires, half-duplex			
Protocol	ModBus / JBus RTU mode			
Speed (configurable)	2,400 - 4,800 - 9,600 - 19,200 - 34,800 (115,200 on ENERIUM 50/150)			
Parity	Even, odd or none			
JBus addresses	1 to 247			
Ethernet output				
Type	RJ45 - 8 pins			
Protocol	ModBus/TCP			
Speed (configurable)	Compatible with 10, 100 and 1,000 base T			
Auxiliary power supply				
Power supply	80 to 265 Vac (< 15 VA) 42.5 to 69 Hz 110 to 375 Vdc 19 to 57 Vdc (<7.5 W)	80 to 265 Vac (< 20 VA) 42.5 to 69 Hz 110 to 375 Vdc 19 to 57 Vdc (< 10 W)		
Digital inputs (on-off or metering pulse)				
Operating voltage	Up to 70 Vdc max	High level: 10 to 110 Vdc Low level: 0 to 5 Vac		
Min. signal width	High: 30 ms Low: 30 ms			
Consumption	< 0.5 W			
Pulse or alarm relay outputs				
Type	Static relay			
Operating voltage	24 to 110 Vdc ± 20 % 24 to 230 Vac ± 10 %			
Max. current	100 mA			
Compliance with standard	IEC 62053-31			
Analog inputs				
Scale		Configurable from 0 to +20 mA		
Power consumption		< 50 mW		
Input impedance		50 Ω		
Analog outputs				
Scale	Configurable between -20 and +20 mA			
Acceptable overload	500 Ω			
Response time	< 500 ms			
Storage				
Non-volatile memory	Configuration parameters – Recordings (curves, alarms, min-max, qualimetry events log, EN50160 statistics)			
RAM	Capture of waveforms			
Environmental specifications				
Operating temperature	-10°C to +55°C (K55 according to IEC61557-12)			
Operating humidity	95 % at 40 °C			
Storage temperature	-25 °C to +70 °C			
Safety specifications				
Pollution	2			
Behaviour in fire	UL 94, severity V1			
Installation category	3			

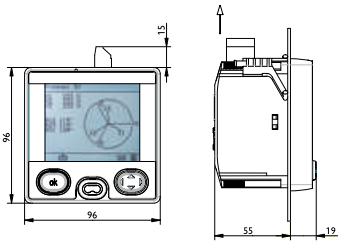
ACCESSORIES

Kit for DIN-rail or plate mounting



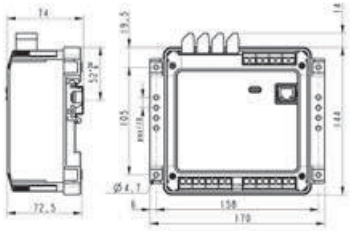
DIMENSIONS (IN MM)

Enerium 50/150



Enerium 100/200/300

Enerium 110/210/310



TO ORDER

STANDARD PRODUCTS

Model	Frequency	Accuracy class	Power supply	Communication	On-off inputs	On-off outputs	Analog outputs	Reference
Enerium 50	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	RS485	0	0	0	P01330805
	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	Ethernet	0	0	0	P01330806
	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	RS485	1	1	0	P01330807
	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	Ethernet	1	1	0	P01330808
Enerium 150	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	RS485	0	0	0	P01330809
	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	Ethernet	0	0	0	P01330810
	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	RS485	0	2	0	P01330811
	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	Ethernet	0	2	0	P01330812
Enerium 100	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	RS485	0	0	0	P01330831
	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	RS485	2	2	0	P01330832
Enerium 200	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	RS485	4	2	0	P01330833
	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	Ethernet	2	2	2	P01330834
Enerium 210	50 / 60 HZ	0.5s	80 to 265 Vac / 110 to 375 Vdc	Ethernet	8	0	0	P01330835
Enerium 300	50 / 60 HZ	0.2s	80 to 265 Vac / 110 to 375 Vdc	RS485	0	0	0	P01330816
	50 / 60 HZ	0.2s	80 to 265 Vac / 110 to 375 Vdc	Ethernet	0	0	0	P01330817
	50 / 60 HZ	0.2s	19 to 58 Vdc	RS485	0	0	0	P01330818
	50 / 60 HZ	0.2s	19 to 58 Vdc	Ethernet	0	0	0	P01330819

ACCESSORIES

Model	Reference
Optical head for ENERIUM 50/150	P01330403
Optical head for ENERIUM 100/110 - 200/210 - 300/310	P01330401
DIN-rail mounting kit for ENERIUM 30/50/150	P01330830
DIN-rail mounting kit for ENERIUM 100/200/300	P01330360
Power supply for On-Off inputs 85 to 256 Vac/12 Vdc - 3.5 A (42 W)	ACCJ1004

CONFIGURED PRODUCTS

ENERIUM | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

1 Model

50	ENERIUM 50 - Electrical energy - Load curves - Format 96 x 96
150	ENERIUM 50 + Trend curves - Format 96 x 96
100	ENERIUM 100 - Multi-energy - Trend curves - Format 144 x 144
110	ENERIUM 100 screenless version - Format 144 x 144
200	ENERIUM 100 + Load curves - Format 144 x 144
210	ENERIUM 200 screenless version - Format 144 x 144
300	ENERIUM 200 + Qualimetry
310	ENERIUM 300 screenless version

2 Frequency of network measured

0	50 / 60 Hz
1	400 Hz (except on Enerium 100 / 200 class 0.5s / 300)

3 Auxiliary power supply

0	80 to 265 Vac / 110 to 375 Vdc
1	19.2 to 58 Vdc

4 Communication

0	RS485
1	Ethernet

Note : with choices 5, 6, 7 and 8, it is possible to have a maximum of 8 inputs and/or outputs (ENERIUM 100-110/200-210). Note: for the Enerium 50/150, choices 5 and 6 only allow the following combinations: 0-0, 1-1, 2-0, 0-2.

5 Metering (or On-Off) inputs

0	none
1	1 input (only on ENERIUM 50 / 150)
2	2 inputs
4	4 inputs (except on ENERIUM 50 / 150)
6	6 inputs (except on ENERIUM 50 / 150)
8	8 inputs (except on ENERIUM 50 / 150)

6 On-Off outputs

0	none
1	1 output (only on ENERIUM 30 / 50 / 150)
2	2 outputs
4	4 outputs (except on ENERIUM 30 / 50 / 150)
6	6 outputs (except on ENERIUM 30 / 50 / 150)
8	8 outputs (except on ENERIUM 30 / 50 / 150)

7 Analog inputs (ENERIUM 100/200/300 only)

0	none
2	2 analog inputs
4	4 analog inputs
6	6 analog inputs
8	8 analog inputs

8 Analog outputs

0	none
2	2 outputs
4	4 outputs (except on Enerium 50 / 150)

9 Accuracy class

5	0.5s (except on ENERIUM 300)
2	0.2s (ENERIUM 200/210/300/310 only)

Example : Enerium 200, frequency 50/60 Hz, 80 to 264 Vac auxiliary power supply, RS485 communication, 2 on-off inputs, no on-off outputs, no analog inputs, no analog outputs, Class 0.2s

▶ order ENERIUM 200 01020002 :

1	200	2	0	3	0	4	0	5	2	6	0	7	0	8	0	9	2

ASSOCIATED PRODUCTS

Current transformers

Cable primary, busbar primary, closed core or split core, etc.

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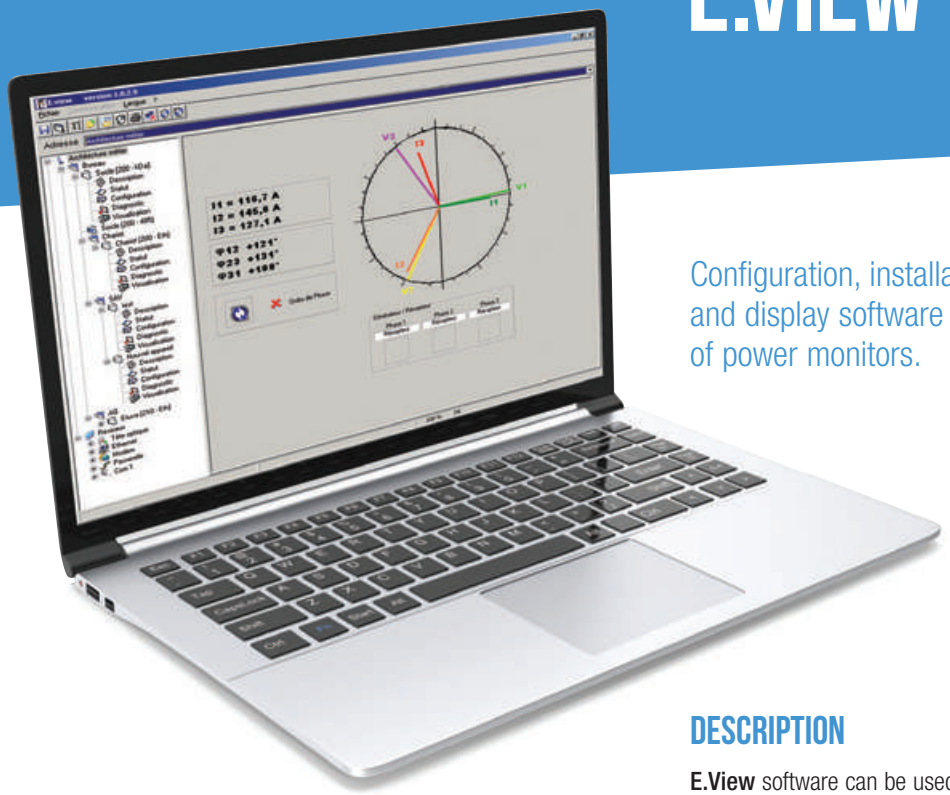
E.VIEW



Configuration, installation diagnostics and display software for the ENERIUM range of power monitors.

DESCRIPTION

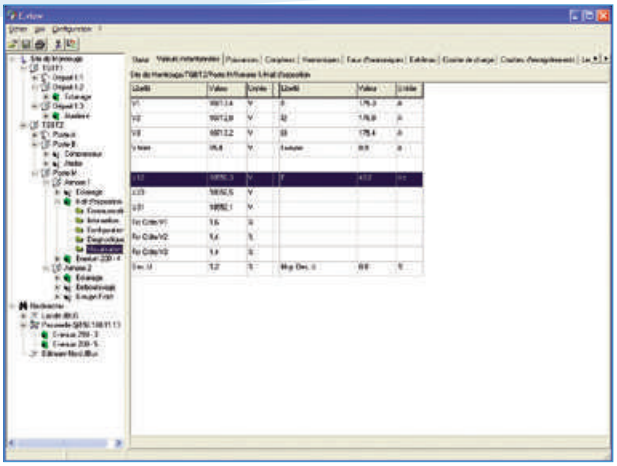
E.View software can be used to configure the power monitors in the ENERIUM range remotely via the RS485 network, Ethernet network or optical head. At any time, it is possible to program the communication parameters of the products (address, speed, parity, etc.) and the configuration parameters (CT ratio, PT ratio, alarm thresholds, etc.).

E.View can be used for remote control of the inputs and outputs on ENERIUM power monitors. **E.View** enables you to view the basic electrical parameters and retrieve recordings of the load curves, trend curves and alarms log in .txt format.

- Configuration of the whole range of ENERIUM power monitors
- Installation diagnostics
- Display of the electrical parameters
- Copies of recordings in.txt format

Functions	E.View
Description	■
Status	■
Configuration	■
Diagnostics	■
Display	■
Graphics	

E.VIEW



DESCRIPTION

- The tabs enable you to define the hardware status of the Enerium and the functional use of the inputs (on-off) and outputs (analog or on-off)
- Details of slots: analog output board, on-off I/O board
- Communication (Ethernet, RS485)

CONFIGURATION OF ENERIUM POWER MONITORS

- Configuration of the communication parameters
- Modification of the date and time
- Configuration of the CTs, PT, alarm status, overrun thresholds, etc.
- Configuration and activation of alarms
- Programming of the analog outputs
- Programming of the inputs/outputs
- Reinitialization of the meters, overruns, log, etc.

NETWORKING ASSISTANCE

- Communication test on a power monitor of your choice among all the power monitors on the RS485 or Ethernet network
- Automatic detection of all the products on the RS485 or Ethernet networks with display of the communication parameters (address, speed, parity, stop bit) and the type of configuration (CT and PT ratios) for each power monitor.

STATUS

This page can only be used to view the Enerium's status (voltage and current inputs, phase order, time synchro, elementary alarms, global alarms, pulse and analog outputs).

- Operation (correct or incorrect) of the voltage, current and phase order quantities
- Status of global alarms
- Status of elementary alarms
- Status of pulse outputs and analog outputs

BACKUP AND LOADING OF CONFIGURATIONS

- Recording and import of a configuration
- Downloading of the configuration from one power monitor to another via PC
- Writing of the new configuration
- Self-diagnosis of the configuration

SCREEN PROGRAMMING

- Programming of the 3 customizable screens

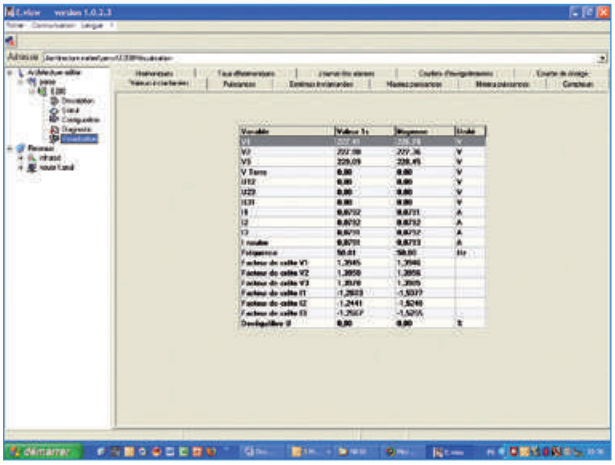
COMMUNICATION

- Ethernet
- RS485/RS232
- Modem
- Optical head (infrared)

ASSOCIATED PRODUCTS

ENERIUM
Power monitors for all electrical networks compliant with the IEC 61557-12 standard.
page 56

ENERIUM
Optical head
page 56



DISPLAY OF THE BASIC PARAMETERS

- Supervision of the electrical network by displaying the essential parameters measured by ENERIUM
- Consultation of the instantaneous and average values of the electrical quantities required to operate the electrical network
- Examples of display possibilities
  - Instantaneous values
  - Instantaneous extreme values
  - Maximum/minimum power values
  - Energy meters
  - Maximum odd harmonic values per order
  - Total harmonic distortion (THD)
  - Alarm log
  - Trend curves
  - Load curves

REMOTE CONTROL OF THE INPUTS/OUTPUTS

All the inputs and outputs can be controlled remotely and separately. This function can be used, for example, to simulate an analog output in order to verify the integration of an ENERIUM power monitor in the process.

RETRIEVAL OF THE RECORDS IN .TXT FORMAT

- Load curves
- Trend curves
- Alarm log

DIAGNOSIS OF THE INSTALLATION

This page can be used to read the digital inputs, as well as to read and/or force the digital and analog outputs of ENERIUM.

- This concerns:
  - Pulse inputs
  - On-off inputs
  - On-off outputs
  - Analog outputs
- Detection of phase order reversal
  - Presence of voltage
  - Presence of current
  - Status of the current ratings being used by the power monitor
  - Indication of the generator/receiver mode of phases 1, 2 and 3
- Status of the alarms
- Status of the alarm relays
- Detection of external time synchronization errors
- Malfunction of an option card
- Saturation and possible loss of a pulse on the on-off outputs
- Trend curve memory occupancy
- Load curve memory occupancy

TO ORDER

Model	Reference
E.View software	P01330601

ASSOCIATED PRODUCTS

ENERIUM

Power monitors for all electrical networks compliant with the IEC 61557-12 standard.

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ENERIUM

Optical head

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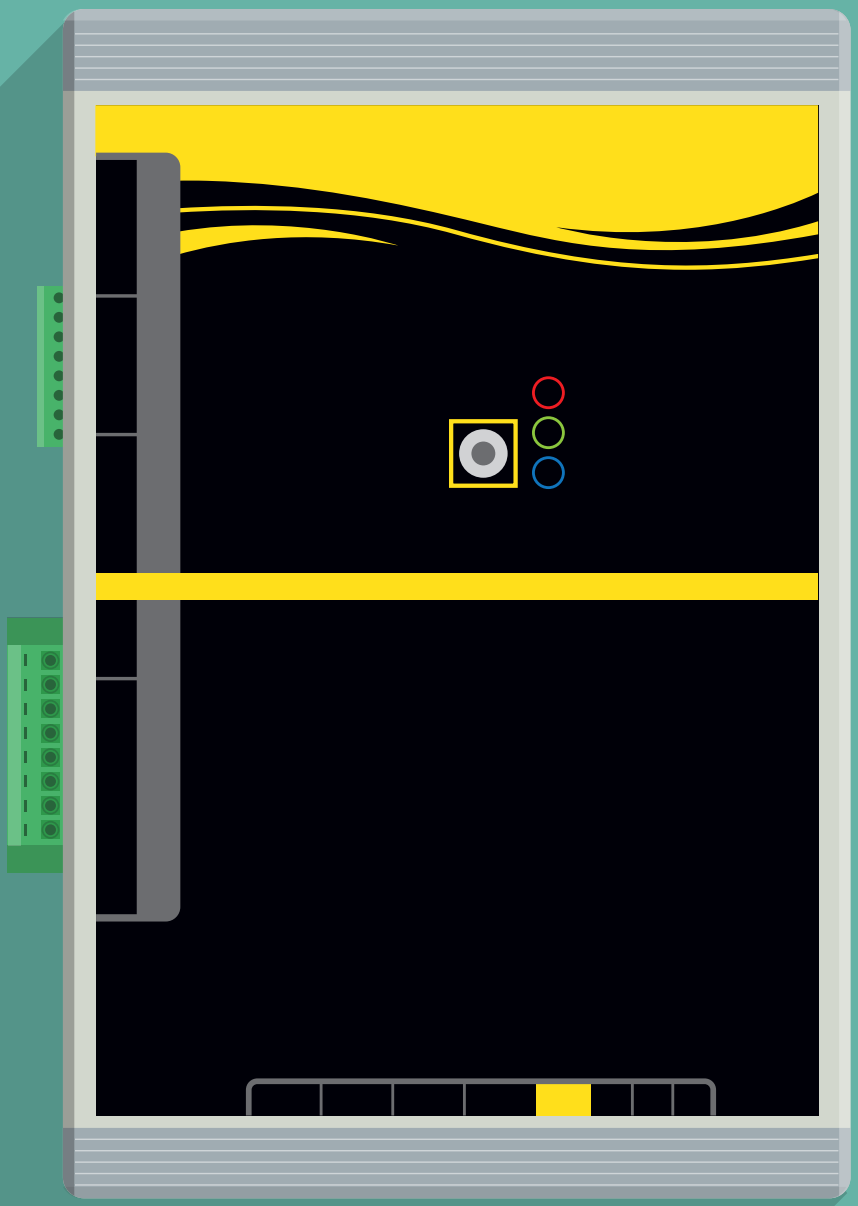
NOTES



NETWORK SUPERVISION AND PHYSICAL MEASUREMENT

NETWORK ANALYZERS

72 OVERVIEW OF THE RANGE
74 SELECTION GUIDE
80 NETWORK ANALYZERS
88 MANAGEMENT AND ANALYSIS SOFTWARE

NETWORK ANALYZERS

Electrical network analyzers

Permanent analyzers - MAP range - Class A

MAP 607
Single-phase voltage quality analyzer
page 81

MAP 620
Three-phase voltage/current network quality analyzer
page 83

MAP 640
Three-phase voltage/current network quality analyzer with HF transient capture
page 83

MAP Compact
Three-phase voltage/current power and network quality analyzer + Monitoring of EN50160 template
page 82

Power quality monitor

ENERIUM 300
Power monitor
Qualimetry according to EN50160
page 56

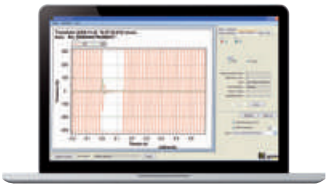
Non-intrusive analyzers - MAP range - Class A

MAP 620-NI
Non-intrusive network analyzer - three-phase voltage/current
page 80

Management and analysis software

For MAP 607

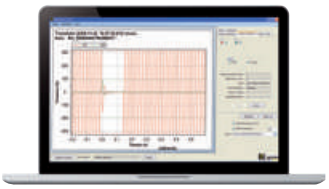
Qual-SRT
Configuration and display
page 88



Qual-View
Settings, display and analysis
page 88

For MAP Compact

Qual-SRTc
Settings and display
page 88



Qual-View
Settings, display and analysis
page 88

For MAP 6XX range

E.Qual-Premium
Settings, display and analysis
page 88

E.Qual-Premium Server
Settings, remote data retrieval, display, administration and analysis
page 88

SELECTION GUIDE

BASED ON ITS SPECIFICATIONS

	MAP permanent analyzers			MAP non-intrusive analyzers
	page 99			page100
				
	Single-phase	Three-phase		
	607	620	640	620-NI
Installation				
Number of voltage channels	2	3	3	3
Number of HF voltage channels			3	
Number of current channels		4	4	4
Number of 0 - 20 mA inputs		4	4	
Sampling				
Sampling frequency	12.8 kHz	12.8 kHz	12.8 kHz	12.8 kHz
Frequency for fast transients			2 MHz	
Communication				
Mini USB	■			
CL port		■	■	
Built-in Ethernet port (Modbus TCP/IP available)		option	option	option
Local RS232 port		■	■	■
Remote RS232 port		■	■	■
Memory				
Capacity	64 MB	128 MB	128 MB	128 MB
Internal clock				
GPS synchronization via external coupler		■	■	
DCF synchronization via external coupler		■	■	
Back-up power supply and connections				
Internal power reserve	1 s	10 s	10 s	10 s
Power reserve via external UPS		10 min	10 min	10 min
Voltage connections	Standardized plug	Screw-on	Screw-on	4 mm banana
Current connections		Screw-on	Screw-on	1/4 turn
Strengths	Retrieval of measurements via USB 2.0 port - Plug & Play system.			

BASED ON ITS FUNCTIONS

	MAP permanent analyzers			MAP non-intrusive analyzers
	page 99			page 100
				
	Single-phase	Three-phase		
	607	620	640	620-NI
Calculated parameters				
Voltage	■	■	■	■
Frequency	■	■	■	■
Unbalance	■	■	■	■
THD	■	■	■	■
Harmonics (up to 50th order)	■	■	■	■
Flicker: Pst (10 min), Plt (2 h) and Lfl (inst.)	■	■	■	■
Signalling voltages	■	■	■	■
Power harmonics		■	■	■
P, Q and S power values		■	■	■
Power factors, tangents		■	■	■
Voltage events				
Dips	■	■	■	■
Interruption / outage	■	■	■	■
Transients	■	■	■	■
Fast variations	■	■	■	■
Event log	■	■	■	■
HF transients			■	
Event capture and recording				
Signature	■	■	■	■
Waveforms	■	■	■	■
Customizable power quality reports	■	■	■	■
Connection				
Quick / non-intrusive connection	■			■
Software				
Qual SRT / Qual-View	■			
E.Qual-Premium		■	■	■
E.Qual-Premium-Server	■ (import)	■	■	■

INFO & ADVICE

COVER ALL YOUR REQUIREMENTS FOR ENERGY QUALITY SUPERVISION AND ARBITRATION

UNDERSTANDING THE DETAILS OF YOUR ELECTRICITY BILL

It is essential to keep a close eye on your real energy consumption for energy monitoring because, when considerable power is involved, the electricity bill is also high. So measuring these high power values with mediocre accuracy means that uncertainty persists concerning actual energy consumption and the related cost.
This is why we recommend choosing measuring equipment with 0.2% accuracy, currently the highest accuracy standardized by the IEC 62053-22 international standard on metering active energy.

Electrical environments may also be **disturbed** (presence of harmonics, phase shift on the current and voltage, etc.), thus causing deterioration of the power factor. Energy measurement in these conditions is more complex. For such environments, the **accuracy of your equipment should be accompanied by the letter "s"**, guaranteeing that you have the most reliable energy measurement possible in disturbed environments..

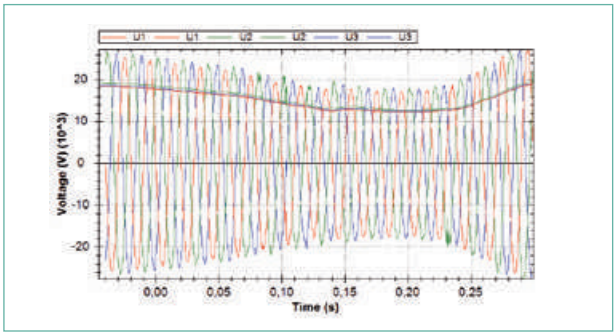
> If you choose 0.2s accuracy on your power monitor, it guarantees that you meter energy with the same accuracy as your tariff meter (or higher).

Estimate the impact of complex electricity consumption on your network to take quick action. Electricity differs from the other utilities (gas, water, etc.) due to the complexity of its composition and the wide variety of indicators which help to optimize its cost. **The apparent power is the most important thing to monitor** because it will determine the quantity of electrical energy and thus the subscription which you will need. To achieve savings, you therefore have to take into account the two components of the apparent energy which need to be reduced:

- **Reactive energy:**

The inductive loads on the network will create a mismatch between the current and voltage which naturally draws unwanted power. The rejection of this "reactive" power is limited to a certain proportion of the active power by the network administrators. This limitation may be performed by adding "compensation" solutions at the level of the load or at certain points in the network.

- **Distorting power:**



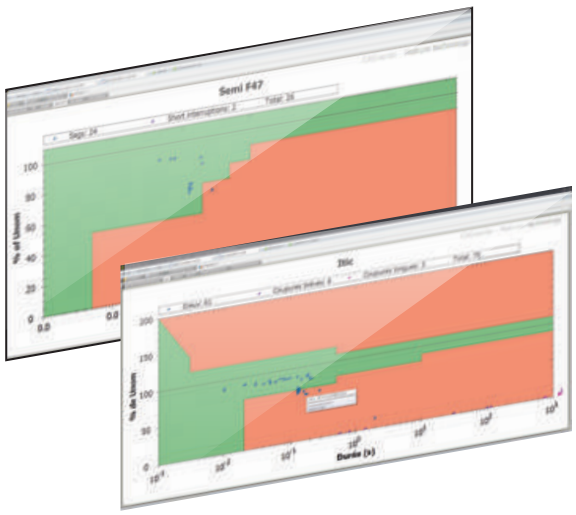
Distorting loads on the electrical network change the waveforms of the currents and voltages by producing signals whose frequencies are different from the rated frequency of the network. These signals, called harmonics, will have a large number of harmful effects, such as changing the voltage level of the network, drawing additional "distorting" power and increasing the currents in certain conductors. The harmonics, whose presence is also limited by the standard, can be corrected by filtering systems.

UNDERSTANDING ENERGY QUALITY AND HOW TO IMPROVE IT

You must **anticipate the losses and maintenance costs on the equipment** due to poor energy quality.
The variations of the main electrical quantities outside the tolerance ranges shorten the life span of the electronic equipment in the network. Constant monitoring of these quantities will enable you to establish a correlation between equipment maintenance and network energy quality.

Energy quality events such as dips, outages and voltage surges are bad for the operating continuity of electrical installations. The costs linked to production losses and production downtime after voltage dips may be high. **Recording to quantify and qualify the energy quality events will subsequently help to find the sources of the anomaly so that you can correct them. Sector-specific templates are available to qualify the dips in terms of their harmful effects** on specific equipment:

- The **ITIC template** for qualifying a dip which may corrupt data or damage computer bays
- The **SEMIF47 template** for qualifying a dip which may cause a fault in sensitive production-line tooling (such as semi-conductor production sites)



MONITORING THE COMMITMENTS CONCERNING THE ELECTRICITY SUPPLY

The **European standard** concerning energy supply quality is the **EN50160** standard. This describes the requirements covering the voltage and frequency at any point of connection.

All electricity suppliers must comply with this standard. By using an analyzer, you can check all the parameters and produce a compliance or non-compliance report.

Specific commitments may be agreed between the electricity suppliers and customers, limiting the annual number of outages or voltage dips. The use of an **analyzer** will enable the supplier to **confirm to customers that these commitments are met**, while also allowing the customer to contest fulfilment of the commitments if quality events occur.

To **provide indisputable information on energy quality** (events or electrical quantities), the measurement must be reproducible. The IEC 61000-4-30 standard specifies the methods for measuring the events and electrical quantities and also defines several classes, of which Class A is the most demanding.

This helps to guarantee that two different items of equipment connected to the same location will give identical results.

> Class A is the crucial criterion for choosing a network analyzer.

IDENTIFYING ALL THE DISTURBANCES

The difficult when troubleshooting stems from the fact that you are seeking to "trap" something about which you have no prior information. This makes it difficult to stipulate in advance the fault capture characteristics of your network analyzer. **The crucial criterion for the analyzer will be the sampling frequency**, which will define the minimum resolution at which a transient phenomenon will be detected.

- **For the most frequent requirements, a 12 kHz sampling frequency** (256 points per cycle) will be sufficient to analyze all the aspects of the events
- **For advanced troubleshooting**, requiring highly-accurate display of all the variations before and after the fault, **the sampling frequency of the equipment must be at least 2 MHz.**

> A high sampling frequency guarantees that all the information necessary for investigation has been recorded.

CHOOSING YOUR EQUIPMENT

A simple, economical solution for supervising energy quality

ENERIUM 300 (page 56)

Assess the impact of energy quality on your electrical feeder

The power monitor focused on energy quality

- Accuracy class 0.2s
- Storage of consumption data
- Recording of trend curves
- Harmonic analysis
- Events log (dips, outages, etc.)
- Monitoring of compliance with the EN50160 standard
- Capture of waveforms
- Up to 8 input/outputs

Switch to a higher gear with the MAP network analyzers

- Class A IEC 61000-4-30
- Capture of the most complex energy quality parameters
- Continuous data storage 24/7
- Production of turnkey reports and investigative tools using a wide range of software products

MAP COMPACT

Monitor your electrical network simply and effectively

The economical solution for analyzing your network

- A compact format for easier integration
- A screen for the basic information
- Access to the data locally via USB or remotely via Ethernet
- 3-channel voltage input, 230/400 VRMS
- 4-channel current input, 0 – 6 A RMS
- Auxiliary power supply: 175 – 255 Vac (10 s power reserve)
- 2 On-Off inputs/outputs

MAP 640

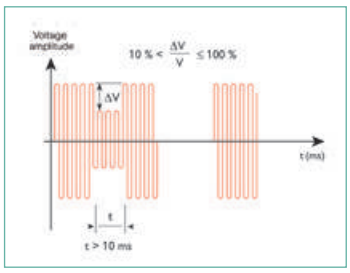
Don't miss any disturbances

The comprehensive product for transformer station environments

- 2 MHz HF transient capture
- 4 analog inputs and 2 On-Off outputs
- Generation of customized reports
- 3-channel voltage input, 400/690 VRMS
- 4-channel current input, 0 – 6 A RMS
- Access to the data locally via USB or remotely via Ethernet (Modbus TCP)
- Monitoring of the homopolar voltage (option)
- Auxiliary power supply: 175-255 Vac (10 s power reserve) or 24 Vdc

Power supply faults and deteriorating electrical power quality cause disturbances which adversely affect the operation of electro-technical equipment. What are the disturbances involved? What are their causes and consequences?

SLOW VARIATIONS AND INTERRUPTIONS

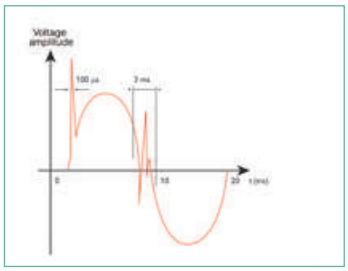


The nominal range of variation of the network voltage is set by the power distributor at ± 10% of the phase-to-phase voltage.

The amplitude of the voltage is usually the primary contractual commitment given by the power distributor. It is nevertheless subject to abnormal variations which may reach a level close to 0.

Faults generated	• Voltage surge or dip • Micro-interruptions < 10 ms • Short interruptions < 3 min and long interruptions > 3 min
Causes linked to disturbances due to equipments	• Heavy loads connected to a network whose short-circuit power at a delivery point is undersized • High-power motors, transformers and capacitor banks • Internal faults in the electrical installation
Causes linked to electrical power supply networks	• Atmospheric phenomena and accidental short-circuits • Transmission and distribution network management problems
Parameters to be measured	• Amplitude and duration of the variation

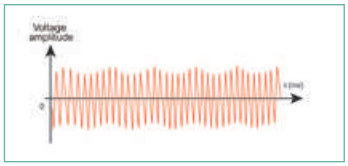
RAPID VARIATIONS



Digital analyzers with a high sampling frequency are necessary to measure transient overvoltages.

Faults generated	• Transient overvoltages (<10 ms)
Causes linked to disturbances due to equipments	• Switching of more or less inductive loads causing transient overvoltages at high frequency • Switching of 2 thyristors causing a very brief short-circuit between the 2 phases
Causes linked to electrical power supply networks	• Atmospheric phenomena (lightning)
Parameters to be measured	• Maximum amplitude and duration of the transient

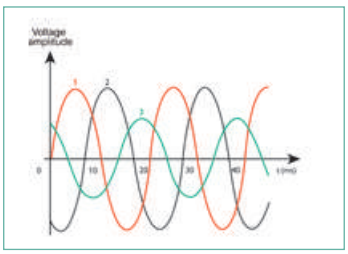
RAPID VOLTAGE VARIATIONS (FLICKER)



The discomfort caused by rapid variations in the brightness of lighting is measured by the flicker value. Effects on people: headache, irritability, epileptic fit, etc.

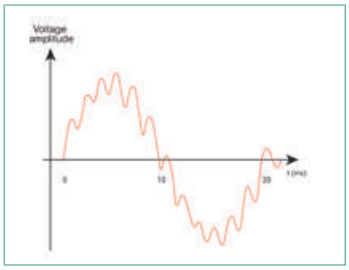
Faults generated	• Variation of brightness • Flickering of computer screens
Causes linked to disturbances due to equipments	• Arc furnaces • Laser printers • Air-conditioning systems
Causes linked to electrical power supply networks	• None
Parameters to be measured	• Short-term flicker (Pst) and long-term flicker (Plt)

VOLTAGE UNBALANCE



Faults generated	• Current or voltage not phase-shifted by 120° and with different amplitudes
Causes linked to disturbances due to equipments	• Load absorbing power in an unbalanced way on the 3 phases • Disconnection of one electrical power supply phase
Causes linked to electrical power supply networks	• Disconnection of one electrical power supply phase
Parameters to be measured	• Level of unbalance, direct, inverse and homopolar voltage or current

HARMONICS AND INTERHARMONICS

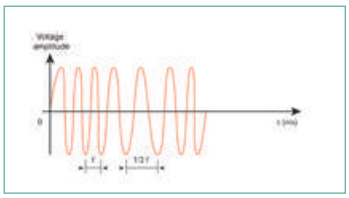


Harmonics: sinusoidal waves whose frequencies are multiples of 50 Hz superimposed on the fundamental wave.
Interharmonics: component of the signal superimposed on the fundamental wave (50 Hz) but which is not a multiple of the fundamental (e.g. 175 Hz).

The current consumed by the loads no longer has a pure sinusoidal waveform. The current distortion implies a voltage distortion that also depends on the impedance of the source.

Faults generated	• Functional synchronization problems, switching • Untimely tripping of circuit-breakers • Induced heating reducing the life span of rotating machines, capacitors, power transformers and neutral conductors
Causes linked to disturbances due to equipment	• EQUIPMENT containing power electronics: variable speed drives, uninterruptible power supplies, dimmers, welding units
Causes linked to electrical power supply networks	• Propagation of harmonic pollution from customers supplied by the same electrical network
Parameters to be measured	• Global THD • Harmonics order by order in % and RMS value

FREQUENCY VARIATIONS

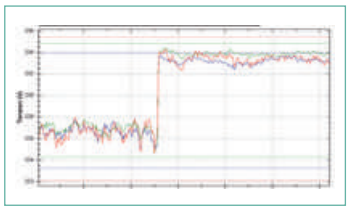


The average value of the fundamental frequency must be 50 Hz ± 1% in normal operating conditions.

Frequency fluctuations are observed on non-interconnected networks and networks connected to electrical generator sets.

Faults generated	• Process shutdown
Causes linked to disturbances due to equipments	• Autonomous source control fault
Causes linked to electrical power supply networks	• After an overload on networks that are not interconnected or on an electrical generator set
Parameters to be measured	• Frequency F(Hz)

VOLTAGE SURGES



Surges of a few per cent which do not cause the voltage to deviate from the template ± 10 %.

The maximum number of voltage surges during an observation period is usually monitored.

Faults generated	• Contributes to flicker, malfunction of the control systems acting on the phase angle, acceleration/deceleration torque of motors • Damage to sensitive electronic equipment
Causes linked to disturbances due to equipments	• Operations: motor startup, activation of a capacitor bank, activation of an inductance, etc.
Causes linked to electrical power supply networks	• Activation of load adjustment systems • Variation of production by independent producers (wind turbines, solar panels, etc.)
Parameters to be measured	• Voltage surges according to the IEC 61000-3-3 standard, difference between two stable states (voltage change less than or equal to 0.5 % for 1 second) • The characteristics of voltage surges are: duration (time between two stable states), largest voltage variation in relation to previous stable state (Umax), difference between the two stable states (Ustat)

MAP
RANGE

Electrical network quality analyzers
HV / MV / LV – Class A.

- Compliant with the EN 61000-4-30 standard, Class A
- Detection of the fault location direction (upstream/downstream) for products with current channels
- Analysis of transients with a high, variable sampling frequency
- Measurement of harmonics (up to 50th order) and interharmonics (up to 50th group)
- Flicker measurement: Ifl, Pst, Plt
- Processing of the data according to the EN 50160 standard

GENERAL SPECIFICATIONS

The products in the **MAP** range, mounted on a platen or on the cabinet backplate, measure all the parameters of HV / MV / LV electrical networks: RMS voltage, frequency, THD, level of unbalance, positive/negative/zero sequence voltage, flicker, harmonics up to the 50th order, interharmonics up to the 50th group. For products with current channels: RMS current, THDi, active, reactive and apparent power, cos φ, power factor, power values of harmonics, energy values (calculated by the software).

The products in the **MAP** range record and, via the associated software, provide detailed, comprehensive and continuous analysis of the quality of the electricity supplied according to the applicable standards, particularly EN 50160: voltage variations (voltage dips, swells and outages), rapid variations (transient overvoltages), flicker or rapid voltage fluctuations…
The related software can be used either to analyze an isolated MAP unit or to manage and retrieve the data remotely from the equipment installed.
On some models, additional 20 mA analog inputs can be used to:

- monitor physical parameters from a 20 mA transducer
- monitor statuses such as circuit-breaker contacts and protection relays via suitable couplers
- trigger waveform capture by a digital channel via a digital input/20 mA signal coupler
- check the equipment transmitting binary signals

Various communication modes are available for remote recovery of the data and in-depth analysis of all the recorded parameters.
Thanks to its Modbus TCP/IP communication output, **the MAP range can be integrated into a PLC and CTM environment.**

ZOOM


Communication port: local, modem, built-in Ethernet

Status LED: phase sequence and template overrun


Communication couplers: local, modem, Ethernet

MAP 607

Single-phase analyzer – Class A

- 2 voltage channels: phase/neutral and phase/neutral-earth
- Plug & play: no driver required
- USB 2.0 communication port
- Configuration for voltage dips, overvoltages and transient disturbances
- Class A according to IEC 61000-4-30
- Measurement of all the power quality parameters according to the predefined standard (EN 50160, etc.)
- Direct indication on the product: Green LED: parameters OK Red LED: parameters outside profile

Inputs			
Voltage input (Phase-Neutral)	0-300 VRMS	Standard measurement (Class A)	1
Voltage input (Phase/Neutral-Earth)	0-300 VRMS, 700 Vpk		1
Power supply			
Power supply range		Power supply via voltage input	Yes
Internal back-up			Yes
Compliance with standards			
Sliding reference			Yes
IEC 61000-4-30, Class A	< 0.1 %	Reference equipment	Yes
IEC 61000-4-7		Measurement of harmonics	Yes
IEC 61000-4-15		Flicker measurement	Yes
EN 50 160 (European Norm)		Calculated in the unit	Yes
PQDIF format			Option
Hardware			
Memory		Circular Flash Memory (NAND)	64MB
Sampling rate			12.8 kHz (x2)
Accuracy		Class A	< 0.1 %
Resolution			16 bit
Input impedance – Input voltage			10 MΩ
Anti-aliasing filter			Yes
Bandwidth			3.5 kHz
PLL Synchronization			Yes
Communication			
USB port	2.0 (Full-speed)	For PC connection, detected automatically Driver not required	Yes
Measurement specifications			
All power quality parameters are measured and stored		Voltage (avg/min/max), Frequency, THD, Harmonics (up to 50th order), Flicker (Lfl, Pst, Plt)	Yes
Analysis of rapid disturbances		Dips/swells (RMS 1/2 cycle), transients	Yes
Waveform capture		Programmable pre-time and post-time	Max. duration 200 cycles
Mechanical specifications			
Housing	For 230 V socket	Humidity: 10% - 85% without condensation	
Dimensions (L x H x W)	120 x 65 x 65 mm		
Weight	0.3 kg	Safety: EN 61 010-1	
Operating temperature	-10 °C +55 °C	EMC: EN 58 081-1,2; EN 50 082-1,2	

TO ORDER

	Reference
Package includes: - MAP607 - mini USB cable - Qual-view and Qual-SRT software - carrying case	MAP607-P

MAP COMPACT

Compact Power Quality Analyzer – Class A with monitoring of EN50160 template and calculation of energy values

- Built-in display
- Measurement compliant with IEC 61000-4-30 Class A
- Integrated EN50160 and NRS048 report generation function
- Recording of voltage dips / swells / outages
- Waveform capture with programmable pre-time and post-time
- Measurement of power and energy values as primary quantities
- Communication interfaces
- Compact format for installation in existing cabinets

SPECIFICATIONS

Inputs		Characteristics	
PH/N, PH/PH voltage input	3	0-364/0-630 VRMS	Impedance 1 MΩ
Current input	3	0-6 A RMS	Impedance 10 mΩ
CT and VT ratio	■		
Sampling and algorithmic conformity			
Sampling		12.8 kHz / 16 bits	Anti-aliasing filter and PLL synchronization
Bandwidth		3.5 kHz	
Network quality		IEC 61000-4-30 Class A	
Harmonics		IEC 61000-4-7	50th order
Flicker		IEC 61000-4-15	
Voltage surges		IEC 61000-3-3	
Template monitoring		EN50160 / NRS048	
Parameters measured			
Voltage	■		EN50160
Frequency	■		EN50160
Unbalance	■		EN50160
Harmonics	■		EN50160
Flicker (Pst, Plt, Ifl)	■		EN50160
Current	■		10 min
Power	■	P/Q/S, PF, Cosφ	Selectable integration
Energy	■	kWh, kVArh	Selectable integration
Storage, communication and display			
Mini-USB	■		
CL port	■		
RS232 port	■		
Ethernet port	Available as an option		
Storage capacity	Flash, circular	64 MB	
Display	Navigation keys	3 lines	U, I, events
Power supply and power reserve			
Power supply		175 Vac to 255 Vac	
Internal power reserve		10 s	
Mechanical specifications			
Dimensions		155 x 165 x 68 mm	
Weight		0.9 kg	
Operating temperature		-10°C to +55°C	
Advantages	Integrated EN50160 reports Display Measurement of network quality and energy in kWh / kVarh Compact format		

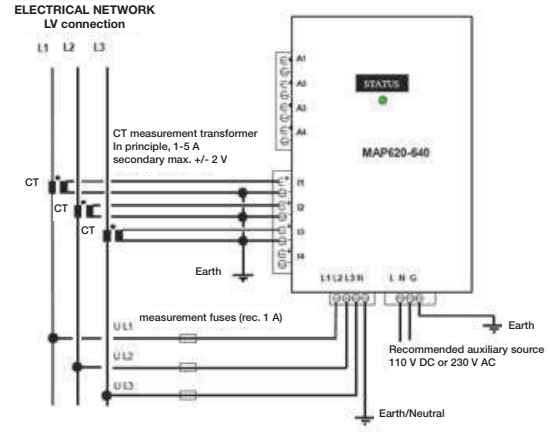
TO ORDER

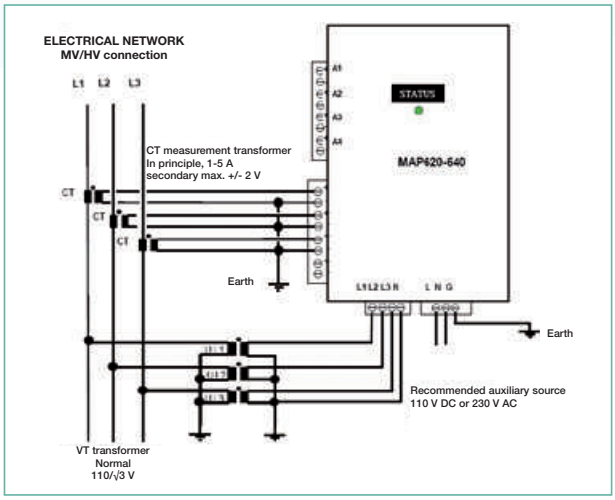
	Reference
MAP COMPACT without Ethernet	P01 3400 10
MAP COMPACT with Ethernet	P01 3400 20

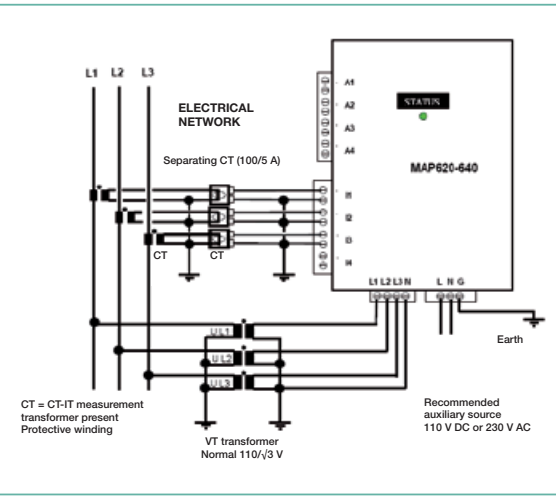
PERMANENT ANALYZERS - THREE-PHASE

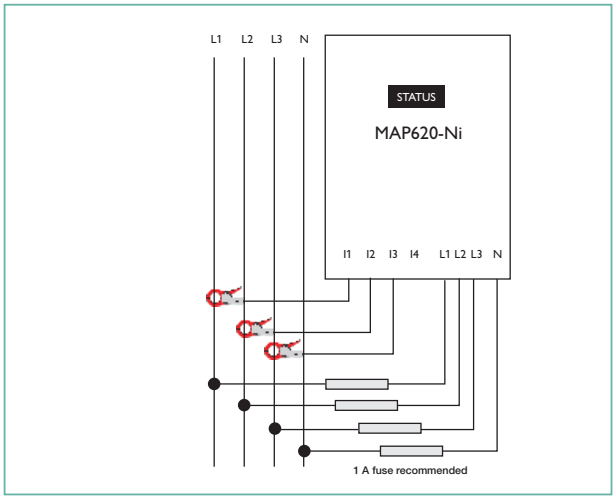
		PERMANENT		NON-INTRUSIVE
		MAP 620	MAP 640	MAP 620-NI
Inputs	**Specifications**	Voltage / Current		
Voltage	0-400/690 VRMS	■	■	■
HF voltage	0-400/690 VRMS, high frequency (2 MHz)		■	
Current	Current transformers or external sensors	0-6 A RMS		2 VAC
General	0-20 mA analog inputs	4	4	
Network quality parameters				
Voltage	Min, Max, average values	■	■	■
Frequency		■	■	■
Unbalance		■	■	■
Lfl, Pst and Plt flicker	Pst 10 min, Plt 2 h, Selectable storage range	■	■	■
Signalling voltages	< 3,000 Hz	■	■	■
THD-F		■	■	■
Individual harmonics	Up to 50th order	■	■	■
Interharmonics	Up to 50th group	■	■	■
Voltage surges	Number of times and variation (%)	■	■	■
Sliding reference	Complies with IEC 61000-4-30 Class A	■	■	■
Other parameters				
Current	Min, Max and average values	■	■	■
Current harmonics	Up to 50th order	■	■	■
Power measurement	P/Q/S, PF/cosφ	■	■	■
Energy measurement	in the software, active, reactive, apparent	■	■	■
Event-related				
Dips / overvoltages / interruptions / outages	1/2-1 cycles RMS, Class A	■	■	■
Calculation of event direction	Upstream/Downstream	■	■	■
Signature recording	12.8 kHz, half-period RMS curve	■	■	■
Pre-/post-triggering	Pre/post configurable, Pre+Post ≤ 15 s	■	■	■
Waveform recording	Configurable up to 12.8 kHz	■	■	■
Pre-/post-triggering	Pre/post configurable, Pre+Post ≤ 20 cycles	■	■	■
HF transients, peak detection	2 MHz		■	
Recording of waveforms and HF transients				
Power supply				
Power supply input range	85-264 Vac / 110-375 Vdc, (47-63 Hz)	■	■	■
Internal back-up		■	■	■
Compliance with standards				
IEC 61000-4-30, Class A	< 0.1%, reference standard	■	■	■
IEC 61000-4-7	Measurement of harmonics	■	■	■
IEC 61000-4-15	Flicker measurement	■	■	■
EN 50 160	Calculated in the equipment	■	■	■
Customized reports	Calculated in the equipment	■	■	■
PQDIF format		Option	Option	Option
Hardware				
Memory	128 MB Flash memory (NAND)	■	■	■
Sampling frequency		12.8 kHz	12.8 kHz / 2 MHz	12.8 kHz
Voltage accuracy		< 0.1 %	< 0.1 %	< 0.1 %
Resolution		16 bit	16/10 bit	16 bit
Standard bandwidth / HF		3.5 kHz / -	3.5 kHz / 1 MHz	3.5 kHz / -
Input impedance - voltage input		1 MΩ	1 MΩ	1 MΩ
Input impedance – current input		10 mΩ	10 mΩ	ext. sensor
Anti-aliasing filter		■	■	■
Communication				
RS-232	PC port	■	■	■
RS-232	Modems, external couplers, etc.	■	■	■
CL port	Current loop port	■	■	■
Ethernet port (RJ-45)	Ethernet port	Option	Option	Option
Mechanical specifications				
Dimensions (L x H x W) in mm		160 x 240 x 90	160 x 240 x 90	160 x 240 x 60
Electrical connection		Terminal strip		BNC and banana plug
Weight		1.3 kg	1.7 kg	1.3 kg
Operating temperature		-10 °C +50 °C		

ELECTRICAL CONNECTIONS

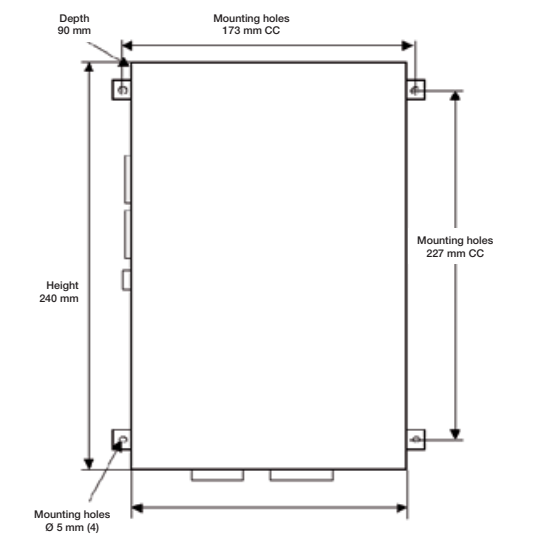






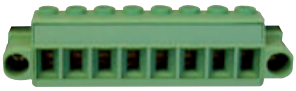


DIMENSIONS



CONNECTION SYSTEMS

MAP permanent analyzers

	MAP 620	MAP 640	MAP Compact
			Screw-on connectors
Voltage			
Current			

MAP non-intrusive analyzers

MAP 620-NI / Nix
¼ turn connection systems
620-Nix (independent power supply)


MAP NETWORK ANALYZER

TO ORDER

MAP6 ☐ **0** **C** ☐ ☐ **6**

Model

2 Three-phase - Voltage + Current

4 Three-phase - Voltage + Current + HF transients

Digital outputs

C With digital outputs

Communication

0 Without Ethernet port (COM and MODEM only)

E With Ethernet port (+ COM and MODEM)

Power supply

0 85 - 264 Vac / 110 - 375 Vdc

4 48 Vdc

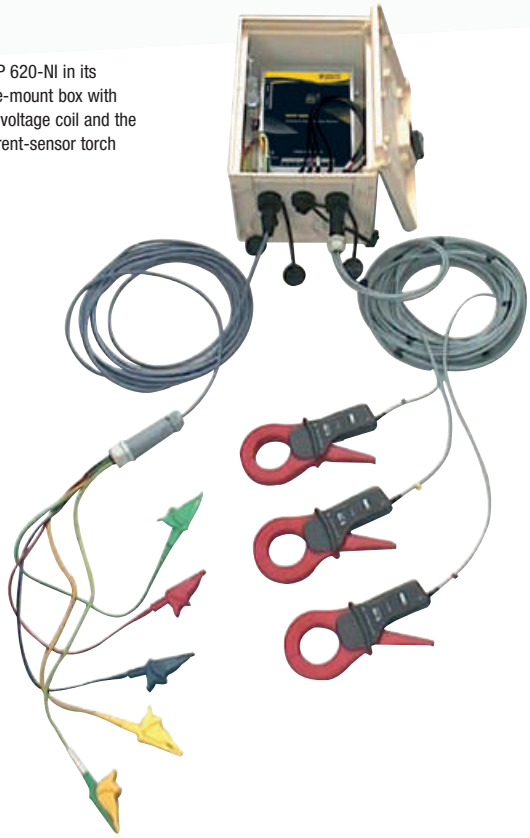
Voltage input

6 690 VRMS (Ph-Ph)

Example:
Order the code MAP640CE46 for a MAP640 model with Ethernet port, 48 Vdc power supply + 690 VRMS voltage input.

SELF-POWERED ANALYZER MEASUREMENT IN POLE-MOUNTED BOXES

MAP 620-NI in its pole-mount box with the voltage coil and the current-sensor torch



Output via leakproof connectors on the underside of the box

TO ORDER, PLEASE CONTACT US

ENVIRONMENT

Operating temperature: -10°C to + 50°C

Relative humidity: 10% - 85%, without condensation

Installation category: Category III, 600 V (300 V for the MAP607)

Pollution level: 2

COMPLIANCE WITH STANDARDS

Measurements:

- EN 61000-4-30: Voltage quality measurement method (Class A RMS values)
- EN 61000-4-7: General guide to harmonic and interharmonic measurements
- EN 61000-4-15: Test and measurement technique: flickermeter

Safety (Low Voltage Directive):

- EN 61010-1: Safety rules for electrical equipment for measurement, testing and laboratory use
- EN 60950: Safety of data processing equipment

Communication:

- Protocol compatible with the associated Qual-SRT, E.Qual-Premium and E.Qual-Premium Server software, TCP/IP encapsulation on internal Ethernet port (option)

Electromagnetic compatibility:

- EN 61326-1: Instructions concerning EMC for electrical measurement, control and laboratory equipment

Including:

- EN 61000-4-2: Electrostatic discharge Level 3 (Air 8 kV / Contact 4 kV)
- EN 61000-4-3: Immunity to radiated electrostatic fields – Level 3 (10 V/m)
- EN 61000-4-4: Fast electrical transients – Level 4 (2 kV)
- EN 61000-4-5: Immunity to voltage surges – Level 4 (common mode 2 kV, differential mode 1 kV)
- EN 61000-4-6: Immunity to conducted disturbances – Level 3 (3 Vrms)
- EN 61000-4-8: Level 4 (30 A/m)
- EN 61000-4-11: Level 0 (duration 0.5 period – voltage dip and short interruption 100% U)
- EN 61000-4-12: Level 3 (common mode 2.5 kV / diff. mode 1.0 kV)
- CISPR 16-2-1, CISPR 16-2-3, EN55011 (EN5022 required by the generic standard EN 61326)

MECHANICAL SPECIFICATIONS

Weight:

- 1.3 kg (MAP 620 and MAP640)
- 1.7 kg (MAP 670-NI – excl. accessories)
- Mechanical shock test: EN60068-2-27: table 1: 30 g/18 m sec

Connection:

- 4 mm² cable for U and I
- 2.5 mm² cable for inputs/outputs

NOTES

MAP SOFTWARE
RANGE

Management and analysis software
for the MAP range.

DESCRIPTION

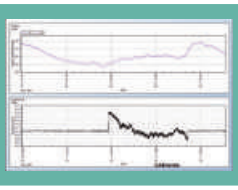
Depending on the model, the range of software for MAP allows:

- configuration of the MAPs
- creation of call sessions
- display of the electrical parameters (monitoring mode)
- retrieval of recorded data
- analysis of the disturbances and transients
- EN 50160 analysis
- a point-to-point or client/server architecture
- an automatic data retrieval engine
- multi-equipment analysis sessions
- external synchronization by server
- an event viewer module for duty control rooms
- report printing
- transmission of alarms by email, SMS, etc.

+

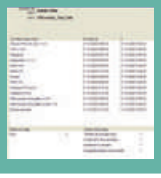
- **Particularly user-friendly software**
- **Analysis and diagnostics according to the applicable standards**
- **Set-up of all the parameters in the EN 50160 standard on a single screen**
- **Qual-Web module for all your quality measurements in your web browser**

ZOOM



Graphic display
of all the available
parameters

Configuration
and manual
or automatic
retrieval of the data



Generation
of reports

RECOMMENDED CONFIGURATION

PC platform:

- operating system: Windows XP Pro SP3 / Vista / Seven / Server 2003 SP2 / Server 2008 / Server 2010
- processor frequency ≥ 2.0 GHz with dual-core architecture (e.g. Pentium or Intel Core 2 Duo)
- RAM ≥ 2 GB
- hard disk ≥ 250 GB with 240 MB free
- Ethernet network board

For the Equal-Premium Server version:
additional specifications :

- requires SQL Server
- processor frequency ≥ 2.0 GHz with dual-core architecture (e.g. Pentium or Intel Core 2 Duo)
- RAM ≥ 4 GB
- hard disk ≥ 500 GB, 1 GB free, base expansion 50/100 MB / unit / year

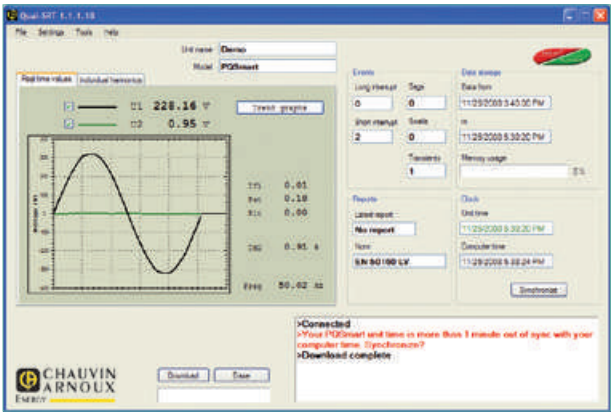
QUAL-SRT

For MAP 607 and MAP Compact

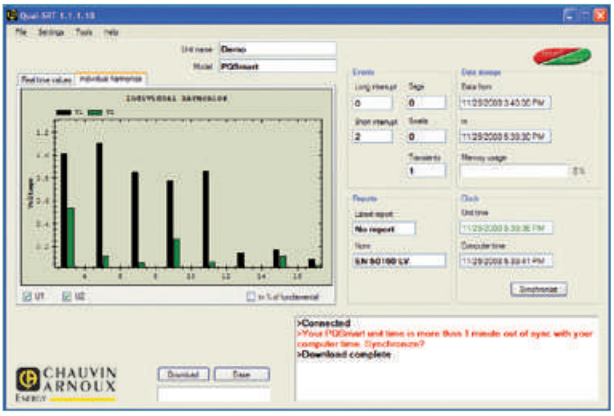
Configuration and real-time display module for "online" display of:

- the measurements
- the number of dips/ voltage surges / long outages / short outages / transients recorded
- the global status of the last EN50160 report
- the memory occupation rate
- the date and time on the equipment

Dynamic views are also available: the trend graph (recorder-type view) and the bargraph of harmonics up to the 50th order. Thanks to the self-declaring ultra-fast USB2.0 link, this module can be used for almost instantaneous recovery of the data while deleting them from the equipment.



Qual-SRT: real-time display of the waveform connected to a MAP 607



Qual-SRT: real-time display of the harmonics bargraph

TO ORDER

Description	Reference
Configuration software for MAP 607	QUAL-SRT
Configuration software for MAP Compact	QUAL-SRTc

ASSOCIATED PRODUCTS

MAP 607
Single-phase voltage quality analyzer
page 81

MAP Compact
Compact power and network quality analyzer
page 82

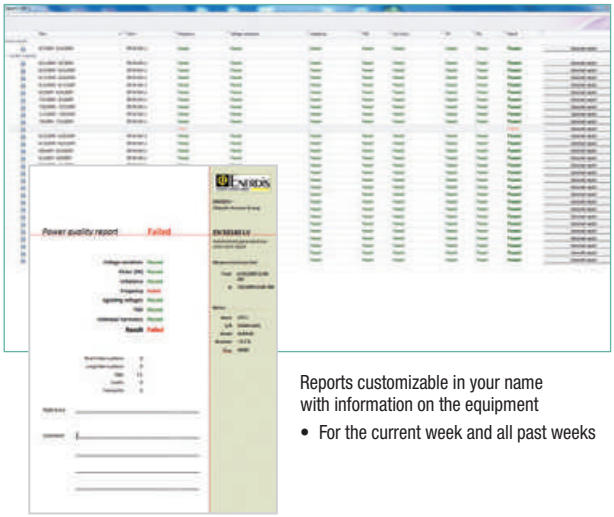
QUAL-VIEW

Analysis and report generation module for MAP network analyzers.

This provides a view of all the trend curves generated by the equipment, with the possibility of zooming and graphical display of the qualimetry template limits for each parameter.

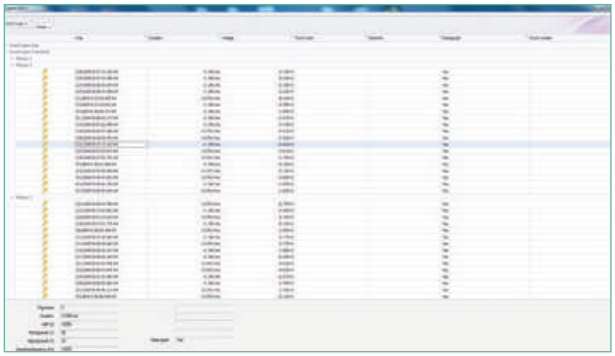
The event-based views such as the event signatures, waveforms and time/date-stamped events log can also be obtained by means of dedicated tabs in the Qual-View software.

- For discussing the quality of the energy supply at the point of connection
- Intuitive, user-friendly and simple to use in order to track the most complex phenomena
- For assessing the evolution of energy quality over time and measuring its impact on ageing of the installation and the size of your energy bill



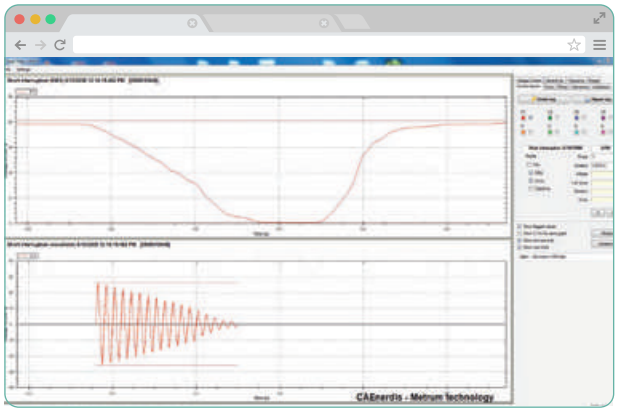
Reports customizable in your name with information on the equipment

- For the current week and all past weeks



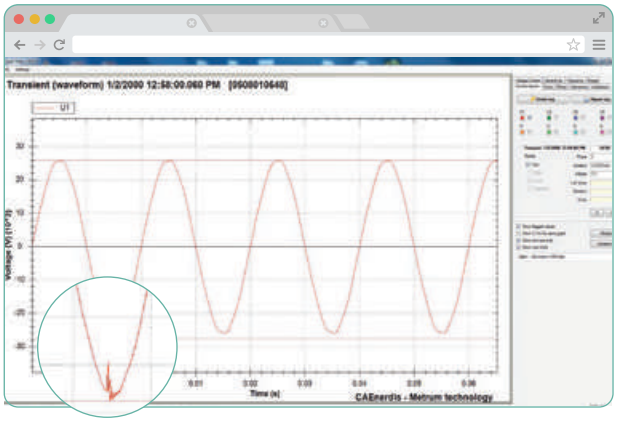
A history of all the events listed according to their type

- Relevant sorting systems (type, phase concerned, upstream/downstream, etc.)
- A summary of each time/date-stamped event along with a snapshot



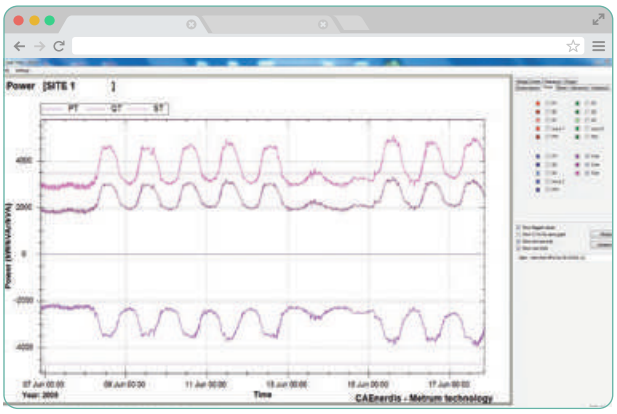
Understand the causes of network outages

- What happened?
- Does it come from my installation?
- Observe the waveform of the event affecting delivery of the energy as a voltage
- Compare this event with the waveform of the current

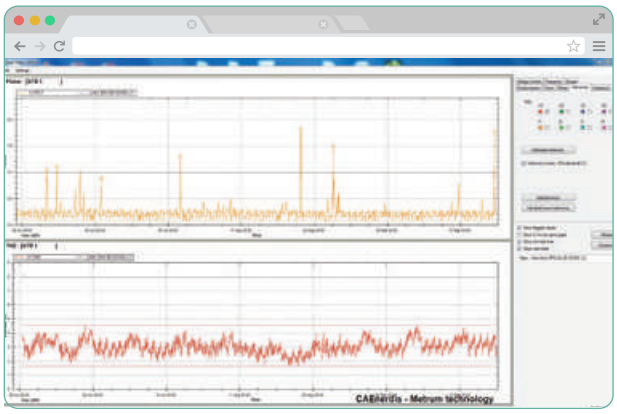


Benefit from all the tools needed for in-depth troubleshooting

- Zoom on the waveform at the time of the event (current or voltage)
- Display of the briefest phenomena distorting the waveform



An approach covering periods from 1 year down to 1 hour to detect the network's behaviour in the variations of power and active energy consumption



Maintaining the site and limiting the harmful effects of disturbances over the long term

- Benefit from a 10-minute approach for all the electrical quantities simultaneously:
  - The distorting power THDi vs. the apparent power S
  - Flicker disturbances
  - Frequency and unbalance
  - Harmonics and their components

TO ORDER

Description	Reference
Configuration, display and analysis software	MAP-QV

ASSOCIATED PRODUCTS

MAP 607
Single-phase voltage quality analyzer
page 81

MAP Compact
Compact power and network quality analyzer
page 82

MAP range
Three-phase network quality analyzer
page 80

E. QUAL-PREMIUM - E.QUAL-PREMIUM SERVER

Analysis and report generation modules for network analyzers in the MAP range.

E.Qual-Premium can be used to generate various views corresponding to the different parameters present in the measurement campaign recovered, including:

- views of the events
- views of the transients
- views of the trend curves
- views of the measurement campaign summaries
- reports generated directly in MS Word® format

The most extensive and critical electrical networks require special supervision of energy quality at the points of connection.
See the processing software views on page 90.

E.Qual-Premium Server is a unique, user-friendly solution for managing from ten to several hundred network analyzers.

E.Qual-Premium Server also includes E.Qual-Premium:

- graphical multi-equipment views
- multi-equipment event logs
- statistical views

Peace of mind: all the data retrievals are performed automatically by a high-performance remote data-retrieval engine

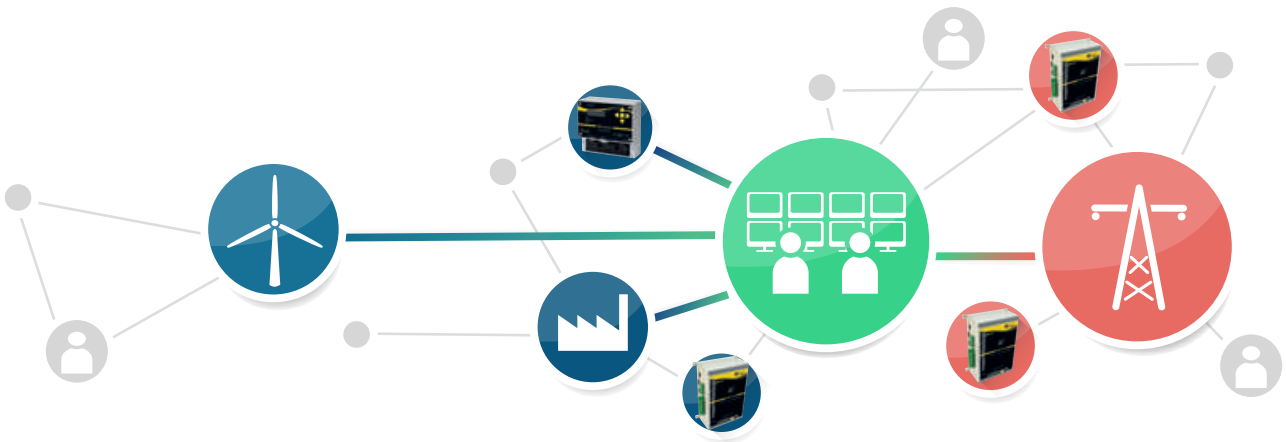
Complete: a history from the moment the equipment fleet was commissioned, allowing benchmarking of all the analyzers

Analysis: special tools for summarizing the measurements on the fleet of analyzers and sharing the information in concise form with the decision-makers and operators

	E.Qual-Premium	E.Qual-Premium Server
Architecture		
Point to point	■	■
Multi-equipment by successive targeting	■	■
Management of measurements in database		■
Multi-site / multi-equipment		■
Client / Server architecture		■
Data transfer		
Manual	■	■
Selective transfer	■	■
Automatic transfer		■
Communication log		■
Measurement display		
Real-time waveform and vectorial	■	■
Recorded curves	■	■
Curves with multi-equipment parameters		■
Global measurement campaign		■
Event display		
List of events	■	■
Waveform and fast RMS	■	■
Sorted views		■
Statistical view of events		■
Report generation		
Standard report covering one week	■	■
Report covering customizable period		■

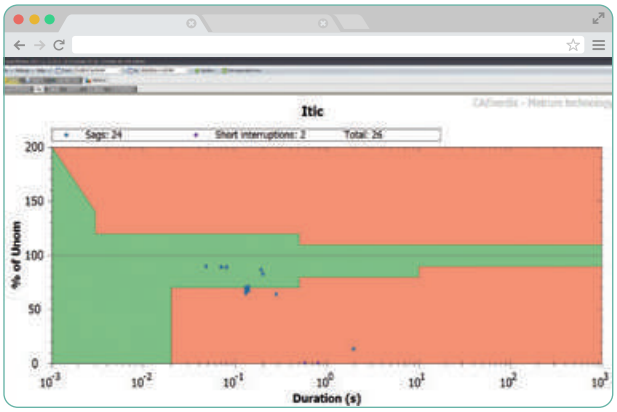
TO ORDER

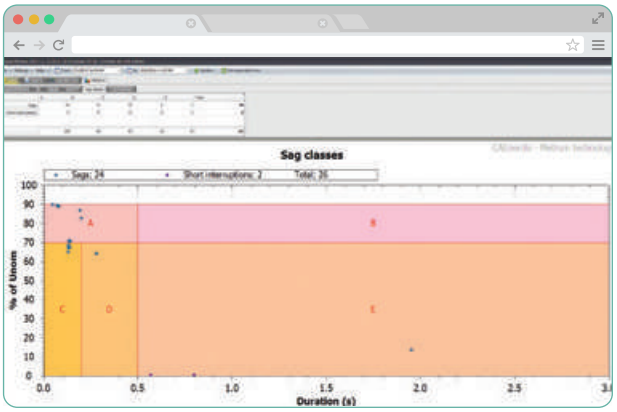
Model	Description	No. of licences	Reference
E.Qual-Premium	Configuration, display and analysis software	1	P01340120
E.Qual-Premium Server	Configuration, remote data retrieval, display, administration and analysis software	5	P01340123
E.Qual-Premium Server	Configuration, remote data retrieval, display, administration and analysis software	20	P01340122



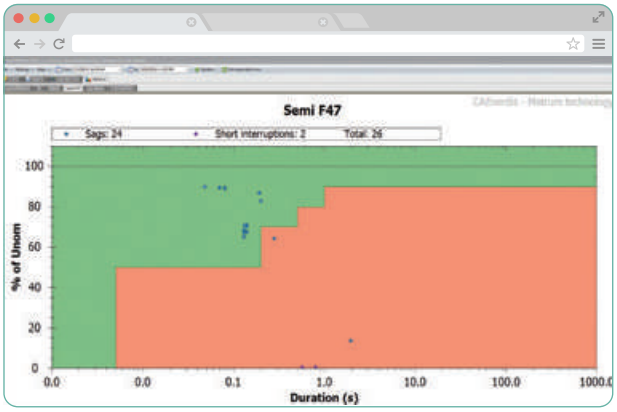
E.QUAL-PREMIUM SERVER

Analytical and statistical tools





The statistical distributions used for electrical network management



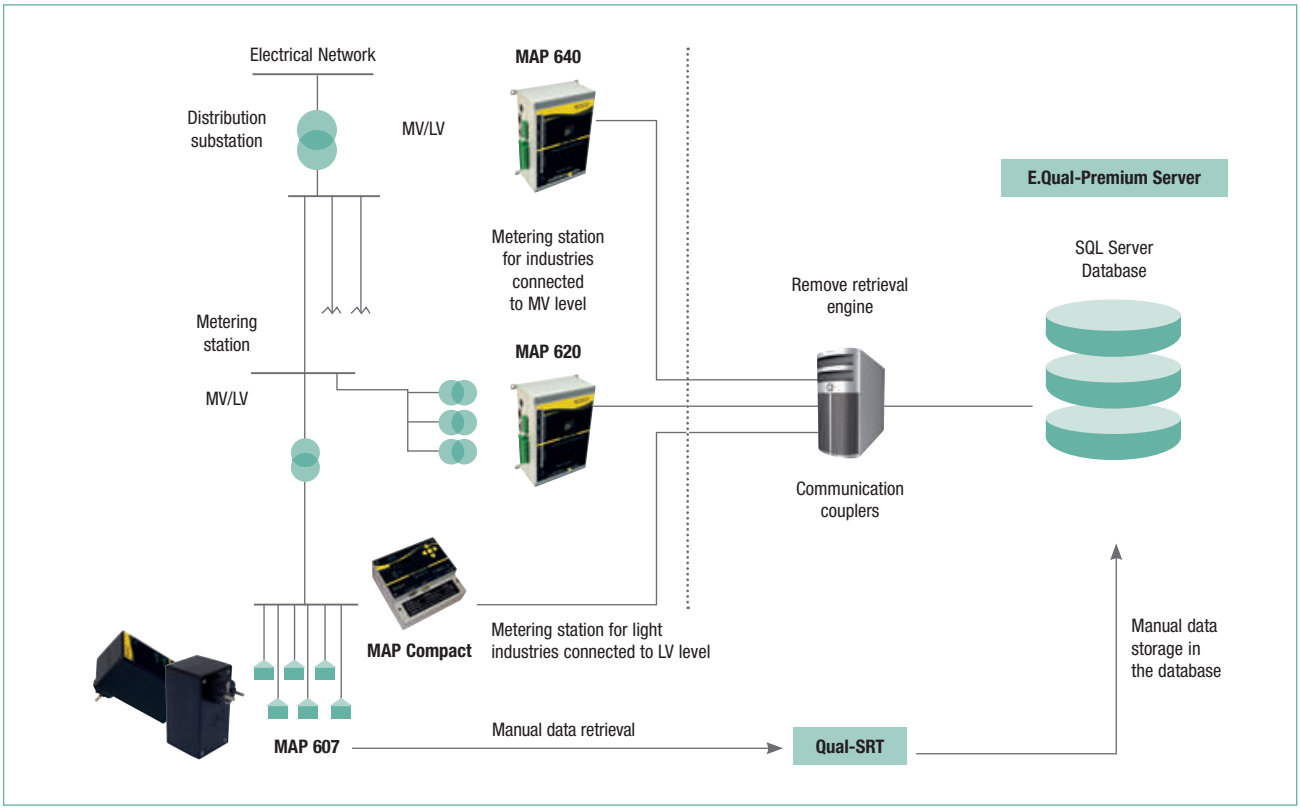
The sector-specific analytical tools for IT environments and sensitive industrial processes

ASSOCIATED PRODUCT

MAP range
Three-phase network quality analyzer
page 80

E.QUAL-PREMIUM SERVER ARCHITECTURE

The E.Qual-Premium Server architecture is ideal for applications where you want to analyze the energy quality measurements gathered from several points in the electrical network and compile data supplied by different models in the MAP range. Thanks to its automatic remote retrieval engine, the E.Qual-Premium Server software is capable of transferring the data from the different network analyzers and integrating them into the system's SQL-server® base. The multi-equipment analysis module can then use the measurements stored in the database to generate composite views and statistics grouping information from several measurement points.



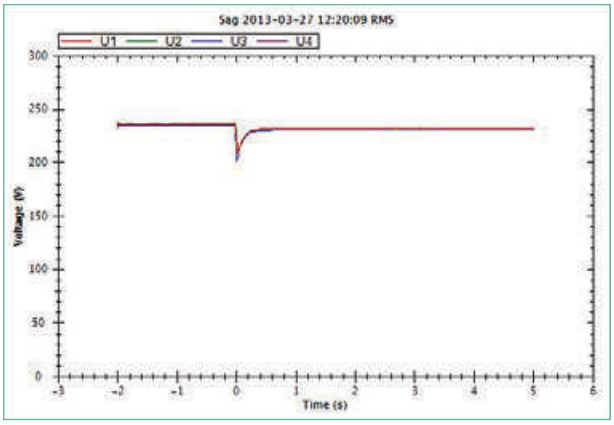
Components of an E.Qual-Premium Server with the network analyzers, the communication links, the database and the analysis and graphic display modules.

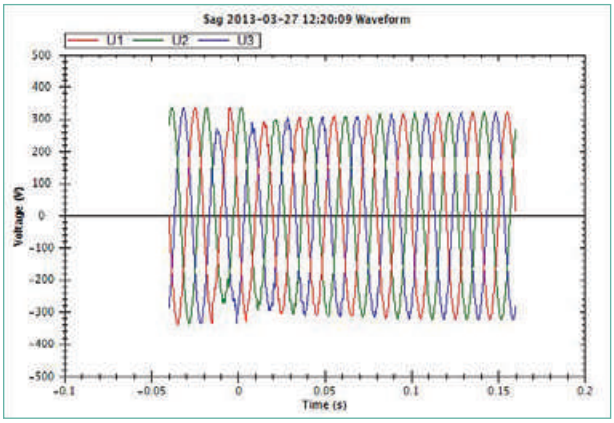
QUAL-WEB

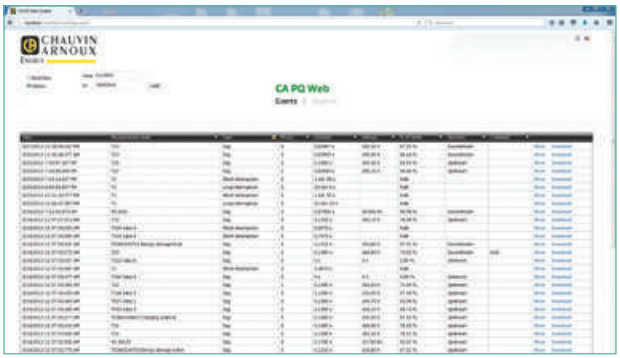
Key information from the qualimetry database available in a web browser.

Add-on module for E.Qual-Premium Server enabling transmission of the information from the database to other users (operators, customers, management, etc.) which does not require any local software installation.

- Management of EN50160 report generation and events
- Access manager: the administrator can limit access to a selection of devices for the various users.







NOTES

NOTES

NETWORK SUPERVISION AND PHYSICAL MEASUREMENT

CURRENT TRANSFORMERS AND SHUNTS

100 OVERVIEW OF THE RANGE
102 SELECTION GUIDE
108 TERTIARY AND INDUSTRIAL CURRENT TRANSFORMERS
122 CURRENT TRANSFORMERS FOR TARIFF METERING
133 CURRENT TOTALIZERS
134 CT SHORT-CIRCUITER
136 SHUNTS

CURRENT TRANSFORMERS AND SHUNTS

Tertiary and industrial current transformers

TCR
Wound primary
Class 0.5/1/3
page 109

TCR
Cable/busbar primary
Class 0.5/1/3
page 110

TCR
Busbar primary
Class 0.5/1/3
page 113

JVS
Cable/busbar primary
Class 0.2s
page 114

TCRO
Split core
Without conductor opening
page 118

TC CLIP
Split core
Small volume
page 122

Current transformers for tariff metering

Core – Single-phase

JVR86
Wound primary
M8-M10
page 125

JVO 40-100
Cable primary
Ø 42 mm - Class 0.5
page 127

JVO 40-100 S
Cable primary
Ø 40 mm - Class 0.2s
page 128

J3R 80B
Cable primary
Ø 66 mm - Class 0.5
page 125

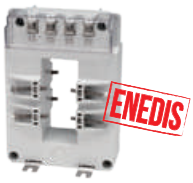
JVO 90-160S
Cable primary
Ø 90 mm - Class 0.2s
page 129

JVS 38B
Cable/ busbar primary
Ø 63 mm - Class 0.2s
page 116

JVP 1025
Busbar primary
100 x 20 - Class 0.5
page 125

JVP 1045
Busbar primary
100 x 40 - Class 0.5
page 125

JVP 1045B
Busbar primary
100 x 40 - Class 0.5
Two-rating
page 126



JVP 1145S
Busbar primary
100 x 12 - Class 0.2s
page 130

Current transformers for tariff metering

Plate-mounting - Three-phase

TRI 500
Single-rating
50 to 240 mm² cable clamp
Class 0.5
page 131

TRI 700
Three-rating
50 to 240 mm² cable clamp
Class 0.5
page 132

TRI 700 S
Two-rating
50 to 240 mm² cable clamp
Class 0.2
page 132

Current totalizers

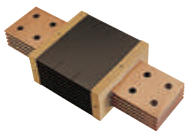
JVM 15
CT designed to add together the instantaneous current values from the secondaries of 2 or 3 current transformers.
page 133

CT short-circuiter

PRTC
Protection against the hazards due to opening of the secondary circuit of a low-voltage measurement CT.
page 134

Shunts

Class 0.5



76/2 - 77/2 range
1 to 4,000 A
A reference for measurement in demanding applications.
page 138

Class 1

SHMI range
1 to 6,000 A
Vast choice for industrial applications.
page 140

SHEL range
10 to 300 A
At low power, everything you need to facilitate implementation.
page 142

SHMO range
1 to 60 A
DIN-rail mounting.
page 142

CHOOSING YOUR TERTIARY AND INDUSTRIAL CURRENT TRANSFORMER

	TCR Wound primary		TCR / JVS Cable/busbar primary						
	page 109		page 110						
									
	TCR 10	TCR 15	TCR 21	TCR 31	TCR 41 JVS 25B	TCR 51 JVS 26B	TCR 61 JVS 30B	TCR 71 JVS 38B	TCR 75 JVS 39B
Accuracy class	0.5 / 1 / 3	0.5 / 1 / 3	0.5 / 1 / 3	0.5 / 1 / 3	0.5 / 1 / 3 0.2s	0.5 / 1 / 3 0.2s	0.5 / 1 / 3 0.2s	0.5 / 1 / 3 0.2s	0.5 / 1 / 3 0.2s
Wound primary (threaded rod)	Aperture 25 x 25	Wire 16 mm²							
Cable primary (mm)			Ø 20	Ø 22	Ø 26	Ø 28	Ø 44	Ø 63	
Busbar primary (mm)			15 x 10 20 x 10 25 x 5	20 x 12 25 x 11 30 x 10	20 x 20 25 x 12 30 x 10	20 x 25 30 x 15 40 x 10	50 x 30 60 x 12	50 x 50 60 x 37 80 x 30	3 x 100 x 10
Primary 5 A	■	■							
10 A	■	■							
15 A	■	■							
20 A	■	■							
25 A	■	■							
30 A	■	■							
40 A	■	■	■						
50 A	■	■	■						
60 A	■		■						
75 A	■		■						
100 A	■		■	■	■	■ / ●			
125 A	■		■	■	■ / ●	■ / ●			
150 A	■		■	■	■	■			
200 A			■	■	■	■			
250 A			■	■	■	■			
300 A				■	■	■			
400 A				■	■	■	■ / ●	■ / ●	
500 A				■	■ / ●	■	■	■ / ●	
600 A				■	■ / ●	■	■	■ / ●	
750 A						■	■	■ / ●	
800 A						■	■	■ / ●	
1,000 A							■	■	
1,200 A							■	■	
1,500 A							■	■	■
2,000 A								■	■
2,500 A								■	■
3,000 A								■	■
4,000 A									■
5,000 A									
Strengths	Combining a high level of accuracy and compact design.		Extensive choice of primaries. Mounting accessories supplied as standard.						

■ Please contact us. 5 A secondary as standard ■ 1 A secondary on request ■ 5 A secondary only ● JVS only - 5 A secondary available

User sectors

tertiary | industry | energy generation | energy transmission & distribution | nuclear | energy efficiency | rail

TCR / JVS Busbar primary	TCRO Split core	TC CLIP Split core
page 113	page 118	page 122

TCR 80 JVS 40	TCR 90 JVS 50	TCR 100 JVS 60	TCRO 2030	TCRO 5080	TCRO 8080	TCRO 80120	TCRO 80160	TCC 176	TCC 241	TCC 242	TCC 364	TCC 366
0.5 / 1 / 3 0.2s	0.5 / 1 / 3 0.2s	0.5 / 1 / 3 0.2s	0.5 / 1 / 3	0.5 / 1 / 3	0.5 / 1 / 3	0.5 / 1 / 3	0.5 / 1 / 3	1	1	1	1	1
								Ø 17	Ø 24	Ø 24	Ø 36	Ø 36
100 x 20	100 x 30	125 x 60	20 x 30	50 x 80	80 x 80	80 x 120	80 x 160					
								■				
			□						■			
			□									
			□							■		
			□	□	□							
			□	□	□							
			□	□	□						■	
				□	□	□						
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		□					□					

TCR / JVS	TCRO	TC CLIP
Complete products for 100 and 125 mm busbar type.	A wide range suitable for most primaries. Installation without disconnecting busbars.	Implementation without disconnecting the power cables. Compact format.

■ 1 A secondary

CHOOSING YOUR CURRENT TRANSFORMER
FOR TARIFF METERING

		Core - single-phase					
		page 125	page 127	page 128	page 125	page 129	page 116
							
		JVR 86	**JVO 40-100**	**JVO 40-100 S**	**J3R 80B**	**JVO 90-160 S**	**JVS 38B**
Type of connection	**Wound primary**	Ø M8/M10 > 75 A					
	Cable primary (diameter mm)		Ø 42	Ø 40	Ø 66	Ø 90	Ø 63
	Busbar primary (mm)						50 x 50 60 x 30 80 x 30
	Cable clamp (section mm²)						
Accuracy	**Accuracy class**	0.5	0.5	0.2s	0.5	0.2s	0.2s
	Precision power (VA)	20	7.5 (two-rating) / 15	7.5	15 (5 for 300 A 10 for 400 A)	7.5	10 (7.5 for 1,000 A)
Rating	**Single-rating**	■	■		■		■
	Two-rating		200 - 500 A	200 - 500 A			
	Three-rating					500 - 1,000 - 2,000 A	
Primary	**5 / 5 A**	■*					
	20 / 5 A	■*					
	40 / 5 A	■*					
	50 / 5 A	■					
	60 / 5 A	■*					
	75 / 5 A	■					
	100 / 5 A	■*					
	150 / 5 A	■					
	200 / 5 A	■	■	■			
	250 / 5 A						
	300 / 5 A				■*		
	400 / 5 A				■*		
	500 / 5 A		■	■	■*	■	
	600 / 5 A				■*		
	750 / 5 A				■*		
	800 / 5 A						
	1,000 / 5 A				■*	■	■
	1,200 / 5 A						■
	1,250 / 5 A				■		
	1,500 / 5 A				■		■
	2,000 / 5 A					■	■
	2,500 / 5 A						■
	3,000 / 5 A						■

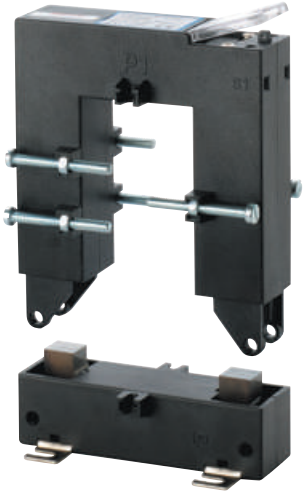
* Also available with 1 A secondary. Please contact us.

Core - Single-phase

Plate-mounting - Three-phase

page 125	page 125	page 126	page 130	page 131	page 132	page 132
						
JVP 1025	**JVP 1045**	**JVP 1045B**	**JVP 1145 S**	**TRI 500**	**TRI 700**	**TRI 700 S**
100 x 20	100 x 40	100 x 40	100 x 12			
				50 to 240	50 to 240	50 to 240
0.5	0.5	0.5	0.2s	0.5	0.5	0.2s
15 (30 for 1,250 A)	15 (30 for 1,000 A)	7.5 (two-rating) / 15	7.5	15	3.75	7.5
■	■	■		■		
		500 - 1,000 A 1,000 - 2,000 A				50 - 100 A 100 - 200 A 200 - 500 A
			500 - 1,000 - 2,000 A		100 - 200 - 500 A	
				■		
				■	■	■
				■		
				■	■	■
				■		
				■		
■		■	■	■	■	■
■	■			■		
	■	■	■			
■						
		■	■			

INFO & ADVICE



TRANSFORMERS

Function

Current transformers power low-voltage measuring instruments and isolate them from the network. They supply their secondary winding with a standard current proportional to the primary current. They are divided into four main families:

- wound primaries;
- split-core primaries;
- cable primaries;
- busbar primaries.

These transformers can be used with all types of measuring instruments: ammeters, energy meters, power monitors, etc.

How to choose a current transformer

The choice is based on two main criteria:

- the current on the primary (transformation ratio Ip / 5 A);
- the type of installation.

In other words, the choice **depends on the type of cable or busbar** on the installation and the **intensity of the currents flowing through them.**

Determining a CT's accuracy class

The accuracy class of a current transformer depends on the transformer's apparent power (VA) and the consumption of the entire measurement line. It is the result of the measurement errors of each element in the line and must therefore be less than or equal to the accuracy class of the measuring instrument which it supplies, particularly for energy metering where accuracy has a direct impact on billing. For a given accuracy class, the measurement line's consumption must not exceed the current transformer's apparent power (VA).

Example of measurement chain consumption at 20 °C

Power dissipated per meter of line (2 ways)

Copper-wire section (mm²)	Secondary 5 A	Secondary 1 A
1.5 mm²	0.61 VA	0.025 VA
2.5 mm²	0.37 VA	0.015 VA
4 mm²	0.23 VA	0.009 VA
6 mm²	0.15 VA	0.006 VA

Enerium 50 Power Monitor	0.15 VA
5 m of double 2.5 mm² wire	0.37 x 5 = 1.85 VA
Measurement line consumption	0.15 + 1.85 = 2 VA

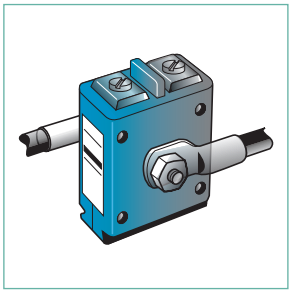
	Power (VA) on Class		
Primary	0.5	1	3
100 A	-	1	1.5
125 A	-	1	1.5
150 A	1	1.75	2.5
200 A	1.5	2.75	3.75
250 A	2	3.25	3.75
300 A	2.5	3.25	4
400 A	3	3.75	5
500 A	3.5	3.75	5
600 A	3.75	5	7.5

The transformer's accuracy class can then be deduced from the results obtained by referring to the table opposite (provided as an example):

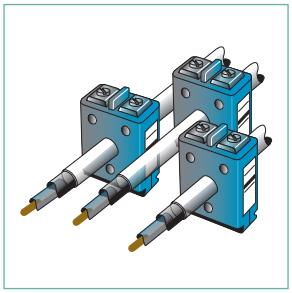
- Class 3 for a CT with a ratio of 150/5
- Class 1 for a CT with a ratio of 200/5
- Class 0.5 for a CT with a ratio of 250/5

CONNECTING A CURRENT TRANSFORMER

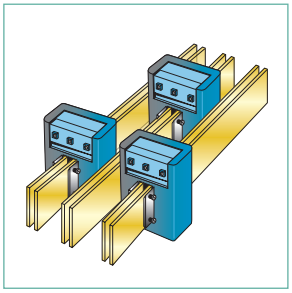
Chauvin Arnoux Energy current transformers offer 4 types of connection:



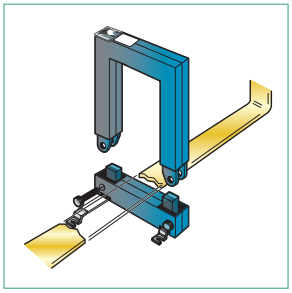
WOUND PRIMARY
for currents less than 200 A



CABLE PRIMARY
for currents between 40 and 2,500 A



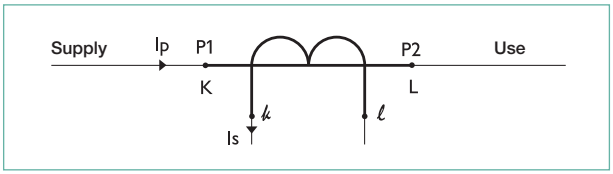
BUSBAR PRIMARY
for currents between 750 and 5,000 A

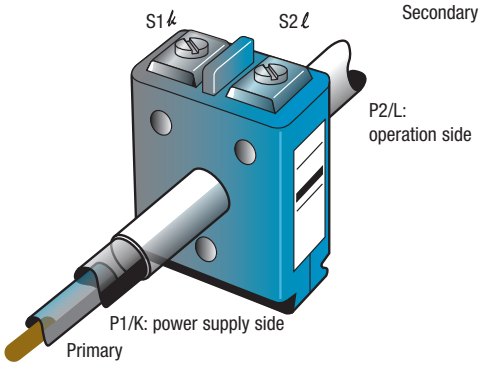


SPLIT CORE PRIMARY
for easy connection to an existing installation using a busbar or cable primary

CONNECTING YOUR CT

It is important to always install the transformer in the right direction, especially on three-phase networks, so as not to invert the phase shift between the current and the voltage on one or more of the phases.





Accuracy limit tables according to the IEC 60044-1 standard

Class	Limit errors – Table 1			
	± Error (in %) depending on In (in %)			
	5	20	100	120
0.2	0.75	0.35	0.20	0.20
0.5	1.50	0.75	0.50	0.50
1	3.00	1.50	1.00	1.00

Class	Limit errors – Table 2				
	± Error (in %) depending on In (in %)				
	1	5	20	100	120
0.2 S	0.75	0.35	0.20	0.20	0.20
0.5 S	1.50	0.75	0.50	0.50	0.50

FINANCIAL IMPACT OF A CT'S ACCURACY CLASS

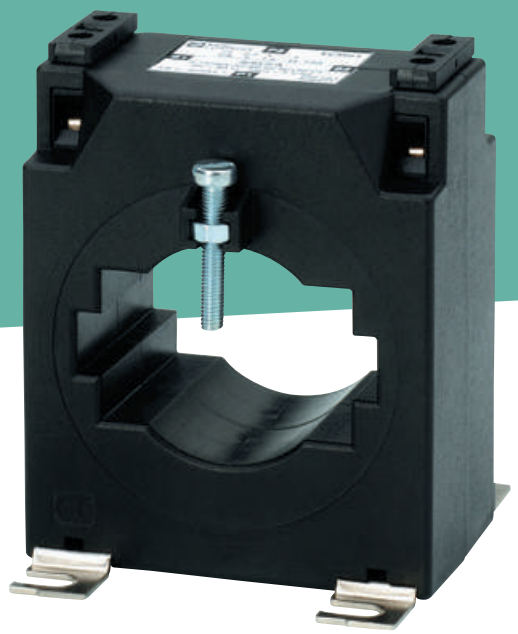
For a consumption of 12,000 MWh/year and a cost of 0.10 €/kWh

- CT class 1: ±120,000 kWh = ± €12,000
- CT class 0.5: ±60,000 kWh = ± €6,000
- CT class 0.2S: ±2,500 kWh = ± €2,500

This calculation takes into account neither the class of the measuring instruments, nor losses occurring on the network cables.

CT SAFETY RULES

You must never open the secondary circuit of a CT supplied on the primary. The very high voltage created may cause bodily harm or irreparable damage to the transformer.
Before working on the secondary of a CT, it must be shortcircuited.
When a CT is not in use (secondary open) the secondary must be short-circuited before powering up the system.
See page 134, PRTC transformer short-circuiter.



TCR
RANGE

CTs designed for submetering.
Accuracy class 0.5/1/3.

- Complete range: primary currents from 5 to 5,000 A and 5 A secondary currents
- DIN-rail mounting, plate mounting or clamped around the busbar
- Compact design

GENERAL SPECIFICATIONS

Reference standards: EN 60044-1 (ex IEC 185)
Maximum network voltage: 720 Vac
Dielectric test voltage: 3 kV/50 Hz/1 min
Frequency response: 50/60 Hz
Short-circuit thermal current (Ith): 60 In - 1 second
Dynamic current (Idyn): 2.5 Ith
Safety factor: < 5
Operating conditions: Temperature: -10°C to +50°C
Relative humidity: < 90%
Protection: Protection rating: IP 50
(terminal covers as standard depending on model)
Dry winding with self-extinguishing ABS covering (UL 94VO)

ZOOM

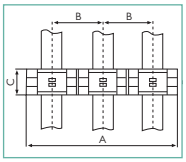

Outputs on split terminals enabling short-circuiting of the secondary current (M4 or cage for 4 mm² wire)

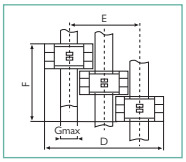

DIN rail mounting using supplied clip-on adapters for TCR 21 - 31 - 41 - 51


Supplied with bar clamp fitting accessories


Plate mounting using removable screw-on clips

3CT MOUNTING





Dimensions

Model	A	B	C	D	E	F	G
TCR 10	-	-	-	-	-	-	-
TCR 15	-	-	-	-	-	-	-
TCR 21	176	59	32	143.6	85.6	98	25.6
TCR 31	176	59	32	148.6	90.6	98	30.6
TCR 41	194	65	44	160.6	96.6	134	30.6
TCR 51	194	65	44	170.6	106.6	134	40.6
TCR 61	255.5	85.5	50	231.6	147.1	152	60.6
TCR 71	326	109	50	298.6	190.6	152	80.6
TCR 80	287	96	59	215	120	179	23
TCR 90	347	116	44	264	149	134	32
TCR 100	374	125	44	310	186	134	60

MOUNTING ACCESSORIES

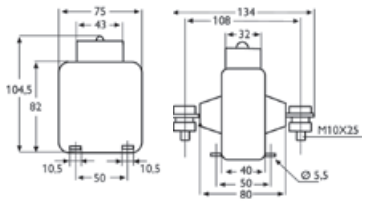
Model	DIN rail fittings	Plate mounting fittings	Sealable terminal cover*
TCR 10	1923 0021	■	■
TCR 15	■		
TCR 21	■	■	1923 0022
TCR 31	■	■	1923 0022
TCR 41	■	■	1923 0022
TCR 51	■	■	1923 0022
TCR 61		■	1923 0022
TCR 71		■	1923 0022
TCR 75		■	1923 0022
TCR 80		■	■
TCR 90		■	■
TCR 100		■	■

■ Standard accessories *sold in pairs

TCR WOUND PRIMARY

TCR 10

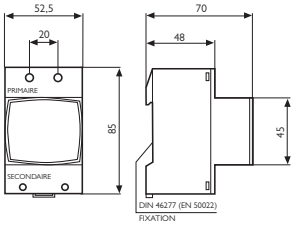
25 x 25 mm aperture



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
5 A	15	20	30	0.70
10 A	15	20	30	0.70
15 A	15	20	30	0.70
20 A	15	20	30	0.70
25 A	15	20	30	0.70
30 A	15	20	30	0.70
40 A	15	20	30	0.70
50 A	15	20	30	0.80
60 A	15	20	30	0.80
75 A	15	20	30	0.75
100 A	15	20	30	0.70
125 A	15	20	30	0.70
150 A	15	20	30	0.70

TCR 15

Primary: 16 mm² wire
Secondary: 4 mm² wire



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
5 A	2.5	5	7	0.28
10 A	2.5	5	7	0.28
15 A	2.5	5	7	0.28
20 A	2.5	5	7	0.28
25 A	2.5	5	7	0.28
30 A	2.5	5	7	0.28
40 A	2.5	5	7	0.28
50 A	2.5	5	7	0.28

TO ORDER

Primary	Secondary 5 A*
5 A	1920 1507
10 A	1920 1512
15 A	1920 1514
20 A	1920 1515
25 A	1920 1516
30 A	1920 1517
40 A	1920 1518
50 A	1920 1519
60 A	1920 1521
75 A	1920 1523
100 A	1920 1525
125 A	1920 1526
150 A	1920 1528

* Please contact us for 1 A secondary

Primary	Secondary 5 A*
5 A	1920 1707
10 A	1920 1712
15 A	1920 1714
20 A	1920 1715
25 A	1920 1716
30 A	1920 1717
40 A	1920 1718
50 A	1920 1719

* Please contact us for 1 A secondary

ASSOCIATED PRODUCTS

Mounting accessories

DIN-rail mounting, plate-mounting and sealable terminal cover.

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PRTC

CT short-circuiter

Protection against hazards due to opening of the secondary circuit of a low-voltage measurement CT.

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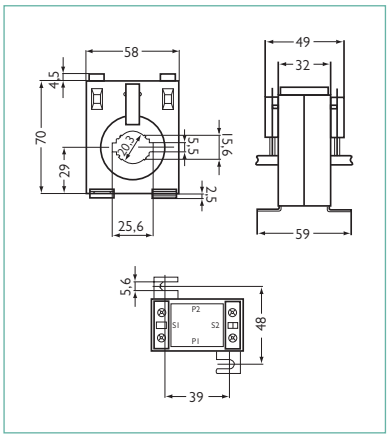
CABLE/BUSBAR PRIMARY

TCR 21

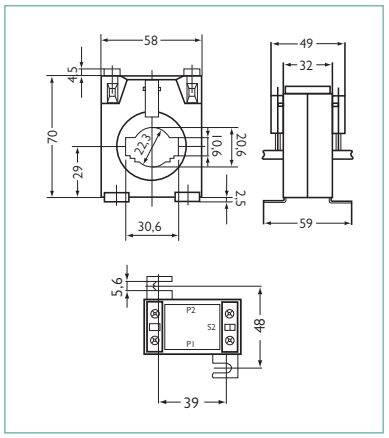
Cable Ø 20 mm
Bar: 15 x 10 mm
20 x 10 mm
25 x 5 mm



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
40 A	-	-	1.5	0.41
50 A	-	-	3	0.42
60 A	-	1.25	3.5	0.43
75 A	-	2	3.5	0.44
100 A	1.5	2.5	3.75	0.44
125 A	1.75	3.5	5	0.45
150 A	2.5	3.5	5	0.29
200 A	3.75	5	5	0.30
250 A	5	7.5	7.5	0.31

TCR 31

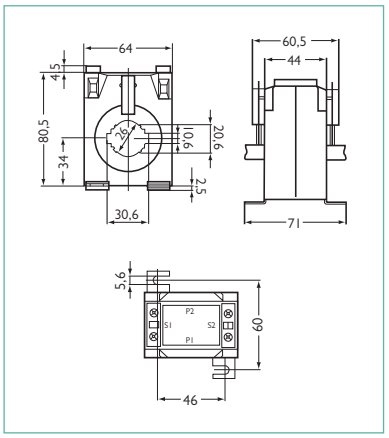
Cable Ø 22 mm
Bar: 20 x 12 mm
25 x 11 mm
30 x 10 mm



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
100 A	-	1	1.5	0.53
125 A	-	1	2	0.53
150 A	1	2	2.5	0.53
200 A	2.5	3	3.5	0.54
250 A	3.5	3.75	5	0.54
300 A	3.5	3.75	5	0.51
400 A	3.5	5	7.5	0.51
500 A	5	7.5	10	0.51
600 A	5	7.5	10	0.52

TCR 41

Cable Ø 26 mm
Bar: 20 x 20 mm
25 x 12 mm
30 x 10 mm



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
100 A	1.75	3.75	7.5	0.53
125 A	3.75	7.5	10	0.53
150 A	5	7.5	10	0.53
200 A	7.5	10	10	0.54
250 A	7.5	10	15	0.54
300 A	10	10	15	0.51
400 A	10	10	15	0.51
500 A	15	15	20	0.51
600 A	15	20	25	0.51

TO ORDER

Primary	Secondary 1 A	Secondary 5 A
40 A	Contact us	1920 2318B
50 A		1920 2319B
60 A		1920 2321B
75 A		1920 2323B
100 A		1920 2325B
125 A		1920 2326B
150 A		1920 2328B
200 A		1920 2330B
250 A		1920 2331B

Primary	Secondary 1 A	Secondary 5 A
100 A	Contact us	1920 2425B
125 A		1920 2426B
150 A		1920 2428B
200 A		1920 2430B
250 A		1920 2431B
300 A		1920 2433B
400 A		1920 2435B
500 A		1920 2436B
600 A		1920 2438B

Primary	Secondary 1 A	Secondary 5 A
100 A	Contact us	1920 2525B
125 A		1920 2526B
150 A		1920 2528B
200 A		1920 2530B
250 A		1920 2531B
300 A		1920 2533B
400 A		1920 2535B
500 A		1920 2536B
600 A		1920 2538B

ASSOCIATED PRODUCTS

PRTC

CT short-circuiter

Protection against hazards due to opening of the secondary circuit of a low-voltage measurement CT.

page 134

Mounting accessories

DIN-rail mounting, plate-mounting and sealable terminal cover.

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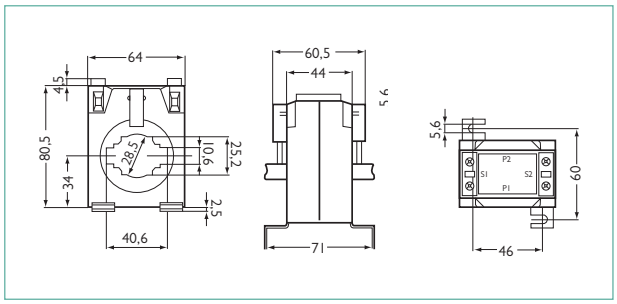
TCR 51

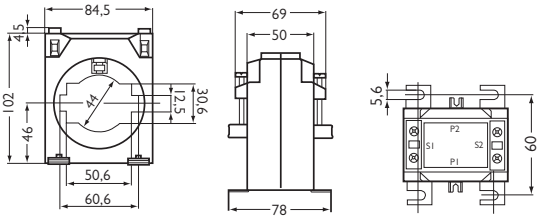
Cable Ø 28 mm
Bar: 20 x 25 mm
30 x 15 mm
40 x 10 mm



Primary	Power (VA) in class 0.5	1	3	Weight (kg)
100 A	0.5	1	2.5	0.36
125 A	0.75	1.5	3.75	0.37
150 A	1	3.5	5	0.37
200 A	3.5	5	7.5	0.38
250 A	5	7.5	10	0.39
300 A	5	7.5	10	0.40
400 A	5	7.5	10	0.41
500 A	7.5	10	15	0.41
600 A	7.5	10	15	0.42
750 A	10	15	20	0.43
800 A	10	15	20	0.44

TCR 61

Cable Ø 44 mm
Bar: 50 x 30 mm
60 x 12 mm



Primary	Power (VA) in class 0.5	1	3	Weight (kg)
400 A	5	7.5	10	0.5
500 A	7.5	10	15	0.52
600 A	10	15	20	0.52
750 A	15	20	25	0.59
800 A	15	20	30	0.60
1,000 A	15	20	30	0.61
1,200 A	15	20	30	0.63
1,500 A	15	20	30	0.65

TO ORDER

Primary	Secondary 1 A	Secondary 5 A
100 A	Contact us	1920 3425B
125 A		1920 3426B
150 A		1920 3428B
200 A		1920 3430B
250 A		1920 3431B
300 A		1920 3433B
400 A		1920 3435B
500 A		1920 3436B
600 A		1920 3438B
750 A		1920 3440B
800 A		1920 3441B

Primary	Secondary 1 A	Secondary 5 A
400 A	Contact us	1920 4735B
500 A		1920 4736B
600 A		1920 4738B
750 A		1920 4740B
800 A		1920 4741B
1,000 A		1920 4742B
1,200 A		1920 4751B
1,500 A		1920 4744B

ASSOCIATED PRODUCTS

Mounting accessories

DIN-rail mounting, plate-mounting and sealable terminal cover.

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PRTC

CT short-circuiter

Protection against hazards due to opening of the secondary circuit of a low-voltage measurement CT.

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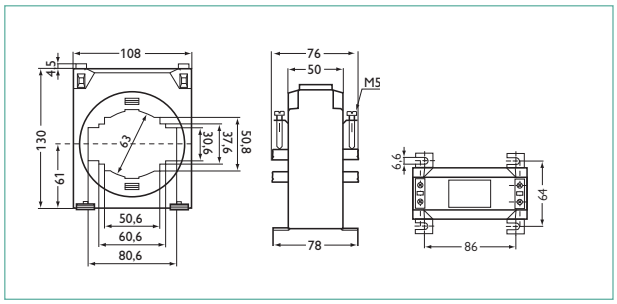
CABLE/BUSBAR PRIMARY

TCR 71

Cable Ø 63 mm
Bar: 50 x 50 mm
60 x 37 mm
80 x 30 mm

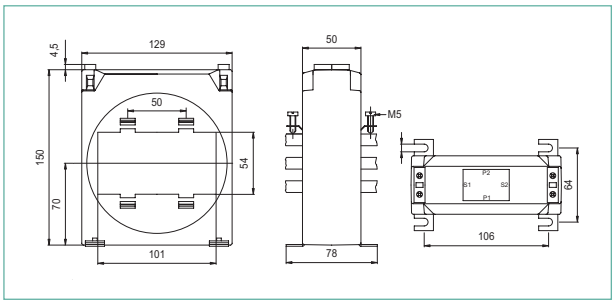


Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
400 A	5	7.5	10	0.82
500 A	5	7.5	10	0.80
600 A	7.5	10	15	0.83
750 A	7.5	10	15	0.88
800 A	7.5	10	15	0.66
1,000 A	10	15	20	0.72
1,200 A	10	15	20	0.68
1,500 A	15	20	25	0.84
2,000 A	15	20	25	0.82
2,500 A	15	20	30	0.88
3,000 A	15	20	30	0.88

Primary	Secondary 1 A	Secondary 5 A
400 A	Contact us	1920 4635B
500 A		1920 4636B
600 A		1920 4638B
750 A		1920 4640B
800 A		1920 4641B
1,000 A		1920 4642B
1,200 A		1920 4651B
1,500 A		1920 4644B
2,000 A		1920 4645B
2,500 A		1920 4646B
3,000 A		1920 4647B

TCR 75

Bar: 3 x 100 mm x 10 mm



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
1,500 A	5	20	30	1.47
2,000 A	15	20	30	1.55
2,500 A	20	30	40	1.63
3,000 A	30	40	60	1.71
4,000 A	35	40	60	1.87

Primary	Secondary 1 A	Secondary 5 A
1,500 A	Contact us	1920 5044B
2,000 A		1920 5045B
2,500 A		1920 4638B
3,000 A		1920 5047B
4,000 A		1920 5049B

TO ORDER

ASSOCIATED PRODUCTS

PRTC

CT short-circuiter

Protection against hazards due to opening of the secondary circuit of a low-voltage measurement CT.

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Mounting accessories

DIN-rail mounting, plate-mounting and sealable terminal cover.

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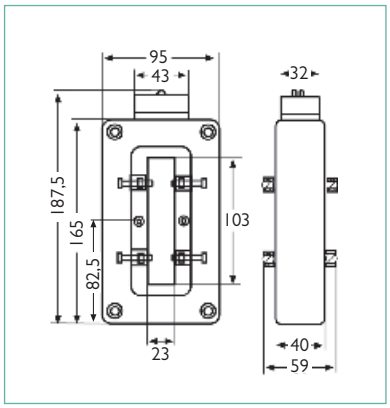
BUSBAR PRIMARY

TCR 80

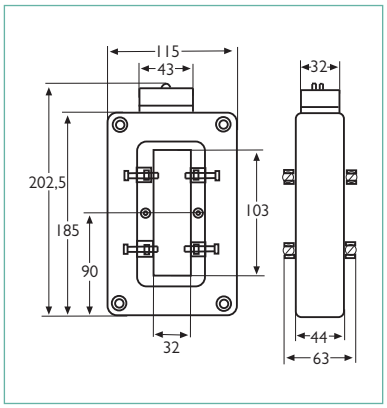
Bar: 100 x 20 mm



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
750 A	15	20	30	0.80
800 A	15	20	30	0.80
1,000 A	15	20	30	0.76
1,200 A	15	20	30	0.76
1,500 A	15	30	40	0.76
2,000 A	20	40	50	0.76

TCR 90

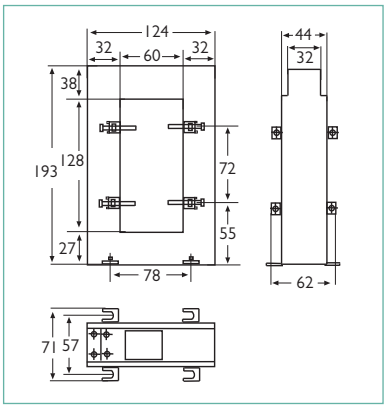
Bar: 100 x 30 mm



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
1,500 A	15	30	40	0.76
2,000 A	20	40	50	0.82
2,500 A	20	40	50	0.78
3,000 A	20	45	60	0.90
4,000 A	35	50	70	0.90
2,000 A	20	40	50	0.76

TCR 100

Bar: 125 x 60 mm



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
1,000 A	15	20	30	0.75
1,200 A	15	20	30	0.80
1,500 A	15	20	30	0.83
2,000 A	15	20	30	0.92
2,500 A	20	30	40	1.01
3,000 A	30	40	60	1.09
4,000 A	35	50	70	1.21
5,000 A	40	60	80	1.44

TO ORDER

Primary	Secondary 1 A	Secondary 5 A
750 A	Contact us	1920 5640
800 A		1920 5641
1,000 A		1920 5642
1,200 A		1920 5651
1,500 A		1920 5644
2,000 A		1920 5645

Primary	Secondary 1 A	Secondary 5 A
1,500 A	Contact us	1920 6644
2,000 A		1920 6645
2,500 A		1920 6646
3,000 A		1920 6647
4,000 A		1920 6649

Primary	Secondary 1 A	Secondary 5 A
1,000 A	Contact us	1920 6842
1,200 A		1920 6851
1,500 A		1920 6844
2,000 A		1920 6845
2,500 A		1920 6846
3,000 A		1920 6847
4,000 A		1920 6849
5,000 A		1920 6850

ASSOCIATED PRODUCT

PRTC

CT short-circuiter

Protection against hazards due to opening of the secondary circuit of a low-voltage measurement CT.

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JVS RANGE

CTs designed to supply electronic measuring instruments, power monitors, digital transducers, etc.

- Choice of primary from 100 to 5,000 A
- Accuracy class: 0.2 S for high-performance applications

GENERAL SPECIFICATIONS

Reference standard: EN 60044-1 (ex IEC 185)
Maximum network voltage: 720 Vac
Dielectric test voltage: 3 kV/50 Hz/1 min
Frequency response: 50/60 Hz
Short-circuit thermal current (Ith): 60 In - 1 second
Dynamic current (Idyn): 2.5 Ith
Safety factor: < 5
Operating conditions: Temperature: -10°C to +50°C
Relative humidity: < 90%
Protection: Protection rating: IP 50 (terminal covers supplied)
Dry winding with self-extinguishing ABS covering (UL 94 VO)

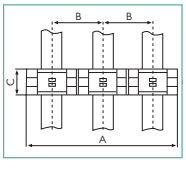
ZOOM

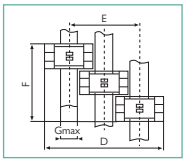
Removable, lead-sealable terminal cover supplied

Split output terminals enabling risk-free short-circuiting of the secondary current (M4 or cage for 4 mm² wire)

Cabinet backplate fitting (or directly on busbar primary)

3CT MOUNTING





Dimensions

Model	A	B	C	D	E	F	G
JVS 25B	243.5	81.5	60.5	189	108.5	183.5	26
JVS 26B	243.5	81.5	60.5	191	110.5	183.5	28
JVS 30B	308	103	69	250	148	209	44
JVS 38B	392	131	69	325	195	209	63
JVS 40	287	96	40	215	120	122	23
JVS 50	347	116	44	264	149	134	32
JVS 60	374	125	44	310	186	134	60

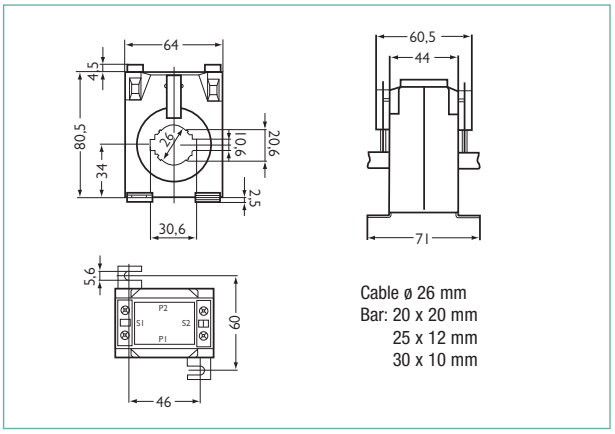
MOUNTING ACCESSORIES

Model	DIN-rail mounting fittings	Plate-mounting fittings	Sealable terminal cover*
JVS 25B	■	■	1923 0022
JVS 26B	■	■	1923 0022
JVS 30B	■	■	1923 0022
JVS 38B	■	■	1923 0022
JVS 39B	■	■	1923 0022
JVS 40	■	■	■
JVS 50	■	■	■
JVS 60	■	■	■

■ Standard accessories *sold in pairs

CABLE/BUSBAR PRIMARY

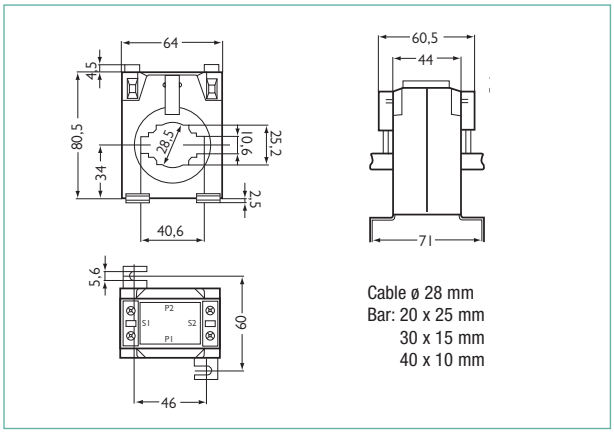
JVS 25B



Cable ø 26 mm
Bar: 20 x 20 mm
25 x 12 mm
30 x 10 mm

Primary	Power (VA) in class 0.2 S	Weight (kg)
100 A	1	0.53
150 A	2.5	0.53
200 A	3.5	0.54
250 A	5	0.54
300 A	5	0.51
400 A	7.5	0.51

JVS 26B



Cable ø 28 mm
Bar: 20 x 25 mm
30 x 15 mm
40 x 10 mm

Primary	Power (VA) in class 0.2 S	Weight (kg)
150 A	1	0.37
200 A	1.25	0.38
250 A	1.5	0.39
300 A	1.75	0.4
400 A	1	0.41
500 A	5	0.41
600 A	5	0.42
750 A	7.5	0.43
800 A	7.5	0.44

TO ORDER

Primary	Secondary 5 A
100 A	JVSB25 100/5
150 A	JVSB25 150/5
200 A	JVSB25 200/5
250 A	JVSB25 250/5
300 A	JVSB25 300/5
400 A	JVSB25 400/5

Primary	Secondary 5 A
150 A	JVSB26 150/5
200 A	JVSB26 200/5
250 A	JVSB26 250/5
300 A	JVSB26 300/5
400 A	JVSB26 400/5
500 A	JVSB26 500/5
600 A	JVSB26 600/5
750 A	JVSB26 750/5
800 A	JVSB26 800/5

ASSOCIATED PRODUCTS

Mounting accessories

DIN-rail mounting, plate-mounting and sealable terminal cover.

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PRTC

CT short-circuiter

Protection against hazards due to opening of the secondary circuit of a low-voltage measurement CT.

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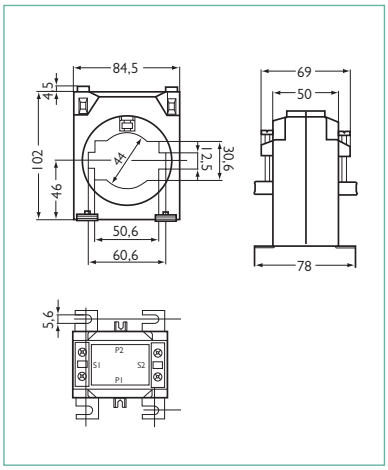
CABLE/BUSBAR PRIMARY

JVS 30B

Cable Ø 44 mm
Bar: 50 x 30 mm
60 x 12 mm

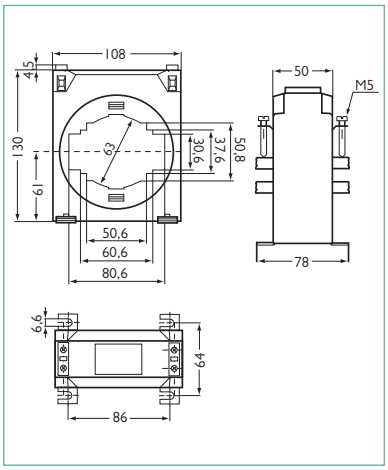


Primary	Power (VA) in class 0.2 S	Weight (kg)
600 A	5	0.52
750 A	7.5	0.59
800 A	7.5	0.60
1,000 A	10	0.61
1,200 A	10	0.63
1,500 A	10	0.65

Primary	Secondary 5 A
600 A	JVSB30 600/5
750 A	JVSB30 750/5
800 A	JVSB30 800/5
1,000 A	JVSB30 1000/5
1,200 A	JVSB30 1200/5
1,500 A	JVSB30 1500/5

JVS 38B

Câble Ø 63 mm
Bar: 50 x 50 mm
60 x 30 mm
80 x 30 mm

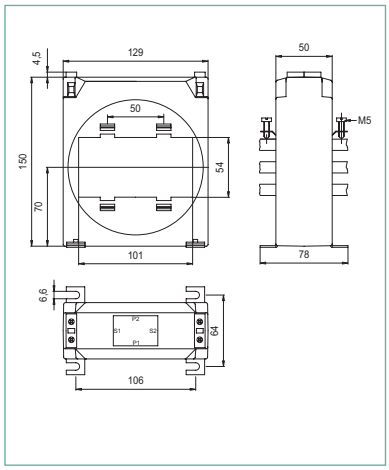


Primary	Power (VA) in class 0.2 S	Weight (kg)
1,000 A	7.5	0.72
1,200 A	10	0.68
1,500 A	10	0.84
2,000 A	10	0.82
2,500 A	10	0.88
3,000 A	10	0.88

Primary	Secondary 5 A
1,000 A	JVSB38 1000/5
1,200 A	JVSB38 1200/5
1,500 A	JVSB38 1500/5
2,000 A	JVSB38 2000/5
2,500 A	JVSB38 2500/5
3,000 A	JVSB38 3000/5

JVS 39B

Bar: 3 x 100 x 10 mm



Primary	Power (VA) in class 0.2 S	Weight (kg)
1,500 A	10	1.47
2,000 A	10	1.55
2,500 A	15	1.63
3,000 A	20	1.71
4,000 A	25	1.83

Primary	Secondary 5 A
1,500 A	JVSB39 1500/5
2,000 A	JVSB39 2000/5
2,500 A	JVSB39 2500/5
3,000 A	JVSB39 3000/5
4,000 A	JVSB39 4000/5

TO ORDER

ASSOCIATED PRODUCTS

Mounting accessories

DIN-rail mounting, plate-mounting and sealable terminal cover.

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PRTC

CT short-circuiter

Protection against hazards due to opening of the secondary circuit of a low-voltage measurement CT.

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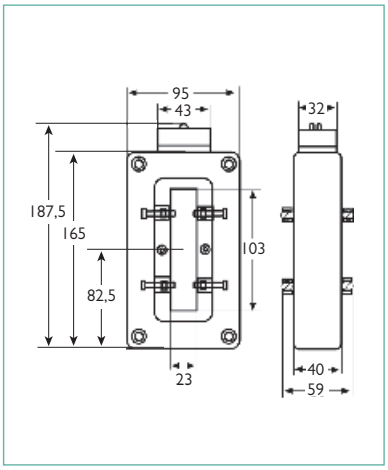
BUSBAR PRIMARY

JVS 40

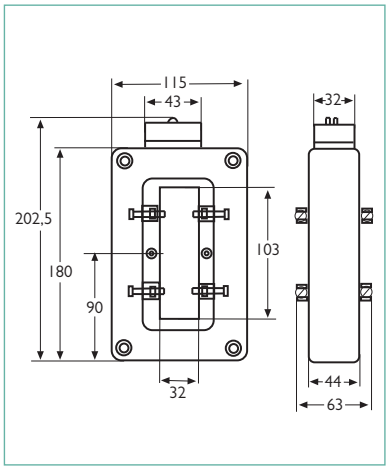
Bar: 100 x 20 mm



Primary	Power (VA) in class 0.2 S	Weight (kg)
1,000 A	1.5	0.76
1,200 A	4	0.76
1,500 A	10	0.76
2,000 A	10	0.76

JVS 50

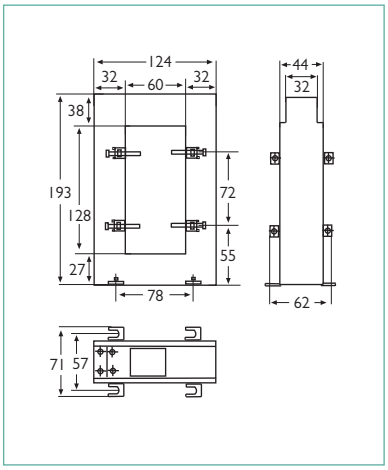
Bar: 100 x 30 mm



Primary	Power (VA) in class 0.2 S	Weight (kg)
1,500 A	10	0.76
2,000 A	10	0.82
2,500 A	10	0.78
3,000 A	10	0.90
4,000 A	10	0.90

JVS 60

Bar: 125 x 60 mm



Primary	Power (VA) in class 0.2 S	Weight (kg)
1,000 A	1.5	0.75
1,500 A	7.5	0.83
2,000 A	10	0.92
2,500 A	10	1.01
3,000 A	10	1.09
4,000 A	10	1.21
5,000 A	10	1.44

TO ORDER

Primary	Secondary 5 A
1,000 A	JVS40-1000/5
1,200 A	JVS40-1200/5
1,500 A	JVS40-1500/5
2,000 A	JVS40-2000/5

Primary	Secondary 5 A
1,500 A	JVS50-1500/5
2,000 A	JVS50-2000/5
2,500 A	JVS50-2500/5
3,000 A	JVS50-3000/5
4,000 A	JVS50-4000/5

Primary	Secondary 5 A
1,000 A	JVS60-1000/5
1,500 A	JVS60-1500/5
2,000 A	JVS60-2000/5
2,500 A	JVS60-2500/5
3,000 A	JVS60-3000/5
4,000 A	JVS60-4000/5
5,000 A	JVS60-5000/5

ASSOCIATED PRODUCT

PRTC

CT short-circuiter

Protection against hazards due to opening of the secondary circuit of a low-voltage measurement CT.

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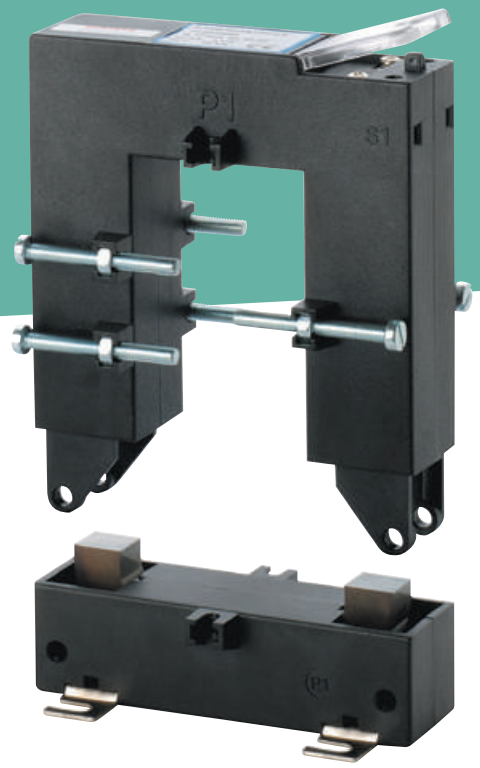


TCRO
RANGE

CTs designed for insertion on electrical installations without opening the conductor.

- Primary from 200 to 5,000 A and wide choice of primary options
- Fully opening primary

GENERAL SPECIFICATIONS

Reference standard: EN 60044-1 (ex IEC 185)
Maximum network voltage: 720 Vac
Dielectric test voltage: 3 kV/50 Hz/1 min
Frequency response: 50/60 Hz
Short-circuit thermal current (Ith): 60 In - 1 second
Dynamic current (Idyn): 2.5 Ith
Safety factor: < 5
Operating conditions: Temperature: -10°C to +50°C
Relative humidity: < 90%
Protection: Protection rating: IP 50 (terminal covers supplied)
Dry winding with self-extinguishing ABS covering (UL 94 VO)

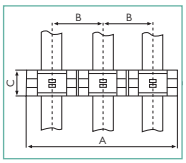
ZOOM

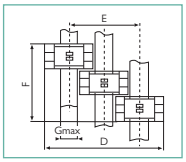
Plate mounting fitting

Bar clamp fitting

Captive sealable terminal covers. Split output terminals enabling risk-free short-circuiting of the secondary current (cage for 4 mm² wire)

3CT MOUNTING





Model	Dimensions A	B	C	D	E	F	G
TCRO 2030	269	90	40	200	111	122	20
TCRO 5080	344	115	32	280	166	98	50
TCRO 8080	434	145	32	370	226	98	80
TCRO 80120	434	145	32	370	226	98	80
TCRO 80160	554	185	52	450	266	158	80

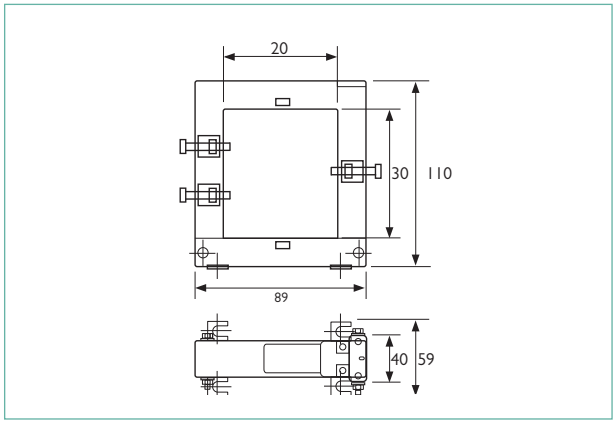
STANDARD MOUNTING ACCESSORIES

Model	Plate mounting fittings	Busbar clamp
TCRO 2030	■	■
TCRO 5080	■	■
TCRO 8080	■	■
TCRO 80120	■	■
TCRO 80160	■	■

TCRO RANGE

TCRO 2030

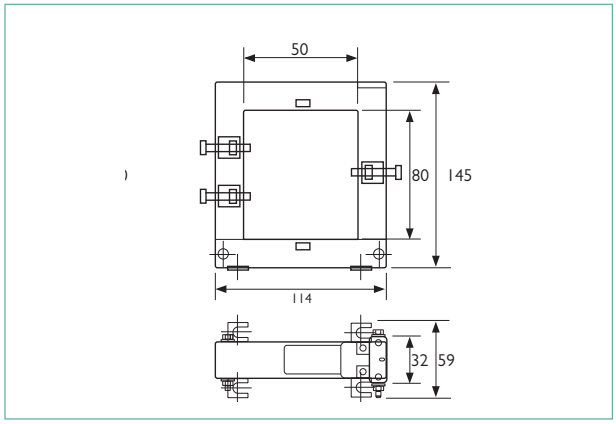
Bar: 20 x 30 mm



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
100 A	-	-	1.5	0.75
150 A	-	-	2	0.75
200 A	-	1.5	2.5	0.75
250 A	-	2	4	0.75
300 A	1.5	4	6	0.75
400 A	2.5	6	10	0.75

TCRO 5080

Bar: 50 x 80 mm



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
250 A	1	2	4	0.90
300 A	1.5	3	6	0.90
400 A	1.5	3	10	0.90
500 A	2.5	5	15	0.90
600 A	2.5	5	17.5	0.90
800 A	3	7	18	0.90
1,000 A	5	10	20	0.90

TO ORDER

Primary	Secondary 5 A
100 A	1920 8328
150 A	1920 8329
200 A	1920 8330
250 A	1920 8331
300 A	1920 8333
400 A	1920 8335

1 A secondary on request

Primary	Secondary 5 A
250 A	1920 8431
300 A	1920 8433
400 A	1920 8435
500 A	1920 8436
600 A	1920 8438
800 A	1920 8441
1,000 A	1920 8442

1 A secondary on request

ASSOCIATED PRODUCT

PRTC

CT short-circuiter

Protection against hazards due to opening of the secondary circuit of a low-voltage measurement CT.

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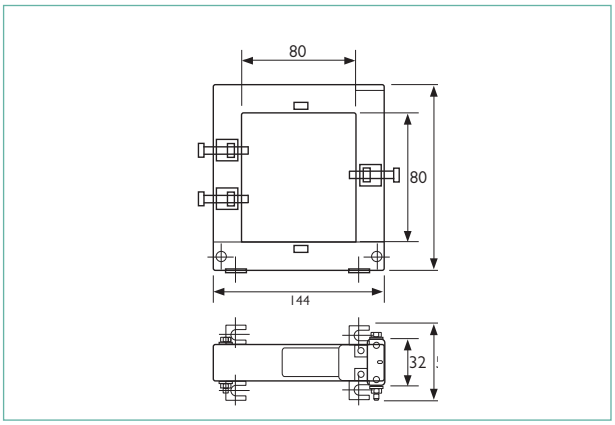
SPLIT CORE

TCRO 8080

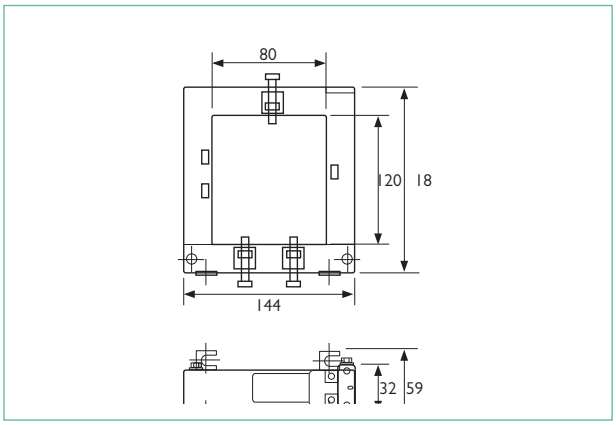
Bar: 80 x 80 mm



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
250 A	1	2	4	1.00
300 A	1.5	3	6	1.00
400 A	1.5	3	10	1.00
500 A	2.5	5	15	1.00
600 A	2.5	5	17.5	1.00
800 A	3	7	18	1.00
1,000 A	5	10	20	1.00

TCRO 80120

Bar: 80 x 120 mm



Primary	Power (VA) in class			Weight (kg)
	0.5	1	3	
500 A	-	4	12	1.20
600 A	-	5	14	1.20
800 A	3	7	18	1.20
1,000 A	5	9	20	1.20
1,200 A	6	11	28	1.20
1,500 A	8	17	30	1.20

TO ORDER

Primary	Secondary 5 A
250 A	1920 8531
300 A	1920 8533
400 A	1920 8535
500 A	1920 8536
600 A	1920 8538
800 A	1920 8541
1,000 A	1920 8542

Primary	Secondary 5 A
500 A	1920 8636
600 A	1920 8638
800 A	1920 8641
1,000 A	1920 8642
1,200 A	1920 8643
1,500 A	1920 8644

ASSOCIATED PRODUCT

PRTC

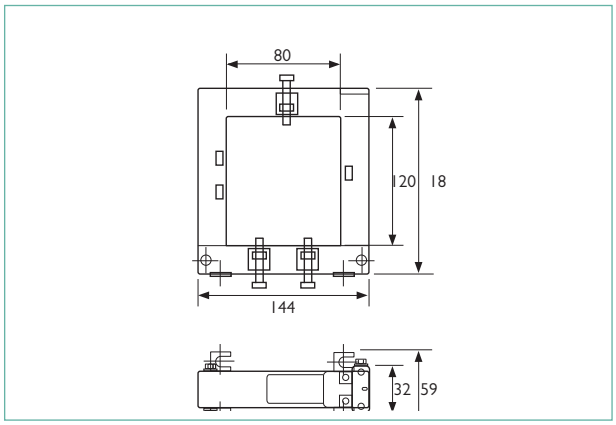
CT short-circuiter

Protection against hazards due to opening of the secondary circuit of a low-voltage measurement CT.

page 134

TCRO 80160

Bar: 80 x 160 mm



	Power (VA) in class			Weight (kg)
Primary	0.5	1	3	
1,000 A	10	15	20	3.50
1,500 A	15	20	25	3.50
2,000 A	15	20	25	3.50
2,500 A	15	20	25	3.50
3,000 A	20	25	30	3.50
4,000 A	20	25	30	3.50
5,000 A	20	25	30	3.50

TO ORDER	
Primary	Secondary 5 A
1,000 A	1920 8742
1,500 A	1920 8744
2,000 A	1920 8745
2,500 A	1920 8746
3,000 A	1920 8747
4,000 A	1920 8749
5,000 A	1920 8750

TC CLIP
RANGE

Very compact current transformer for inclusion on electrical installations without disconnecting the power cables.

- Quick and easy implementation without cutting off the power
- Built-in shortcircuiting switch
- Reinforced hinge
- Very compact
- Primary from 60 to 600 A

GENERAL SPECIFICATIONS

Maximum network voltage: 720 Vac
Dielectric test voltage: 3 kV 50 Hz 1 min
Secondary current: 1 A
Power: 0.5 VA
Frequency: 50/60 Hz
Operating temperature: -20°C to +50°C
Storage temperature: -30°C to 90°C
Accuracy class: 1 %

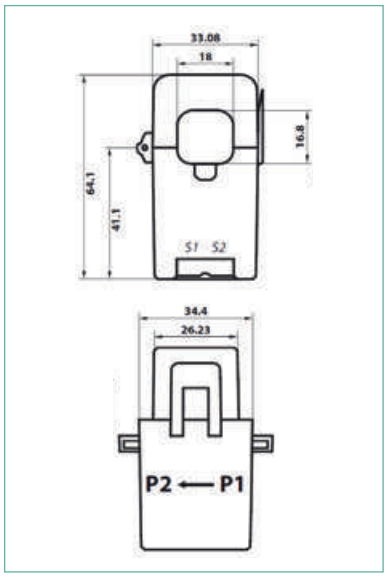
The **TC CLIP** models are compatible with all the measuring products with input on CT available on the market, and particularly ENERIUM power monitors and ULYS submeters from Chauvin Arnoux Energy®.

ZOOM

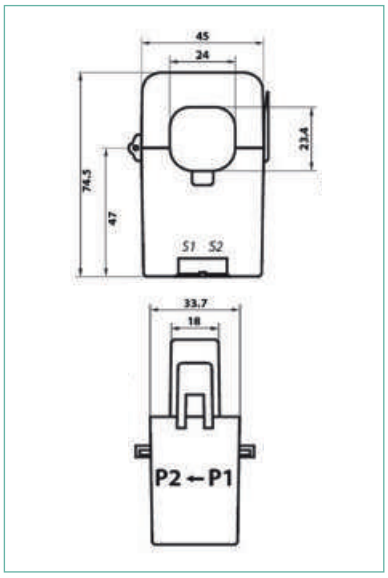
Reinforced hinge

Built-in short-circuiter

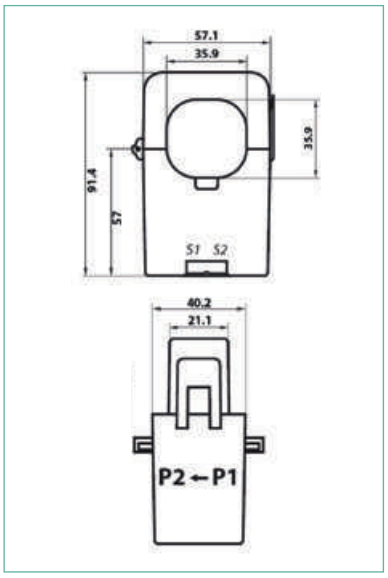
TCC176
Cable Ø 17 mm



TCC241 / TCC242
Cable Ø 24 mm



TCC364 / TCC366
Cable Ø 36 mm

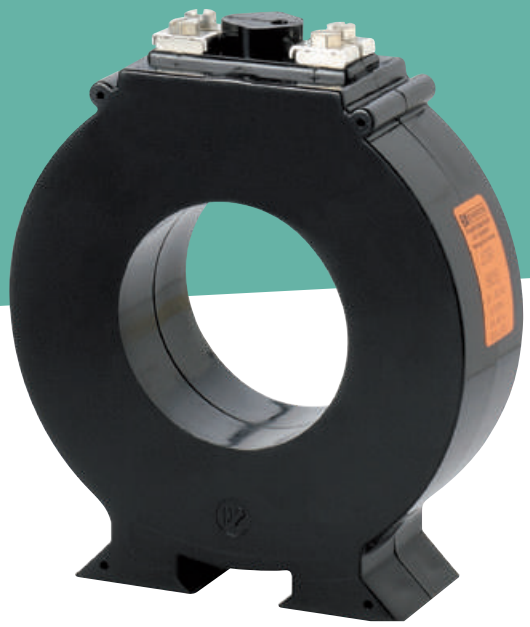


	TCC 176	TCC 241	TCC 242	TCC 364	TCC 366
Primary	60 A	100 A	250 A	400 A	600 A
Secondary	1A				
Power	0.2 VA	0.5 VA			
Accuracy class	3 %	1 %			
Diameter	17 mm	24 mm	24 mm	36 mm	36 mm
Dimensions (mm)	64 x 33 x 34.4	74.5 x 45 x 34	74.5 x 45 x 34	91 x 57 x 40.5	91 x 57 x 40.5
Weight (g)	128	162	187	263	300

TO ORDER

Model	Primary / Secondary	Reference
TCC 176	60 A / 1 A	P01379609
TCC 241	100 A / 1 A	P01379601
TCC 242	250 A / 1 A	P01379602
TCC 364	400 A / 1 A	P01379603
TCC 366	600 A / 1 A	P01379604

Pack of 3 TC CLIP	Reference
Pack of 3 TCC 176	P01379610
Pack of 3 TCC 241	P01379605
Pack of 3 TCC 242	P01379606
Pack of 3 TCC 364	P01379607
Pack of 3 TCC 366	P01379608



SINGLE-PHASE CORE CT RANGE

CTs designed to supply analog or digital measurement instruments. Accuracy class 0.5/1/3.

- Complete range: primary from 1 to 3,000 A and 5 A or 1 A secondary
- Totally adaptable range for specific requirements (primary, secondary, power class, frequency)

The following CTs are still available. Please contact Chauvin Arnoux Energy:

- JVR 64 and JVR 75
- JVO 12-46 / JVO 18-51 / JVO 21-64 / JVO 21-75 / JVO 32-75 / JVO 36-75 and JVO 25 CR
- JVO 32 CR and JVP 624

GENERAL SPECIFICATIONS

Reference standard: EN 60044-1 (ex IEC 185)
Maximum network voltage: 720 Vac
Dielectric test voltage: 3 kV/50 Hz/1 min
Frequency response: 50/60 Hz
Short-circuit thermal current (Ith): JVO, JVP: 80 In
JVR 86: 60 In
Dynamic current (Idyn): 2.5 Ith
Safety factor: 5 in Class 1
Operating conditions: Temperature: -5°C to +50°C
Relative humidity: 93% at 40°C
Protection: Protection rating: IP 50 (with terminal cover supplied)
Dry winding with self-extinguishing ABS covering (UL 94 VO)

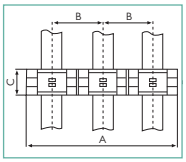
ZOOM

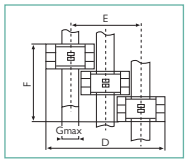
Sealable cover
M5 terminals with 2 grooves for dual connection on secondary

Mounting on symmetrical rail (except for JVP) or plate mounting in cabinet

3CT MOUNTING

Model	Dimensions A	B	C	D	E	F	G
JVP 1025	344	115	45	252	138	137	22
JVP 1045	404	135	45	312	178	137	42



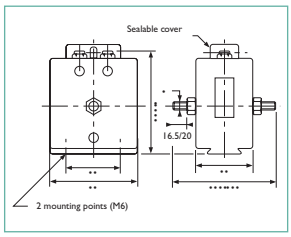


MOUNTING ACCESSORIES

Model	1 CT mounting rail	2 CT mounting rail	3 CT mounting rail
JVR	ACCE 7652	ACCE 7653	ACCE 7655
J3R 80 B	ACCE 7640		

JVR 86

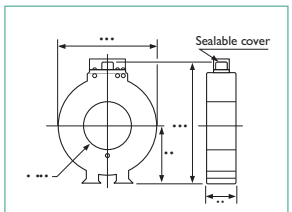
Ø M8/M10 > 75 A
Weight: 1.2 kg



	Power (VA) in class	
Primary	1	3
5 A	20	30
10 A	20	30
15 A	20	30
20 A	20	30
25 A	20	30
30 A	20	30
40 A	20	30
50 A	20	30
60 A	20	30
75 A	20	30
100 A	20	30
125 A	20	30
150 A	20	30
200 A	20	30

J3R 80 B

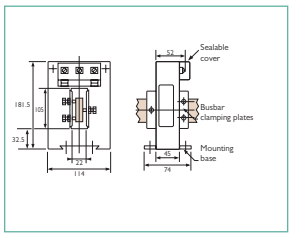
Cable Ø 66 mm
Weight: 1.6 kg



	Power (VA) in class		
Primary	0.5	1	3
200 A		5	10
250 A		5	10
300 A	5	10	15
400 A	10	20	25
500 A	15	20	25
600 A	15	20	25
750 A	15	20	25
800 A	15	20	25
1,000 A	15	20	25
1,250 A	15	20	25
1,500 A	15	20	25

JVP 1025

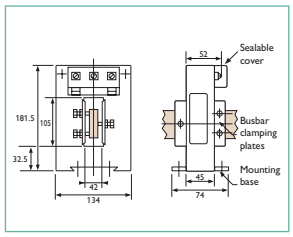
Bar: 100 x 20 mm
Weight: 2 kg



	Power (VA) in class	
Primary	1	3
200 A		5
250 A		5
300 A	10	20
400 A	5	30
500 A	15	15
600 A	15	15
750 A	20	20
800 A	20	30
1,000 A	30	30
1,250 A	30	30
1,500 A	30	30
2,000 A	30	30
2,500 A	30	30
3,000 A	30	30

JVP 1045

Bar: 100 x 40 mm
Weight: 2.5 kg



	Power (VA) in class	
Primary	1	3
300 A	5	5
400 A	5	10
500 A	10	15
600 A	15	15
750 A	20	20
800 A	20	20
1,000 A	30	30
1,250 A	30	30
1,500 A	30	30
2,000 A	30	30
2,500 A	30	30
3,000 A	30	30

TO ORDER

Primary	Secondary 5 A
5 A	JVRC 8742
10 A	JVRC 8743
15 A	JVRC 8744
20 A	JVRC 8745
25 A	JVRC 8746
30 A	JVRC 8747
40 A	JVRC 8748
50 A	JVRC 8749
60 A	JVRC 8750
75 A	JVRC 8751
100 A	JVRC 8752
125 A	JVRC 8753
150 A	JVRC 8754
200 A	JVRC 8755
Sealable cover	ACCE 7668

Primary	Secondary 5 A
200 A	J3RC 7514
250 A	J3RC 7524
300 A	J3RC 7525
400 A	J3RC 7528
500 A	J3RC 7527
600 A	J3RC 7529
750 A	J3RC 7526
800 A	J3RC 7531
1,000 A	J3RC 7530
1,250 A	J3RC 7532
1,500 A	J3RC 7533
Sealable cover	ACCE 7671

Primary	Secondary 5 A
200 A	JVPT 8890
250 A	JVPT 8891
300 A	JVPT 8892
400 A	JVPT 8893
500 A	JVPT 8896
600 A	JVPT 8897
750 A	JVPT 8898
800 A	JVPT 8895
1,000 A	JVPT 8899
1,250 A	JVPT 8900
1,500 A	JVPT 8901
2,000 A	JVPT 8902
2,500 A	JVPT 8921
3,000 A	JVPT 8922
Mounting plate (base)	ACCE 7669
Sealable cover	ACCE 7672

Primary	Secondary 5 A
300 A	JVPU 8906
400 A	JVPU 8918
500 A	JVPU 8907
600 A	JVPU 8908
750 A	JVPU 8909
800 A	JVPU 8919
1,000 A	JVPU 8910
1,250 A	JVPU 8911
1,500 A	JVPU 8912
2,000 A	JVPU 8913
2,500 A	JVPU 8920
3,000 A	JVPU 8914
Mounting plate (base)	ACCE 7669
Sealable cover	ACCE 7672

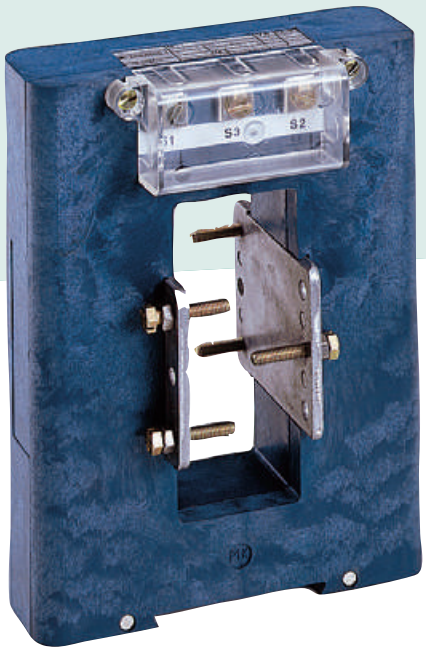
CUSTOMIZED PRODUCT

	Model				Primary	Secondary	Class	Power	Frequency
	JVR 86	J3R 80 B	JVP 1025	JVP 1045					
Example	JVR 86				200 A	1 A	0.5	10 VA	60 Hz

ASSOCIATED PRODUCTS

Mounting accessories
Mounting rails
1 CT, 2 CT, 3 CT.
page 124

PRTC
CT short-circuiter
Protection against hazards due to opening of the secondary circuit of a low-voltage measurement CT.
page 134



JVP 1045 B

Busbar primary 100 x 40 mm

GENERAL SPECIFICATIONS

Reference standard: EN 60044-1 (ex-IEC 185) and NFC 42-502

Maximum network voltage: 720 Vac

Dielectric test voltage: 3 kV/50 Hz/1 min

Frequency response: 50/60 Hz

Thermal short-circuit current (Ith): 80 In

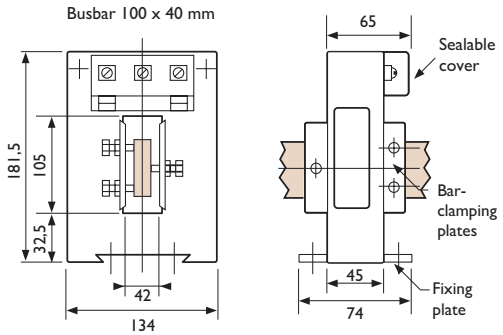
Dynamic current (Idyn): 2.5 Ith

Safety factor: 10 in class 0.5
Except * SF = 6.4/10.5 and **SF = 4.7/8.2

Operating conditions: Temperature: -20°C to +60°C
Relative humidity: 93% at 40°C

Protection: Protection rating: IP 50
Dry winding in self-extinguishing ABS envelope (UL 94 V0)

- Delivered with sealable protective cover for the secondary. Simple M5 terminals
- Direct mounting on primary busbar by means of plate and tightening screw or panel mounting with mounting plate



TO ORDER

Primary	Power (VA) in class 0.5 Secondary 5A		Weight (kg)
	7.5	15	
500 A		JVPA 7569	2.50
1,000 A		JVPA 7573	2.50
2,000 A		JVPA 7576	2.50
500-1,000 A*	JVPA 7589	JVPA 7585	2.50
1,000-2,000 A*	JVPA 7590	JVPA 7588	2.50

JVO 40-100

Cable primary Ø 42 mm

- Delivered with sealable terminal cover for the secondary. M5 terminals with two grooves for double connection
- Mounting on symmetrical mounting rail or plate mounting

GENERAL SPECIFICATIONS

Reference standard: EN 60044-1 (ex-IEC185) and NFC 42-502

Maximum network voltage: 720 Vac

Dielectric test voltage: 3 kV/50 Hz/1 min

Frequency response: 50/60 Hz

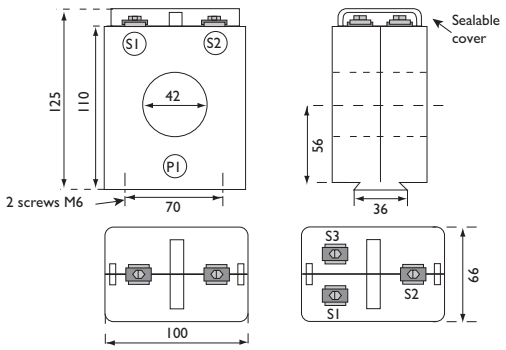
Thermal short-circuit current (Ith) : 80 In

Dynamic current (Idyn): 2.5 Ith

Safety factor: 10 in class 0.5
Except * SF = 6.4/10.5 and **SF = 4.7/8.2

Operating conditions: Temperature: -5 °C to +50 °C
Relative humidity: 93 % at 40 °C

Protection: Protection rating: IP 50
Dry winding in self-extinguishing ABS envelope (UL 94 V0)



TO ORDER

Primary	Power (VA) in class 0.5			Weight (kg)
	15	7,5	15	
	Secondary 2.5 A	Secondary 5 A	Secondary 5 A	
200 A	JVON 7103		JVON 7100	0.97
500 A			JVON 7101	0.97
200-500 A		JVON 7104	JVON 7102	0.97
1-CT mounting rail		ACCE 7679		
2-CT mounting rail		ACCE 7680		
3-CT mounting rail		ACCE 7681		

JV0 40-100 S
Bi-rating

Cable primary Ø 40 mm

- Class 0.2s according to IEC 60044-1
- Particularly suitable for ENEDIS-qualified bi-rating electronic meters

GENERAL SPECIFICATIONS

Cable primary: Ø 40 mm

Transformation ratio: 200 - 500 / 5 A

Accuracy class: 0.2s

Precision power: 7.5 VA

Highest network voltage: 720 Vac

Rated frequency: 50/60 Hz

Rated short-circuit thermal current (Ith): 20 kA for 1 s

Rated dynamic current (Idyn): 2.5 Ith

Safety factor: SF = 3 (200/5 A);
SF = 6 (500/5 A)

Rated thermal current: 1.2 Ipn

Operating temperature: -25°C to +40°C

Type of casing: Self-extinguishing thermoplastic (UL94V0)

Protection: IP30

Mechanical shock resistance: IK7

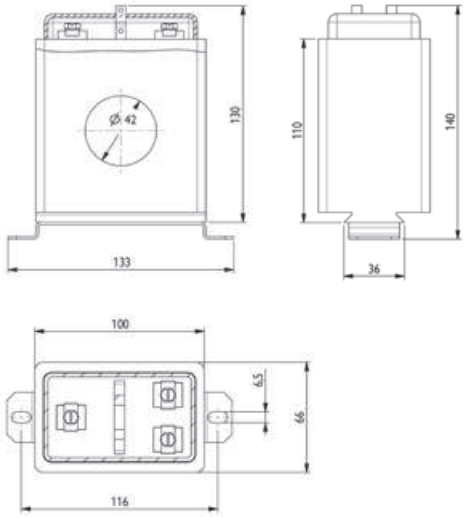
Rated withstand voltage: 3 kV (RMS value) at 50 Hz for 1 minute

Rated lightning impulse withstand voltage:
8 kV (peak value) – Wave 1.2/50 µs

Insulation class: E (heating limit: 75 K)

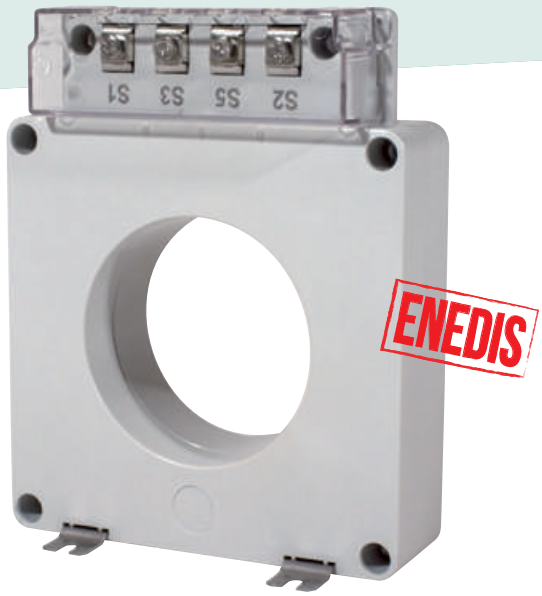
Weight: 1.1 kg

DIMENSIONS



TO ORDER

Model	Reference
JV0 40-100 S bi-rating	P01379512



JVO 90-160 S
Tri-rating

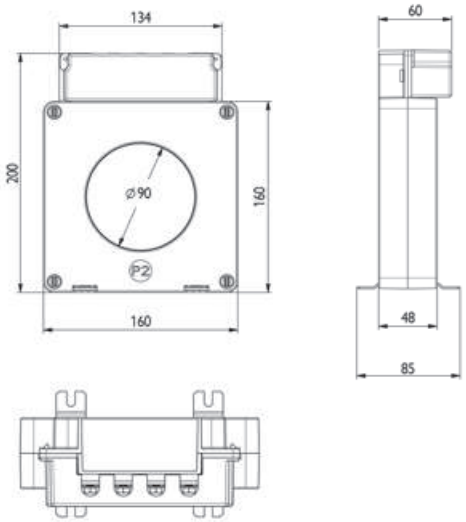
Cable primary Ø 90 mm

- Class 0.2s according to IEC 60044-1
- Particularly suitable for ENEDIS-qualified tri-rating electronic meters

GENERAL SPECIFICATIONS

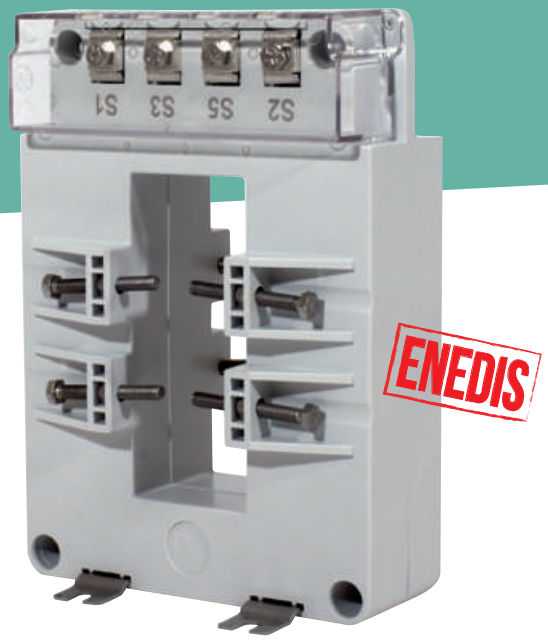
Cable primary: Ø 90 mm
Transformation ratio: 500 - 1,000 - 2,000 / 5 A
Accuracy class: 0.2s
Precision power: 7.5 VA
Highest network voltage: 720 Vac
Rated frequency: 50/60 Hz
Rated short-circuit thermal current (Ith): 30 kA for 1 s
Rated dynamic current (Idyn): 2.5 Ith
Safety factor: SF = 4 (500/5 A);
SF = 6 (1 000/5 A);
SF = 9 (2 000/5 A)
Rated thermal current: 1.2 Ipn
Operating temperature: -25°C to +40°C
Type of casing: Self-extinguishing thermoplastic (UL94V0)
Protection: IP30
Mechanical shock resistance: IK7
Rated withstand voltage: 3 kV (RMS value) at 50 Hz for 1 minute
Rated lightning impulse withstand voltage:
8 kV (peak value) – Wave 1.2/50 µs
Insulation class: E (heating limit: 75 K)
Weight: 1.9 kg

DIMENSIONS



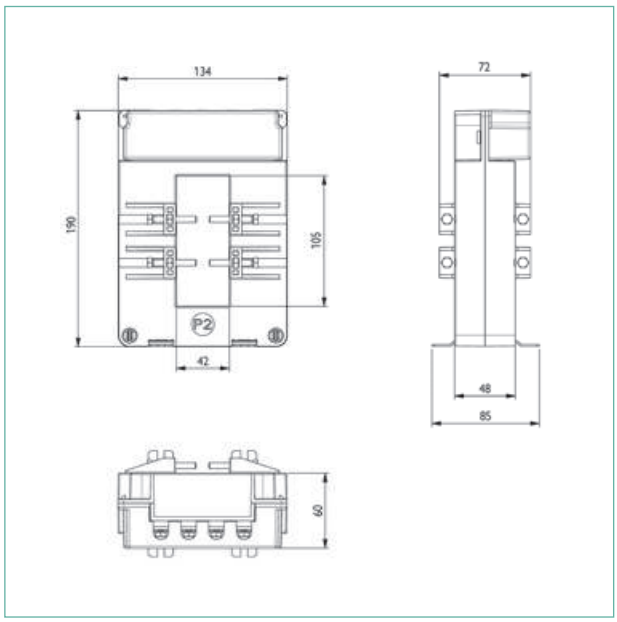
TO ORDER

Model	Reference
JVO 90-160 S tri-rating	P01379513



- Class 0.2s according to IEC 60044-1
- Particularly suitable for ENEDIS-qualified tri-rating electronic meters

DIMENSIONS



JVP 1145 S
Tri-rating

Cable/busbar primary

GENERAL SPECIFICATIONS

Cable primary: Busbar: 63 x 12 mm or 100 x 12 mm

Cable: Ø 40 mm

Transformation ratio: 500 – 1,000 – 2,000 / 5 A

Accuracy class: 0.2s

Precision power: 7.5 VA

Highest network voltage: 720 Vac

Rated frequency: 50/60 Hz

Rated short-circuit thermal current (Ith): 30 kA for 1 s

Rated dynamic current (Idyn): 2.5 Ith

Safety factor: SF = 3 (500/5 A);
SF = 4 (1000/5 A);
SF = 6 (2000/5 A)

Rated thermal current: 1.2 Ipn

Operating temperature: -25°C to +40°C

Type of casing: Self-extinguishing thermoplastic (UL94V0)

Protection: IP30

Mechanical shock resistance: IK7

Rated withstand voltage: 3 kV (RMS value) at 50 Hz for 1 minute

Rated lightning impulse withstand voltage:
8 kV (peak value) – Wave 1.2/50 µs

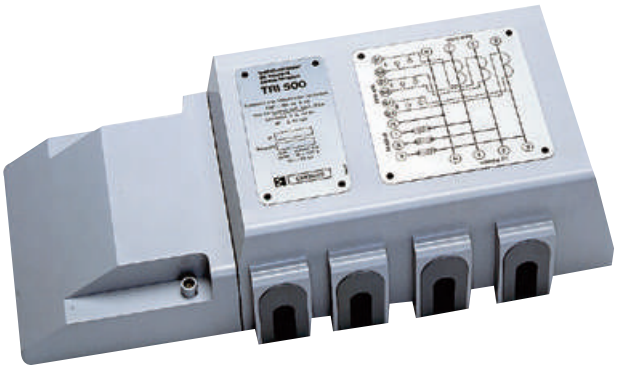
Insulation class: E (heating limit: 75 K)

Weight: 1.7 kg

TO ORDER

Model	Reference
JVP 1145 S tri-rating	P01379510

THREE-PHASE PLATE-MOUNTED CT RANGE



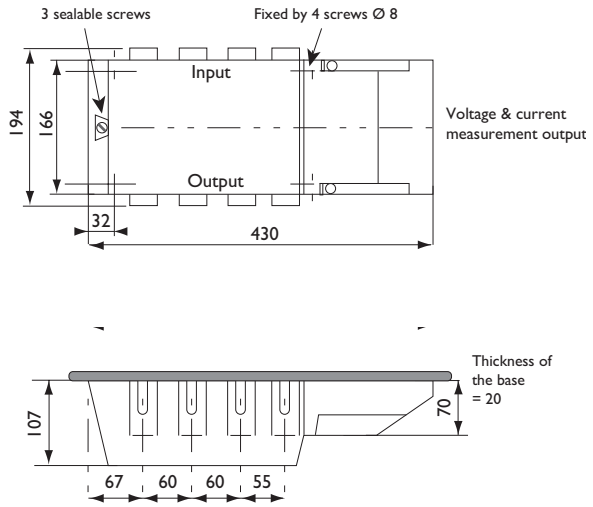
TRI 500

- Compliant with NF-C-42-502 standard
- Designed for three-phase LV metering

GENERAL SPECIFICATIONS

Maximum network voltage: 500 Vac
Dielectric test voltage: 2 kV - 50 Hz - 1 min
Rated withstand voltage: 8 kV
Frequency response: 50 Hz
Primary via cable clamp: conductors from 50 to 240 mm²

Primary	Power (VA) Class 0.5	Weight (kg)
50 A	15	7.50
100 A	15	7.50
150 A	15	7.50
200 A	15	7.50
300 A	15	7.50
500 A	15	7.50



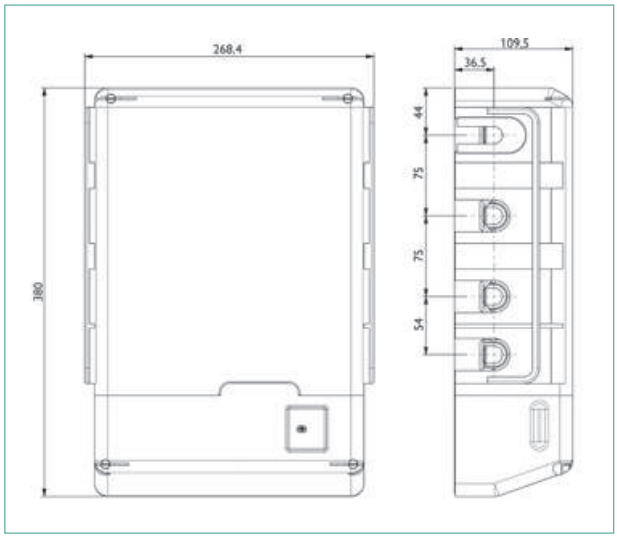
TO ORDER

Model	Reference
50 A	TRI5 7823
100 A	TRI5 7825
150 A	TRI5 7826
200 A	TRI5 7827
300 A	TRI5 7828
500 A	TRI5 7831

75/5, 250/5, 400/5 and 600/5 also available. Please contact us.

- Class 0.2s according to IEC 60044-1
- Choice of primary conductor type: copper or aluminium
- Built-in short-circuiting switch

DIMENSIONS



TO ORDER

Model	Reference
TRI 700 tri-rating	P01379514
TRI 700 S bi-rating 50 - 100 / 5 A	P01379515
TRI 700 S bi-rating 100 - 200 / 5 A	P01379516
TRI 700 S bi-rating 200 - 500 / 5 A	P01379517

TRI 700

GENERAL SPECIFICATIONS

Primary via cable clamp: Conductor cross-section from 50 mm² to 240 mm²

Transformation ratio:
TRI700S bi-rating model 50 A - 100 A / 5 A
TRI700S bi-rating model 100 A - 200 A / 5 A
TRI700S bi-rating model 200 A - 500 A / 5 A
TRI700 tri-rating model 100 A - 200 A - 500 A / 5 A

Accuracy class: Bi-rating model 0.2s; tri-rating model: 0.5

Precision power: Bi-rating model: 7.5 VA;
tri-rating model: 3.75 VA

Maximum network voltage:
Bi-rating / tri-rating model: 720 Vac

Rated frequency: Bi-rating / tri-rating model: 50/60 Hz

Rated thermal short-circuit current (Ith):
Bi-rating / tri-rating model: 80 Ipn with a maximum of 20 kA for 1 s

Rated dynamic current (Idyn): Bi-rating / tri-rating model: 2.5 Ith

Safety factor:

TRI700S 50 - 100 / 5 A: SF = 2.3 (50 A); SF = 4.2 (100 A)

TRI700S 100-200/5 A: SF = 2.3 (100 A); SF = 4.2 (200 A)

TRI700S 200 - 500 / 5 A: SF = 2.3 (200 A); SF = 5 (500 A)

TRI700 100 - 200 - 500 / 5 A: SF = 4 (100 A); SF = 7 (200 A); SF = 10 (500 A)

Rated thermal current: Bi-rating / tri-rating model: 1.2 Ipn

Operating temperature:
Bi-rating / tri-rating model: -25°C to +40°C

Type of casing: Bi-rating / tri-rating model:
Self-extinguishing thermoplastic (UL94V0)

Protection rating: With additional cover: IP40

Mechanical shock resistance: Bi-rating / tri-rating model: (IK7)

Rated withstand voltage: Bi-rating / tri-rating model: 3 kV (RMS value) at 50 Hz for 1 minute

Lightning impulse withstand voltage:
Bi-rating / tri-rating model: (8 kV) (peak value) – Wave 1.2/50 µs

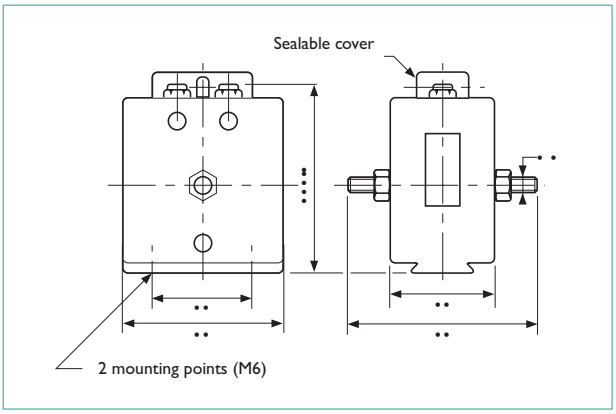
Insulation class: Bi-rating / tri-rating model:
E (heating limit: 75 K)

Weight: Bi-rating / tri-rating model: 9 kg

CURRENT SUMMATION: JVM 15

CT designed for adding or subtracting instantaneous values from the secondaries of 2 or 3 current transformers.
Used to supply measuring or metering instruments on installations with several feeders or feeds.

- Compact design
- Mounting on plate or rail

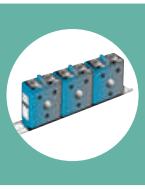


GENERAL SPECIFICATIONS

Reference standard: EN 60044-1 (ex IEC 185)
Maximum network voltage: 720 Vac
Dielectric test voltage: 3 kV/50 Hz/1 min
Frequency response: 50/60 Hz
Short-circuit thermal current (Ith): 80 In - 1 second
Dynamic current (Idyn): 2.5 Ith
Safety factor: < 5
Internal power: 4 VA
Operating conditions: Temperature: -5°C to +60°C
Relative humidity: 93% at 40°C
Protection: Protection rating:
IP 40 (module casing) and IP 10 (terminals)
Dry winding with self-extinguishing ABS covering (UL 94 V0)

ZOOM

Sealable cover.
Terminal connections: M5; secondary with 2 grooves for double connections; primary side connections.



Mounting on plate or symmetrical rail

CABINET ACCESSORIES

Model	1 CT slide rail mounting	2 CT slide rail mounting	3 CT slide rail mounting
JVM 15	ACCE 7652	ACCE 7653	ACCE 7655

	Power (VA) in class			Weight (kg)
Primary	0.5	1	3	
5 + 5 A	15	20	30	1.20
5 + 5 + 5 A	15	20	30	1.20

TO ORDER

Model	Reference
5 + 5 A (Secondary 5 A)	JVMA 7523
5 + 5 + 5 A (Secondary 5 A)	JVMA 7524
Sealable cover	ACCE 7668

TRANSFORMER SHORT-CIRCUIT SWITCH

Protection against the dangers caused by opening the secondary circuit on low-voltage measurement CTs.

- Protects users and equipment against overvoltages caused by opening the CT 5 A or 1 A secondary
- Automatic short-circuiting of CT secondary to which it is permanently connected
- Allows users to work without shutting down the load beforehand

GENERAL SPECIFICATIONS

Reference standards: NFC 15100 art 411-1)

Connections: double terminals capable of receiving 6 mm² cables.

DIN rail mounting (supplied with fittings) or plate mounting using clamp bolts.

Weight: 90 g

Operating conditions: Temperature: -10°C to +50°C
Relative humidity: < 95%

Protection: Protection rating: IP 20
Self-extinguishing polyamide casing (UL 94V0)

Measurement current: 5 A/50 Hz or 1 A/50 Hz

Maximum permitted current: 25 Aac

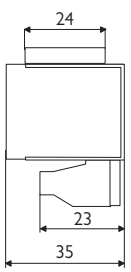
Peak protection voltage: 22 Vac

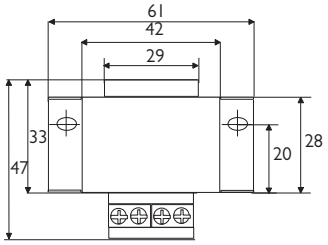
ZOOM

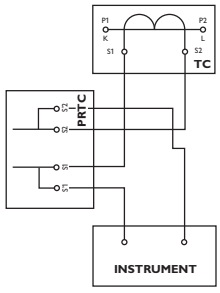

Mounting on DIN rail or plate


Four terminals available for 6 mm² wires

Connection diagram





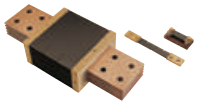


TO ORDER

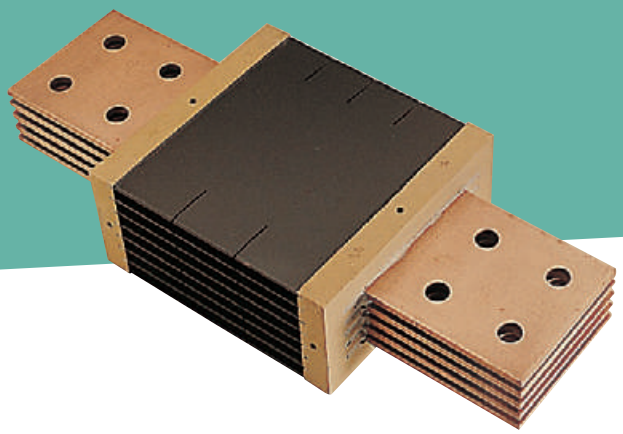
Model	Reference
Transformer short-circuit switch	PRTC 1001

NOTES

CHOOSING YOUR SHUNTS

	76-2 and 77-2			SHMI		
	page 138			page 140		
						
	76-2	**76-2**	**77-2**	**SHMI**	**SHMI**	**SHMI**
Type	Eye connection on base	Eye connection	Blade connection for busbar	Screw connection	Eye connection	Connection to block for busbar
Voltage drop	100 mV					
Accuracy class	0.2 and 0.5				0.5 and 1	
1 A	■			■		
1.25 A	■			■		
1.5 A	■			■		
2 A	■			■		
2.5 A	■			■		
3 A	■			■		
4 A	■			■		
5 A	■			■		
6 A	■			■		
7.5 A	■			■		
10 A		■		■		
15 A		■		■		
20 A		■		■		
25 A		■		■		
30 A		■			■	
40 A		■			■	
50 A		■			■	
60 A		■			■	
75 A		■			■	
100 A		■			■	
125 A		■			■	
150 A		■			■	
200 A		■			■	
250 A		■			■	
300 A		■			■	
400 A		■			■	
500 A		■			■	
600 A			■		■	
750 A			■		■	
1,000 A			■			■
1,250 A			■			■
1,500 A			■			■
2,000 A			■			■
2,500 A			■			■
3,000 A			■			■
4,000 A			■			■
5,000 A						■
6,000 A						■
Strengths	High-performance range. High overload capacity. Treated against corrosion.			Range with a good performance/price trade-off. Large choice of voltage drop ratings (on request).		
	SPECIFIC PRODUCTS POSSIBLE IN THIS RANGE					

SHEL	SHMO
page 142	page 142
	
SHEL	SHMO
Direct connection to measuring component	Modular casing
100 mV	
1	
	■
	■
■	■
■	■
■	■
■	■
■	■
■	■
■	■
■	■
■	
■	
■	
■	
■	
■	
The most economical range.	Range for mounting on DIN 46277 rail.
SPECIFIC PRODUCTS POSSIBLE IN THIS RANGE	



76-2 AND 77-2 RANGES

A reference for measurements
in demanding applications.

- High-performance range
- High overload capacity

GENERAL SPECIFICATIONS

Accuracy class defined in the following domain:

Over the whole measurement range,
for an ambient temperature of:
-10°C to +35°C (Class 0.2)
-25°C to +40°C (Class 0.5 and 1)
For a blade temperature of 80°C
For a shunt current ≤ 5 mA

Permitted rated calibres:

In = 1 A - 1.25 A - 1.5 A - 2 A - 2.5 A - 3 A - 4 A - 5 A - 6 A - 7.5 A;
their multiples or sub-multiples

Voltage drops:

50 mV - 60 mV - 100 mV - 150 mV - 200 mV - 300 mV - 1 V

Permitted overloads:

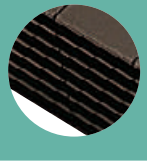
On average and in normal operating conditions

I rated (In)	2 h	5 s Class 0.2	5 s Class 0.5 and 1
< 250 A	1.2 In	2 In	10 In
250 to 2,000 A	1.2 In	2 In	5 In
> 2,000 A	1.2 In	2 In	2 In

Compliance with standards:

Accuracy and influence factor: IEC 60051-1 to 9
Preferred calibres and dimensions for 100 mV shunts:
NFC 42-151/152/153z
Lead-free range: RoHS directive (2002/95/CE)

ZOOM

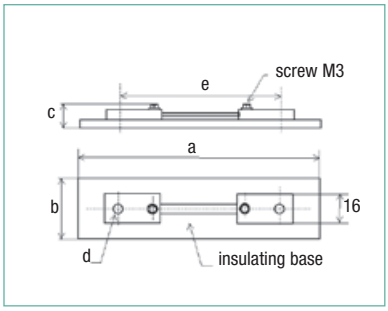


Protection against corrosion
with epoxy-modified acrylic paint

Large-area fittings
to facilitate heat dissipation

76-2
Eye connection on base

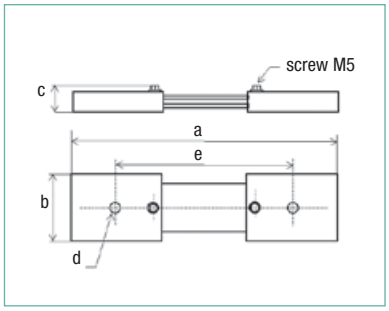
Voltage drop: 100 mV
Class 0.2 and 0.5



	Dimensions (mm)				
Current	a	b	c	d	e
1 A	150	20	13	6	130
1.25 A	150	20	13	6	130
1.5 A	150	20	13	6	130
2 A	150	20	13	6	130
2.5 A	150	20	13	6	130
3 A	150	20	13	6	130
4 A	150	20	13	6	130
5 A	150	20	13	6	130
6 A	150	20	13	6	130
7.5 A	150	20	13	6	130

76-2
Eye connection

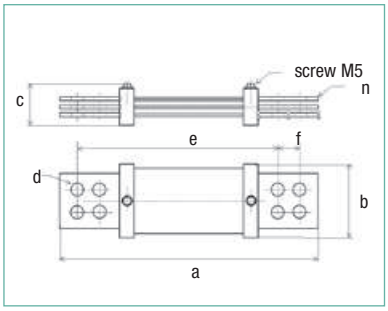
Voltage drop: 100 mV
Class 0.2 and 0.5



	Dimensions (mm)				
Current	a	b	c	d	e
10 A	160	16	11	6	130
15 A	160	16	11	6	130
20 A	160	16	11	6	130
25 A	160	16	11	6	130
30 A	190	25	11	10	160
40 A	190	25	11	10	160
50 A	190	25	11	10	160
60 A	190	25	11	10	160
75 A	190	25	11	10	160
100 A	190	32	11	10	160
125 A	220	32	13	14	180
150 A	220	32	13	14	180
200 A	220	32	13	14	180
250 A	220	50	13	14	180
300 A	220	50	13	14	180
400 A	240	60	17	18	200
500 A	240	60	17	18	200

77-2
Blade connection for bar

Voltage drop: 100 mV
Class 0.2 and 0.5



	Dimensions (mm)						
Current	a	b	c	d	e	f	n
600 A	280	80	35	11	220	25	1
750 A	280	80	35	11	220	25	1
1,000 A	380	115	35	14	280	50	1
1,250 A	380	115	35	14	280	50	1
1,500 A	380	115	55	14	280	50	2
2,000 A	380	115	55	14	280	50	2
2,500 A	400	168	55	14	300	50	3
3,000 A	400	168	65	14	300	50	4
4,000 A	400	168	85	14	300	50	5

TO ORDER

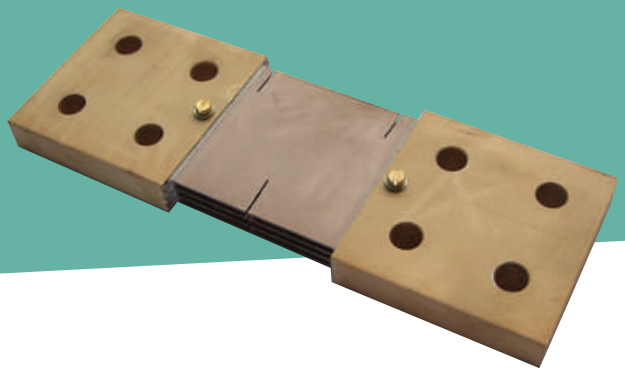
	Reference for 100 mV	
Current	Class 0.2	Class 0.5
1 A	SHUN 1200	SHUN 1300
1.25 A	SHUN 1201	SHUN 1301
1.5 A	SHUN 1202	SHUN 1302
2 A	SHUN 1203	SHUN 1303
2.5 A	SHUN 1204	SHUN 1304
3 A	SHUN 1205	SHUN 1305
4 A	SHUN 1206	SHUN 1306
5 A	SHUN 1207	P01 3042 11
6 A	SHUN 1208	SHUN 1308
7.5 A	SHUN 1209	SHUN 1309

	Reference for 100 mV	
Current	Class 0.2	Class 0.5
10 A	SHUN 1210	P01 3042 01
15 A	SHUN 1211	P01 3042 08
20 A	SHUN 1212	P01 3042 02
25 A	SHUN 1213	P01 3042 09
30 A	SHUN 1214	P01 3042 03
40 A	SHUN 1215	P01 3042 10
50 A	SHUN 1216	P01 3042 04
60 A	SHUN 1217	P01 3042 12
75 A	SHUN 1218	P01 3042 13
100 A	SHUN 1219	P01 3042 05
125 A	SHUN 1220	P01 3042 15
150 A	SHUN 1221	P01 3042 16
200 A	SHUN 1222	P01 3042 06
250 A	SHUN 1223	P01 3042 17
300 A	SHUN 1224	P01 3042 07
400 A	SHUN 1225	P01 3042 18
500 A	SHUN 1226	P01 3042 14

	Reference for 100 mV	
Current	Class 0.2	Class 0.5
600 A	SHUN 1227	P01 3042 48
750 A	SHUN 1228	P01 3042 41
1,000 A	SHUN 1229	P01 3042 42
1,250 A	SHUN 1230	P01 3042 49
1,500 A	SHUN 1231	P01 3042 43
2,000 A	SHUN 1232	P01 3042 44
2,500 A	SHUN 1233	P01 3042 45
3,000 A	SHUN 1234	P01 3042 46
4,000 A	SHUN 1235	P01 3042 47

CUSTOMIZED PRODUCT

	Model		Voltage drop	Accuracy class	Current
	76-2	77-2			
Example	77-2		50 mV	Class 0.2	800 A



SHMI
RANGE

Vast choice of industrial applications.

- Range with excellent performance/price trade-off
- A wide choice of voltage drops
- Compact design that respects accepted thermal dissipation requirements

ZOOM

Easy-to-connect brass plates

GENERAL SPECIFICATIONS

Accuracy class defined in the following domain:

Over the entire measurement range
For an ambient temperature of:
-10°C to +35°C (class 0.2)
-25°C to +40°C (class 0.5 and 1)
For a blade temperature of 80°C
For a shunt current ≤ 5 mA

Permitted rated calibres:

In = 1 A - 1.25 A - 1.5 A - 2 A - 2.5 A - 3 A - 4 A - 5 A - 6 A - 7.5 A ; and their multiples or sub-multiples

Permitted overloads:

On average and in normal operating conditions

I nominal (In)	2 h	5 s class 0.2	5 s class 0.5 and 1
< 250 A	1.2 In	2 In	10 In
250 to 2,000 A	1.2 In	2 In	5 In
> 2,000 A	1.2 In	2 In	2 In

Voltage drops:
50 mV - 60 mV - 100 mV - 150 mV - 200 mV - 300 mV - 1 V

Compliance with standards:

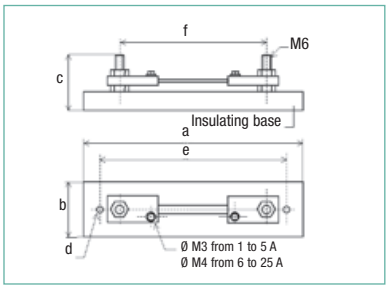
Accuracy and influence factor: IEC 60051-1 to 9
Preferred ratings and dimensions for 100 mV shunts:
NFC 42-151/152/153
Lead-free range: RoHS directive (2002/95/CE)

MOUNTING ACCESSORIES

Kit of screw connectors + lead for shunt	Reference
1 to 25 A range	2919 9901
30 to 75 A range	2919 9902
100 A range	2919 9903
125 to 200 A range	2919 9904
250 to 500 A range	2919 9905
600 A and 750 A range	2919 9906

SHMI
1 A to 25 A
Screw connection

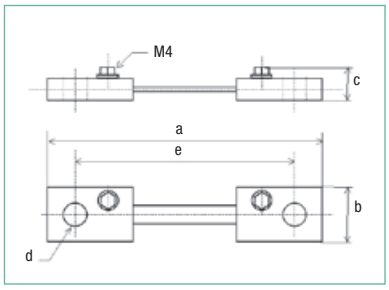
Voltage drop: 100 mV
Class 0.5 and 1



	Dimensions (mm)					
Current	a	b	c	d	e	f
1 A	162	25	40	3.5	152	110
2 A	162	25	40	3.5	152	110
2.5 A	162	25	40	3.5	152	110
3 A	162	25	40	3.5	152	110
4 A	162	25	40	3.5	152	110
5 A	162	25	40	3.5	152	110
6 A	162	25	40	3.5	152	110
7.5 A	162	25	40	3.5	152	110
10 A	162	25	40	3.5	152	110
15 A	162	25	40	3.5	152	110
20 A	162	25	40	3.5	152	110
25 A	162	25	40	3.5	152	110

SHMI
30 A to 750 A
Eye connection

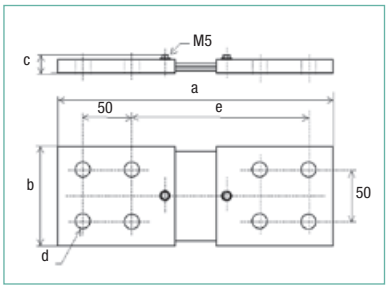
Voltage drop: 100 mV
Class 0.5 and 1



	Dimensions (mm)				
Current	a	b	c	d	e
30 A	150	16	10	8.5	130
40 A	150	16	10	8.5	130
50 A	150	16	10	8.5	130
60 A	150	16	10	8.5	130
75 A	150	16	10	8.5	130
100 A	150	21	10	8.5	130
125 A	150	32	10	8.5	130
150 A	150	32	10	8.5	130
200 A	150	32	14	8.5	130
250 A	210	52	13	14.5	180
300 A	210	52	13	14.5	180
400 A	210	52	17	14.5	180
500 A	210	52	17	14.5	180
600 A	210	52	22	14.5	180
750 A	210	52	22	14.5	180

SHMI
1,000 A to 6,000 A
Busbar connection block

Voltage drop: 100 mV
Class 0.5 and 1



	Dimensions (mm)				
Current	a	b	c	d	e
1,000 A	290	100	20	14.5	190
1,250 A	290	100	25	14.5	190
1,500 A	290	100	25	14.5	190
2,000 A	290	100	35	14.5	190
2,500 A	290	100	45	14.5	190
3,000 A	290	100	45	14.5	190
4,000 A	330	150	45	16.5	230
5,000 A	330	150	45	16.5	230
6,000 A	330	150	45	16.5	230

TO ORDER

	Reference for 100 mV	
Current	Class 0.5	Classe 1
1 A	2901 0301	2901 0101
2 A	2901 0303	2901 0103
2.5 A	2901 0304	2901 0104
3 A	2901 0305	2901 0105
4 A	2901 0306	2901 0106
5 A	2901 0307	2901 0107
6 A	2901 0308	2901 0108
7.5 A	2901 0310	2901 0110
10 A	2901 0312	2901 0112
15 A	2901 0314	2901 0114
20 A	2901 0315	2901 0115
25 A	2901 0316	2901 0116

	Reference for 100 mV	
Current	Class 0.5	Classe 1
30 A	2901 0317	2901 0117
40 A	2901 0318	2901 0118
50 A	2901 0319	2901 0119
60 A	2901 0321	2901 0121
75 A	2901 0323	2901 0123
100 A	2901 0325	2901 0125
125 A	2901 0326	2901 0126
150 A	2901 0328	2901 0128
200 A	2901 0330	2901 0130
250 A	2901 0331	2901 0131
300 A	2901 0333	2901 0133
400 A	2901 0335	2901 0135
500 A	2901 0336	2901 0136
600 A	2901 0338	2901 0138
750 A	2901 0340	2901 0140

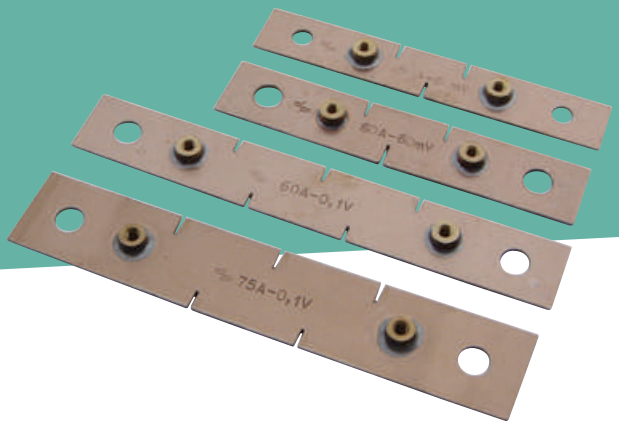
	Reference for 100 mV	
Current	Class 0.5	Classe 1
1,000 A	2901 0361	2901 0161
1,250 A	2901 0362	2901 0162
1,500 A	2901 0363	2901 0163
2,000 A	2901 0364	2901 0164
2,500 A	2901 0365	2901 0165
3,000 A	2901 0366	2901 0166
4,000 A	2901 0368	2901 0168
5,000 A	2901 0369	2901 0169
6,000 A	2901 0370	2901 0170

CUSTOMIZED PRODUCT

	Model	Voltage drop	Accuracy class	Current
	SHMI			
Example	SHMI	50 mV	Class 0.5	3,000 A

ASSOCIATED PRODUCT

Mounting accessories
Screws, bolts and cables
Ratings from 1 to 750 A.
page 140



SHEL AND SHMO RANGES

For simplified installation on low-power networks.

- Economy range for construction (SHEL) and for simplified installation (SHMO)
- Direct connection to measuring component (SHEL)
- 1 V modular casing for quick and easy mounting (SHMO)
- Compact design (SHEL)

GENERAL SPECIFICATIONS

Accuracy class 1 defined in the following domain:

Over the entire measurement range
For an ambient temperature of
-25°C to +40°C
For a blade temperature of 80°C
For a shunt current ≤ 5 mA

Permitted rated calibres:

In = 1 A - 1.25 A - 1.5 A - 2 A - 2.5 A - 3 A - 4 A - 5 A - 6 A - 7.5 A
and their multiples or sub-multiples
Max. 300 A for SHEL and 60 A for SHMO

Permitted rated calibres:

50 mV - 60 mV - 100 mV

I nominal (In)	2 h	5 s
< 250 A	1.2 In	10 In
> 250 A	1.2 In	5 In

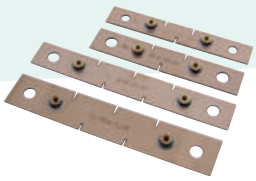
Permitted overloads:

On average and in normal operating conditions

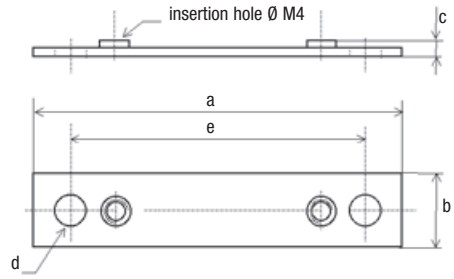
Compliance with standards:

Accuracy and influence factor: IEC 60051-1 to 9
Lead-free range: RoHS directive (2002/95/CE)

SHEL



Voltage drop: 100 mV Class 1

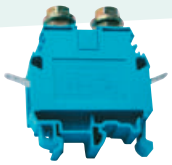


	Dimensions (mm)				
Current	a	b	c	d	e
10 A	150	10	5	6.5	122
15 A	150	12	5	6.5	122
20 A	150	12	5	6.5	122
25 A	150	15	5	6.5	122
30 A	150	15	5	6.5	122
40 A	150	15	5	6.5	122
50 A	150	20	5	6.5	122
60 A	150	25	5	8.5	122
75 A	150	30	5	8.5	122
100 A	150	20	6	8.5	122
125 A	150	25	6	8.5	122
150 A	150	30	6	8.5	122
200 A	150	40	6	10.5	122
250 A	150	50	6	10.5	122
300 A	150	60	6	10.5	122

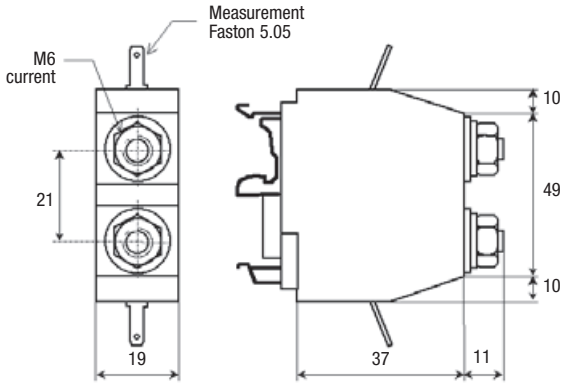
TO ORDER

	Reference for 100 mV
Current	Class 1
10 A	2901 0246
15 A	2901 0247
20 A	2901 0227
25 A	2901 0228
30 A	2901 0229
40 A	2901 0230
50 A	2901 0231
60 A	2901 0232
75 A	2901 0233
100 A	2901 0235
125 A	2901 0236
150 A	2901 0237
200 A	2901 0238
250 A	2901 0239
300 A	2901 0248

SHMO



Voltage drop: 100 mV Class 1

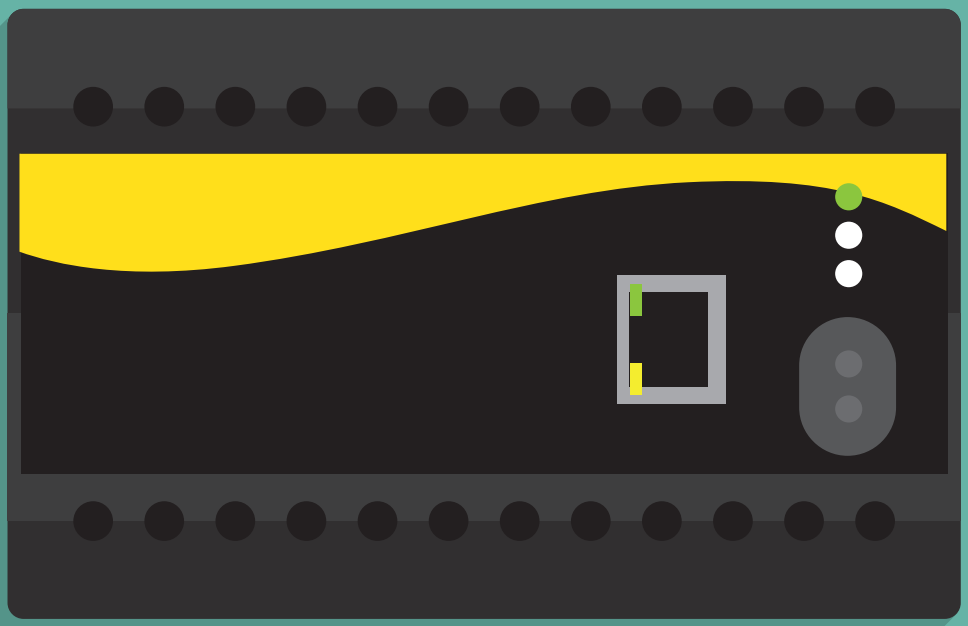


TO ORDER

	Reference for 100 mV
Current	Class 1
1 A	2925 0101
5 A	2925 0107
10 A	2925 0112
15 A	2925 0114
20 A	2925 0115
25 A	2925 0116
30 A	2925 0117
40 A	2925 0118
50 A	2925 0119
60 A	2925 0121

CUSTOMIZED PRODUCT

	Model		Voltage drop	Accuracy class	Current
	SHEL	SHMO			
Example	SHEL		50 mV	Class 1	80 A



NETWORK SUPERVISION AND PHYSICAL MEASUREMENT

TRANSDUCERS

146 OVERVIEW OF THE RANGE
151 CHOOSING YOUR TRANSDUCER
152 DIGITAL TRANSDUCERS
168 ANALOG TRANSDUCERS
176 COMMUNICATION SOLUTION

TRANSDUCERS

Digital transducers

1, 2, 3 or 4 configurable analog outputs / Class 0.1
1 Ethernet or RS485 digital output

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

TRIAD 2

Configured at the factory
AC quantities

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

page 152

TRIAD 2

Configurable via TRIADJUST 2
AC quantities

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

page 152

Analog transducers

For nuclear environments

Vac | Iac | P | Q

T82N

1 analog output / Class 0.5

Suitable for the requirements of the nuclear market.

page 168

Communication solution

ELINK 61850

ModBus / IEC 61850 gateway

For TRIAD 2 transducers.

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INFO & ADVICE

Transducers measure AC, DC or physical quantities and transmit them as a standard analog signal (V_{DC} or mA).

FACTORY-PROGRAMMED OR USER-PROGRAMMABLE?

Factory-programmed

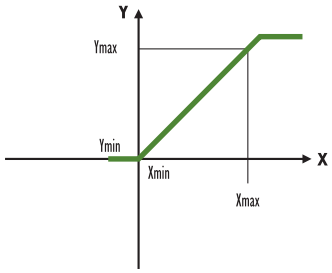
If the specifications of the measurements required are known, a **factory-programmed** transducer can be used.

User-programmable

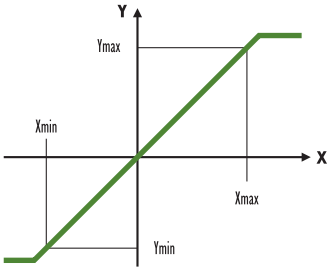
If the precise specifications of the measurements are not known, choose a **user-programmable** transducer. You can then program it accordingly when the specifications are known and you can modify the settings if these specifications change.

WHICH TRANSFER CURVES SHOULD YOU CHOOSE?

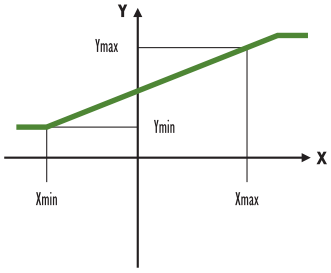
Linear



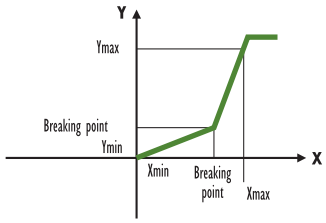
Linear without offset



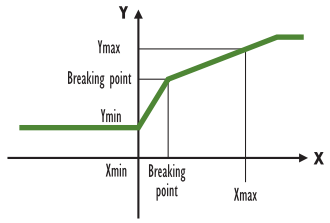
Linear with offset



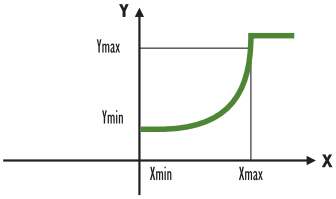
Linear with 2 extended slopes



Linear with 2 slopes



Quadratic



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.

EDF TYPE HN 44-S-80 AND IEC 61000-6-5 SPECIFICATIONS

When designing our products, we take into account the requirements and constraints linked to EDF's technical specifications to ensure that they can withstand severe environments.

- electrical power stations
- switching stations
- source stations

Compliance with the requirements of the leading French electricity supplier helps Chauvin Arnoux Energy to achieve recognition nationally and international.

ADVANTAGES OF ANALOG 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, analog and digital panel meters, measurement relays, PLCs, RTUs, etc.).

Response time

The response time of an analog output enables real-time viewing of all electrical parameters (for example, SCADA application, dispatching, control and monitoring of industrial processes).

Resistance to disturbances

Analog 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

Analog 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 changes on installations

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 data retrieval

Using the commands available in the ModBus mapping, a transducer can be operated via a digital supervision system and retrieve remotely 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 alarms, date-stamping or energy index functions.

CHOOSING YOUR TRANSDUCER

	TRIAD 2	T82N
	page 152	page 168
		
Mesures		
Iac	■	■
Vac	■	■
Uac	■	
Vterre		
Ineutre		
Idc		
Vdc		
P	■	■
Q	■	■
S	■	
F	■	
FP	■	
Cosφ	■	
Tanφ	■	
φ	■	
φ (U' – U")	■	
T°		
Ω		
kWh	■	
kVArh	■	
kVAh	■	
Current/voltage unbalance	■	
Options		
Number of analog outputs	4	1
RS485	■	
Ethernet	■	
Pulse output		
Alarm output		
Relay output	■	
Programmable	■	
Plug-in versions		■
Self-powered	(1)	

(1) By looping the input voltage

TRIAD 2
RANGE

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

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

MAIN SPECIFICATIONS

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

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

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

Current inputs: 1 A and 5 A

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

Transfer curves: linear, 2 slopes or quadratic

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

Response time down to 50 ms

Operating frequency: 50 or 60 Hz

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

Compliance with CE directive

Digital technology

ZOOM

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

Communication: Ethernet, RS 485 or optical head

Accessibility and safety: large-dimension terminals Insulated circuits

Ergonomic: easy mounting on DIN rail or switchboard

FACTORY-PROGRAMMABLE

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

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

PROGRAMMABLE VIA TRIADJUST 2

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

ENVIRONMENT AND STANDARDS

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

MOUNTING ACCESSORIES

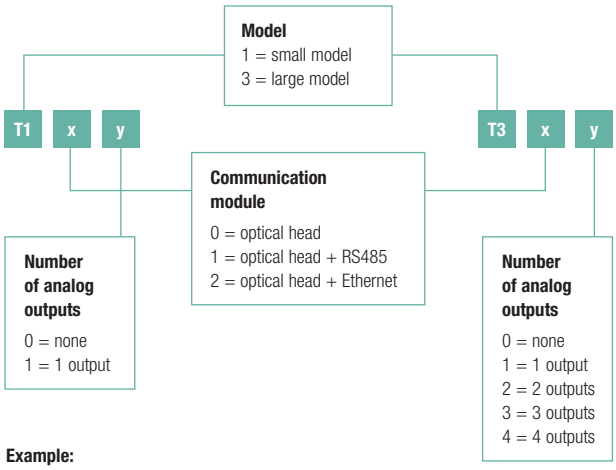
Model	Reference
Plate mounting for T1xy	ACCT 1007
Plate mounting for T3xy	ACCT 1006

CASING

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

HARDWARE IDENTIFICATION

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



Example:

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

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

* Accessible via the product's Modbus communication

TRIAD 2 Programmable model

ELECTRICAL SPECIFICATIONS

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

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

COMMUNICATION

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

METROLOGICAL SPECIFICATIONS

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

* RT: Response time for F = 50 Hz

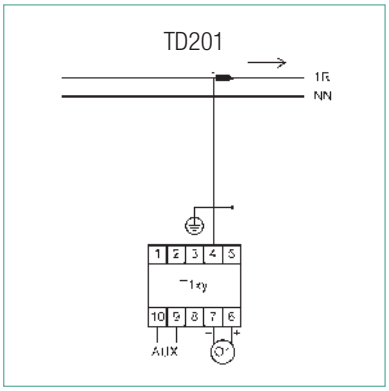
* These values may change according to the input and output measurement ranges

** Phase angle between voltages for φU and φV

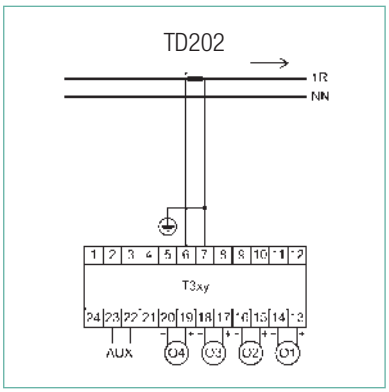
ELECTRICAL CONNECTIONS - SINGLE-PHASE NETWORK

I1, F:

TD201

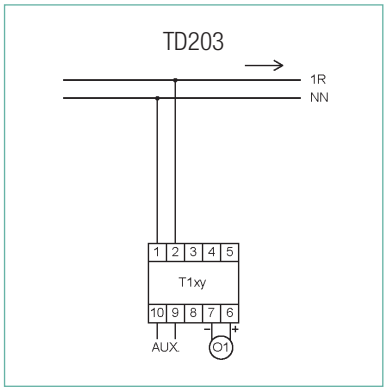


TD202

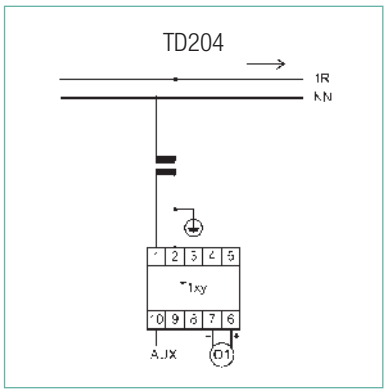


V1, F:

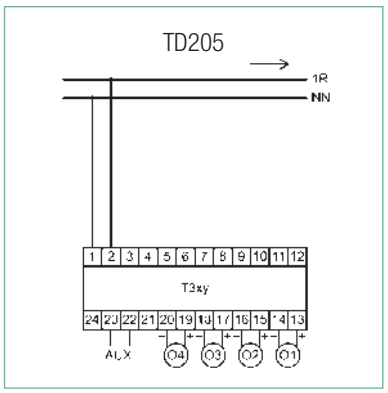
TD203



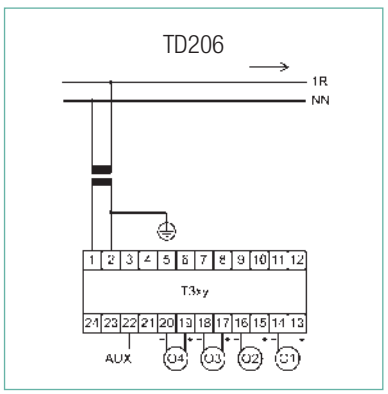
TD204



TD205

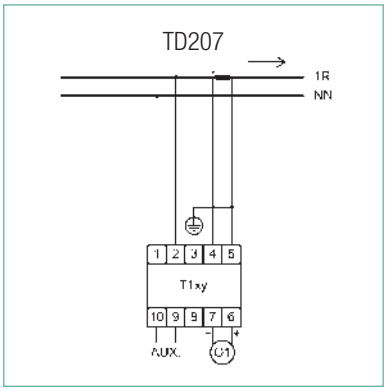


TD206

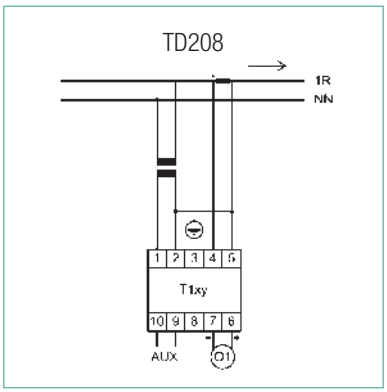


V1, I1, P1, Q1, S1, PF1, F, TANφ, Cosφ1, φ1:

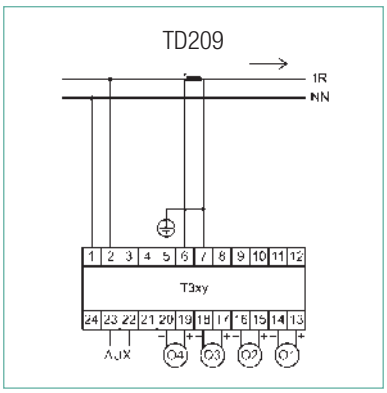
TD207



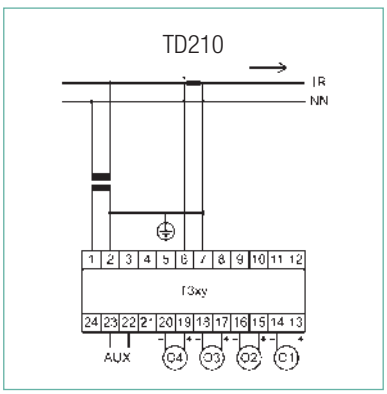
TD208



TD209



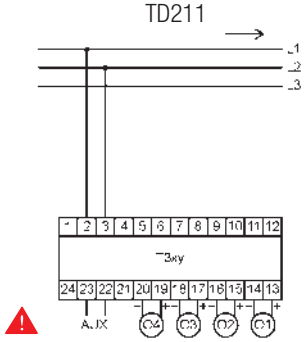
TD210



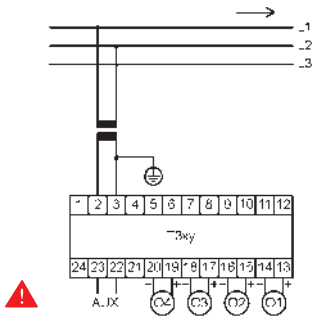
BALANCED 3-PHASE, 3-WIRE NETWORK

U12, U23, U31, F:

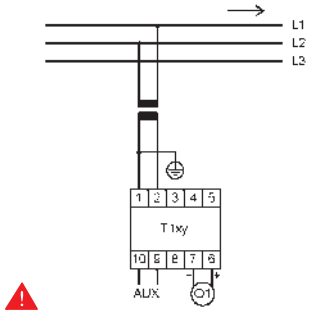
TD211



TD212

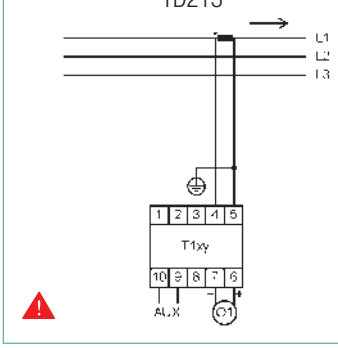


TD237

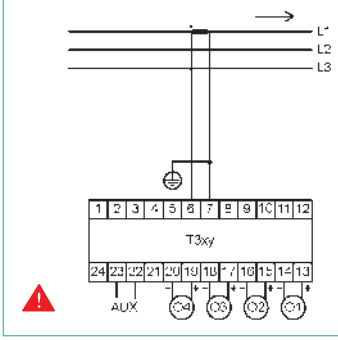


I1, I2, I3, F:

TD213

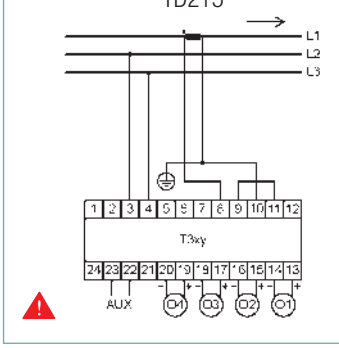


TD214

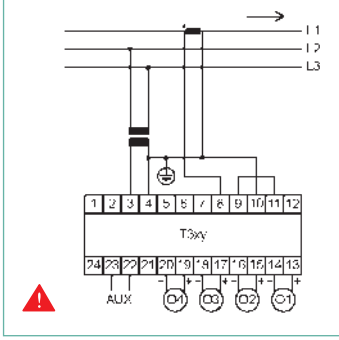


U12, U23, U31, I1, I2, I3, Pt, St, Qt, PFt, F, TANφ, Cosφt, φt:

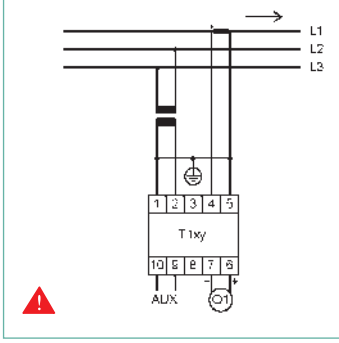
TD215



TD216



TD238

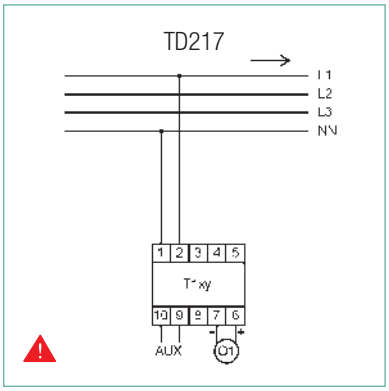


Phase rotation authorized

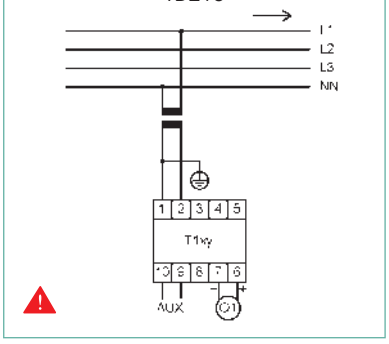
BALANCED 3-PHASE, 4-WIRE NETWORK

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

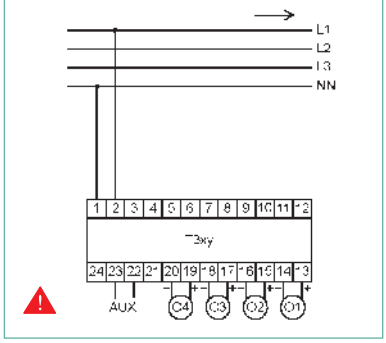
TD217



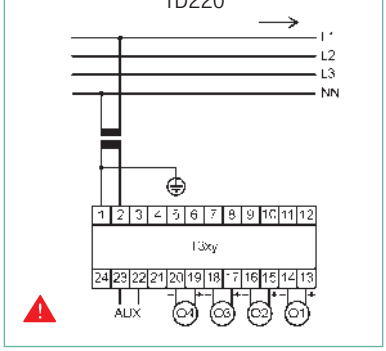
TD218



TD219

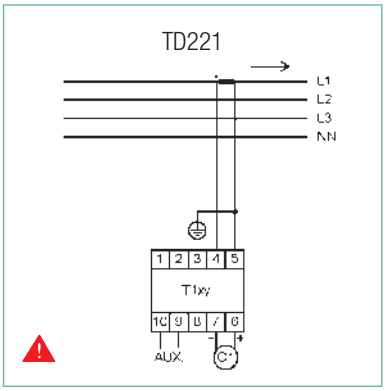


TD220

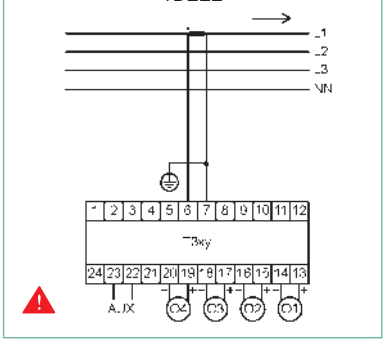


I1, I2, I3, F:

TD221



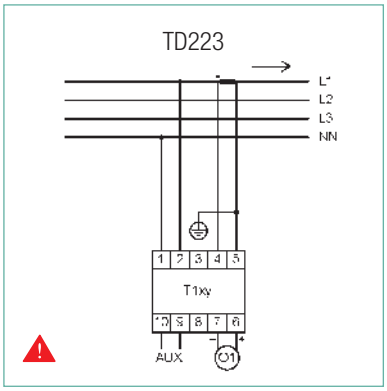
TD222



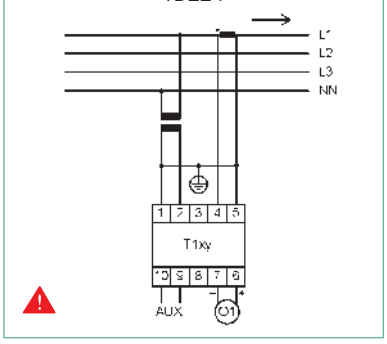
Phase rotation authorized

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

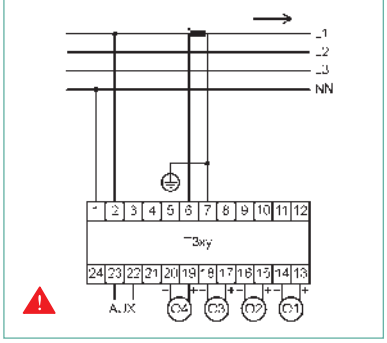
TD223



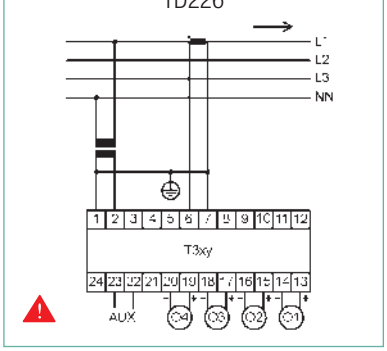
TD224



TD225



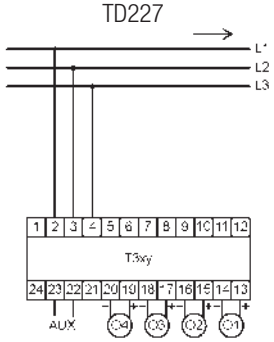
TD226



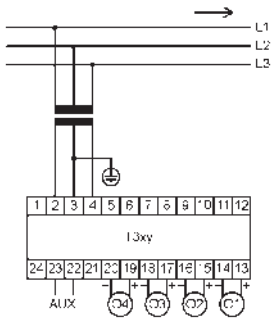
UNBALANCED 3-PHASE, 3-WIRE NETWORK

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

TD227

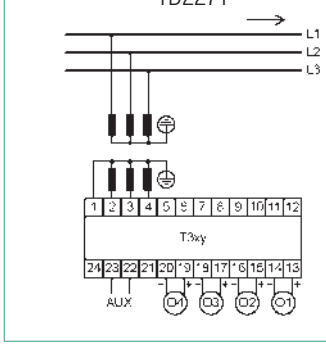


TD227D



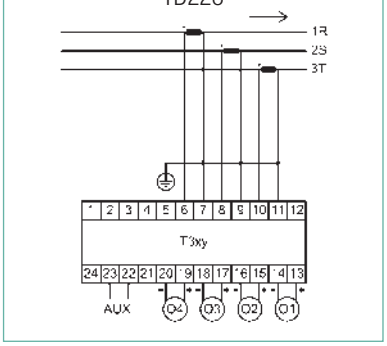
V1, V2, V3, U12, U23, U31, F,
Angle (V1/V2, V2/V3, V3/V1),
Angle (U12/U23, U23/U31, U31/U12):

TD227Y

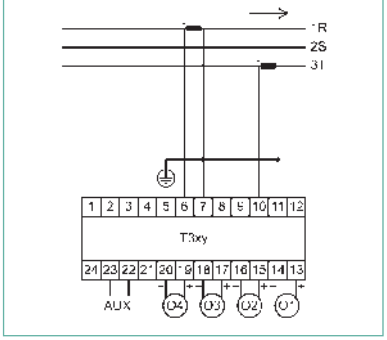


I1, I2, I3, F:

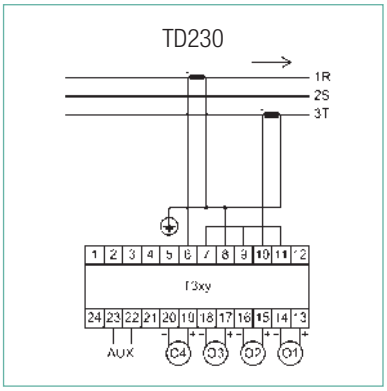
TD228



TD229



TD230

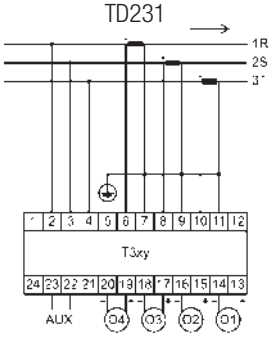


UNBALANCED 3-PHASE, 3-WIRE NETWORK (CONTINUED)

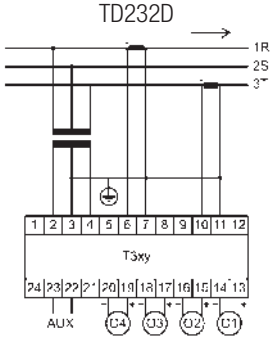
U12, U23, U31, I1, I2, I3, Pt, St, Qt, PFt, F, TANφ, Cosφt, φt, Angle (U12/U23, U23/U31, U31/U12):

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

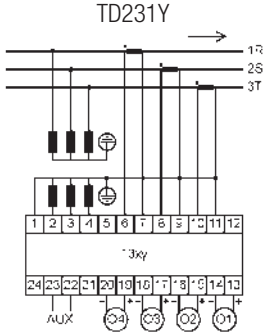
TD231



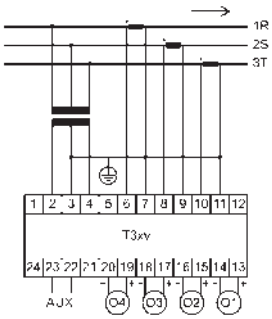
TD232D



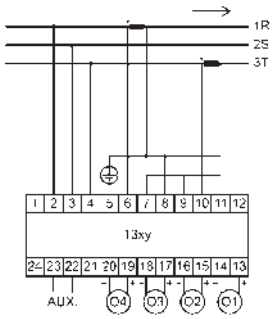
TD231Y



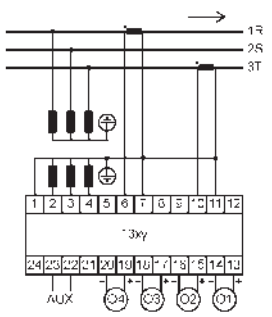
TD231D



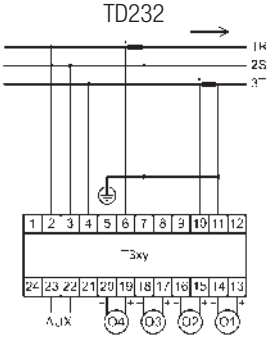
TD233



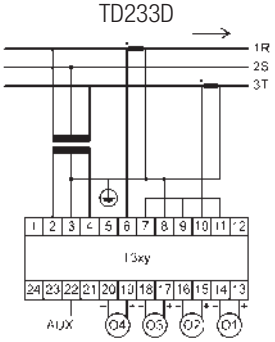
TD232Y



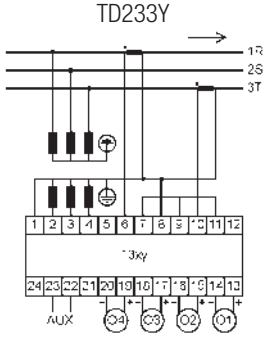
TD232



TD233D



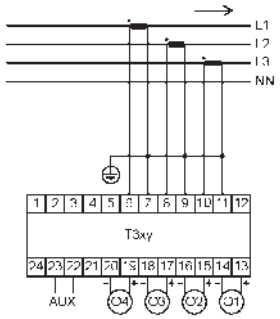
TD233Y



UNBALANCED 3-PHASE, 4-WIRE NETWORK

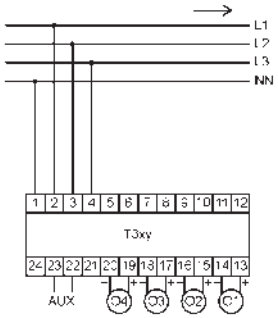
I1, I2, I3, F:

TD234

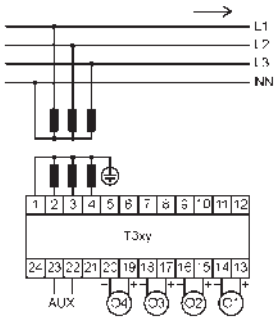


V1, V2, V3, U12, U23, U31, F,
Angle (V1/V2, V2/V3, V3/V1),
Angle (U12/U23, U23/U31, U31/U12):

TD235

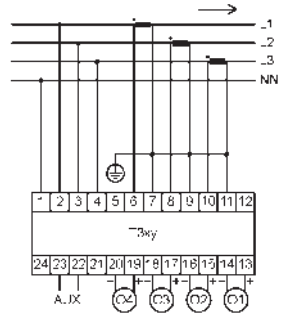


TD235Y

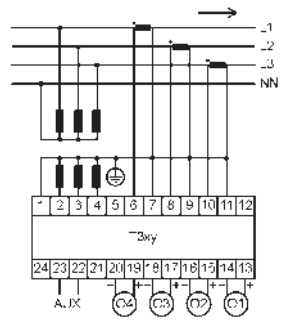


V1, V2, V3, U12, U23, U31, I1, I2, I3, P1, P2, P3, Pt, S1, S2, S3, St, Q1, Q2, Q3, Qt, PF1, PF2, PF3, PFt, F, TANφ, Cosφ1, Cosφ2, Cosφ3, Cosφt, φ1, φ2, φ3, φt
Angle (V1/V2, V2/V3, V3/V1),
Angle (U12/U23, U23/U31, U31/U12):

TD236



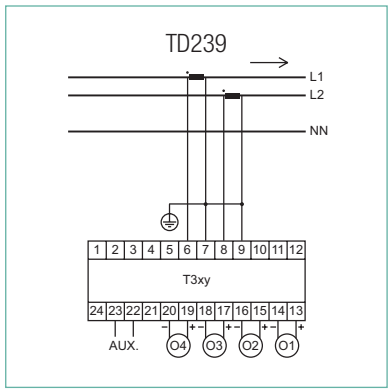
TD236Y



SPLIT-PHASE

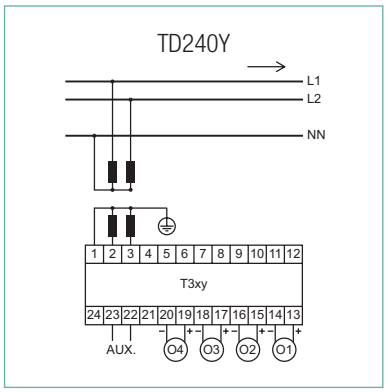
I1, I2, F:

TD239

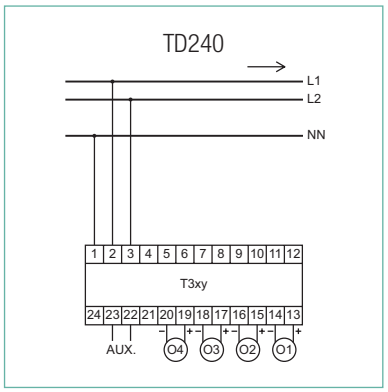


V1, V2, U12, F, Angle (V1/V2) rad, Angle (V1/V2) deg:

TD240Y

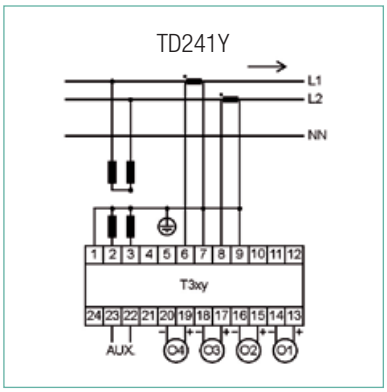


TD240

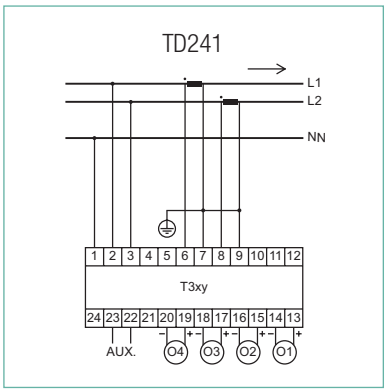


V1, V2, U12, I1, I2, P1, P2, Pt, Q1, Q2, Qt, S1, S2, St, PF1, PF2, PFt, F, tanφ, Angle (V1/V2) rad, Angle (V1/V2) deg, cos φ1, cos φ2, cosφt, φ1 Fund. rad, φ2 Fund. rad, φt Fund. rad, φ1 Fund. deg, φ2 Fund. deg, φt Fund.. deg, Angle V1/V2 Fund. deg, I1 (signed), I2 (signed):

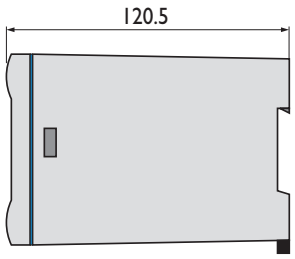
TD241Y



TD241

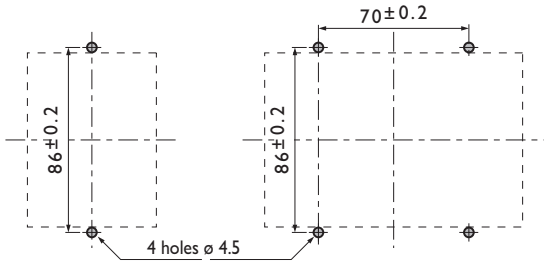


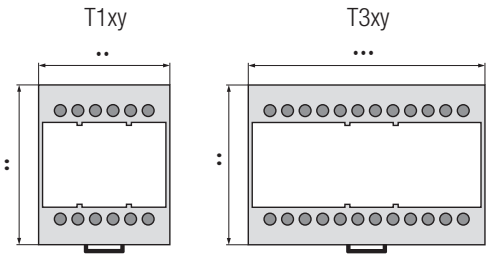
DIMENSIONS (IN MM)



All models

Panel drilling diagram for plate mounting

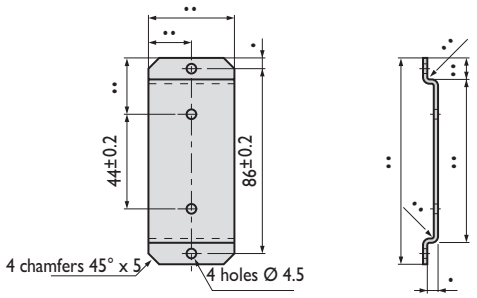




Weight: 320 g

Weight: 700 g

Accessory for plate mounting with screw (option)



TRIAD 2 PROGRAMMABLE VIA TRIADJUST 2

TO ORDER

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

TRIAD 2 FACTORY-PROGRAMMABLE

1 Model - Frequency

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

2 Network

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

3 Communication - Connection

0	Without
1	RS485
2	Ethernet

Indicate the diagram number. E.g. TD204

4 Supply

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

5 Tropicalization

0	Without
1	With

6 Inputs

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

7 Number of analog outputs

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

8 Analog outputs

Indicate for each output:

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

9 Analog output ratings*

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

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

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

FACTORY-PROGRAMMED TRIAD 2: ORDER FORM

1 - Model / Hz

☐ T1 or ☐ T3
☐ 50 Hz or ☐ 60 Hz

2 - Network

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

3 - Communication / Connection

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

4 - Power supply

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

5 - Tropicalization

☐ With ☐ Without

6 - Inputs

Current

With current transformer or Direct

Primary / Secondary: ____ / ____ A

Direct: ____ A

Voltage

With voltage transformer or Direct

Primary / Secondary: ____ / ____ V

Direct: ____ V

☐ Phase-phase ☐ Phase-neutral (√3)

Available quantities

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

7 - Number of analog outputs

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

8 / 9 - Analog outputs calibres

Output 1

Quantity and measurement range (x)

☐ Indicate quantity to be measured

Min | Breaking point | Max | Unit (1)

Transfer curve: ☐ Linear ☐ 2 slopes ☐ Quadratic

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

Accuracy class (2)

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

Output 2

Quantity and measurement range (x)

☐ Indicate quantity to be measured

Min | Breaking point | Max | Unit (1)

Transfer curve: ☐ Linear ☐ 2 slopes ☐ Quadratic

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

Accuracy class (2)

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

Output 3

Quantity and measurement range (x)

☐ Indicate quantity to be measured

Min | Breaking point | Max | Unit (1)

Transfer curve: ☐ Linear ☐ 2 slopes ☐ Quadratic

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

Accuracy class (2)

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

Output 4

Quantity and measurement range (x)

☐ Indicate quantity to be measured

Min | Breaking point | Max | Unit (1)

Transfer curve: ☐ Linear ☐ 2 slopes ☐ Quadratic

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

Accuracy class (2)

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

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

TRIADJUST 2
SOFTWARE

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

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

DESCRIPTION

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

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

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

ZOOM

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

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

Display
- Instantaneous quantities (in digital or analog form)

Recording
- In real time in exported file

MINIMUM CONFIGURATION

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

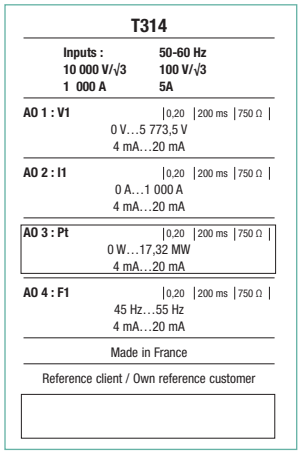
TRIADJUST 2 KIT

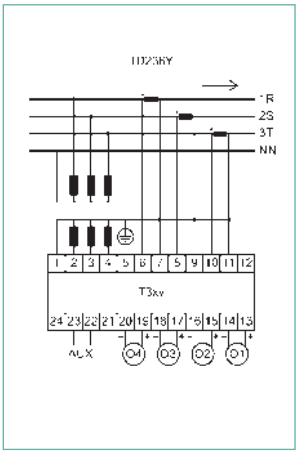
The TRIADJUST 2 configuration kit comprises:

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

LABELS

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





TO ORDER

Model	Reference
TRIADJUST 2 kit	P01380410

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

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

ASSOCIATED PRODUCT

TRIAD 2

Configurable via TRIADJUST 2

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

page 152

T82N
RANGE

Analog transducers for AC electrical quantities, class 0.5.

DESCRIPTION

The **T82N** models measure an AC electrical quantity and convert it into a standardized, low-level DC current or voltage signal (e.g. 4...20 mA).

They are normally used in conjunction with analog or digital measuring instruments (panel meters, recorders, etc.).

+
- Configurable on request: Input quantities, transfer curve, output signal, etc.
- Fixed or plug-in mounting modes
- Socket equipped with current short-circuiter as standard

ZOOM

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

IAR 1210B
RMS AC current

UAR 1210B
RMS AC voltage

QAR 1232B
Reactive power

PAR 1232B
Active power

FAR 1210B
Frequency

JAR 1211B
Phase angle

ELECTRICAL SPECIFICATIONS

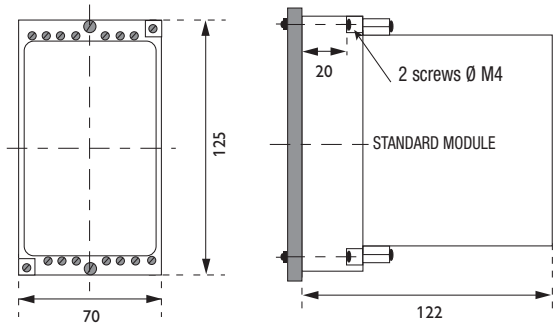
- **Inputs**
  - Short-term overload:
    U input: 2 Un during 1s repeated 10 times
    I input: 20 In during 1s repeated 10 times
  - DC overload :
    U input: 1.2 Un
    I input: 1.2 Un
  - Frequency:
    50 Hz (45….55 Hz)
    60 Hz (55….65 Hz)

- **Analog output**
  - Accuracy: class 0.5 according to IEC 60688 April 2013
  - Response time: 120 ms to 260 ms at 95 % of output current
  - Current output operating resistance: 20 V / Is
  - Influence of operating resistance: ± 0.1 % from 0 Ω to max. operating resistance
  - Peak-to-peak ripple: 0,2 à 0,4 %

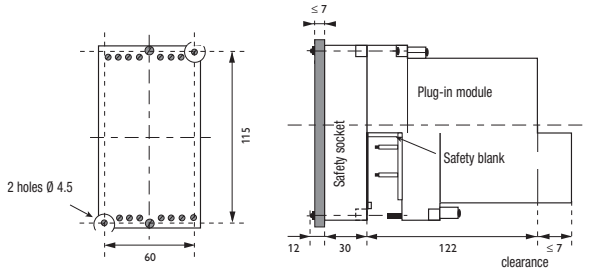
- **Auxiliary power supply**
  - Operating range:
    ± 10 % from 100/√3 Vac to 440 Vac
    ± 20 % from 24 to 125 Vdc
  - Consumption :
    ≤ 3 VA from 100/√3 to 440 Vac
    ≤ 3 W from 24 to 125 Vdc

DIMENSION (IN MM)

T82N plate-mounting module



T82N plug-in module



REFERENCE STANDARDS

- **Electromagnetic compatibility:** 2014/30/CE(CEM)
  IEC 61326-1 (07/2013)
- **Safety:** 2006/95/CE
  IEC 61010-1 (01/2011)
- **Metrological:** IEC 60688 (04/2013)
- **Climatic:** IEC 60688 (04/2013)
- **Mechanical:** IEC 60068-2-6 (04/2008)
  IEC 60068-2-27 (07/2009)

OPERATING ENVIRONMENT

- **Operating temperature:** -10 to +60 °C
- **Operating humidity:** Up to 95 % at 45 °C
- **Storage temperature:** -25 to +70 °C

CASINGS

- **Screw connection** terminals, 2 x 2.5 mm² or 1 x 6 mm²
- **IP20 protection** rating as per IEC 60529
- **Weight:** 0.60 to 0.85 kg (Socket: 0.25 kg)

MOUNTING ACCESSORIES

- Connection socket for plug-in module

	Socket	
Model	**Type**	**Reference**
UAR 1210B	5	EMBB 4005
IAR 1210B	4	EMBB 4004
PAR 1232B	3	EMBB 4003
QAR 1232B	3	EMBB 4003
FAR 1210B	5	EMBB 4005
JAR 1211B	4	EMBB 4004

- 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 MS01-7562.

Vac

RMS AC VOLTAGE

Model		UAR 1210 B
Transfer curve		
Linear		■
Module		
Fixed / plate-mounting		0.7 kg
Measurement input		
Voltage Un		Direct or on VT: "100/√3" "110/√3" "115/√3" "120/√3" "132/√3" "90" "100" "110" "115" "120" "127" "132" "138" "180" "220" "250" "300" "360" "380 Vac
Frequency Fn		50 Hz ±5 Hz and 60 Hz ±5 Hz
Measurement range 0…Xmax		0…1.25 Un
Consumption		1kΩ/ V or 0.4 VA at 400 Vac
Analog output		
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		0.5 %
Auxiliary supply		
Alternating current		"100/√3 Vac" "110/√3 Vac" "115/√3 Vac" "100 Vac" "110 Vac" "115 Vac" "127 Vac" "220 Vac" "230 Vac" "240 Vac"
Direct current		"24 Vdc" "48 Vdc" "110 Vdc" "125 Vdc"
Module protection rating		
Plate-mounting		IP20

CUSTOMIZED PRODUCT

	Model	Module	Direct Un or on VT	Measurement range	Fn	Analog output	Auxiliary supply	Protection	Tropicalization
Example	UAR 1210 B	Fixed	Direct 100 Vac	0…120 Vac	50 Hz	4-20 mA	220 Vac	IP 20	☑

ASSOCIATED PRODUCTS

Normeurope analog panel meters

Round / square barrel

For viewing an instantaneous and variable quantity.

page 216

Sockets

For plug-in modules

page 169

Mounting on DIN rail

Plate-mounting or plug-in

page 169

Iac

RMS AC CURRENT

Model		IAR 1210 B
Transfer curve		
Linear		■
Module		
Fixed / plate-mounting		0.7 kg
Measurement input		
Current In		Direct 0.5 to 10 A or on CT 1/5 A
Frequency Fn		50 Hz ±5 Hz and 60 Hz ±5 Hz
Measurement range 0…Xmax		0 to In and 0 to 1.3 In if CT present
Consumption		≤ 0.2 VA
Analog output		
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		0.5 %
Auxiliary supply		
Alternating current		"100/√3 Vac" "110/√3 Vac" "115/√3 Vac" "100 Vac" "110 Vac" "115 Vac" "127 Vac" "220 Vac" "230 Vac" "240 Vac"
Direct current		"24 Vdc" "48 Vdc" "110 Vdc" "125 Vdc"
Module protection rating		
Fixed / plate-mounting		IP20

CUSTOMIZED PRODUCT

	Model	Module	Direct In or on CT	Measurement range	Fn	Analog output	Auxiliary supply	Protection	Tropicalization
Example	IAR 1210 B	Fixed	1 000 / 5 A	0…1 300 A	50 Hz	4…20 mA	48 Vdc	IP 20	☑

ASSOCIATED PRODUCTS

Normeurope analog panel meters

Round / square barrel

For viewing an instantaneous and variable quantity.

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Sockets

For plug-in modules

page 169

Mounting on DIN rail

Plate-mounting or plug-in

page 169

P

ACTIVE POWER

Model		PAR 1232 B
Network + connections		
Balanced three-phase - 3 wires		■
Unbalanced three-phase - 3 / 4 wires		■
Transfer curve		
Linear		■
Module		
Fixed / plate-mounting		0.85 kg
Measurement input		
Current In		Direct or on CT: "1" "5"
Ph-N voltage Un		Direct or on VT: "57.73" "63.51" "66.4" "230"
Ph-Ph voltage Un		Direct or on VT: "100" "110" "115" "120" "127" "230" "240" "380" "400"
Frequency Fn		50 Hz ±5 Hz and 60 Hz ±5 Hz
Measurement range 0…Xmax		±1.35 ≥Sn(1) ≥ ±0.50
Consumption		I input: ≤ 0.2 VA ; U input: ≥ 500 Ω/ V
Analog output		
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" "1/3/5 mA" "2/6/10 mA" "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
Voltage	**0…Ymax**	"0/1 V" "0/5 V" "0/10 V"
	Ymin…Ymax	"1/5V" "2/10V" "-1/0/1V" "-5/0/5V" "-10/0/10 V
Accuracy		0.5 %
Auxiliary supply		
Alternating current		"100/√3 Vac" "110/√3 Vac" "115/√3 Vac" "100 Vac" "110 Vac" "115 Vac" "127 Vac" "220 Vac" "230 Vac" "240 Vac"
Direct current		"24 Vdc" "48 Vdc" "110 Vdc" "125 Vdc"
Self-powered		For voltages "100 Vac" "110 Vac" "115 Vac" "120 Vac" " 127 Vac" "230 Vac" "240 Vac"
Module protection rating		
Fixed / plate-mounting		IP20

(1) Sn = √ x I x cos φ (single-phase network) Sn = 3 x √ 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

CUSTOMIZED PRODUCT

	Model	Network	Module	Direct In or on CT	Direct Un or on VT	Measurement range	Fn	Analog output	Auxiliary supply	Protection	Tropicalization
Example	PAR 1232 B	Unbal. 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	☑

ASSOCIATED PRODUCTS

Normeurope analog panel meters
Round / square barrel
For viewing an instantaneous and variable quantity.
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Sockets
For plug-in modules
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Mounting on DIN rail
Plate-mounting or plug-in
page 169

Q

REACTIVE POWER

Model		QAR 1232 B
Network + connections		
Unbalanced three-phase - 3 / 4 wires		■
Transfer curve		
Linear		■
Module		
Fixed / plate-mounting		0.85 kg
Measurement input		
Current In		Direct or on CT: "1" "5"
Ph-N voltage Un		Direct or on VT "57.73" "63.51" "66.4" "230"
Ph-Ph voltage Un		Direct or on VT "100" "110" "115" "120" "127" "230" "240" "380" "400"
Frequency Fn		50 Hz ±5 Hz and 60 Hz ±5 Hz
Measurement range 0…Xmax		±1.35 ≥Sn(1) ≥ ±0.50
Consumption		I input: ≤ 0.2 VA ; U input: ≥ 500 Ω/ V
Analog output		
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" "1/3/5 mA" "2/6/10 mA" "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
Voltage	**0…Ymax**	"0/1 V" "0/5 V" "0/10 V"
	Ymin…Ymax	"1/5V" "2/10V" "-1/0/1V" "-5/0/5V" "-10/0/10 V
Accuracy		0.5 %
Auxiliary supply		
Alternating current		"100/√3 Vac" "110/√3 Vac" "115/√3 Vac" "100 Vac" "110 Vac" "115 Vac" "127 Vac" "220 Vac" "230 Vac" "240 Vac"
Direct current		"24 Vdc" "48 Vdc" "110 Vdc" "125 Vdc"
Self-powered		For voltages "100 Vac" "110 Vac" "115 Vac" "120 Vac" " 127 Vac" "230 Vac" "240 Vac"
Module protection rating		
Fixed / plate-mounting		IP20

(1) Sn = √ x I x cos φ (single-phase network) Sn = 3 x √ 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

CUSTOMIZED PRODUCT

	Model	Network	Module	Direct In or on CT	Direct Un or on VT	Measurement range	Fn	Analog output	Auxiliary supply	Protection	Tropicalization
Example	QAR 1232 B	Unbal. 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	☑

ASSOCIATED PRODUCTS

Normeurope analog panel meters
Round / square barrel
For viewing an instantaneous and variable quantity.
page 216

Sockets
For plug-in modules
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Mounting on DIN rail
Plate-mounting or plug-in
page 169

F

ACTIVE POWER

Model		FAR 1210 B
Measurement		
Type of measurement		RMS value
Type of input		■
Casing		
Fixed/plug-in		0.7 kg
Measurement input		
Voltage Un		Direct or on VT: "100/√3" "110/√3" "115/√3" "100" "110" "115" "120" "127" "230" "240" "380"
Measurement range Xmin…Xmax		"45/55 Hz" "48/52 Hz" "49/51 Hz" " "55/65 Hz" "58/62 Hz" "59/61 Hz"
Consumption		1 k Ω / V
Analog 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" "-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**	"0/1 V" "0/5 V" "0/10 V"
	Ymin…Ymax	"1/5V" "2/10V" "-1/0/1V" "-5/0/5V" "-10/0/10 V
Accuracy		0.5 %
Auxiliary power supply		
AC		"100/√3 Vac" "110/√3 Vac" "115/√3 Vac" "100 Vac" "110 Vac" "115 Vac" "127 Vac" "220 Vac" "230 Vac" "240 Vac"
DC		"24 Vdc" "48 Vdc" "110 Vdc" "125 Vdc"
Self-powered		■
Casing protection		
Fixed/plug-in		IP20

■ Parameters to be indicated when ordering

CUSTOMIZED PRODUCT

	Model	Casing	Un direct or on VT	Measurement range	Analog output	Auxiliary power supply	Protection	Tropicalization
Example	FAR 1210 B	Fixed	Direct 100 Vac	45...55 Hz	4…20 mA	220 Vac	IP 20	☑

ASSOCIATED PRODUCTS

Normeurope analog panel meters

Round / square barrel

For viewing an instantaneous variable quantity.

page 216

Sockets

For plug-in modules

page 169

Mounting on DIN rail

Plate-mounting or plug-in

page 169

J

PHASE ANGLE

Model		JAR 1211 B
Networks		
Single-phase		■
Casing		
Fixed/plug-in		0.7 kg
Measurement input		
Current In		Direct or on CT: "1" "5" "10 A"
Voltage Un		Direct or on VT: "100/√3" "110/√3" "115/√3" "100" "110" "115" "127" "230" "240" "380" "400"
Frequency Fn		50 Hz, 60 Hz
Measurement range Xmin…Xmax		±1,35 ≥Sn(1) ≥ ±0,50
Consumption		Input I: ≤ 0,3 VA; Input U: ≥ 1 kΩ/ V
Analog output		
Transfer curve		Linear
Current	**0…Ymax**	"0/1 mA" "0/2 mA" "0/2,5 mA" "0/5 mA" "0/10 mA" "0/20mA"
	Ymin…Ymax	"4...20 mA"
Voltage	**0…Ymax**	"0/1 V" "0/5 V" "0/10 V"
	Ymin…Ymax	"1/5V" "2/10V"
Accuracy		1 %
Auxiliary power supply		
AC		"100/√3 Vac" "110/√3 Vac" "115/√3 Vac" "100 Vac" "110 Vac" "115 Vac" "127 Vac" "220 Vac" "230 Vac" "240 Vac"
DC		"24 Vdc" "48 Vdc" "110 Vdc" "125 Vdc"
Self-powered		■
Casing protection		
Fixed/plug-in		IP20

Parameters to be indicated when ordering

CUSTOMIZED PRODUCT

	Model	Casing	In direct or on CT	Un direct or on VT	Measurement range	Analog output	Auxiliary power supply	Protection	Tropicalization
Example	JAR 1211 B	Fixed	CT 1000/5 A	Direct: 100 Vac	0.5 LEAD/1/0.5 LAG	4…20 mA	220 Vac	IP 20	☑

ASSOCIATED PRODUCTS

Normeurope analog panel meters

Round / square barrel

For viewing an instantaneous variable quantity.

page 216

Sockets

For plug-in modules

page 169

Mounting on DIN rail

Plate-mounting or plug-in

page 169

ELINK 61850

IEC 61850 network communication gateway for TRIAD 2 transducers and ENERIUM power monitors.

- Communication
  - IEC 61850 server – Edition 2
  - Modbus RS485 master
- Invisible: TRIAD 2 and ENERIUM seen as native products
- Simple implementation via web pages
- High-performance: up to 20 slave units

DESCRIPTION

The ELINK 61850 network gateway enables communication between ENERIUM power monitors and TRIAD 2 transducers via the IEC 61850 protocol.
In this way, the ENERIUM and TRIAD products can be seen as native IEC 61850 products by any IEC 61850 supervision system or SCADA / RTU client PLC.

- **Independent:** ELINK 61850 allows IEC 61850 communication without calling your choice or qualification of a Chauvin Arnoux Energy measurement solution into question
- **Installation upgrading:** ELINK 61850 interfaces with equipment already in place and allows you to modernize your installation to transition towards digital stations
- **Complete:** All the electrical measurements from the Chauvin Arnoux Energy measuring equipment are carried by the IEC 61850 communication protocol:
  - Instantaneous measurements for TRIAD 2
  - Instantaneous measurements, min/max/avg, energy and energy quality for ENERIUM
- **Customizable:** the teams at Chauvin Arnoux Energy respond quickly to offer solutions allowing you to adapt ELINK 61850 to fit your configurations

ZOOM


IEC 61850 server Ethernet port

2 x RS485 ports (Modbus/jbus RTU) in master mode

ELECTRICAL SPECIFICATIONS

Auxiliary power supply	
AC network	80 to 265 Vac - 10 VA / 42.5 to 69 Hz
DC network	80 to 265 Vdc - 7 W
Outputs	
Power reserve	2.5 seconds at 230 Vac

COMMUNICATION

IEC 61850 protocol	
Parts	IEC 61850-1, IEC 61850-5, IEC 61850-7
Logical nodes supported	MMXU, MMXN, MSTA, MMTR (Triad2/Enerium) MHAI, MHAN (Enerium)
Ethernet port	RJ45 - 8 contacts / 10 - 100 baseT
RS485A and RS485B ports	Type : Independent RS485 - 2 isolated wires Protocol: Modbus RTU mode Operation: Master mode Half-duplex speed: 300 to 115,200 bauds

MECHANICAL SPECIFICATIONS

Weight	560 g
Mounting	On DIN rail
Connection **Cable cross-sections**	Screw terminal block 6 mm² single-strand wire- 4 mm² multi-strand wire
Dimensions	120.5 x 120 x 81 mm (W x L x H)

ENVIRONMENTAL CONSTRAINTS

Operating temperature	-10 °C to +55 °C
Storage temperature	-25 °C to +70 °C
Ingress protection	IP20
Pollution degree	2
Installation category	III
Safety standard	IEC 61010
Electromagnetic standards	IEC 61000-4-2/3/4/5/6/8/11/12/18 - CISPR22 IEC 61000-6-5 (Zone 2)

ELECTRICAL CONNECTIONS

RJ45 Ethernet port
10/100 Base T

Auxiliary power supply
80-265 Vac / 10 VA :
42.5 … 69 Hz
80 - 265 Vdc / 7 W

RS485 A port
ModBus master

RS485 B port
ModBus master

TO ORDER

Model	Reference
ELINK 61850	P01 3808 50

ASSOCIATED PRODUCTS

TRIAD 2
Digital transducers
1 to 4 analog outputs.
Class 0.1.
page 152

ENERIUM
Power meters
Multi-energy, qualimetry.
page 56

NETWORK SUPERVISION AND PHYSICAL MEASUREMENT

PANEL METERS AND SYNCHROCOUPLER

180 DIGITAL PANEL METERS
180 OVERVIEW OF THE RANGE
181 SELECTION GUIDE
196 SYNCHRONIZATION UNIT
200 ANALOG PANEL METERS
200 OVERVIEW OF THE RANGE
202 SELECTION GUIDE
228 HOUR METERS

DIGITAL PANEL METERS AND SYNCHROCOUPLER

µDIGI1 and µDIGI2 ranges

µDIGI1

24 x 48 mm-format programmable panel meters for industrial use.

page 184

µDIGI2

48 x 96 mm-format programmable panel meters for industrial use.

page 188

CA 2150 range

CA 2150

48 x 96 mm-format programmable digital panel meters for all types of industrial applications.

page 192

Synchronization unit

Synchrocoupler

Synchronization units for LV networks.

page 196

SELECTION GUIDE

		µDIGI1 & µDIGI2 ranges		CA 2150 range
		page 184	page 188	page 192
				
		µDIGI1	µDIGI2	CA 2150
Front panel format (mm)		24 x 48	48 x 96	48 x 96
Display range (in counts)		-1,999/+9,999	-1,999/+9,999	-19,999/+19,999
Measurement functions	AC ammeter	µDIGI1 E	µDIGI2 E	CA 2150-E
	AC voltmeter	µDIGI1 E	µDIGI2 E	CA 2150-E
	Frequency meter			CA 2150-D
	DC ammeter	µDIGI1 E	µDIGI2 E	CA 2150-E
	DC voltmeter	µDIGI1 E	µDIGI2 E	CA 2150-E
	Process signals	µDIGI P/LP	µDIGI2 P	CA 2150-M
	Thermocouple thermometer		µDIGI2 P	CA 2150-M
	Pt 100 thermometer		µDIGI2 P	CA 2150-M
	Ohmmeter		µDIGI2 P	
	Tachometer			CA 2150-D
	Meter			CA 2150-D
	Chronometer			CA 2150-D
	Load cell			CA 2150-M
	Potentiometer		µDIGI2 P	CA 2150-M
Special functions	MIN/MAX		µDIGI2 E/P	CA 2150-E/D/M
Output(s)	Analog output			Option
	RS232 output			Option
	RS485 output			Option
	Threshold output(s)		Option	Option
User-programmable				
Strengths		Economical programmable range for industrial use		Programmable range for universal use

INFO & ADVICE

Digital panel meters are used to display an analog value clearly and precisely. The digital processing enables these instruments to display different values, and allows connection to external measurement or supervision systems.

Several criteria influence the choice of a digital panel meter, the first being the scale or the measurement range, defined by the variation range of the signal to be measured.

The resolution

The number of display counts defines the resolution of the panel meter. The resolution is the necessary variation of the measurement signal required to vary the reading by one point. For a given rating, the greater the display capacity, the better the resolution.

For example, for an 11-bit (2,000-counts) panel meter with a 20 V range, the resolution is 10 mV.

However, for industrial applications, it is not always wise to choose a digital panel meter of too high resolution. The measurement signal may be subject to noise interference, resulting in permanent instability of the low-weighted displays (units) on the panel meter.

Accuracy

Accuracy, which is not to be confused with resolution, defines the maximum variation between the instrument reading and the true value of the signal measured.

It is expressed as follows: E = x% of the reading ± y counts.

The first term depends on the conversion method and the precision of the components, while the second depends on the various drift, dispersion, fluctuation and noise factors that can affect the instrument.

The error is therefore constant over the entire measurement range. This is one of the main advantages of the digital panel meter over the galvanometer, where the most accurate readings are obtained at the end of the scale.

Format

The format and weight of the instrument must also be taken into account, as they affect the sizing of electrical cabinets. The format 48 x 96 (DIN standard 43700) is the industrial standard.

Display

The visibility of panel meter display characters is directly linked to the light difference between the digits and the screen background. LEDs, LCDs and backlit LCDs offer different levels of readability. LED technology, used on most of the Chauvin Arnoux Energy range of digital panel meters, offers the best display contrast.
A choice of red, green and amber colors also ensures they are easy to read.

Display only or multifunction products?

Panel meters are increasingly universal, and must be able to display both strong signals, such as the voltage of a network, and weak signals such as process signals.

Instruments with multiple inputs, ratings and outputs are increasingly equipped with digital interfaces (RS232, RS485) for remote communication, analog outputs, and relay or alarm interfaces for connection to logic controllers.

Number of digits and display counts

The display of a digital panel meter is characterized by the number of digits. We speak, for example, of 3 1/2 digit or 4 3/4 digit panel meters.

A full digit has 10 possible states, in other words all values between 0 and 9.

A 1/2 digit has a maximum value of 1 and is capable of 2 states: 0 and 1.

A 3/4 digit can display a maximum value equal to 3 and has 4 states: 0, 1, 2, 3.

We can therefore expect a 3 1/2 digit panel meter to be capable of counting up to 2,000 (0 to 1,999), and a 4 3/4 digit panel meter to be capable of counting up to 40,000 (0 to 39,999). For this, the real display range of the apparatus must not be inferior.

HOW TO GET THE BEST OUT OF YOUR PANEL METER.

Environment

Digital panel meters, in general, are intended for indoor use, their electronic circuit being sensitive to difficult climatic environments (in contrast to analog panel meters, which are suitable for both indoor and outdoor use). They must also support emissions induced and emitted by the electrical equipment.

Maintenance

Unlike the analog panel meter, the digital panel meter accepts low currents (maximum 600 V and 5 A). It therefore requires minimal precautions for the use of currents and voltages

µDIGI 1
RANGE

24 x 48 mm programmable panel meters
for industrial use.

- Simple programming using 3 keys
- Instant mounting without tools
- Compact dimensions

PROGRAMMING

Quick and easy:

- **Local** programming using the 3 keys of the keyboard.
  Only the instructions required for the application are shown.
  No mistakes are possible. Access to programming can be protected on all the instruments.

ZOOM

Plug-in connectors
for quick and easy
connection

Display with 4 levels
of brightness

µDIGI 1-LP

4-20mA process signal

- **Input:** 4-20 mA
- **Display range:** -1,999… 9,999

TO ORDER

Power supply	Reference
Self-powered (active loop)	P01 330 000

µDIGI 1-P

U/I process signal

- **Input:**
  -10… +10 Vdc
  -20… +20 Vdc
  -200… +200 Vdc (1 MΩ)
  -100… +100 mVdc (100 MΩ)
  -20… +20 mAdc (12.1 Ω)
- **Display range:** -1,999… 9,999

TO ORDER

Power supply	Reference
85 - 265 Vac & 100 - 300 Vdc	P01 330 031
22 - 53 Vac & 10.5 - 70 Vdc	P01 330 032

µDIGI 1-E

U/I voltage and current

- **Input:** 600 Vac
  100 Vac
  -199.9… +600 Vdc
  -100… +100 Vdc (3 MΩ)
  5 Aac
  1 Aac
  -1.999… +5 Adc
  -1… +1 Adc (14 mΩ)
  40 Hz… 1 KHz
- **Display range:**
  -1,999… 9,999 (dc)
  0… 9,999 (ac)

TO ORDER

Power supply	Reference
85 - 265 Vac & 100 - 300 Vdc	P01 330 011
22 - 53 Vac & 10.5 - 70 Vdc	P01 330 012

ASSOCIATED PRODUCT

Current transformers & shunts

Tertiary, industrial, tariff

5 to 5,000 A.

page 99

DISPLAY

	µDIGI1-LP	µDIGI1-P	µDIGI1-E
Measurement rate	62/s		
Display range	-1,999… 9,999	-1,999… 9,999	-1,999… 9,999 (dc) 0… 9,999 (ac)
7-segment red LED display			Height 10 mm
Reading	4 digits		
Polarity	Automatic		
Overrun	OVE display		
Decimal position	Programmable using software		

MECHANICAL SPECIFICATIONS

Material	Polycarbonate as per UL94 V-O
Weight	60 g - 40 g (µDIGI1-LP)
Protection rating	Front panel IP 65
Mounting	On panel with self-locking strap

ENVIRONMENT

Operating temperature	-10 °C to +60 °C
Storage temperature	-25 °C to +85 °C
Relative humidity	< 95 % at +40 °C
Max. altitude	2,000 m

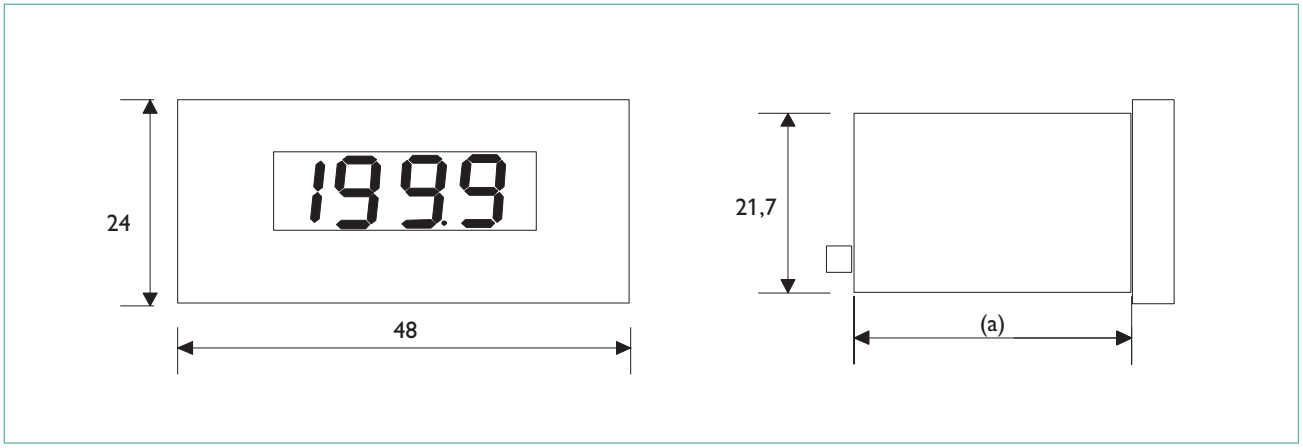
POWER SUPPLY

High level	85/265 Vac 50 / 60 Hz - 100/300 Vdc
Low level	22/53 Vac 50 / 60 Hz - 10.5/70 Vdc
Consumption	≤ 2.2 W

STANDARDS

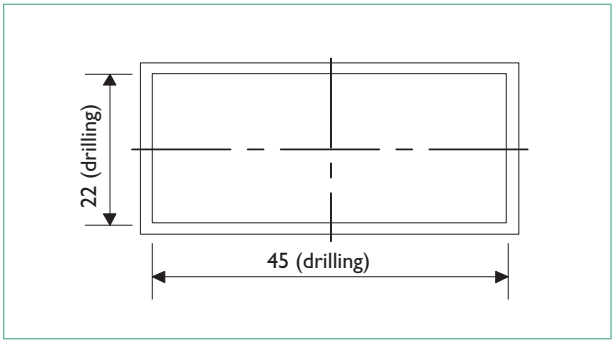
Insulation – dielectric strength: EN 611010-1 (category II installation)
EMC – immunity/emission: EN 61000-4-2, EN 61000-4-3, EN 61000-4-4 / EN 55022
(EN 610000-4-6 for µDIGI1-LP – EN 61000-4-5)

DIMENSIONS (IN MM)



	µDIGI1-LP	µDIGI1-P	µDIGI1-E
(a)	40 mm	70 mm	

PANEL DRILLING SPECIFICATIONS (IN MM)



µDIGI2 RANGE

Programmable panel meters in 48 x 96 mm format for industrial applications.

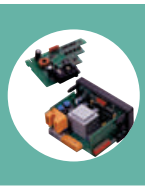
- Economical single-function range
- Instant fitting without tools

DESCRIPTION

- Display on 4 digits
- MIN/MAX values stored
- Power supply with large dynamic range
- Programming on front panel

ZOOM

Simple programming with 3 keys on front panel



Easy installation of option boards

Quick connection using plug-in connectors

OPTION BOARD

	Reference
2-relay alarm board	P01 3193 01

µDIGI2 E

- **DC voltage:**
  600 V
  200 V
  20 V
- **DC current:**
  5 A
  1 A
  100 mV
  60 mV
- **AC voltage:**
  600 V
  200 V
  20 V
- **AC current:**
  5 A
  1 A
  100 mV
  60 mV

TO ORDER

Supply	Reference
20/265 Vac - 11/265 Vdc	P01 330 081

µDIGI2 P

- **Process:**
  ±20 mA
  10 V
  200 V
  dynamo-tachometer
- **Temperature:**
  Thermocouple J
  Thermocouple K
  Thermocouple T
  Thermocouple N
  Pt 100
  Pt 1000
- **Potentiometer:**
  100 Ω to 100 kΩ
- **Resistance:**
  1 kΩ
  10 kΩ
  50 kΩ

TO ORDER

Supply	Reference
20/265 Vac - 11/265 Vdc	P01 330 080

ASSOCIATED PRODUCTS

Accessories and option boards
Alarm boards
page 188

Current transformers & shunts
Tertiary, industrial, tariff
5 to 5,000 A.
page 99

Tachometric sensor
Please contact us

Thermocouple / probe
See Pyrocontrole Catalog

DISPLAY

Display range	-9,999…9,999
Display indicators	Red LED, 7 segments
	Height 14 mm
Reading	4 digits
Polarity	Automatic
Overrun	OVE displayed
Decimal position	Programmable by software
Measurement rate	20 measurements / second

ACCURACY

	Vdc, Adc, Aac	±0.05 % R
Vac	**±20 V**	±0.1 % R
	±200 V	±0.25 % R
	±600 V	±0.35 % R
	Process signal	±0.1 % R
	Thermocouple J, K, N	±0.1 % R
Temperature	**Thermocouple T**	±0.2 % R
	PT 100 / PT 1000	±0.15 % R
	Potentiometer	±0.1 % R
	Resistance	±0.1 % R

MECHANICAL SPECIFICATIONS

Material	Polycarbonate V0 as per UL94
Weight	150 g
Protection rating	IP 65 on front panel
Fitting	On panel using strap

ENVIRONMENT

Operating temperature	-10 °C to +60 °C
Storage temperature	-25 °C to +85 °C
Relative humidity	< 95 % at +40 °C
Maximum altitude	2,000 m

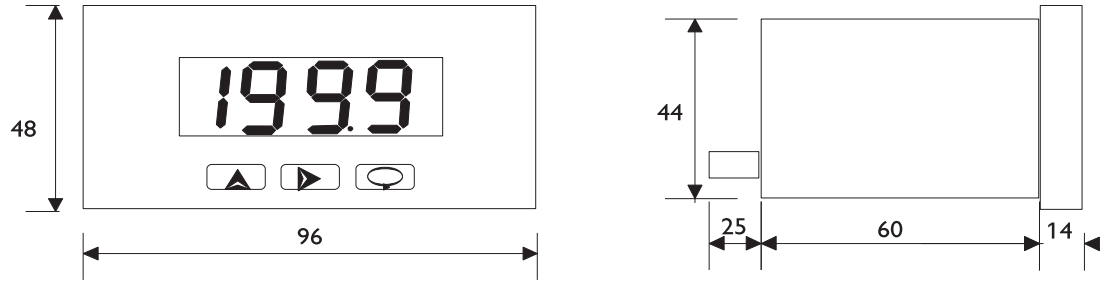
POWER SUPPLY

Voltage	20/265 Vac - 50/60 Hz – 11/265 Vdc
Consumption	3 VA/3 W

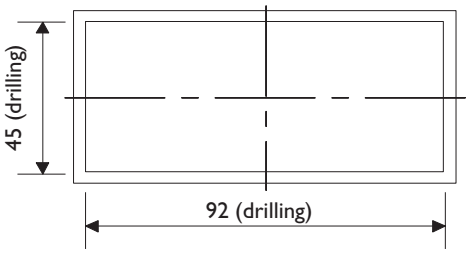
STANDARD

Low voltage directive 73/23/CEE
Insulation - dielectric strength IEC 61010-1

DIMENSIONS (IN MM)



PANEL DRILLING SPECIFICATIONS (IN MM)



CA 2150
RANGE

48 x 96 mm programmable digital panel meters for all types of industrial applications.

- Multi-function products
- 3 display colors
- 4 alarms as standard
- Instant mounting without tools
- Serial link for remote processing of the measurements
- RS232 or RS485

DESCRIPTION

The **CA 2150-E** is a 4-in-1 programmable panel meter which can be configured for TRMS Vac or Iac signals and Vdc or Idc signals.

The **CA 2150-M** is a 4-in-1 programmable panel meter which can be configured for process, temperature, load cell or potentiometer signals.

The **CA 2150-D** is a 4-in-1 programmable panel meter which can be configured for the following applications: meter, tachometer, frequencymeter and chronometer.

The serial link can be used to transfer the measurements onto a PC.

The configuration software, available free of charge from www.chauvin-arnoux-energy.com, can be used to read the measurement directly, and to configure and remotely program one or more connected panel meters.

It can also be used to save and recover the configuration of an existing panel meter.

ZOOM

3 display colors

Quick connection using plug-in connectors (spring-cage type)

OPTION BOARDS*

Model	Reference
CA 2XXX AL 2-relay board	P01 3193 01
CA 2XXX AL 4-relay board	P01 3193 03
CA 2XXX COM RS232 board	P01 3193 06
CA 2XXX COM RS485 board	P01 3193 07
CA 2150 0 – 10 V output board	P01 3193 10
CA 2150 4 – 20 mA output board	P01 3193 11

* Extra boards (addition or replacement)

CUSTOMIZED PRODUCT

	Model	Auxiliary power supply	Alarm	Analog output	Digital communication
Example	C.A 2150-M	1	X	1	1
		85-265 Vac & 100-300 Vdc: **1** 22-53 Vac & 10.5-70 Vdc: **2**	Without: **X** 2 relays : **1** 4 relays : **2** 4 transistors : **3**	Without: **X** 4-20 mA: **1** 0-10 V: **2**	Without: **X** RS232: **1** RS485: **2**

CA 2150-E

AC input voltage rating (TRMS)
- 2 V with 75 kΩ
- 20 V, 200 V or 600 V with 850 kΩ

AC input current rating (TRMS)
- 200 mA with 0.75 Ω
- 1 A or 5 A with 0.014 Ω
- 50 mV, 60 mV or 100 mV with 1.5 MΩ

DC input voltage rating
- 2 V 100 kΩ
- 20 V, 200 V or 600 V with 850 kΩ

DC input current rating
- 200 mA with 0.75 Ω
- 1 A or 5 A with 0.014 Ω
- 50 mV, 60 mV or 100 mV with 1.8 MΩ

CA 2150-M

DC U/I process signals
- **Voltage:** 0...±10 V with 1 mΩ
- **Current:** 0...±20 mA with 15 Ω

Temperature
- **J thermocouple:** Vin > 120 mVeff
- **NAMUR sensor:** -50...+800 °C / -58...+1,472 °F
- **K thermocouple:** -50...+1,200 °C / -58...+2,192 °F
- **T thermocouple:** -150...+400 °C / -302...+752 °F
- **Pt 100:** -100...+800 °C / -148...+1,472 °F

Load cells
- 0...±15 mV with 100 mΩ
- 0...±30 mVdc with 100 mΩ
- 0...±150 mV with 100 mΩ

Potentiometer
- 200 Ω...100 kΩ

CA 2150-D

Frequencymeter / Tachometer
- **Fmin :** 0.01 Hz
- **Fmax without relay option:** 19 kHz
- **Fmax with relay option:** 9.9 kHz

Meter / Chronometer
- **Fmax without relay option:** 20 kHz
- **Fmax with relay option:** 15 kHz

Types of inputs
- **Voltage:** 10…300 Vac
- **Magnetic sensor:**
  Vin > 60 mVrms (F < 1 kHz)
  Vin > 120 mVrms (F > 1 kHz)
- **NAMUR sensor:**
  Rc = 3.3 kΩ
  Ion < 1 mAdc
  Ioff > 3 mAdc
- **TTL encoder/24 Vdc:**
  "0" < 2.4 Vdc / "1" > 2.6 Vdc
  Rc = 3.3 kΩ
- **Dry contact:**
  Vc = 5 Vdc / Rc = 3.9 kΩ / Fc = 20 Hz

AVAILABLE OPTIONS

Relay boards

	Board with 2 alarms on relays	Board with 4 alarms on relays
Outputs	2 x 1CO relays	4 x 1CO relays
Max. voltage	250 Vac or 12 Vdc	250 Vac or 50 Vdc
Max. current	8 A at 250 Vac or 8 A at 24 Vdc	500 mA at 125 Vac or 1 A at 30 Vdc

Communication board

Type of link	RS232	RS485
Protocol	ISO1745, CA protocol or ModBus/RTU	
Speed	1,200, 2,400, 4,800, 9,600 or 19,200 bauds	
Output connector	RJ9-4	RJ11-6 with dual adapter (input + output)

Analog output board

Output	0… 10 V	4… 20 mA
Accuracy	0.1 % ±1 digit	
Temperature coeff.	0.2 mV per K	0.5 µA per K
Max. load	> 500 Ω	< 800 Ω

DISPLAY

	CA 2150-E	CA 2150-M			CA 2150-D		
Measurement rate	50 ms	Process/ load	Pt100	TC	Meter/chrono		Freq./Tacho.
		50 ms	250 ms	100 ms	100 ms		0.1 to 9.9 s
Display range	± 19,999	± 19,999			Meter	Chrono	Freq./Tacho.
					± 99,999	0 to 999.9	0 to 99,999
Displays	7-segment programmable color LED (red, green, amber), height 14 mm						
Reading	5 digits						
Polarity	Automatic						
Overrun	OvEr / - OvEr						
Decimal position	By programming						

SENSOR EXCITATION

24 Vdc	Process (60 mA)	(30 mA)
10 Vdc / 5 Vdc	(60 mA)	
8 Vdc		(30 mA)
< 1 mAdc	Pt100	

MECHANICAL SPECIFICATIONS

Material	polycarbonate as per UL 94 V-0
Protection rating	IP 65 on front panel
Mounting	On panel using self-locking strap
Weight	CA 2150-D: 160 g CA 2150-E: 135 g CA 2150-M: 160 g

ENVIRONMENT

Operating temperature	10 °C to +60 °C
Storage temperature	-25 °C to +80 °C
Relative humidity	< 95 % at +40 °C
Maximum altitude	2,000 m

POWER SUPPLY

Universal	85 - 265 Vac / 100 - 300 Vdc
Low voltage	10.5 - 70 Vdc / 22 - 53 Vac
Consumption	5 W without option, 8 W max.

ACCURACY

		Process / Load / Ω	Temperature	Freq. / Tacho.	Meter
Max. error on reading	**Vac: ± 0.30 % R Iac: ± 0.30 % R Vdc: ± 0.05 % R Idc: ± 0.10 % R**	± 0.1 % R + 1 digit	TC ± 0.4 % R ± 0.6 °C ± 0.4 % R ± 1 °F Pt100 ± 0.2 % R ± 0.6 °C ± 0.2 % R ± 1 °F	0.005 % R	0.01 % R
Resolution	**2 V rating: 0.1 mV 20 V rating: 1 mV 200 V rating: 10 mV 600 V rating: 10 mV 200 mA rating: 0.01 mA 1 / 5 A rating: 0.1 mA 50 / 60 / 100 mV rating: 0.01 mV**	Process: voltage 1 mV / current 1 µA Load cell: 1 µV Temperature: 0.1° / 1° (selectable)		Frequency: 0.01 Hz Chronometer: 0.06 s	
Temperature coefficient	**100 ppm/ °C**	100 ppm/ °C		50 ppm/ °C	

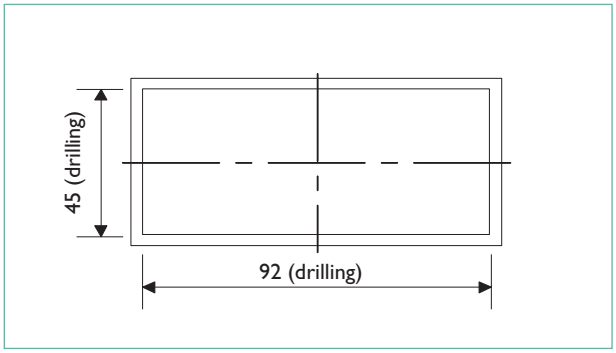
SPECIAL FUNCTIONS

- Reset to factory configuration
- Change of display color
- Total or partial locking of programming by code
- Display with 2 levels of brightness

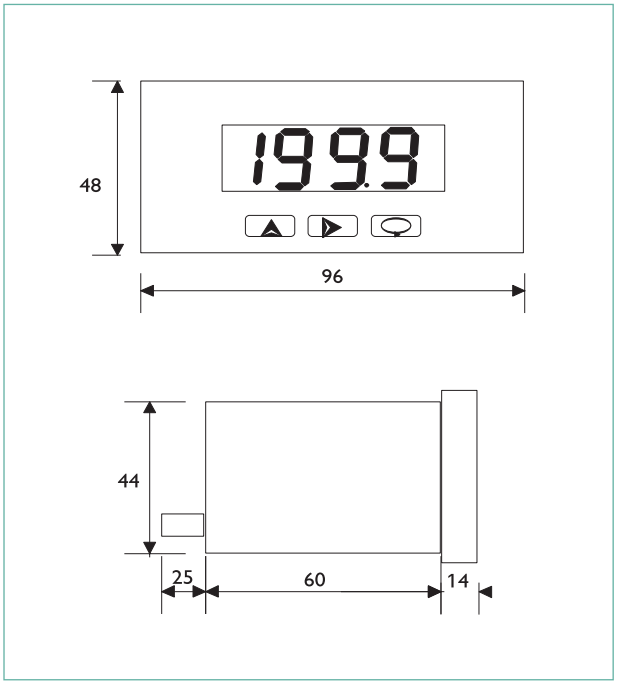
STANDARDS

Insulation – dielectric strength: EN 611010-1 (Category II installation)
EMC - Immunity: EN 61000-4-2 EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6 and EN 61000-4-11
EMC - emission: EN 55022

PANEL DRILLING SPECIFICATIONS (IN MM)



DIMENSIONS (IN MM)



TO ORDER			
Power supply	CA 2150-E	CA 2150-M	CA 2150-D
85 - 65 Vac / 100 - 300 Vdc	P01308005	P01308001	P01308003
22 - 53 Vac / 10.5 - 70 Vdc	P01308006	P01308002	P01308004

ASSOCIATED PRODUCTS

Accessories and option boards
Alarm boards
page 192

Current transformers & shunts
Tertiary, industrial, tariff
5 to 5,000 A.
page 99

Tachometric sensor
Please contact us

Thermocouple / probe
See Pyrocontrole Catalog

SYNCHROCOUPLER RANGE

Synchronization instruments for LV networks.

- Integration in 96 x 96 format
- 1 synchronization command
- 1 control command
- 3 command modes for synchronization
- Control in just a few seconds (PID model)

DESCRIPTION

The **SYNCHROCOUPLER** is an automatic synchronization instrument for generator sets. It includes:

- a control relay for assisted manual coupling or automatic coupling with time delay control
- two control relays (fast/slow) for speed adjustment (proportional and integral)
- an external control loop for opening the coupling relay
- four front panel keys for programming,display and messages (password option included)

ZOOM

Display of deviations between setpoint and measurement

Digital display of 3 measurements: phase, frequency and voltage

User-programmable

SYNCHROCOUPLER

Display:

- Phase angle variations by 30 LEDs arranged in a circle
- Voltages, frequencies, variations (in %) on 4 digits
- Frequency variations ±, status of coupler relay, conditions obtained in phase, frequency and voltage

TO ORDER

Power supply	Reference
24 VDC	LS9N 421X
48 VDC	LS9N 422X
110 VAC	LS9N 423X
230 VAC	LS9N 424X
400 VAC	LS9N 425X

SYNCHROCOUPLER PID

Display: as for standard synchrocoupler

PID adjustment method (Proportional Integral Derivative) for faster and more accurate synchronization than with conventional synchrocouplers

- **Proportional:** proportional correction of measurement errors
- **Integral:** guarantees reduction of adjustment error to 0
- **Derivative:** brings greater stability to the system, enabling you to anticipate the inertia of generator sets

TO ORDER

Power supply	Reference
24 VDC	LS9N 441X
48 VDC	LS9N 442X
110 VAC	LS9N 443X
230 VAC	LS9N 444X
400 VAC	LS9N 445X

ELECTRICAL SPECIFICATIONS

Measurements	
Rated voltage range	110 to 600 V
Frequency	35 Hz…80 Hz
Permanent overvoltage	800 V
Consumption	< 500 µA
Relay output	
With sealed change-over contact	8 A - 250 Vac / 5 A - 30 Vdc
Multi-measurement (accuracy)	
Phase angle deviation	± 0.5°
Frequency	± 0.01 Hz
Voltage (RMS)	Class 1 ± 2 digits
Auxiliary power supply	
AC voltage	110, 230, 400, 440, 480 Vac (-10 / +15 %)
Frequency	35 Hz…450 Hz
Consumption	10 VA
DC voltage	9-18 Vdc (12 Vdc), 18-36 Vdc (24 Vdc), 36-72 Vdc (48 Vdc)
Consumption	1.5 W

ENVIRONMENT

Operating temperature	-10 °C to +65 °C
Storage temperature	-40 °C to +70 °C
Relative humidity	< 90 % at 40 °C
Installation category	3
Pollution level	2

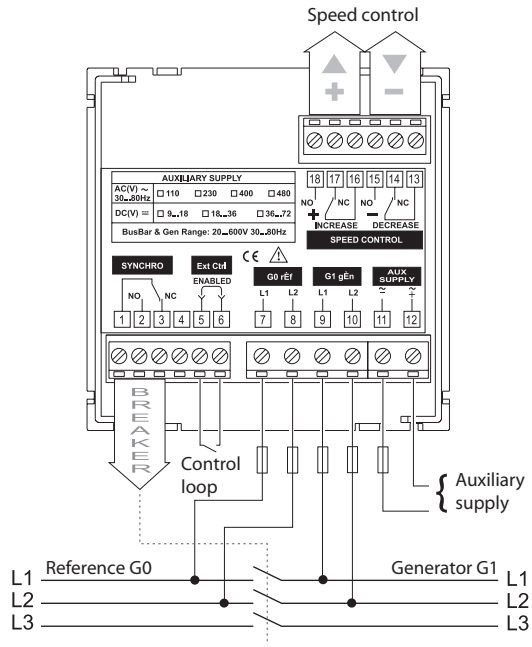
MECHANICAL SPECIFICATIONS

Casing materials	
Casing and flange	Self-extinguishing black ABS
Front panel	Light gray polycarbonate
Protection rating	IP 54 front panel (IP 65 optional)
Weight	505 g
Connection	Holder for 2.5 mm wire
Fitting	Mounting on 8 mm front panel

STANDARDS

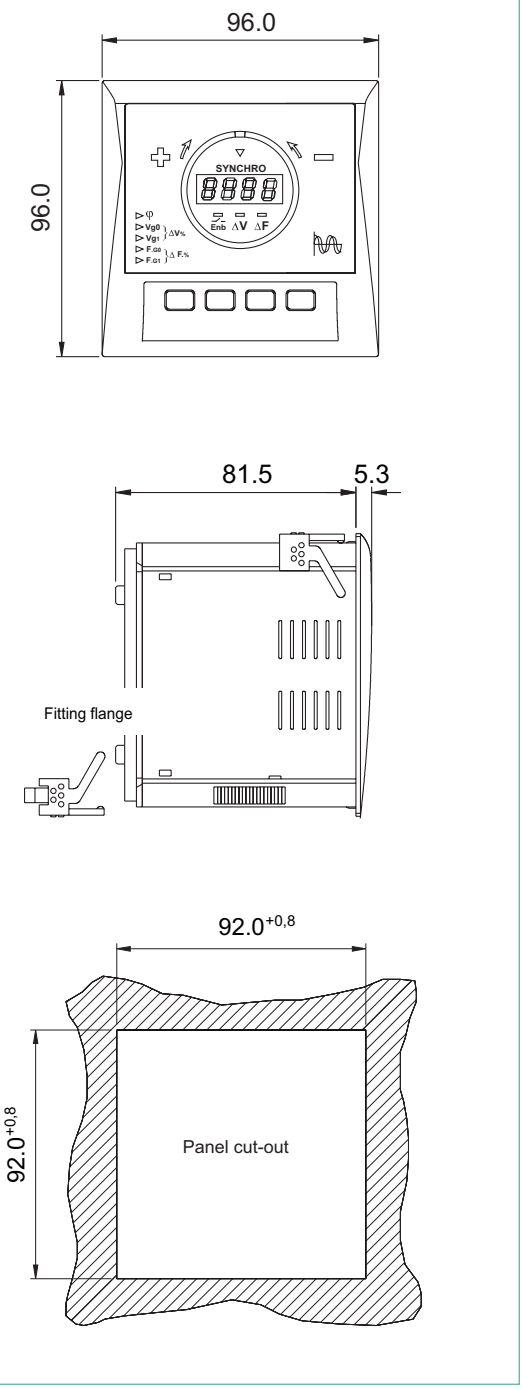
Reference standards	
Safety	IEC 61010-1
Dimensions	DIN 43700
EMC	EN 61326-1
ANSI function	Nos. 25 and 90
Resistance to shock	IEC 60068-2-27
Resistance to vibrations	IEC 60068-2-6
Environment	IEC 60068-1

ELECTRICAL CONNECTIONS



* **EC** (control loop): Input 5-6 must be closed to authorize closure of the synchro contact in 1-2-3.

DIMENSIONS AND DRILLING SPECIFICATIONS (MM)



ANALOG PANEL METERS

Classic range

For standard applications

AC ammeter

Analog panel meters with round barrels for day-to-day industrial requirements.

page 208

AC voltmeter

Analog panel meters with round barrels for day-to-day industrial requirements.

page 210

Frequency meter

Analog panel meters with round barrels for day-to-day industrial requirements.

page 211

Wattmeter
Varmeter

Analog panel meters with round barrels for day-to-day industrial requirements.

page 212

Phasemeter

Analog panel meters with round barrels for day-to-day industrial requirements.

page 212

DC ammeter

Analog panel meters with round barrels for day-to-day industrial requirements.

page 213

DC voltmeter

Analog panel meters with round barrels for day-to-day industrial requirements.

page 214

Normeurope range

For severe environments

AC ammeter
Analog panel meters with round barrels for severe operating constraints.
page 218

AC voltmeter
Analog panel meters with round barrels for severe operating constraints.
page 220

Frequency meter
Analog panel meters with round barrels for severe operating constraints.
page 221

Wattmeter Varmeter
Analog panel meters with round barrels for severe operating constraints.
page 222

Phasemeter
Analog panel meters with round barrels for severe operating constraints.
page 224

Synchronization units
Analog panel meters with round barrels for severe operating constraints.
page 225

DC ammeter
Analog panel meters with round barrels for severe operating constraints.
page 226

DC voltmeter
Analog panel meters with round barrels for severe operating constraints.
page 227

COHO/LK range

Hour meters

COHO
Totalize the operating time of a machine or piece of equipment with the aim of checking or repairing it.
page 228

LK
Totalize the operating time of a machine or piece of equipment with the aim of checking or repairing it.
page 229

CHOOSING
AN ANALOG PANEL METER

	CLASSIC
	page 206
	
Front panel drilling	
Round barrel	■
Square barrel	
Front panel	
Format	48 x 48
Standard functions	
AC Ammeter	90° 240°
AC Voltmeter	90° 240°
Pointer dial frequency meter	90°
Vibrating reed frequency meter	■
Wattmeter / Varmeter	90° 240°
Phasemeter	90° 240°
DC Ammeter	90° 240°
DC Voltmeter	90° 240°
Hour meter	
Synchronization equipment	
Double vibrating reed frequency meter	
Differential voltmeter	
Strengths	CLASSIC, the model for day-to-day industrial applications.

NORMEUROPE

page 216

COHO / LK

page 228-229

			COHO	LK
				LK
48 x 48	72 x 72	96 x 96	48 x 48	48 x 48
90°		250°		
90°		250°		
	90°	250°		
	1 x 9 reeds			
	90°	250°		
90°		250°		
90°		250°		
	2 x 9 reeds			
	90°	250°		
NORMEUROPE, the industry reference for the generation, transmission and distribution of electrical energy for severe operating constraints.			COHO, the industry reference for severe operating constraints, and LK for standard applications.	

INFO & ADVICE

The essential function of the analog panel meter is to display instantaneous and variable values. It shows the pointer's position and movement, both required for monitoring industrial processes.

SELECTING A PANEL METER

As a panel meter is a low-cost item, it is easily installed at the various control and monitoring points: the switchboard panels of LV distribution networks, motor drive control units or automation device panels.

Functions

Choose the quantity to be displayed in order to monitor and control a known risk. For an electrical line, for example, the voltage is selected as it is crucial for ensuring user safety.

Ergonomics

Choose the instrument size depending on the distance between the operator and the mounting panel. Choose the pointer deflection: a deflection of 240° may be preferred to the usual 90° deflection, to facilitate the reading of extended ranges.

Environmental constraints and standards

It is important to take into account mechanical specifications, environmental restrictions, standards in force, consumption and compatibility with sensors, in order to choose the appropriate dial ranges and calibration scales.

Options and accessories

Panel meters, though robust by nature, are nevertheless sensitive to degraded environments. It is therefore recommended to choose customized solutions for military applications, for onboard rail applications or for explosive atmospheres.

MOVING IRON OR MOVING COIL?

The electric current is read directly by a sensor guiding the pointer movement. The most usual types are:

Moving iron

The moving iron panel meter is composed of a fixed magnet and a mobile magnet, mutually repellent and placed in the field of a coil powered by the current to be measured. For measuring AC signals with a frequency of 50, 60 or 400 Hz. The non-linear scale law is a function of the true root mean square value (TRMS) and the graduation is in TRMS. The measurement is not sensitive to the waveform.
Calibrated for alternating current, it can also measure values in direct current but with a diminished accuracy rating of about 3.
The scale can be normal, motor or expanded.

Moving coil

The moving coil panel meter is composed of a coil traversed by the current to be measured which pivots around a permanently fixed magnet.
For measurement of DC signals, the scale law is linear.
Due to its low consumption, the moving coil panel meter is the ideal instrument for the measurement of low direct current values. Its scale is linear.

Moving coil with rectifier

This involves a classic moving coil measuring element equipped with a diode bridge to rectify AC signals.
For measuring AC signals from 50 to 10,000 Hz.
The linear scale law is a function of the mean rectified value of the signal and the graduation is in RMS. The measurement is sensitive to the waveform.

DEFINITIONS

Damping: Time taken by the needle to stabilize, according to the following requirements:

- **Overrun:** The mechanical overrun must not exceed 20% of the scale length.
- **Response time:** Time necessary for the panel meter to reach and remain within a band centered on the final stable indication when the measured quantity varies suddenly from the value corresponding to unpowered status (zero) on a scale such that the final stable indication is located at a specific point on the scale. The difference between the idle position of the meter and its position after application of a sudden excitation producing a variation of the final indication equal to two third of the scale length must not exceed 1.5 % of the scale length after 4 s.

Mechanism for adjusting the mechanical zero: Mechanism which can be used to adjust the instrument so that the mechanical zero coincides with the appropriate scale marking.

Dial: Plate mounted on the front panel of the meter and on which the scale and numbering are printed.

Rating: This is the largest measurable value for which the maximum deflection is obtained.

Numbering: All the numbers indicated for the scale markings.

Class index: Also known as the Accuracy Class, this is defined by a value in % and determines the uncertainty of the measurement calculated over the full scale and referred to the measurement. Class 1.5 means that the maximum uncertainty is between + and –1.5% of the full scale, applicable at all points on the scale (e.g. 0-100 A scale: the uncertainty will be 1.5%x100 = +/-1.5A. The needle pointing to the 50 A marking really means: 48.5 A > actual measurement > 51.5 A)

Cover: Covers and protects the dial and needle. It may be openable on certain models, with a removable upper element making dial changes quick and easy to perform.

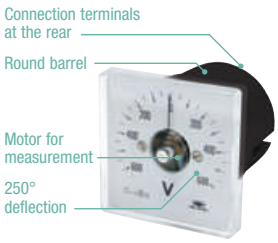
Division: Distance between any two consecutive scale markings.

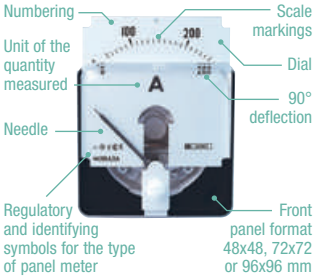
Scale: All the markings and numbers which, in combination with the position of the index (needle or vibrating reed) enable you to determine the value of the quantity measured.

Repeatability: Property of always showing the same deflection for a given value of the quantity measured.

Graduation: The set formed by the scale+numbering; it complies with the IEC 60051-1 standard.

Markings (on a scale): Markings on the dial whose purpose is to divide the scale into convenient intervals so that the position of the index (needle or vibrating reed) can be determined.





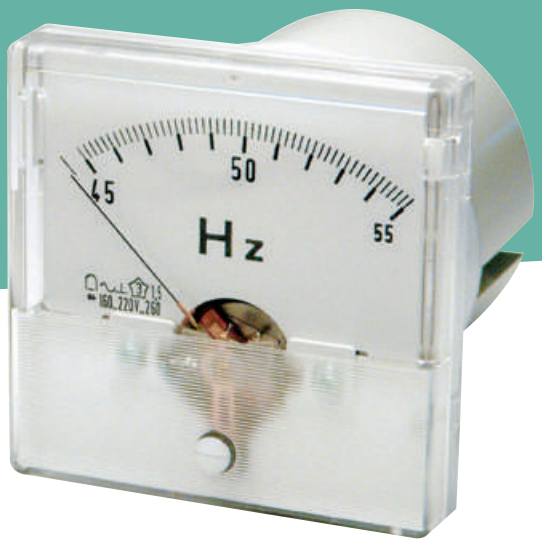
Enclosure ingress protection (IP rating): Represents a level of protection provided by the instrument's enclosure. The protection rating is stated by means of 2 separate digits.

INGRESS PROTECTION: TWO DIGITS

Rating	1st digit (tens) Protection against solids	2nd digit (units) Protection against water ingress
0	No protection	No protection
1	Protected against solid bodies larger than 50 mm across	Protected against water droplets falling vertically
2	Protected against solid bodies larger than 12.5 mm across	Protected against water droplets falling at up to 15° from the vertical
3	Protected against solid bodies larger than 2.5 mm across	Protected against water spray at up to 60° from the vertical
4	Protected against solid bodies larger than 1 mm across	Protected against water spray from any direction
5	Protected against dust and other microscopic residue	Protected against hose water spray from all directions (nozzle 6.3 mm, distance 2.5 to 3 m, flow rate 12.5 l/mm ± 5%)

MEANINGS OF THE REGULATORY MARKINGS ON DIAL:

- Dielectric voltage test (4 kV)
- Accuracy class 1.5
- Vertical position of dial
- Horizontal position of dial
- Inclined position of dial in relation to the horizontal
- Standard – IEC 60051-1
- Usable with direct and alternating current
- Usable with alternating current
- Moving-iron device
- Moving-coil instrument with built-in rectifier
- Vibrating-reed frequency meter
- For connection to 100/5A CT
- For connection to 380/100V VT
- Usable with direct current
- Moving-coil instrument
- External shunt with measurement lead, R = 0.02 Ω
- Additional resistance
- Caution



CLASSIC
RANGE

Analog panel meters with round barrels
for day-to-day industrial requirements.

- Attractive acquisition and installation costs
- Multiple customization possibilities
for switchboard and machine manufacturers

ZOOM


Slimline and easy to install

Accurate


Rugged

GENERAL SPECIFICATIONS

Reference standard: IEC 60051-1

Accuracy: accuracy class 1.5
(±1.5 % error at full scale)

Front-panel protection: IP52 reference IEC 60529

Isolation test: reference IEC 61010-1 Category III

Max. operating voltage: 650 Vac

Mechanical shocks: reference standard IEC 60068-2-27

Vibration withstand: reference IEC 60068-2-6

Environment: reference IEC 68-1
Reference temperature: 23 °C ± 2 °C
Operating temperature: -25 °C to +50 °C
Storage temperature: -25 °C to +70 °C
Relative humidity: < 90 % at 40 °C

Mounting: Front mounting on panel
Panel thickness: 8 mm max.

Materials:
Barrel: ABS
Front panel: polymethyl methacrylate
Additional casing: ABS
Dial: ABS/PC, black markings on white background.
Black bar needle

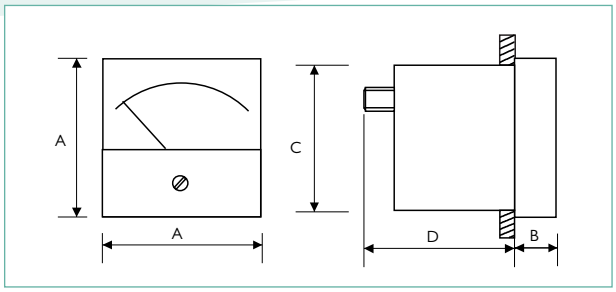
Operating position: Calibration for vertical position (±10°)

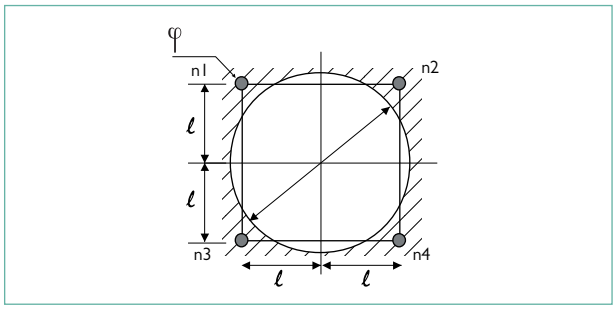
Overloads :
Voltmeter and frequencymeter
- 1.2 Un permanent
- 2 Un for 5 s

Ammeter
- 1.3 In permanent
- 10 In for 5 s

Extreme values: recommendation, IEC 60 051-1 standard
1 - 1.2 -1.5 - 2 - 2.5 - 3 - 4 - 5 - 6 - 7.5 - 8 - 9 and
their decimal multiples and sub-multiples

DIMENSIONS AND DRILLING OF THE PANEL





A x A Format		48 x 48	72 x 72	96 x 96
B (mm)		12	13	14
C (mm)		44	65	65
D 90° (mm)		48	35	35
D 240° (mm)			70	70
Ø (mm)		45	67	67
l (mm)		20	28.5	40
ni IP52 (mm)		n1	n1-n4	n1-n4
ni IP55 (mm)		n1	n1-n2-n3-n4	n1-n2-n3-n4
e (mm)		Ø 3.5	Ø 4	Ø 4
Standard mounting		clamp	2 studs M3	2 studs M3
Weight (kg)	90°	0.18	0.18	0.18
	240°	0.25	0.25	0.25
Connection		M5	M5	M5

MECHANICAL FORMATS

Deflection	90°			240°	
Format	48 x 48	72 x 72	96 x 96	72 x 72	96 x 96
Non-standard mounting and front-panel tightness					
IP55 (4-stud mounting and zero reset seal)	■	■	■	■	■
Mounting by automatic clip	■				
Mounting strap	■ as standard	■	■	■	■
Non -standard front-panel cover					
Locator index	■	■	■		
Non-standard dial format					
Creation of dial markings (after feasibility study)	■	■	■	■	■
Color marking	■	■	■	■	■
Color area	■	■	■	■	■
Black background with white markings	■	■	■	■	■
Markings not in standard documentation	■	■	■	■	■
Double scale		■	■	■	■

ACCESSORIES

Deflection	90°			240°	
Format	48 x 48	72 x 72	96 x 96	72 x 72	96 x 96
Front-panel sealed gasket	1890 0011	1890 0009	1890 0010	1890 0009	1890 0010
Cylindrical ring fastener		N003 34A00		N003 34A00	
Standard dial	■	■	■	■	■
Customized dial (on request)	■	■	■	■	■
Flask of antistatic liquid	9030 00676	9030 00676	9030 00676	9030 00676	9030 00676
Insulation cap for terminals	0026 2803	0026 2803	0026 2803	0026 2803	0026 2803
Faston terminal connections	■	■	■	■	■

AC AMMETER

- Deflection 90°

Standard-scale model
Accuracy class: 1.5
Measuring component:
moving iron 50 to 60 Hz,
rectified moving coil 50 to 10,000 Hz
Pseudo-linear scale (moving iron)
Interchangeable dial
Consumption: 1 VA

Motor-scale models
Accuracy class: 1.5
Measuring component:
moving iron 50-60 Hz
Pseudo-linear scale
Calibrated 0-In up to 2/3 of deflection, with overload zone beyond
Interchangeable dial
Consumption: 1 VA

- Deflection 240°

In standard-scale model
Accuracy class: 1.5
Measuring component:
rectified moving coil 50 to 10,000 Hz
Linear scale
Consumption: 0.5 VA

Motor-scale models
Accuracy class: 1.5
Measuring component:
rectified moving coil
50 to 10,000 Hz
Linear scale
Calibrated 0-In up to 2/3 of deflection, with overload zone beyond
Consumption: 0.5 VA

FEASIBILITY LIMITS

Deflection		90°			240°	
Format		**48 x 48**	**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
Direct connection						
Standard scale	**moving iron**	100 mA to 30 A	100 mA to 30 A	100 mA to 30 A		
	moving coil		100 mA to 30 A	100 mA to 30 A	100 mA to 30 A	100 mA to 30 A
Motor scale	**moving iron 6 In max.**	1-30 A	1-30 A	1-30 A		
	moving coil 3 In		1-30 A	1-30 A	1-30 A	1-30 A
Connection on CT						
Standard scale	**moving iron**	1-6.5 A	1-6.5 A	1-6.5 A		
	moving coil		1-6.5 A	1-6.5 A	1-6.5 A	1-6.5 A
Motor scale	**moving iron 6 In max.**	1-5 A	1-5 A	1-5 A		
	moving coil 3 In		1-5 A	1-5 A	1-5 A	1-5 A

DIRECT CONNECTION

Deflection		moving iron 90°			240°	
Format		**48 x 48**	**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
Rating	**Scale In**					
5 A	**0-5 A**	1048 1207	1082 1207	1083 1207	2074 1207	2075 1207
10 A	**0-10 A**	1048 1212	1082 1212	1083 1212	2074 1212	2075 1212
20 A	**0-20 A**	1048 1215	1082 1215	1083 1215	2074 1215	2075 1215
30 A	**0-30 A**	1048 1217	1082 1217	1083 1217	2074 1217	2075 1217
	Scale 3 In					
5 A	**0-5/15 A**	1048 9507	1082 9507	1083 9507	2074 9507	2075 9507
10 A	**0-10/30 A**	1048 9512	1082 9512	1083 9512	2074 9512	2075 9512
20 A	**0-20/60 A**	1048 9515	1082 9515	1083 9515	2074 9515	2075 9515
	Scale 5 In					
5 A	**0-5/25 A**	1048 9607	1082 9607	1083 9607		

ASSOCIATED PRODUCTS

Accessories
Seal, ring fastener, dial, sleeve, etc.
page 207

Current transformers
Cable primary, busbar primary, closed core or split core, etc.
page 99

CONNECTION TO 5 A CT

Deflection		moving iron 90°			moving iron 90°			240°	
		Separate panel meter and dial			Complete panel meter			Complete panel meter	
Format		48 x 48	72 x 72	96 x 96	48 x 48	72 x 72	96 x 96	72 x 72	96 x 96
	Scale 1.3 In	Panel meter only							
		1048 1299	1082 1299	1083 1299					
CT ratio	Scale 1.3 In	Dial only							
5/5 A	0-6.5 A	1961 0507	1962 0507	1963 0507	1048 2407	1082 2407	1083 2407	2074 9107	2075 9107
10/5 A	0-13 A	1961 0512	1962 0512	1963 0512	1048 2412	1082 2412	1083 2412	2074 9112	2075 9112
15/5 A	0-19.5 A	1961 0514	1962 0514	1963 0514	1048 2414	1082 2414	1083 2414	2074 9114	2075 9114
20/5 A	0-26 A	1961 0515	1962 0515	1963 0515	1048 2415	1082 2415	1083 2415	2074 9115	2075 9115
25/5 A	0-32.5 A	1961 0516	1962 0516	1963 0516	1048 2416	1082 2416	1083 2416	2074 9116	2075 9116
30/5 A	0-39 A	1961 0517	1962 0517	1963 0517	1048 2417	1082 2417	1083 2417	2074 9117	2075 9117
40/5 A	0-52 A	1961 0518	1962 0518	1963 0518	1048 2418	1082 2418	1083 2418	2074 9118	2075 9118
50/5 A	0-65 A	1961 0519	1962 0519	1963 0519	1048 2419	1082 2419	1083 2419	2074 9119	2075 9119
60/5 A	0-78 A	1961 0521	1962 0521	1963 0521	1048 2421	1082 2421	1083 2421	2074 9121	2075 9121
75/5 A	0-97.5 A	1961 0523	1962 0523	1963 0523	1048 2423	1082 2423	1083 2423	2074 9123	2075 9123
100/5 A	0-130 A	1961 0525	1962 0525	1963 0525	1048 2425	1082 2425	1083 2425	2074 9125	2075 9125
125/5 A	0-162.5 A	1961 0526	1962 0526	1963 0526	1048 2426	1082 2426	1083 2426	2074 9126	2075 9126
150/5 A	0-195 A	1961 0528	1962 0528	1963 0528	1048 2428	1082 2428	1083 2428	2074 9128	2075 9128
200/5 A	0-260 A	1961 0530	1962 0530	1963 0530	1048 2430	1082 2430	1083 2430	2074 9130	2075 9130
250/5 A	0-325 A	1961 0531	1962 0531	1963 0531	1048 2431	1082 2431	1083 2431	2074 9131	2075 9131
300/5 A	0-390 A	1961 0533	1962 0533	1963 0533	1048 2433	1082 2433	1083 2433	2074 9133	2075 9133
400/5 A	0-520 A	1961 0535	1962 0535	1963 0535	1048 2435	1082 2435	1083 2435	2074 9135	2075 9135
500/5 A	0-650 A	1961 0536	1962 0536	1963 0536	1048 2436	1082 2436	1083 2436	2074 9136	2075 9136
600/5 A	0-780 A	1961 0538	1962 0538	1963 0538	1048 2438	1082 2438	1083 2438	2074 9138	2075 9138
750/5 A	0-975 A	1961 0540	1962 0540	1963 0540	1048 2440	1082 2440	1083 2440	2074 9140	2075 9140
800/5 A	0-1.04 kA	1961 0541	1962 0541	1963 0541	1048 2441	1082 2441	1083 2441	2074 9141	2075 9141
1,000/5 A	0-1.3 kA	1961 0542	1962 0542	1963 0542	1048 2442	1082 2442	1083 2442	2074 9142	2075 9142
1,200/5 A	0-1.56 kA	1961 0551	1962 0551	1963 0551	1048 2451	1082 2451	1083 2451	2074 9151	2075 9151
1,500/5 A	0-1.95 kA	1961 0544	1962 0544	1963 0544	1048 2444	1082 2444	1083 2444	2074 9144	2075 9144
2,000/5 A	0-2.6 kA	1961 0545	1962 0545	1963 0545	1048 2445	1082 2445	1083 2445	2074 9145	2075 9145
2,500/5 A	0-3.25 kA	1961 0546	1962 0546	1963 0546	1048 2446	1082 2446	1083 2446	2074 9146	2075 9146
3,000/5 A	0-3.9 kA	1961 0547	1962 0547	1963 0547	1048 2447	1082 2447	1083 2447	2074 9147	2075 9147
4,000/5 A	0-5.2 kA	1961 0549	1962 0549	1963 0549	1048 2449	1082 2449	1083 2449	2074 9149	2075 9149
5,000/5 A	0-6.5 kA	1961 0550	1962 0550	1963 0550	1048 2450	1082 2450	1083 2450	2074 9150	2075 9150
	Scale 3 In	Panel meter only							
		1048 9597	1082 9597	1083 9597					
CT ratio	Scale 3 In	Dial only							
5/5 A	0-5/15 A	1961 0607	1962 0607	1963 0607	1048 2607	1082 2607	1083 2607	2074 9207	2075 9207
10/5 A	0-10/30 A	1961 0612	1962 0612	1963 0612	1048 2612	1082 2612	1083 2612	2074 9212	2075 9212
15/5 A	0-15/45 A	1961 0614	1962 0614	1963 0614	1048 2614	1082 2614	1083 2614	2074 9214	2075 9214
20/5 A	0-20/60 A	1961 0615	1962 0615	1963 0615	1048 2615	1082 2615	1083 2615	2074 9215	2075 9215
25/5 A	0-25/75 A	1961 0616	1962 0616	1963 0616	1048 2616	1082 2616	1083 2616	2074 9216	2075 9216
30/5 A	0-30/90 A	1961 0617	1962 0617	1963 0617	1048 2617	1082 2617	1083 2617	2074 9217	2075 9217
40/5 A	0-40/120 A	1961 0618	1962 0618	1963 0618	1048 2618	1082 2618	1083 2618	2074 9218	2075 9218
50/5 A	0-50/150 A	1961 0619	1962 0619	1963 0619	1048 2619	1082 2619	1083 2619	2074 9219	2075 9219
60/5 A	0-60/180 A	1961 0621	1962 0621	1963 0621	1048 2621	1082 2621	1083 2621	2074 9221	2075 9221
75/5 A	0-75/225 A	1961 0623	1962 0623	1963 0623	1048 2623	1082 2623	1083 2623	2074 9223	2075 9223
100/5 A	0-100/300 A	1961 0625	1962 0625	1963 0625	1048 2625	1082 2625	1083 2625	2074 9225	2075 9225
125/5 A	0-125/375 A	1961 0626	1962 0626	1963 0626	1048 2626	1082 2626	1083 2626	2074 9226	2075 9226
150/5 A	0-150/450 A	1961 0628	1962 0628	1963 0628	1048 2628	1082 2628	1083 2628	2074 9228	2075 9228
200/5 A	0-200/600 A	1961 0630	1962 0630	1963 0630	1048 2630	1082 2630	1083 2630	2074 9230	2075 9230
250/5 A	0-250/750 A	1961 0631	1962 0631	1963 0631	1048 2631	1082 2631	1083 2631	2074 9231	2075 9231
300/5 A	0-300/900 A	1961 0633	1962 0633	1963 0633	1048 2633	1082 2633	1083 2633	2074 9233	2075 9233
400/5 A	0-400/1,200 A	1961 0635	1962 0635	1963 0635	1048 2635	1082 2635	1083 2635	2074 9235	2075 9235
500/5 A	0-500/1,500 A	1961 0636	1962 0636	1963 0636	1048 2636	1082 2636	1083 2636	2074 9236	2075 9236
600/5 A	0-600/1,800 A	1961 0638	1962 0638	1963 0638	1048 2638	1082 2638	1083 2638	2074 9238	2075 9238
750/5 A	0-750/2,250 A	1961 0640	1962 0640	1963 0640	1048 2640	1082 2640	1083 2640	2074 9240	2075 9240
800/5 A	0-800/2,400 A	1961 0641	1962 0641	1963 0641	1048 2641	1082 2641	1083 2641	2074 9241	2075 9241
1,000/5 A	0-1/3 kA	1961 0642	1962 0642	1963 0642	1048 2642	1082 2642	1083 2642	2074 9242	2075 9242
1,200/5 A	0-1.2/3.6 kA	1961 0651	1962 0651	1963 0651	1048 2651	1082 2651	1083 2651	2074 9251	2075 9251
1,500/5 A	0-1.5/4.5 kA	1961 0644	1962 0644	1963 0644	1048 2644	1082 2644	1083 2644	2074 9244	2075 9244
2,000/5 A	0-2/6 kA	1961 0645	1962 0645	1963 0645	1048 2645	1082 2645	1083 2645	2074 9245	2075 9245
2,500/5 A	0-2.5/7.5 kA	1961 0646	1962 0646	1963 0646	1048 2646	1082 2646	1083 2646	2074 9246	2075 9246
3,000/5 A	0-3/9 kA	1961 0647	1962 0647	1963 0647	1048 2647	1082 2647	1083 2647	2074 9247	2075 9247
4,000/5 A	0-4/12 kA	1961 0649	1962 0649	1963 0649	1048 2649	1082 2649	1083 2649	2074 9249	2075 9249
5,000/5 A	0-5/15 kA	1961 0650	1962 0650	1963 0650	1048 2650	1082 2650	1083 2650	2074 9250	2075 9250
To be specified	Scale 1 In				1048 1297C	1082 1297C	1083 1297C	2074 9193C	2075 9193C
To be specified	Scale 1.3 In				1048 1299C	1082 1299C	1083 1299C	2074 9293C	2075 9293C
To be specified	Scale 3 In				1048 9597C	1082 9597C	1083 9597C		
To be specified	Scale 5 In				1048 9697C	1082 9697C	1083 9697C		

CUSTOMIZED PRODUCT

	Instrument	Deflection	Measuring component	Format	Scale	CT ratio rating	Frequency
Examples	Complete panel meter	90°	coil	72 x 72	0-12/36A	direct 12A	60 Hz
	Panel meter only	90°	iron	48 x 48	In	CT/1A	50 Hz
	Dial only	90°	iron	48 x 48	0-225/675A	CT225/1A	50 Hz

AC VOLTMETER

- **Deflection** 90°

Standard-scale model
Accuracy class: 1.5
Measuring component:
moving iron 50/60 Hz, and
rectified moving coil 50-10,000 Hz
Pseudo-linear scale (iron)
Interchangeable dial
Consumption: 3.5 to 6 VA
depending on rating

- **Deflection** 240°

Standard-scale model
Accuracy class: 1.5
Measuring component:
rectified moving coil 50 - 10,000 Hz
Linear scale
Consumption: 1 mA

FEASIBILITY LIMITS

Deflection	90°			240°	
Format	**48 x 48**	**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
Direct connection					
moving iron	6-600 V	6-600 V	6-600 V	6 to 600 V	6 to 600 V
moving coil	3-600 V	3-600 V	3-600 V		
Connection to VT					
moving iron	from 100/√3 V				
moving coil	from 100/√3 V			from 100/√3 V	

DIRECT CONNECTION

Deflection		90°			240°	
Format		**48 x 48**	**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
Rating	**Scale Vn**					
15 V	**0-15 V**	1048 0214	1082 0214	1083 0214	2074 0214	2075 0214
30 V	**0-30 V**	1048 0217	1082 0217	1083 0217	2074 0217	2075 0217
60 V	**0-60 V**	1048 0221	1082 0221	1083 0221	2074 0221	2075 0221
150 V	**0-150 V**	1048 0228	1082 0228	1083 0228	2074 0228	2075 0228
250 V	**0-250 V**	1048 0231	1082 0231	1083 0231	2074 0231	2075 0231
300 V	**0-300 V**	1048 0233	1082 0233	1083 0233	2074 0233	2075 0233
500 V	**0-500 V**	1048 0236	1082 0236	1083 0236	2074 0236	2075 0236

CONNECTION TO VT

Deflection		90°			240°	
Format		**48 x 48**	**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
VT ratio	**Scale**	Always specify VT ratio when ordering				
VT/100 √3V	**1.2 Vn**	1048 0621C	1082 0621C	1083 0621C	2084 0621C	2085 0621C
VT/100 V	**1.2 Vn**	1048 0625C	1082 0625C	1083 0625C	2084 0625C	2085 0625C

CUSTOMIZED PRODUCT

	Connection	Deflection	Measuring component	Format	Scale	VT rating or ratio	Frequency
Example	direct	240°	moving coil	96 x 96	Vn	110 V	50 Hz

ASSOCIATED PRODUCTS

Accessories
Seal, ring fastener, dial, sleeve, etc.
page 207

Current transformers
Cable primary, busbar primary, closed core or split core, etc.
page 99

FREQUENCYMETER

Pointer frequencymeter
Deflection 90°
Accuracy class: 0.5 Fn
Measuring component: moving coil
+ frequency converter
Operating range: 0.8 Un to 1.15 Un

Consumption: 1 VA with 100 V, 1.5 VA with 230 V, 2 VA with 400 V
CH version with built-in hour meter from 0 to 99999.9 hours
in 96 x 96 format

FEASIBILITY LIMITS

Voltage: 57.7 V to 440 V
Frequency: 50 to 400 Hz

Deflection		90°		
Format		**48 x 48**	**96 x 96**	**96 x 96 CH**
Rated voltage	**Measurement range**			Hour meter
100 V	**45-55 Hz**	3582 3511	3583 3511	3583 3371
	55-65 Hz	3582 3521	3583 3521	3583 3381
230 V	**45-55 Hz**	3582 3512	3583 3512	3583 3372
	55-65 Hz	3582 3522	3583 3522	3583 3382
400 V	**45-55 Hz**	3582 3513	3583 3513	3583 3373
	55-65 Hz	3582 3523	3583 3523	3583 3383

CUSTOMIZED PRODUCT

	Format	Voltage	Measurement range	Hour meter
Example	72 x 72	150 V	350-450 HZ	☑

ASSOCIATED PRODUCTS

Accessories
Seal, ring fastener, dial, sleeve, etc.
page 207

TRIAD 2
Digital transducers
1 to 4 analog outputs.
Class 0.1.
page 152

WATTMETER VARMETER

PHASEMETER

- **Panel meter**

Deflection 90° 240°
Accuracy class: 1.5
Measuring component: moving coil
Linear scale

- **Panel meter**

See transducers page 145

PANEL METER

	Deflection	90°		240°	
Format		**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
Rating	**Scale Vn**				
0 - 20 mA	**0 left**	2086 1415C	2087 1415C	2084 1415C	2085 1415C
4 - 20 mA	**0 left**	2086 1490C	2087 1490C	2084 1490C	2085 1490C

TRANSDUCERS

See transducers page 145

CUSTOMIZED PRODUCT

Wattmeter / Varmeter

	Panel meter	Transducer model	CT ratio	Direct/VT	Voltage or VT ratio	Start/end of scale	Auxiliary power supply
Example	2085 1490C	TRIAD 2	500/5 A	VT	20 kV / 110 V	-20...+20 MW	110 Vac

Phasemeter

	Panel meter	Transducer model	Current	Highest voltage	Start/end of scale	Auxiliary power supply
Example	2086 1415C	TRIAD 2	1 A	440 V	0.5 cap/1/0.5 ind	230 Vac

ASSOCIATED PRODUCTS

Accessories
Seal, ring fastener, dial, sleeve, etc.
page 207

TRIAD 2
Digital transducers
1 to 4 analog outputs. Class 0.1.
page 152

Current transformers
Cable primary, busbar primary, closed core or split core, etc.
page 99

DC AMMETER

- **Deflection** 90°

Accuracy class: 1.5
Measuring component: moving coil
Linear scale
Voltage drop:
20 mV for rating ≥ 1.25 mA
variable for rating < 1.25 mA

- **Deflection** 240°

Accuracy class: 1.5
Measuring component: moving coil
Linear scale
Voltage drop:
40 mV for rating ≥ 6 mA
variable for rating < 6 mA

FEASIBILITY LIMITS

Deflection		90°			240°	
Format		**48 x 48**	**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
Connection	**Zero position**					
Direct	**Left or central**	50 µA to 30 A			250 µA to 30 A	
Process signal	**Left or offset**	0-1 mA to 0-20 mA and 4-20 mA			0-1 mA to 0-20 mA and 4-20 mA	
On shunt	**Left or central**	50 mV to 300 mV			50 mV to 300 mV	

DIRECT CONNECTION

Deflection		90°			240°	
Format		**48 x 48**	**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
Rating	**Scale**					
5 A	**0-5 A**	2048 1207	2086 1207	2087 1207	2084 1207	2085 1207
10 A	**0-10 A**	2048 1212	2086 1212	2087 1212	2084 1212	2085 1212
15 A	**0-15 A**	2048 1214	2086 1214	2087 1214	2084 1214	2085 1214
25 A	**0-25 A**	2048 1216	2086 1216	2087 1216	2084 1216	2085 1216
		Always specify start and end of scale when ordering				
0-20 mA	**Process**	2048 1415C	2086 1415C	2087 1415C	2084 1415C	2085 1415C
4-20 mA	**Process**	2048 1490C	2086 1490C	2087 1490C	2084 1490C	2085 1490C

CONNECTION TO 100 mV SHUNT

Deflection		90°		
Format		**48 x 48**	**72 x 72**	**96 x 96**
Panel meter only		2048 5293	2086 5293	2087 5293
Shunt	**Scale**	**Dial only**		
5 A	**0-5 A**	2961 0307	2962 0307	2963 0307
10 A	**0-10 A**	2961 0312	2962 0312	2963 0312
15 A	**0-15 A**	2961 0314	2962 0314	2963 0314
20 A	**0-20 A**	2961 0315	2962 0315	2963 0315
25 A	**0-25 A**	2961 0316	2962 0316	2963 0316
30 A	**0-30 A**	2961 0317	2962 0317	2963 0317
40 A	**0-40 A**	2961 0318	2962 0318	2963 0318
50 A	**0-50 A**	2961 0319	2962 0319	2963 0319
60 A	**0-60 A**	2961 0321	2962 0321	2963 0321
75 A	**0-75 A**	2961 0323	2962 0323	2963 0323

Deflection		90°		
Format		**48 x 48**	**72 x 72**	**96 x 96**
Panel meter only		2048 5293	2086 5293	2087 5293
Shunt	**Scale**	**Dial only**		
100 A	**0-100 A**	2961 0325	2962 0325	2963 0325
125 A	**0-125 A**	2961 0326	2962 0326	2963 0326
150 A	**0-150 A**	2961 0328	2962 0328	2963 0328
200 A	**0-200 A**	2961 0330	2962 0330	2963 0330
250 A	**0-250 A**	2961 0331	2962 0331	2963 0331
300 A	**0-300 A**	2961 0333	2962 0333	2963 0333
400 A	**0-400 A**	2961 0335	2962 0335	2963 0335
500 A	**0-500 A**	2961 0336	2962 0336	2963 0336
600 A	**0-600 A**	2961 0338	2962 0338	2963 0338
1000 A	**0-1000 A**	2961 0342	2962 0342	2963 0342

Deflection		90°			240°	
Format		**48 x 48**	**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
Rating	**Scale**	Always specify the rated current of the shunt				
50 mV	**Gauche**	2048 5093C	2086 5093C	2087 5093C	2084 0319C	2085 0319C
60 mV	**Gauche**	2048 5193C	2086 5193C	2087 5193C	2084 0321C	2085 0321C
100 mV	**Gauche**	2048 5293C	2086 5293C	2087 5293C	2084 0325C	2085 0325C
50 mV	**Central**	3048 5093C	3086 5093C	3087 5093C	3084 0319C	3085 0319C
60 mV	**Central**	3048 5193C	3086 5193C	3087 5193C	3084 0321C	3085 0321C
100 mV	**Central**	3048 5293C	3086 5293C	3087 5293C	3084 0325C	3085 0325C

CUSTOMIZED PRODUCT

	Connection	Deflection	Format	Zero position	Rating	Start/end of scale
Example	Shunt 2000 A	240°	96 x 96	central	60 mV	-2000 +2000A

DC VOLTMETER

- **Deflection** 90°

Accuracy class: 1.5
Measuring component: moving coil
Linear scale
Consumption: 1 mA

- **Deflection** 240°

Accuracy class: 1.5
Measuring component: moving coil
Linear scale
Consumption: 5 mA for Un < 5 V
0.5 mA for Un ≥ 5 V

FEASIBILITY LIMITS

Deflection		90°			240°	
Format		**48 x 48**	**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
Connection	**Zero position**					
Direct	**Left or central**	50 mV to 600 V			50 mV to 600 V	
Process signal	**Left and offset**	0-1 V to 0-10 V			0-1 V to 0-10 V	

DIRECT CONNECTION

Deflection		90°			240°	
Format		**48 x 48**	**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
Rating	**Linear scale**					
15 V	**0-15 V**	2048 0214	2086 0214	2087 0214	2084 0214	2085 0214
30 V	**0-30 V**	2048 0217	2086 0217	2087 0217	2084 0217	2085 0217
60 V	**0-60 V**	2048 0221	2086 0221	2087 0221	2084 0221	2085 0221
75 V	**0-75 V**	2048 0223	2086 0223	2087 0223	2084 0223	2085 0223
150 V	**0-150 V**	2048 0228	2086 0228	2087 0228	2084 0228	2085 0228
300 V	**0-300 V**	2048 0233	2086 0233	2087 0233	2084 0233	2085 0233
Rating	**Expanded scale**					
30 V	**20-30 V**		2086 3290	2087 3220		
60 V	**40-60 V**		2086 3291	2087 3221		

READING OF PROCESS SIGNAL

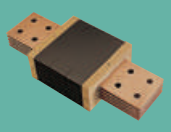
Deflection		moving iron 90°			240°	
Format		**48 x 48**	**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
Rating	**Scale**	Always specify the start and end of scale when ordering				
0-1 V	**Process**	2048 0401C	2086 0401C	2087 0401C	2084 0401C	2085 0401C
0-10 V	**Process**	2048 0412C	2086 0412C	2087 0412C	2084 0412C	2085 0412C

CUSTOMIZED PRODUCT

	Connection	Deflection	Format	Zero position	Rating	Start/end of scale
Examples	direct process signal	90° 240°	48 x 48 96 x 96	left left	0 - 200 V 0 - 10 V	0 - 200 V 0 - 400 m³

ASSOCIATED PRODUCTS

Accessories
Seal, ring fastener, dial, sleeve, etc.
page 207



SHUNTS
1 to 6,000 A
Vast choice whatever your application.
page 136

Current transformers
Cable primary, busbar primary, closed core or split core, etc.
page 99

NOTES

NORMEUROPE
RANGE

Round barrel analog panel meters
for high-level operating constraints.

- Customer references: EDF, on-board naval applications, energy generation and distribution
- Designed for demanding applications: nuclear, military, naval
- Long product life span

ZOOM

Compliant with the latest applicable standards

Large choice of functions, formats, ratings, IPs and options

Attractive design and easy to read

REFERENCE STANDARDS

Reference standard: IEC 60051-1, IEC 60051-2, IEC 60051-9

EMC: IEC 61326-1, IEC 61326-2-1, EN 61000-4

Safety rules: IEC 61010-1, IEC 61010-2-030
- Category III

Resistance to vibrations: IEC60051 – IEC 60068-2-6
- 10 to 55 Hz, +/- 15 mm

Resistance to mechanical shocks: IEC 60068-2-27
- 15 g

Degree of protection: IEC 60529
- See table «Mounting mode – Ingress Protection (IP)»

Degree of protection provided by the enclosure: IEC60529
- IK08 on the cover

Climatic withstand: IEC 60051-1, IEC 60051-9
- Calibration temperature: 23°C +/- 2°C
- Rated operating temperature: 23°C +/- 10°C
- Operating temperature limits: -25°C à + 60 °C
- Storage temperature: -25°C to + 70°C
- Relative humidity: 25% to 95%
- Atmospheric pressure: up to 2,000 m – 795 hPa

GENERAL SPECIFICATIONS

Accuracy class: 1.5 (+/- 1.5% of full scale)

Mounting: on front panel by means of studs or ring fastener
- Maximum panel thickness: 8 mm

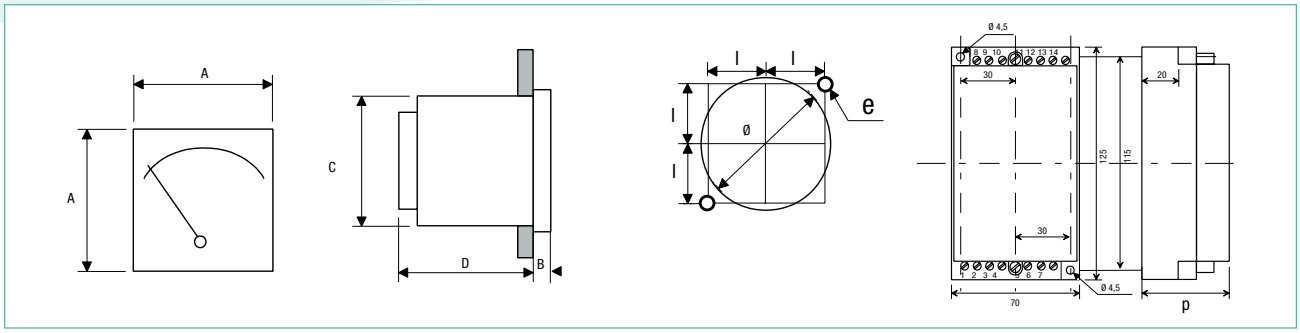
Materials:
Barrel: self-extinguishing ABS
Front panel: self-extinguishing polycarbonate
Additional casing: Bakelite base, ABS cover

Operating position: calibration for vertical position (± 10°)

Overloads:
Voltmeter and frequency meter
- 1.2 Un permanent
- 2 Un for 5 s

Ammeter
- 1.3 In permanent
- 10 In for 5 s

DIMENSIONS AND PANEL DRILLING SPECIFICATIONS



	Panel meter			Additional unit	
A x A Format	**48 x 48**	**72 x 72**	**96 x 96**	**A**	**B**
B (mm)	8	13	14		
C (mm)	diam. 44	diam. 55	diam. 80		
D 90°deflection or blades	46	29 if 20 A max, 39 if 25 A max or more			
D 250° deflection (mm)			93		
Ø (mm)	45	58	88		
l (mm)	20.25	26.5	34		
e (mm)	Ø3.5	Ø4.5	Ø4.5	P=48	P=122
Approx. weight (kg)	0.20	0.25	0.30	0.30	0.70
Terminal	M4 and Faston up to 20 A, M6 for higher values			cage for 4 mm² wire	

MECHANICAL SPECIFICATIONS

Deflection	90°			250°		
Format	**48 x 48**	**72 x 72**	**96 x 96**	**48 x 48**	**72 x 72**	**96 x 96**
Mounting and front-panel tightness outside standard (1)						
Panel meter standard: IP 40 front panel Casing: IP 20 360° panel meters: always 4 studs	2 studs M2,5	2 studs M4	2 studs M4	2 studs M2,5	2 studs M4	2 studs M4
Option Ring fastener IP 40 front panel	drill 48 mm	drill 58 mm	drill 88 mm	drill 48 mm	drill 58 mm	drill 88 mm
Option Reinforced mounting + gasket IP 52 front panel	4 studs M2,5	4 studs M4	4 studs M4	4 studs M2,5	4 studs M4	4 studs M4
Option Watertight (Reset, front panel) + IP54 seal front panel		4 studs M4	4 studs M4	4 studs M2,5	4 studs M4	4 studs M4
Option Watertight (Reset, front/rear panels) + IP55 product		4 studs M4	4 studs M4	4 studs M2,5	4 studs M4	4 studs M4
Non-standard dial options (after agreement on feasibility)						
Dial markings on request	■	■	■	■	■	■
Color markings	■	■	■	■	■	■
Color zones	■	■	■	■	■	■
Black background, white markings	■	■	■	■	■	■
Double scale		■	■	■	■	■

(1) IPXY, where X is the level of protection against penetration by solid bodies and Y is the level of protection against penetration by liquid

ACCESSORIES

Deflection	90°			250°		
Format	**48 x 48**	**72 x 72**	**96 x 96**	**48 x 48**	**72 x 72**	**96 x 96**
Front-panel sealed gasket	2465 001	2314 375	2314 376	2465 001	2314 375	2314 376
Fitting clip (without seal)	2328 558	2302 348	2307 086	2328 558	2302 348	2307 086
Standard or previous dial	■	■	■	■	■	■
Customized dial (on request)	■	■	■	■	■	■
Flask of antistatic liquid	9030 00676					
Insulation sleeve for terminals	ACCQ 1001					

AC AMMETER

• Deflection 90°

Standard-scale model
Accuracy class: 1.5
Measuring component: moving iron 50-60-400 Hz and rectified moving coil 50-10,000 Hz
Pseudo-linear scale (moving iron)
Interchangeable dial, except 144 x 144
Consumption: 1 VA

Motor-scale model
Accuracy class: 1.5
Measuring component: moving iron 50-60-400 Hz
Pseudo-linear scale
Calibrated 0-In up to 2/3 of deflection, with overload zone beyond
Interchangeable 90° dial,
Consumption: 1 VA

• Deflection 250°

Standard-scale model
Accuracy class: 1.5
Measuring component: rectified moving coil 50-10,000 Hz
Linear scale
With additional unit “A” in 48 x 48 format
Consumption: 0.5 VA

Motor-scale model
Accuracy class: 1.5
Measuring component: rectified moving coil 50-10,000 Hz
Linear scale
Calibrated 0-In up to 2/3 of deflection, with overload zone beyond
With additional unit “A” in 48 x 48 format
Consumption: 0.5 VA

FEASIBILITY LIMITS

Deflection		90°			250°		
Format		48 x 48	72 x 72	96 x 96	48 x 48	72 x 72	96 x 96
Direct connection							
Standard scale	moving iron	0.5 to 15 A	0.5 to 50 A				
	moving coil		1 mA to 25 A			1 mA to 25 A	
Motor scale	moving iron 2 to 6 In	0.5 to 12 A	0.5 to 40 A				
	moving coil 2/3/5 In					0.5 to 20 A	
Connection on CT							
Standard scale	moving iron		1 to 6.6 A				
	moving coil		1.3 to 6.6 A			1.2 to 6.6 A	
Motor scale	moving iron 2 to 6 In		1 A and 5 A				
	moving coil 2/3/5 In					1 A and 5 A	

DIRECT CONNECTION

Deflection		Moving iron. 50 Hz	90°		250°		
Format		48 x 48	72 x 72	96 x 96	48 x 48	72 x 72	96 x 96
Rating	Scale In						
5 A	0-5 A	■	A90A 0302	A90A 0502	■	■	■
10 A	0-10 A	■	A90A 0303	A90A 0503	■	■	■
20 A	0-20 A		A90A 0304	A90A 0504		■	■
30 A	0-30 A		A90A 0305	A90A 0505			
50 A	0-50 A		A90A 0307	A90A 0507			
Rating	Scale 3 In						
5 A	0-5/15 A	■	■	A90A 0533	■	■	■
10 A	0-10/30 A	■	■	A90A 0534	■	■	■
20 A	0-20/60 A		■	A90A 0535		■	■
30 A	0-30/90 A		■	A90A 0536			
40 A	0-40/120 A		■	A90A 0537			
Rating	Scale 5 In						
5 A	0-5/25 A		■	■		■	■

ASSOCIATED PRODUCTS

Accessories
Seal, ring fastener, dial, sleeve, etc.
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Current transformers
Cable primary, busbar primary, closed core or split core, etc.
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CONNECTION ON CT 5 A

Deflection		Moving iron 50 Hz 90°			Moving iron 50 Hz 90°			250°		
		Panel meter and dial separate			Complete panel meter			Complete panel meter		
Format		48 x 48	72 x 72	96 x 96	48 x 48	72 x 72	96 x 96	48 x 48	72 x 72	96 x 96
Ratio	Scale	Panel meter only								
		A90A 0487	A90A 0486	A90A 0485						
CT	1.3 In	Dial only								
5/5 A	0-6,5 A	CADR 0136	CADR 0702	CADR 0492	■	■	■	■	■	■
10/5 A	0-13 A	CADR 0137	CADR 0703	CADR 0493	■	■	■	■	■	■
15/5 A	0-20 A	CADR 0138	CADR 0704	CADR 0494	■	■	■	■	■	■
20/5 A	0-26 A	CADR 0111	CADR 0461	CADR 0441	A90A 0211	A90A 0311	A90A 0511	■	■	A250 0611
25/5 A	0-32.5 A	CADR 0110	CADR 0701	CADR 0486	■	■	■	■	■	■
30/5 A	0-40 A	CADR 0112	CADR 0462	CADR 0442	A90A 0212	A90A 0312	A90A 0512	■	■	A250 0612
40/5 A	0-52 A	CADR 0113	CADR 0463	CADR 0443	A90A 0213	A90A 0313	A90A 0513	■	■	A250 0613
50/5 A	0-65 A	CADR 0114	CADR 0464	CADR 0444	A90A 0214	A90A 0314	A90A 0514	■	■	A250 0614
60/5 A	0-80 A	CADR 0115	CADR 0465	CADR 0445	A90A 0215	A90A 0315	A90A 0515	■	■	A250 0615
75/5 A	0-100 A	CADR 0116	CADR 0466	CADR 0446	A90A 0216	A90A 0316	A90A 0516	■	■	A250 0616
100/5 A	0-130 A	CADR 0117	CADR 0467	CADR 0447	A90A 0217	A90A 0317	A90A 0517	■	■	A250 0617
125/5 A	0-165 A	CADR 0118	CADR 0468	CADR 0448	A90A 0218	A90A 0318	A90A 0518	■	■	A250 0618
150/5 A	0-200 A	CADR 0119	CADR 0469	CADR 0449	A90A 0219	A90A 0319	A90A 0519	■	■	A250 0619
200/5 A	0-260 A	CADR 0120	CADR 0470	CADR 0450	A90A 0220	A90A 0320	A90A 0520	■	■	A250 0620
250/5 A	0-325 A	CADR 0121	CADR 0471	CADR 0451	A90A 0221	A90A 0321	A90A 0521	■	■	A250 0621
300/5 A	0-400 A	CADR 0122	CADR 0472	CADR 0452	A90A 0222	A90A 0322	A90A 0522	■	■	A250 0622
400/5 A	0-520 A	CADR 0123	CADR 0473	CADR 0453	A90A 0223	A90A 0323	A90A 0523	■	■	A250 0623
500/5 A	0-650 A	CADR 0124	CADR 0474	CADR 0454	A90A 0224	A90A 0324	A90A 0524	■	■	A250 0624
600/5 A	0-800 A	CADR 0125	CADR 0475	CADR 0455	A90A 0225	A90A 0325	A90A 0525	■	■	A250 0625
750/5 A	0-1 kA	CADR 0126	CADR 0476	CADR 0456	A90A 0226	A90A 0326	A90A 0526	■	■	A250 0626
800/5 A	0-1.04 kA	CADR 0135	CADR 0481	CADR 0487	■	■	■	■	■	■
1,000/5 A	0-1.3 kA	CADR 0127	CADR 0477	CADR 0457	A90A 0227	A90A 0327	A90A 0527	■	■	A250 0627
1,250/5 A	0-1.65 kA	CADR 0128	CADR 0478	CADR 0458	A90A 0228	A90A 0328	A90A 0528	■	■	A250 0628
1,500/5 A	0-2 kA	CADR 0129	CADR 0479	CADR 0459	A90A 0229	A90A 0329	A90A 0529	■	■	A250 0629
2,000/5 A	0-2.6 kA	CADR 0130	CADR 0480	CADR 0460	A90A 0230	A90A 0330	A90A 0530	■	■	A250 0630
2,500/5 A	0-3.25 kA	CADR 0131	CADR 0482	CADR 0488	■	A90A 0331	A90A 0531	■	■	■
3,000/5 A	0-4 kA	CADR 0132	CADR 0483	CADR 0489	■	A90A 0332	A90A 0532	■	■	■
4,000/5 A	0-5.2 kA	CADR 0133	CADR 0484	CADR 0490	■	■	■	■	■	■
5,000/5 A	0-6.5 kA	CADR 0134	CADR 0485	CADR 0491	■	■	■	■	■	■
Ratio	Scale	Panel meter only								
		A90A 0107	A90A 0106	A90A 0105						
CT	3 In	Dial only								
5/5 A	0-5/15 A	CADR 0139	CADR 0169	CADR 0059	A90A 0239	A90A 0339	A90A 0539	■	■	A250 0639
10/5 A	0-10/30 A	CADR 0140	CADR 0170	CADR 0060	A90A 0240	A90A 0340	A90A 0540	■	■	A250 0640
15/5 A	0-15/45 A	CADR 0141	CADR 0171	CADR 0061	A90A 0241	A90A 0341	A90A 0541	■	■	A250 0641
20/5 A	0-20/60 A	CADR 0142	CADR 0172	CADR 0062	A90A 0242	A90A 0342	A90A 0542	■	■	A250 0642
25/5 A	0-25/75 A	CADR 0167	CADR 0168	CADR 0087	■	■	■	■	■	■
30/5 A	0-30/90 A	CADR 0143	CADR 0173	CADR 0063	A90A 0243	A90A 0343	A90A 0543	■	■	A250 0643
40/5 A	0-40/120 A	CADR 0144	CADR 0174	CADR 0064	A90A 0244	A90A 0344	A90A 0544	■	■	A250 0644
50/5 A	0-50/150 A	CADR 0145	CADR 0175	CADR 0065	A90A 0245	A90A 0345	A90A 0545	■	■	A250 0645
60/5 A	0-60/180 A	CADR 0146	CADR 0176	CADR 0066	A90A 0246	A90A 0346	A90A 0546	■	■	A250 0646
75/5 A	0-75/225 A	CADR 0147	CADR 0177	CADR 0067	A90A 0247	A90A 0347	A90A 0547	■	■	A250 0647
100/5 A	0-100/300 A	CADR 0148	CADR 0178	CADR 0068	A90A 0248	A90A 0348	A90A 0548	■	■	A250 0648
125/5 A	0-125/375 A	CADR 0149	CADR 0179	CADR 0069	A90A 0249	A90A 0349	A90A 0549	■	■	A250 0649
150/5 A	0-150/450 A	CADR 0150	CADR 0180	CADR 0070	A90A 0250	A90A 0350	A90A 0550	■	■	A250 0650
200/5 A	0-200/600 A	CADR 0151	CADR 0181	CADR 0071	A90A 0251	A90A 0351	A90A 0551	■	■	A250 0651
250/5 A	0-250/750 A	CADR 0152	CADR 0182	CADR 0072	A90A 0252	A90A 0352	A90A 0552	■	■	A250 0652
300/5 A	0-300/900 A	CADR 0153	CADR 0183	CADR 0073	A90A 0253	A90A 0353	A90A 0553	■	■	A250 0653
400/5 A	0-0.4/1.2 kA	CADR 0154	CADR 0184	CADR 0074	A90A 0254	A90A 0354	A90A 0554	■	■	A250 0654
500/5 A	0-0.5/1.5 kA	CADR 0155	CADR 0185	CADR 0075	A90A 0255	A90A 0355	A90A 0555	■	■	A250 0655
600/5 A	0-0.6/1.8 kA	CADR 0156	CADR 0186	CADR 0076	■	A90A 0356	A90A 0556	■	■	■
750/5 A	0-0.75/2.25 kA	CADR 0157	CADR 0187	CADR 0077	■	A90A 0357	A90A 0557	■	■	■
800/5 A	0-0.80/2.4 kA	CADR 0158	CADR 0188	CADR 0078	■	■	■	■	■	■
1,000/5 A	0-1/3 kA	CADR 0159	CADR 0189	CADR 0079	■	■	■	■	■	■
1,200/5 A	0-1.2/3.6 kA	CADR 0160	CADR 0190	CADR 0080	■	■	■	■	■	■
1,500/5 A	0-1.5/4.5 kA	CADR 0161	CADR 0191	CADR 0081	■	■	■	■	■	■
2,000/5 A	0-2/6 kA	CADR 0162	CADR 0192	CADR 0082	■	■	■	■	■	■
2,500/5 A	0-2.5/7.5 kA	CADR 0163	CADR 0193	CADR 0083	■	■	■	■	■	■
3,000/5 A	0-3/9 kA	CADR 0164	CADR 0194	CADR 0084	■	■	■	■	■	■
4,000/5 A	0-4/12 kA	CADR 0165	CADR 0195	CADR 0085	■	■	■	■	■	■
5,000/5 A	0-5/15 kA	CADR 0166	CADR 0196	CADR 0086	■	■	■	■	■	■

CUSTOMIZED PRODUCT

	Instrument	Deflection/Motor scale	Format	Scale	Rating CT ratio	Frequency
Examples	Complete meter	90° iron 250° coil	72 x 72 144 x 144	0-15/90A 0-1.25/2.5 kA	direct 15A CT 1,250/5 A	50 Hz 60 Hz

AC VOLTMETER

- **Deflection 90°**

Standard-scale model
Accuracy class: 1.5
Measuring component: moving iron 50-60-400 Hz and rectified moving coil 50-10,000 Hz
Pseudo-linear scale (iron)
Interchangeable dial
Consumption: 4.5 VA max

Extended-scale model
Accuracy class: 1.5
Measuring component: moving iron 50-60-400 Hz
Pseudo-linear scale
Consumption: 2.5 VA
With additional "A" unit for 48 x 48 format with 250° and 90° if value < 100 V

- **Deflection 250°**

Standard-scale model
Accuracy class: 1.5
Measuring component: rectified moving coil 50-10,000 Hz
Linear scale
Impedance 1 kΩ/ V

Extended-scale model
Accuracy class: 1.5
Measuring component: rectified moving coil 50-10,000 Hz
Linear scale
Impedance 2 kΩ/ V
With additional "A" unit in 48 x 48 format with 250° and 90° if value < 100 V

FEASIBILITY LIMITS

Deflection		90°			250°		
Format		48 x 48	72 x 72	96 x 96	48 x 48	72 x 72	96 x 96
Direct connection							
Scale Vn ; 1.2 Vn	**moving iron**	15 to 600 V					
	moving coil	1.5 to 600 V			3 to 600 V		
	Extended scale	10-15, 20-30, 40-70, 75-120, 80-120, 90-130, 90-140, 100-150, 200-300, 400-600 V			40-70, 80-120, 96-144, 100-150, 400-600 V		
Connection on VT							
Scale according to client specifications		from Un/ 100/√3 V			from Un/ 100/√3 V		

DIRECT CONNECTION

Deflection		Iron 50 Hz	90°		250°		
Format		48 x 48	72 x 72	96 x 96	48 x 48	72 x 72	96 x 96
Rating	**Scale Vn**						
15 V	**0-15 V**	■	■	■	■	■	■
30 V	**0-30 V**	■	■	■	■	■	■
60 V	**0-60 V**	■	■	■	■	■	■
150 V	**0-150 V**	■	■	■	■	■	■
250 V	**0-250 V**	A90V 0266	A90V 0366	A90V 0566	■	■	A250 0666
300 V	**0-300 V**	A90V 0268	A90V 0368	A90V 0568	■	■	A250 0668
500 V	**0-500 V**	A90V 0267	A90V 0367	A90V 0567	■	■	A250 0667
Rating	**Extended scale**						
230 V	**150-260**	■	■	A90V 0588	■	■	■
400 V	**300-450**	■	■	A90V 0589	■	■	■

CONNECTION ON VT

Deflection		Iron 50 Hz	90°		250°		
Format		48 x 48	72 x 72	96 x 96	48 x 48	72 x 72	96 x 96
VT ratio	**Scale**						
VT/100 V	**0-1.2 Vn**	■	■	■	■	■	■
VT/100/√3 V	**0-1.2 Vn**	■	■	■	■	■	■

CUSTOMIZED PRODUCT

	Connection	Deflection / Measure	Format	Scale	Rating/VT ratio	Frequency
Examples	direct on VT	90° iron 250°	72 x 72 96 x 96	Vn 1.2 Vn	15 V 20 / 0.11 kV	50 Hz 60 Hz

ASSOCIATED PRODUCTS

Accessories
Seal, ring fastener, dial, sleeve, etc.
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Current transformers
Cable primary, busbar primary, closed core or split core, etc.
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FREQUENCY METER

Pointer frequency meter

- **Deflection** 90° 250°

Accuracy class: 0.5 of Fn
Measuring component: moving coil and frequency converter
Linear scale
Operating range: 0.80 Un to 1.15 Un
With additional "A" unit for 48 x 48 format with 250° and 90° if value < 100 V
Consumption: 3 VA

FEASIBILITY CONSTRAINTS

Voltage 57.7 V to 440 V and frequency 50 to 400 Hz

Deflection:		90°		
Format		72 x 72	96 x 96	144 x 144
Rated voltage	Measurement range			
100 V	45-55 Hz	■	■	■
	55-65 Hz	■	■	■
230 V	45-55 Hz	■	FA90 0681	■
	55-65 Hz	■	■	■
400 V	45-55 Hz	■	FA90 0682	■
	55-65 Hz	■	■	■

Deflection:		250°		
Format		72 x 72	96 x 96	144 x 144
Rated voltage	Measurement range			
100 V	45-55 Hz	■	■	■
	55-65 Hz	■	■	■
230 V	45-55 Hz	■	■	■
	55-65 Hz	■	■	■
400 V	45-55 Hz	■	■	■
	55-65 Hz	■	■	■

CUSTOMIZED PRODUCT

	Deflection	Format	Voltage	Measurement range
Examples	90° 250°	72 x 72 144 x 144	100 V 110 V	45-55 Hz 45-65 HZ

ASSOCIATED PRODUCTS

Accessories
Seal, ring fastener, dial, sleeve, etc.
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Current transformers
Cable primary, busbar primary, closed core or split core, etc.
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WATTMETER VARMETER

- **Deflection** 90° 250°

Linear scale, measurement range according to client specifications (apparent power kVA, active power kW or reactive power kvar)
2 mA moving coil analog panel meter (other ratings on request) associated with a T82 or TRIAD measurement transducer (see Transducers chapter)
Accuracy class: 1.5

TRANSDUCERS TO BE USED

The transducer used with the analog panel meter will be selected in the “TRANSDUCERS” chapter of this catalog.

T82N

TRIAD 2

CUSTOMIZED PRODUCT

	Network	Deflection	Format	Frequency	CT ratio	Direct / VT	Voltage or VT ratio	Scale beginning	Scale ending	Transducer model
Examples	Active single Reactive balanced three-phase 3 wires	90° 250°	72 x 72 96 x 96	50 Hz 60 Hz	1,000 / 5 A 400 / 5 A	Direct VT	230 V 20 kV / 115 V	0 kW -12 MVAr	250 kW +12 MVAr	TRIAD T82

ASSOCIATED PRODUCTS

Accessories
Seal, ring fastener, dial, sleeve, etc.
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Current transformers
Cable primary, busbar primary, closed core or split core, etc.
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NOTES

ASSOCIATED PRODUCTS

Accessories

Seal, ring fastener, dial, sleeve, etc.

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Current transformers

Cable primary, busbar primary, closed core or split core, etc.

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PHASEMETERS

- **Deflection** 90° 250°

Scale in cos φ

2 mA moving coil analog panel meter (other ratings on request) associated with a T82 or TRIAD measurement transducer (see Transducers chapter)

Accuracy class: 2.5

TRANSDUCERS TO USE

The transducer to use with the analog panel meter will be chosen in the “TRANSDUCERS” chapter of this catalog.

T82N

TRIAD 2

CUSTOMIZED PRODUCT

	Network	Deflection	Format	Frequency	CT secondary	Voltage	Measurement range	Transducer model
Examples	Single Unbalanced three-phase	250° 360°	72 x 72 96 x96	50 Hz 60 Hz	5 A 1 A	230 V 440 V	0.5 lead /1/0.5 lag -1 / 0 / +1	TRIAD T82

ASSOCIATED PRODUCTS

Accessories

Seal, ring fastener, dial, sleeve, etc.

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Current transformers

Cable primary, busbar primary, closed core or split core, etc.

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SYNCHRONIZERS

Vibrating-reed double frequency meter

Accuracy class: 0.5
Consumption: 3 VA
Operating range: 0.8 to 1.15 Un
Measuring component: vibrating reed in field of coil
Amplitude of vibration: proportional to V^2

FEASIBILITY LIMITS

Voltage 57.7 V to 440 V

		2 rows of 9 reeds	
Format		72 x 72	96 x 96
Frequency	Voltage		
48-52 Hz	100/√3 V	■	■
	100 V		FL12 0677
	230 V	■	FL12 0678
	400 V	■	FL12 0679
58-62 Hz	100/√3 V	■	■
	100 V	■	■
	230 V	■	■
	400 V	■	■

CUSTOMIZED PRODUCT

	Format	Frequency	Voltage
Examples	96 x 96 72 x 72	48-52 Hz 58-62 Hz	100/√3 V 415 V

Differential Voltmeter

Deflection 90° 250°
Accuracy class: 2.5
Consumption: 0.5 VA per circuit
Frequency: 50-60 Hz
Measurement range: 0.75 to 1.25 Un
Additional unit "B"

FEASIBILITY LIMITS

Voltage 57.7 V to 440 V, other measurement ranges

Deflection	90°	
Format	72 x 72	96 x 96
Voltage Un		
100/√3 V	■	■
100 V	■	BASS 0591
230 V	■	BASS 0592
400 V	■	BASS 0593

Deflection	250°	
Format	72 x 72	96 x 96
Voltage Un		
100/√3 V	■	■
100 V	■	■ C250 069
230 V	■	■
400 V	■	■

CUSTOMIZED PRODUCT

	Deflection	Format	Voltage	Measurement range
Examples	90° 250°	72 x 72 96 x 96	100 V 100/3 V	±25% ±50%

ASSOCIATED PRODUCTS

Accessories
Seal, ring fastener, dial, sleeve, etc.
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Current transformers
Cable primary, busbar primary, closed core or split core, etc.
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DC AMMETER

- **Deflection** 90°

Accuracy class: 1.5
(option class 1 except 48 x 48)
Measuring component: Moving coil
Linear scale
Interchangeable dial, except 144 x 144
Voltage drop: 60 mV for rating ≥ 50 mA
variable for rating < 50 mA

- **Deflection** 250°

Accuracy class: 1.5
Measuring component: Moving coil
Linear scale
Voltage drop: 100 mV for rating ≥ 10 mA
variable for rating < 10 mA

FEASIBILITY LIMITS

Deflection		90°			250°		
Format		**48 x 48**	**72 x 72**	**96 x 96**	**48 x 48**	**72 x 72**	**96 x 96**
Direct connection	**Zero position, left or central**	50 mA to 20 A		50 µA to 75 A	500 µA to 12 A		
Process signal connection	**Zero position set**	4-20 mA 10-50 mA 2-10 mA			4-20 mA 10-50 mA 2-10 mA 4-23,2 mA		
Shunt connection	**Zero position, left or central**	50 mV 60 mV 100 mV 120 mV 150 mV 300 mV 360 mV			50 mV 60 mV 100 mV 120 mV 150 mV 300 mV		

DIRECT CONNECTION

Deflection		90°			250°		
Format		**48 x 48**	**72 x 72**	**96 x 96**	**48 x 48**	**72 x 72**	**96 x 96**
Rating	**Scale**						
5 A	**0-5 A**	■	■	■	■	■	■
10 A	**0-10 A**	■	■	■	■	■	■
15 A	**0-15 A**	■	■	■			
25 A	**0-25 A**		■	■			

CONNECTION ON 100 mV SHUNT

Deflection		90°			250°		
Format		**48 x 48**	**72 x 72**	**96 x 96**	**48 x 48**	**72 x 72**	**96 x 96**
Shunt	**Scale 1.2 In**						
5 A	**0-6 A**	■	■	■	■	■	■
10 A	**0-12 A**	■			■	■	■
15 A	**0-18 A**	■	■	■	■	■	■
20 A	**0-24 A**	■	■	■	■	■	■
25 A	**0-30 A**	■	■ C90S 1403	■ C90S 1503	■	■	■
30 A	**0-36 A**	■	■	■	■	■	■
40 A	**0-48 A**	■	■	■	■	■	■
50 A	**0-60 A**	■	■ C90S 1406	■ C90S 1506	■	■	■
60 A	**0-72 A**	■	■	■	■	■	■
75 A	**0-90 A**	■	■ C90S 1408	■ C90S 1508	■	■	■
100 A	**0-120 A**	■	■ C90S 1409	■ C90S 1509	■	■	■
125 A	**0-150 A**	■	■	■	■	■	■
150 A	**0-180 A**	■	■ C90S 1411	■ C90S 1511	■	■	■
200 A	**0-240 A**	■	■	■	■	■	■
250 A	**0-300 A**	■	■ C90S 1413	■ C90S 1513	■	■	■
300 A	**0-360 A**	■	■	■	■	■	■
400 A	**0-480 A**	■	■	■	■	■	■
500 A	**0-600 A**	■	■ C90S 1416	■ C90S 1516	■	■	■
600 A	**0-720 A**	■	■	■	■	■	■
1,000 A	**0-1,200 A**	■	■	■	■	■	■

CUSTOMIZED PRODUCT

	Connection	Deflection	Format	Zero position	Rating	Beginning/end of scale
Examples	direct process signal	90° 250°	72 x 72 96 x 96	left set	60 A 4-20 mA	0-60 A 0-1,500 rpm

ASSOCIATED PRODUCTS

Accessories
Seal, ring fastener, dial, sleeve, etc.
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SHUNTS
1 to 6,000 A
Vast choice whatever your application.
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DC VOLTMETER

- **Deflection** 90°

Accuracy class: 1.5
(option class 1 except 48 x 48)
Measuring component: Moving coil
Linear scale
Consumption:
1 mA for Un ≥ 500 mV
5 mA for Un < 500 mV

- **Deflection** 250°

Accuracy class: 1.5
Measuring component: Moving coil
Linear scale
Consumption:
1 mA for Un ≥ 1 V
2 mA for Un ≥ 1 V (central zero)
5 mA for Un < 1 V

FEASIBILITY LIMITS

Deflection		90°			250°		
Format		**48 x 48**	**72 x 72**	**96 x 96**	**48 x 48**	**72 x 72**	**96 x 96**
Direct connection	**Zero position, left or central**	50 mV to 600 mV			50 mV to 600 V		
Process signal connection	**Zero position, left**	from 50 mV			from 50 mV		
	Set zero position				1-5 V 2-10 V		

DIRECT CONNECTION

Deflection		90°			250°		
Format		**48 x 48**	**72 x 72**	**96 x 96**	**48 x 48**	**72 x 72**	**96 x 96**
Rating							
15 V		■	■	■	■	■	■
30 V		■	■ C90S 1425	■ C90S 1525	■	■	■
60 V		■	■ C90S 1426	■ C90S 1526	■	■	■
75 V		■	■	■	■	■	■
150 V		■	■ C90S 1428	■ C90S 1528	■	■	■ C250 1928
300 V		■	■	■	■	■	■

CUSTOMIZED PRODUCT

	Deflection	Format	Zero position	Rating	Beginning/end of scale
Examples	90° 250°	72 x 72 48 x 48	left central	75 V 400 V	0 - 75 V 400 V - 0 - 400 V

ASSOCIATED PRODUCTS

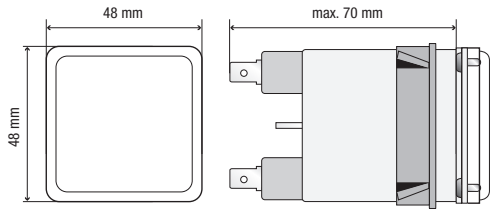
Accessories
Seal, ring fastener, dial, sleeve, etc.
page 217

Current transformers
Cable primary, busbar primary, closed core or split core, etc.
page 99

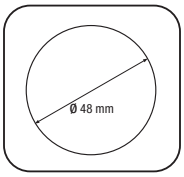
COHO
RANGE

Hour meters for totalling the operating time of machines or equipment for control and maintenance.

- For harsh environments
- High-reliability range



Panel drilling



Format		48 x 48 (IP50)	48 x 48 (IP55)
Frequency	Voltage		
50 Hz	24 V	COHO 0606	COHO 1606
	48 V	COHO 0607	COHO 1607
	110 V	COHO 0608	COHO 1608
	230/400 V	COHO 0610	COHO 1610
60 Hz	24 V	COHO 0627	COHO 1627
	48 V	COHO 0628	COHO 1628
	110 V	COHO 0629	COHO 1629
	230/400 V	COHO 0631	COHO 1631
DC	24 V	COHO 0604	COHO 1604
	48 V	COHO 0605	COHO 1605

GENERAL SPECIFICATIONS

Reference standard: NFC 42310

Display: without reset function, white on black background, decimals in red
Height of digits: 4 mm
AC and DC capacity: 99,999.99 h
Operating indicator: scrolling 1/100 h every 36 s

Motor in Vac/Vdc: pulse + electronic counter

Consumption:
0.5 VA in 24 Vac/dc,
1.5 VA in 48 Vac/dc,
2 VA in 110/230 Vac,
6 VA in 400 Vac

Operating range:
Voltage Vac: -15% +10%
Frequency: ± 5 Hz
Voltage Vdc: ± 20%

Insulation: double

Dielectric test voltage:
5.5 kV - 50 Hz - 1 min

Environment:
Operating temperature: -10°C to +60°C
Relative humidity: < 95% at +45°C

Protection rating on front panel:
standard: IP50,
variant: IP55

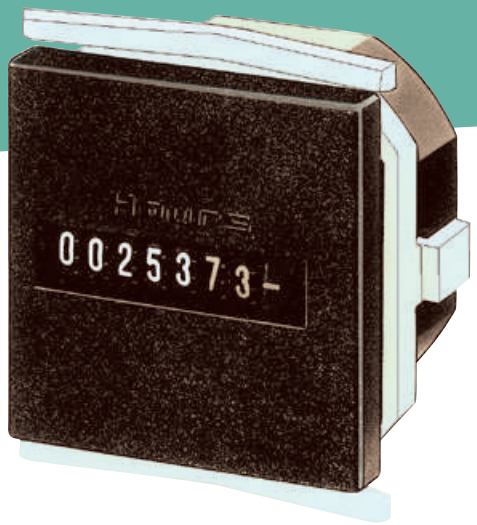
Electromagnetic compatibility
(emission and immunity): EN 61326-1

Mounting:
Standard version: elastic joint
IP55 version: joint + strap

Weight: 180 g

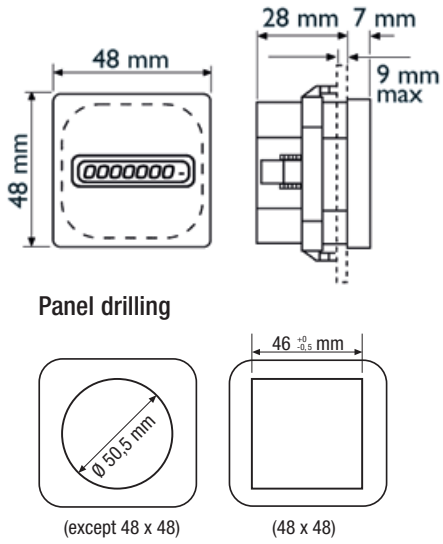
Connection: 6.35 Faston clips + terminal covers included

LK RANGE



Hour meters (7 or 8 digits) for totalling the operating time of machines or equipment for control and maintenance.

- Easy to install
- Economical



GENERAL SPECIFICATIONS

Display: without reset function,
white on black background,decimals in red
Height of digits: 4 mm
AC capacity: 99,999.99 h
DC capacity: 999,999.99 h
Operating indicator in Vac: ridged roll
Operating indicator in Vdc: continuous scrolling 1/100h every 36 s

Motor in Vac: synchronous
Motor in Vdc: step-by-step

Consumption:
Vdc: ≤ 750 mW
Vac: ≤ 1.65 VA

Insulation: single

Dielectric test voltage: 2 kV - 50 Hz - 1 min

Operating range:
Voltage Vac: ± 10%
Frequency: ± 10%
Voltage Vdc: ± 10%

Environment:
Operating temperature: -15°C to +50°C
Relative humidity: < 95% at +45°C

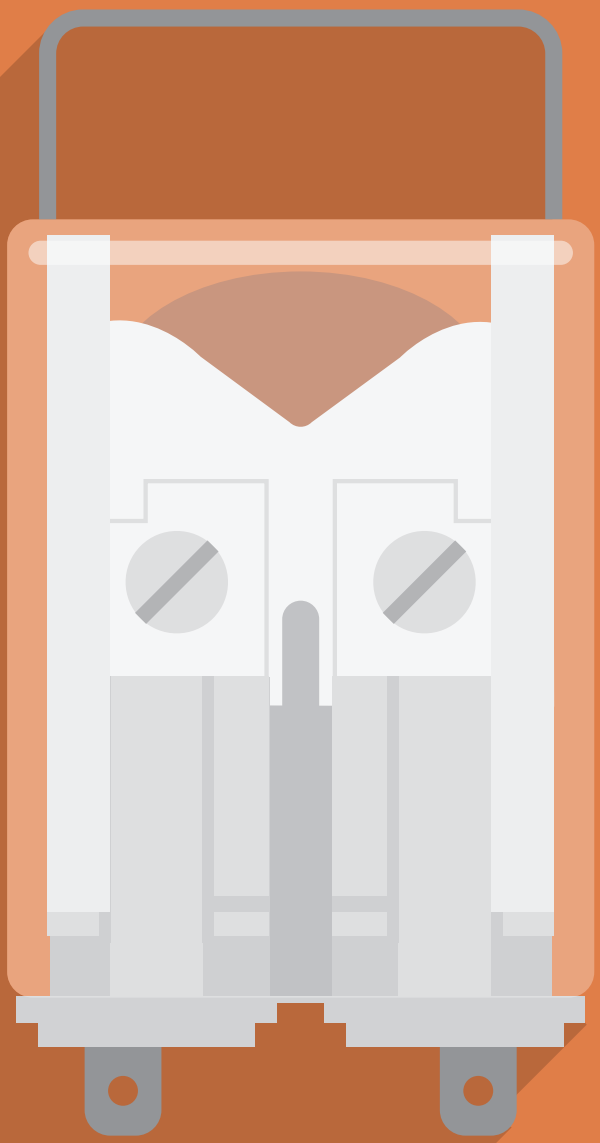
Protection rating on front panel: IP52

Mounting: self-locking flange

Weight: 50 g

Connection: 6.35 lugs or Faston clips

Format		48 x 48	55 x 55	72 x 72
Frequency	Voltage			
50 Hz	24 V	LK4N 001N	LK5N 001N	LK7N 001N
	48 V	LK4N 003N	LK5N 003N	LK7N 003N
	115 V	LK4N 005N	LK5N 005N	LK7N 005N
	230 V	LK4N 007N	LK5N 007N	LK7N 007N
	400 V	LK4N 009N	LK5N 009N	LK7N 009N
60 Hz	24 V	LK4N 002N	LK5N 002N	LK7N 002N
	48 V	LK4N 004N	LK5N 004N	LK7N 004N
	115 V	LK4N 006N	LK5N 006N	LK7N 006N
	230 V	LK4N 008N	LK5N 008N	LK7N 008N
	400 V	LK4N 010N	LK5N 010N	LK7N 010N
DC	10-30 V	LK4N 011N	LK5N 011N	LK7N 011N
	36-80 V	LK4N 012N	LK5N 012N	LK7N 012N
	110-130 V	LK4N 013N	LK5N 013N	LK7N 013N
Front panel only			LK5N 0000	LK7N 0000



CRITICAL AUXILIARY RELAYS

AUXILIARY RELAYS

232 OVERVIEW OF THE RANGE
234 SELECTION GUIDE

AUXILIARY RELAYS

TO SEE ALL OUR RANGES, CHECK OUT OUR RELAYS CATALOG

Instantaneous relays

Monostable
catalog 906130145

Monostable with forcibly guided contacts

Bistable
catalog 906130145

Fast-acting monostable and bistable

Time-delay relays / Logic functions

Time delay on pick-up or drop-out (logic function)

Time-delay with forcibly guided contacts

Measurement relays

Sockets and accessories

Rear connection, front connection, screw connection, Faston connection, blade connection, spring connection: various sockets are available.
Chauvin Arnoux Energy® also proposes a complete range of accessories: locking spring, bar-mounting strap, bar for panel mounting, DIN-rail fitting, safety blank, etc.

catalog 906130145

The reference for industrial relays

The French measuring instrument designer and manufacturer Chauvin Arnoux Group is acknowledged as a major player in the electrical sector and is consolidating its position on the physical measurement market.
At the heart of electrical measurement activities, it plays a crucial role in the implementation of energy management and control systems.
Its scope covers applications as diverse as basic measurement of electrical parameters, network monitoring – from energy generation through to distribution to end-users – safety of property and people, equipment maintenance and energy supply quality.

THREE BRANDS, ONE BUSINESS

Inside the Chauvin Arnoux Group, **Chauvin Arnoux Energy** offers the electrical industry and the tertiary sector all the fixed electrical switchboard equipment necessary to measure, control and monitor the power distribution chain. Drawing on more than sixty years' experience, the group proposes its **expertise in control relays for severe environments** such as the nuclear industry, petrochemicals or rail transport. It is also backed by the expertise and know-how of the Group's Italian subsidiary, **AMRA Spa**, which has been making electro-mechanical relays since 1975.
With its integration of relays made by **RIA – MTI**, a well-known manufacturer since 1957, Chauvin Arnoux Energy is now a major player in the world of control relays.

APPLICATIONS AND CONFORMITY

Nuclear power, petrochemicals, rail transport, industry: there are relays for every sector of activity.
Some are covered by particularly strict standards so that they can handle the constraints of the environment in which they will be operating:

- Temperature withstand
- Fire resistance
- Resistance to corrosive gases
- Shock resistance
- Vibration resistance
- Dust resistance
- Contact materials
- Type of magnetic circuit
- Surface treatments and finishes

SPECIFIC STANDARDS AND CERTIFICATIONS

RAIL

NF-F 16-101, NF-F 16-102 (materials), NF-F 62002, CF 62003, UIC 616-0, IEC 61810-3 and EN 45545-2, Relays approved by SNCF
and RATP: F-OK B, F-OK TBAO, F-OK TBOR

ENERGY

Category K3 (seismic stresses), EDF qualification for use in nuclear power stations. Chauvin Arnoux Energy relays are recommended by EDF for EPRs (European Pressurized Reactors).
EDF: HM-2A / 03 / 111 / ENEL: LV15/1, LV15/2 / LV16/1, LV16/2, LV16/3, LV16/4, LV16/5

SELECTION GUIDE

DEPENDING ON PRODUCTS

Power generation	Nuclear	Power transmission	Rolling stock	Fixed railway installation	Shipbuilding	Petroleum industry	Heavy industry
✓	Depending on products	✓	Depending on products	✓	✓	✓	✓

Model	Monostable instantaneous	Bistable (latching)	Forcibly guided contacts	Fast-acting(*)	Time delay	Contacts	In	Notes	Rolling stock equipment (***)	Nuclear
RCM	■					2 RT	10 A	Compact		
RDM	■					4 RT	10 A	Compact		
RGM	■					4 RT	12 A	High breaking capacity (**)		
RMMX	■					8 RT	10 A	Multi-contact, compact		
RMM	■					8-12-20 RT	12 A	High breaking capacity, multi-contact		
POK-POKS	■					2 RT	5-10 A	Compact	■	■
BIPOK-BIPOKS	■					4 RT	5-10 A	Compact	■	■
TRIPOK-TRIPOKS	■					6 RT	5-10 A	Compact	■	
QUADRIPOK	■					8 RT	10 A	Compact	■	
ESAPOK	■					12 RT	10 A	Compact		
OK	■					4-8-12 RT	10 A	High breaking capacity	■	
OKB184	■					4 RT	10 A	High breaking capacity, K3-qualified		■
RE3000	■					4 RT	10 A	K3-qualified		■
FOKB	■					4 RT NF-NO	13 A	High breaking capacity, NF F62-002	■	
RCG	■		■			2 RT	10 A	Forcibly guided contacts, type A, EN61810-3	■	
RDG	■		■			4 RT	10 A	Forcibly guided contacts, type A, EN61810-3	■	
RGG Ancien nom RGMZX	■		■			4 RT	10 A	High breaking capacity, forcibly guided contacts, type A, EN61810-3	■	
RMGX	■		■			8 RT	10 A	High breaking capacity, forcibly guided contacts, type A, EN61810-3	■	
RGB		■				3-4 RT	12 A	High breaking capacity		
RMBX		■				7-8 RT	10 A	Multi-contact	■	
RMB		■				7-11-19 RT	10 A	High breaking capacity, multi-contact, common negative		
OKBA		■				4-8 RT	10 A	High breaking capacity	■	
RGMVX	■			■		4 RT	10 A	Operating time < 8 ms		
RMMV/X	■			■		8-12 RT	10 A	Operating time < 8 ms for compact models, otherwise < 10 ms		
RGR	■			■		2 RT	2 A	Operating time < 3 ms		

DEPENDING ON PRODUCTS

Power generation	Nuclear	Power transmission	Rolling stock	Fixed railway installation	Shipbuilding	Petroleum industry	Heavy industry
✓	Depending on products	✓	Depending on products	✓	✓	✓	✓

Model	Monostable instantaneous	Bistable (latching)	Forcibly guided contacts	Fast-acting(*)	Time delay	Contacts	In	Notes	Rolling stock equipment (***)	Nuclear
RGMV	■			■		4 (CO or NC)	10 A	Operating time < 8 ms		
RMMV	■			■		8 (CO or NC)	10 A	Operating time < 6 ms		
RMMZ11/13	■			■		8 CO	10 A	Operating time < 13 ms		
RGBV		■		■		4 CO	10 A	Operating time < 10 ms		
RMBV		■		■		8-12 CO	10 A	Operating time < 10 ms		
RGBZ10/11		■		■		3-4 CO	12 A	Operating time < 12 ms		
RMBZ30		■		■		7 CO	10 A	Operating time < 18 ms		
RV LV16	■			■		6 (NO or NC)	5 A	Operating time < 6 ms		
RDT					■	4 CO	10 A	Time delay on pick-up or drop-out		
RDL - RGL					■	2 CO	10 A	Flasher		
RDTE15/16					■	4 CO	10 A	Delay on drop-out, adjustable duration, no Vaux		
RGTO					■	1 CO	5 A	Delay on drop-out, adjustable duration, no Vaux		
TMM					■	4 CO	10 A	Multifunction relay, 10 functions	✓	✓
TM - TMS Ancien noms OK-TMF/S					■	4 CO	5-10 A	Time delay on pick-up or drop-out	✓	
TOK					■	4 CO	10 A	High breaking capacity, time delay on pick-up or drop-out	✓	✓
OKR					■	4 CO	5 A	Time delay on pick-up or drop-out	✓	
OKT					■	4 CO	5 A	Time delay on pick-up or drop-out	✓	
UTM					■	-	-	Static time delay unit	✓	
TOK-L					■	4 CO	10 A	High breaking capacity, flasher	✓	
TOK-FP					■	4 CO	10 A	High breaking capacity, flasher	✓	
OKRE-L					■	4 CO	5 A	Flasher	✓	
OKRE-FP					■	4 CO	5 A	Flasher	✓	
CLE					■	4 CO	5 A	Flasher		
RGK			■		■	4 CO	12 A	Forcibly guided contacts, type A, EN61810-3	✓	
MOK-V2	■					2 CO	3 A	Measuring relay, voltage	✓	

SELECTION GUIDE

	FRONT Connection			REAR Connection			
TERMINAL	SCREW		SPRING CLAMP	SCREW	DOUBLE FASTON	SPRING CLAMP	PCB
MOUNTING	PLATE-WALL / DIN RAIL	PLATE-WALL	PLATE-WALL / DIN RAIL	FLUSH MOUNTING			SOLDER
RELAY MODEL	SOCKET MODEL						
RCM	PAVC081	-	PAIR085	PRVC081	PRDC081	-	PRCC080
RDM	PAVD161	-	PAIR165	PRVD161	-	-	PRCD161
RGM	PAVG161	-	-	PRVG161	PRDG161	-	-
RMMX	96IP20-I DIN	-	PAIR320	-	ADF4	PRIR320	-
RMM (8 cts)	PAVM321	-	-	PRVM321	PRDM321	-	-
RMM (12 cts)	PAVM481	-	-	PRVM481	PRDM481	-	-
RMM (20 cts)	PAVM801	-	-	PRVM801	PRDM801	-	-
POK-POKS	50IP20-I DIN	50L	PAIR080	53IL	ADF1	PRIR080	65
BIPOK-BIPOKS	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65
TRIPOK-TRIPOKS	78BIP20-I DIN	78BL	PAIR240	73IL	ADF3	PRIR240	-
QUADRIPOK	96IP20	96BL	PAIR320	43IL	ADF4	PRIR320	65
ESAPOK	156IP20	78BL	PAIR480	73IL	ADF6	PRIR480	-
OK / OKB184	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	-	65
RE3000	EVV3100	EVL3100*	-	ERV3100	ERL320*	ERL310*	-
FOKB	-	-	-	-	84F*	-	-
RCG	50IP20-I DIN	-	PAIR080	-	ADF1	PRIR080	65
RDG	48BIP20-I DIN	-	PAIR160	-	ADF2-BIPOK	PRIR160	65
RGG	48BIP20-I DIN	-	PAIR160	43IL	ADF2	PRIR160	65
RMGX	96IP20-I DIN	-	PAIR320	-	ADF4-E1	PRIR321	-
RGB	PAVG161	-	-	PRVG161	PRDG161	-	-
RMBX	96IP20-I DIN	-	PAIR320	-	ADF4	PRIR320	-
RMB (7 cts)	PAVM321	-	-	PRVM321	PRDM321	-	-
RMB (11 cts)	PAVM481	-	-	PRVM481	PRDM481	-	-
RMB (19 cts)	PAVM801	-	-	PRVM801	PRDM801	-	-
OKBA	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65

*EVL3100: Faston front connection
*ERL320: double blade
*ERL310: single blade
*84F: Single Faston

OLD SOCKET NAME	NEW SOCKET NAME
50	50IP20-I DIN
48B	48IP20-I DIN
78B	78IP20-I DIN
50BF	50L
48BF	48BL
78BF	78BL
65F	65

	FRONT Connection			REAR Connection			
TERMINAL	SCREW		SPRING CLAMP	SCREW	DOUBLE FASTON	SPRING CLAMP	PCB
MOUNTING	PLATE-WALL / DIN RAIL	PLATE-WALL	PLATE-WALL / DIN RAIL	FLUSH MOUNTING			SOLDER
RELAY MODEL	SOCKET MODEL						
RGMVX	48BIP20-I DIN	-	PAIR160	-	ADF2	PRIR160	-
RMMVX	96IP20-I DIN	-	PAIR320	-	ADF4	PRIR320	-
RMMVx1/7	PAVM481	-	-	PRVM481	PRDM481	-	-
RGR	PAVG161	-	-	PRVG161	PRDG161	-	-
RGMV	PAVG161	-	-	PRVG161	PRDG161	-	-
RMMV	PAVM321	-	-	PRVM321	PRDM321	-	-
RMMZ11 / 13	PAVM321	-	-	PRVM321	PRDM321	-	-
RGBZ10 / 11	PAVG161	-	-	PRVG161	PRDG161	-	-
RMBZ30	PAVM321	-	-	PRVM321	PRDM321	-	-
RV LV16	78BIP20-I DIN	-	PAIR240	73IL	ADF3	PRIR240	-
RDT	PAVD161	-	PAIR165	PRVD161	-	-	PRCD161
RDL	PAVD161	-	PAIR165	PRVD161	-	-	PRCD161
RGL	PAVG161	-	-	PRVG161	PRDG161	-	-
RDTE15 / 16	PAVD161	-	PAIR165	PRVD161	-	-	PRCD161
RGTO	PAVG161	-	-	PRVG161	PRDG161	-	-
TMM	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65
TM - TMS	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65
TOK	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65
OKR	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65
OKT	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65
UTM	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65
TOK-L	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65
TOK-FP	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65
OKRE-L	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65
OKRE-FP	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65
CLE	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65
RGK	48BIP20-I DIN	-	PAIR160	-	ADF2	PRIR160	-
MOK-V2	48BIP20-I DIN	48BL	PAIR160	43IL	ADF2	PRIR160	65

For more details, please see the socket datasheets.

SERVICES AND TRAINING

SERVICES AND TRAINING

Combined know-how in a demanding technological context.

- More than 25 years' experience
- Multiple areas of expertise
- A dedicated team of applications engineers
- Service provided all over the world

DESCRIPTION

Chauvin Arnoux Energy offers you the benefits of **more than 25 years' experience and know-how in all aspects of electrical energy and in the most demanding business sectors:** energy generation, transmission and distribution, major industries, infrastructure, tertiary, etc.

Chauvin Arnoux Energy proposes a set of services to help you succeed in your projects, with support from an applications team composed of specialized engineers:

- Basic design studies - Engineering
- Surveys and technical audits
- Commissioning
- Training courses
- On-site and remote maintenance contracts
- Specific development
- Certificate of conformity and verification certificate
- Factory acceptance
- Repairs - After-Sales service

BASIC DESIGN STUDIES - ENGINEERING

Drafting of technical proposals on the basis of specifications or special technical clauses, visit and on-site technical inspection.

SURVEYS AND TECHNICAL AUDITS

Pre-project inspection of the sites to identify the requirements and gather all the technical data.
Size an extension or upgrade of the functional installations.
Find the causes and solutions for your on-site technical problems.

COMMISSIONING

Operations in France and abroad to set up the equipment, check its installation and roll out the processing and analysis software. Commissioning includes adjusting the parameter settings of the equipment and related software to ensure that the operator can get the system up and running quickly and easily.

TRAINING COURSES

The training services on our equipment and software help to optimize the operation of your installations and make them autonomous so that they can be upgraded.
Chauvin Arnoux Energy, a certified training organization since 1993 - certification no. 11.92.16273.92.

ON-SITE AND REMOTE MAINTENANCE

With a maintenance contract, you benefit from:

- a privileged relationship for user assistance
- preventive maintenance
- upgrading of the products and software
- specific on-site assistance
- tailored services sized to match your needs

SPECIFIC DEVELOPMENTS

Chauvin Arnoux Energy's engineering and manufacturing resources enable it to develop equipment according to specifications with specific features to meet the requirements of the most demanding applications in the energy sector: tariff meters, high-precision current transformers, etc., for RTE and ENEDIS.

CERTIFICATE OF CONFORMITY AND VERIFICATION CERTIFICATE

On request, Chauvin Arnoux Energy can deliver its products with specific certificates:

- The certificate of conformity confirms compliance with the stipulations of an order delivered by the industrial company / supplier as per the NF L 00-015C standard
- The verification certificate establishes a table of the measurement deviations between the equipment and a reference instrument. This document complies with the FDX07-011 documentation booklet

FACTORY ACCEPTANCE

The customer or a mandated organization is present during the final tests of the products before shipment. Measurements to check the equipment's accuracy and dielectric tests may be performed. The checks are performed on a unit-by-unit basis or by sampling.

REPAIRS - AFTER-SALES SERVICE

Manumesure, a company in the Chauvin Arnoux Group, provides after-sales service for the instruments from the Group's brands, with a particular focus on Chauvin Arnoux Energy products. Manumesure's expertise is backed by dedicated human and technical resources, computerization and traceability of the diagrams, centralized management of replacement parts and metrological traceability to the national standards.

CHAUVIN ARNOUX ENERGY, A CERTIFIED TRAINING ORGANIZATION SINCE 1993 - CERTIFICATION NO. 11.92.16273.92

WE ARE IN THE BEST POSITION TO TRAIN YOU

As a manufacturer, we constantly innovate, developing new technologies which we fully master. This know-how guarantees that we possess thorough knowledge of the environments in which our solutions are installed.
As a measuring equipment manufacturer, we design and produce most of the instruments that we offer and with which you work. This means that we can draw on our comprehensive knowledge of the products to offer you training on our most technical equipment and on the energy information systems which form the foundation of our expertise. Practical exercises and concrete case studies are presented and analyzed so that you quickly learn and adopt the best professional practices, particularly in terms of compliance with the applicable standards and regulations.

TRAINING CERTIFICATES

For all our training courses which do not lead to a qualification, we test and confirm the knowledge acquired by the trainees by means of a multiple-choice test. If their test results are satisfactory, each trainee is awarded a training certificate.

Training courses at the Chauvin Arnoux Group's site in Asnières-sur-Seine

- Expert training instructors acknowledged in their fields
- Innovative demonstration equipment for easier understanding and handling
- A limited number of participants to ensure high-quality dialog

TRAINING IS A FUNDAMENTAL ADVANTAGE IN ANYONE'S CAREER PATH.

- To boost skills development
- To gain access to the various levels of qualification
- To obtain professional authorizations

NOTES

ABBREVIATIONS

AC OR ac	alternating current
CL	class
CT	current transformer
DC OR dc	direct current
E	energy
EACT	active energy
EAPP	apparent energy
EREACT	reactive energy
FS	full scale
g	acceleration of gravity (9.81 m/s^2)
GB	gigabyte
HV	high-voltage
I	current (A, kA)
I/O	input/output
IEC	International Electrotechnical Commission
In	nominal or rated current
IP	protection level
IR	infrared
K	Kelvin temperature gradient
kB	kilobyte
LCD	liquid crystal display
LED	light-emitting diode
LV	low voltage
MB	megabyte
MIN	minute
MM	millimeter
MS	millisecond
MV	medium voltage
NC	“normally closed (“break” relay contact)”
NO	“normally open (“make” relay contact)”
P	active power (W, kW, MW)
PC	personal computer
PF	power factor
PID	proportional integral derivative
PPM	parts per million diameter (in mm)
PR	protection rating (often expressed as IP)
Q	reactive power
R	reading accuracy (in %)
RMS	root mean square
S	apparent power (in VA, kVA, MVA...)
s	second
STN	switched telephone network
TC	thermocouple
THD	total harmonic distortion
TRMS	True RMS
U	phase-phase voltage
Un	nominal or rated voltage
V	phase-neutral voltage
VT (OR PT)	voltage or potential transformer

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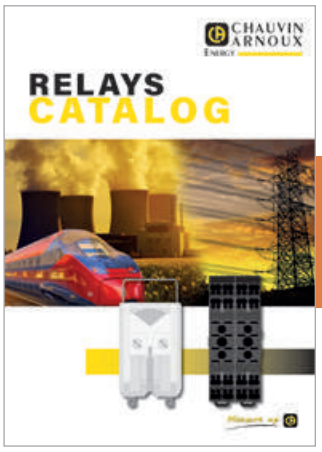

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906131165 - Ed.1 - 01/2023 - Non-contractual document - Specifications are to be confirmed at time of ordering - Photos and diagrams are non-contractual.