CHAUVIN ARNOUX
ENERGY



GENERAL CATALOG

2025

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ENERGY METERING PLAN

Remote data retrieval from meters
Energy saving
ISO 50001
Energy rebilling

NETWORK SUPERVISION AND PHYSICAL MEASUREMENT

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

CRITICAL AUXILIARY RELAYS

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

CIVILIAN AND MILITARY NAVAL APPLICATIONS

Anemovane
Pressure, temperature and humidity sensor
Temperature sensor
Multifunction wind repeater
Data concentration and communication unit

SERVICES AND TRAINING

Combined know-how

THE CHAUVIN ARNOUX GROUP MEASUREMENT EXPERTS

6 companies of measurement experts

CHAUVIN ARNOUX
Portable test & measurement instrumentation Chauvin Arnoux, Metrix & Multimetrix brands

CHAUVIN ARNOUX ENERGY
Measuring equipment for critical infrastructure applications

CHAUVIN ARNOUX INDATECH
Design of optical sensors for quality control in the laboratory & on in-line processes.

CHAUVIN ARNOUX MANUMESURE
Metrology & regulatory testing

CHAUVIN ARNOUX PYROCONTROLE
Temperature sensors in industrial processes

CHAUVIN ARNOUX SPECTRALYS
Expert in agri-food product quality control in real time by fluorescence and infrared



100 millions d'euros in sales revenues

1000 staff

11% of revenues invested in R&D

10 subsidiaries spread across the world

8 R&D departments worldwide

8 production sites

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.

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



ELECTRICAL POWER GENERATION



ELECTRICAL POWER TRANSMISSION AND DISTRIBUTION



RAIL



NAVAL



INDUSTRY AND TERTIARY BUILDINGS

A FRENCH BRAND WITH INTEGRATED PRODUCTION

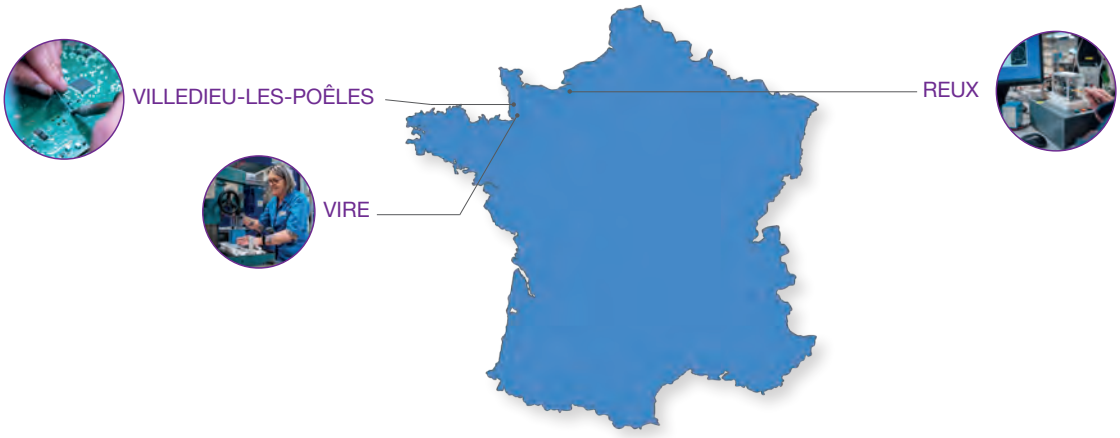
Chauvin Arnoux Energy, a French company in the Chauvin Arnoux Group, handles all aspects of product manufacturing; from design through to final testing of the equipment. Our teams guarantee the quality and reliability of all the instruments we supply, as well as support lasting decades.

A LONG-TERM OFFERING

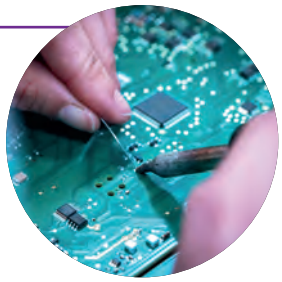
Our thorough mastery of our industrial know-how in our factories in France and our ability to keep abreast of the changes in the markets (materials used in our equipment) enable us to guarantee constant quality and long-term availability for our products.

Our production sites and innovation center

For Chauvin Arnoux, manufacturing in France is a matter of course. Our manufacturing “made in France” guarantees quality and traceability. Our mastery of the production chain enables us to monitor products and solutions bearing the Chauvin Arnoux brand.



VILLEDIEU-LES-POÊLES



More than a hundred people spread over an area of 4000 square meters dedicated mainly to manufacturing electronic items.

Here we make flexible or rigid single-sided and double-sided printed circuit boards up to Class V. 800,000 components can thus be assembled every week for CA Energy and the Group's other brands.

VIRE



Vire is the site where our current sensors are assembled. In two main buildings covering 4,300 and 1,400 square meters, respectively, 140 people produce our spare parts.

The first building produces the bar-turned, machined and milled mechanical parts for our measuring instruments and the screening or casings made of sheet metal. The second is dedicated to plastic injection for molding our products' casings.

REUX



10,000 square meters of buildings housing the Group's logistics, the spare parts warehouses, the assembly workshops, the finished products and the shipment department.

More than 60,000 references are managed in these warehouses, which group the parts needed to manufacture the measuring instruments assembled on the site and the finished products ready for shipment all over the world. The site is equipped with a single platform from which all the instruments from the Group's brands are shipped to France, our subsidiaries and the international markets.



The Nuclear sector has trusted us for more than 40 years

We offer a complete range of essential solutions for monitoring and controlling electrical distribution in nuclear power plants, designed to fulfil the strict requirements of this strategic sector.

PRODUCT QUALITY

We master the design of products specifically adapted to harsh nuclear environments.

Our solutions are developed to meet the most demanding technical requirements: longevity, reliability in the face of aging, and robust resistance to seismic stresses.

We provide support at every stage of technical qualification, in particular for compliance with the K3 standards.

LONG-TERM VISION

We support the extended life of nuclear power plants. Since the 1970s, our solutions have equipped the first generations of power plants, and continue to be modernized to meet today's standards.

Our products are updated for new projects and ten-yearly inspections, as well as to reinforce the safety of existing sites.

QUALITY PROCESS

Our projects integrate nuclear qualification standards (RCCE, IEEE, etc.), guaranteeing consistent quality.

We draw up complete qualification files, ensuring a high level of industrial traceability and control, and meticulously manage the technical status of our products, as well as supporting our customers during audits..

WORLDWIDE PRESENCE

Our solutions are installed in nuclear power plants all over the world.

They meet the specific requirements of different reactor models and generations (American, Russian, French, etc.), and are also implemented in new projects, notably in China and the UK.



Chauvin Arnoux Energy serving the optimization and supervision of electrical networks

Chauvin Arnoux Energy offers a complete range of innovative solutions to ensure the performance, reliability and safety of electrical networks. We actively support operators in their energy transition by optimizing the networks and facilitating contractualization between actors.

RUGGED, HIGH-PRECISION PRODUCTS FOR CRITICAL ENVIRONMENTS

Our solutions are designed to excel in the harshest environments.

By complying with the strictest metrological standards (MID, IEC 60688) and signal analysis requirements (IEC 61000-4-30), we guarantee the accuracy, reliability and longevity of our products which are essential for electrical transformer stations.



CONSTANT INNOVATION TO ANTICIPATE THE NETWORKS' NEEDS

With a significant proportion of our sales revenues devoted to research and development, we offer cutting-edge solutions which evolve according to the challenges facing the sector.

In close collaboration with energy sector professionals, we develop demonstrators to validate and refine our technical solutions before their roll-out.

A COMPREHENSIVE RANGE ADAPTABLE TO TECHNOLOGICAL CHANGES

For decades, we have been supporting network managers with a wide range of metering, measurement and network analysis solutions.

Our products can adapt to the specific features and communication protocols on each installation, guaranteeing a smooth transition between different generations of technology.



Chauvin Arnoux Energy and its solutions for the rail sector

The automation and reliability of rail systems are key issues for this sector. Thanks to our expertise, we contribute rugged solutions supporting this dynamic of intensifying passenger flows and strengthening security of the fixed equipment and rolling stock.

OUR CONTRIBUTIONS TO RAIL NETWORKS AND METRO LINES

Since the late 1990s, we have played a key role in equipping several metro lines in Paris, marking a turning point in the modernization of urban transport and passenger safety. Since 1985, our relays have been integrated into TGV high-speed train systems, in particular for brake, door and speed control.

Our collaboration with major international manufacturers has resulted in the installation of our solutions on trains operating in countries such as South Korea, China, Mexico, Morocco, Italy and Saudi Arabia.

We are also active in fixed infrastructure for the rail network, with solutions adapted to mainline trains (signaling, level crossings, electrical substations) and urban transport (automated sliding doors, smoke evacuation, etc.).

CERTIFICATIONS AND SAFETY: OUR QUALITY STANDARDS

Our R&D teams designs exceptionally resistant relays suited to the constraints in the rail sector, such as fire risks, shocks and vibrations.

We are proud to comply with SNCF specification NF F 62002-2, as well as the international standards applicable to rolling stock, such as EN 60077, EN 50155, EN 61373 and EN 45545- 2, certifying the reliability and quality of our products.

Our forced-guided relays, for example, are specially designed to ensure load switching safety in the critical rolling stock systems and comply with the EN 61810-3 standard.

We manufacture our relays in our own production plants in France and Italy. Thanks to our integrated production, we guarantee a long life span and traceability: we produce most of the parts, assemble them and carry out the final inspection.

OUR PRODUCT OFFERING: SOLUTIONS SUITED TO EACH REQUIREMENT

We propose a wide range of products specially designed to meet the needs of the rail sector.. Our relays for fixed installations, such as those in the RGM, RDM, RCM or OK ranges, are used in the electrical substations. For rolling stock, our forced-guided relays and the POK and OK ranges offer proven solutions guaranteeing high security.

We also offer electrical measuring solutions with products like Enerium, Triad, and MAP, which allow optimized energy management on rail networks.



Tailored Solutions for Military and Civilian Naval Applications

Chauvin Arnoux Energy proposes a comprehensive range of meteorological and electrical monitoring solutions which are essential for the propulsion and navigation systems of naval ships and submarines. We meet the specific requirements of industrial defense companies and administrations in France and worldwide.

COMPLETE CUSTOMIZED SYSTEMS

We design high-precision sensors (wind vanes, anemometers, hygrometers) and temperature measurement and meteorological and electrical monitoring systems.

Our team of specialized engineers and technicians develops tailored solutions including digital meteorological chains and wind chains for accurate transmission of the weather data. Our modifiable multi-purpose repeaters can be used to collect and transmit all the information via Ethernet and digital links.

A DEDICATED TEAM OF EXPERTS

Our engineers accompany you from design to installation, to guarantee perfectly adapted solutions. Based on detailed specifications, we provide advice, commissioning, equipment configuration and team training.

We offer turnkey projects that meet the most stringent technical requirements.

30 YEARS OF EXPERIENCE AND INTERNATIONAL TRUST

Chauvin Arnoux Energy has been equipping the French Navy and major French ports such as Marseille, Dunkerque and Le Havre for 30 years.

Internationally, we are trusted by the Navies of Chile, India, Malaysia, Brazil and many other countries.



Buildings and Industry: we transform your energy challenges into measuring solutions

At Chauvin Arnoux Energy, we draw on our expertise to design high-performance products for varied environments: industrial sites (primary industries, manufacturing industries, heavy industry, etc.), and buildings (tertiary buildings, commercial buildings, data centers, residential buildings, etc.).

Our rugged, innovative solutions offer our customers complete control over their energy consumption, meeting the challenges of the energy efficiency regulations and current economic pressures. We also optimize the management and maintenance of internal electrical networks, with particular attention to sensitive processes.

A COMPREHENSIVE OFFERING FOR METERING, MEASURING AND ANALYZING ELECTRICAL NETWORKS

We propose an extensive range of solutions suitable for all applications and covering the whole electrical system, from the point of delivery to the low-voltage sub-switchboards.

Thanks to our technical know-how, we meet varied needs from simple metering of energy consumption to thorough analysis of the waveforms and energy quality events.

25 YEARS OF EXPERTISE IN METERING PLANS AND MEASUREMENT

To guarantee our solutions' reliability and effectiveness, we accompany our customers at every step:

- Customized advice: selection of the equipment according to the requirements and constraints.
- Support for implementation: parameterization and integration.
- Interoperability: compatibility with the meter-reading and data collection systems on the market.

UNIQUE, FORWARD-LOOKING KNOW-HOW

Our Altys electricity meter is the market leader and the reference for medium-voltage customer delivery points on the French grid.

This know-how lies at the heart of our innovations for electricity meters intended for buildings and industry.

All our products fulfil the requirements of the MID standard, guaranteeing reliable solutions certified for energy rebilling.

INNOVATION AT THE HEART OF OUR PRODUCTS

Every day, we push back the limits of compact design, connectivity and simple use. Our latest product, the Ulys MCM, is revolutionizing electrical measurement by centralizing the consumption and measurements from an entire site in a single box positioned upstream.

At Chauvin Arnoux Energy, we turn your energy challenges into measurement solutions.



METERS AND POWER MONITORS



14 OVERVIEW OF THE RANGE

18 SELECTION GUIDE

28 SUBMETERS

48 MULTICHANNEL METERS

58 TARIFF METERS

62 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 28



MEMO MD65
65 A direct input
Class 1
Energy meter for single-phase networks with direct connection up to 65 A.
page 30

THREE-PHASE NETWORKS



MEMO TD80
80 A direct input
Class 1
Energy meter for single-phase networks with direct connection up to 80 A.
page 32

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 34



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 36



ULYS MD45-M EV
45 A direct input
MID Class B Built-in communication
Energy meter for single-phase networks, directconnection up to 45 A, for electric vehicle applications
page 54

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 38



ULYS TTA-M
Connection to CT
MID Class B
Communication with ULYSCOM modules
Energy meter for three-phase networks with connection to CT.
page 40



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 42



ULYS TT-M
Connection to CT
MID Class B
Built-in communication
Energy meter for three-phase networks, connection to CT.
page 44



ULYS FLEX
On Rogowski coils
Measurement from 0.3 A to 20,000 A Built-in RS485 communication.
page 46



ULYS TD100-M EV
Connection to CT
MID Class B
Energy meter for three-phase networks, connection to CT, for electric vehicle applications
page 56

USER SECTORS

Tertiary | Industry | Energy generation | Energy transmission & distribution | Energy efficiency

METERING SOLUTION



ULYS MCM

Connection to CT or Rogowski coil
Power monitor and multichannel energy meter
Up to 18 three-phase channels
page 48

TARIFF METER



ALTYS

Class 0.5s - MID
Connected to the MV network.

Takes into account all the tariff offers on the market.
page 58

POWER MONITORS

96 X 96 MM FORMAT



MEMO P200

Class 0.5
Electrical energy.
page 62



ENERIUM 50

Class 0.5
Electrical energy.
page 64



ENERIUM 150

Class 0.5
Electrical energy.
page 64

144 X 144 MM FORMAT



ENERIUM 100

Class 0.5
Multi-energy.
page 64



ENERIUM 110

Class 0.5/0.2
Without display
Multi-energy.
page 64



ENERIUM 200

Class 0.5/0.2
Multi-energy.
page 64



ENERIUM 210

Class 0.5
Without display
Multi-energy.
page 64



ENERIUM 300

Class 0.2
Qualimetry.
page 64



ENERIUM 310

Class 0.2
Without display
Qualimetry.
page 64

ASSOCIATED SOFTWARE



E.VIEW

Configuration and diagnostic software
Reading of the digital inputs and/or forcing of the digital and analog outputs.
page 74

QUICK SELECTION GUIDE
FOR SUBMETERS

MEMO range

FOR SIMPLE METERING FUNCTIONS

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
Consumption monitoring and allocation

TYPE OF ELECTRICAL NETWORK

Single-phase

Upstream circuit-breaker rating

≤ 32 A

MEMO MD32



page 28

≤ 65 A

MEMO MD65



page 30

Three-phase

Upstream circuit-breaker rating

≤ 80 A

MEMO TD80



page 32

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

USER SECTORS

Tertiary | Industry | Energy efficiency

ULYS range

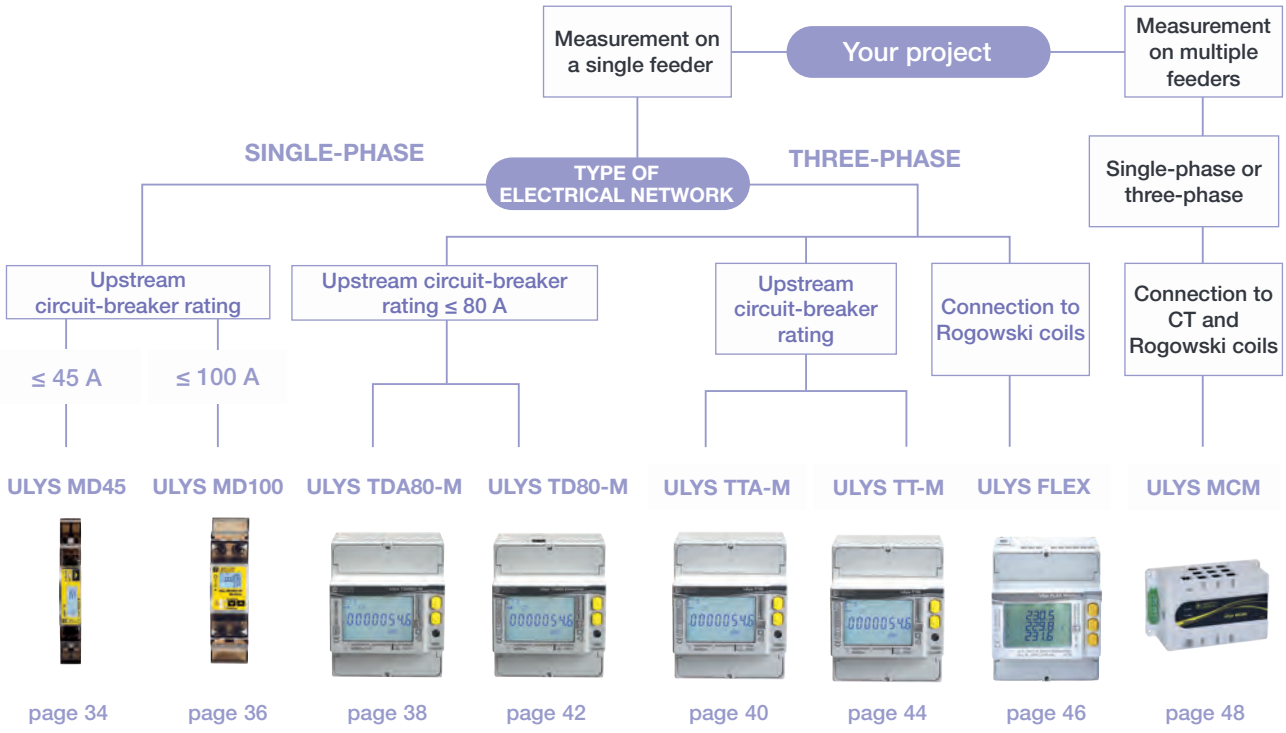
FOR ADVANCED METERING AND MEASUREMENT FUNCTIONS

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

Fair rebilling
MID, double tariff, partial metering.

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

Simple implementation
Large choice of sensors for current measurement.



page 34 | page 36 | page 38 | page 42 | page 40 | page 44 | page 46 | page 48

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 P01331048 to P01331049	ULYS MCM 9 feeders P01331062
-	-	-	ULYS TD80-M Ethernet P01331040	-	ULYS TT-M Ethernet P01331041	-	ULYS MCM 18 feeders P01331064

METER SELECTION GUIDE
BY FUNCTIONS

MEMO range

			Single-phase		Three-phase
			MEMO MD32	**MEMO MD65**	**MEMO TD80**
		model	page 28	page 30	page 32
					
		Rating	100	100	100
		Calibre	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
	Auxiliary power supply	Self-powered		Self-powered	
	Rated voltage		230 Vac	230 Vac	230/400 Vac
	Inputs	Direct/Sensors	32 A	65 A	80 A
Energy metering and management	Display and communication (if relevant)		total kWh	total and partial kWh	total and partial kWh
Multimeasurement	Display and communication (if it exists)		-	-	-
Recording / Push FTP			-	-	-
Inputs / Outputs	Pulse output(s)		1	1	1
	Tariff change input		-	-	-
Communication	RS485 Modbus		-	-	-
	Ethernet Modbus		-	-	-

USER SECTORS

Tertiary | Industry | Energy efficiency

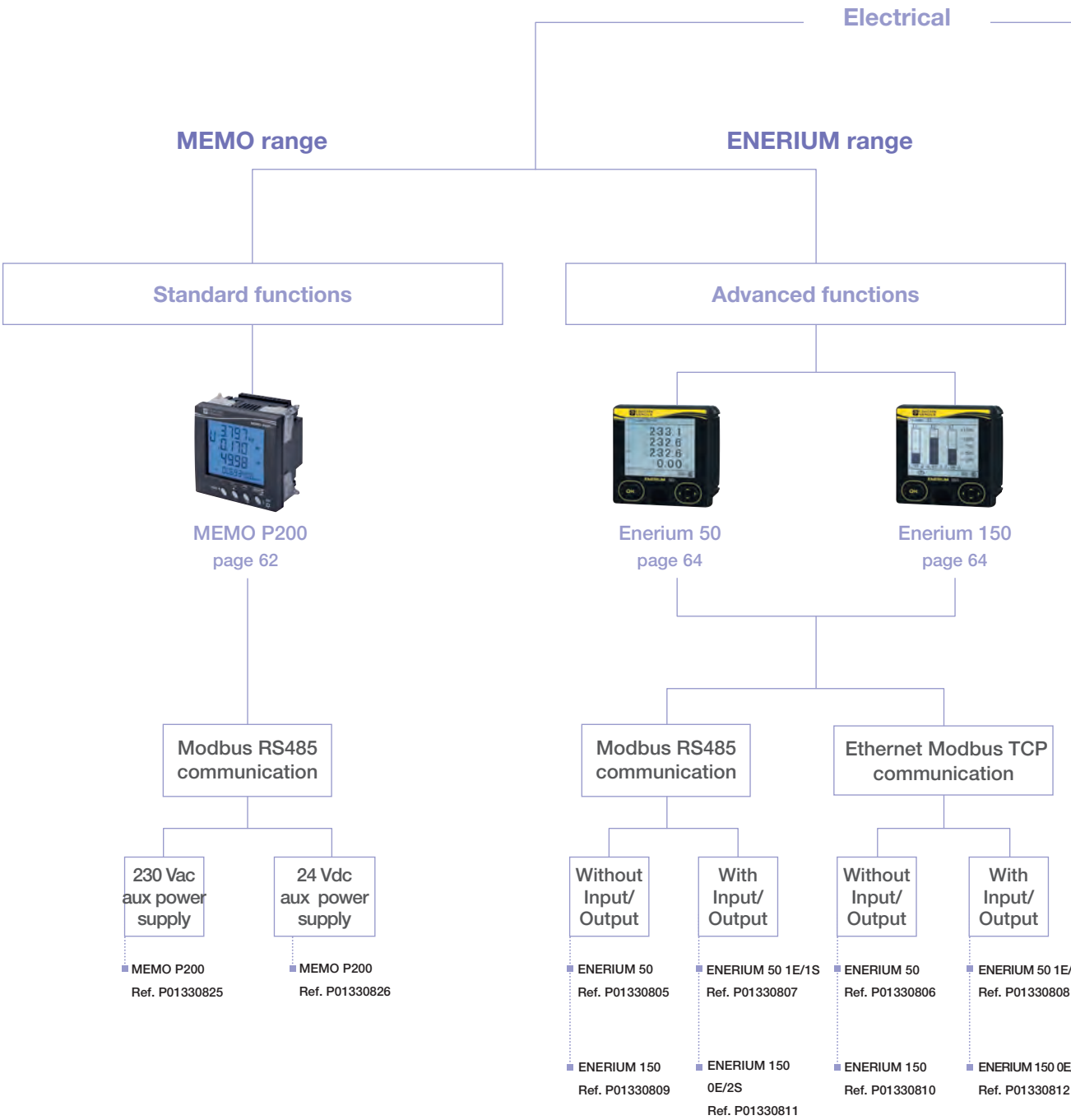
ULYS range

Single-phase		Three-phase			Multiple feeders
ULYS MD45-M	**ULYS MD100-M**	**ULYS TDA80-M ULYS TD80-M**	**ULYS TTA-M ULYS TT-M**	**ULYS Flex Modbus**	**ULYS MCM**
page 34	page 36	page 38 page 42	page 40 page 44	page 46	page 48
					
210	210	210	210	210	210
45 A	100 A	80 A	On CT 1/5 A	0,3 to 20000 A	Jusqu'to 3000A
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 coils
Bidirectional ,kWh, total kVArh and partial kWh	Bidirectional ,kWh, total kVArh and partial kWh	Bidirectional, kWh, kVArh, total, partial and per-phase kVAh	Bidirectional, kWh, kVArh, total, partial and per-phase kVAh	Bidirectional, kWh, kVArh, total and per-phase kVAh	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, ∑P, ∑Q, ∑S	V, U, I, P, Q, S, F, PF, ∑P, ∑Q, ∑S	V, U, I, P, Q, S, F, PF, ∑P, ∑Q, ∑S	V, U, F, I, P, Q, S, PF, ∑P, ∑Q, ∑S per feeder
-	-	Recording and Push FTP on Ethernet version		-	-
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 range

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



USER SECTORS

Industry | Energy generation | Energy transmission & distribution | Energy efficiency

ENERIUM range

- 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 totallyintegrated inputs/outputs (on-off or analog)
- Energy quality measurement at the heart of a power monitor

Application → **Multi-energy** → **ENERIUM range**

- **Installation supervision**
  - 
  - Enerium 100 page 64
- **Multi-energy management**
  - 
  - Enerium 200 page 64
- **Data logger**
  - 
  - Enerium 210 page 64
- **Power quality**
  - 
  - Enerium 300 page 64

Modbus RS485 communication

- **Without Input/Output**
  - ENERIUM 100
    Ref. P01330831
  - ENERIUM 300
    Ref. P01330816 (alim. STD)
    Ref. P01330818 (alim. BN)
- **With Input/Output**
  - ENERIUM 100 2E/2S
    Ref. P01330832
    ENERIUM 200 4E/2S
  - IM 332
    Ref. P01330833

Ethernet Modbus TCP communication

- **Without Input/Output**
  - ENERIUM 300
    Ref. P01330817 (alim. STD)
    Ref. P01330819 (alim. BN)
- **With Input/Output**
  - ENERIUM 200 2E/4S
    Ref. P01330834
  - ENERIUM 210 8E
    Ref. P01330835
  - ENERIUM 300 4E/2

CHOOSING YOUR POWER MONITOR

		MEMO	ENERIUM
		page 62	page 64
			
		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		

USER SECTORS

Industry

Energy generation

Energy transmission & distribution

Energy efficiency

ENERIUM

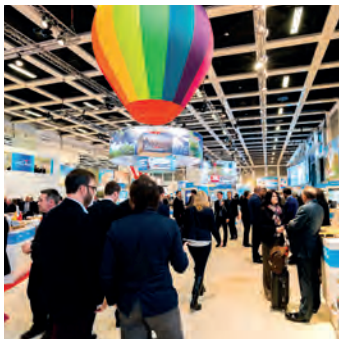
Enerium 150	Enerium 100	Enerium 200	Enerium 300
page 64	page 64	page 64	page 64
			
0.5 %	0.5 %	0.2 %	0.2 %
■	■	■	■
■	■	■	■
■	■	■	■
8		8	8
0, 1 or 2	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8
	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8	0, 2, 4, 6 or 8
4	4	4	4
16	16	16	16
64	64	64	64
■	■	■	■
0, 1 or 2	0, 2, 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.

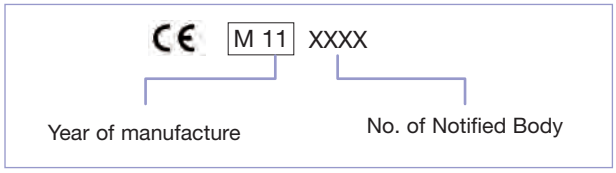
The Directive also imposes product certification according to the EN50470-1/-3 standard, as well as design certification (Module B) and manufacturing process certification (Module D) by a Notified Body, in order to ensure product traceability
and guarantee its metrological value, thus helping to protect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

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

Accuracy Classs and meter identification

The EN50470-1/-3 defines three specific accuracy Classs: 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



MEMO P200
Power monitor

Secondary switchboard





ENERIUM 150
Power monitor



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.



USER SECTORS

Tertiary

Economical solution



Sealable terminal covers



Pulse output as standard

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**

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

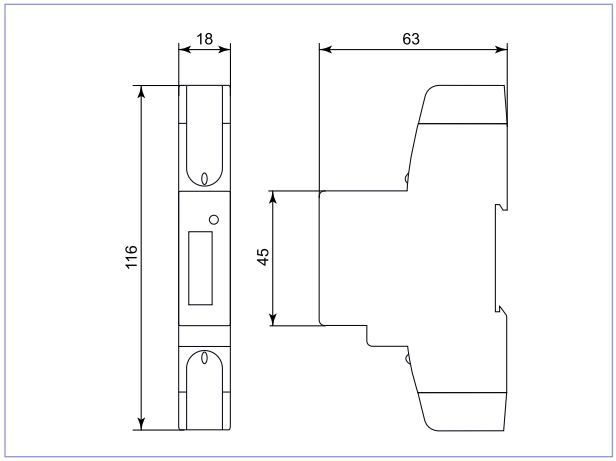
DISPLAY

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

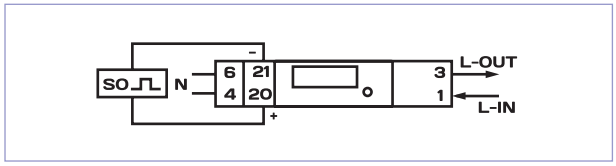
TO ORDER

Model	Reference
MEMO MD32	P01330740

DIMENSIONS (MM)



ELECTRICAL CONNECTIONS



MEMO MD65
SINGLE-PHASE 65 A

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





Display of energy index on an LCD screen



Sealable terminal cover



Direct connection up to 65 A

USER SECTORS

Tertiary

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

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

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	1000 pulses/kWh
Maximum voltage	12-27 Vdc
Maximum current	27 mA
Accuracy	
Active energy	Class 1 as per IEC 62053-21
Metrological LED	
Weight	1000 pulses / kWh

MECHANICAL SPECIFICATIONS

Ingress protection	IP50
Power circuit connection	Screw terminal strip for 25 mm^2 wires
Pulse output connection	Screw terminal strip for 1.5 mm^2 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

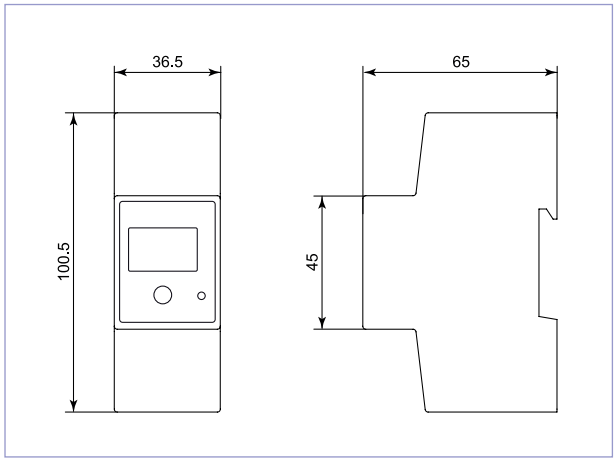
DISPLAY

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

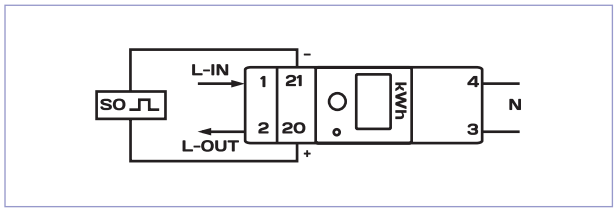
TO ORDER

Model	Reference
MEMO MD65	P01330741

DIMENSIONS (MM)



ELECTRICAL CONNECTIONS



MEMO TD80
THREE-PHASE 80 A

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

USER SECTORS

Tertiary | Industry | Energy efficiency





Display of the energy index on LCD screen



Sealable terminal covers



Direct connection up to 80 A

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

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

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	1000 pulses / kWh 1000 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 temperatur	- 25 °C to +65 °C
Storage temperature	- 25 °C to +75 °C
Relative humidity	Max. 85 % without condensation

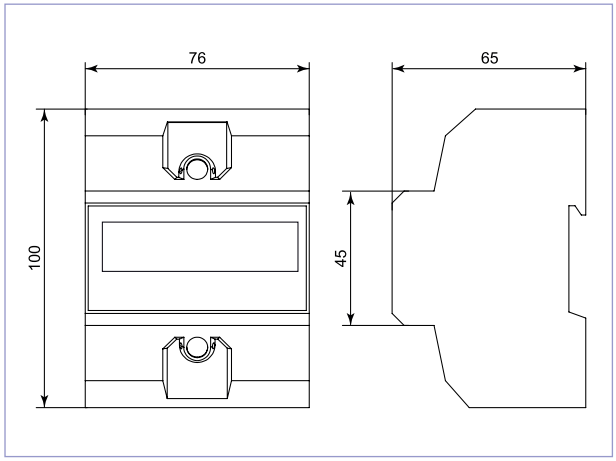
DISPLAY

Display	LCD
Number of digits	6+2

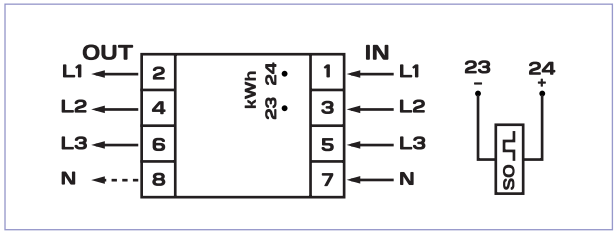
TO ORDER

Model	Reference
MEMO MD65	P01330745

DIMENSIONS (MM)



ELECTRICAL CONNECTIONS



ULYS MD45
SINGLE-PHASE 45 A

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



USER SECTORS

Tertiary

Industry

Energy efficiency



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



Sealable terminal covers delivered as standard



Backlit LCD screen

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 assignable)
- MID version for energy rebilling on private networks
- Multi-measurement:
  - Instantaneous quantities: V, I, P, Q, S, PF 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 assignable on front panel or via optical head**
- **Customizable multi-measurement display**
- **MID Class B**

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
Frequency	50 Hz (± 10%)
Tariff change input (ULYS MD45-M only)	
T1	0 V
T2	230 Vac
Metrological LED	
Weight	10000 pulses/kWh
Pulse output	
Weight	Parameterizable (0.01 - 0.1 - 1 - 10 - 100 - 1000 - 2000 - 10000 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 - 1000 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 load	60
Maximum distance	1000 meters
Parameterization	Using button on front panel and optical head

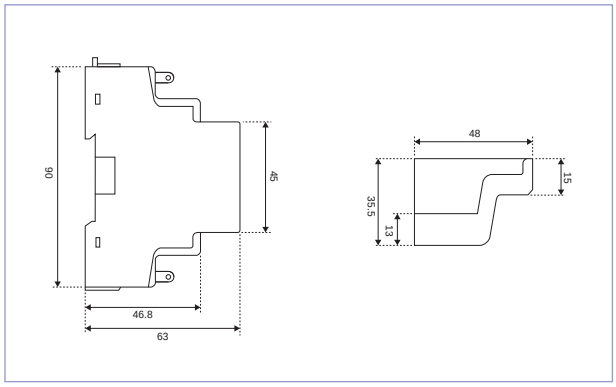
MECHANICAL SPECIFICATIONS

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

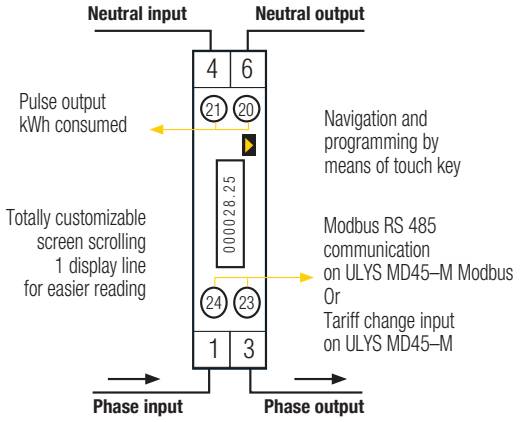
ENVIRONMENT

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

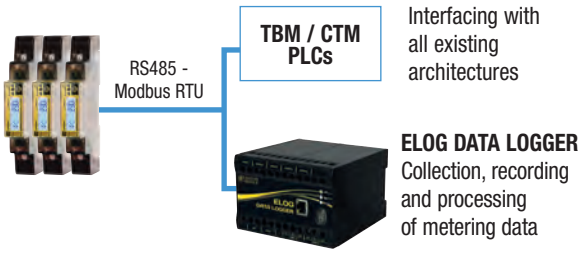
DIMENSIONS (IN MM)



ELECTRICAL CONNECTIONS



BLOCK DIAGRAM



TO ORDER

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

Models	Certification	Communication	Reference
ULYS MD45-M	MID		P01330754
ULYS MD45-M Modbus	MID	RS485 Modbus	P01330756
Accessories			
USB optical head			P01330790

ULYS MD100
SINGLE-PHASE 100 A

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



USER SECTORS

Tertiary

Industry

Energy efficiency



2 tariffs



Sealable terminal covers delivered as standard



Backlit LCD screen

GENERAL SPECIFICATIONS

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 assignable)
- 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.

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

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
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	10000/2000/1000/100/10/1/ 0.1/0.01 pulse/kWh
Duration	1 000/100/10/1/0,1/0,01 pulses/kWh 31 ms 2 000 pulses/kWh ≤ 30 kW 31 ms 2000 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	1000 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

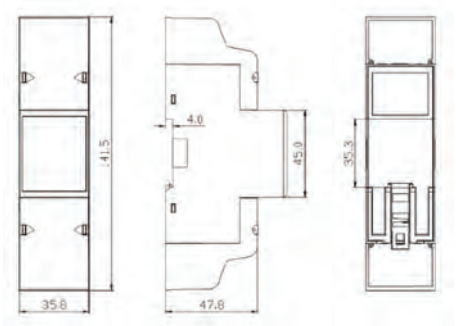
ENVIRONMENT

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

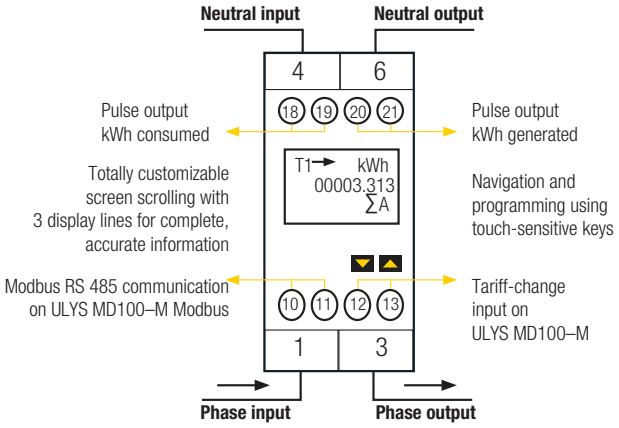
TO ORDER

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

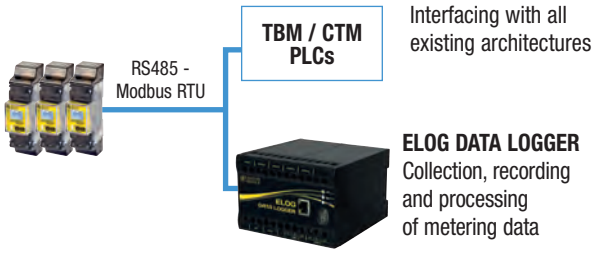
DIMENSIONS (EN MM)



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.

USER SECTORS

Tertiary | Industry | Energy efficiency



2 tariffs



Measurement in all 4 quadrants with energy balance indicator



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



- 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)

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 assignable as Ea, Eq, ou 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	Front panel IP51

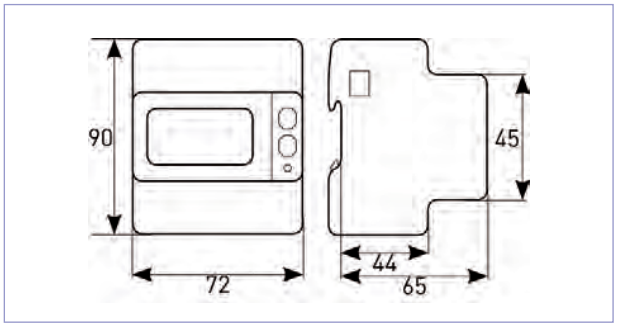
ENVIRONMENT

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

TO ORDER

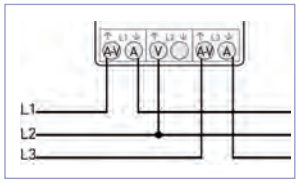
Model	Certification	Reference
ULYS TDA80-M	MID	P01331018

DIMENSIONS (MM)

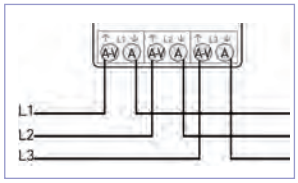


ELECTRICAL CONNECTIONS

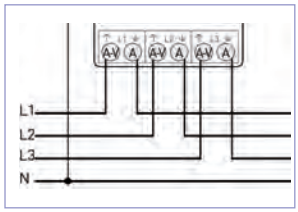
3 wires, 2 currents



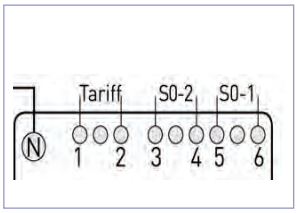
3 wires, 3 currents



4 wires, 3 currents



Tariff inputs and pulse outputs



ULYS TTA-M
THREE-PHASE WITH CT CONNECTION

Energy meter for three-phase networks.
CT connection.





2 tariffs



Metering on all 4 quadrants
with energy balance indicato



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

USER SECTORS

Tertiary

Industry

Energy efficiency

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)

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

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 assignable as Ea, Eq or Es
Weight	Automatic adjustment according to CT ratio: from 1,000 pulses/kWh/kVArh to 0.1 pulse/kWh/kVArh
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

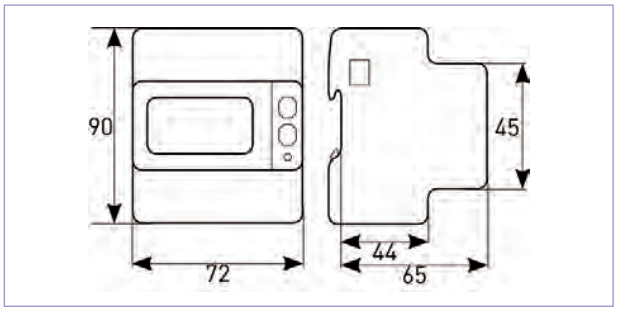
Model	Certification	Reference
ULYS TDA80-M	MID	P01331018

ASSOCIATED PRODUCTS



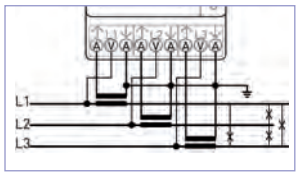
Current transformers
Cable primary, busbar primary, closed core or split core, etc.
page 109

DIMENSIONS (MM)

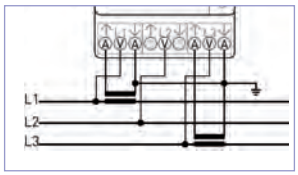


ELECTRICAL CONNECTIONS

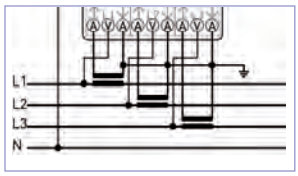
3 wires - 3 CTs



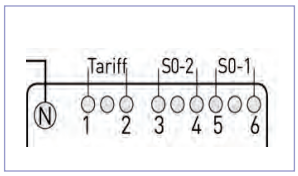
3 wires - 2 CTs



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.

USER SECTORS

Tertiary | Industry | Energy efficiency





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, assignable as P, Q or S

DESCRIPTION

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, assignable 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)

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

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	80 Vac/Vdc to 276 Vac/Vdc max.
Pulse output	
Type	Optically isolated 250 Vac/dc
Number	1 assignable as Ea, Eq, ou Es
Weight	100 pulses/kWh, /kVArh, /kVAh
Accuracy	
Active energy	MID Class B as per EN 50470-1-3
Reactive energy	Class 2 as per IEC 62053-23
Metrological LED	
Weight	1000 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 terminal strip for 35 mm² wires
Protection	Front panel IP51

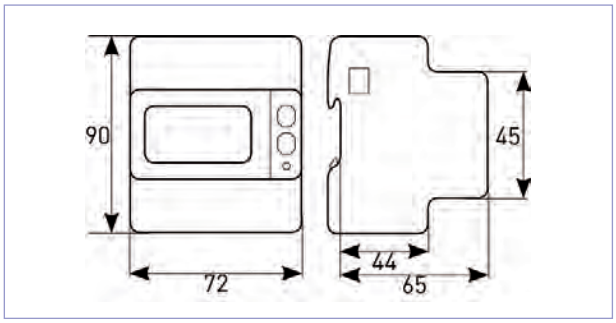
ENVIRONMENT

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

TO ORDER

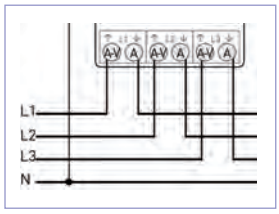
Model	Certification	Reference
ULYS TD80-M Modbus	MID	P01331036
ULYS TD80-M Ethernet	MID	P01331040

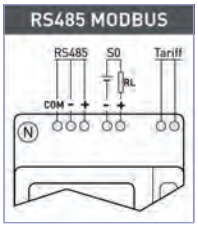
DIMENSIONS (IN MM)

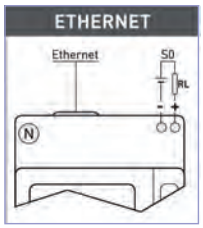


ELECTRICAL CONNECTIONS

4 wires, 3 currents
All Models







ULYS TT

THREE-PHASE CT CONNECTION

WITH INTEGRATED COMMUNICATION

USER SECTORS

Tertiary

Industry

Energy efficiency

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





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

DESCRIPTION

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).

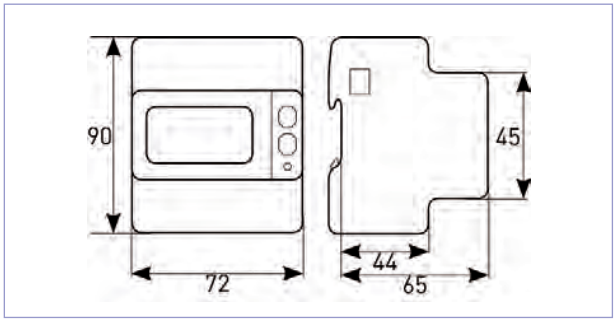
- Integrated communication depending on model: Ethernet, M-bus or Modbus
- Small size (4 modules)
- Display customizable by means of predefined user profiles
- 1 pulse output as standard, assignable to Ea, Eq or Es
- 1 or 5 A isolated inputs
- Connection error indicator
- MID version available for electricity 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)

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

ELECTRICAL SPECIFICATIONS

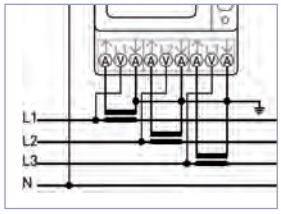
Current input	
Type	On CT 1 or 5 A
Rated current (In)	5 A
Istart current (Ist)	20 mA
Voltage input	
Rated voltage (Un)	3 x 230/400 Vac... 3 x 240/415 Vac (+/- 20 %)
Consumption	7.5 VA max. per phase
Frequency	50/60 Hz
Tariff change input (M-bus and Modbus models)	
T1	No voltage
T2	80 Vac/Vdc to 276 Vac/Vdc max.
Pulse output	
Type	Optically isolated 250 Vac/dc
Number	1 assignable as 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

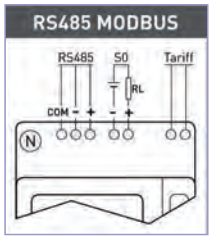
DIMENSIONS (IN MM)

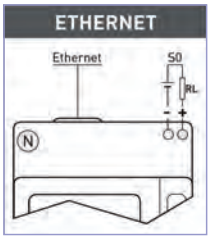


ELECTRICAL CONNECTIONS

4 wires, 3 currents - All Models







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

TO ORDER

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

ASSOCIATED PRODUCTS



Current transformers
Cable primary, busbar primary, closed core or split core, etc.
page 109

ULYS FLEX
MODBUS

USER SECTORS

Tertiary | Industry | Energy efficiency

Metering solution on Rogowski coils.





Built-in RS485 communication



Mounting without cutting off the electrical circuit



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

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)

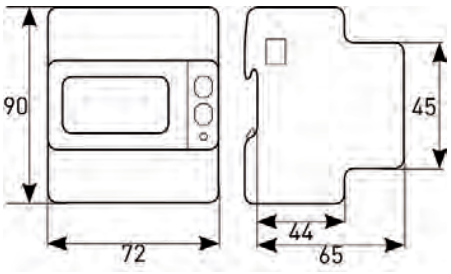
- **Quick implementation**
- **Reduced installation costs**
- **Wide dynamic range for measurement (0.3 A to 20,000 A)**
- **RS485 Modbus RTU communication**

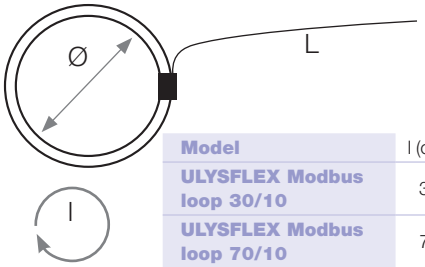
ELECTRICAL SPECIFICATIONS

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 (IST)	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%lofreadingfrom5%FS...FS
Power	±0.5%ofreading±0.1%FS(PF=1)
Frequency	±0.1%ofreading±1digitintherange45...65H
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

DIMENSIONS (MM)





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

MECHANICAL SPECIFICATIONS

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

ENVIRONMENT

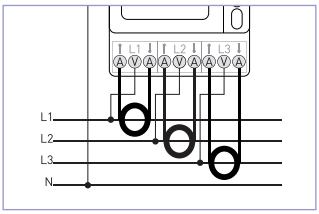
Operating temperature	- 25 °C to +55 °C
Storage temperature	25 °C to +75 °C
Relative humidity	Max. 80 % without condensation
Product operating altitude	< 2 000 m
Vibration or shock (sinusoidal amplitude)	50 Hz ± 0.075 mm

STANDARDS

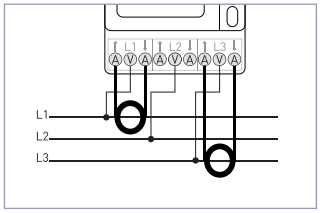
Directives	2066/95/EC, 2004/108/EC
Safety	EN61010-1, EN 61010-2-030, EN 61010-2-032
Electromagnetic compatibility (EMC)	EN61326-1, EN 55011, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4 EN 61000-4-5 EN 61000-4-6, EN 61000-4-11, EN 61000-6-2

ELECTRICAL CONNECTIONS

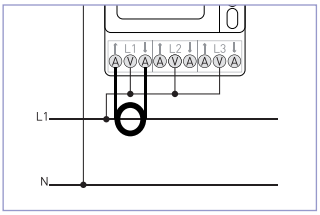
Three-phase 4 wires, 3 Rogowski coils



Three-phase 3 wires, 2 Rogowski coils



Single-phase, 1 Rogowski coil

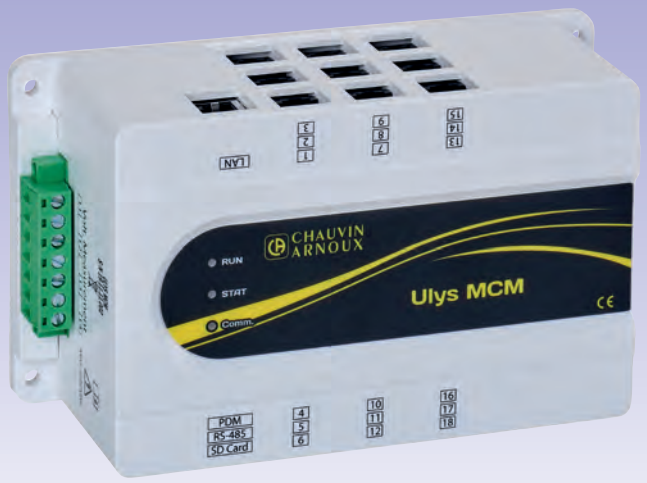


TO ORDER

Models	Reference
ULYSFLEX Modbus boucle 30/10	P01331048
ULYSFLEX Modbus boucle 70/10	P01331049

ULYS MCM
MULTI-CHANNEL METER

Multi-channel power monitor and and energy meter



USER SECTORS

Industry

Energy generation

Energy transmission & distribution

Energy efficiency

18 meters in one

Compact

Compatible with a large number of sensors

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**

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
Electrical system		1P2W, 3P3W, 3P4W
Spécifications nominales des entrées	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) | 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~
	Consumption	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

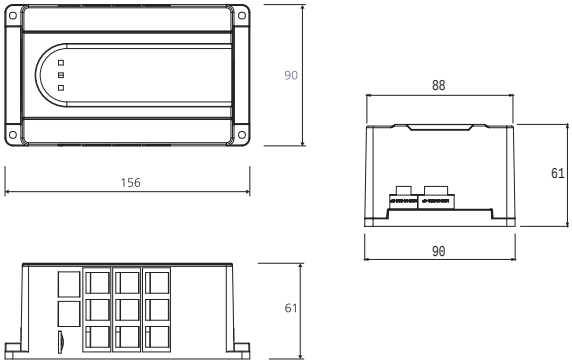
Quantity	Standard	ULYS MCM	ULYS MCM and MF300/ MF300
Active power (P) measurements	IEC 61557-12 : 2018	0.5	1
Active energy (Ea)	IEC 61557-12 : 2018 IEC 62053-21 : 2003 IEC 62053-22 : 2003	0.5	1
Reactive power (Q) measurements	IEC 61557-12 : 2018	1	2
Reactive energy (Er)	IEC 61557-12 : 2018 IEC 62053-23 : 2003	2	2
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 - 99 999 999.9
Reactive energy	KVarh	0.0 - 99 999 999.9
Apparent energy	KVAh	0.0 - 99 999 999.9

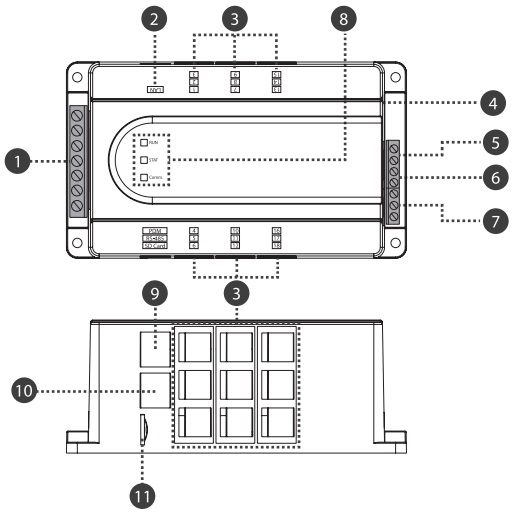
*Power equivalent: please refer to user's manual

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

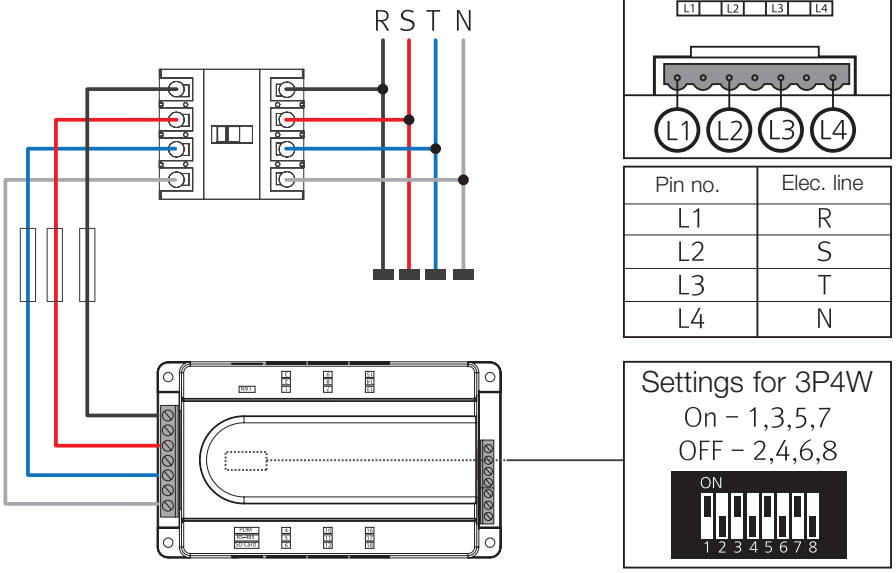
CONNECTION



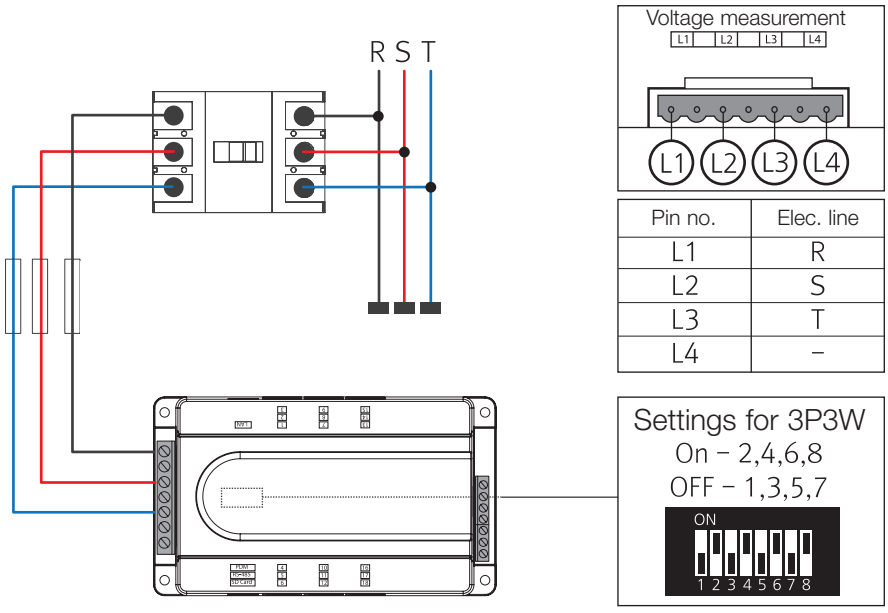
No	Designation	Description
1	Input voltage	Input voltage terminal for the measurements
2	Ethernet port	Communication with master (Modbus slave) Protocol: Modbus TCP/IP Speed: 10/100 Mbit/s
3	CT 1 to 18 port	RJ12 connectors for connection to the current sensor
4	Temperature sensor	NTC temperature sensor: NTC temperature measurement at the level of the port
5	Output	On-off output terminal Rated specifications: 250 V~/5 A, 30 Vp-p/5A resistive
6	On-off input	On-off output terminal Rated specifications: 80-250 V~ locking voltage required
7	Auxiliary power supply	ULYS MCM auxiliary power supply
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



Wiring of 3-wire three-phase system



TO ORDER

Models	Reference
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)

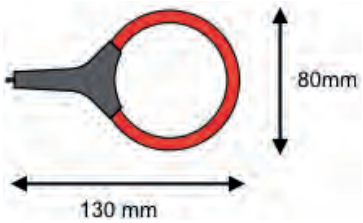
MF300 and MF3000 openable flexible current sensors (Rogowski coils)



GENERAL SPECIFICATIONS

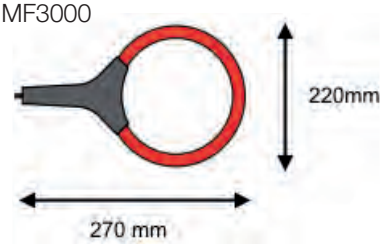
Measurement range	MF300 : 2,4 A to 600 A MF3000 : 2,4 A to 3 000 A
Output	39,1 µV/A
Accuracy (current measurement)	Class 0.5 as per IEC 61557-12 (complete ULYS MCM measurement line and coils)
Output connections	HY-Y type

MECHANICAL SPECIFICATIONS



Thickness: 12 mm

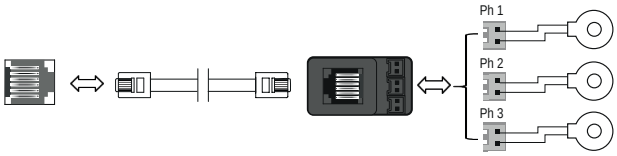
MF3000



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 meters
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

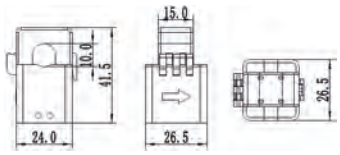


GENERAL SPECIFICATIONS

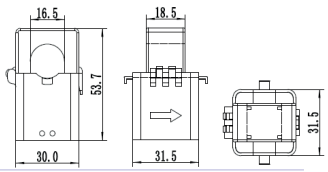
Nominal current (In)	TCC V 105 : 5 A TCC V 1050 : 50 A TCC V 161 : 100 A TCC V 242 : 250 A TCC V 364 : 400 A TCC V 366 : 600 A
Clamping diameter	TCC V 105 : 10 mm TCC V 1050 : 10 mm TCC V 161 : 16 mm TCC V 242 : 24 mm TCC V 364 : 36 mm TCC V 366 : 36 mm
Frequency	50-60 Hz
Output	333 mV
Accuracy (current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

MECHANICAL SPECIFICATIONS

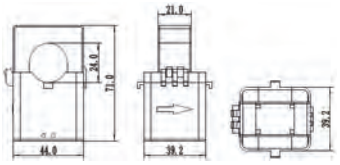
TCC V 105/1050



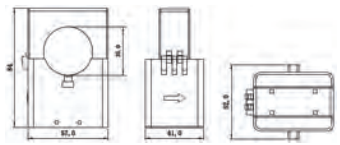
TCC V 161



TCC V 242



TCC V 364 and TCC V 366



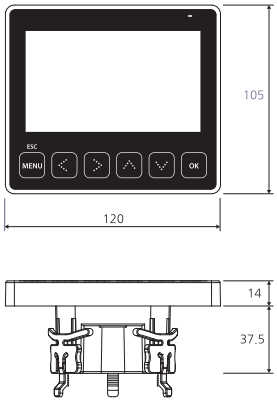
ULYS MCM D REMOTE DISPLAY UNIT



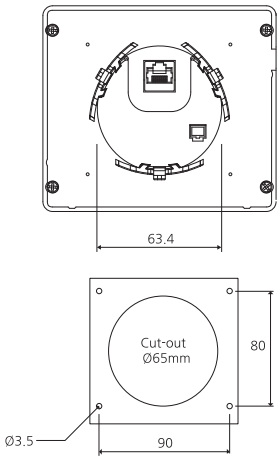
GENERAL SPECIFICATIONS

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 (W)
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
Key	Screen	4.3 inch LCD TFT screen (480 (W) x 272 (H) mm
	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

MECHANICAL SPECIFICATIONS



CUT-OUTS



TO ORDER

WHICH SENSORS DO YOU WANT?

(may be different for each feeder, in kits of 3)

	Ratio	Diameter
PACK 3 TCC V 105	5A / 333mV	10mm
PACK 3 TCC V 1050	50A / 333mV	10mm
PACK 3 TCC V 161	100A / 333mV	16mm
PACK 3 TCC V 242	250A / 333mV	24mm
PACK 3 TCC V 364	400A / 333mV	36mm
PACK 3 TCC V 366	600A / 333mV	36mm
PACK 3 MF300	600A / 39.1µV	70mm
PACK 3 MF3000	3000A / 39.1µV	200mm

A pack comprises 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

ULYS MD45-M EV

45 A SINGLE-PHASE

WITH BUILT-IN COMMUNICATION

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

USER SECTORS

Tertiary

Industry

Energy efficiency





Intuitive navigation



Direct connection up to 45A



Lead-sealable terminal covers delivered asstandard

DESCRIPTION

Designed for electric vehicle AC recharging applications requiring MID certification for energy rebilling, the Ulys MD45-M EV Modbus meter can be used to cover any type of single-phase grid and station power rating: Wallbox, roadside charging station, private fleet recharging, etc.

The meter can be used locally with its screen or remotely via its built-in communication.

Particularly suitable for single-phase charging station from

3 kW to 7 kW, the Ulys MD45-M EV Modbus offers the following features:

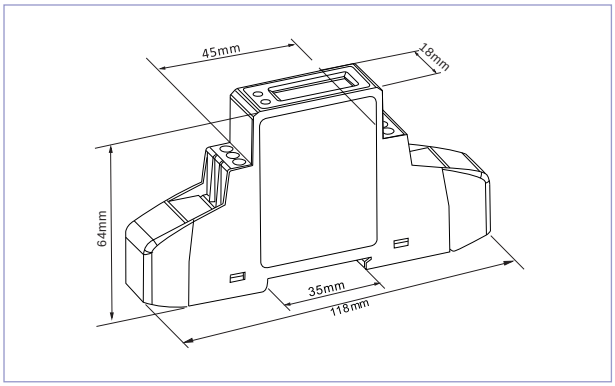
- 1 DIN module
- Single-phase 45A direct (40A used)
- Class 1
- MID-certified
- Measurements:
  - Voltage, current, frequency, Power Factor
  - Active power, reactive power
  - Active energy drawn and injected, reactive energy
- Modbus RS485 communication
- Operating temperature: -40 to +70 °C

- **Compact meter with built-in Modbus RS485 communication**
- **Direct connection between the network and the socket: 45A single-phase**
- **Complies with the MID Class B regulations**

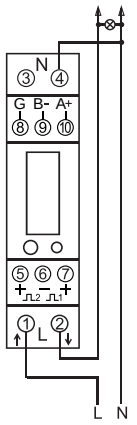
ELECTRICAL SPECIFICATIONS

Current input	
Rated current (Imax)	45 A
Reference current (Iref)	5A
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%)v
Metrological LED	
Weight	10000 pulses/kWh
Pulse output	
Weight	10000/ 2000/ 1000/ 100/ 10/ 1/ 0.1/ 0.01 pulses/kWh
Pulse width	≤ 5 625 W : 32 ms > 5 625 W : 11.2 ms
Max. operating voltage	5 -27 Vdc
Max. admissible current	≤ 27 mAdc
Communication	RS485 Modbus
Data backup	10 years with power off
Accuracy class	MID (Class 1)
Accuracy	
Active energy	Total, partial, import, export
Reactive energy	Total, import, export
Multi-measurement	P, Q, S, V, I, PF, F
Bidirectional	Yes

DIMENSIONS (MM)



ELECTRICAL CONNECTIONS



MECHANICAL SPECIFICATIONS

Ingress protection	IP51
Power circuit connection	10 mm²
Pulse output or communication connection	1.5 mm²
Mounting	On 35 mm DIN rail
Weight	80 g

ENVIRONMENT

Operating temperature	-40°C to +70°C
Relative humidity in operation	≤ 75% / ≤ 95%

TO ORDER

Model	Certification	Reference
ULYS MD45-M EV Modbus	MID	P01331081

ULYS TD100-M EV

100 A THREE-PHASE

WITH BUILT-IN COMMUNICATION

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



USER SECTORS

Tertiary

Industry

Energy efficiency



Captive terminal cover



Direct terminal up to 100A



Intuitive navigation

DESCRIPTION

Designed for electric vehicle AC recharging applications requiring MID certification for energy rebilling, the Ulys TD100-M EV Modbus meter can be used to cover any type of three-phase grid and station power rating: Wallbox, roadside charging station, private fleet recharging, fast charging, etc.

The meter can be used locally with its screen or remotely via its built-in communication.

Particularly suitable for three-phase charging station from 11kW to 43kW, the Ulys TD100-M EV Modbus offers the following features:

- 4 DIN modules
- Three-phase 100A direct (40A used)
- Class 1
- MID-certified
- Measurements:
  - Voltage, current, frequency, Power Factor
  - Active power, reactive power
  - Active energy drawn and injected, reactive energy
- Modbus RS485 communication
- Operating temperature: -40 to +70 °C

- **Compact meter with built-in Modbus RS485 communication**
- **Direct connection between the network and the socket: 100A three-phase**
- **Complies with the MID Class B regulations**

ELECTRICAL SPECIFICATIONS

Current input	
Rated current (Imax)	100 A
Reference current (Iref)	10A
Inrush current (Ist)	40 mA
Voltage input	
Rated voltage (Un)	230 Vac (-15% / +10%)
Consumption	≤ 2 W/Phase - ≤ 10 VA/Phase
Frequency	50 Hz (±10%)
Metrological LED	
Weight	1000 pulses/kWh
Pulse output	
Weight	1000/ 100/ 10/ 1 pulses/kWh
Pulse width	35 ms
Max. operating voltage	5 -27 Vdc
Max. admissible current	≤ 27 mAdc
Communication	RS485 Modbus
Data backup	10 years (powered down)
Accuracy class	MID (Class 1)
Accuracy	
Active energy	Total, partial, import, export
Reactive energy	Total, import, export
Multi-measurement	P, Q, S, V, I, PF, F
Bidirectional	Yes

MECHANICAL SPECIFICATIONS

Ingress protection	IP51
Power circuit connection	16 mm²
Pulse output or communication connection	1.5 mm²
Mounting	On 35 mm DIN rail
Weight	80 g

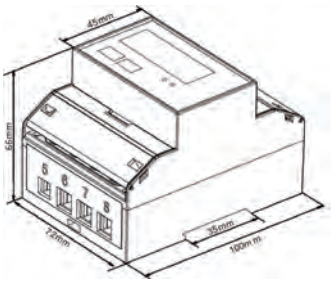
ENVIRONMENT

Operating temperature	-40°C to +70°C
Relative humidity in operation	≤ 90% / ≤ 95%

TO ORDER

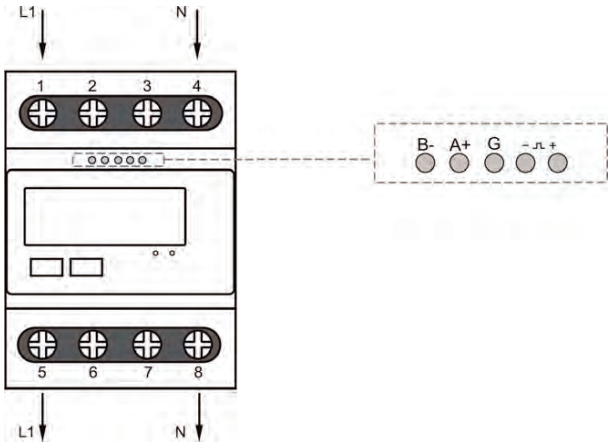
Model	Certification	Reference
ULYS TD100-M EV Modbus	MID	P01331083

DIMENSIONS (IN MM)

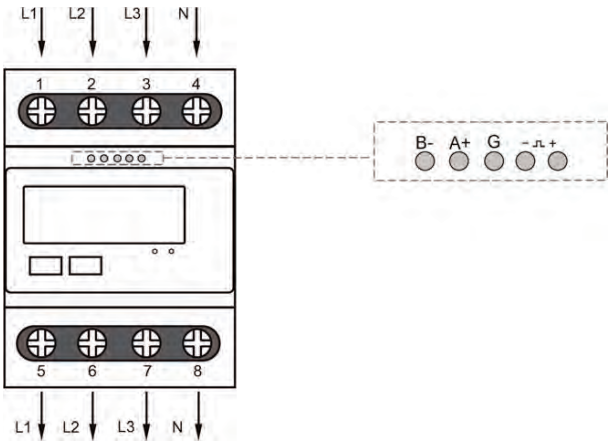


ELECTRICAL CONNECTIONS

Single-phase with two wires



Three-phase with four wires



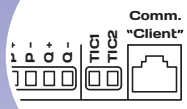
ALTYS
TARIFF METER

4-quadrant tariff meter for MV customers.

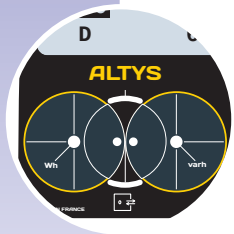


USER SECTORS

Energy transmission & distribution



Customer communication access



High-speed optical interface

dlms

Standardized protocol

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

- **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**

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)

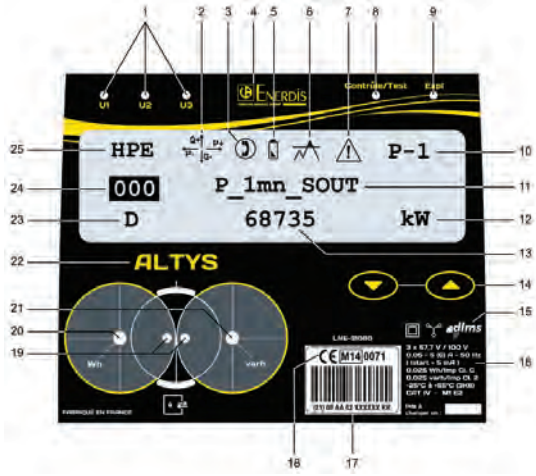
Interfaces

- 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 et 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 par 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 Vp-p / 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 Operator: Data retrieval and programming of the meter / 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	Unidirectionnel
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

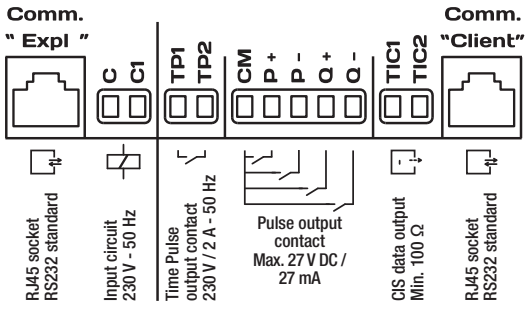
Climatic	
Rated operating temperature	-25°C to +55°C
Storage temperature	-28°C to +70°C
Relative humidity	Max 80%
Electrical	
Overvoltage category	II

CONNECTIONS

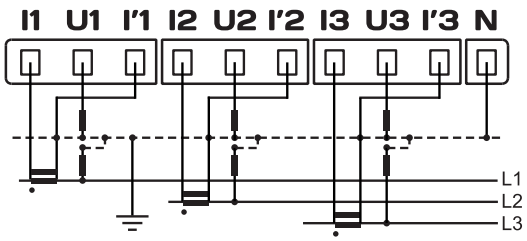
Operator access	
Terminals	**Functions**
Comm. "Expl"	Two-way "Operator" interface
C, C1	Input circuit for tariff change

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

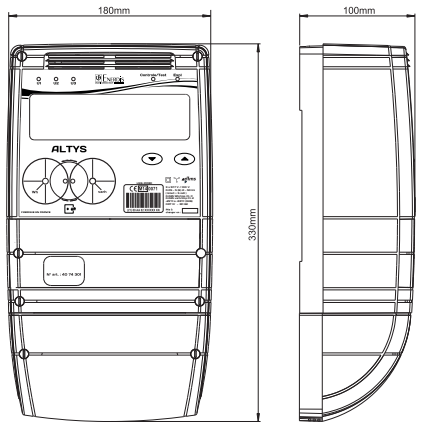


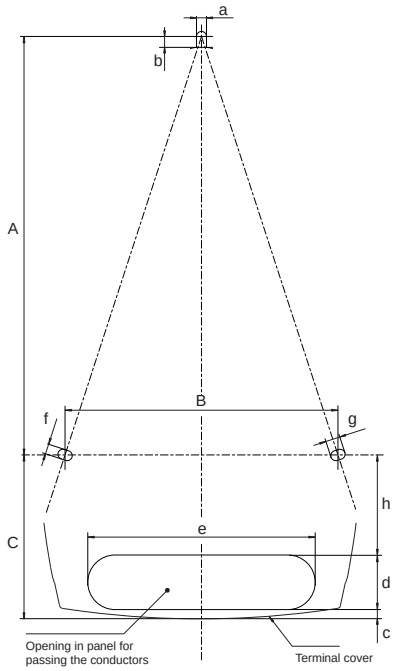
Power terminal strip



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



USB optical head
P01330401

MEMO
RANGE

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



USER SECTORS

Tertiary | Industry | Energy efficiency



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

DESCRIPTION

MEMO P200 is a range of 2 simple, high-performance power monitors for immediately providing a clear view of your electrical grid.

- 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)

- **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**

ELECTRICAL SPECIFICATIONS

Voltage inputs	
Primary VT	100 V to 500 kV – Secondary VT: 100 V to 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 W	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

TO ORDER

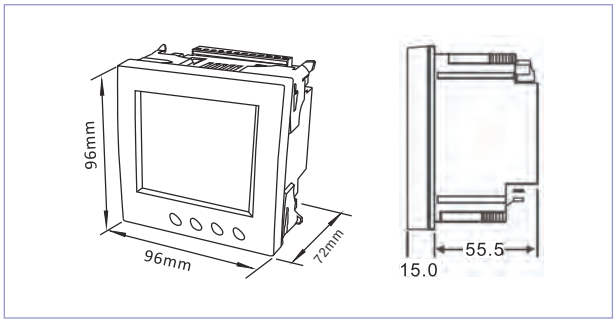
Model	Reference
MEMO P200 - 230 VAC aux. power supply	P01330825
MEMO P200 - 24 VDC aux. power supply	P01330826
DIN rail mounting kit	P01330830

ASSOCIATED PRODUCTS



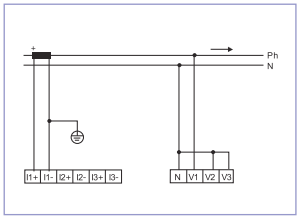
Current transformers
Cable primary, busbar primary, closed core or split core, etc.
page 109

DIMENSIONS (MM)

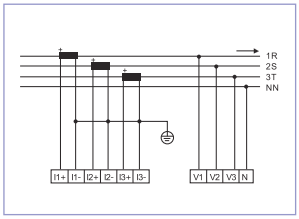


ELECTRICAL CONNECTIONS

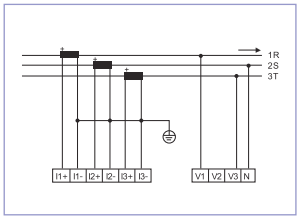
SINGLE-PHASE



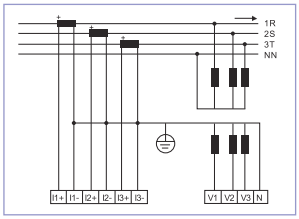
Unbalanced three-phase, 4 wires- 3 CTs



Unbalanced three-phase, 3 wires - 3 CTs



Example of connection to VT



ENERIUM
RANGE

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

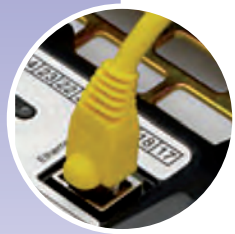


USER SECTORS

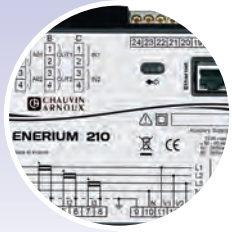
Industry | Energy generation | Energy transmission & distribution | Energy efficiency



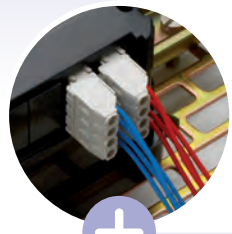
Optical head for:
- programming
- reading the data
- upgrading the firmware



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

- **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

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





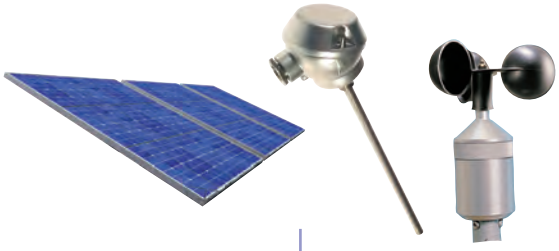


	Enerium 50	Enerium 150	Enerium 100	Enerium 200	Enerium 300
	ELECTRICAL ENERGY		MULTI-ENERGY		POWER QUALITY
	321	332	232	332	333
Functional specifications					
Accuracy class (IEC61557-12)	0.5	0.5	0.5	0.5 ou 0.2	0.2
Format	96 x 96 mm	96 x 96 mm	144 x 144 mm	144 x 144 mm	144 x 144 mm
Backlit LCD screen	■	■	■	■	■
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 (pulses 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 (pulses 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

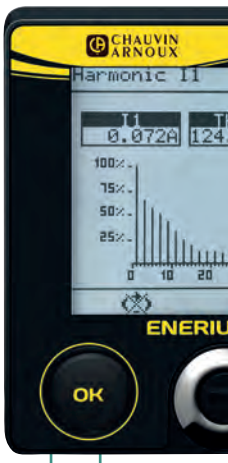


water, gas, electricity

insolation, weather data, temperatures, etc.

Current and voltage inputs
lv/mv/hv networks



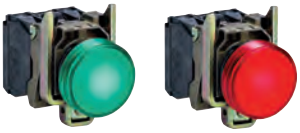


Analog outputs





Alarm relay outputs

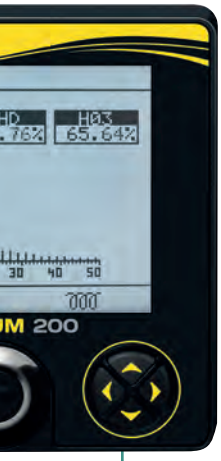


Synchro pulse inputs



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.

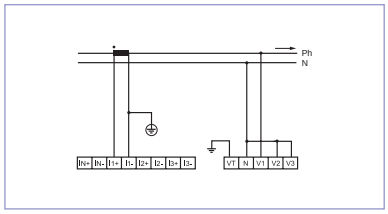
MEASUREMENTS

	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	■					

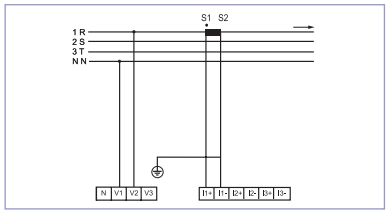
[1] On Enerium 30/50/150, calculated only

CONNECTION DIAGRAMS

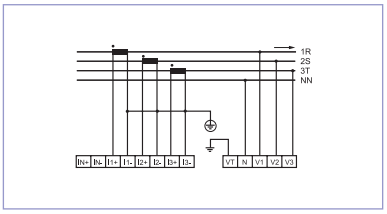
Single-phase



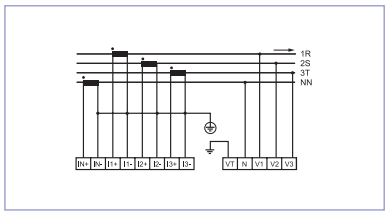
Balanced three-phase, 4 wires - 1 CT



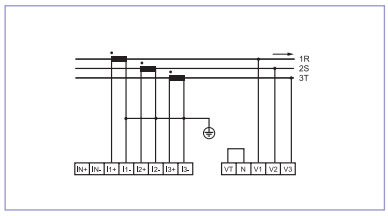
Unbalanced three-phase, 4 wires - 3 CTs



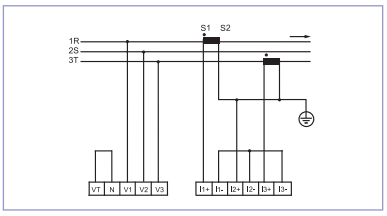
Unbalanced three-phase, 4 wires - 4 CTs
Except Enerium 50/150



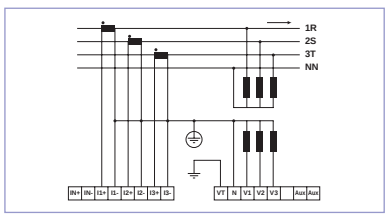
Unbalanced three-phase, 3 wires - 3 CTs



Unbalanced three-phase, 3 wires - 2 CTs



Example of connection to VT



TREND CURVES

(sauf 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, Ineutre	■
THD V1, V2, V3	■

ALARMS

1S VALUES	
V1, V2, V3	■
Vearth	■
U12, U23, U31	■
I1,I2, I3, In	■
Pt	■
Qt	■
St	■
PFt	■
Cosft	■
Tanft	■
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	■
Tanft (except on Enerium 50/150)	■
Tanft (except on Enerium 30/50/150)	■
Analog inputs (Enerium 100/200/300 only)	■

LOAD CURVES

(except on Enerium 100 and 110)

AVERAGE VALUES	
Pt Gen, Pt, Rec	■
Qcad1, Qcad2, Qcad3, Qcad4,	■
St Gen, St Rec	■
On-off input	■
Analog inputs (Enerium 200 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	■
Cosf1, Cosf2, Cosf3	■
Cosft	■
Tanft	■
Frequency	■

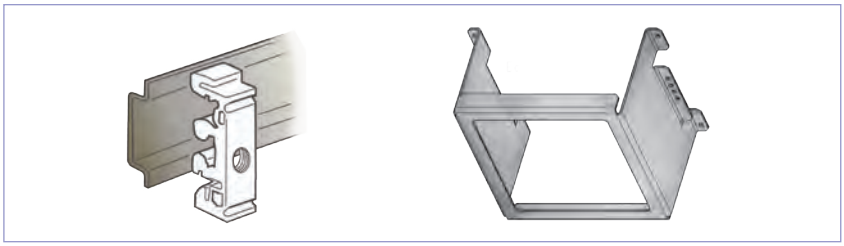
SPECIFICATIONS

	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 % of 20 % to 130 % of Un			
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	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 % of ≥ 10 %... ≤ 130 % 0.5 % of ≥ 5 %... ≤ 10 % 1 % of ≥ 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 Reactive energy Class 0.5s		Active energy Class 0.2s	Active energy Class 0.2s
IEC 61557-12	V,I Class 0.2 P,S Class 0.5	Class 0.5	Class 0.2	Class 0.2
PMD SD/SS	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 % of 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 mode RTU			
Speed (configurable)	2 400 - 4 800 - 9 600 - 19 200 - 34 800 (115 200 for ENERIUM 50/150)			
Parity	Even, odd or none			
JBus addresses	1 to 247			
Ethernet output				
Type	RJ45 - 8 points			
Protocole	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 80 to 265Vdc 19 to 57 Vdc (<7.5 W)		80 to 265 Vac (< 20 VA) 42.5 to 69 Hz 80 to 265Vdc 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 Vdc	
Min. signal width	High levelt: 30 ms Low level: 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 %			
Current max.	100 mA			
Compliance with standard	IEC 62053-31			
Analog inputs				
Scale	Configurable from -20 and +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 as per IEC 61557-12)			
Operating humidity	95 % to 40 °C			
Storage temperature	-25 °C to +70 °C			
Safety specifications				
Pollution	2			
Behavior in fire	UL94, severity V1			
Installation category	3			

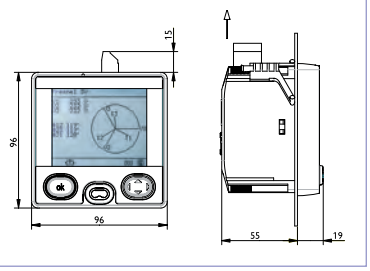
ACCESSORIES

Kit for DIN-rail or plate mounting

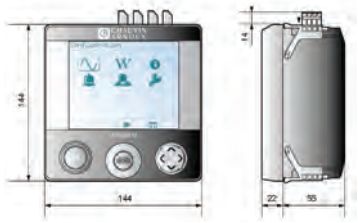


DIMENSIONS (MM)

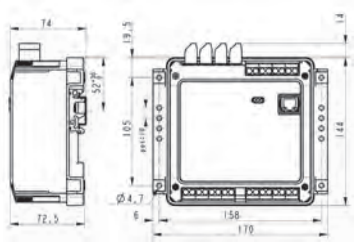
Enerium 50/150



Enerium 100/200/300



Enerium 110/210/310



TO ORDER

STANDARD PRODUCTS

Model	Frequency	Accuracy class	Power supply	Communication	On-Off inputs	On-Off Ouputs	Analog outputs	Reference	IM
Enerium 50	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	RS485	0	0	0	P01330805	321
	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	Ethernet	0	0	0	P01330806	321
	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	RS485	1	1	0	P01330807	321
	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	Ethernet	1	1	0	P01330808	321
Enerium 150	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	RS485	0	0	0	P01330809	332
	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	Ethernet	0	0	0	P01330810	332
	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	RS485	0	2	0	P01330811	332
	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	Ethernet	0	2	0	P01330812	332
Enerium 100	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	RS485	0	0	0	P01330831	232
	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	RS485	2	2	0	P01330832	232
Enerium 200	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	RS485	4	2	0	P01330833	332
	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	Ethernet	2	2	2	P01330834	332
Enerium 210	50 / 60 HZ	0.5s	80 to 265 Vac / 80 to 265Vdc	Ethernet	8	0	0	P01330835	332
Enerium 300	50 / 60 HZ	0.2s	80 to 265 Vac / 80 to 265Vdc	RS485	0	0	0	P01330816	333
	50 / 60 HZ	0.2s	80 to 265 Vac / 80 to 265Vdc	Ethernet	0	0	0	P01330817	333
	50 / 60 HZ	0.2s	19 to 58 Vdc	RS485	0	0	0	P01330818	333
	50 / 60 HZ	0.2s	19 to 58 Vdc	Ethernet	0	0	0	P01330819	333

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-énergies - Courbes d'enregistrement 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 / 80 to 265Vdc
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

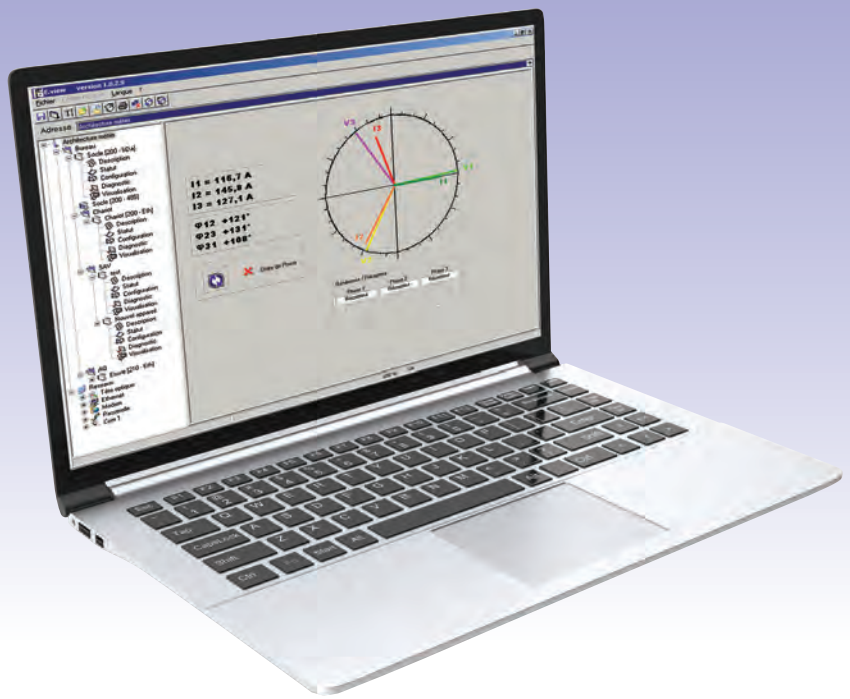
ASSOCIATED PRODUCTS



Current transformers
Cable primary, busbar primary, closed core or split core, etc.
Page 109

E.VIEW

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



USER SECTORS

Industry

Energy generation

Energy transmission & distribution

Energy efficiency

DESCRIPTION

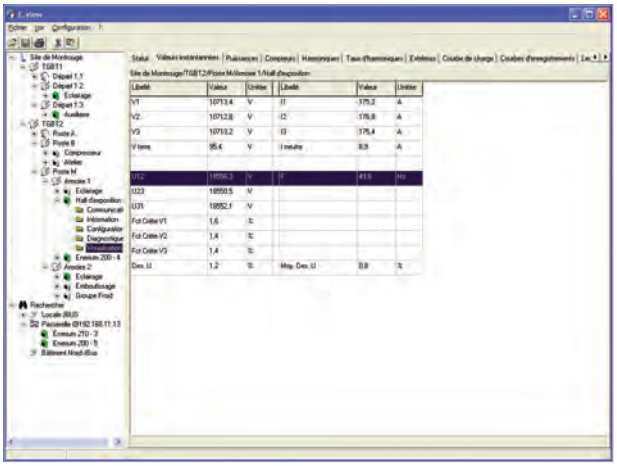
E.View software can be used to configure the power monitors in the ENERIUM range remotely via the RS485 network, Ethernet network or optical head. At any time, it is possible to program the communication parameters of the products (address, speed, parity, etc.) and the configuration parameters (CT ratio,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

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.

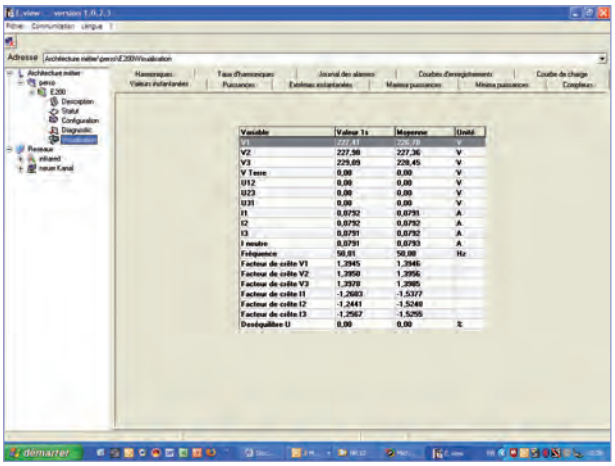
page 64



ENERIUM

Optical head

page 64



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
- Saturationandpossiblelossofapulseontheon-offoutputs
- Trend curve memory occupancy
- Load curve memory occupancy

The E.VIEW software can be DOWNLOADED FREE OF CHARGE from the support section of www.chauvin-arnoux-energy.com

ASSOCIATED PRODUCTS



ENERIUM
Power monitors for
all electrical networks compliant with the IEC 61557-12 standard.
page 64



ENERIUM
Optical head
page 64

NOTES



NETWORK SUPERVISION AND PHYSICAL MEASUREMENT

NETWORK MONITORING FROM LOW VOLTAGE TO HIGH VOLTAGE



80 NETWORK ANALYZERS

98 MONITORING OF LOW-VOLTAGE NETWORKS

NETWORK ANALYZERS

ELECTRICAL NETWORK ANALYZERS

PERMANENT ANALYZERS - MAP RANGE - CLASS A



MAP 607
Single-phase voltage quality analyzer
page 87



MAP Compact
Three-phase voltage/current power and network quality analyzer + Monitoring of EN50160 template
page 88

POWER QUALITY MONITOR



ENERIUM 300
Power monitor
Qualimetry according to EN50160
page 65

USER SECTORS

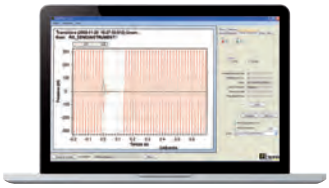
Tertiary
Industry
Energy generation
Energy transmission & distribution
Energy efficiency
Navy

MANAGEMENT AND ANALYSIS SOFTWARE

MANAGEMENT AND ANALYSIS SOFTWARE



Qual-SRT
Configuration and display
page 88

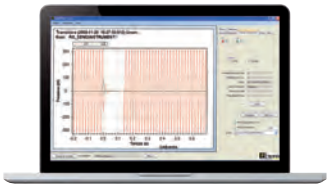


Qual-View
Settings, display and analysis
page 88

FOR MAP COMPACT



Qual-SRTc
Settings and display
page 88



Qual-View
Settings, display and analysis
page 88



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

INFO & ADVICE

COVER ALL YOUR REQUIREMENTS FOR ENERGY QUALITY SUPERVISION AND ARBITRATION

UNDERSTANDING THE DETAILS OF YOUR ELECTRICITY BIL

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.

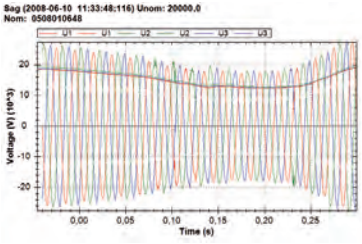
If you choose 0.2s accuracy on your power monitor, it guarantees that you meter energy with the same accuracy as your tariff meter (or higher).

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:**

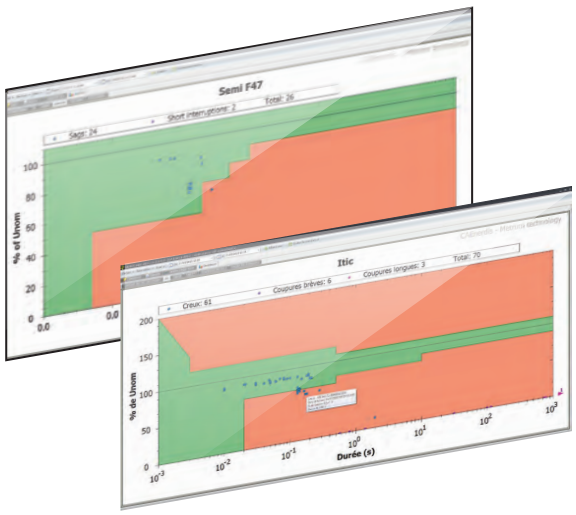


Distorting loads on the electrical network change the waveforms of the currents and voltages by producing signals whose frequencies are different from the rated frequency of the network. These signals, called harmonics, will have a large number of harmful effects, such as changing the voltage level of 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 Classs, 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

A simple, economical solution for supervising energy quality

ENERIUM 300

page 65

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

page 88

Monitor your electrical network simply and effectively



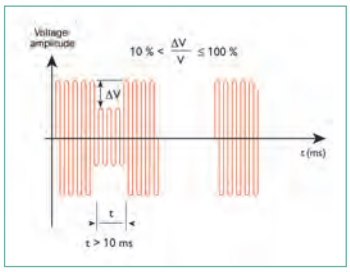
- A compact format for easier integration
- A screen for the basic information
- Access to the data locally via USB or remotely via Ethernet
- 3-channel voltage input, 230/400 VRMS
- 4-channel current input, 0 – 6 A RMS
- Auxiliary power supply: 175 – 255 Vac (10 s power reserve)
- 2 On-Off inputs/outputs

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 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.

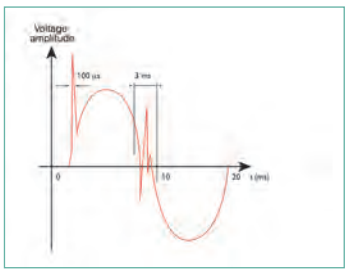


The nominal range of variation of the network voltage is set by the power distributor at ± 10% of the phase-to-phase voltage.

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

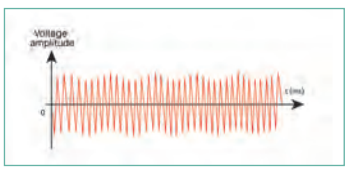
Digital analyzers with a high sampling frequency are necessary to measure transient overvoltages.



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

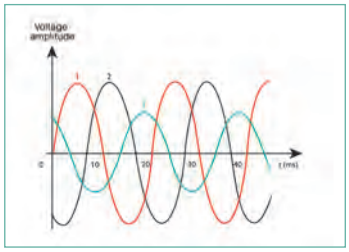
RAPID VOLTAGE VARIATIONS (FLICKER)

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)

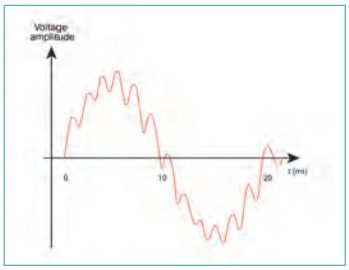
VOLTAGE UNBALANCE



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

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.

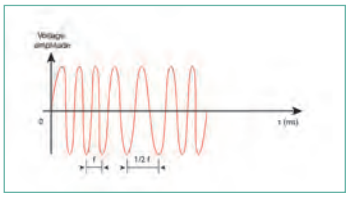


Harmonics: sinusoidal waves whose frequencies are multiples of 50 Hz superimposed on the fundamental wave. Interharmonics: component of the signal superimposed on the fundamental wave (50 Hz) but which is not a multiple of the fundamental (e.g. 175 Hz).

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 equipments	• 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

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

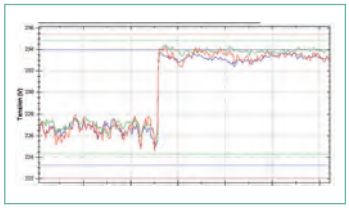


The average value of the fundamental frequency must be 50 Hz ± 1% in normal operating conditions.

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

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



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

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.



USER SECTORS

- Industry
- Energy generation
- Energy transmission & distribution

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 f, 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.

Various communication modes are available for remote recovery of the data and in-depth analysis of all the recorded parameters.

- **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**

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

Model	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



- **Integrated EN50160 reports**
- **Display**
- **Measurement of network quality and energy in kWh / kVarh**
- **Compact format**

USER SECTORS

Industry

Energy generation

Energy transmission & distribution

GENERAL SPECIFICATIONS

- 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		Specifications	
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 / NRS048
Frequency	■		EN50160 / NRS048
Unbalance	■		EN50160 / NRS048
Harmonics	■		EN50160 / NRS048
Flicker (Pst, Plt, Ifl)	■		EN50160 / NRS048
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 , +55 °C	

Connection systems

MAP permanent analyzers

	MAP Compact
	Screw-on connectors
Voltage	
Current	

TO ORDER

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

MAP SOFTWARE
RANGE

Management and analysis software for the MAP range.

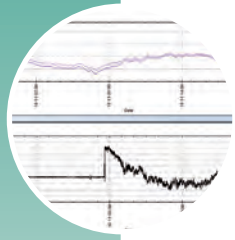


USER SECTORS

Industry

Energy generation

Energy transmission & distribution



Graphic display of all the available parameters



Configuration and manual or automatic retrieval of the data



Generation of reports

DESCRIPTION

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

- configuration of the MAP
- 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**

Recommended configuration

PC platform:

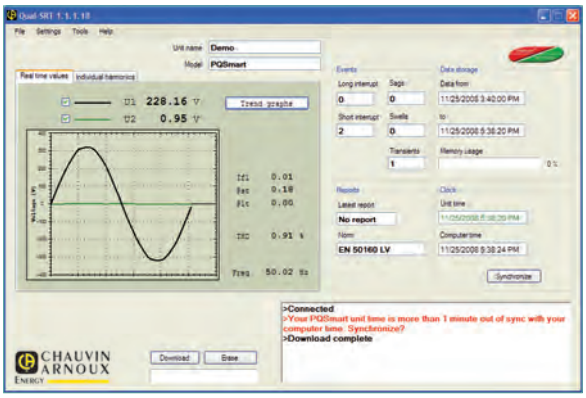
- operating system: Windows XP Pro SP3 / Vista / Seven / Server 2003 SP2 / Server 2008 / Server 2010
- processor frequency ≥ 2.0 GHz with dual-core architecture (e.g. Pentium or Intel Core 2 Duo)
- RAM ≥ 2 GB
- hard disk ≥ 250 GB with 240 MB free
- Ethernet network board

For MAP 607 and MAP Compact

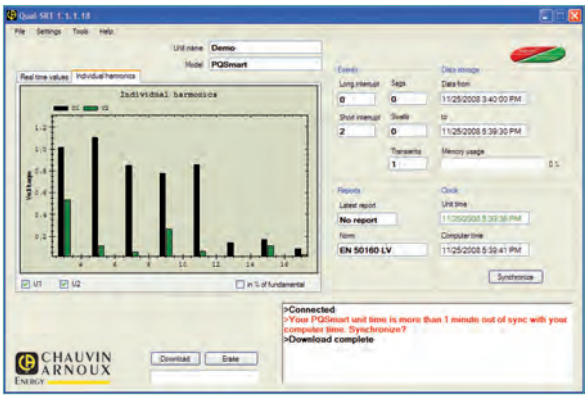
Configuration and real-time display module for "online" display of:

- 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 Compac	QUAL-SRTc

ASSOCIATED PRODUCTS



MAP 607
Single-phase voltage quality analyzer
page 87



MAP Compact
Compact power and network quality analyzer
page 88

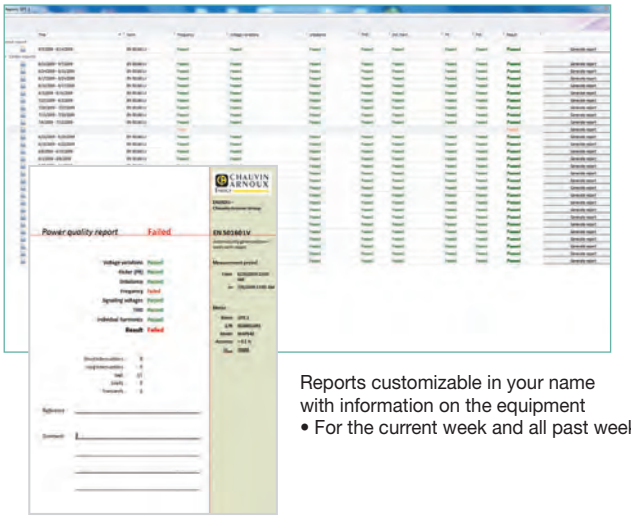
Qual-VIEW

Analysis and report generation module for MAP network analyzers.

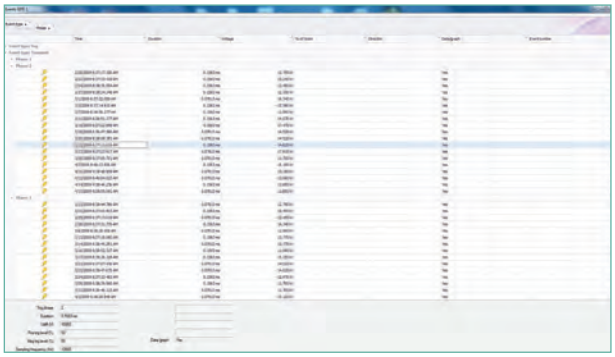
This provides a view of all the trend curves generated by the equipment, with the possibility of zooming and graphical display of the qualimetry template limits for each parameter.

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.

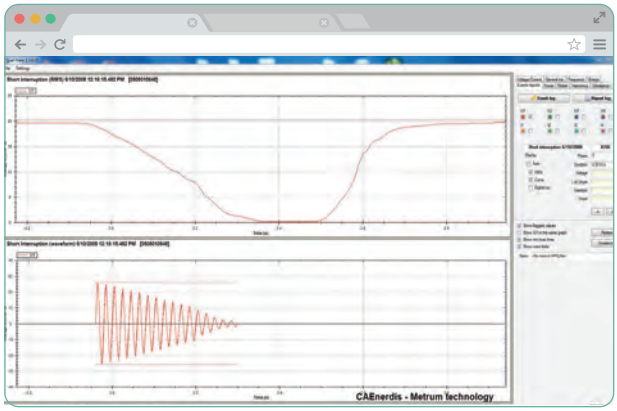
- For discussing the quality of the energy supply at the point of connection
- Intuitive, user-friendly and simple to use in order to track the most complex phenomena
- For assessing the evolution of energy quality over time and measuring its impact on ageing of the installation and the size of your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



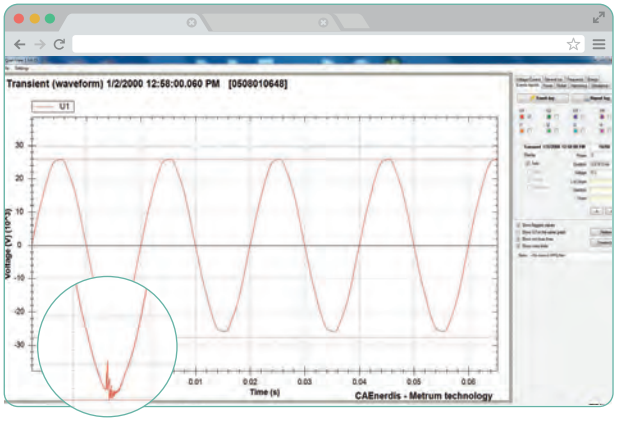
Reports customizable in your name with information on the equipment
- For the current week and all past weeks



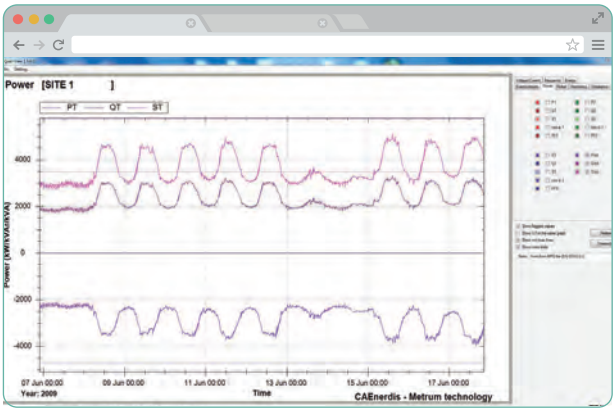
A history of all the events listed according to their type
- Relevant sorting systems (type, phase concerned, upstream/ downstream, etc.)
- A summary of each time/date-stamped event along with a snapshot



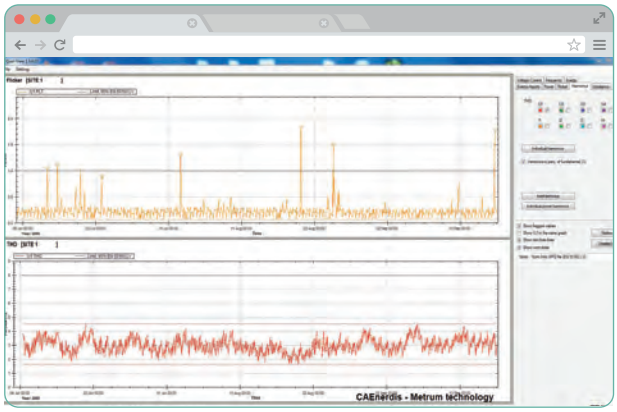
Understand the causes of network outages
- What happened?
- Does it come from my installation?
- Observe the waveform of the event affecting delivery of the energy as a voltage
- Compare this event with the waveform of the current



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 87



MAP Compact

Compact power and network quality analyzer

page 88

E.Qual-Premium Server

Analysis and report generation module for MAP network analyzers.

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

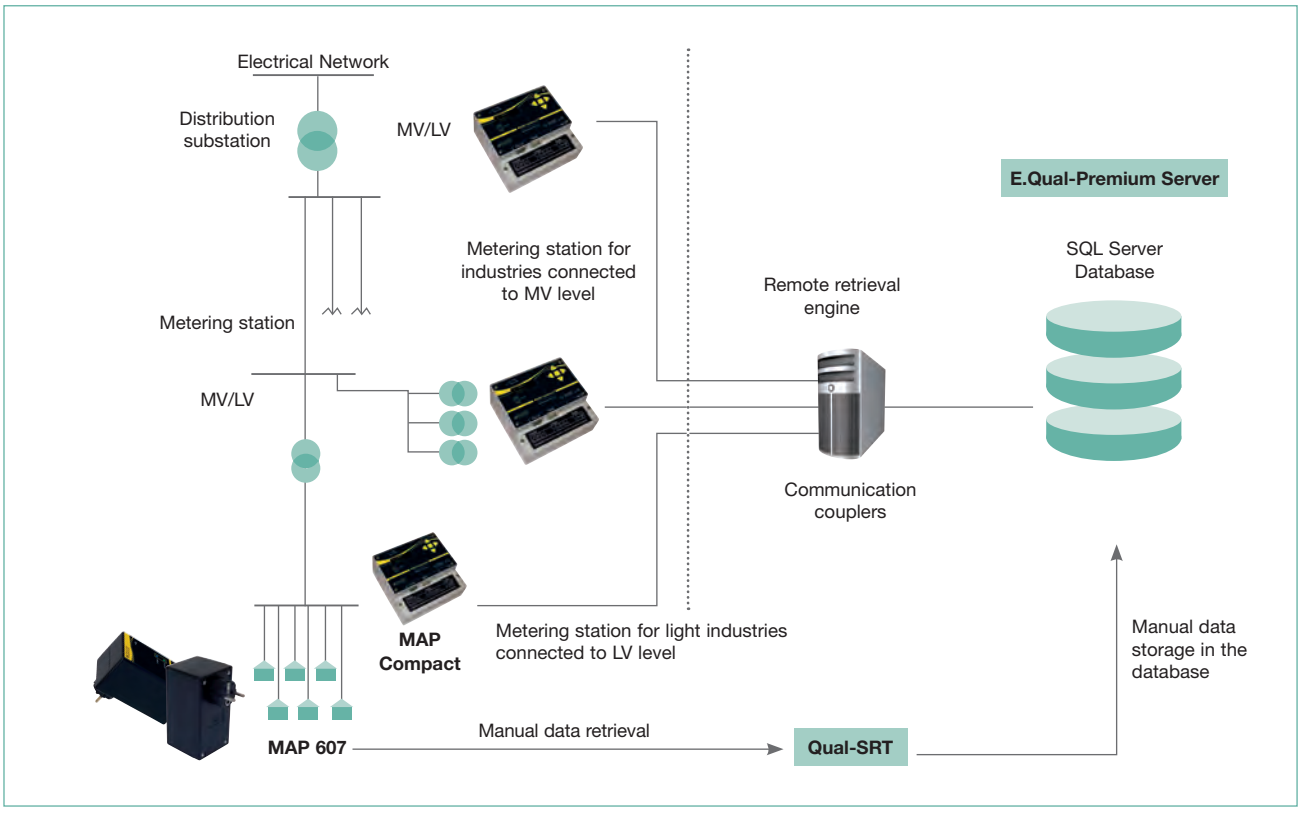
Peace of mind: all the data retrievals are performed automatically by a high-performance remote data-retrieval engine

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

Architecture of E.Qual-Premium Server

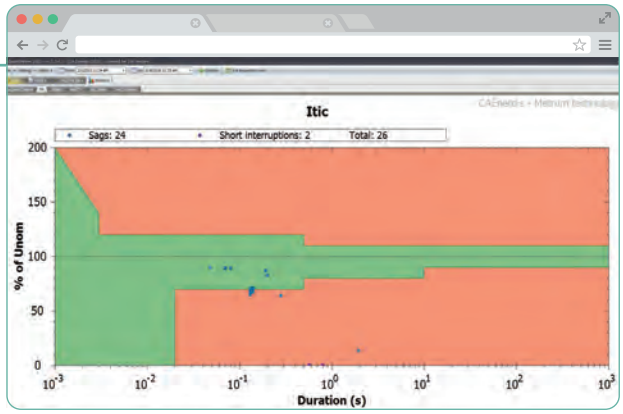
The **E.Qual-Premium Server** architecture is ideal for applications where you want to analyze the energy quality measurements gathered from several points in the electrical network and compile data supplied by different models in the MAP range. Thanks to its automatic remote retrieval engine, the E.Qual-Premium 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.

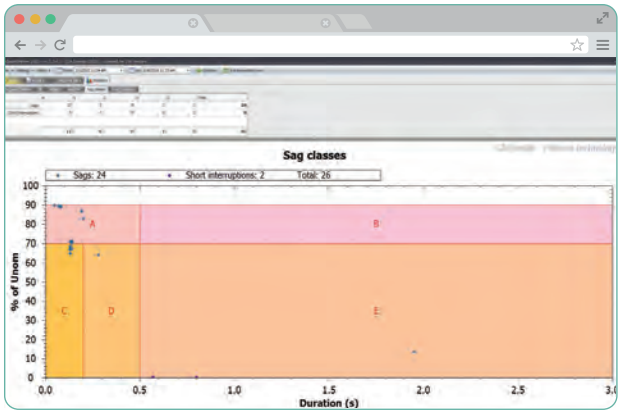


Components of an E.Qual-Premium Server with the network analyzers, the communication links, the database and the analysis and graphic display modules.

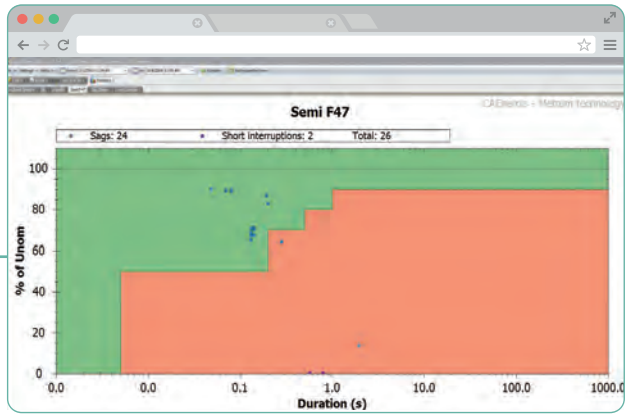
E.Qual-Premium Server

Analytical and statistical tools





The statistical distributions used for electrical network management



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

TO ORDER

Models	Description	Number of licenses	Reference
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

ASSOCIATED PRODUCTS



MAP Compact

Three-phase network quality analyzer

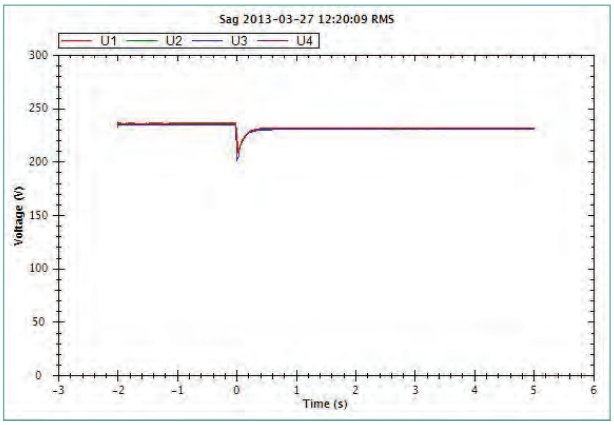
page 88

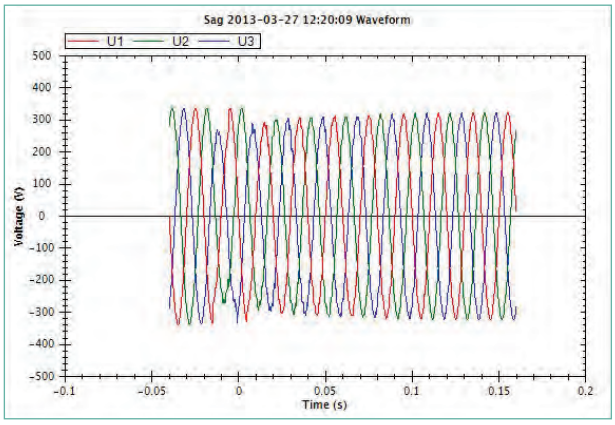
Qual-Web

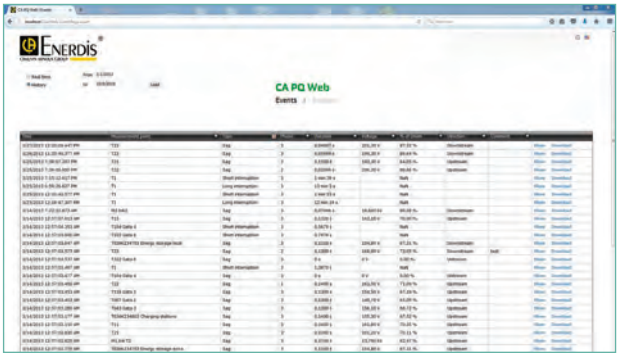
Key information from the qualimetry database available in a web browser

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

GRIDWATCH

SOLUTION FOR SUPERVISION OF LV INSTALLATIONS

A tailored solution based on integration of the Ulys MCM multichannel meter



ANTICIPATE

Aging of the transformer and installations

Optimized scheduling and reduced maintenance costs

TRACK AND SECURE

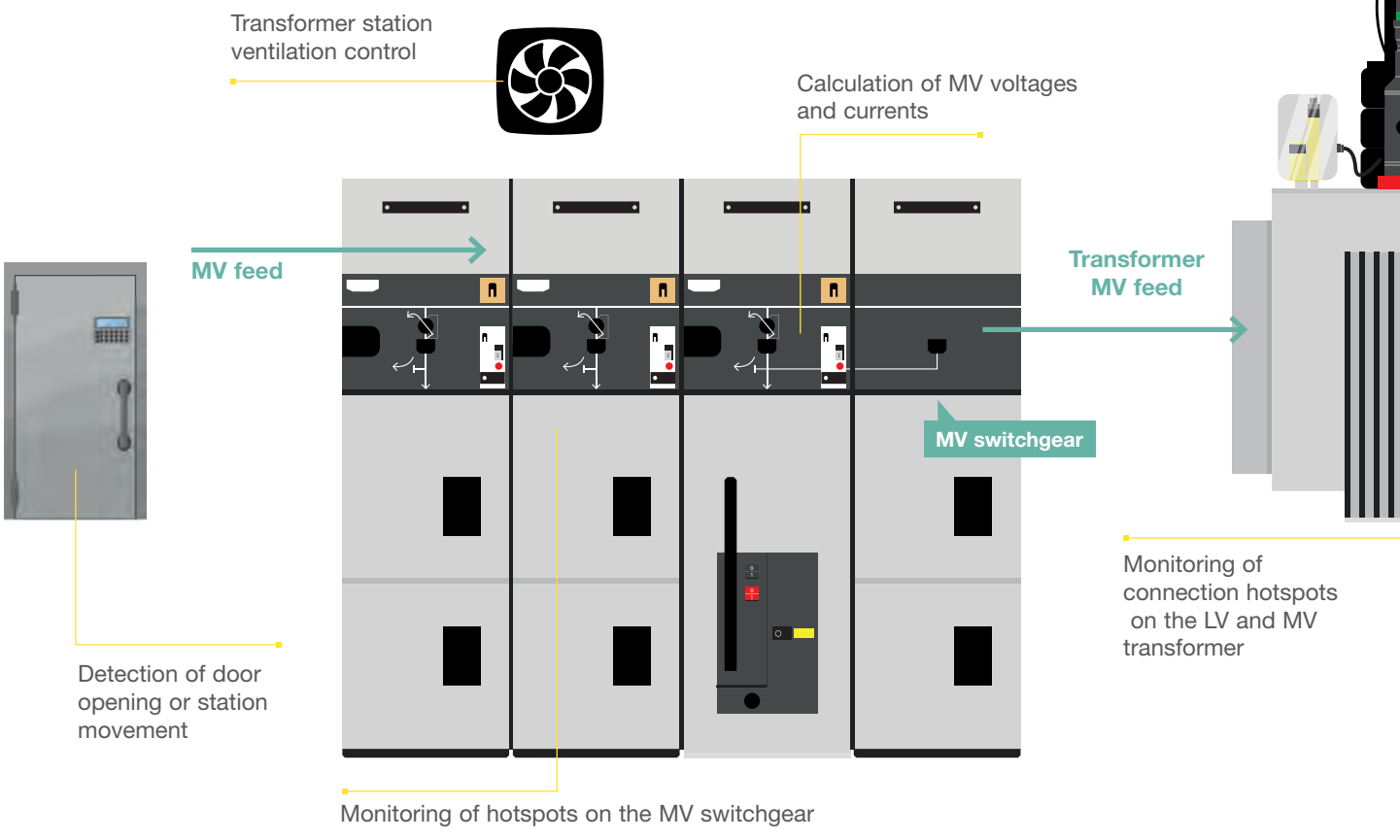
The energy flows

Reduced technical and non-technical losses

OPTIMIZE

The installations and new connections

Assessment of the available reserve or the effective overload on the feeders or transformers

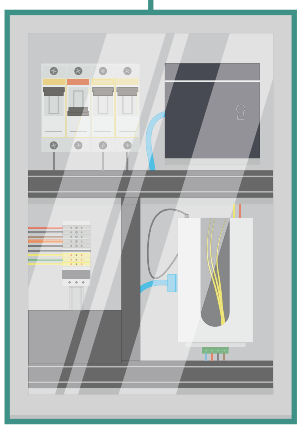


USER SECTORS

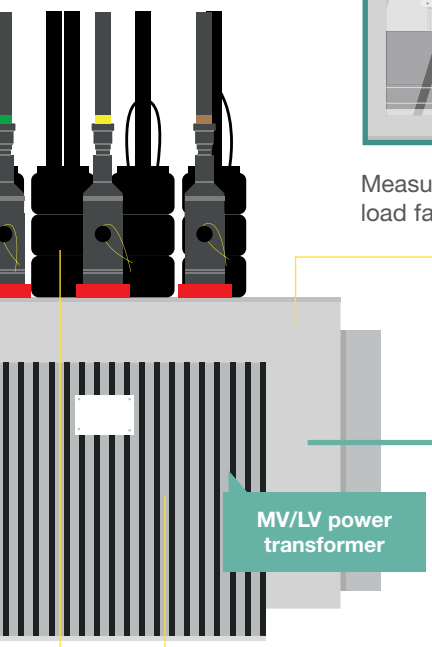
Industry

Energy transmission & distribution

GRIDWATCH MEASUREMENT KIT

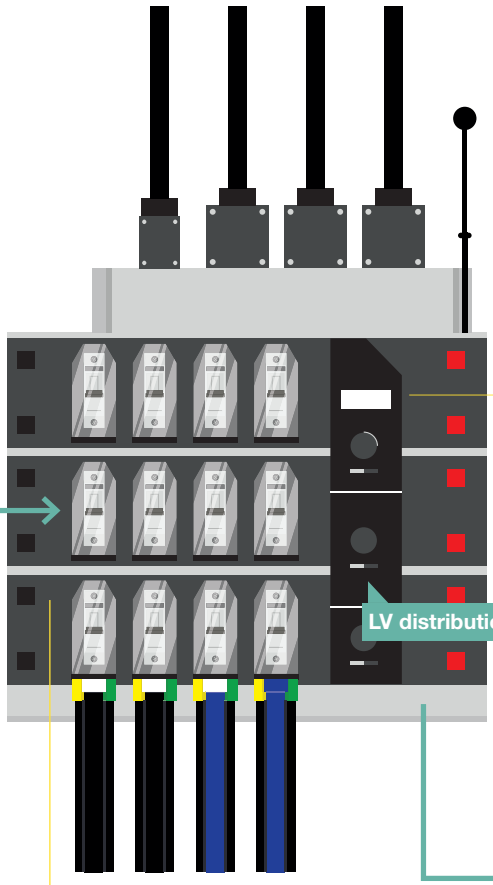


Measurement of transformer load factor and unbalance



MV/LV power transformer

LV transformer general feeder



Measurement of current and power values on each LV feeder

LV distribution switchboard

Monitoring of transformer surface temperature

Transformer station temperature and humidity measurement

Flood detection – transformer station water level

Detection of fuse blowout on LV feeder

LV distribution

Strengths

Complete and upgradable



GridWatch includes all the sensors needed to supervise the critical points in the MV/LV transformer station.

Available in various versions, it can be adapted to the sizing and the available budget for **optimum roll-out**.

Moving forward, GridWatch can be gradually equipped with sensors to instrument the transformer and then extend the analysis to the electrical feeders on the transformer station.

Quick roll-out



To reduce unavailability of the transformer station during commissioning of the system, **GridWatch has been designed for quick installation and roll-out**:

- split-core current sensors connected with a single click,
- prewired environmental measuring sensors,
- preconfigured wireless hotspot sensors, etc.

Interface our solution with your teams

CHAUVIN ARNOUX ENERGY

Communication modes for everything from the demonstrator to high-volume roll-outs

SMS/Email alerts

WEB pages

Recording and FTP Push of .csv data

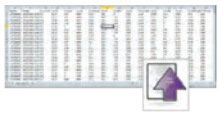
MQTT alarms log

Real-time viewing

VPN service for remote access







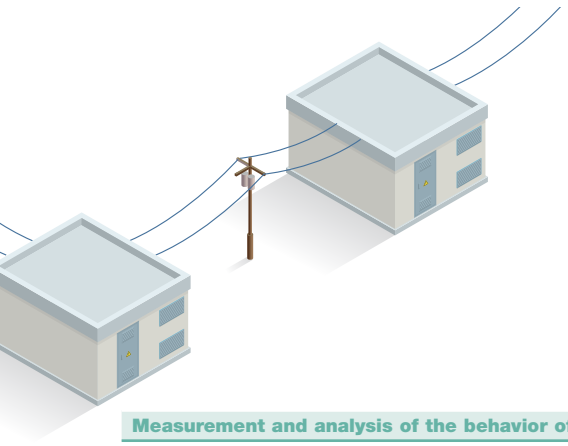


M2Web API
HTTPS web services
OPC UA
Modbus TCP

USER SECTORS

Industry

Energy transmission & distribution



	GridWatch C100	GridWatch C200
	Analyze the load factor of the transformer and feeders to optimize the connection of new equipment	**Analyze** the load factor of the transformer and feeders to optimize the connection of new equipment **+ Anticipate** failures and aging on electrical installations **+ Steer** maintenance of the transformer stations
Measurement and analysis of the behavior of cabin station equipment		
Transformer monitoring: Electrical measurement and metering on the secondary of the general MV/LV transformer	• 3P+N voltage socket on feed terminal strip • Quick-install current socket for Rogowski sensor (diameter 200mm) • Quantities m:easured: V, U, I, F, P, Q, S, Phase, Ea, Eq, Es • MV quantities calculated: U, I	
Monitoring of the low-voltage electrical feeders: Electrical measurement and metering	• Quick-install current socket for split-core CTs (up to 8 feeders) • Quantities measured: V, U, I, F, P, Q, S, Phase, Ea, Eq, Es	
Measurement of neutral currents (general and low-voltage feeders)	-	Yes
Measurement of connection hotspot temperatures on the LV and MV transformer	-	Yes
Transformer surface temperature measurement	-	Yes
Measurement of the ambient temperature of the kit and the ambient temperature and humidity of the transformer station	-	Yes
Interfacing with the other elements in the transformer station	-	Analog inputs and on-off inputs/outputs available
Communication and data management		
Communication mode	3G/4G communication and associated remote antenna	
Data viewing	Remote web pages	
Management of alarms and recordings	• Overrun alarms and timeout with transmission of an SMS text or email, recording in alarms log • Recording of all the quantities and variabless	
Protocols used simultaneously	• Modbus TCP: access to all the electrical and physical quantities in real time (1s) • MQTT: Publisher mode on alarm / Subscriber mode • HTTP: Access to all the electrical and physical quantities in real time, as well as historized data • FTP Push: file sent to FTP server	
Remote administration	Mise à jour - Paramètrage - Gestion de parc	
General specifications		
Local data viewing screen	-	Yes
Use	Indoor	
Operating temperature	-10°C - +55°C	
Installation	Wall mounting or mounting on stand	
Standards	IEC 61439-1 / IEC 61439-5	
Battery operation in the event of power outage	-	Yes

Tailored product : **Contact Chauvin Arnoux Energy for details of the GridWatch P100 solution adapted for monitoring H61 pole-mounted electrical transformer stations!**



Ask us for a quotation to equip your transformer station monitoring projects!



NETWORK SUPERVISION AND PHYSICAL MEASUREMENT

CURRENT TRANSFORMERS AND SHUNTS



104 OVERVIEW OF THE RANGE

106 SELECTION GUIDE

112 TERTIARY AND INDUSTRIAL CURRENT TRANSFORMERS

126 CURRENT TRANSFORMERS FOR TARIFF METERING

137 CURRENT TOTALIZERS

138 CT SHORT-CIRCUITER

140 SHUNTS

CURRENT TRANSFORMERS AND SHUNTS

TERTIARY AND INDUSTRIAL CURRENT TRANSFORMERS



TCR
Wound primary
Class 0.5/1/3
page 113



TCR
Cable/busbar primary
Class 0.5/1/3
page 114



JVS
Cable/busbar primary
Class 0.2s
page 119



TCRO
Split core
Without conductor opening
page 122



TC CLIP
Split core
Small volume
page 126

CURRENT TRANSFORMERS FOR TARIFF METERING

CORE – SINGLE-PHASE



JVR86
Wound primary
M8-M10
page 129



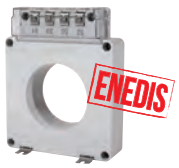
JVO 40-100
Cable primary
Ø 42 mm - Class 0.5
page 131



JVO 40-100 S
Cable primary
Ø 40 mm - Class 0.2s
page 132



J3R 80B
Cable primary
Ø 66 mm - Class 0.5
page 129



JVO 90-160S
Cable primary
Ø 90 mm - Class 0.2s
page 133



JVS 38B
Cable/ busbar primary
Ø 63 mm - Class 0.2s
page 120



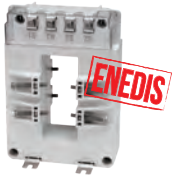
JVP 1025
Busbar primary
100 x 20 - Class 0.5
page 129



JVP 1045
Busbar primary
100 x 40 - Class 0.5
page 129



JVP 1045B
Busbar primary
100 x 40 - Class 0.5
Bi-Rating
page 130



JVP 1145S
Busbar primary
100 x 12 - Class 0.2s
page 134

USER SECTORS

Tertiary | Industry | Energy transmission & distribution | Energy efficiency | Naval applications

CURRENT TRANSFORMERS FOR TARIFF METERING

PLATE-MOUNTING - THREE-PHASE



TRI 500
Single-rating
50 to 240 mm² cable clamp
Class 0.5
page 135



TRI 700
Three-rating
50 to 240 mm² cable clamp
Class 0.5
page 136



TRI 700 S
Two-rating
50 to 240 mm² cable clamp
Class 0.2
page 136

CURRENT TOTALIZERS



JVM 15
CT designed to add together the instantaneous current values from the secondaries of 2 or 3 current transformers.
page 137

CT SHORT-CIRCUITER



PRTC
Protection against the hazards due to opening of the secondary circuit of a low-voltage measurement CT.
page 138

SHUNTS

CLASS 0.5



76/2 - 77/2 range
1 to 4.000 A
A reference for measurement in demanding applications.
page 142

CLASS 1



SHMI range **1 to 6.000 A**
Vast choice for industrial applications.
page 144



SHEL range
10 to 300 A
At low power, everything you need to facilitate implementation.
page 146



SHMO range
1 to 60 A
DIN-rail mounting.
page 146

CHOOSING YOUR TRANSFORMER

CURRENT TERTIARY AND INDUSTRYL

		TCR Wound primary		TCR / JVS Cable/busbar primary						JVS Busbar primary	
		page 113		page 119						page 118	
											
		TCR10	TCR15	TCR20	TCR22-30	JVS 25B	TCR28-40 JVS 26B ●	TCR43-60 JVS 30B ●	TCR63-80 JVS 38B ●	JVS 39B	JVS 40
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	0.2s	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 43	Ø 63		
Busbar primary (mm)					25 x 10 30 x 10 20 x 12	20 x 20 25 x 12 30 x 10	20 x 25 30 x 15 40 x 10	50 x 30 60 x 12 12 x 45	50 x 50 60 x 30 80 x 30	3 x 100 x 10	100 x 20
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						●	■ / ●	●		
	1000 A							■ / ●	●		■
	1200 A							■ / ●	●		■
	1500 A							●	■ / ●	■	■
	2000 A								■ / ●	■	■
	2500 A								■ / ●	■	
	3000 A								■ / ●	■	
	4000 A									■	
	5000 A										

USER SECTORS

Tertiary | Industry | Energy efficiency | Naval applications

		TCRO Split core				TC CLIP Split core				
		page 122				page 126				
										
JVS 50	**JVS 60**	**TCRO 2030**	**TCRO6080**	**TCRO80120**	**TCRO80160**	**TCC16**	**TCC24**	**TCC24**	**TCC36**	**TCC36**
0.2s	0.2s	0.5 / 1 / 3	0.5 / 1 / 3	0.5 / 1 / 3	0.5 / 1 / 3	1	1	0.5	0.5	0.5
						Ø 16	Ø 24	Ø 24	Ø 36	Ø 36
100 x 30	125 x 60	20 x 30	60 x 80	80 x 120	80 x 160					

CHOOSING YOUR CURRENT TRANSFORMER

FOR TARIFF METERING

		Core - Single-phase					
		page 129	page 131	page 132	page 129	page 133	page 120
							
		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 - 1000 - 2000 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.**

USER SECTORS

Industry | Energy efficiency | Naval applications

	Core - Single-phase				Plate-mounting - Three-phase		
	page 129	page 129	page 130	page 134	page 135	page 136	page 136
							
	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 - 1000 - 2000 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 5A	Secondary 1A
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):

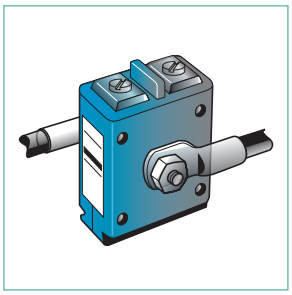
• Class 3 for a CT with a ratio of 150/5
• Class 1 for a CT with a ratio of 200/5
• Class 0.5 for a CT with a ratio of 250/5

USER SECTORS

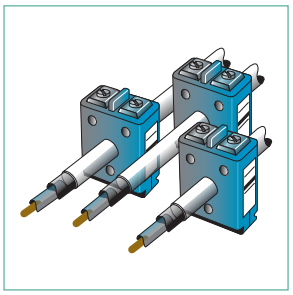
Tertiary | Industry | Energy transmission & distribution | Energy efficiency | Naval applications

CONNECTING A CURRENT TRANSFORMER

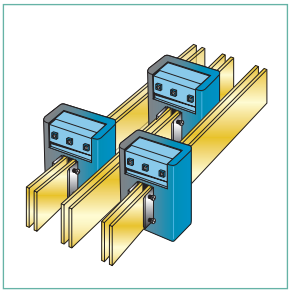
Chauvin Arnoux Energy current transformers offer 4 types of connection:



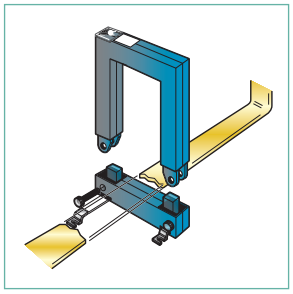
WOUND PRIMARY
for currents less than 200 A



CABLE PRIMARY
for currents between 40 and 2.500 A



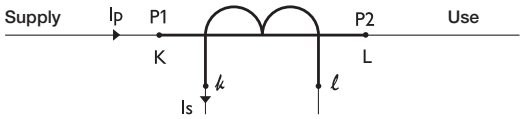
BUSBAR PRIMARY
for currents between 750 and 5.000 A

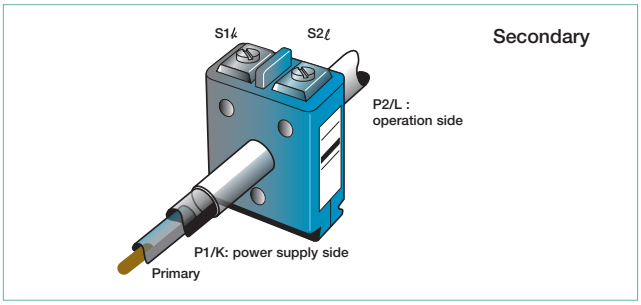


SPLIT CORE PRIMARY
for easy connection to an existing installation using a busbar or cable primary

ACCURACY LIMIT TABLES ACCORDING TO THE IEC 60044-1 STANDARD

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

Limit errors – Table 1

Class	± 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

Limit errors – Table 2

Class	± 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 156, PRTC transformer short-circuiter.

TCR RANGE

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



USER SECTORS

Tertiary

Industry

Energy efficiency



Supplied with bar clamp fitting accessories



Plate mounting using removable screw-on clips



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

GENERAL SPECIFICATIONS

Reference standards: IEC 61869-1. IEC 61869-2, UL94
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
Working temperature: Thermal class B (130 °C)
Plastic casing: V0 self-extinguishing UL94
Ingress protection on secondary terminals: IP20
Operating conditions: Temperature: -10 °C to +50 °C
Relative humidity < 90 %

- **Comprehensive range from 5 to 3.000 A**
- **All types of mounting**
- **Compact design**

Model	Terminal cover	DIN rail
TCR20	P01340190	P01340195
TCR22-30	P01340191	
TCR28-40	P01340192	
TCR43-60	P01340193	P01340196
TCR63-80	P01340194	

MOUNTING ACCESSORIES

Sealable terminal covers



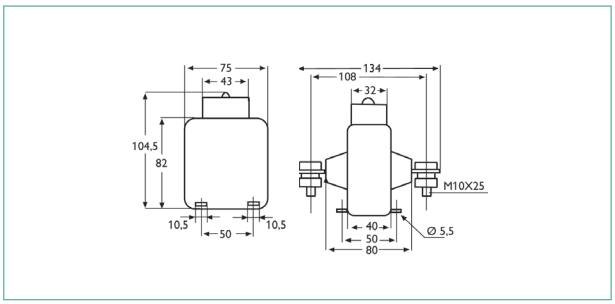
DIN rail mounting



TCR WOUND PRIMARY

TCR 10

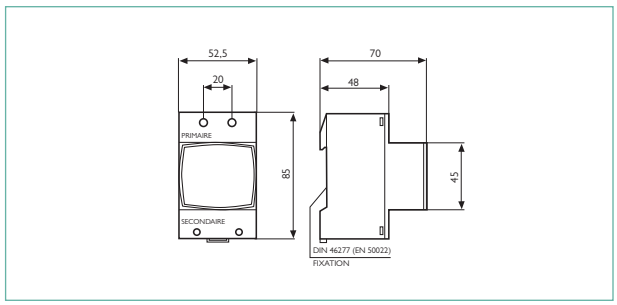
25 x 25 mm aperture



Primary	Power (VA) in class 0.5	1	3	Weight (kg)
5 A	15	20	30	0.70
10 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
125 A	15	20	30	0.70

TCR 15

Primary: 16 mm² wire
Secondary: 4 mm² wire



Primary	Power (VA) in class 0.5	1	3	Weight (kg)
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
50 A	2.5	5	7	0.28

TO ORDER

Primary	Secondary 5 A
5A	1920 1507
10A	1920 1512
50A	1920 1519
60A	1920 1521
75A	1920 1523
125A	1920 1526

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

ASSOCIATED PRODUCTS



PRTC

CT short-circuiter

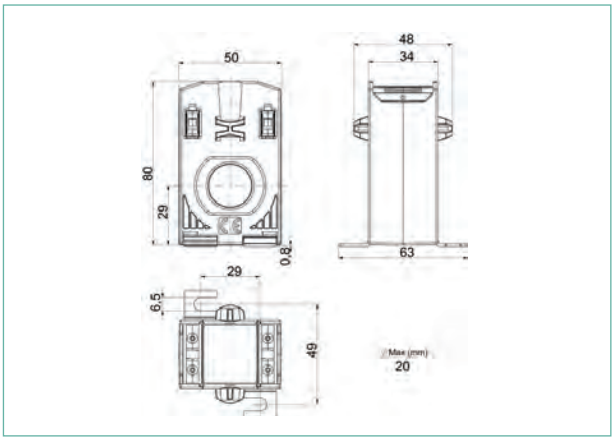
Protection against hazards due to opening of the secondary circuit of a low, voltage measurement CT.

page 138

CABLE/BUSBAR PRIMARY

TCR20

Cable Ø 20 mm

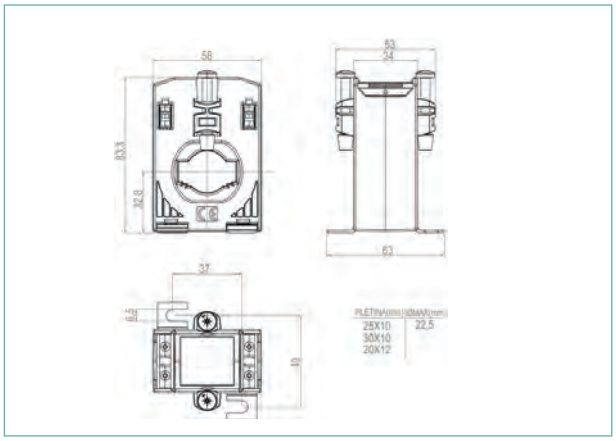


	Power (VA) in class		
Primary	**0.5**	**1**	**3**
40/5A	-	-	1.25
50/5A	-	1	1.5
60/5A	-	1.25	2.5
75/5A	-	1.5	3.75
100/5A	1.5	2.5	5
125/5A	2.5	3.75	5
150/5A	3.75	5	5
200/5A	5	7.5	7.5

Primary	Secondary 5 A
40/5A	P01340200
50/5A	P01340201
60/5A	P01340202
75/5A	P01340203
100/5A	P01340204
125/5A	P01340205
150/5A	P01340206
200/5A	P01340207

TCR22-30

Cable Ø 22 mm
Bar : 25 x 10 | 30 x 10 | 20 x 12 (mm)



	Power (VA) in class		
Primary	**0.5**	**1**	**3**
100/5A	-	-	1
125/5A	-	1	1.5
150/5A	1	1.5	2.5
200/5A	1.5	2.5	3.5
250/5A	2.5	3.5	5
300/5A	2.5	3.5	5
400/5A	2.5	3.5	5

Primary	Secondary 5 A
100/5A	P01340208
125/5A	P01340209
150/5A	P01340210
200/5A	P01340211
250/5A	P01340212
300/5A	P01340213
400/5A	P01340214

TO ORDER

ASSOCIATED PRODUCTS



PRTC

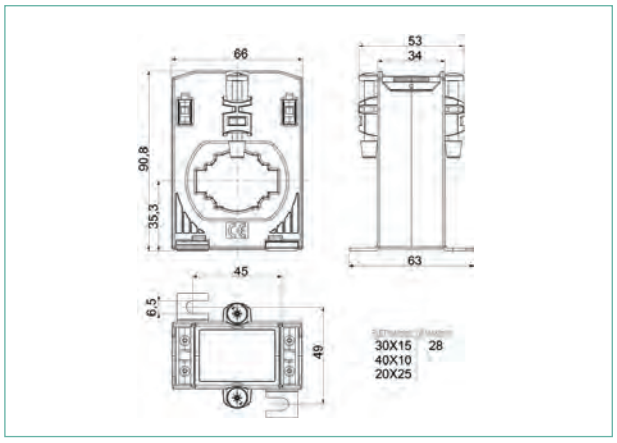
CT short-circuiter

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

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TCR28-40

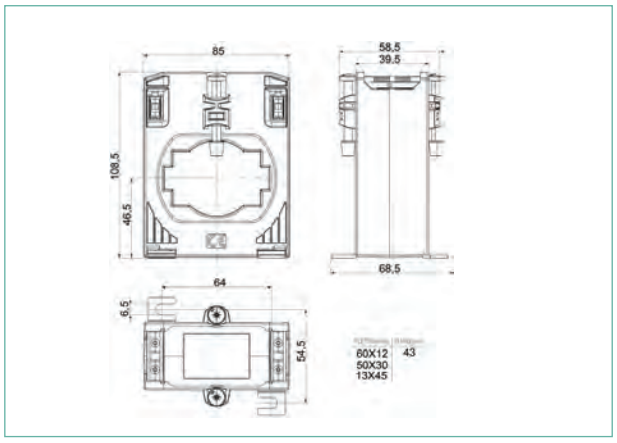
Cable Ø 28 mm
Bar : 20 x 25 | 30 x 15 | 40 x 10



	Power (VA) in class		
Primary	**0.5**	**1**	**3**
150/5A	1	2.5	3.5
200/5A	1.5	3.5	5
250/5A	2.5	5	5
300/5A	2.5	5	5
400/5A	2,5	5	5
500/5A	5	7.5	7,5
600/5A	5	7.5	7.5

TCR43-60

Cable Ø 43 mm
Bar : 50 x 30 | 60 x 12 | 12 x 45



	Power (VA) in class		
Primary	**0.5**	**1**	**3**
400/5A	2.5	3.5	5
500/5A	2,5	5	5
600/5A	2.5	5	5
750/5A	2.5	5	5
800/5A	5	7.5	7.5
1000/5	5	7.5	10
1200/5	5	7.5	10

TO ORDER

Primary	Secondary 5 A
150/5A	P01340215
200/5A	P01340216
250/5A	P01340217
300/5A	P01340218
400/5A	P01340219
500/5A	P01340220
600/5A	P01340221

Primary	Secondary 5 A
400/5A	P01340222
500/5A	P01340223
600/5A	P01340224
750/5A	P01340225
800/5A	P01340226
1000/5	P01340227
1200/5	P01340228

ASSOCIATED PRODUCTS



PRTC

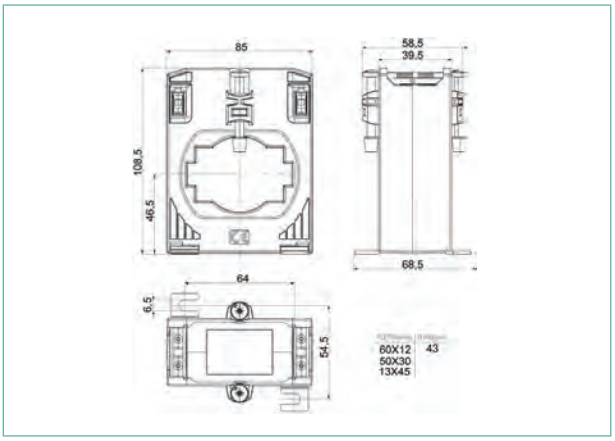
CT short-circuiter

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

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TCR63-80

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



	Power (VA) in class		
Primary	**0.5**	**1**	**3**
1500/5	5	10	15
2000/5	5	10	15
2500/5	5	10	15
3000/5	5	10	15

TO ORDER

Primary	Secondary 5 A
1500/5	P01340229
2000/5	P01340230
2500/5	P01340231
3000/5	P01340232

ASSOCIATED PRODUCTS



PRTC

CT short-circuiter

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

page 138

NOTES

JVS RANGE

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



USER SECTORS

Tertiary

Energy transmission & distribution

Naval applications



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)



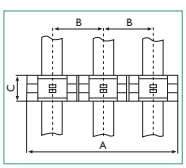
Cabinet backplate fitting (or directly on busbar primary)

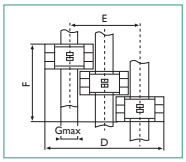
GENERAL SPECIFICATIONS

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)

- **Choice of primary from 100 to 5.000 A**
- **Accuracy class: 0.2 S for high-performance applications**

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

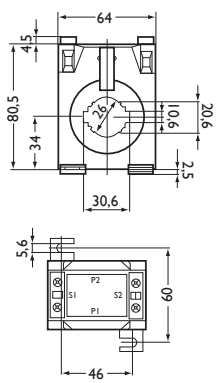
MOUNTING ACCESSORIES

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

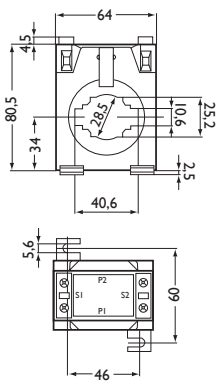
JVS 25B



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

Primary	Power (VA) 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
Bars : 20 x 25 mm
30 x 15 mm
40 x 10 mm

Primary	Power (VA) 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 5A
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 5A
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.

page 112



PRTC

CT short-circuiter

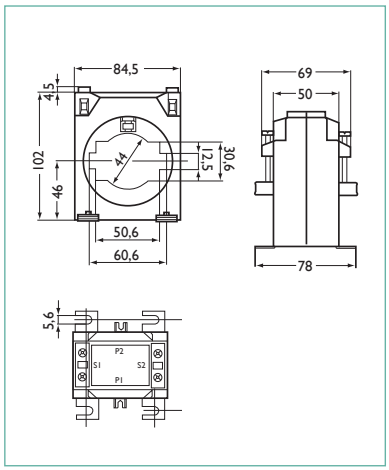
Protection against hazards due to opening of the secondary circuit of a low, voltage measurement CT.

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CABLE/BUSBAR PRIMARY

JVS 30B

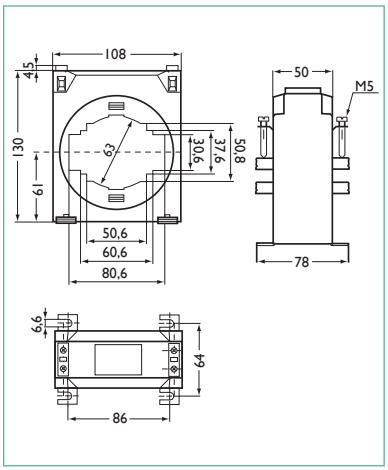
Cable Ø 44 mm
Bars : 50 x 30 mm
60 x 12 mm



Primary	Power (VA) Class 0.2 S	Weight (kg)
600 A	5	0.52
750 A	7.5	0.59
800 A	7.5	0.60
1000 A	10	0.61
1200 A	10	0.63
1500 A	10	0.65

JVS 38B

Cable Ø 63 mm
Bars : 50 x 50 mm
60 x 30 mm
80 x 30 mm

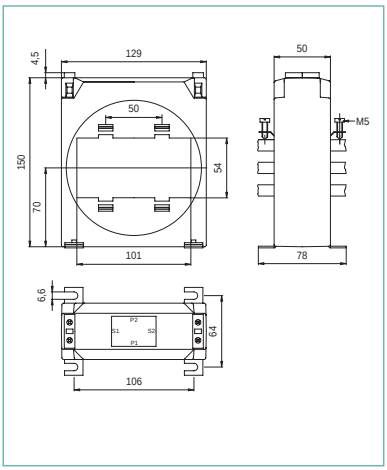


Primary	Power (VA) Class 0.2 S	Weight (kg)
1000 A	7.5	0.72
1200 A	10	0.68
1500 A	10	0.84
2000 A	10	0.82
2500 A	10	0.88
3000 A	10	0.88

BUSBAR PRIMARY

JVS 39B

Bar : 3 x 100 x 10 mm



Primary	Power (VA) Class 0.2 S	Weight (kg)
1500 A	10	1.47
2000 A	10	1.55
2500 A	15	1.63
3000 A	20	1.71
4000 A	25	1.83

TO ORDER

Primary	Secondary 5A
600 A	JVSB30 600/5
750 A	JVSB30 750/5
800 A	JVSB30 800/5
1000 A	JVSB30 1000/5
1200 A	JVSB30 1200/5
1500 A	JVSB30 1500/5

Primary	Secondary 5A
1000 A	JVSB38 1000/5
1200 A	JVSB38 1200/5
1500 A	JVSB38 1500/5
2000 A	JVSB38 2000/5
2500 A	JVSB38 2500/5
3000 A	JVSB38 3000/5

Primary	Secondary 5A
1500 A	JVSB39 1500/5
2000 A	JVSB39 2000/5
2500 A	JVSB39 2500/5
3000 A	JVSB39 3000/5
4000 A	JVSB39 4000/5

ASSOCIATED PRODUCTS



Mounting accessories

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

page 112



PRTC

CT short-circuiter

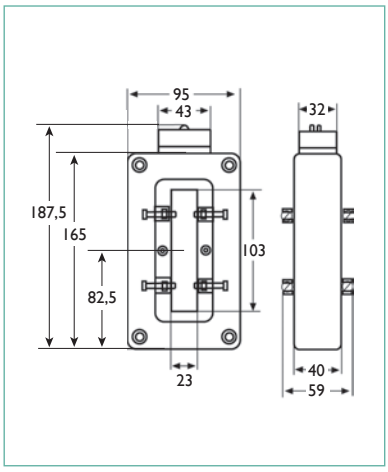
Protection against hazards due to opening of the secondary circuit of a low- voltage measurement CT.

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BUSBAR PRIMARY

JVS 40

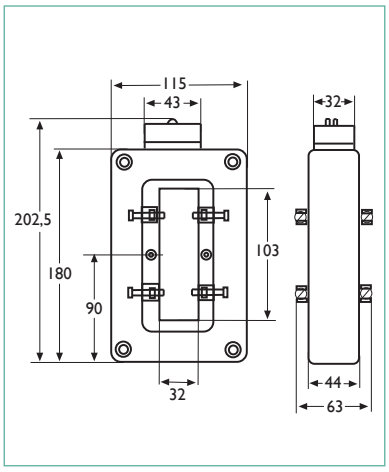
Bar : 100 x 20 mm



Primary	Power (VA) Class 0.2 S	Weight (kg)
1000 A	1.5	0.76
1200 A	4	0.76
1500 A	10	0.76
2000 A	10	0.76

JVS 50

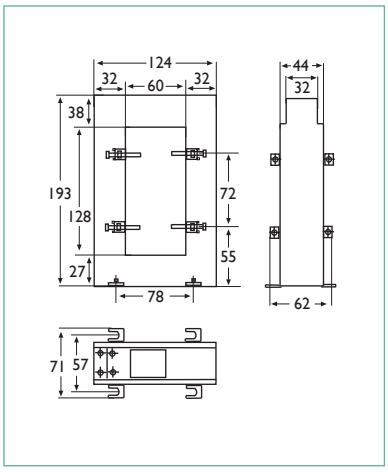
Bar : 100 x 30 mm



Primary	Power (VA) Class 0.2 S	Weight (kg)
1500 A	10	0.76
2000 A	10	0.82
2500 A	10	0.78
3000 A	10	0.90
4000 A	10	0.90

JVS 60

Bar : 125 x 60 mm



Primary	Power (VA) Class 0.2 S	Weight (kg)
1000 A	1.5	0.75
1500 A	7.5	0.83
2000 A	10	0.92
2500 A	10	1.01
3000 A	10	1.09
4000 A	10	1.21
5000 A	10	1.44

TO ORDER

Primary	Secondary 5A
1000 A	JVS40-1000/5
1200 A	JVS40-1200/5
1500 A	JVS40-1500/5
2000 A	JVS40-2000/5

Primary	Secondary 5A
1000 A	JVSB38 1000/5
1200 A	JVSB38 1200/5
1500 A	JVSB38 1500/5
2000 A	JVSB38 2000/5
2500 A	JVSB38 2500/5
3000 A	JVSB38 3000/5

Primary	Secondary 5A
1000 A	JVS60-1000/5
1500 A	JVS60-1500/5
2000 A	JVS60-2000/5
2500 A	JVS60-2500/5
3000 A	JVS60-3000/5
4000 A	JVS60-4000/5
5000 A	JVS60-5000/5

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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TCRO
RANGE

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



USER SECTORS

Tertiary | Industry | Energy efficiency | Naval applications



Plate mounting with screw-on movable clips or DIN rail mounting



Sealable cover



Button for instant opening

- **New opening system for easier implementation**
- **Wide choice of aperture sizes**

GENERAL SPECIFICATIONS

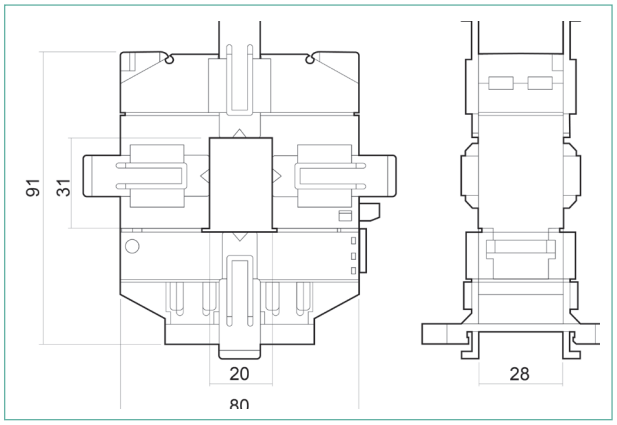
Reference standards: IEC 61869-2, UL94
Max. grid voltage: 720 Vac
Dielectric test voltage: 3 kV/50 Hz/1 min
Frequency response: 50/60 Hz
Thermal short-circuit current (Ith) : 60 In - 1 second
Dynamic current (Idyn): 2.5 Ith
Safety factor: 10
Working temperature: Thermal class B (130 °C)
Plastic casing: V0 Self-extinguishing UL94
Ingress protection on secondary terminals: IP20
Operating conditions: Temperature: -10 °C to +50 °C
Relative humidity < 90 %
DIN rail mounting: Yes

STANDARD MOUNTING ACCESSORIES

Model	Plate-mounting fitting	Busbar clamps
TCRO 2030	■	■
TCRO 6080	■	■
TCRO 8080	■	■
TCRO 80120	■	■
TCRO 80160	■	■

TCRO 2030

Bar : 20 x 30 mm

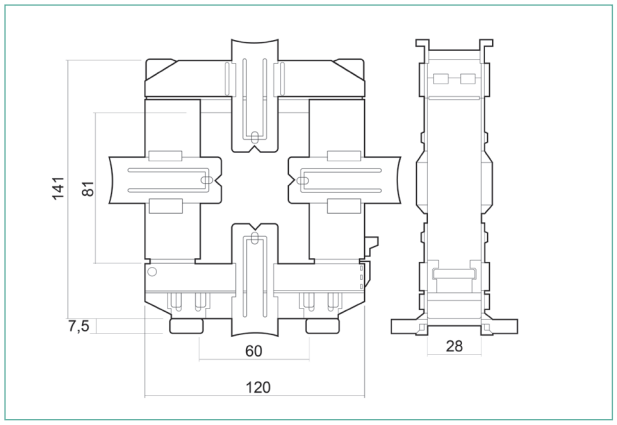


Primary	Power VA in Class 0.5	1	3
100/5A	-	-	1
150/5A	-	-	1
200/5A	-	-	2
250/5A	-	1	2
400/5A	1	2.5	4

Primary	Secondary 5 A
100/5A	P01340300
150/5A	P01340301
200/5A	P01340302
250/5A	P01340303
400/5A	P01340304

TCR0 6080

Bar : 60 x 80 mm



Primary	Power VA in Class 0.5	1	3
400/5A	1	1.5	3
500/5A	2	5	7.5
600/5A	2	5	8
800/5A	3	6	10
1000/5	5	8	15

Primary	Secondary 5 A
400/5A	P01340305
500/5A	P01340306
600/5A	P01340307
800/5A	P01340308
1000/5	P01340309

TO ORDER

ASSOCIATED PRODUCTS



PRTC

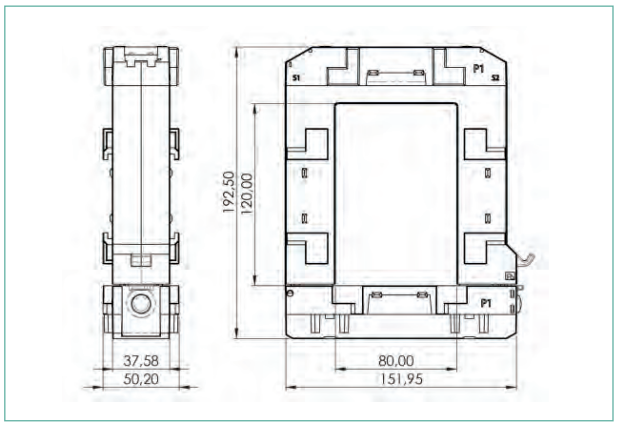
CT short-circuiter

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

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TCRO 80120

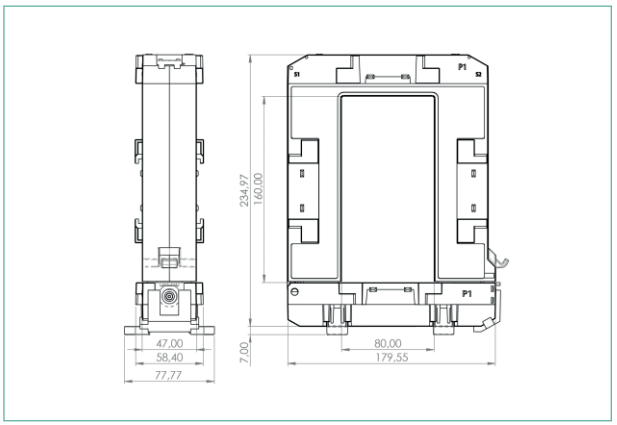
Bar : 120 x 80



Primary	Power VA in Class 0.5	1	3
500/5A	-	4	12
800/5A	3	7	18
1000/5A	5	9	20
1200/5A	6	11	24
1500/5A	8	17	30

TCRO 80160

Bar : 160 x 80



Primary	Power VA in Class 0.5	1	3
1500/5A	15	20	25
2000/5A	15	20	25
2500/5A	15	20	25
3000/5A	15	20	25

TO ORDER

Primary	Secondary 5 A
500/5A	P01340310
800/5A	P01340311
1000/5A	P01340312
1200/5A	P01340313
1500/5A	P01340314

Primary	Secondary 5 A
1500/5A	P01340315
2000/5A	P01340316
2500/5A	P01340317
3000/5A	P01340318

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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NOTES

TC CLIP
RANGE

Compact CT for integration on electrical installations without disconnecting the power cables.

USER SECTORS

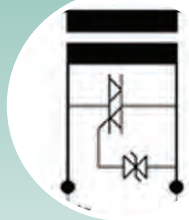
Tertiary

Industry

Energy efficiency



Reinforced hinge



Built-in short-circuiting switch



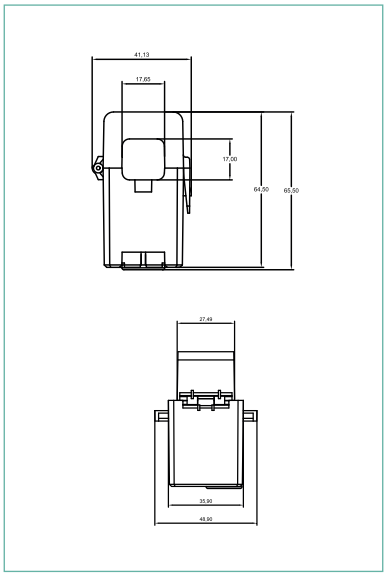
- **Quick, practical implementation without cutting off the power supply**
- **Compact design**
- **Built-in short-circuiting switch**
- **Primary from 60 to 600 A**
- **High VA**
- **Reinforced hinge**

GENERAL SPECIFICATIONS

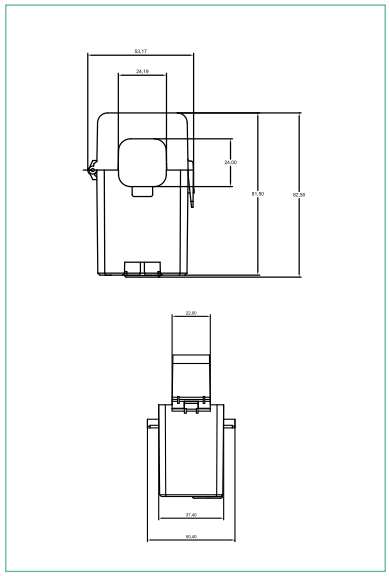
Max. grid voltage : 720 Vac
Dielectric test voltage : 3 kV 50 Hz 1 min
Secondary current : 1 A
Power : up to 1 VA
Frequency: 50 / 60 Hz
Operating temperature: -20 °C to +55 °C
Accuracy class: up to 0.5 %
Reference standard: IEC 61869-2

The **TC CLIP** models are compatible with all the measuring products on the market with 1 A CT input. In particular, they are compatible with tthe ENERIUM power monitors and ULYS submeters from CHAUVIN ARNOUX ENERGY®.

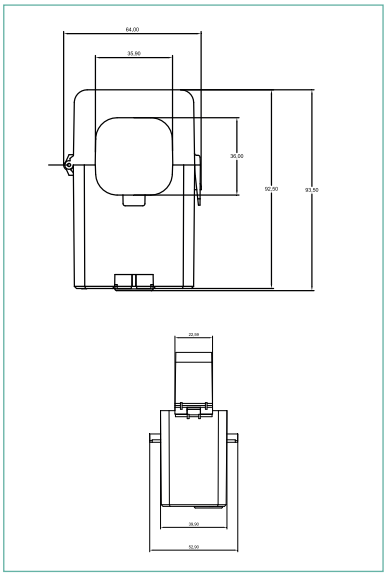
TCC16



TCC24



TCC36



	TCC16	TCC24	TCC24	TCC36	TCC36
Primary	60 A	100 A	250 A	400 A	600 A
Secondary			1A		
Power (VA)	0.2	0.2	0.5	1	1
Accuracy class	3	1	1	0.5	0.5
Diameter	16	24		36	
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)	127	188	188	262	262

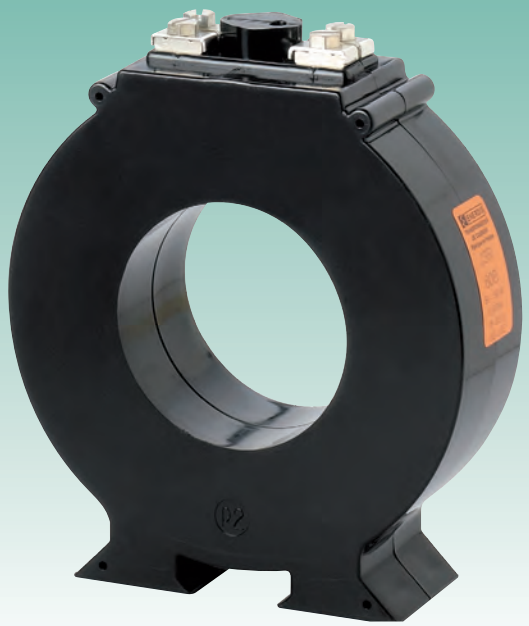
TO ORDER

Model	Reference
TCC16 60/1A	P01340400
TCC24 100/1A	P01340402
TCC24 250/1A	P01340404
TCC36 400/1A	P01340406
TCC36 600/1A	P01340408

Pack of 3 TC CLIP	Reference
Pack 3 TCC16 60/1A	P01340401
Pack 3 TCC24 100/1A	P01340403
Pack 3 TCC24 250/1A	P01340405
Pack 3 TCC36 400/1A	P01340407
Pack 3 TCC36 600/1A	P01340409

SINGLE-PHASE CORE CT RANGE

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



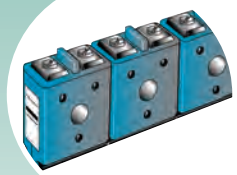
USER SECTORS

Industry

Energy transmission & distribution



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



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

- **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)**

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): 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 coZvOeOriMng (UL 94 VO)

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
- JV0 32 CR and JVP 624

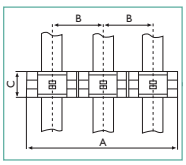
MOUNTING ACCESSORIES

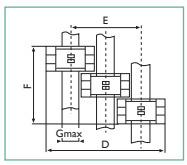
Model	1 CT mounting rail	2 CT mounting rail	3 CT mounting rail
JVR	ACCE 7652	ACCE 7653	ACCE 7655
J3R 80 B	ACCE 7640		

3CT MOUNTING

Dimensions

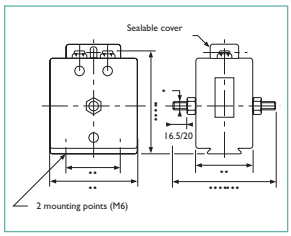
Model	A	B	C	D	E	F	G
JVP 1025	344	115	45	252	138	137	22
JVP 1045	404	135	45	312	178	137	42





JVR 86

Ø M8/M10 > 75 A
Weight : 1.2 kg

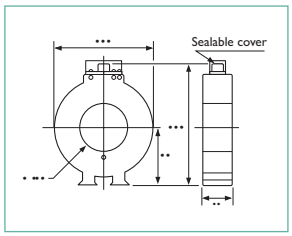


Power (VA) in class

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

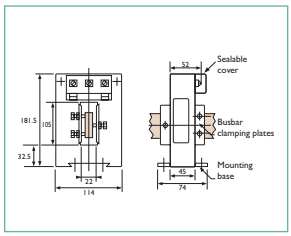


Power (VA) in class

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
1000 A	15	20	25
1250 A	15	20	25
1500 A	15	20	25

JVP 1025

Bar : 100 x 20 mm
Weight : 2 kg

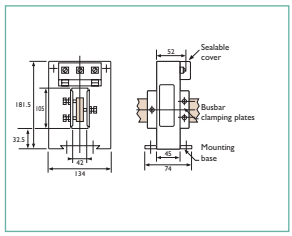


Power (VA) in class

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
1000 A	30	30
1250 A	30	30
1500 A	30	30
2000 A	30	30
2500 A	30	30
3000 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
1000 A	30	30
1250 A	30	30
1500 A	30	30
2000 A	30	30
2500 A	30	30
3000 A	30	30

TO ORDER

Primary	Secondary 5A
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
1000 A	J3RC 7530
1250 A	J3RC 7532
1500 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
1000 A	JVPT 8899
1250 A	JVPT 8900
1500 A	JVPT 8901
2000 A	JVPT 8902
2500 A	JVPT 8921
3000 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
1000 A	JVPU 8910
1250 A	JVPU 8911
1500 A	JVPU 8912
2000 A	JVPU 8913
2500 A	JVPU 8920
3000 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 CTn 2 CTs, 3 CTs.

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PRTC

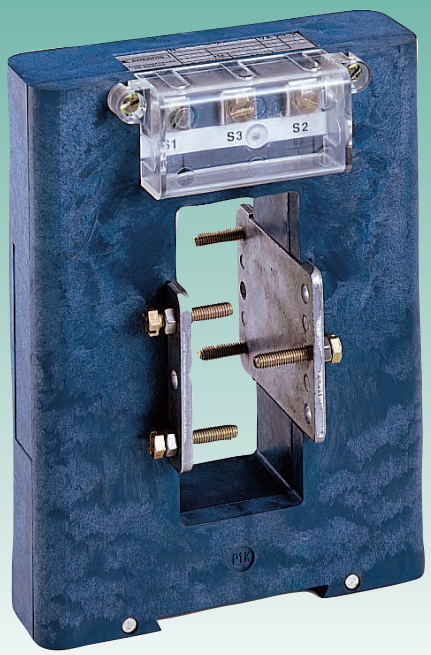
CT short-circuiter

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

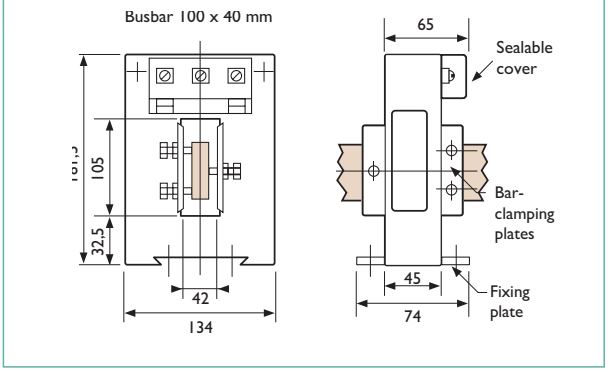
page 138

JVP 1045 B

Busbar primary 100 x 40 mm



- **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**



GENERAL SPECIFICATIONS

Reference standards: 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 VO)

TO ORDER

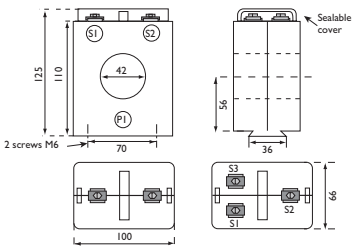
	Power (VA) in class 0.5		Weight (kg)
	7.5	15	
Primary	Secondary 5A		
500 A		JVPA 7569	2.50
1000 A		JVPA 7573	2.50
2000 A		JVPA 7576	2.50
500-1000 A*	JVPA 7589	JVPA 7585	2.50
1000-2000 A*	JVPA 7590	JVPA 7588	2.50

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 standards: 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: 110 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 VO)

TO ORDER

	Power (VA) in class 0.5			Weight (kg)
	15	7.5	15	
Primary	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

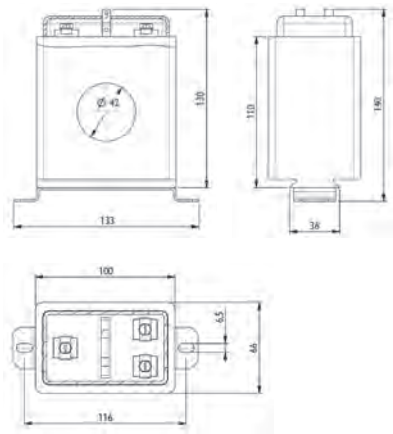


- Class 0.2s according to IEC 60044-1
- Particularly suitable for ENEDIS-qualified bi-rating electronic meters

GENERAL SPECIFICATIONS

Cable primary: JVO 40-100 S bi Rating : Ø 40 mm
Transformation ratio: JVO 40-100 S bi Rating : 200-500/5 A
Accuracy class: JVO 40-100 S : 0.2s
Precision power: JVO 40-100 S : 7.5 VA
Highest network voltage: JVO 40-100 S : 720 Vac
Rated frequency: JVO 40-100 S : 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
JVO 40-100 S bi-rating	P01379512

JVO 90-160 S
TRI-RATING

Cable primary Ø 90 mm

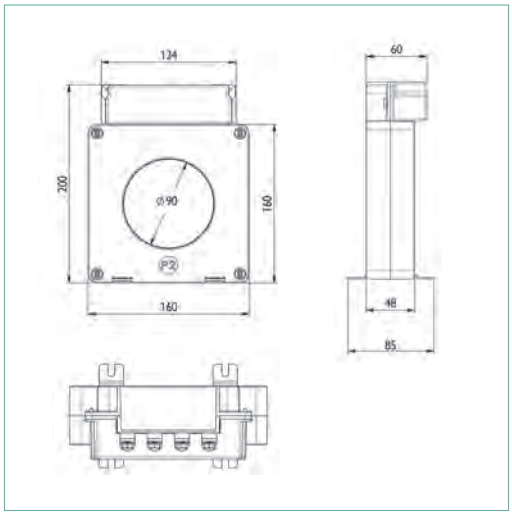


- Class 0.2s according to IEC 60044-1
- Particularly suitable for ENEDIS-qualified tri-rating electronic meters

GENERAL SPECIFICATIONS

Cable primary: Ø 90 mm
Transformation ratio: J500 - 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

JVP 1145 S
TRI-RATING

Cable/busbar primary

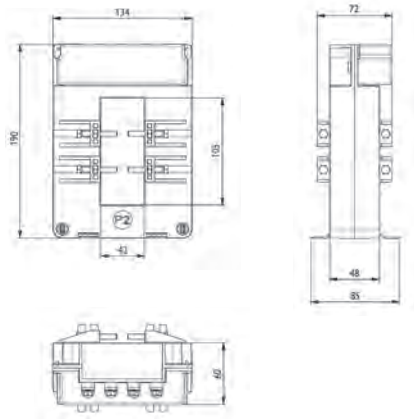


- Class 0.2s according to IEC 60044-1
- Particularly suitable for ENEDIS-qualified tri-rating electronic meters

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

DIMENSIONS



TO ORDER

Model	Reference
JVP 1145 S tri Rating	P01379510

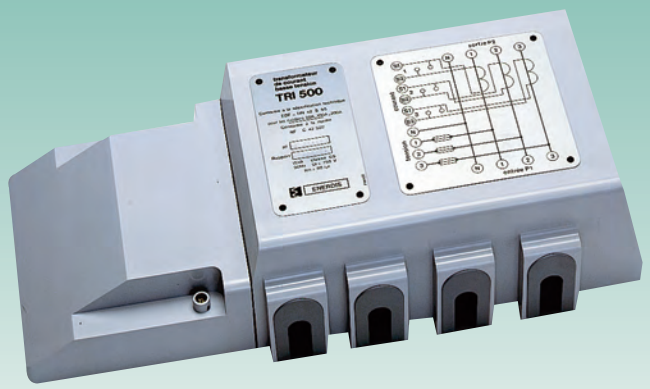
THREE-PHASE PLATE-MOUNTED CT RANGE

TRI 500

USER SECTORS

Industry

Energy transmission & distribution



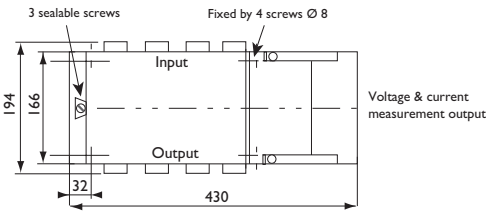
- Compliant with NF-C-42-502 standard
- Designed for three-phase LV metering

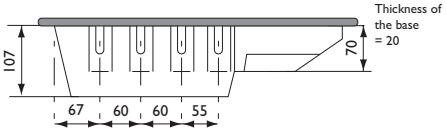
GENERAL SPECIFICATIONS

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

	Power (VA)	Weight (kg)
Primary	Class 0.5	
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

DIMENSIONS





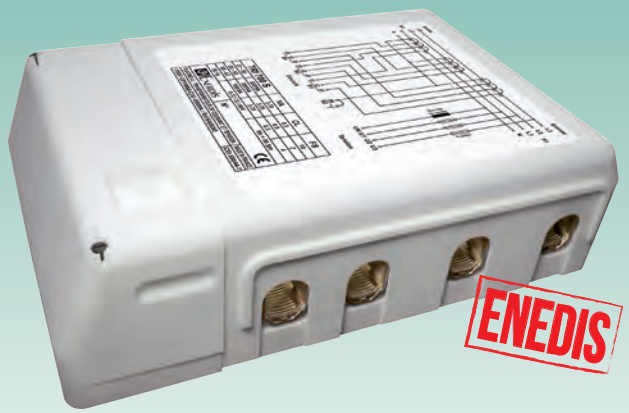
TO ORDER

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.

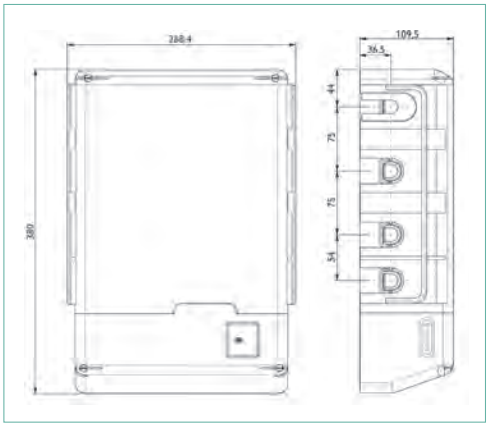
TRI 700

Transformers for tariff metering ERDF application



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

ENCOMBREMENT



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

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.



USER SECTORS

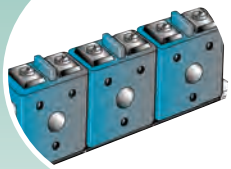
Tertiary

Industry

Energy efficiency



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

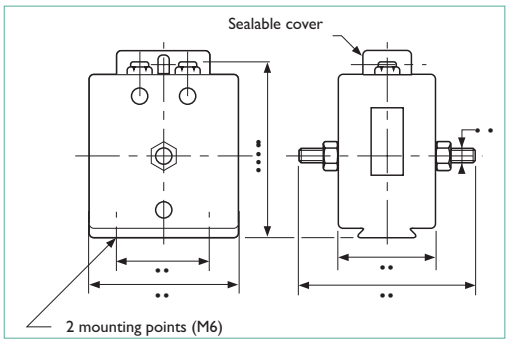


Mounting on plate or symmetrical rail

- **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 VO)



CABINET ACCESSORIES

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

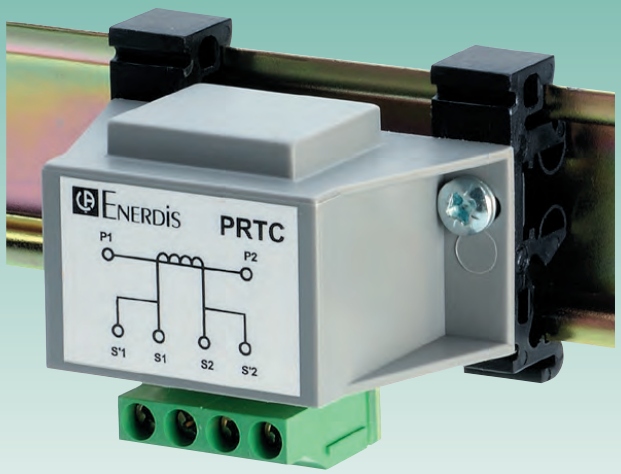
	Power (VA) in class			Weight
Primary	0.5	1	3	(kg)
5 + 5 A	15	20	30	1.20
5 + 5 + 5 A	15	20	30	1.20

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.

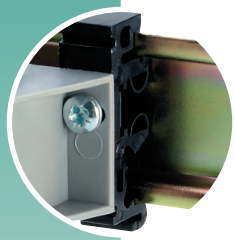


USER SECTORS

Tertiary

Industry

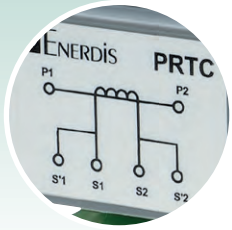
Energy efficiency



Mounting on DIN rail or plate



Four terminals available for 6 mm2 wires



Connection diagram

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 94VO)

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

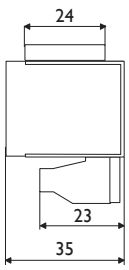
Maximum permitted current: 25 Aac

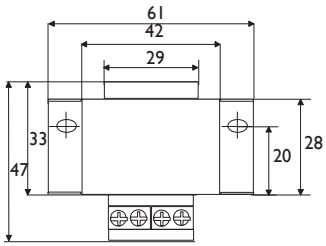
Peak protection voltage: 22 Vac

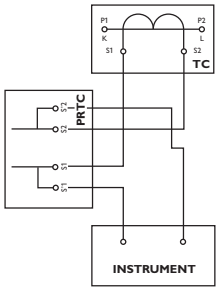
- **Protects users and equipment against overvoltages caused by opening the CT 5 A or 1 A secondary**
- **Automatic short-circuiting of CT secondary to which it is permanently connected**
- **Allows users to work without shutting down the load beforehand**

TO ORDER

Model	Reference
Transformer short-circuit switch	PRTC 1001



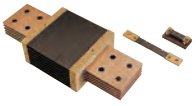




NOTES

CHOOSING YOUR SHUNTS

TERTIARY AND INDUSTRIAL CURRENT SHUNTS

	76-2 and 77-2			SHMI		
	page 142			page 144		
						
	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			■		■	
1000 A			■			■
1250 A			■			■
1500 A			■			■
2000 A			■			■
2500 A			■			■
3000 A			■			■
4000 A			■			■
5000 A						■
6000 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					

USER SECTORS

Tertiary

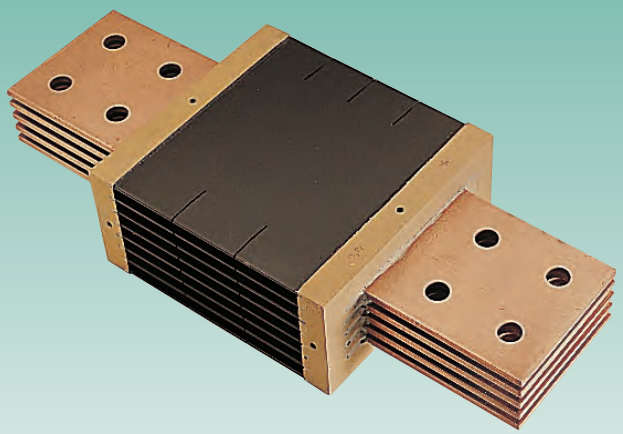
Industry

Energy efficiency

SHEL	SHMO
page 146	page 146
	
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.

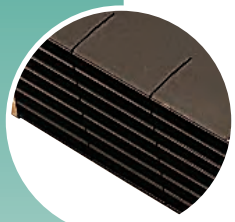


USER SECTORS

Tertiary

Industry

Energy efficiency



Protection against corrosion with epoxy-modified acrylic paint



Large-area fittings to facilitate heat dissipation

- **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

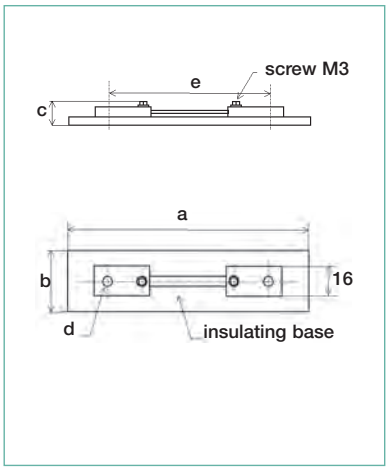
I nominal (In)	2 h	5 s Class 0.2	5 s Class 0.5 et 1
< 250 A	1.2 In	2 In	10 In
250 to 2000 A	1.2 In	2 In	5 In
> 2000 A	1.2 In	2 In	2 In

Compliance with standards:

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

76-2
EYE CONNECTION ON BASE

Voltage drop: 100 mV
Class 0.2 and 0.5

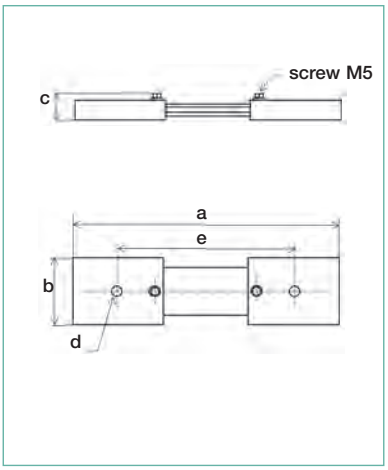


Dimensions (mm)

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

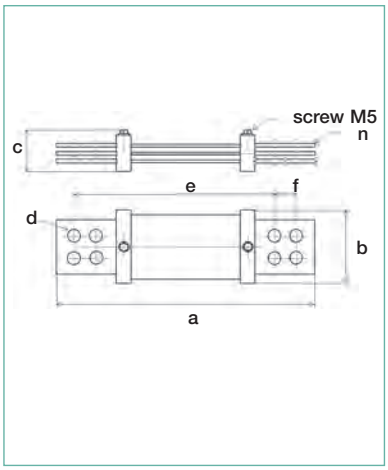


Dimensions (mm)

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
1000 A	380	115	35	14	280	50	1
1250 A	380	115	35	14	280	50	1
1500 A	380	115	55	14	280	50	2
2000 A	380	115	55	14	280	50	2
2500 A	400	168	55	14	300	50	3
3000 A	400	168	65	14	300	50	4
4000 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
1000 A	SHUN 1229	P01 3042 42
1250 A	SHUN 1230	P01 3042 49
1500 A	SHUN 1231	P01 3042 43
2000 A	SHUN 1232	P01 3042 44
2500 A	SHUN 1233	P01 3042 45
3000 A	SHUN 1234	P01 3042 46
4000 A	SHUN 1235	P01 3042 47

CUSTOMIZED PRODUCT

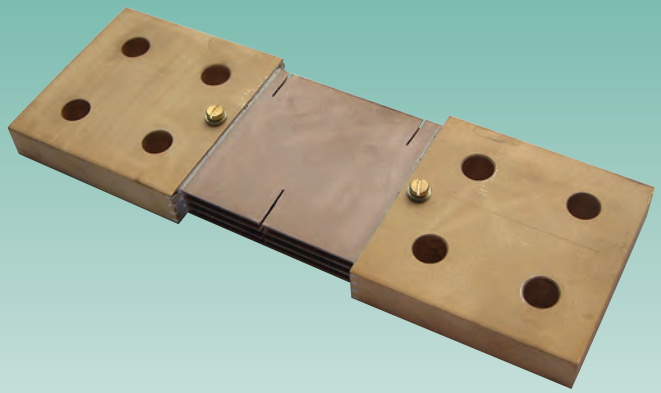
	Model (76-2 / 77-2)	Voltage drop	Accuracy class	Current
Example	77-2	50 mV	Class 0.2	800 A

SHMI
RANGE

Vast choice of industrial applications.

USER SECTORS

Tertiary | Industry | Energy efficiency





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 et 1
< 250 A	1.2 In	2 In	10 In
250 to 2000 A	1.2 In	2 In	5 In
> 2000 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)

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

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

ASSOCIATED PRODUCT

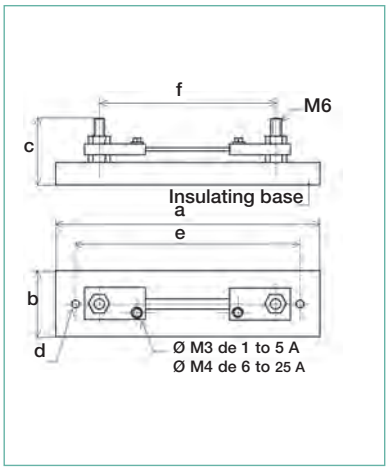


Mounting accessories
Screws, bolts and cables
Ratings from 1 to 750 A.
page 144

SHMI

1 A to 25 A
SCREW CONNECTION

Voltage drop: 100 mV
Class 0.5 and 1



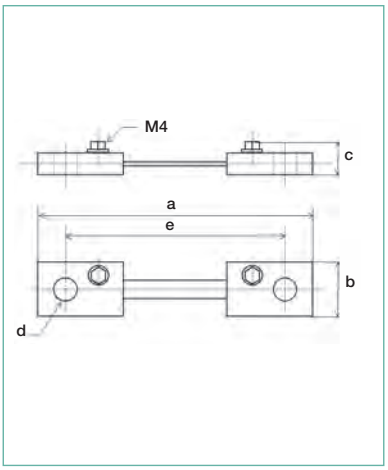
Dimensions (mm)

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
SCREW CONNECTION

Voltage drop: 100 mV
Class 0.5 and 1



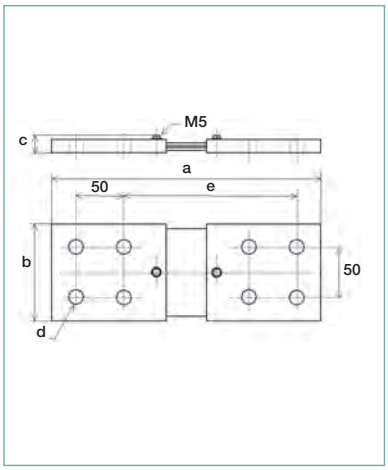
Dimensions (mm)

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

1000 A to 6000 A
BUSBAR CONNECTION BLOCK

Voltage drop: 100 mV
Class 0.5 and 1



Dimensions (mm)

Current	a	b	c	d	e
1000 A	290	100	20	14,5	190
1250 A	290	100	25	14,5	190
1500 A	290	100	25	14,5	190
2000 A	290	100	35	14,5	190
2500 A	290	100	45	14,5	190
3000 A	290	100	45	14,5	190
4000 A	330	150	45	16,5	230
5000 A	330	150	45	16.5	230
6000 A	330	150	45	16.5	230

TO ORDER

Reference for 100 mV

Current	Class 0.5	Class 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 0.2	Class 0.5
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

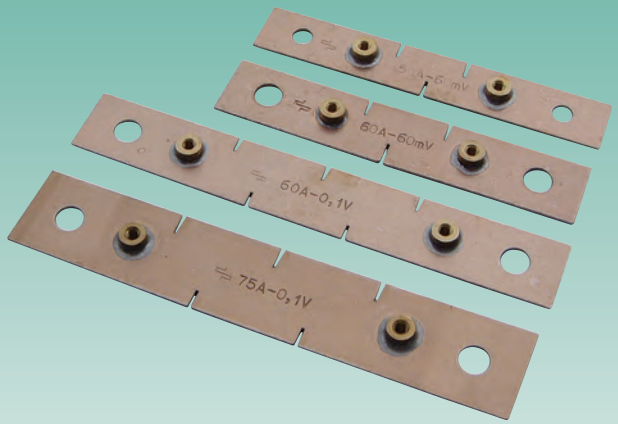
Current	Class 0.2	Class 0.5
1000 A	2901 0361	2901 0161
1250 A	2901 0362	2901 0162
1500 A	2901 0363	2901 0163
2000 A	2901 0364	2901 0164
2500 A	2901 0365	2901 0165
3000 A	2901 0366	2901 0166
4000 A	2901 0368	2901 0168
5000 A	2901 0369	2901 0169
6000 A	2901 0370	2901 0170

CUSTOMIZED PRODUCT

	Model	Voltage drop	Accuracy class	Current
	SHMI			
Example	SHMI	50 mV	Class 0.5	3000 A

SHEL AND SHMO RANGES

For simplified installation on low-power networks.



USER SECTORS

Tertiary

Industry

Energy efficiency

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

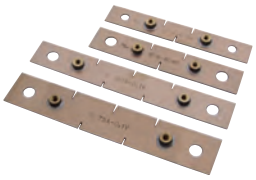
I nominal (In)	2 h	5 s
< 250 A	1.2 In	10 In
> 250 A	1.2 In	5 In

Permitted overloads:
On average and in normal operating conditions

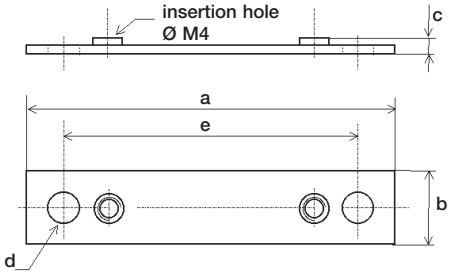
Compliance with standards:
Accuracy and influence factor: IEC 60051-1 to 9
Lead-free range: RoHS directive (2002/95/CE)

- **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)**

SHEL



Voltage drop: 100 mV Class 1



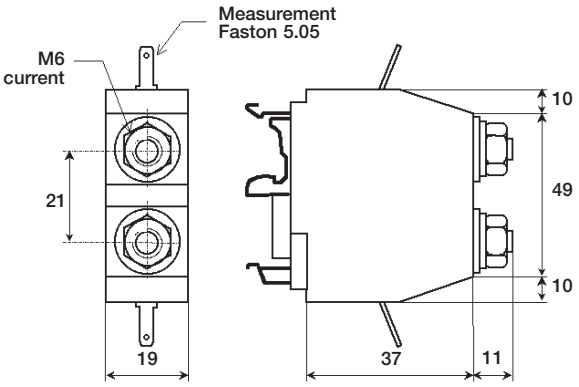
Dimensions (mm)

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

SHMO



Voltage drop: 100 mV Class 1



TO ORDER

Current	Reference for 100 mV 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

Current	Reference for 100 mV 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



150 OVERVIEW OF THE RANGE

155 CHOOSING YOUR TRANSDUCER

156 DIGITAL TRANSDUCERS

172 ANALOG TRANSDUCERS

182 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 156



TRIAD 2

Configurable via TRIADJUST 2 AC quantities

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

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ANALOG TRANSDUCERS

For nuclear environments

Vac | Iac | P | Q | F | PF
T°C | Vdc



T82N

1 analog output / Class 0.5

Suitable for the requirements of the nuclear market.

page 172

COMMUNICATION SOLUTION

For nuclear environments

Vac | Iac | P | Q | F | PF



ELINK 61850

ModBus /
IEC 61850 gateway

For TRIAD 2 transducers.

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USER SECTORS



Energy generation



Energy transmission & distribution



Nuclear



Naval applications

INFO & ADVICE

TRANSDUCERS



Transducers measure or physical quantities and transmit them as a standard analog signal (Vsc 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.

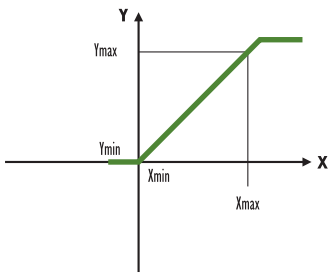
User-programmable

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.

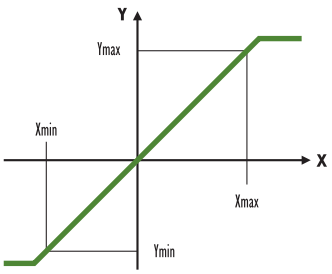


WHICH TRANSFER CURVES SHOULD YOU CHOOSE?

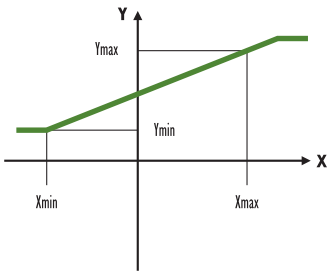
Linear



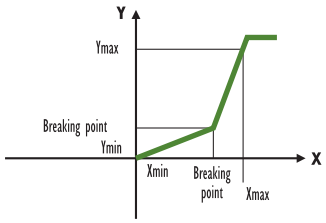
Linear without offset



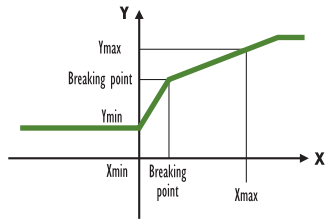
Linear with offset



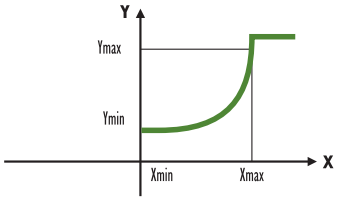
Linear with 2 extended slopes



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 156	page 172
		
Measurements		
Iac	■	■
Vac	■	■
Uac	■	
Vdc		■
P	■	■
Q	■	■
S	■	
F	■	■
PF	■	■
Cosφ	■	
Tanφ	■	
φ	■	
φ (U' – U")	■	
Temperature		■
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.



USER SECTORS

Energy generation

Energy transmission & distribution

Naval applications



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



Communication: Ethernet, RS 485 or optical head



Accessibility and safety:
arge-dimension terminals
Insulated circuits

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: 1A 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



Ergonomic: easy mounting on DIN rail or switchboard

- **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**

FACTORY-PROGRAMMABLE

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

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

PROGRAMMABLE VIA TRIADJUST 2

- **With the TRIADJUST 2 software and one of the 3 communication modes available (Ethernet, RS485 or optical head) you can program all the parameters characterizing a TRIAD 2 transducer.**
- To do so, simply choose a model which suits your electrical installation:
  - Type of network: split-phase, balanced or unbalanced three-phase, 3 or 4 wires.
  - Number of 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

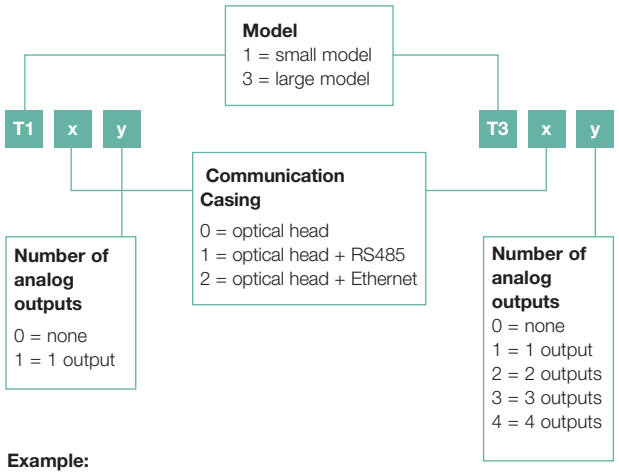
Model	Reference
Plate mounting for T1xy	ACCT 1007
Plate mounting for T3xy	ACCT 1006

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	■	■
	Energy values*	■	■
Balanced 3-phase, 3 wires	U12, U23, U31	■	■
	I1, I2, I3	■	■
	F	■	■
	Pt	■	■
	Qt	■	■
	St	■	■
	PFt	■	■
	Tanφ	■	■
	Cosφt	■	■
	φt	■	■
	Energy values*	■	■
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	■	■
	Energy values*	■	■
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		■
	Energy values*		■
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		■
	Energy values*		■

* Accessible via the product's Modbus communication

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) – 80 / 265 Vdc	
Low level	19 / 58 Vdc	
Consumption	High level T1: 3.3 VA to 8.5 VA max. T3: 9 VA to 20 VA max.	Low level T1: 3.2 W to 5.5 W max. T3: 5.5 W to 11 W max.
Analog outputs		
Rated values	Current ± 1mA, ± 5mA, ± 20mA	Voltage ± 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**	± 0.5 %	± 0.3 %	± 0.2 %	± 0.15 %	± 0.1 %

RT: Response time for F = 50 Hz

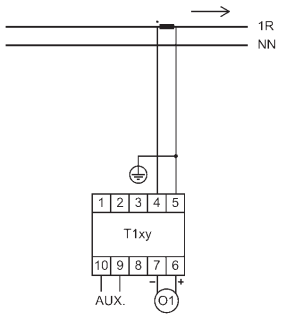
* These values may change according to the input and output measurement ranges

** Phase angle between voltages for φU and φV

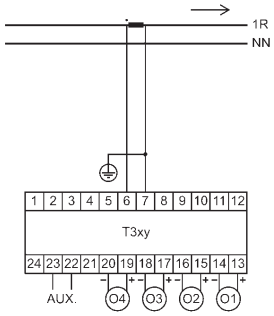
ELECTRICAL CONNECTIONS - SINGLE-PHASE NETWORK

I1, F:

TD201

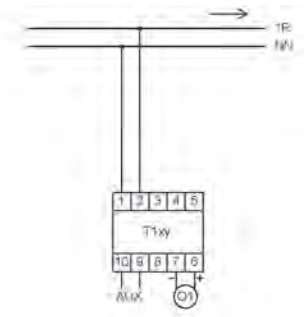


TD202

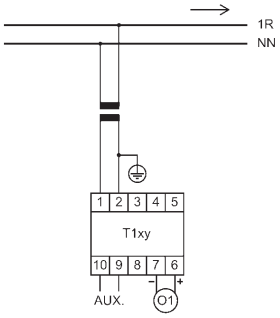


V1, F:

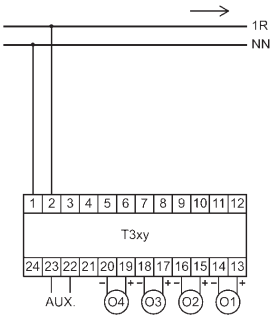
TD203



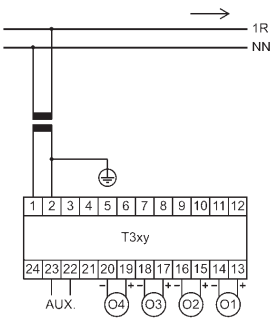
TD204



TD205

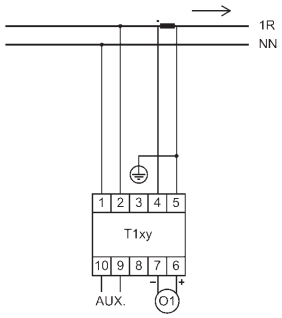


TD206

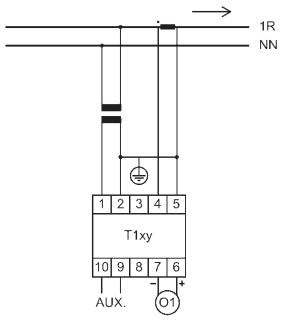


V1, I1, P1, Q1, S1, PF1, F, TANφ, Cosφ1, φ1:

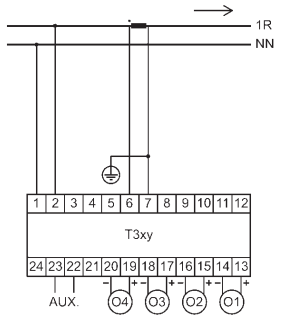
TD207



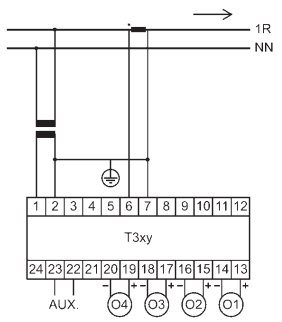
TD208



TD209



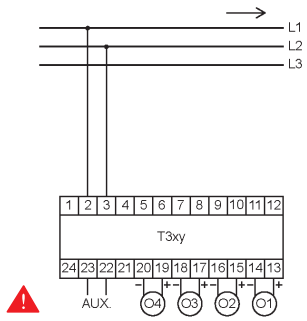
TD210



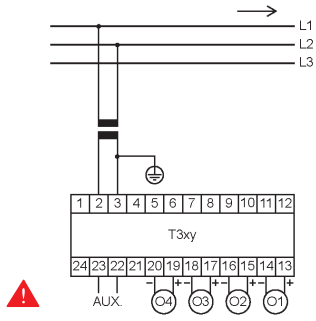
BALANCED 3-PHASE, 3-WIRE NETWORK

U12, U23, U31, F:

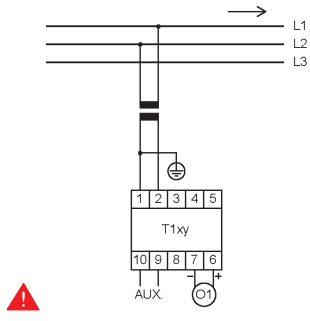
TD211



TD212

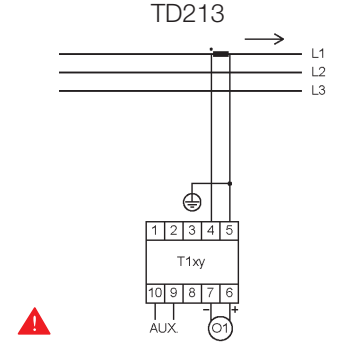


TD237

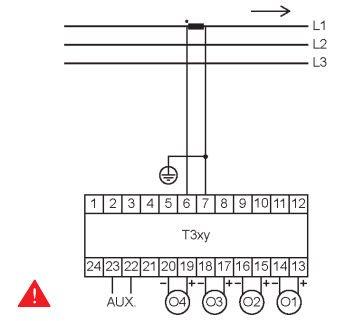


I1, I2, I3, F:

TD213

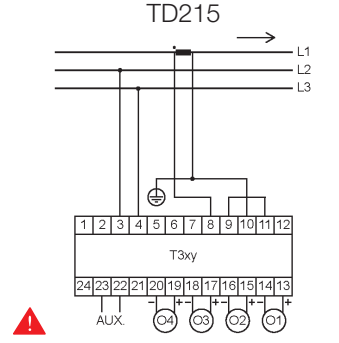


TD214

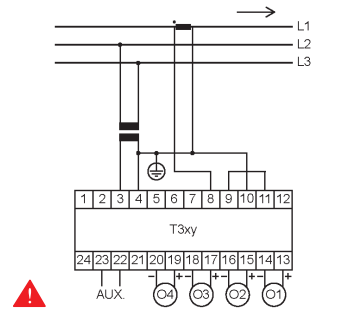


U12, U23, U31, I1, I2, I3, Pt, St, Qt, PFt, F, TANφ, Cosφt, φt :

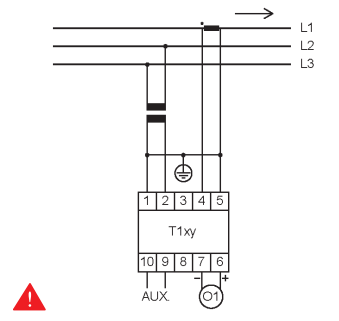
TD215



TD216



TD238

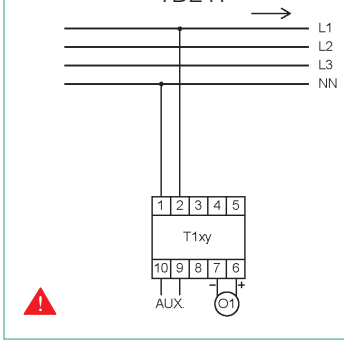


Phase rotation authorized

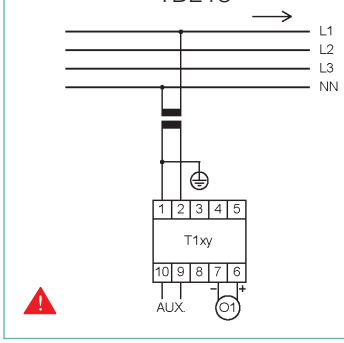
BALANCED 3-PHASE, 4-WIRE NETWORK

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

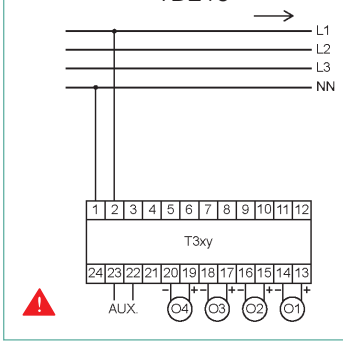
TD217



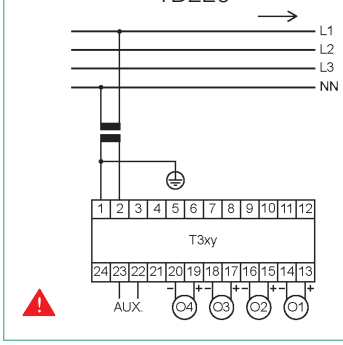
TD218



TD219

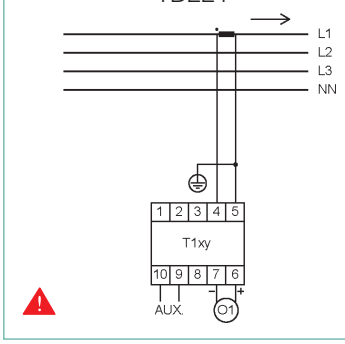


TD220

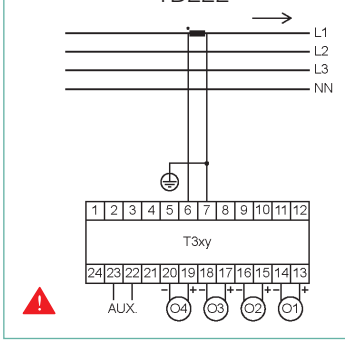


I1, I2, I3, F:

TD221



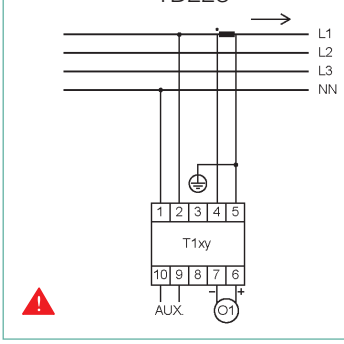
TD222



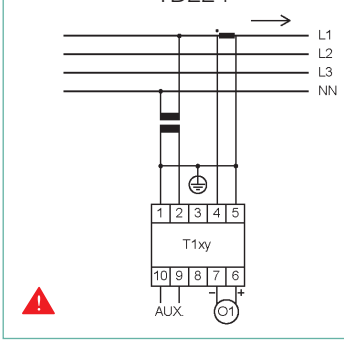
Phase rotation authorized

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:

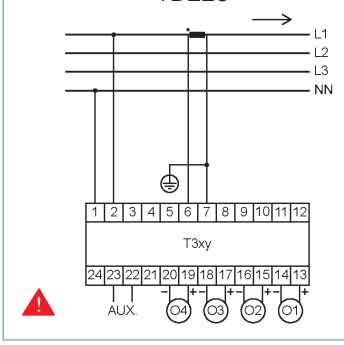
TD223



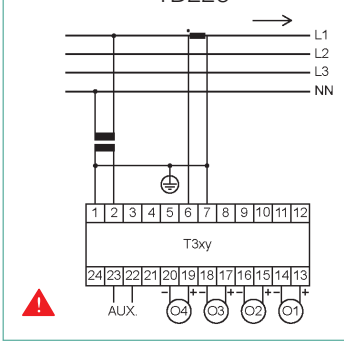
TD224



TD225



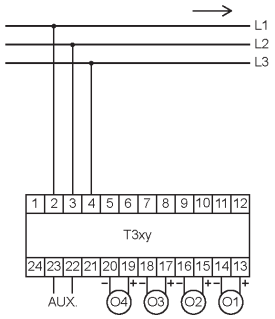
TD226



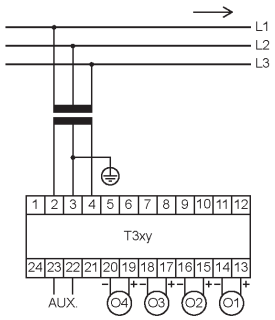
UNBALANCED 3-PHASE, 4-WIRE NETWORK

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

TD227

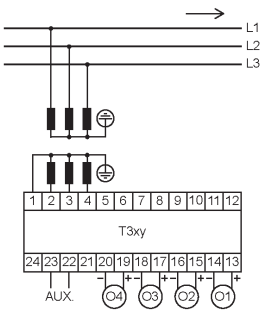


TD227D



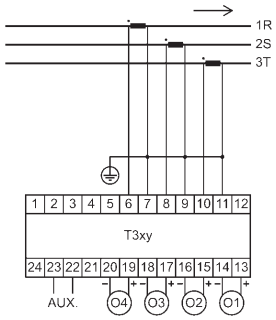
V1, V2, V3, U12, U23, U31, F,
Angle (V1/V2, V2/V3, V3/V1),
Angle (U12/U23, U23/U31, U31/U12):

TD227Y

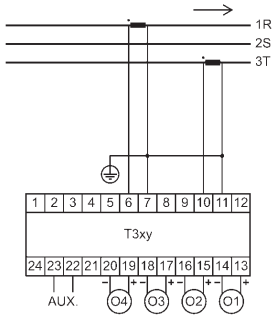


I1, I2, I3, F:

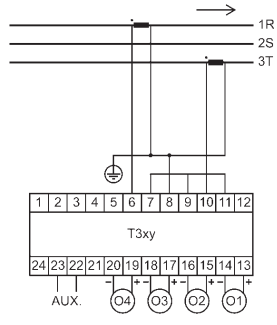
TD228



TD229



TD230

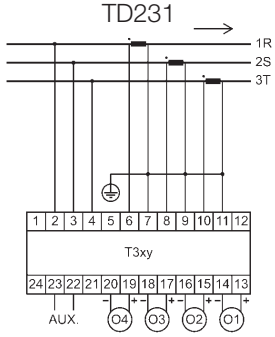


UNBALANCED 3-PHASE, 3-WIRE NETWORK (DIRECT CURRENTD)

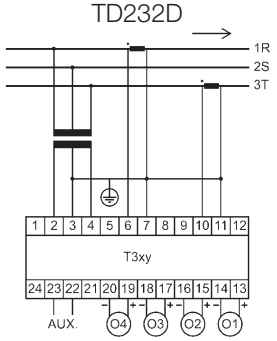
U12, U23, U31, I1, I2, I3, Pt, St, Qt, PFt, F, TANφ, Cosφt, φt, Angle (U12/U23, U23/U31, U31/U12):

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):

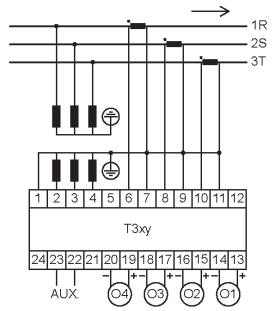
TD231



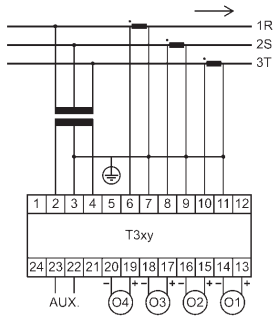
TD232D



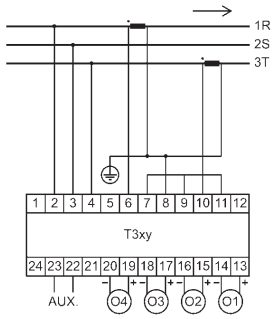
TD231Y



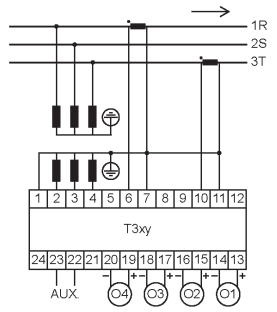
TD231D



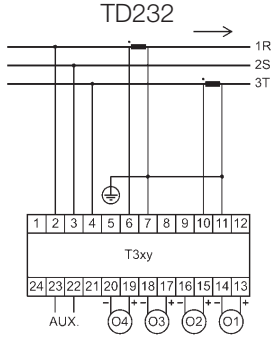
TD233



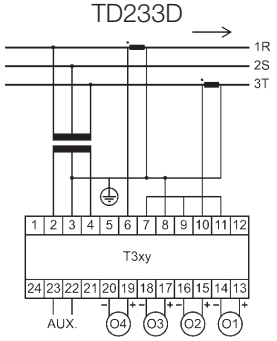
TD232Y



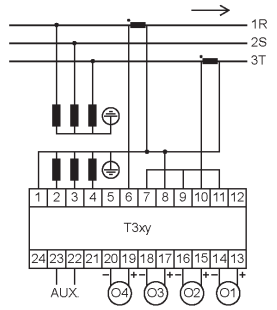
TD232



TD233D



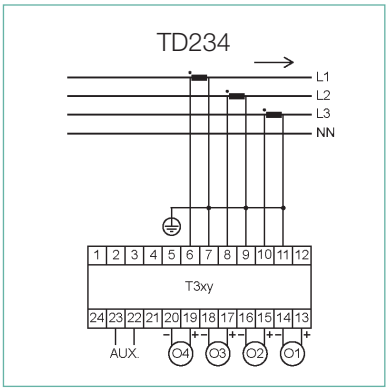
TD233Y



UNBALANCED 3-PHASE, 4-WIRE NETWORK

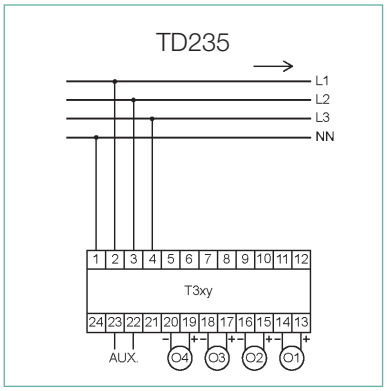
I1, I2, I3, F:

TD234

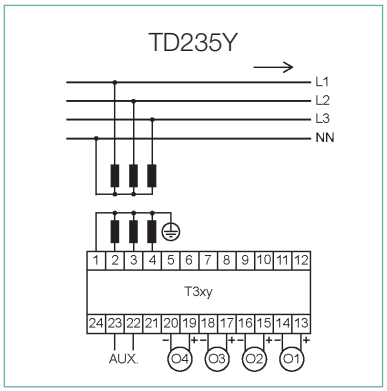


V1, V2, V3, U12, U23, U31, F, Angle (V1/V2, V2/V3, V3/V1), Angle (U12/U23, U23/U31, U31/U12):

TD235

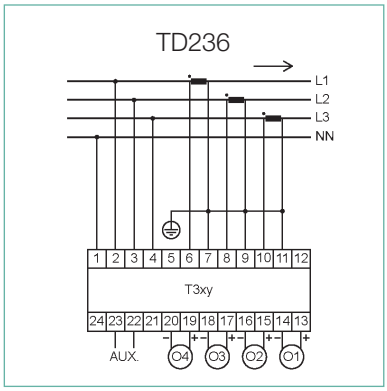


TD235Y

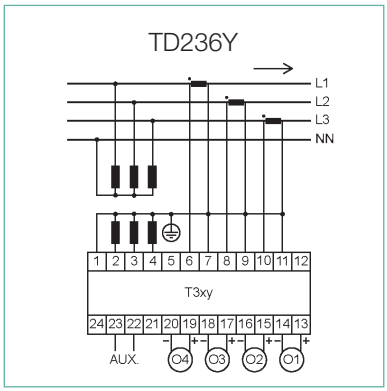


V1, V2, V3, U12, U23, U31, I1, I2, I3, P1, P2, P3, Pt, S1, S2, S3, St, Q1, Q2, Q3, Qt, PF1, PF2, PF3, PFt, F, TANφ, Cosφ1, Cosφ2, Cosφ3, Cosφt, φ1, φ2, φ3, φt Angle (V1/V2, V2/V3, V3/V1), Angle (U12/U23, U23/U31, U31/U12):

TD236



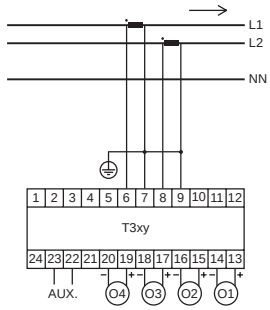
TD236Y



SPLIT-PHASE

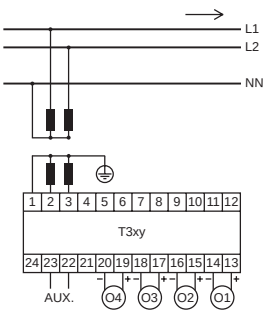
I1, I2, F :

TD239

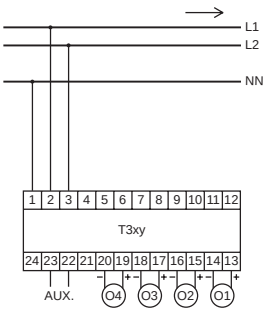


**V1, V2, U12, F, Angle (V1/V2) rad,
Angle (V1/V2) deg :**

TD240Y

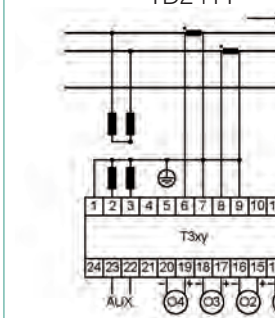


TD240

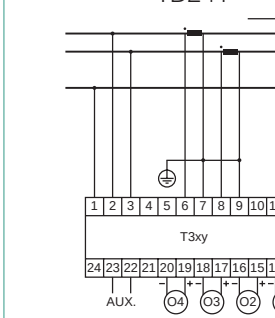


V1, V2, U12, I1, I2, P1, P2, Pt, Q1, Q2, Qt, S1, S2, St, PF1, PF2, PFt, F, tanφ, Angle (V1/V2) rad, Angle (V1/V2) deg, cos φ1, cos φ2, cosφt, φ1 Fund rad, φ2 Fund rad, φt Fund rad, φ1 Fund deg, φ2 Fund deg, φt Fund. deg, Angle V1/V2 Fund deg, I1 (signed), I2 (signed) :

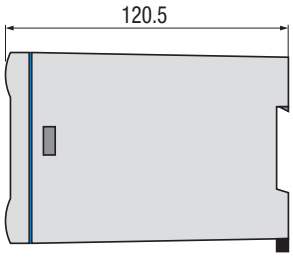
TD241Y



TD241

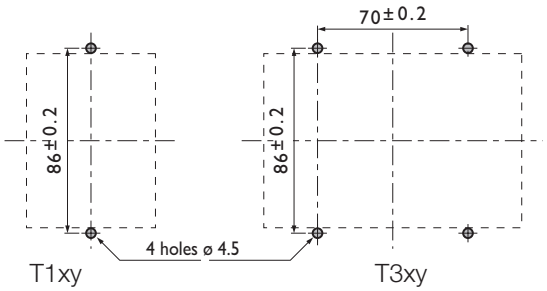


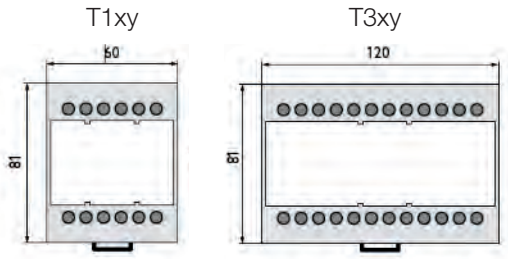
DIMENSIONS (IN MM)



All Models

Panel drilling diagram for plate mounting

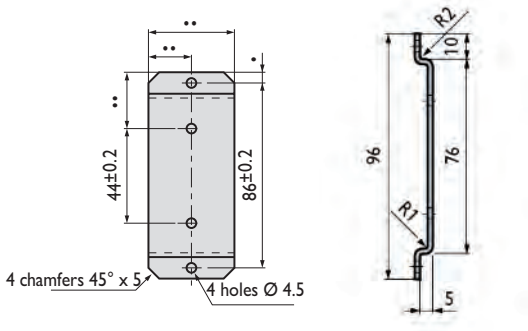




Weight : 320 g

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 mA
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 169.

FACTORY-PROGRAMMED TRIAD 2: ORDER FORM

1 - Model / Hz

☐ T1 or ☐ T3
☐ 50 Hz or ☐ 60 Hz

2 - Network

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

3 - Communication / Connection

☐ Ethernet or ☐ RS485
☐ 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 ou 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 signé

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
☐ 0.5 %	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
☐ 0.5 %	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
☐ 0.5 %	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
☐ 0.5 %	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.



USER SECTORS

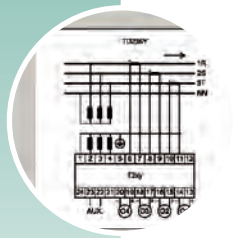
Energy generation

Energy transmission & distribution

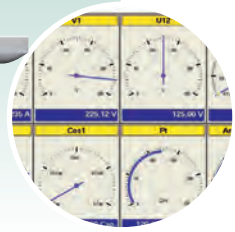
Naval applications



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

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 WindowsTM 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.

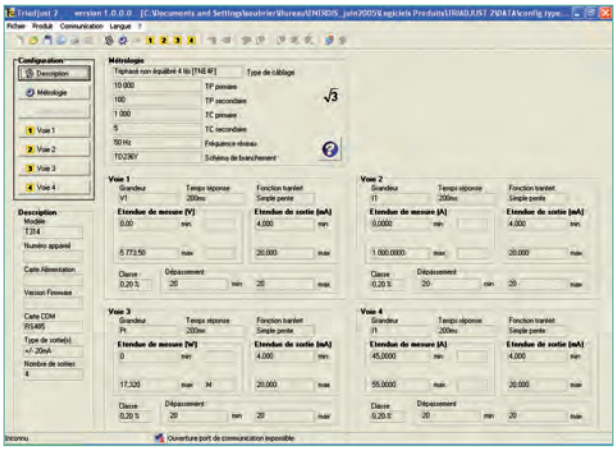
You can also print labels indicating the configurations and connections of your products.

- **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**

MINIMUM CONFIGURATION

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

KIT TRIADJUST 2

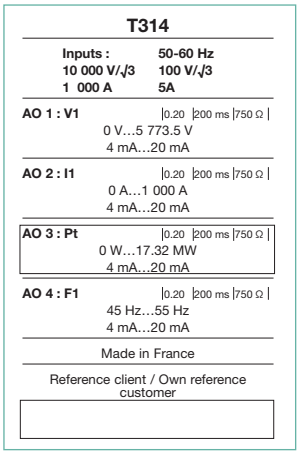


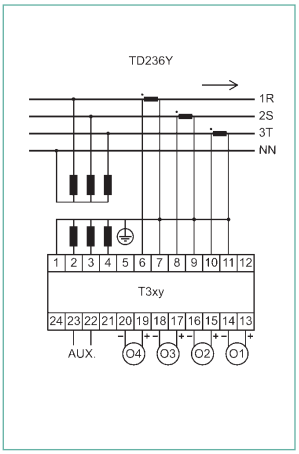
The TRIADJUST 2 configuration kit comprises:

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

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 PRODUCTS



TRIAD 2

Configurable via TRIADJUST 2
Programmable digital transducers, 1 to 4 analog outputs. Configurable accuracy class.
page 156

T82N
RANGE

Nuclear environments.Analog transducers for AC electrical quantities,class 0.5.



USER SECTORS

Nuclear



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

- **Ideal for the requirements of the nuclear market**
- **Plate-mounted and plug-in versions**
- **Configurable on request: Input quantities, transfer curve, output signal, etc.**

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.), centralized supervision systems (PLCs, SCADA, building management automation systems, etc.) and are also incorporated in measurement and control loops.



IAR 1210B
RMS AC current

UAR 1210B
RMS AC voltage

FAR 1210B
Frequency

UCR 1420B
DC voltage

QAR 1232B
Reactive power

PAR 1232B
Active power

JAR 1211B
Phase angle

RCL 1220B
Temperature

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 %

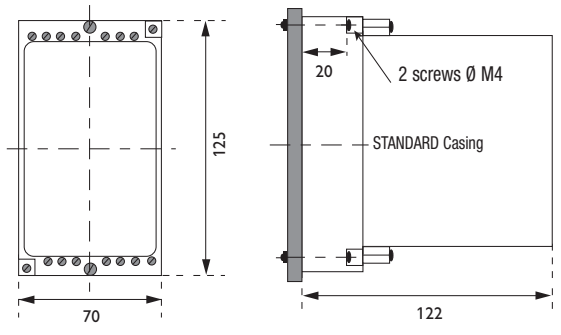
- **Auxiliary power supply**

Operating range:
- ± 10 % from 100/√3 Vac to 440 Vac
- ± 20 % from 24 to 125 Vdc

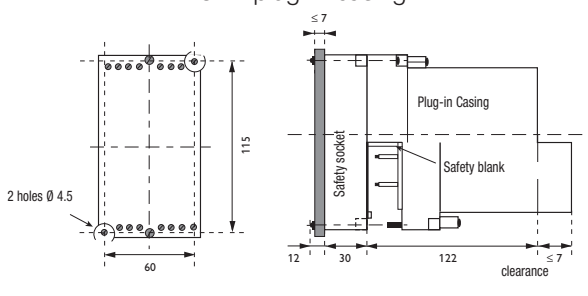
Consumption :
- ≤ 3 VA from 100/√3 to 440 Vac
- ≤ 3 W from 24 to 125 Vdc

DIMENSION (IN MM)

T82N plate-mounting casing



T82N plug-in casing



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 % to 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 Casing**



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
UCR 1420B	5	EMBB 4005
RCL 1220B	6	EMBB 4006

- **Mounting on DIN rail for plate-mounting or plug-in Casing**



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

ELECTRICAL CONNECTIONS

MS01-7562 or the User's Manuals.



Vac

ASSOCIATED PRODUCTS



Normeurope analog panel meters

Round / square barrel

For viewing an instantaneous and variable quantity.

page 222



Sockets

For plug-in casings

page 173



Mounting on DIN rail

Plate-mounting or plug-in

page 173

RMS AC VOLTAGE

Model		UAR 1210 B
Transfer curve		
Linear		■
Casing		
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"
Casing protection rating		
Plate-mounting		IP20

CUSTOMIZED PRODUCT

	Model	Casing	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**	☑



Iac

ASSOCIATED PRODUCTS



Normeurope analog panel meters

Round / square barrel

For viewing an instantaneous and variable quantity.

page 222



Sockets

For plug-in casings

page 173



Mounting on DIN rail

Plate-mounting or plug-in

page 173

RMS AC VOLTAGE

Model		IAR 1210 B
Transfer curve		
Linear		■
Casing		
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"
Casing protection rating		
Fixed / plate-mounting		IP20

CUSTOMIZED PRODUCT

	Model	Casing	Direct In or on CT	Measurement range	Fn	Analog output	Auxiliary supply	Protection	Tropicalization
Example	IAR 1210 B	Fixed	1000/5 A	0...1300 A	50 Hz	4-20 mA	48 Vdc	IP 20	☑



P

ASSOCIATED PRODUCTS



Normeurope analog panel meters

Round / square barrel

For viewing an instantaneous and variable quantity.

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Sockets

For plug-in casings

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Mounting on DIN rail

Plate-mounting or plug-in

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REACTIVE POWER

Model		PAR 1232 B
Network + connections		
Balanced three-phase - 3 wires		■
Unbalanced three-phase - 3 / 4 wires		■
Transfer curve		
Linear		■
Casing		
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"
Casing 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 (Network TE, TNE 3 fils)

★ Parameters to be specified when ordering

CUSTOMIZED PRODUCT

	Model	Network	Casing	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	CT 1000 / 5 A	VT 20 kV / 100 V	0... 120 Vac	50 Hz	4-20 mA	220 Vac	IP 20	☑



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ASSOCIATED PRODUCTS



Normeurope analog panel meters

Round / square barrel

For viewing an instantaneous and variable quantity.

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Sockets

For plug-in casings

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Mounting on DIN rail

Plate-mounting or plug-in

page 173

REACTIVE POWER

Model		QAR 1232 B
Network + connections		
Unbalanced three-phase - 3 / 4 wires		■
Transfer curve		
Linear		■
Casing		
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"
Casing 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	Casing	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	CT 1000 / 5 A	VT 20 kV / 100 V	0... 2.77 MW	50 Hz	4...20 mA	220 Vac	IP 20	☑



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ASSOCIATED PRODUCTS



Normeurope analog panel meters

Round / square barrel

For viewing an instantaneous and variable quantity.

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Sockets

For plug-in casings

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Mounting on DIN rail

Plate-mounting or plug-in

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REACTIVE POWER

Model		FAR 1210 B
Measurement		
Measurement type		Effective value
Input type		■
Casing		
Fixed / plate-mounting		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 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		■
Casing protection rating		
Fixed / plate-mounting		IP20

★ Parameters to be specified when ordering

CUSTOMIZED PRODUCT

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



PF

ASSOCIATED PRODUCTS



Normeurope analog panel meters

Round / square barrel

For viewing an instantaneous and variable quantity.

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Sockets

For plug-in casings

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Mounting on DIN rail

Plate-mounting or plug-in

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PHASE ANGLE

Model		JAR 1211 B
Network		
Single-phase		■
Casing		
Fixed/plug-in		0.7 kg
Measurement input		
In Current		Direct or on CT: "1" "5" "10 A"
Un Voltage		Direct or on VT : "100/√3" "110/√3" "115/√3" "100" "110" "115" "127" "230" "240" "380" "400"
Fn Frequency		50 Hz, 60 Hz
Measurement range 0...Xmax		±1.35 ≥Sn(1) ≥ ±0.50
Consumption		Input I: ≤ 0.3 VA; Input U: ≥ 1 kΩ/ V
Analog output		
		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		0.5 %
Auxiliary power 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		■
Protection for casing		
Fixed/plug-in		IP20

★ Parameters to be specified 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	☑



Vdc

ASSOCIATED PRODUCTS



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

Model		UCR1420B
Measurement		
DC voltage		■
Transfer curve		
Linear		■
Casing		
Fixed		0.7 kg
Plug-in		0.7 kg
Voltage input		
Voltage Un		5mV ⩽ Un ⩽ 300V
Measurement range 0 ... Xmax		5mV ... 300V
Input resistance		Umax ⩽ 0.3V : 1MΩ Umax ⩽ 20V : 30kΩ + (10kΩ / Umax) Umax ⩽ 200V : Umax * 10kΩ Umax > 200V : 2.5MΩ
Analog output		
Current	0...Ymax	"0/1 mA" "0/2.5 mA" "0/5 mA" "0/10 mA" "0/20 mA
	Ymin...Ymax	"0/1 mA" "0/2.5 mA" "0/5 mA" "0/10 mA" "0/20 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 power 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"
Casing protection		
Fixed		IP20
Plug-in		IP20

★ Parameters to indicate when ordering

CUSTOMIZED PRODUCT

	Model	Casing	Measurement range	Analog output	Auxiliary power supply	Ingress protection	Tropicalization
★							
Example	UCR1420B	Fixed	0...150Vdc	4...20 mA	48Vdc	IP 20	☑



T°C

TEMPERATURE

Model		RCL 1220B	
Measurement			
Temperature		■	
Transfer curve			
Linear		■	
Casing			
Fixed		0.7 kg	
Plug-in		0.7 kg	
Measurement input			
Type		Platinum	Copper
Thermocouple break safety		Max output or Min output	
Mounting		2, 3 or 4 wires	
Measurement range Xmin ... Xmax		0 ... 500°C	0 ... 200°C
Current in probe		2 mA	3 mA
Line resistance		0.5%	
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 power 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"	
Casing protection			
Fixed		IP20	
Plug-in		IP20	

CUSTOMIZED PRODUCT

	Model	Casing	Sensor type	Safety	Mounting	Line resistance	Analog output	Auxiliary power supply	Ingress protection	Tropicalization
Example	**RCR1220B**	**Fixed**	**Plate**	**Max output**	**3 wires**	**2 Ω**	**4...20 mA**	**48Vdc**	**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 casings
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Mounting on DIN rail
Plate-mounting or plug-in
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CHAUVIN ARNOUX PYROCONTROLE

Thermocouple/probe:
Pyrocontrole Catalog

ELINK 61850

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



USER SECTORS

Energy generation

Energy transmission & distribution

Naval applications



IEC 61850 server Ethernet port



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

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

- **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**

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

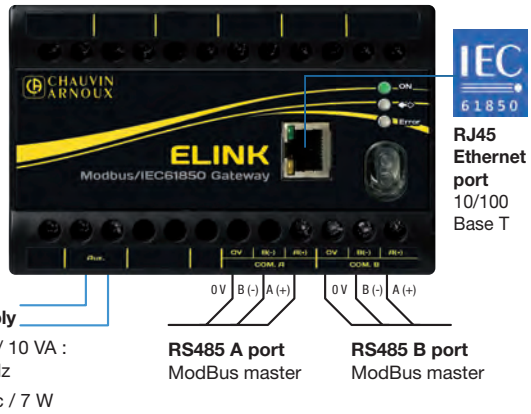
MECHANICAL SPECIFICATIONS

Weight	560 g
Mounting	On DIN rail
Connection Cable cross-section	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



TO ORDER

Model	Reference
ELINK 61850	P01 3808 50

ASSOCIATED PRODUCTS



TRIAD 2
Digital transducers
1 to 4 analog outputs. Class 0.1.
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ENERIUM
Power meters
Multi-energy, qualimetry.
page 64



NETWORK SUPERVISION AND PHYSICAL MEASUREMENT

PANEL METERS

AND

SYNCHROCOUPLER



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DIGITAL PANEL METERS AND SYNCHROCOUPLER

µDIGI1 ET µDIGI2 RANGES



µDIGI1

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

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µDIGI2

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

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CA 2150 RANGE



CA 2150

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

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SYNCHRONIZATION UNIT



Synchrocoupleur

Synchronization units for LV networks.

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SELECTION GUIDE

USER SECTORS

Industry

Energy generation

Naval applications

		µDIGI1 / µDIGI2 range		CA 2150 range
		page 190	page 194	page 198
				
		µDIGI1	**µDIGI2**	**CA 2150**
Front panel format (mm)		24 x 48	48 x 96	48 x 96
Display range (in counts)		-1999 / +9999	-1999 / +9999	-19999 / +19999
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.

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.

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.

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

µDIGI1
RANGE

24 x 48 mm programmable panel meters for industrial use.



USER SECTORS

Industry

Energy generation

Naval applications



Plug-in connectors for quick and easy connection



Display with 4 levels of brightness

PROGRAMMING

Quick and easy:

- **Local** programming using the 3 keys of the keypad. Only the instructions required for the application are shown. No mistakes are possible. Access to programming can be protected on all the instruments.

- **Simple programming using 3 keys**
- **Instant mounting without tools**
- **Compact dimensions**

µDIGI1-LP

4-20mA process signal

- **Input:** 4-20 mA
- **Display range:**
  -1 999… 9 999

µDIGI1-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

µDIGI1-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
Self-powered (active loop)	P01 330 000

Power supply	Reference
85 - 265 Vac & 100 - 300 Vdc	P01 330 031
22 - 53 Vac & 10.5 - 70 Vdc	P01 330 032

Power supply	Reference
85 - 265 Vac & 100 - 300 Vdc	P01 330 011
22 - 53 Vac & 10.5 - 70 Vdc	P01 330 012

ASSOCIATED PRODUCTS



Current transformers & shunts
Tertiary, industrial, tariff
5 to 5,000 A.
page 120

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

Storage temperature	-10 °C to +60 °C
Storage temperature	-25 °C to +85 °C
Relative humidity	< 95 % at +40 °C
Max. altitude	2 000 m

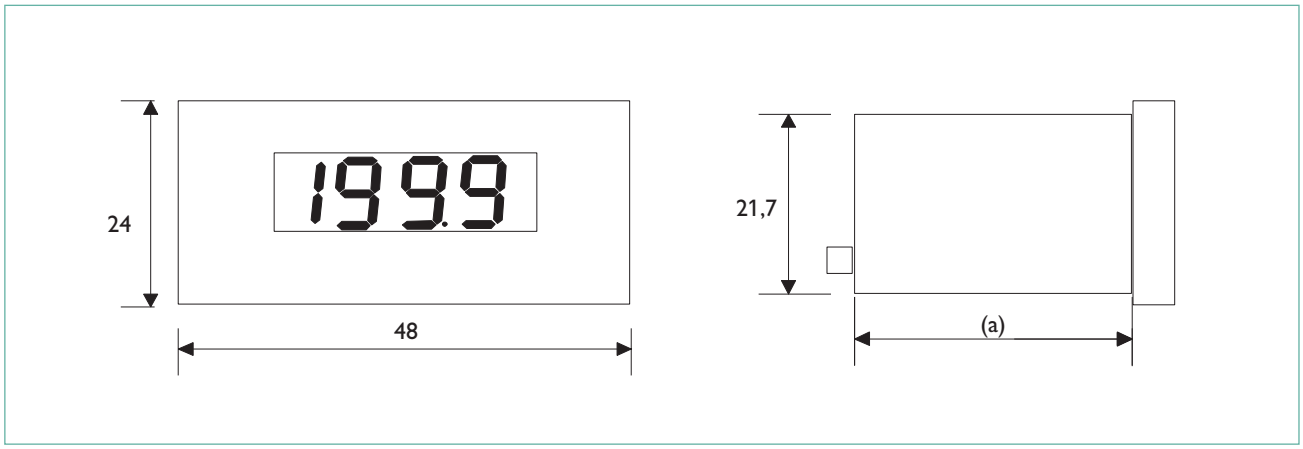
POWER SUPPLY

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

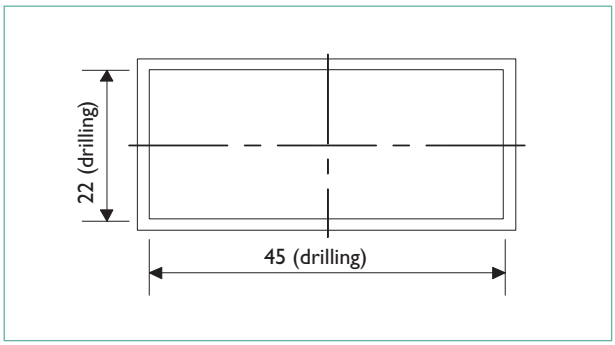
Insulation – dielectric strength: EN 611010-1 (category II installation)
EMC – immunity/emission: EN 61000-4-2, EN 61000-4-3, EN 61000-4-4 / EN 55022
(EN 610000-4-6 for µDIGI1-LP – EN 61000-4-5)

DIMENSIONS (IN MM)



	µDIGI1-LP	µDIGI1-P	µDIGI1-E
(a)	40 mm	70 mm	

(A) PANEL DRILLING SPECIFICATIONS (IN MM)



µDIGI2
RANGE

Programmable panel meters in 48 x 96 mm format for industrial applications.



USER SECTORS

Industry | Energy generation | Naval applications



Simple programming with 3 keys on front panel



Easy installation of option boards



Quick connection using plug-in connectors

DESCRIPTION

- Display on 4 digits
- MIN/MAX values stored
- Power supply with large dynamic range
- Programming on front panel

• Economical single-function range
• Instant fitting without tools

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

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

Power supply	Reference
20/265 Vac - 11/265 Vdc	P01 330 081

Power supply	Reference
20/265 Vac - 11/265 Vdc	P01 330 080

ASSOCIATED PRODUCTS



Accessories and option boards
Alarm boards
page 194



Current transformers & shunts
Tertiary, industrial, tariff
5 to 5,000 A..
page 120



Tachometric sensor
Please contact us

Thermocouple / probe
See Pyrocontrole Catalog

CHAUVIN ARNOUX
PYROCONTROLE

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 % of reading
Vac	**±20 V**	±0.1 % of reading
	±200 V	±0.25 % of reading
	±600 V	±0.35 % of reading
Process signal		±0.1 % of reading
Temperature	**Thermocouple J. K. N**	±0.1 % of reading
	Thermocouple T	±0.2 % of reading
	Pt 100 / Pt 1000	±0.15 % of reading
Potentiometer		±0.1 % of reading
Resistance		±0.1 % of reading

MECHANICAL SPECIFICATIONS

Material	Polycarbonate V0 as per UL94
Weight	150 g
Protection rating	IP 65 on front panel
Mounting	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
Max. altitude	2 000 m

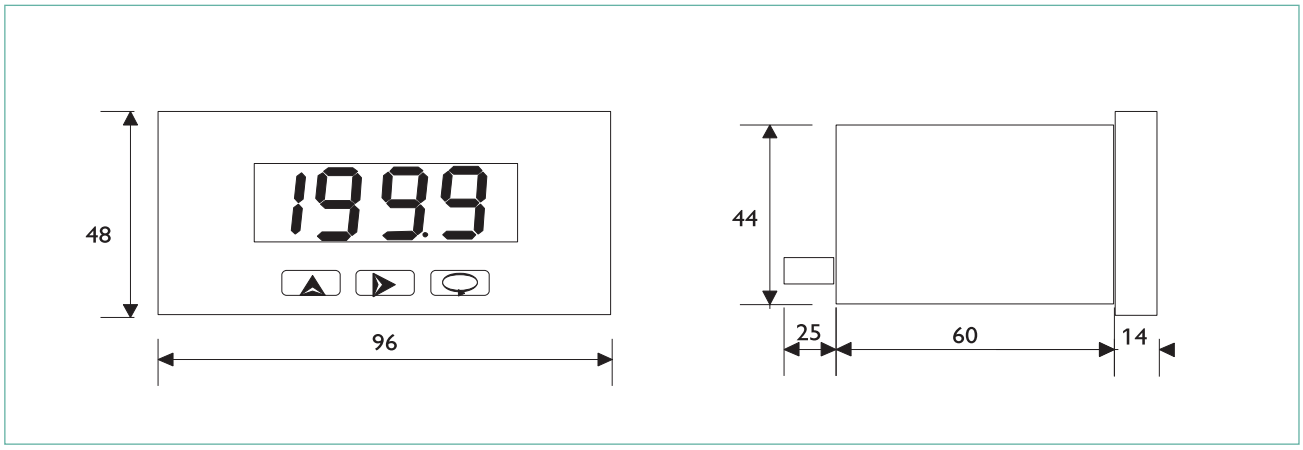
POWER SUPPLY

Voltage	20/265 Vac - 50/60 Hz – 11/265 Vdc
Consumption	3 VA/3 W

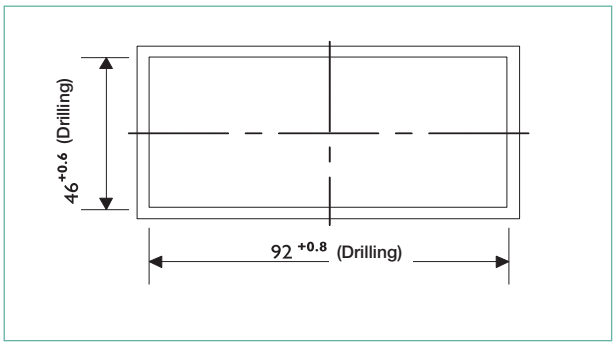
STANDARD

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.

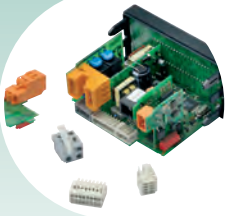


USER SECTORS

Industry | Energy generation | Naval applications



3 display colors



Quick connection using plug-in connectors (spring-cage type)

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.

- **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**

OPTION BOARDS*

Model	Reference
CA 2XXX AL 2-relay board	P01 3193 01
CA 2XXX AL 4-relay board	P01 3193 03
CA 2XXX AL 4 NPN board	P01 3193 04
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

- Auxiliary power supply: 85-265 Vac & 100-300 Vdc : **1**; 22-53 Vac & 10.5-70 Vdc : **2**
- Alarm: None : **X**; 2 relays : **1**; 4 relays : **2**; 4 transistors : **3**
- Analog output: None : **X**; 4-20 mA : **1**; 0-10 V : **2**
- Digital communication: None : **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

Power supply	Reference
Self-powered (active loop)	P01 330 000

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	1200, 2400, 4800, 9600 or 19200 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	± 1 9999	± 1 9999			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

Model	Input	Excitation
CA 2150-M	Process	24 Vdc @ 60 mA, 10/5 Vdc @ 60 mA
	Load cell	10/5 Vdc @ 60 mA
	Resistance	10 Vdc
	Temperature	< 1 mAdc
CA 2150-D	-	8 Vdc @ 30 mA 20 Vdc (unstabilized) @ 100 mA

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	

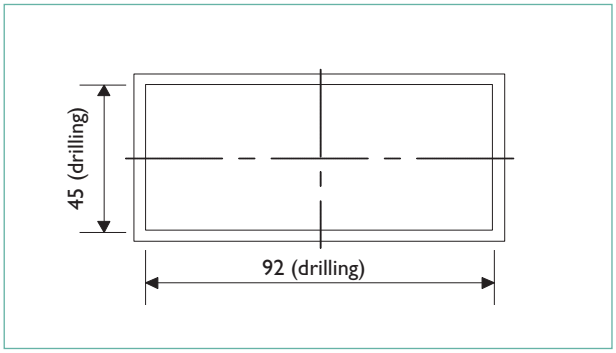
SPECIAL FUNCTIONS

- Reset to factory configuration
- Change of display color
- Total or partial locking of programming by code
- Display with 2 levels of brightness

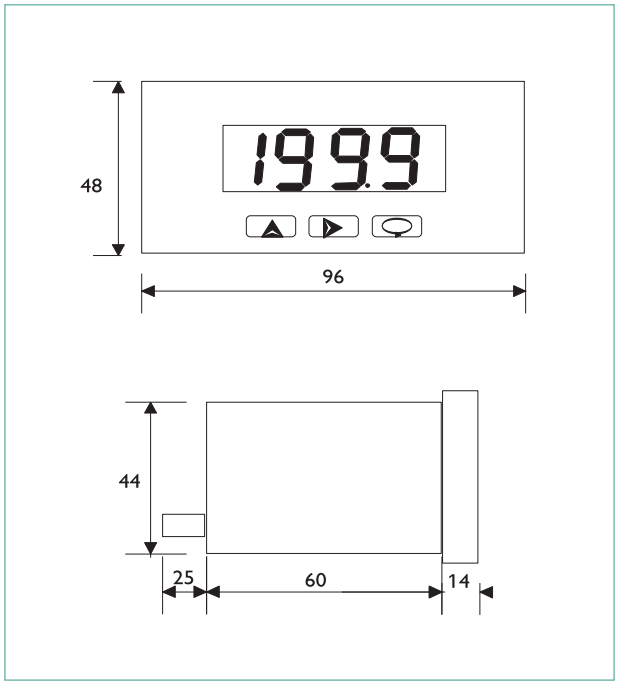
STANDARDS

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	Reference
20/265 Vac - 11/265 Vdc	P01 330 081

Power supply	CA 2150-E	CA 2150-M	CA 2150-D
85 - 265 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
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Current transformers & shunts
Tertiary, industrial, tariff 5 to 5,000 A.
page 120



Tachometric sensor
Please contact us

Thermocouple / probe
See Pyrocontrole Catalog

SYNCHROCOUPLER RANGE

Synchronization instruments for LV networks.



USER SECTORS

Industry

Energy generation

Naval applications



Display of deviations between setpoint and measurement



Digital display of 3 measurements: phase, frequency and voltage



User-programmable

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)

- **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)**

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

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 421X
48 VDC	LS9N 422X
110 VAC	LS9N 423X
230 VAC	LS9N 424X
400 VAC	LS9N 425X

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 % to 40 °C
Installation categorye	3
Pollution level	2

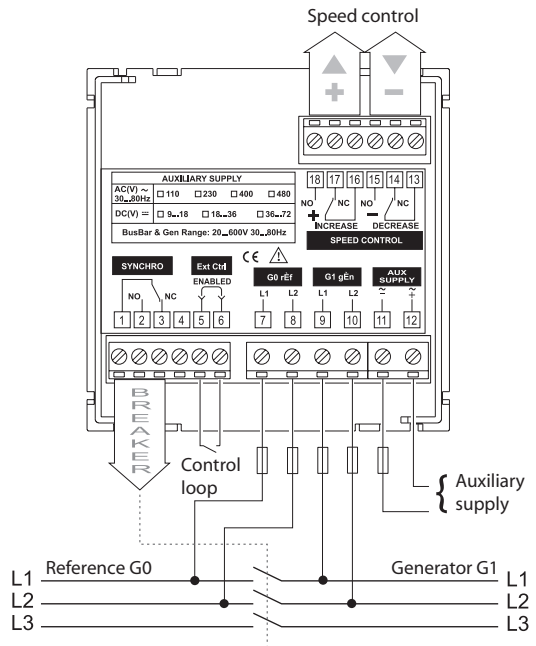
MECHANICAL SPECIFICATIONS

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

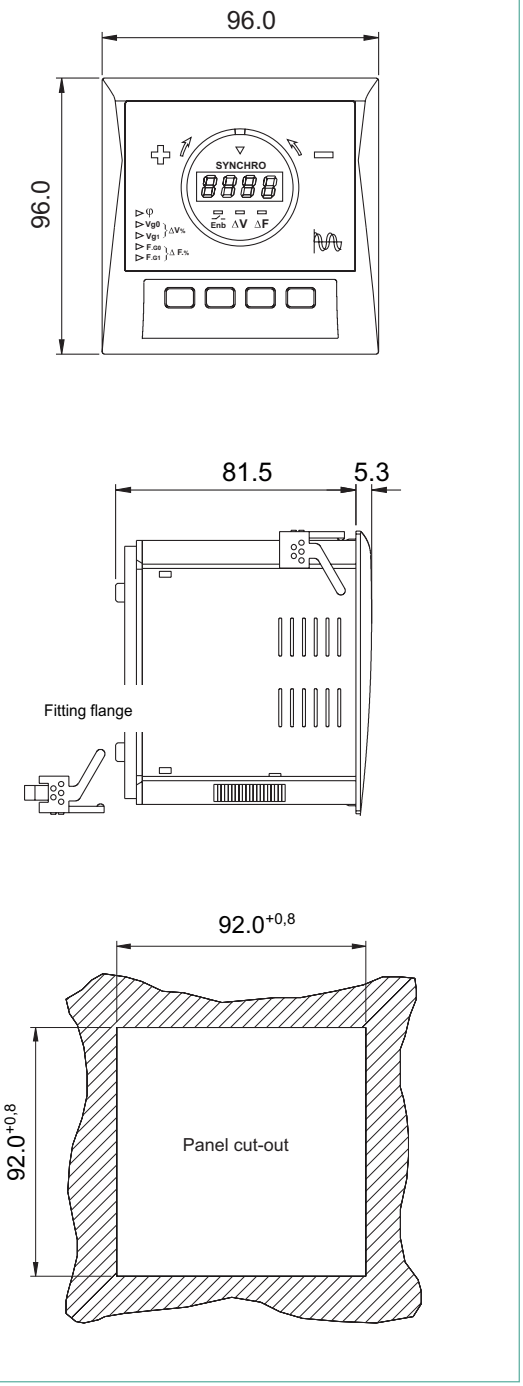
Reference standards	
Safety	IEC 61010-1
Dimensions	DIN 43700
EMC	EN 61326-1
ANSI function	Nos. 25 and 90
Resistance to shock	IEC 60068-2-27
Resistance to vibrations	IEC 60068-2-6
Environment	IEC 60068-1

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 214



AC voltmeter

Analog panel meters with round barrels for day-to-day industrial requirements.

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Frequency meter

IAnalog panel meters with round barrels for day-to-day industrial requirements.

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Wattmeter Varmeter

Analog panel meters with round barrels for day-to-day industrial requirements

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Phasemeter

Analog panel meters with round barrels for day to-day industrial requirements.

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DC ammeter

Analog panel meters with round barrels for day-to-day industrial requirements.

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DC voltmeter

Analog panel meters with round barrels for day-to-day industrial requirements.

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USER SECTORS

Industry

Energy transmission & distribution

Nuclear

Naval applications

NORMEUROPE RANGE

FOR SEVERE ENVIRONMENTS



AC ammeter

Analog panel meters with round barrels for severe operating constraints.

page 224



AC voltmeter

Analog panel meters with round barrels for severe operating constraints.

page 226



Frequency meter

Analog panel meters with round barrels for severe operating constraints.

page 228



Wattmeter / Varmeter

Analog panel meters with round barrels for severe operating constraints

page 229



Phasemeter

Analog panel meters with round barrels for severe operating constraintss.

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Synchronization units

Analog panel meters with round barrels for severe operating constraints

page 231



DC ammeter

Analog panel meters with round barrels for severe operating constraints

page 232



DC voltmeter

Analog panel meters with round barrels for severe operating constraints.

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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 234



LK

Totalize the operating time of a machine or piece of equipment with the aim of checking or repairing it.

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CHOOSING
AN ANALOG PANEL METER

	CLASSIC
	page 212
	
Front panel drilling	
Round barrel	
Square barrel	
Front panel	
Format	48 x 48 / 72 x 72 / 96 x 96
Standard functions	
AC Ammeter	90° / 250°
AC Voltmeter	90° / 250°
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 222



48 x 48 / 72 x 72 / 96 x 96	
90° / 250°	
90° / 250°	
90° / 250°	
1 x 9 reeds	
90° / 250°	
90° / 250°	
90° / 250°	
2 x 9 reeds	
90°	

NORMEUROPE, the industry reference for the generation, transmission and distribution of electrical energy for severe operating constraints.

COHO / LK

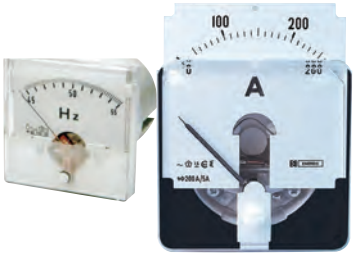
page 234-235



COHO	LK
	LK
48 x 48	48 x 48

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.d'onde.

USER SECTORS

Industry | Energy transmission & distribution | Nuclear | Naval applications

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.

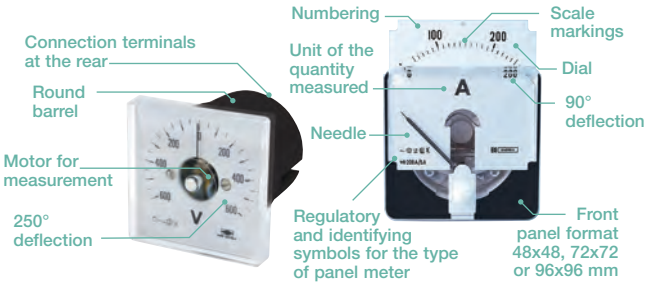
Division: Distance between any two consecutive scale markings.

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.



USER SECTORS

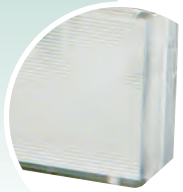
Industry



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

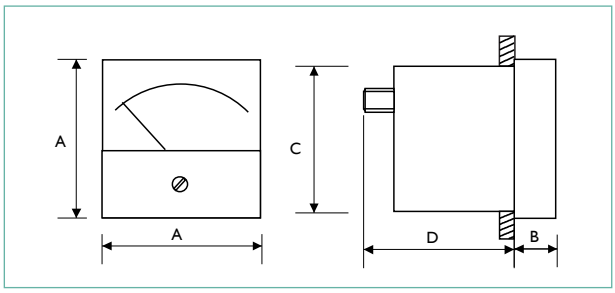
- **Attractive acquisition and installation costs**
- **Multiple customization possibilities for switchboard and machine manufacturers**

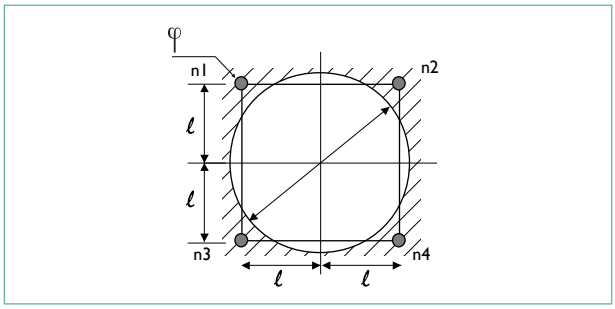
Operating position: Calibration for vertical position (±10°)
Overloads :
Voltmeter and frequencymeter
- 1.2 Un permanent
- 2 Un for 5 s

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°	0.180	0.180	0.180
	240°	0.250	0.250	0.250
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

Analog panel meters with round barrels for day-to-day industrial requirements.



90° DEFLECTION

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

240° DEFLECTION

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		

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	TC/1A	50 Hz
	Dial only	90°	iron	48 x 48	0-225/675A	TC225/1A	50 Hz

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
1000/5 A	0-1.3 kA	1961 0542	1962 0542	1963 0542	1048 2442	1082 2442	1083 2442	2074 9142	2075 9142
1200/5 A	0-1.56 kA	1961 0551	1962 0551	1963 0551	1048 2451	1082 2451	1083 2451	2074 9151	2075 9151
1500/5 A	0-1.95 kA	1961 0544	1962 0544	1963 0544	1048 2444	1082 2444	1083 2444	2074 9144	2075 9144
2000/5 A	0-2.6 kA	1961 0545	1962 0545	1963 0545	1048 2445	1082 2445	1083 2445	2074 9145	2075 9145
2500/5 A	0-3.25 kA	1961 0546	1962 0546	1963 0546	1048 2446	1082 2446	1083 2446	2074 9146	2075 9146
3000/5 A	0-3.9 kA	1961 0547	1962 0547	1963 0547	1048 2447	1082 2447	1083 2447	2074 9147	2075 9147
4000/5 A	0-5.2 kA	1961 0549	1962 0549	1963 0549	1048 2449	1082 2449	1083 2449	2074 9149	2075 9149
5000/5 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	0-400/1200 A	1961 0635	1962 0635	1963 0635	1048 2635	1082 2635	1083 2635	2074 9235	2075 9235
500/5 A	0-500/1500 A	1961 0636	1962 0636	1963 0636	1048 2636	1082 2636	1083 2636	2074 9236	2075 9236
600/5 A	0-600/1800 A	1961 0638	1962 0638	1963 0638	1048 2638	1082 2638	1083 2638	2074 9238	2075 9238
750/5 A	0-750/2250 A	1961 0640	1962 0640	1963 0640	1048 2640	1082 2640	1083 2640	2074 9240	2075 9240
800/5 A	0-800/2400 A	1961 0641	1962 0641	1963 0641	1048 2641	1082 2641	1083 2641	2074 9241	2075 9241
1000/5 A	0-1/3 kA	1961 0642	1962 0642	1963 0642	1048 2642	1082 2642	1083 2642	2074 9242	2075 9242
1200/5 A	0-1.2/3.6 kA	1961 0651	1962 0651	1963 0651	1048 2651	1082 2651	1083 2651	2074 9251	2075 9251
1500/5 A	0-1.5/4.5 kA	1961 0644	1962 0644	1963 0644	1048 2644	1082 2644	1083 2644	2074 9244	2075 9244
2000/5 A	0-2/6 kA	1961 0645	1962 0645	1963 0645	1048 2645	1082 2645	1083 2645	2074 9245	2075 9245
2500/5 A	0-2.5/7.5 kA	1961 0646	1962 0646	1963 0646	1048 2646	1082 2646	1083 2646	2074 9246	2075 9246
3000/5 A	0-3/9 kA	1961 0647	1962 0647	1963 0647	1048 2647	1082 2647	1083 2647	2074 9247	2075 9247
4000/5 A	0-4/12 kA	1961 0649	1962 0649	1963 0649	1048 2649	1082 2649	1083 2649	2074 9249	2075 9249
5000/5 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		

ASSOCIATED PRODUCTS



Accessories

Seal, ring fastener, dial, sleeve, etc.

page 223



Current transformers

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

page 120

AC VOLTMETER

Analog panel meters with round barrels for severe operating constraints.



90° DEFLECTION

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

240° DEFLECTION

Standard-scale model
Accuracy class: 1.5
Measuring component:
rectified moving coil 50 - 10,000 Hz
Linear scale
Consumption: 1 mA

ASSOCIATED PRODUCTS



Accessories
Seal, ring fastener, dial, sleeve, etc.
page 223

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 to 600 V	6 to 600 V	6 to 600 V	6 to 600 V	6 to 600 V
moving coil	3 to 600 V	3 to 600 V	3 to 600 V		
Connection to VT					
moving iron		from 100/√3 V			
moving coil		from 100/√3 V		from 100/√3 V	

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 Vr**					
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		moving iron 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				
TT/100 √3V	**1,2 Vn**	-	-	-	2084 0621C	2085 0621C
TT/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
Examples	**direct**	**240°**	**moving coil**	**96 x 96**	**Vn**	**110 V**	**50 Hz**

FREQUENCY METER



Pointer frequencymeter
90° DEFLECTION
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 223



TRIAD 2
Digital transducers
1 to 4 analog outputs.
Class 0.1
page 156

WATTMETER VARMETER



• **Panel meter**

90° - 240° DEFLECTION
Accuracy class: 1.5
Measuring component moving coil
Linear scale

PHASEMETER



• **Panel meter**
See transducers page 167

PANEL METER

	Deflection	90°		240°	
Format		**72 x 72**	**96 x 96**	**72 x 72**	**96 x 96**
Rating	**Scale Vr**				
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 202

CUSTOMIZED PRODUCT

Wattmeter / Varmeter	Panel meter	Transducer model	CT ratio	Direct/VT	Voltage or VT ratio	Start/end of scale	Auxiliary power supply
Examples	**2085 1490C**	**TRIAD 2**	**500/5 A**	**TT**	**20 kV / 110 V**	**-20...+20 MW**	**110 Vac**

Phasemeter	Panel meter	Transducer model	Current	Highest voltage	Start/end of scale	Auxiliary power supply
Examples	**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 223



TRIAD 2
Digital transducers
1 to 4 analog outputs. Class 0.1.
page 156



Current transformers
Cable primary, busbar primary, closed core or split core, etc.
page 120

DC AMMETER



90° DEFLECTION

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

240° DEFLECTION

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°(Iron. 50Hz)			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 1190C	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 Vr		Always specify the rated current of the shunt			
50 mV	Left	2048 5093C	2086 5093C	2087 5093C	2084 0319C	2085 0319C
60 mV	Left	2048 5193C	2086 5193C	2087 5193C	2084 0321C	2085 0321C
100 mV	Left	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



90° DEFLECTION

Accuracy class: 1.5
Measuring component: moving coil
Linear scale
Consumption: 1 mA

240° DEFLECTION

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		iron. 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		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

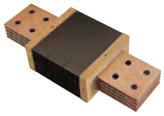
	Connection	Deflection	Format	Zero position	Rating	Start/end of scale
Example	direct process signal	90° 240°	48 x 48 96 x 96	left left	0 - 200 V 0 - 10 V	0 - 200 V 0 - 400 m3

ASSOCIATED PRODUCTS



Accessories

Seal, ring fastener, dial, sleeve, etc.
page 223



SHUNTS

1 to 6,000 A
Vast choice whatever your application.
page 142

NOTES

NORMEUROPE
RANGE

Round barrel analog panel meters
for high-level operating constraints.



USER SECTORS

Industry
Energy generation
Energy transmission & distribution
Nuclear



Compliant with the latest applicable standards



Large choice of functions, formats, ratings, IPs and options



Attractive design and easy to read

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

- **Customer references: EDF, on-board naval applications, energy generation and distribution**
- **Designed for demanding applications: nuclear, military, naval**
- **Long product life span**

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)"

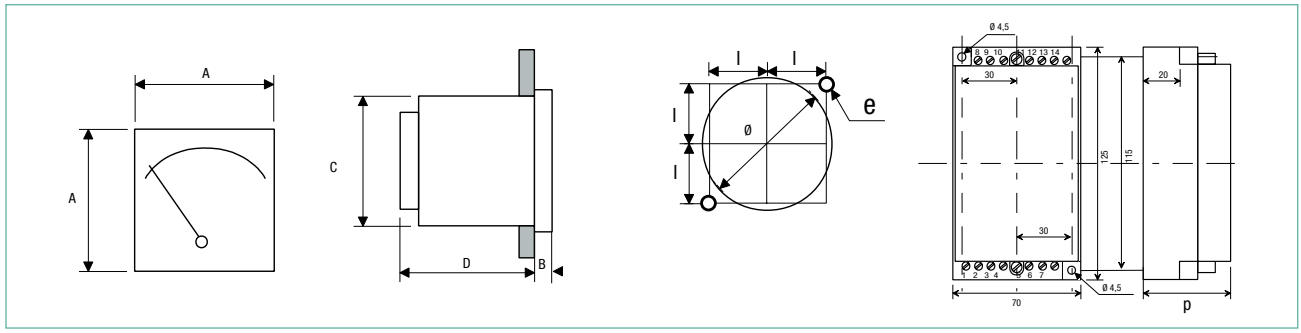
Degree of protection provided by the enclosure: IEC60529

- 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 to + 60 °C
- Storage temperature: -25°C to + 70°C
- Relative humidity: 25% to 95%
- Atmospheric pressure: up to 2,000 m – 795 hPa

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 (mm)	46	29 if 20 A max. 39 if 25 A et plus			
D 250° DEFLECTION (mm)	58	71	71		
Ø (mm)	45	58	88		
l (mm)	20.25	26.5	34		
e (mm)	Ø3.5	Ø4.5	Ø4.5	P=48	P=122
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°			240°		
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
Production of non-standard dials (after feasibility approval)								
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°			240°		
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



90° DEFLECTION

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, except 144 x 144 format
Consumption: 1 VA

250° DEFLECTION

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		90° (iron. 50 Hz)			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		■	■		■	■

CUSTOMIZED PRODUCT

	Instrument	Deflection/Motor scale	Format	Scale	Rating CT ratio	Frequency
Examples	Complete meter	90° iron 250° coil	72 x 72 96 x 96	0-15/90A 0-1.25/2.5 kA	direct 15A CT 1250/5 A	50 Hz 60 Hz

CONNECTION ON CT 5 A

	Deflection	Iron. 50 Hz - 90°			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
Rapport	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	■	■	■	■	■	■
1000/5 A	0-1,3 kA	CADR 0127	CADR 0477	CADR 0457	A90A 0227	A90A 0327	A90A 0527	■	■	A250 0627
1250/5 A	0-1,65 kA	CADR 0128	CADR 0478	CADR 0458	A90A 0228	A90A 0328	A90A 0528	■	■	A250 0628
1500/5 A	0-2 kA	CADR 0129	CADR 0479	CADR 0459	A90A 0229	A90A 0329	A90A 0529	■	■	A250 0629
2000/5 A	0-2,6 kA	CADR 0130	CADR 0480	CADR 0460	A90A 0230	A90A 0330	A90A 0530	■	■	A250 0630
2500/5 A	0-3,25 kA	CADR 0131	CADR 0482	CADR 0488	■	A90A 0331	A90A 0531	■	■	■
3000/5 A	0-4 kA	CADR 0132	CADR 0483	CADR 0489	■	A90A 0332	A90A 0532	■	■	■
4000/5 A	0-5,2 kA	CADR 0133	CADR 0484	CADR 0490	■	■	■	■	■	■
5000/5 A	0-6,5 kA	CADR 0134	CADR 0485	CADR 0491	■	■	■	■	■	■
Rapport	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	■	■	■	■	■	■
1000/5 A	0-1/3 kA	CADR 0159	CADR 0189	CADR 0079	■	■	■	■	■	■
1200/5 A	0-1,2/3,6 kA	CADR 0160	CADR 0190	CADR 0080	■	■	■	■	■	■
1500/5 A	0-1.5/4,5 kA	CADR 0161	CADR 0191	CADR 0081	■	■	■	■	■	■
2000/5 A	0-2/6 kA	CADR 0162	CADR 0192	CADR 0082	■	■	■	■	■	■
2500/5 A	0-2,5/7,5 kA	CADR 0163	CADR 0193	CADR 0083	■	■	■	■	■	■
3000/5 A	0-3/9 kA	CADR 0164	CADR 0194	CADR 0084	■	■	■	■	■	■
4000/5 A	0-4/12 kA	CADR 0165	CADR 0195	CADR 0085	■	■	■	■	■	■
5000/5 A	0-5/15 kA	CADR 0166	CADR 0196	CADR 0086	■	■	■	■	■	■

ASSOCIATED PRODUCTS



Accessories

Seal, ring fastener, dial, sleeve, etc.

page 223



Current transformers

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

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AC VOLTMETER



90° DEFLECTION

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

250° DEFLECTION

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		90°(Iron. 50Hz)			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	■	■	■

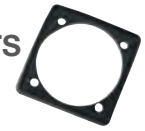
CONNECTION ON VT

Deflection		90°(Iron. 50Hz)			250°		
Format		48 x 48	72 x 72	96 x 96	48 x 48	72 x 72	96 x 96
Rating	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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NOTES

FREQUENCY METER



Pointer frequency meter
90° - 250° DEFLECTION
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
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
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 96 x 96	100 V 110 V	45-55 Hz 45-65 HZ

ASSOCIATED PRODUCTS



Accessories
Seal, ring fastener, dial, sleeve, etc.
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WATTMETER VARMETER



90° - 250° DEFLECTION

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	1000/5 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.
page 223



Current transformers

Cable primary, busbar primary, closed core or split core, etc.
page 120

PHASEMETERS



90° - 250° DEFLECTION

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 must 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 cap /1/0.5 -1 / 0 / +1	TRIAD T82

ASSOCIATED PRODUCTS



Accessories

Seal, ring fastener, dial, sleeve, etc.

page 223



Current transformers

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

page 120

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 segments	
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	96x96 72x72	48-52 Hz 58-62 Hz	100/√3 V 415 V

ASSOCIATED PRODUCTS



Accessories
Seal, ring fastener, dial, sleeve, etc.
page 223

Differential Voltmeter



90° DEFLECTION - 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 96x96	100 V 100/3 V	±25% ±50%

DC AMMETER



90° DEFLECTION

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

240° DEFLECTION

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°			240°		
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°			240°		
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	■	■	■	■	■	■
1000 A	0-1200 A	■	■	■	■	■	■

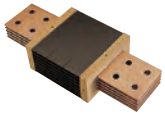
CUSTOMIZED PRODUCT

	Connection	Deflection	Format	Zero position	Rating	Beginning/end of scale
Examples	direct signal process	90° 250°	72 x 72 96 x 96	left set	60 A 4-20 mA	0-60 A 0-1500 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



90° DEFLECTION

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

250° DEFLECTION

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 V			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°			240°		
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

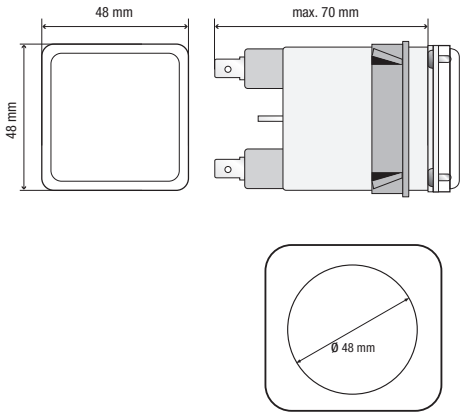
Seal, ring fastener, dial, sleeve, etc.
page 223

COHO
RANGE

Hour meters for totalling the operating time of machines or equipment for control and maintenance.



Panel drilling



GENERAL SPECIFICATIONS

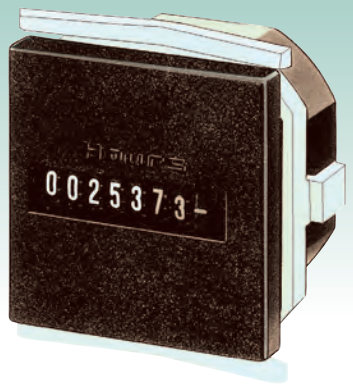
Reference standard: NFC 42310
Display: without reset function, white on black background, decimals in red Height of digits: 4 mm
AC and DC capacity: 99,999.99 h
Operating indicator: scrolling 1/100 h every 36 s
Motor in Vac/Vdc: pulse + electronic counter
Consumption:
0.5 VA in 24 Vac/dc,
1.5 VA in 48 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

- **For harsh environments**
- **High-reliability range**

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

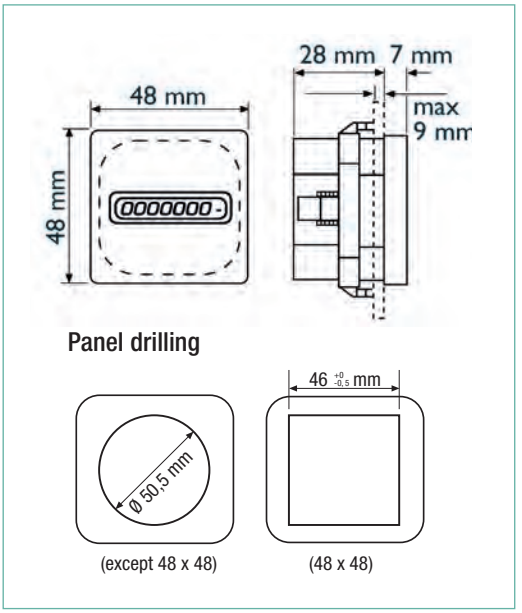
LK
RANGE

Hour meters (7 or 8 digits) for totalling the operating time of machines or equipment for control and maintenance.



USER SECTORS

Industry



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

- Easy to install
- Economical

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
Continu	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



AUXILIARY RELAYS



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AUXILIARY RELAYS

INSTANTANEOUS RELAYS

MONOSTABLE



MONOSTABLE
catalog 906130145



MONOSTABLE
forcibly guided contacts

BISTABLE



BISTABLE
catalog 906130145

FAST-ACTING MONOSTABLE AND BISTABLE



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.

catalogue 906130145



TO SEE ALL OUR RANGES,
CHECK OUT OUR
RELAYS CATALOG

USER SECTORS


Energy generation


Energy transmission & distribution


Nuclear

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 production through to distribution to end-users – **safety of property CO 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 CECOIFICATIONS

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

Energy 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)	Contacts guidés	Fast-acting(*)	Time delay	Contacts	In	Notes	Rolling stock equipment (***)	Nuclear
RCM	■					2 CO	10 A	Compact		
RDM	■					4 CO	10 A	Compact		
RGM	■					4 CO	12 A	High breaking capacity (**)		
RMMX	■					8 CO	10 A	Multi-contact, compact		
RMM	■					8-12-20 CO	12 A	High breaking capacity, multi-contact		
POK-POKS	■					2 CO	5-10 A	Compact	●	●
BIPOK-BIPOKS	■					4 CO	5-10 A	Compact	●	●
TRIPOK-TRIPOKS	■					6 CO	5-10 A	Compact	●	
QUADRIPOK	■					8 CO	10 A	Compact	●	
ESAPOK	■					12 CO	10 A	Compact		
OK	■					4-8-12 CO	10 A	High breaking capacity	●	
OKB184	■					4 CO	10 A	High breaking capacity, K3-qualified		●
RE3000	■					4 CO	10 A	K3-qualified		●
FOKB	■					4 CO NC-NO	13 A	High breaking capacity, NF F62-002	●	
RCG	■		■			2 CO	10 A	Forcibly guided contacts, type A, EN61810-3	●	
RDG	■		■			4 CO	10 A	Forcibly guided contacts, type A, EN61810-3	●	
RGG Previous name RGMZX	■		■			4 CO	10 A	High breaking capacity, forcibly guided contacts, type A, EN61810-3	●	
RMGX	■		■			8 CO	10 A	High breaking capacity, forcibly guided contacts, type A, EN61810-3	●	
RGB		■				3-4 CO	12 A	High breaking capacity		
RMBX		■				7-8 CO	10 A	Multi-contact	●	
RMB		■				7-11-19 CO	10 A	High breaking capacity, multi-contact, common negative		
OKBA		■				4-8 CO	10 A	High breaking capacity	●	
RGMVX	■			■		4 CO	10 A	Operating time < 8 ms		
RMMV/X	■			■		8-12 CO	10 A	Operating time < 8 ms for compact models, otherwise< 10 ms		
RGR	■			■		2 CO	2 A	Operating time < 3 ms		

Energy 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)	Contacts guidés	Fast-acting(*)	Time delay	Contacts	In	Notes	Rolling stock equipment (***)	Nuclear
RGMV	■			■		4 (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 Previous names OK-T-MF/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

USER SECTORS

Energy generation

Energy transmission & distribution

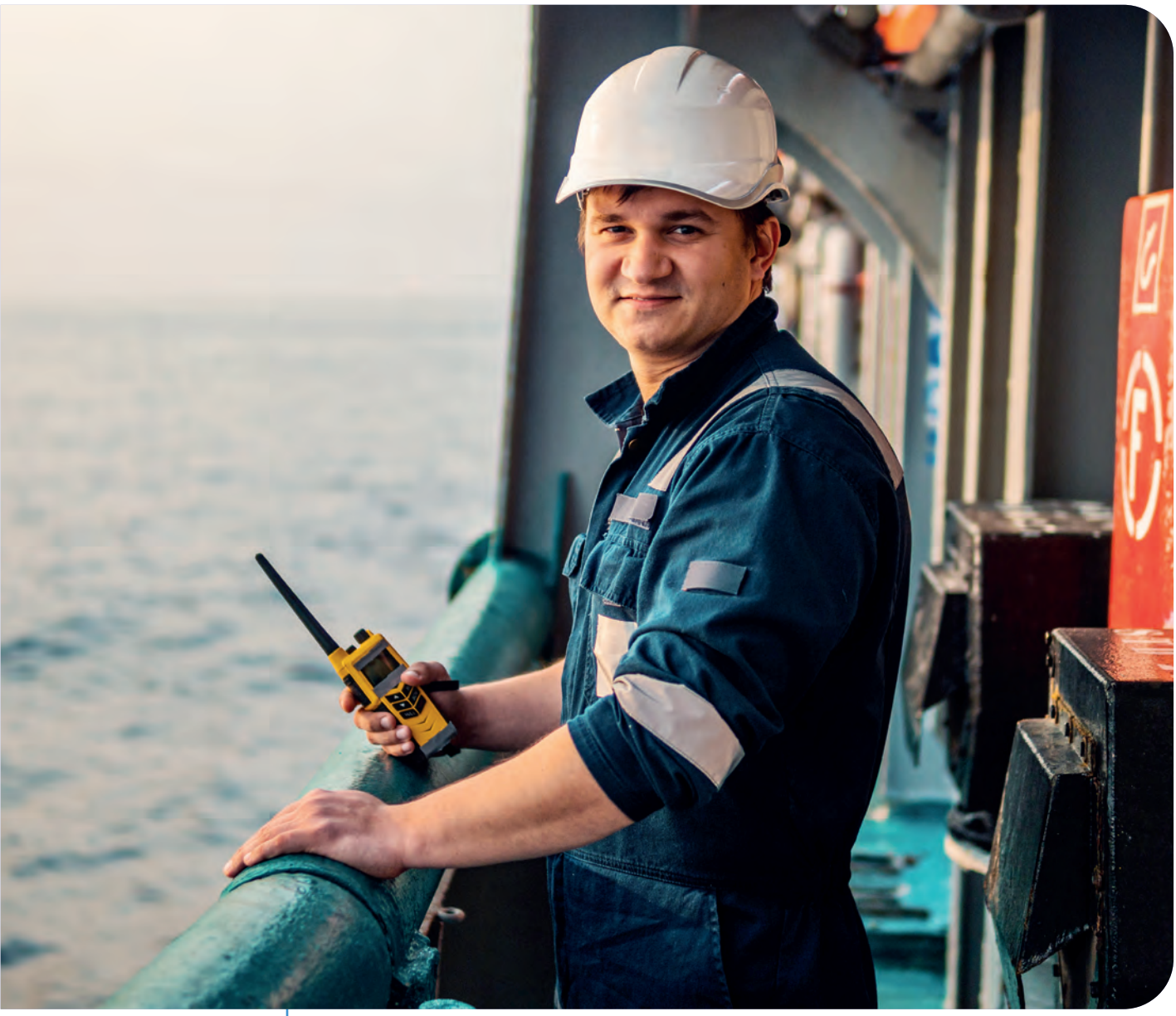
Nuclear

	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.



CIVILIAN AND MILITARY NAVAL APPLICATIONS



246 MECHANICAL ANEMOVANE

248 PTU SENSOR PRESSURE, TEMPERATURE AND HUMIDITY

250 SEAWATER TEMPERATURE SENSOR

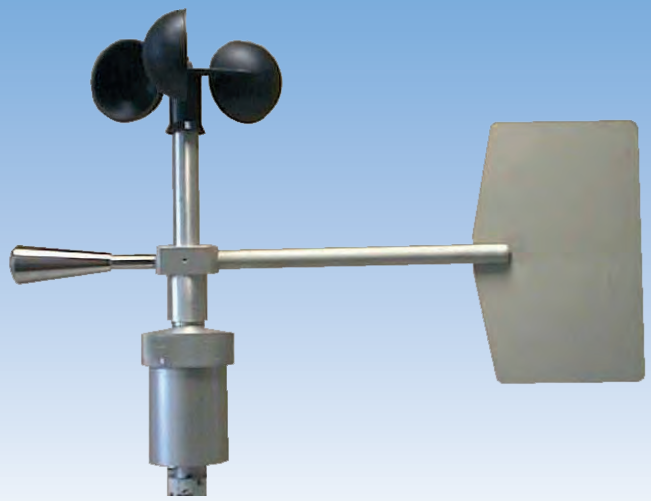
252 WIND REPEATER MULTIFONCTION

254 DATA CONCENTRATION AND COMMUNICATION UNIT

MECHANICAL ANEMOVANE

818 323

This sensor measures the wind speed and direction.



USER SECTORS

Naval applications

GENERAL SPECIFICATIONS

These combined sensors measure the wind speed and direction. They are installed at various locations on the foremast, on the port and starboard sides.

They comprise a microcontroller central processing unit handling measurement acquisition and processing, as well as adjustment and modification of the instrument's specific parameters.

The digital data are delivered via the MODBUS protocol.

Access to the modifications of the parameter settings is provided on a PC via a USB-RS485 interface and the associated software.

- **Compact**
  easy integration
- **Rugged**
  for harsh Naval applications environments
- **Simplified maintenance**
  interchangeable parts

Anemometer		Vane
Type of sensor	Period meter	Synchro-resolver
Measurement range	0 to 60.00 m/s	0 to 359.9 °
Resolution	0.01 m/s	0.1 °
Discrimination threshold	less than 0.5 m/s, 0.5% end of scale +/- 0.3 m/s	
Accuracy		+/- 2 °
Acquisition time	500 ms	500 ms

Environmental specifications	
Temperature	-20 to +70°C in operation
Pressure	700 mbar < P < 1.300 mbar
Hygrometry	10 to 95% RH
Roll, pitch, list, trim	No effect

Mechanical specifications	
Overall dimensions	690 x 390 mm
Body material	AU4G aluminum alloy
Counterweight material	Stainless steel
Weight	1.6 kg
Ingress protection	IP20

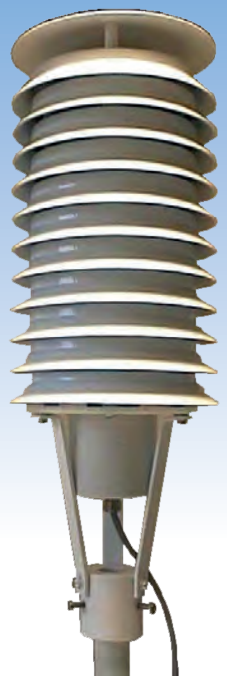
Electrical specifications	
Power supply	DC voltage from 12 to 35 V=
Consumption	25 mA at 28 V=
Connection	Output via cable gland and 5-contact cable

PTU SENSOR

PRESSURE, TEMPERATURE AND HUMIDITY

818 390

This sensor measures air pressure, temperature and humidity.



USER SECTORS

Naval applications

GENERAL SPECIFICATIONS

This sensor comprises a microcontroller central processing unit handling measurement acquisition and processing, as well as adjustment and modification of the instrument's specific parameters.

The digital data are delivered via the MODBUS protocol.

Access to the modifications of the parameter settings is provided on a PC via a USBRS485 interface and the associated software.

- **Compact**
  easy integration
- **Rugged**
  for harsh Naval applications environments
- **Simplified maintenance**
  interchangeable parts

Specifications of the serial link	
Type	Isolated RS 485 as per EIA 485
Mode	Half Duplex
Protocol	MODBUS RTU
Speed	9.600 bauds (1.200 to 38.400 Bd)
Transmission format	1 start bit - 8 data bits 1 parity bit (even, odd or none) - 1 stop bit

Pressure		Dew point	Humidity	Temperature
Type of sensor	Piezoresistive		Polymer capacitor	Pt 1000 Ohms
Measurement range	850 to 1.100 hPa	40 +80 °C	0 to 100% RH	-20 °C to +70 °C
Resolution	0.1 hPa	0.1 °C	0.1 %	0.1 °C
Accuracy	+/- 0.1 % end of scale +/- 0.1 hPa	Digital calculation	+/- 4% RH	0.4 % end of scale +/- 0.1 °C
Coefficient	100 ppm/K		100 ppm/K	100 ppm/K
Acquisition time	1.4 seconds	1.4 seconds	1.4 seconds	1.4 seconds

Environmental specifications	
Temperature	-20 to +70°C in operation
Pressure	700 mbar < P < 1.300 mbar
Hygrometry	10 to 95% RH
Roll, pitch, list, trim	No effect

Mechanical specifications	
Overall dimensions	200 x 200 x 580 mm
Shelter material	ABS
Ingress protection	IP20
Weight	~ 3 kg

Electrical specifications	
Power supply	DC voltage from 12 to 35 V=
Consumption	45 mA at 28V=
Connection	Output via cable gland and 5-contact cable

SEAWATER

TEMPERATURE SENSOR

A25300 SP

This sensor measures the temperature of seawater.



USER SECTORS

Naval applications

GENERAL SPECIFICATIONS

The seawater temperature needs to be measured because the ship's engines are cooled with seawater.

This sensor comprises a microcontroller central processing unit handling measurement acquisition and processing, as well as the settings and modification of the instrument's specific operating parameters.

Parameter modifications can be accessed on a PC by means of a USB-RS485 interface and the associated software.

- **Compact**
  easier integration
- **Complete**
  thermowell supplied
- **Fast**
  SOURIAU quarter-turn plug for easy mounting/removal

Specifications of the measurement channel

Analog input	Pt100 (3 wires)
Measurement range	-100 °C to +300 °C
Resolution	0.1 °C
Accuracy	2.10^{-4} reading +0.3°C
Acquisition time	200 ms

Specifications of the serial link

Type	Isolated RS 485 compliant with EIA 485
Mode	Half Duplex
Protocole	MODBUS RTU
Speed	9600 bauds (1200 à 38400 Bd)
Format de transmission	• 1 start bit • 8 data bits • 1 parity bit (even, odd or without) • 1 stop bit

Environmental specifications

Temperature	-20 to +70°C in operation
Pressure	700 mbar < P < 1300 mbar
Hygrometry	10 to 95% RH
Roll, pitch, list,trim	No effect

Mechanical specifications

Overall dimensions	239 x 84 x 140 mm
Body material	Aluminum
Probe material	Stainless steel
Thermowell material	Cupro Aluminum
Weight	~ 0.95 Kg

Electrical specifications

Power supply	DC voltage from 12 to 35 V=
Consumption	60 mA at 28V=
Connection	Output via HE10 connector, plug supplied (plate 1)

WIND REPEATER

MULTIFUNCTION

A25400

This repeater formats and distributes the wind data.



USER SECTORS

Naval applications

- **Particularly easy to read:** 6.5-inch LCD VGA color screen
- **High performance** advanced algorithms comparing the data from all the sensors to provide a reliable, pertinent indication of the different winds.
- **Complete** recovery of the data from the wind network sensors.

GENERAL SPECIFICATIONS

Measurements of the meteorological parameters such as the winds, air pressure, humidity and temperature, as well as the navigation data, are essential for ship operation.

This unit comprises a microcontroller central processing unit handling the processing, display and distribution of the data, as well as adjustment and modification of the instrument's specific operating parameters.

Access to the modifications of the parameter settings is provided on a PC via a USB-RS485 interface and the associated software.

Specifications of the RS 485 serial link		Specifications of the Ethernet link
Type	Electrically-isolated RS 485 as per EIA 485	Ethernet
Mode	Half Duplex	Full Duplex
Protocol	MODBUS RTU	Multicast
Speed	9.600 bauds (1.200 to 34.800 Bd)	100 Mbps
Transmission format	1 start bit - 8 data bits 1 parity bit (even, odd or none) - 1 stop bit	
Polling cycle	500 ms for all the sensors	

Specifications of the two RS 422 serial links	
Type	Electrically-isolated RS 422 as per EIA 422
Mode	Half Duplex
Protocole	NMEA183 / specific
Speed	1.200 to 34.800 Bd
Format de transmission	1 start bit - 8 data bits 1 parity bit (even, odd or none) - 1 stop bit
Polling cycle	Every 500 ms

Environmental specifications	
Temperature	0 to +50°C in operation
Pressure	700 mbar < P < 1.300 mbar
Hygrometry	10 to 95% RH
Roll, pitch, list, trim	No effect

Mechanical specifications	
Overall dimensions	229 x 202 x 194 mm
Casing material	Sheet steel
Ingress protection	IP20
Weight	3 kg

Electrical specifications	
Power supply	DC voltage from 19 to 35 V=
Consumption	400 mA at 28 V=
Protection	0.6 A time-delayed fuse / 250 V
Connection	Socket J1: 8-pin for 422 link, supplied with plugs Socket J2: 8-pin for RS485 wind BUS, supplied with plugs Socket J3: RJ45 Ethernet link, supplied with plugs

DATA CONCENTRATION
AND COMMUNICATION UNIT
A25412-E

This unit provides the interface between the digitized wind network, the navigation BUS and the external subscribers using the wind data.



USER SECTORS

Naval applications

- **Rugged**
  metal unit integrated in a waterproof cast aluminum enclosure
- **Versatile**
  multiple input and output connections (interfacing with the navigational computers and the wind network and distribution via 4 subscriber links according to various programmable protocols)
- **Complete**
  protocol gateway and data logger function

GENERAL SPECIFICATIONS

The CCC unit collects the wind data available on the BUS and interfaces with the navigation data from the ship. The CCC stores the processed data and then distributes them on several digital links via various protocols.

It comprises a 32-bit microcontroller central processing unit handling management of the communication links and processing of the information, as well as adjustment and modification of the instrument's specific operating parameters.

Access to the modifications of the parameter settings is provided on a PC via a USB-RS485 interface and the associated software.

Internal Wind BUS serial link		Navigation BUS serial link
Type	Electrically-isolated RS 485 as per EIA 485	Electrically-isolated RS 422 as per EIA 422
Mode	Half Duplex	Half Duplex
Protocol	MODBUS RTU slave	Specific
Speed	9.600 bauds (1.200 to 34.800 Bd)	1.200 to 34.800 Bd
Transmission format	1 start bit - 8 data bits 1 parity bit (even, odd or none) - 1 stop bit	1 start bit - 8 data bits 1 parity bit (even, odd or none) - 1 stop bit

4 Subscriber serial links		2 Ethernet links
Type	Electrically-isolated RS 485 / RS422	Ethernet
Mode	Half or Full Duplex	Full Duplex
Protocole	NMEA / specific MODBUS RTU	Proprietary (used for transfer of recordings)
Speed	1.200 to 34.800 Bd	100 Mbits
Transmission format	1 start bit - 8 data bits 1 parity bit (even, odd or none) - 1 stop bit	

Environmental specifications	
Temperature	0 to +50°C in operation
Pressure	700 mbar < P < 1.300 mbar
Hygrometry	10 to 95% RH
Roll, pitch, list, trim	No effect

Mechanical specifications	
Overall dimensions	230 x 330 x 110 mm
Body material	Cast aluminum
Ingress protection	IP20
Weight	4.8 kg

Electrical specifications	
Power supply	DC voltage from 19 to 35 V=
Consumption	300 mA at 28V=
Connection	3 cable glands and Amphenol ZN plug
Protection	Fuse



SERVICES AND TRAINING



258 SERVICES AND TRAINING

260 ORGANIZATION

SERVICES AND TRAINING

Combined know-how in a demanding technological context.



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 production, 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

- **More than 25 years' experience**
- **Multiple areas of expertise**
- **A dedicated team of applications engineers**
- **Service provided all over the world**

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.

- 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 courses at the Chauvin Arnoux Group's site in Asnières-sur-Seine



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	alternating current
CL	class
CT	current transformer
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
VN	tension nominale phase-neutre

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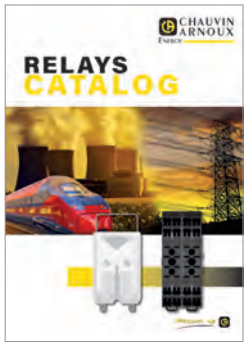
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