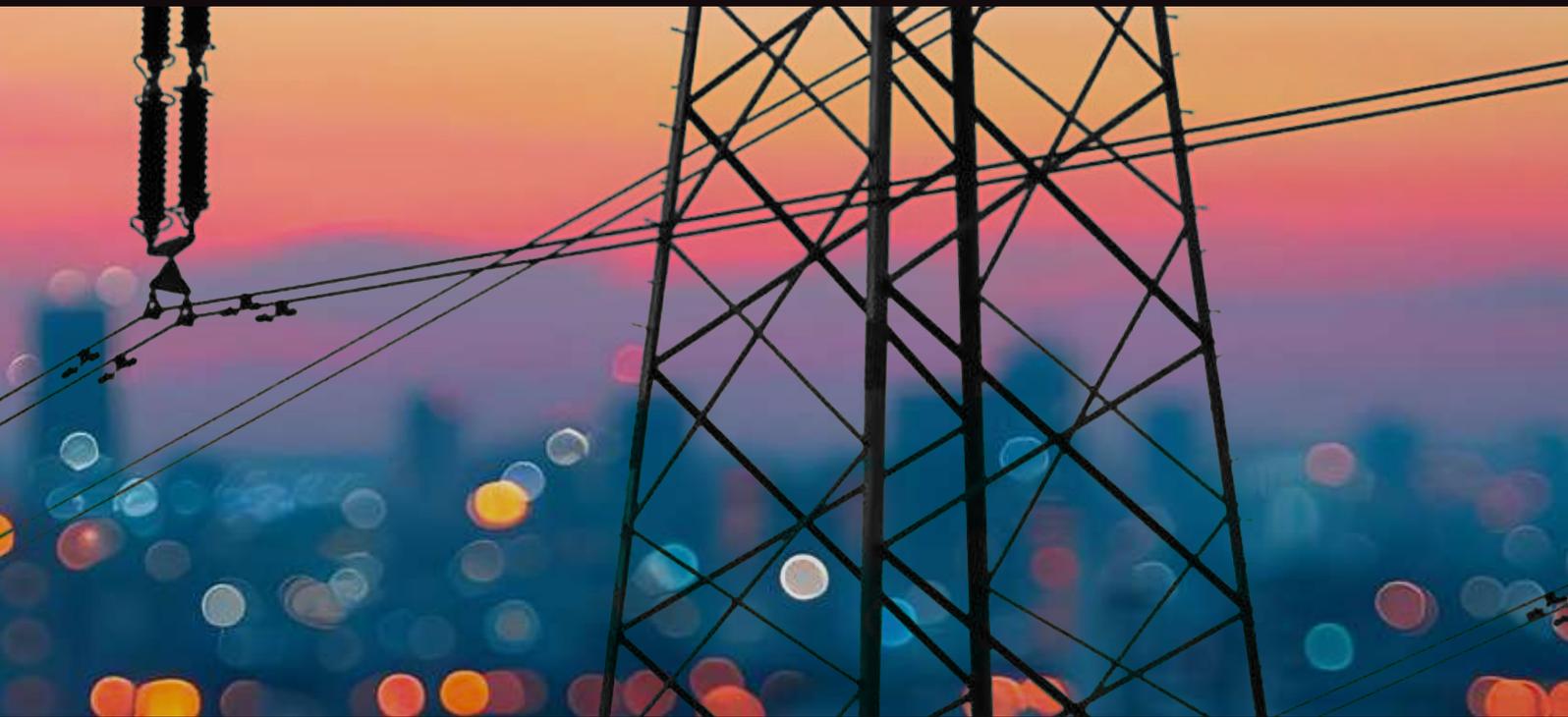


GENERAL  
CATALOGUE **2026**



EXPERTS IN MEASUREMENT,  
CONTROL AND ENERGY EFFICIENCY

[www.saci.es](http://www.saci.es)





**85 years** developing  
advanced electrical  
**solutions**

# GENERAL CATALOGUE



## **INNOVATION FOR THE FUTURE OF ENERGY**

Year after year, we continue to strengthen our production capabilities and reinforce our commitment to Research and Development (R&D), with the goal of creating products that meet the evolving needs of the electrical sector.

Thanks to this ongoing effort, we keep expanding our range of measuring, control, and monitoring instruments, offering our customers the reliability, accuracy, and innovation that define SACI.

2026



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VERSION 1 | FEBRUARY 2026

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A woman with long dark hair and glasses, wearing a dark sleeveless dress, is smiling and looking down at her smartphone. The scene is bathed in a blue light. In the foreground, there are glowing blue digital lines and a robotic hand, suggesting a futuristic or AI theme.

# ADVANCED SOLUTIONS

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## SACI\_EVA

### EV Charging management



Chatbot  
SACI\_EVA

#### General features

Dynamic Load Management (DLM) system designed for the efficient management of electric vehicle chargers. This software stands out for its ability to optimize electrical energy distribution and improve operational efficiency.

It is ideal for installations such as EV charging stations, shopping centers, public and private parking facilities, among others, as its software allows the centralized management of up to 100 charging points from different brands through a single device.

The system is compatible with chargers equipped with Smart Charging technology, supporting OCPP 1.6J and 2.0.1 protocols.

- **Auxiliary voltage:** 100 – 277 V AC/DC
- **Power consumption:** <15 VA
- **Protection rating:** IP20
- **Mounting:** DIN rail or mounting plate
- **Communication:** 2 RS485 ports  
2 Ethernet ports
- **Protocol:** TCP Modbus
- **Dimensions:** 125 × 67 × 145 mm

General features	Model
Dynamic power management system for EVs	SACI_EVA-230V

## Gateway Lite

### Data Concentrator



#### General features

Data logger for SACI devices, capable of connecting up to 8 units via RS485 communication. Ideal for mass data collection, it includes software that facilitates control and monitoring of installations.

The RS485 interface is configurable, allowing the reading of variables from any SACI device using the Modbus RTU protocol through fixed profiles.

The collected data is transmitted via Ethernet / WiFi in JSON format using the MQTT protocol. The monitoring application is available for web and iOS and Android apps.

- **Auxiliary supply:** 85 – 264 V AC/DC
- **Internal processor:** 32-bit
- **Program memory:** 8 GB
- **RAM memory:** 4 MB
- **Dimensions:** 35 × 96 mm
- **Communications:** WiFi / Ethernet / RS485
- **Protocol:** MQTT (Ethernet / WiFi)  
Modbus RTU (RS485)
- **Offline data storage:** 1 week
- **Mounting:** DIN rail

General features	Model
Data concentrator (up to 8 devices)	Gateway lite

## AQM2

Power quality analyzer



### General features

The AQM2 power quality analyzer is designed for large-scale electrical data collection, providing an advanced solution for energy measurement, remote control of the electrical system, and comprehensive power quality analysis, thanks to its 0.2S accuracy class.

- **Nominal voltage:** 230/400 V AC
- **Frequency:** 45 – 65 Hz
- **Indirect measurement:** X/1 A – X/5 A
- **Auxiliary supply:** 80 – 270 V AC/DC
- **Protection rating:** IP54
- **Communication:** RS485
- **Protocol:** Modbus RTU
- **Dimensions:** 144 × 144 mm
- **Tariffs:** 8
- **Memory:** 2 GB

General features	Model
Power quality analyzer	AQM2

Additional options	
QM7	+4 digital inputs module
QM8	+2 relay outputs module
QM11	Ethernet port module, Modbus TCP, Web server
QM13	RS485 port module (Modbus RTU)

Measuring parameters	Unit	Class
Voltage	V	0.1%
Current	A	0.1%
Active / Reactive / Apparent power	W - Var - Va	0.2%
Power factor	-	0.2%
Frequency	Hz	±0,01
Active energy	±kWh	0.2S
Reactive energy	±kvarh	2

## SACI-RTU

Data Concentrator



### General features

Data concentrator and remote control unit designed to centralize, manage and transmit information from a network of measurement and control devices. Its main function is to act as an intelligent gateway between field devices and central supervision systems, simplifying the communications architecture and improving overall system efficiency.

It allows electrical data to be read, temporarily stored and transmitted using Modbus and MQTT protocols, without the need for a dedicated computer. Configuration can be carried out via an embedded web interface, and the unit features dual Ethernet ports and RS485 communication.

- **Mounting:** DIN rail or mounting plate
- **Communications:** (2) Ethernet (RJ45)  
(1) RS485
- **Protocol:** TCP-Modbus, Modbus-RTU, MQTT
- **Auxiliary supply:** 100 – 277 V AC/DC
- **Internal processor:** 64-bit quad-core
- **Protection rating:** IP20
- **Program memory:** 16 GB
- **RAM memory:** 2 GB
- **RTC clock**
- **Operating system:** Linux
- **Dimensions:** 125 × 67 × 145 mm

General features	Model
Data concentrator	SACI-RTU

A photograph of a high-voltage electrical substation. The scene is dominated by metal structures, including a large lattice tower on the left and several vertical insulators supporting power lines. The insulators are white with red and blue components. The ground is covered in grey gravel, and there are concrete foundations for the equipment. The sky is a pale, hazy blue. The overall lighting is bright, suggesting a clear day.

# **NETWORK ANALYZERS**

# NETWORK ANALYZERS

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# NETWORK ANALYZERS

## SAM3001

Alternating current



### General features

The **SAM3001** network analyzer is a new generation of electrical parameter monitoring equipment, capable of real-time measurement, with only **1 DIN module** dimensions for parameter analysis. It measures up to 32 three-phase circuits or 96 single-phase circuits. It has minimum and maximum values.

- **Output relay:** 0.12A / 280V AC  
0.12A / 400V DC
- **Communication:** RS485 port  
Modbus RTU
- Fast connection
- Optional display
- Voltage crest factor

Measurement module	SAM3001-M21A	SAM3001-M1A	SAM3001-M1B
Auxiliary voltage	Self-powered	Universal V aux. (45-275V) AC/DC	
Digital outputs	1 (solid state relay)	—	—
RS485 serial port	HRB Connector	HRB Connector	Terminal block
Tariffs	4	4	4



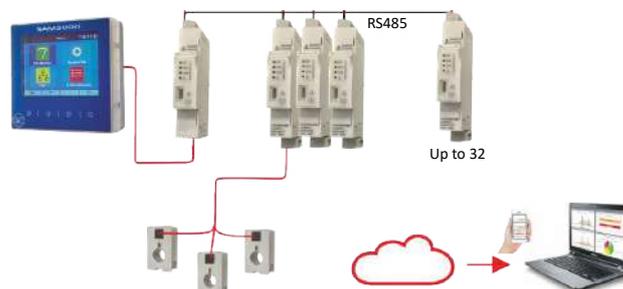
Additional options*	Model
Communication module	SAM3001-02
Display LCD module	SAM3001-03
Power supply module	SAM3000-04
Rogowski sensor module	SAM3000-05

\*A power supply module is required to install the display or communication module.

Measuring parameter	Accuracy	SAM3001		
		M21A	M1A	M1B
Three-phase voltage and current	0,2 %	•	•	•
Total and partial power and power factor	0,5 %	•	•	•
Frequency (Hz)	0,01	•	•	•
Imported and exported active energy (EP+/EP-)	0,5s	•	•	•
Apparent energy	0,5 %	•	•	•
Four quadrant reactive energy	2 %	•	•	•
THD (V, I)	Class A	•	•	•
Sub-harmonics (V, I)	Class A	31	31	31
Unbalance (V, I)	Class B	•	•	•
Maximum / minimum / average demand	-	•	•	•



Transformer type	Range	Model
(S1) 5A closed adapter	5 A / 2.5mA	TU5M3K
(S2) Standard	100 ~ 600 A / 80 mA	TU_M3K
(S3) 5A open adapter	5A / 330mV	TA5M3K
(S4) Split core	100 ~ 600 A / 330mV	TA_M3K
(S4) Rogowski	600 ~ 3000 A / 330mV	RC_F3K



# NETWORK ANALYZERS

## SAM3000

Alternating current



### General features

The **SAM3000** network analyzer is a new generation of electrical parameter monitoring equipment, capable of real time measurement, energy metering or network quality analysis with status monitoring and alarm functions. It measures up to 32 three-phase circuits or 96 single-phase circuits.

- **Output relay:** 0.12A / 280V AC  
0.12A / 400V DC
- **Communication:** RS485 port  
Modbus RTU
- Fast connection
- Optional display
- Voltage crest factor

M. module	SAM3000-011	SAM3000-012	SAM3000-M21	SAM3000-M22
Auxiliary voltage	24 V DC		Self-powered	
Digital outputs	1	1	1	1
Digital inputs	2	2	2	2
Tariffs	-	4	-	4
RS485 serial port	Terminal block			



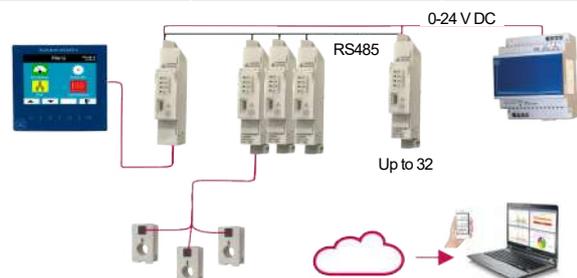
Additional options*	Model
Communication module	SAM3000-02
Display LCD module	SAM3000-03
Power supply module	SAM3000-04
Rogowski sensor module	SAM3000-05

\*A power supply module is required to install the display or communication module.

Measuring parameter	Accuracy	SAM3000			
		011	012	M21	M22
Three-phase voltage and current	0,2 %	•	•	•	•
Total and partial power and power factor	0,5 %	•	•	•	•
Frequency (Hz)	0,01	•	•	•	•
Imported and exported active energy (EP+/EP-)	0,5s	•	•	•	•
Apparent energy	0,5 %	•	•	•	•
Four quadrant reactive energy	2 %	•	•	•	•
THD (V, I)	Class A	•	•	•	•
Sub-harmonics (V, I)	Class A	-	63	-	63
Unbalance (V, I)	Class B	-	•	-	•
Tariff energy	-	-	•	-	•
Maximum / minimum / average demand	-	-	•	-	•



Transformer type	Range	Model
(S1) 5A closed adapter	5 A / 2.5mA	TU5M3K
(S2) Standard	100 ~ 600 A / 80 mA	TU_M3K
(S3) 5A open adapter	5A / 330mV	TA5M3K
(S4) Split core	100 ~ 600 A / 330mV	TA_M3K
(S4) Rogowski	600 ~ 3000 A / 330mV	RC_F3K



## AHM3

Alternating current - LCD display



### General features

The **AHM3** network analyzer is designed to calculate and measure the electrical parameters of a network, such as voltage, current, frequency, power, power factor, energy, harmonic components, etc.

### AHM3-SMTP version

Remote data reading and configuration via web. Alarm notification setup via e-mail. Reading of up to 16 tariffs, CO<sub>2</sub> carbon footprint calculation, and cost breakdown by communication port.

- **Rated voltage (Un):** 3x400 / 690 V AC
- **Current input:** x/1 ó x/5 A
- **Auxiliary voltage:** 80 - 270 AC / DC
- **Dimensions:** 96x96mm
- **Output relay:** 250 V/5A AC  
30 V/5A DC
- **Communication:** RS485 port  
Modbus RTU
- **Refresh rate:** 250ms

General features	Model
Standar analyzer	AHM3
Rogowski version*	AHM3-RC
Web server version	AHM3-SMTP

\* Rogowski coils not included



Easy - wire RJ12

AHM3-RC (Rogowski version)

Measuring parameters	Unit	Accuracy
Voltage (phase-phase and phase-neutral)	V	0,2%
Phase and neutral current	A	0,2%
Active, reactive and apparent power	kW, kvar, kVA	0,2%
Power factor (Cos $\phi$ )	PF	0,5%
Frequency	F	$\pm 0,01$ Hz
THD current and voltage	A, V	Class A
Active positive and negative power	kWh	Class 0,5s
Inductive and capacitive reactive power	kvarh	Class 2
Voltage and current RMS harmonics	A, V	1-63
Voltage and current unbalance	%	•
Maximum demand I, P, Q and S	A, kW, kvar, kVA	•
Hour meter	h: min	•

Additional modules	Model
Passive Rogowski coil	70 / 120 / 200 mm
Memory module: 8 MB	DM 1
Module 2 analogue inputs: mA	DM 2
Module 2 analogue inputs: PT100	DM 3
Module 2 analogue inputs: TC (J, K or E)	DM 4
Module 2 analogue outputs: mA	DM 5
Module 2 analogue inputs + 2 digital outputs	DM 6
Module 4 digital inputs	DM 7
Module 2 output relays	DM 8
Module 1 digital input AC	DM 9
Communication module Profibus - DP VO	DM 10
Ethernet communication module (Modbus/TCP)	DM 11
M. Ethernet communication (Modbus/TCP) / Web server (SMTP)	DM 11 - 2
Communication module WIFI: Modbus/TCP	DM 12
Communication module GPRS: Modbus/TCP, SMS	DM 13



## AHM1

Alternating current - LCD display



AHM1-RC (Rogowski version)

### General features

The **AHM1** network analyzer is designed to calculate and measure the electrical parameters of a network, such as voltage, current, frequency, power, power factor, energy, harmonic components, etc.

Model **AHM1-RC**: Rogowsky version.

Model **AHM1-T**: Data storage for 3 years

Model **AHM1-TCP**: includes Ethernet communication

- **Rated voltage (Un)**: 3x400 / 690 V AC
- **Indirect measurement**: x/1 or x/5 A
- **Auxiliary voltage**: 80 - 270 AC/DC  
Optional: 24V
- **Programmable current and voltage**
- **Dimensions**: 96x96mm
- **Output relay**: 250 V/5A AC  
30 V/5A DC
- **4 quadrant measurement**
- **Refresh rate**: 400ms

Models	Com. RS485	Memory	Memory	Digital inputs	Contact outputs	4 current inputs	Tariffs
AHM1B							
AHM1BC	•						
AHM1	•	8MB		2	2		4
AHM1-RC	•	8MB		2	2		4
AHM1-4CTS	•	8MB		2	2	•	4
AHM1 (TCP/IP)	•	8MB		2	2		4
AHM1 (TCP/IP/BACNET)	•	8MB		2	2		4
AHM1-T	•		128MB	2	2		4
AHM1-T (TCP)	•		128MB	2	2		4

Measuring parameters	Unit	Accuracy
Voltage (phase-phase and phase-neutral)	V	0,2%
Phase and neutral current	A	0,2%
Active, reactive and apparent power	kW, kvar, kVA	0,2%
Power factor (Cos $\phi$ )	PF	0,5%
Frequency	F	$\pm 0,01$ Hz
THD current and voltage	A, V	Class A
Active positive and negative power	kWh	Class 0,5s
Inductive and capacitive reactive power	kvarh	Class 2
Voltage and current RMS harmonics	A, V	1-31
Voltage and current unbalance	%	•
Maximum demand I, P, Q and S	A, kW, kvar, kVA	•
Energy consumption	kWh	•
Hour meter	h: min	•

## ASM3-PV

Alternating current - LCD



### General features

The **ASM3-PV** is designed to calculate and measure the electrical quantities of a network such as voltage, current, frequency, power, Energía, etc. The analyser can measure directly up to 1000V phase to phase, making it ideal for connection to inverters in photovoltaic systems.

- **Rated voltage (Un):** 3x462 / 800 V AC
- **Indirect measurement:** x/1 A ó x/5 A
- **Auxiliary voltage:** 80 - 270 AC / DC
- **Dimensions:** 96x96mm
- **Communication:** RS485 port
- Current and voltage programmable

General features	Model
Analyzer module	ASM3-PV
Analyzer module with TCP communication	ASM3-PV-TCP

Measuring parameters	Unit	Accuracy
Voltage (phase-phase and phase-neutral)	V	0,5%
Phase and neutral current	A	0,5%
Active, reactive and apparent power	kW, kvar, kVA	0,5%
Power factor (Cos $\phi$ )	PF	0,5%
Maximum demand I, P, Q and S	A, kW, kvar, kVA	0,5%
Frequency	F	$\pm 0,01$ Hz
THD current and voltage	A, V	Class A
Active positive and negative power	kWh	Class 0,5s
Inductive and capacitive reactive power	kvarh	Class 2
Voltage and current RMS harmonics	A, V	1-31
4 quadrants measurement and energy	kW, kvar	0,5s
Voltage and current unbalance	%	•

## SNG96

### Alternating current - LCD



#### General features

The SNG96 is a three-phase 4-wire mains analyzer with programmable microprocessor and LCD display with integrated keypad.

- **Rated voltage (Un):** 400 V CA
- **Auxiliary voltage:** Self-powered
- **Measurement range:** 50 - 600 V (line - line)  
0 - 120% In
- **Rated current (In):** 5A
- **Dimensions:** 96x96mm
- **Communication:** RS485 port
- **Frequency:** 45-65Hz
- True RMS value

General features	Model
Standard analyzer	SNG96
Analyzer with RS485 communication	SNG96C

Measuring parameters	Accuracy	SNG96	SNG96C
Voltage (line - line and line - neutral)	0,3%	•	•
Line and neutral current	0,3 %	•	•
Import. / export. active energy (EP+/EP-)	0,5 %	•	•
Import. / export. reactive energy (EQ+/EQ-)	1 %	•	•
Frequency (Hz)			•
Active, reactive and apparent power			•
Power factor (Cos φ)			•
Maximum demand (I)		•	•

## MAR144

Alternating current - LED



### General features

Programmable microprocessor based unit, with 3 LED displays for measurement indication and integrated keyboard.

- **Rated voltage (Un):** 100 - 110 - 230 - 400 - 440 V AC
- **Indirect measurement:** x/1 A or x/5 A
- **Auxiliary voltage:** 63,5 / 110V or 230/400 V AC
- **Digital inputs:** Up to 4 (optional)
- **Contact outputs:** 2
- **Dimensions:** 144x144mm
- **Communication:** RS485 port  
Modbus RTU
- Current and voltage programmable
- 4 quadrant measurement
- Maximum and minimum values
- True RMS value

Network type	Models
Single phase	MAR 144
3 phase balanced 3 or 4 wire	MAR 144 - I
3 phase unbalanced, 3 wire, 2 systems	MAR 144 - II
3 phase unbalanced, 4 wire, 3 systems	MAR 144 - 3

Measuring parameters	Unit	Accuracy
Voltage (phase-phase and phase-neutral)	V	0,2%
Phase and neutral current	A	0,2%
Active and reactive power	kW, kvar	0,2%
Apparent power	kVA	0,4%
Power factor (Cos $\phi$ )	PF	0,4%
Frequency	F	0,2%
Active positive and negative power	kWh	1%
Inductive and capacitive reactive power	kvarh	2%

Additional options
Communication: Digital output RS 485 or RS 232
Auxiliary voltage 18 / 72 V DC
Aux. v. universal 45-275 AC/DC
Input voltage isolation (internal transformers)
4 Digital inputs
Analogue output 4 - 20 mA (incl. voltage isolation)
10 programmable relays

Additional accessories
Connection cable (2m.) from MAR (RS 232) to PC (DB9)
Connection cable (2m.) from MAR (RS 485) to IFRA (Converter)
Connection cable (2m.) from IFRA (Converter) to PC (DB9)

## AR3DC-RS485

Direct current



### General features

Equipment with programmable microprocessor, LCD display, designed to measure variables in a low voltage continuous current network.

- **Rated voltage (Un):** 12, 24 or 48 V DC
- **Rated current:** 10, 20 or 40A
- **Current (external shunt):**  $\geq 50 \text{ A} \dots / 60 \text{ mV}$
- **Aux. voltage:** Self-powered
- **Dimensions:** 3 modules, 52x90mm
- Shunt rated primary current (for indirect measurement)
- **Communication:** RS485 port  
Modbus RTU
- **Contact outputs:** 1 (optocoupler)
- **Direct output:** bidirectional
- Up to 32 devices per line
- Alternative measurement of values every 2 sec.

General features	Model
DC Analyzer module	AR3DC-RS485

Measuring parameters	Unit	Accuracy
Voltage (phase-phase and phase-neutral)	V	0,5%
Phase and neutral current	A	0,5%
Active power	kW	0,5%
Active positive and negative power	kWh	1%
Ampere-hour (+) / (-)	Ah+ / Ah-	1%

## AR4DCT

Direct current - Hall effect sensor



### General features

The **AR4DCT** analyzer is designed to measure voltage, current, power and energy in DC systems using hall effect sensors.

Its RS485 serial output allows easy monitoring. It includes a temperature sensor, an LCD display and a rated voltage of 1500V DC.

- **Rated voltage (Un):** 1500 V CC
- **Rated current:**  $\pm 4$  V CC
- **Aux. voltage :** 80 - 270 V
- **Dimensions:** 4 modules, 70x90mm
- **Hall effect sensors:** 9 - 33 currents
- **Communication:** RS485 port  
Modbus RTU
- **Power:** bidirectional
- **Optional:** 4 Digital inputs and 2 outputs

General features	Model
DC basic analyzer with temperature sensor	AR4DCT
Current expansion module with 12 inputs*	MR4DC
Digital input and relay output expansion module	DIO-02
12 V power supply	PS02

\* Up to 2 MR4DC modules can be added to the main unit.

Measuring parameters	Unit	Accuracy
Voltage	V	0,2%
Current	A	0,2%
Active power	kW	0,2%
Imported and exported active power	kWh	Class 1
External temperature sensor input (Pt100)	°C	2%

## TMC-C

Direct current



### General features

Programmable microprocessor instrument with 3 LCD displays, designed for display of measured values and integrated keyboard.

- **Rated voltage (Un):** 24, 48, 110, 230 ó 400 V DC. Optional 1000V DC.
- **Aux. voltage :** 110, 230, 400 V AC / 24, 48 V DC
- **Communication:** RS485 port or RS232
- **Dimensions:** 144 x 144mm
- Shunt rated primary current

General features	TMCc	TMCc-H
Pulse/contact/alarm outputs	2	2
Analogue output	4-20mA	-
Local display up to 8 parameters	•	•
Display programmable	•	•
Current In: .../ 60 mV DC	•	-
0 - 1000 V and 8 x (+/- 4 V for hall effect sensor)	-	•

Measuring parameters	Unit	Accuracy
Voltage (phase-phase and phase-neutral)	V	0,5%
Phase and neutral current	A	0,5%
Active power	kW	0,5%
Active positive and negative power	kWh	1%
Ampere-hour (+) / (-)	Ah+ / Ah-	1%

Additional options
Communication: RS 485 digital output. Modbus RTU protocol
Auxiliary power supply: 24, 48 V DC or universal 45/275 V AC/DC

# NETWORK ANALYZERS

## Alternating Current

			AHM3	ASM3-PV	AHM1-B	
						
<b>GENERAL FEATURES</b>						
Rated voltage			3 x 400 / 690 V AC	3 x 462 / 800 V AC	3 x 400 / 690 V AC	
Rated current			X/5 A - X/1 A	X/5 A - X/1 A	X/5 A - X/1 A	
Auxiliary voltage			80-270 V AC/DC	80-270 V AC/DC	80-270 V AC/DC	
Dimensions			96 x 96 mm	96 x 96 mm	96 x 96 mm	
IP protection degree			IP 65 (Front) IP 20 (Body)	IP 65 (Front) IP 20 (Body)	IP 65 (Front) IP 20 (Body)	
<b>COMMUNICATIONS</b>						
RS485 (Modbus)			•	•		
RS232 (Modbus)			(Optional)			
Ethernet TCP/IP						
Memory			(Optional)			
<b>OTHER FEATURES</b>						
Digital inputs			(Optional)			
Contact output			(Optional)			
<b>ELECTRICAL MEASURES</b>						
	Unit					
Electrical parameters			63	49	58	
Voltage (Line - Neutral)	V, kV	L1, L2, L3	•	•	•	
Voltage (Line - Neutral)	V, kV	Max/Min	•		•	
Voltage (Line - Neutral)	V, kV	Total		•		
Voltage (Line - Line)	V, kV	L1, L2, L3	•	•	•	
Voltage (Line - Line)	V, kV	Max/Min	•		•	
Voltage (Line - Line)	V, kV	Total		•		
Current	A, kA	L1, L2, L3	•	•	•	
Current	A, kA	Max/Min	•		•	
Current	A, kA	Max. Demand	•	•	•	
Current	A, kA	Total	•	•	•	
Active power (P)	kW, MW, GW	L1, L2, L3 & total	•	•	•	
Active power (P)	kW, MW, GW	Max/Min	•		•	
Active power (P)	kW, MW, GW	Max. Demand	•	•	•	
Reactive power (Q)	kvar, Mvar, Gvar	L1, L2, L3, & total	•	•	•	
Reactive power (Q)	kvar, Mvar, Gvar	Max/Min	•		•	
Reactive power (Q)	kvar, Mvar, Gvar	Max. Demand	•	•	•	
Apparent power (S)	kVA	L1, L2, L3 & total	•	•	•	
Apparent power (S)	kVA	Max/Min	•	•	•	
Apparent power (S)	kVA	Max. Demand	•		•	
Power factor (Cos φ)	PF	L1, L2, L3 & total	•	•	•	
Power factor (Cos φ)	PF	Max/Min	•		•	
Frequency	Hz	Total	•	•	•	
Imported active energy (EP+) & (EP-)	kWh, MWh, GWh	Total	•	•	•	
Imported reactive energy (EQ+) & (EQ-)	kvarh, Mvarh, Gvarh	Total	•	•	•	
Reactive power	kvarh, Mvarh, Gvarh	Q1, Q2, Q3, Q4	•	•		
Tariffs			16			
Backup energy	kWh	Total	•	•	•	
Hour meter	h: min	Total	•	•	•	
THD voltage and current	V y A	L1, L2, L3	•	•	•	
Harmonics RMS-U and RMS-I	%	L1, L2, L3	1-63		1-31	
Unbalance -U and -I	%	Total	•		•	
Voltage crest factor	-	Total				
Current k factor	-	Total				
Voltage and frequency deviation	-	-				
Demand record	-	Max				
Max/Min & average value record	-	Max / min				
Off-limit alarm record	-	-				
SOE event record	-	-				
Voltage swell/sag & interruption record	-	-				



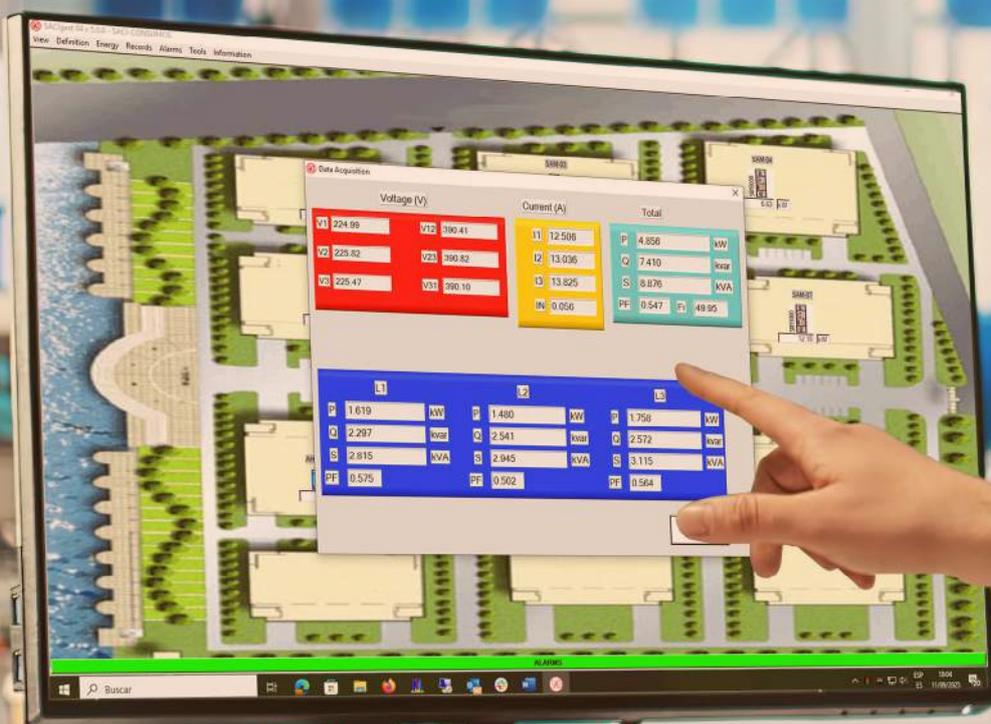
# NETWORK ANALYZERS

## Direct Current

			AR4DCT	AR3DC	
					
<b>GENERAL FEATURES</b>					
Rated voltage			1500 V DC	12, 24 or 48 V DC Optional 125 V DC	
Rated current			Hall effect sensor: 4 V DC	Direct: 10, 20, 40 A DC Shunt: In/60 V DC	
Auxiliary voltage			80-270 V AC/DC	Self-powered	
Dimensions			4 DIN	3 DIN	
IP protection degree			IP 20	IP 20   Optional IP 54	
<b>COMMUNICATIONS</b>					
RS485 (Modbus)			•	•	
RS232 (Modbus)					
<b>OTHER FEATURES</b>					
Digital inputs			(Optional)		
Contact outputs			(Optional)	1	
Analogue outputs					
<b>ELECTRICAL MEASURES</b>		<b>Unit</b>			
Electrical parameters			10	8	
DC voltage	A, kA	Total	•	•	
DC voltage	A, kA	Max/Min	•		
Current	A, kA	Max/Min	•		
Current	A, kA	Max. Demand	•		
DC current	A, kA	Total	•	•	
DC current	A, kA	Max/Min	•		
DC current	A, kA	Max. Demand	•		
Active power (P)	kW, MW, GW	Total	•	•	
Ampere Hour (+)	Ah+	Total		•	
Ampere Hour (-)	Ah-	Total		•	
Rated shunt current	Ip	Total		•	
Import active energy (EP+) & (EP-)	kWh, MWh, GWh	Total	•	•	
Export active energy (EP+) & (EP-)	kWh, MWh, GWh	Total		•	
Outdoor temperature measurement	°C	-	•		



# ENERGY METERS



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## General features

### Energy meters

#### General technical specifications

• Unit of measurement	Kwh
• Enclosure material	ABS
• Type of mounting	35mm DIN rail mounting
• Terminals	Sealable terminals

#### Standards

##### Energy meters

- EN 62053 -21
- EN 62053-22
- EN 62053-23
- DIN 43864
- EN 61010

##### MID energy Meters

- EN 50470-1
- EN 50470-3
- EN 62053-23
- DIN 43864
- EN 61010

## M2DWIFI-2



Single-phase - Remote monitoring - Direct measurement



### General features

The **M2DWIFI-2** energy meter allows you to take measurements and control consumption through an APP available on IOS and Android.

Thanks to its WIFI connection, the electrical panel can be activated or deactivated via the built-in relay, avoiding unwanted consumption.

It has a remote cut-off capacity of up to 80 amps.

- **Rated voltage (Un):** 165-265 V AC
- **Rated current:** 5 (60) A
- **Auxiliary voltage:** Self-powered
- Programmable power limiter
- **Dimensions:** 2 modules (36mm)
- **Communication:** WIFI 802.11 b/g/n  
RS485
- **Protocols:** Modbus RTU  
MQTT

General features	Model
Single-phase	M2DWIFI-2

Measuring parameters	Accuracy	Unit
Energy	Class 1	kWh
Voltage	0,5%	V
Current	0,5%	A
Active power (P)		kW
Power factor (Cos $\phi$ )		PF

### Web and App

- APP monitoring
- Control of electrical consumption
- WIFI power cut
- 80A remote cut-off capacity
- Suitable for integration into third party platforms
- Setting consumption limits
- Alert programming
- Cloud storage
- Small size
- Manual or programmed activation of the device



## M2DWIFI-TCP

Single-phase - Remote monitoring - Direct measurement



### General features

The M2DWIFI-TCP single-phase energy meter features WiFi, Ethernet, and RS485 communication for remote data reading and configuration.

It includes an internal 80 A power relay for local and remote load connection and disconnection.

- **Nominal voltage (Un):** 165–265 V AC
- **Nominal current:** 5 (60) A
- **Auxiliary supply:** Self-powered
- **Programmable power limiter**
- Medida corriente (1 directa/ 1 indirecta)
- **Dimensions:** 54 × 100 mm
- **Communications:**
  - WiFi 802.11 b/g/n
  - RS485 (Modbus RTU)
  - Ethernet (TCP-Modbus / MQTT)

General features	Model
Single-phase	M2DWIFI-TCP

Measuring parameters	Accuracy	Unit
Active energy	Class 2	kWh
Reactive energy	Class 1	Kvarh
Voltage	0,5%	V
Current	0,5%	A
Active power (P)	0,5%	kW
Reactive power (Q)	0,5%	kvar
Power factor (cos φ)	0,5%	-
Current and voltage THD	0,5%	%
Harmonics (V, I) 1–31	1%	%
Maximum demand	-	-
Maximum and minimum values	-	-

### Web and App

- Monitoring via the app
- Electrical consumption control
- Remote supply disconnection via WiFi
- Compact size
- Cloud storage
- Alert configuration
- Setting consumption limits
- Manual or scheduled device activation
- Suitable for integration with third party platforms
- Remote disconnection capability up to 80 A

## TCIDWIFI-TCP

Three-phase - Remote monitoring - Direct measurement



### General features

The TCIDWIFI-TCP three-phase energy meter features WiFi, Ethernet, and RS485 communication for remote data reading and configuration.

It includes three internal switches for remote power disconnection up to 100 A, one per phase. It also allows the load to be connected and disconnected both locally and remotely.

- **Nominal voltage (Un):** 3 × 165–265 V AC
- **Nominal current:** 10 (100) A
- **Auxiliary supply:** Self-powered
- **Programmable power limiter**
- **3 switches for remote disconnection**
- Dimensions: 126 × 100 mm
- Communications:
  - WiFi 802.11 b/g/n
  - RS485 (Modbus RTU)
  - Ethernet (TCP-Modbus / MQTT)

General features	Model
Three-phase	TCIDWIFI-TCP

Measuring parameters	Accuracy	Unit
Active energy	Class 2	kWh
Reactive energy	Class 1	Kvarh
Voltage	0,5%	V
Current	0,5%	A
Active power (P)	0,5%	kW
Reactive power (Q)	0,5%	kvar
Power factor (cos φ)	0,5%	-
Current and voltage THD	0,5%	%
Harmonics (V, I) 1–31	1%	%
Maximum demand	-	-
Maximum and minimum values	-	-

### Web and App

- Monitoring via the app
- Electrical consumption control
- Remote supply disconnection via WiFi
- Cloud storage
- Alert configuration
- Setting consumption limits
- Manual or scheduled device activation
- Suitable for integration with third party platforms
- Remote disconnection capability up to 100 A

## TCIL2

Three-phase - Electronic - Indirect measurement



### General features

The **TCIL2** unit acts as an energy meter and measures the parameters of a three-phase or single-phase low-voltage network. It has RS485 communication and the capacity to connect 32 devices on the same circuit or 128 via a gateway. **Up to 6 hourly tariffs can be configured.**

Control can be done via PC or network from the device. Also available with Ethernet port.

- **Rated voltage (Un):** 3x230/ 400 V AC
- **IB intensity (Imax):** 1,5 (6) A
- **Indirect measurement:** x/5A or x/1A
- **Visualisation:** 8 digits
- **Impulse output:** 2
- **Auxiliary voltage:** Self-powered
- **Communication:** RS485 port and Ethernet Modbus RTU or BACNET
- **Dimensions:** 76 x 90mm
- Resetable active energy meter
- Bidirectional energy meter
- LED's indicators for verification

Model	TCIL2	TCIL2 TCP	TCIL2T	TCIL2T TCP	TCIL2T LP	TCIL2T LP TCP
Memorised parameters	-	-	17 variables in 15 min periods		Load curve in 5 min. periods	
Memory	-	-	3 years		1 year	
Tariffs	6	6	6	6	6	6
Ethernet port	-	Modbus Bacnet	-	Modbus Bacnet	-	Modbus Bacnet

Measuring parameters	Unit	Accuracy
3 voltage (line-line and line-neutral)	V	0,2 %
3 voltage phase-neutral	A	0,2 %
Total and partial active, reactive and apparent power	kW, kvar, kVA	0,5 %
Power factor (Cos φ)	PF	0,5 %
Frequency	Hz	0,01 %
Imported and exported active energy (EP+/EP-)	kWh	0,5s
Imported and exported reactive energy (EQ+/EQ-)	kvar	2 %
Reactive energy (Q1, Q2, Q3, Q4)	kWh	2 %
Maximum demand I, P, Q and S	A, kW, kvar, kVA	-
THD Current and voltage	A, V	-
RMS voltage and current harmonics (1 - 32)	A, V	-

## TCIL1

Three-phase - Electronic - Indirect measurement



### General features

The **TCIL1** three-phase unbalanced 3 or 4 wire energy meter. It has Class 1 accuracy (EN 62053) and is indirect measurement (x/5A) programmable.

It incorporates a power consumption LED indicator and 3 current check LEDs, as well as an 8 digit electronic display.

- **Rated voltage (Un):** 3x230/ 400 V AC
- **IB intensity (Imax):** 1,5 (6) A
- **Indirect measurement:** x/5A
- **Auxiliary voltage:** self-powered
- **Dimensions:** 76 x 90mm
- **Visualisation:** 8 digits
- **Impulse output:** 1
- Active energy measurement

General features	Model
Meter with active energy measurement	TCIL1

## TCIDL3-MID

Three-phase - Electronic - Direct measurement



### General features

The **TCIDL3-MID** counter is also an analyser, measuring the various parameters of a three-phase system. The measured values can be displayed or transmitted via the communication ports.

It has RS485 communication with Modbus protocol. It measures positive and negative active energy and reactive energy in 4 quadrants and has time discrimination for 4 tariff periods.

- **Rated voltage (Un):** 3x230/ 400 V AC
- **Rated current:** 0,25 - 5 (100)A
- **Frequency:** 50 Hz and 60 Hz
- **Communication:** IR/RS485
- **MID certificate**
- **Dimensions:** 4 modules, 70x90mm
- **Visualisations:** 8 digits
- Measurement of active and reactive energy
- **Auxiliary voltage:** Self-powered

General features	TCIDL3-MID	TCIDL3i-MID
Active energy measurement (EP+/EP-)	•	•
Reactive energy	Quadrants 4	
Tariffs	4	4
Digital inputs	-	1
Impulse outputs	2	1

Measuring parameters	Accuracy	Unit
Voltage (Line - Line and Line - neutral)	0,5%	V
Current	0,5%	A
Import and export active energy	Class B	kWh
Import and export reactive energy	2%	kvarh
Active/reactive energy resettable	0,5%	kWh - kvarh
Active/reactive max. power demand	-	kW - kvar
Active, reactive and apparent power	0,5%	kW - kvar - KVA
Frequency	0,01 Hz	Hz
Power factor	0,5%	-

## TCIDL2-MID

Three-phase - Electronic - Direct measurement



### General features

MID certified three-phase direct connection meter.

It measures active energy in a three-phase low-voltage direct connection network.

It also measures frequency, voltages and currents per phase, active power per phase and total power via the RS485 communication port. On request, these parameters can also be shown on the display.

- **Rated voltage (Un):** 3x230/ 400 V AC
- **Auxiliary voltage:** Self-powered
- **Rated current:** 0,25 - 5(80)A
- **Communication:** RS485
- **Frequency:** 50 Hz
- **Dimensions:** 76 x 105 mm
- **Visualisations:** 8 digits
- **Pulse output**

Measuring parameters	Accuracy	Unit
Active energy measurement (EP+)	Class B	kWh
Active energy with zeroing (RS485)	Class B	kWh
Active energy exported	Class B	kWh
Total active power	0,5	kW
Active power per phase	0,5	kW
Voltage (line-to-line and line-to-neutral)	0,5	V
Current	0,5	A
Frequency	0,5	Hz

## TCIDL1

Three-phase - Electronic - Direct measure



### General features

The **TCIDL1** energy meter is an unbalance three-phase meter with 3 or 4 wires. It is direct measurement up to 80 A. It has a power consumption LED indicator and three current check LED's. It also has an 8 digit electronic counter. The pulse output is SO (DIN 43864). It has a size of 4 modules on DIN rail.

- **Nominal voltage (Un):** 3 × 230 / 400 V AC
- **Auxiliary supply:** Self-powered
- **Nominal current:** 10 (80) A
- **Frequency:** 50 – 60 Hz
- **Dimensions:** 76 × 100 mm
- **Display:** 8 digits
- **Pulse output**

General features	Model
Energy meter with active energy measurement (EP+)	TCIDL1

## M1DL-MID

Single-phase - Electronic - Direct measurement



### General features

The **M1DL-MID** single-phase direct meters are also analysers, measuring the parameters of a single-phase low voltage network. In addition, they are MID-certified for active energy, not bidirectional.

The measurement values can be displayed on the built-in display.



M1DL1-MID



M1DL3-MID

General features	M1DL1-MID	M1DL3-MID	M1DL3T-MID
Direct rated current	0,25-5 (50) A	0,25-5 (100) A	0,25-5 (100) A
Rated voltage	230 V		
Auxiliary voltage	Self-powered		
Frequency	50 Hz	50 / 60 Hz	
Dimensions	18 x 116mm	18 x 90mm	18 x 90mm
Active energy measurement (EP+)	•	•	•
Impulse output	1	1	1
Tariffs	-	-	4
RS 485 communication	-	•	•

## M1DL1 - M2DL1

Single-phase - Electronic - Direct measurement



### General features

The single-phase **M1DL1** and **M2DL1** energy meters have class 1 accuracy (EN 62053) and incorporate an internal shunt.

They have an LED power consumption indicator.



M1DL1



M2DL1

General features	M1DL1	M2DL1
Rated voltage (Un)	230 V AC	
Auxiliary voltage	Self-powered	
Rated direct current	5 (50) A	5 (80) A
Visualisation	7 digits	6 digits
Active energy measurement (EP+)	1 (total)	2 (total & partial)
Dimensions	17,5mm	35mm

## M1DM1 - M2DM1

Single-phase - Electromechanic - Direct measurement



### General features

The **M1DM1** and **M2DM1** single-phase electromechanical energy meters have class 1 accuracy (EN 62053) and incorporate an internal shunt.

They have a mechanical power consumption indicator.



M1DM1



M2DM1

General features	M1DM1	M2DM1
Rated voltage (Un)	230 V AC	
Auxiliary voltage	Self-powered	
Rated direct current	5 (50) A	5 (80) A
Visualisation (electromechanic)	6 digits	6 digits
Active energy measurement (EP+)	1 (total)	1 (total)
Dimensions	17,5mm	35mm

## RT485

RS 485 repeaters



### General features

The **RT485** repeater is a communications equipment that allows the extension of a RS485 Modbus, in order to increase the communication distance or the maximum recommended number of terminals.

The communication is bidirectional and incorporates LED indicators to visualise the operation of the signals. DIN rail mounting.

- **Auxiliary voltage:** 110, 230 or 400 V AC  
24 or 48V DC  
110 or 220V DC
- **2 or 4 wire connection (insulated)**
- **Dimensions:** 6 modules, 105x90mm
- **No. of RS 485 serial outputs:** 1

General features	Model
RS485 communication repeaters	RT 485

## TTI - TTIM Totalizer terminals

Microprocessor and serial output



### General features

**TTI:** Totalizer basic module with microprocessor and serial output.

**TTIM:** Totalizer module with microprocessor and serial output, with 128kb memory, LCD display and integrated keypad.

The TTI and TTIM totalizer modules are programmable, they can count closed contact time in seconds, time or pulses.

- **Auxiliary voltage:** 100, 110, 230 or 400 V AC
- **Communication:** RS485 port  
Modbus
- **Dimensions:** 9 modules, 155x90mm
- Programmable counter reading
- Independent counter reset

General features	TTI	TTIM
Independent impulse meter	8 input	8 input
Max. no. of devices per line	32	32
No. of outputs	1	1
Load curve per meter		90 days
LCD display and 128 kb circular memory		•

## IFR - IFRA

RS 232 / RS 485 Converters



### General features

**IFR** devices convert the levels of the RS232 standard to the corresponding levels of the RS485 standard. DIN rail mounting.

They allow the connection of a PC equipped with RS232 to an RS485 bus.

General features	IFR1	IFRA3	IFRA	IFR4
Dimensions (mm)	52x90	52x90	105x90	155x90
No. of RS 232 serial outputs	1	1	1	1
No. of RS 485 serial outputs	1	1	1	4
Auxiliary voltage 110 or 220 V AC				
2 wire connection	•			
2 or 4 wire connection (insulated)		•	•	•
Auxiliary voltage 24, 48, 110 or 220V DC				
2 or 4 wire connection (insulated)			•	•

## ETHERGATE 2

Ethernet conversor



### General features

The **etherGATE** converter is a communication gateway for the conversion of the physical medium (RS 485) to Ethernet and/or Wi-Fi .

- **Rated voltage:** 110 - 264 V AC  
120 - 300 V DC
- **Frequency:** 50-60Hz
- **Dimensions:** 2 modules, 35x90mm
- **Protection degree:** IP30

RS-485 interface		Ethernet interface		Wi-Fi communications	
Field bus	RS-485	Connector	RJ45	Band	2.4 GHz
Speed	4800 - 9600 - 19200 - 38400 - 57600 - 115200 bps	Type	Ethernet 10BaseT - 100BaseTX autodetectable	Standards	IEEE 802.11 b / g , IEEE 802.11 n
Data bits	8	Protocol	TCP - UDP - Modbus TCP - HTTP (Web server) - REST	Max. output power	IEEE 802.11 b : 20 dBm IEEE 802.11 n : 14 dBm
Stop bits	1 - 2	Network connection mode	DHCP ON/OFF		
Parity	Without - even-odd				

## ETHERGATE 3

Ethernet conversor



### General features

The ETHERGATE 3 converter is a gateway for connecting an RS-485 network to an Ethernet network.

- **Rated voltage:** 100 - 240 V AC  
9 - 50 V DC
- **Dimensions:** 27,5 x 92,30 mm
- **Burden:** ~ 100 mA
- **Power:** < 400 mW
- **Processor/ Frequency:** Cortex-M3/96MHz
- **Flash / SDRAM:** 2 MB /128 KB
- **Operating system :** FreeRTOS

RS-485 port		Ethernet port	
Number of ports	1	Number of ports	1
Speed	600 bps ~ 460.800 bps	Interface standard	10/100 Base-T Auto-Negotiation
Data bit	5, 6, 7, 8	Transformer	Integrated
Stop bits	1, 2	Network protocol	IP, TCP, UDP, DHCP, DNS, ARP, AutoIP, ICMP, Telnet, NTP, Modbus TCP, HTTP Server/ Client
Parity	no - even - odd	Security protocol	AES 128Bit / DES3
Flow control	No flow control Software Xon/ Xoff flow control		

## Management software

The **SACIGEST** program is a system that allows the SACI terminals installed in an electrical network to be managed in a simple and graphic way. The installation is grouped by sections, each with a different display, in which the corresponding terminals are inserted. The system incorporates the creation of virtual terminals from real terminals.

The network analyzers it handles are: SAM3000, SAM3001, AHM1, AHM3, ASM3-PV, MAR144, AR3DC, AR4DCT, TMC-C, CP3000, CP4000, likewise, it can handle the energy meters TCIL2 and TCIDL3-MID through the TTI terminals. The software is capable of handling up to four communication ports, as well as the use of MODEM to communicate with the different terminals installed in the network, and can opt for the client-server mode of operation via an Ethernet network.

The system is available in different versions depending on your applications:

- **SACIGEST 01**: Version including terminal monitoring and configuration options.
- **SACIGEST 02**: Version that adds the ENERGIES option to SACIGEST01. The energy consumptions of the installation can be displayed by means of terminals or sections, as well as their graphic representation. Up to six types of tariffs can be configured, as well as the sampling interval.
- **SACIGEST 03**: SACIGEST03 has been added to the version of SACIGEST02 with a version of historical currents, voltages and powers, with the possibility of setting the sampling interval.
- **SACIGEST 04**: The SACIGEST04 version adds the option of alarms. Different alarms can be defined in the system for each terminal, allowing action to be taken on the digital outputs of the same or any other terminal. Pending alarms and alarms already registered are displayed.

Within each SACIGEST version, there are different sub-versions: Normal, Server and Client.



TTIGEST software can handle TCIDL1-MID and M1DL3-MID and TTI totalizer terminals.

- **SOFTWARE TTIGEST**: Programs dedicated to optimizing and controlling water, gas, electricity, etc. consumption. Aimed at managing meter consumption and issuing the corresponding invoices.

The TTIM totalizers allow load curves to be generated and the data can be examined numerically or graphically, printed and exported.

The version incorporates the history of all the meters, the uncontrolled consumption and the assigned and unassigned controlled consumption. It manages the control with PREPAYMENT, allowing to control the balance of each meter and to make collective or individual contributions.

General features	Model
<b>Network analyzers / Programmable converters</b>	
Monitoring (ConFiguReition, grouping and visualisation)	SACIGEST 01
Energy + SACIGEST 01	SACIGEST 02
Historical + SACIGEST 02	SACIGEST 03
Alarms + SACIGEST 03	SACIGEST 04
<b>Energy meters</b>	
Monitoring (ConFiguReition, grouping, visualisation and invoicing)	TTIGEST

### Network analyzers and programmable converters versions (SACIGEST)

- Standard version
- Reduced version (6 units)
- Server version. Up to 10 additional pcs
- Reduced server version (6u). Up to 10 additional pcs

### Energy meters version (TTIGEST)

- Standar version. Specific for billing, only allowed to analyse in header.

# ENERGY METERS

			M2DWIFI-2	M2DIWIFI-TCP	TCIDWIFI-TCP	
						
<b>GENERAL FEATURES</b>						
Rated voltage			165-265 V AC	165-265 V AC	3x 165-265 V AC	
Rated current			5 (60) A	5 (60) A	10 (100) A	
Dimensions			2 DIN	54x100mm	126x100mm	
Protection degree IP			IP 51	IP 51	IP 51	
MID certified						
<b>COMMUNICATIONS</b>						
RS485 (Modbus)			•	•	•	
Ethernet TCP/IP - BacNet TCP/IP				•	•	
Wi-Fi			•	•	•	
Memory						
<b>OTHER FEATURES</b>						
Counter reset						
Contacts output						
<b>ELECTRICAL QUANTITIES</b>						
	Unidad					
Electrical parameters			13	82	97	
Phase voltage	V, kV	L1, L2, L3			•	
Phase voltage	V, kV	Max/Min		•	•	
Phase voltage	V, kV	Total	•	•	•	
Line voltage	V, kV	L1, L2, L3			•	
Line voltage	V, kV	Max/Min		•	•	
Current	A, kA	L1, L2, L3			•	
Current	A, kA	Max/Min		•	•	
Current	A, kA	Max. Demand		•	•	
Current	A, kA	Total	•	•	•	
Active power (P)	kW, MW, GW	L1, L2, L3			•	
Active power (P)	kW, MW, GW	Total	•	•	•	
Active power (P)	kW, MW, GW	Max/Min		•	•	
Active power (P)	kW, MW, GW	Max. Demand		•	•	
Reactive power (Q)	kvar, Mvar, Gvar	L1, L2, L3			•	
Reactive power (Q)	kvar, Mvar, Gvar	Total	•	•	•	
Reactive power (Q)	kvar, Mvar, Gvar	Max/Min		•	•	
Reactive power (Q)	kvar, Mvar, Gvar	Max. Demand		•	•	
Apparent power (S)	kVA	L1, L2, L3			•	
Apparent power (S)	kVA	Total	•	•	•	
Apparent power (S)	kVA	Max/Min		•	•	
Apparent power (S)	kVA	Max. Demand		•	•	
Power factor (Cos)	PF	L1, L2, L3			•	
Power factor (Cos)	PF	Total	•	•	•	
Power factor (Cos)	PF	Max/Min		•	•	
Frequency	Hz	Total	•	•	•	
Import active energy (EP+)	kWh, MWh, GWh	Total	•	•	•	
Import active energy (EP+)	kWh, MWh, GWh	Parcial		•	•	
Export active energy (EP-)	kWh, MWh, GWh	Total	•	•	•	
Export active energy (EP-)	kWh, MWh, GWh	Parcial		•	•	
Export reactive energy (EQ+)	kvarh, Mvarh, Gvarh	Total		•	•	
Export reactive energy (EQ-)	kvarh, Mvarh, Gvarh	Total		•	•	
Export reactive energy (EQ-)	kWh, MWh, GWh	Parcial		•	•	
Energy load curve	kWh, MWh, GWh	Curve				
Reactive energy (4 quadrants)	kvarh, Mvarh, Gvarh	Q1, Q2, Q3, Q4		•	•	
Tariffs			4	4	4	
THD voltage and current	V, A	L1, L2, L3		•	•	
RMS-U and RMS-I harmonics	%	L1, L2, L3		•	•	
Remote cut-off swich	-	ON / OFF	•	•	•	
Programmable power limiter	-	-	•	•	•	



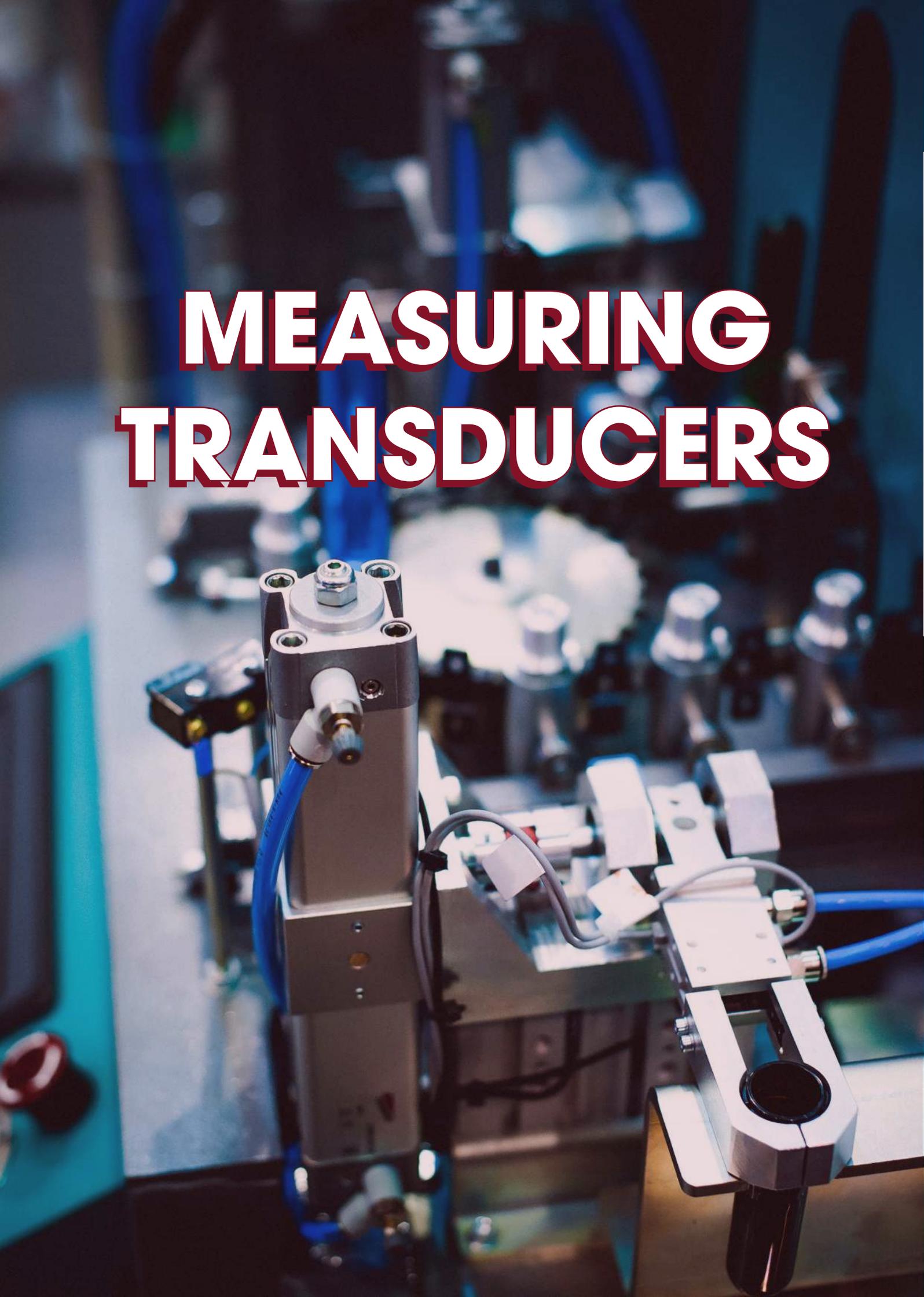
# ENERGY METERS

			M1DL3 - MID M1DL3T - MID	M1DL1 - MID	
					
<b>GENERAL FEATURES</b>					
Rated voltage			230 V AC	230 V AC	
Rated current			0,25-5(100) A	0,25-5(50) A	
Dimensions			1 DIN	1 DIN	
Protection degree IP			IP51	IP51	
MID certified			0120/SGS05731	0120/SGS0575	
<b>COMMUNICATIONS</b>					
RS485 (Modbus)			•		
<b>OTHER FEATURES</b>					
Counter reset			Partial		
Contact output				1 (optocoupler)	
<b>ELECTRICAL MAGNITUDES</b>					
	Unidad				
Electrical parameters			11	6	
Voltage	V, kV	Total	•	•	
Current	A, kA	Total	•	•	
Active power (P)	kW, MW, GW	Total	•	•	
Reactive power (Q)	kvar, Mvar, Gvar	Total	•		
Apparent power (S)	kVA	Total	•		
Power factor (Cos )	PF	Total	•	•	
Frequency	Hz	Total	•	•	
Imported active energy (EP+)	kWh, MWh, GWh	Total	•	•	
Exported active energy (EP-)	kWh, MWh, GWh	Total	•		
Imported reactive energy (EQ+)	kvarh, Mvarh, Gvarh	Total	•		
Exported reactive energy (EQ-)	kvarh, Mvarh, Gvarh	Total	•		
Tariffs			4 (M1DL3T-MID)		

# ENERGY METERS

	M1DL1	M2DL1	M1DM1	M2DM1
				
	230 V AC	230 V AC	230 V AC	230 V AC
	5 (50) A	5 (80) A	5 (50) A	5 (80) A
	1 DIN	2 DIN	1 DIN	2 DIN
		Partial		
	1	1	1	1
	1	1	1	1
	•	•	•	•

# MEASURING TRANSDUCERS



# MEASURING TRANSDUCERS

<b>General features</b>	<b>46</b>
<b>Measuring transducers</b>	<b>48</b>
<b>ATS1P, ATS2P programmable transducers</b>	<b>50</b>
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# MEASURING TRANSDUCERS

## General features

### Measuring transducers

#### General technical specifications

• Isolation	3,7 kV, 50Hz, 1min Double insulation Category III Pollution degree 2
• Electrical impulse test	5 kV, 1,2/50 $\mu$ s
• High Frequency Interference (HF)	2,5 kV, 1 MHz
• Reference temperature	23°C $\pm$ 1 °C
• Temperature Coefficient	$\leq$ 0,01% / °C
• Operating temperature	- 10 °C a + 55 °C
• Storage temperature	- 30 °C a + 70 °C
• Linearity error	$\leq$ 0,1 %
• Ripple (Peak to Peak)	$\leq$ 0,3 %
• Response time	$\leq$ 200 ms (0 - 90 %Io)
• Operating frequency	50, 60 y 400 Hz
• Overloads	<p><b>Current input</b></p> <p>2 In permanent</p> <p>20 In, 3s</p> <p>40 In, 1s</p> <p>30In, 3s (on request)</p> <p>60In, 1s (on request)</p> <p><b>Voltage input</b></p> <p>1,2 Vn permanent</p> <p>2 Vn, 10s</p>

#### Standard

- |             |            |
|-------------|------------|
| • IEC 60688 | • EN 60688 |
| • IEC 60068 | • EN 60069 |
| • IEC 61326 | • EN 61326 |
| • IEC 61010 | • EN 61010 |
| • IEC 60529 | • EN 60529 |

# MEASURING TRANSDUCERS

## Inputs\*

<b>Tipo 1</b> (Alternating current)	<b>In</b>	<b>1 A - 5 A</b>
	Burden (per circuit)	0,2 VA
		1,5 VA (self supplied)
<b>Tipo 2</b> (Alternating voltage)	<b>Vn</b>	<b>57,7..63,5 - 100..110 - 220..230 - 380..400 - 400 V</b>
	Burden (per circuit)	(Vn 1 mA) VA
		1,5 VA (self supplied)
<b>Tipo 3</b> (Direct current)	<b>In</b>	<b>100 <math>\mu</math>A <math>\div</math> 5 A</b>
	Burden (per circuit)	In 60 mV
<b>Tipo 4</b> (Direct voltage)	<b>Vn</b>	<b>60 mV <math>\div</math> 440 V</b>
	Burden (per circuit)	Vn 1 mA
<b>Tipo 5</b> (Frequency)	<b>Fn</b>	<b>50 - 60 - 400 Hz</b>

## Outputs\*

<b>Type 1</b> (Current output)	<b>Io</b>	<b>1 - 5 - 10 - 20 mA</b>
	Load resistance	$R_o (k\Omega) = 12 V / I_o (mA)$
	Saturation limit	2 Io
<b>Type 2</b> (Current output)	<b>Io (auxiliary voltage required)</b>	<b>4 - 20 mA</b>
	Load resistance	$R_o (k\Omega) = 12 V / I_o (mA)$
	Saturation limit	2 Io
<b>Type 3</b> (Voltage output)	<b>Vo (auxiliary voltage required)</b>	<b>1 - 5 - 10 V 1..5 - 2..10 V</b>
	Load resistance	$R_o (k\Omega) = 10 V / V_o (mA)$
	Saturation limit	2 Vo
	Max. open circuit output voltage	30 V
<b>Type 4</b>	<b>Pulse output</b>	<b>CP_'s only</b>
	Voltage	250 Vac, 30 Vdc
	Type	Relay
	Maximum current	10 A
<b>Type 5</b>	<b>Communication</b>	<b>USB and RS 485</b>

## Auxiliary voltage\*

<b>Type 1</b>	AC Auxiliary voltage	115 - 230 - 400 V $\pm$ 20%
<b>Type 2</b>	DC Auxiliary voltage	12 - 24 - 48 - 110 - 220 V $\pm$ 20 %
<b>Type 3</b>	Models ATIP - ATUP - CP40	Universal 40..275 V CA/CC

Generic specifications. Please, check particular characteristics of each model.

\*Other technical specifications, on request.

# MEASURING TRANSDUCERS

## Measuring transducers



### 1° Input

Input <sup>1</sup>	No.	Type
AC current	1	1 or 5 A (.../1 or .../5 A)
AC voltage	2	100, 110, 115, 230, 400 or 440 V
DC current	3	100 µA - 5 A
DC voltage	4	60 mV - 440 V

### 2° Output

Output <sup>2</sup>	No.	Type
DC current	1	1, 5, 10 or 20 mA
DC current	2	4 - 20 mA
Voltage	3	1 - 5 - 10 or 1 - 5 or 2 - 10 V

### 3° Auxiliary voltages

Auxiliary voltages <sup>3</sup>	No.	Type
V. Aux. AC	1	115, 230, 400 ± 20% V AC
V. Aux. DC	2	12, 24, 48, 110 or 220 ± 20% V DC

	AC current	Range	Input <sup>1</sup>	Output <sup>2</sup>	Aux. V. <sup>3</sup>	Models
A	Single-phase	0,5 - 1,2 In	1	1	-	ATI
A	Triple, single-phase	0,5 - 1,2 In	1	1	-	ATI3
A	Single-phase	0 - 1,2 In	1	1	-	ATlz
A	Triple, single-phase	0 - 1,2 In	1	1	-	ATlz3
A	Single-phase	0 - 1,2 In	1	1 - 2 - 3	1 - 2	ATIa
A	Triple, single-phase	0 - 1,2 In	1	1 - 2 - 3	1 - 2	ATIa3
A	Bidirectional, single-phase	± 1,2 In	1 - 2	1 - 2 - 3	1 - 2	ATIB
A	Bidirectional, three-phase balanced	± 1,2 In	1 - 2	1 - 2 - 3	1	ATIBI

Other accuracy values on request. Unaffected by frequency variation



ATI\_

	DC current	Range	Input <sup>1</sup>	Output <sup>2</sup>	Aux. V. <sup>3</sup>	Models
A	Single-phase	± 0 - 1,2 In	3	1 - 2 - 3	1 - 2	ATlca
A	Single-phase	± 0 - 1,2 In	3	1 - 2 - 3	2	ATlca-a

Other accuracy values on request.



ATlca

	AC voltage	Range	Input <sup>1</sup>	Output <sup>2</sup>	Aux. V. <sup>3</sup>	Models
V	Single-phase	0,4 - 1,2 Un	2	1	-	ATU
V	Triple, single-phase	0,4 - 1,2 Un	2	1	-	ATU3
V	Single-phase	0 - 1,2 Un	2	1 - 2 - 3	1 - 2	ATUa
V	Triple, single-phase	0 - 1,2 Un	2	1 - 2 - 3	1 - 2	ATUa3

Other accuracy values on request. Unaffected by frequency variation



ATU\_

	DC voltage	Range	Input <sup>1</sup>	Output <sup>2</sup>	Aux. V. <sup>3</sup>	Models
V	Single-phase	± 0 - 1,2 Un	4	1 - 2 - 3	1 - 2	ATUca
V	Single-phase	± 0 - 1,2 Un	4	1 - 2 - 3	2	ATUca-a

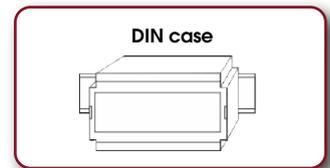
Other accuracy values on request.



ATUca

# MEASURING TRANSDUCERS

## Measuring transducers



ATW\_

Active power		Range	Input <sup>1</sup>	Output <sup>2</sup>	Aux. V. <sup>3</sup>	Model
P	Single-phase	0 - 1,2 Pn or $\pm 1,2 Pn$	1 - 2	1 - 2 - 3	1 - 2	ATW
P	Balanced three-phase (3 wire)	0 - 1,2 Pn or $\pm 1,2 Pn$	1 - 2	1 - 2 - 3	1 - 2	ATWI
P	Balanced three-phase (4 wire)	0 - 1,2 Pn or $\pm 1,2 Pn$	1 - 2	1 - 2 - 3	1 - 2	ATWIn
P	Unbalanced three-phase (3 wire)	0 - 1,2 Pn or $\pm 1,2 Pn$	1 - 2	1 - 2 - 3	1 - 2	ATWII
P	Unbalanced three-phase (4 wire)	0 - 1,2 Pn or $\pm 1,2 Pn$	1 - 2	1 - 2 - 3	1 - 2	ATW3

Other accuracy values on request. Not measurable variation with frequency.



ATWr\_

Reactive power		Range	Input <sup>1</sup>	Output <sup>2</sup>	Aux. V. <sup>3</sup>	Model
Q	Single-phase	0 - 1,2 Qn or $\pm 1,2 Qn$	1 - 2	1 - 2 - 3	1 - 2	ATWr
Q	Balanced three-phase (3 wire)	0 - 1,2 Qn or $\pm 1,2 Qn$	1 - 2	1 - 2 - 3	1 - 2	ATWIr
Q	Balanced three-phase (4 wire)	0 - 1,2 Qn or $\pm 1,2 Qn$	1 - 2	1 - 2 - 3	1 - 2	ATWInr
Q	Unbalanced three-phase (3 wire)	0 - 1,2 Qn or $\pm 1,2 Qn$	1 - 2	1 - 2 - 3	1 - 2	ATWIr
Q	Unbalanced three-phase (4 wire)	0 - 1,2 Qn or $\pm 1,2 Qn$	1 - 2	1 - 2 - 3	1 - 2	ATW3r

Other accuracy values on request. Variation with frequency < 0.1 % / Hz.



ATWV\_

Active + reactive power		Range	Input <sup>1</sup>	Output <sup>2</sup>	Aux. V. <sup>3</sup>	Model
P+Q	Single-phase	0 - 1,2 Pn+Qn or $\pm 1,2 Pn+Qn$	1 - 2	1 - 2 - 3	1 - 2	ATWV
P+Q	Balanced three-phase (3 wire)	0 - 1,2 Pn+Qn or $\pm 1,2 Pn+Qn$	1 - 2	1 - 2 - 3	1 - 2	ATWVI
P+Q	Balanced three-phase (4 wire)	0 - 1,2 Pn+Qn or $\pm 1,2 Pn+Qn$	1 - 2	1 - 2 - 3	1 - 2	ATWVIn
P+Q	Unbalanced three-phase (3 wire)	0 - 1,2 Pn+Qn or $\pm 1,2 Pn+Qn$	1 - 2	1 - 2 - 3	1 - 2	ATWVII
P+Q	Unbalanced three-phase (4 wire)	0 - 1,2 Pn+Qn or $\pm 1,2 Pn+Qn$	1 - 2	1 - 2 - 3	1	ATWV3

Other accuracy values on request. Negligible frequency variation in active power, for reactive power < 0.1 % / Hz.



ATF\_

Frequency		Range	Input <sup>1</sup>	Output <sup>2</sup>	Aux. V. <sup>3</sup>	Model
HZ	50 Hz, 60 Hz or 400 Hz	0,9 - 1,1 Fn	2	1 - 2 - 3	-	ATF
HZ	50 Hz, 60 Hz or 400 Hz	0,9 - 1,1 Fn	2	1 - 2 - 3	1 - 2	ATFa

Other precision values on request.



ATA\_

Phase angle		Range	Input <sup>1</sup>	Output <sup>2</sup>	Aux. V. <sup>3</sup>	Model
A	Single-phase	-60° - 0 - 60°	1 - 2	1 - 2 - 3	1 - 2	ATA
A	Balanced three-phase	-90° - 0 - 90°	1 - 2	1 - 2 - 3	1 - 2	ATAI
A	Single-phase (between voltages)	-180° - 0 - 180°	2	1 - 2 - 3	1	ATAU

Other accuracy values on request. Variation with frequency not measurable.

# MEASURING TRANSDUCERS

## Measuring transducers

Resistance and temperature



### General features

	Input resistance	Range	Output <sup>2</sup>	Aux. V. <sup>3</sup>	Model
R	0 - 100; 0 - 3000 Ohm	0 - 100 %	1 - 2 - 3	1 - 2	ATS2

Other accuracy values on request

	Input temperature	Range	Output <sup>2</sup>	Aux. V. <sup>3</sup>	Model
°C	Pt-100 / Pt-1000 Probe (0 -100; 0-600 °C)	0 - 100 %	1 - 2 - 3	1 - 2	ATS1

Other accuracy values on request

## ATS1P, ATS2P programmable transducers

Resistance and temperature



### General features

Resistance and temperature converters with RMS measurement (true RMS measurement of current or voltage), microprocessor-controlled and configurable via software.

They feature USB and RS485 serial ports with Modbus RTU protocol.

Measurement parameters	ATS2P	ATS1P
Resistance	•	
Temperature		•
Range	0 - 100 %	0 - 100 %

Input features	Range
ATS2	0 - 100; 0 - 3000 Ohm
ATS1	Pt-100 / Pt-1000 Probe (0 -100; 0-600 °C)

Other accuracy values on request

Output features	Range
DC current	1, 5, 10, 20 mA 4 - 20 mA
DC voltage	1 - 5 -10; 1 - 5; 2 - 10 V
Communication	USB y RS485

Auxiliar voltage	Range
Universal	40 - 275 V AC/DC

## ATIP, ATUP programmable transducers

Alternating current



### General features

Microprocessor-controlled, software-configurable RMS (true RMS measurement of current or voltage) converter.

It has a USB and RS485 serial port with Modbus/RTU protocol.

Measurement parameters	ATIP	ATUP
RSM current	•	
RSM voltage		•
Range	0 - 1,2 In	0 - 1,2 Vn

Input features	Range
ATIP	X/5 and X/1 A
ATUP	110 and 230 V

Output features	Range
DC current	0 - 5 or 4 - 20 mA
DC voltage	0 - 10 V
Communication	USB and RS485

Auxiliar voltage	Range
Universal	40 - 275 V AC/DC
Direct current (DC)	12, 24, 48 V DC

## ATlcaP, ATUcaP programmable transducers

Direct current



### General features

DC current converter with RMS measurement (true RMS measurement of current or voltage), microprocessor-controlled and configurable via software.

It features USB and RS485 serial ports with Modbus RTU protocol.

Measurement parameters	ATlcaP	ATUcaP
Current (RMS)	•	
Voltage (RMS)		•
Range	$\pm 0 - 1,2 I_n$	$\pm 0 - 1,2 V_n$

Input features	Range
ATlcaP	60mV
ATUcaP	0 - 100V / 0 - 600V

Output features	Range
DC current	0 - 5 or 4 - 20 mA
DC voltage	0 - 10 V
Communication	USB and RS485

Auxiliary voltage	Range
Universal	40 - 275 V AC/DC

# MEASURING TRANSDUCERS

## CP40 programmable measuring transducers

CP42, CP43, CP44



Measurement parameters	CP42	CP43	CP44
Line and phase voltage (RMS)	•	•	•
Current (RMS)	•	•	•
Total and phase active power	•	•	•
Total and phase cosine of $\phi$	•	•	•
Total and phase reactive power	•	•	•
Total and phase apparent power	•	•	•
Frequency	•	•	•

General features	CP42	CP43	CP44
Positive active energy		Digital output	
Inductive and capacitive reactive power		Digital output	
Analog outputs	2	3	4
Pulse / contacts / alarms outputs	2	2	2
Programmable	•	•	•
Analysis / management software	•	•	•

Input features	Range
Rated voltage	110 or 400V
Rated current	X/1 A and X/5 A
Universal auxiliary power supply	40 - 275 V DC/AC
DC auxiliary power	18 - 72 V DC
Frequency	50 or 60 Hz

Output features	Range
Current	0 - 1; 0 - 5; 0 - 10; 0 - 20 or 4 - 20 mA
Voltage	0 - 1; 0 - 5; 0 - 10; 1 - 5 or 2 - 10 V
Serial port	RS 485 and USB

Auxiliary voltage	Range
Universal	40 - 275 V AC/DC

Type	Models	Models	Models
Single-phase	CP42-0	CP43-0	CP44-0
3-phase, 3 wires, balanced	CP42-1	CP43-1	CP44-1
3-phase, 4 wires, balanced	CP42-1A	CP43-1A	CP44-1A
3-phase, 3 wires, unbalanced	CP42-2	CP43-2	CP44-2
3-phase, 4 wires, unbalanced	CP42-3	CP43-3	CP44-3

## CP\_ programmable measuring transducers

CP300\_, CP400\_



Measurement parameters	CP300X	CP400x
Line and phase voltage (RMS)	•	•
Current (RMS)	•	•
Total and phase active power	•	•
Total and phase cosine of $\phi$	•	•
Total and phase reactive power	•	•
Total and phase apparent power	•	•
Frequency	•	•
Positive active energy	•	•
Inductive reactive energy	•	•
Capacitive reactive energy	•	•
THD current and voltage	•	•

General features	CP300X	CP400x
Analog outputs	3	4
Pulse outputs / contacts / alarms	2	2
Programmable	•	•
Communication: RS 485 or RS 232* digital output	•	•
Analysis / management software	•	•

(\*) Both communications in CP300X

Input features	Range
Rated voltage	100, 110, 230, 400 or 440 V
Rated current	X/1 A or X/5 A
AC and DC auxiliary power supply (Universal)	85 - 264 V AC & 90 - 300 V DC
DC auxiliary power	18 - 72 V AC
Frequency	50 or 60 Hz

Output features	Range
Current	0-1, 0-5, 0-10, 0-20 mA 4 - 20 mA
Voltage	10 V
Serial port	RS 485 or RS 232

Network type	Models
Single-phase	CP3000
Three-phase balanced 3 or 4 wires	CP3001
Three-phase unbalanced 3 wires, 2 systems	CP3002
Three-phase unbalanced 4 wires, 3 systems	CP3003
Single-phase	CP4000
Three-phase balanced 3 or 4 wires	CP4001
Three-phase unbalanced 3 wires, 2 systems	CP4002
Three-phase unbalanced 4 wires, 3 systems	CP4003

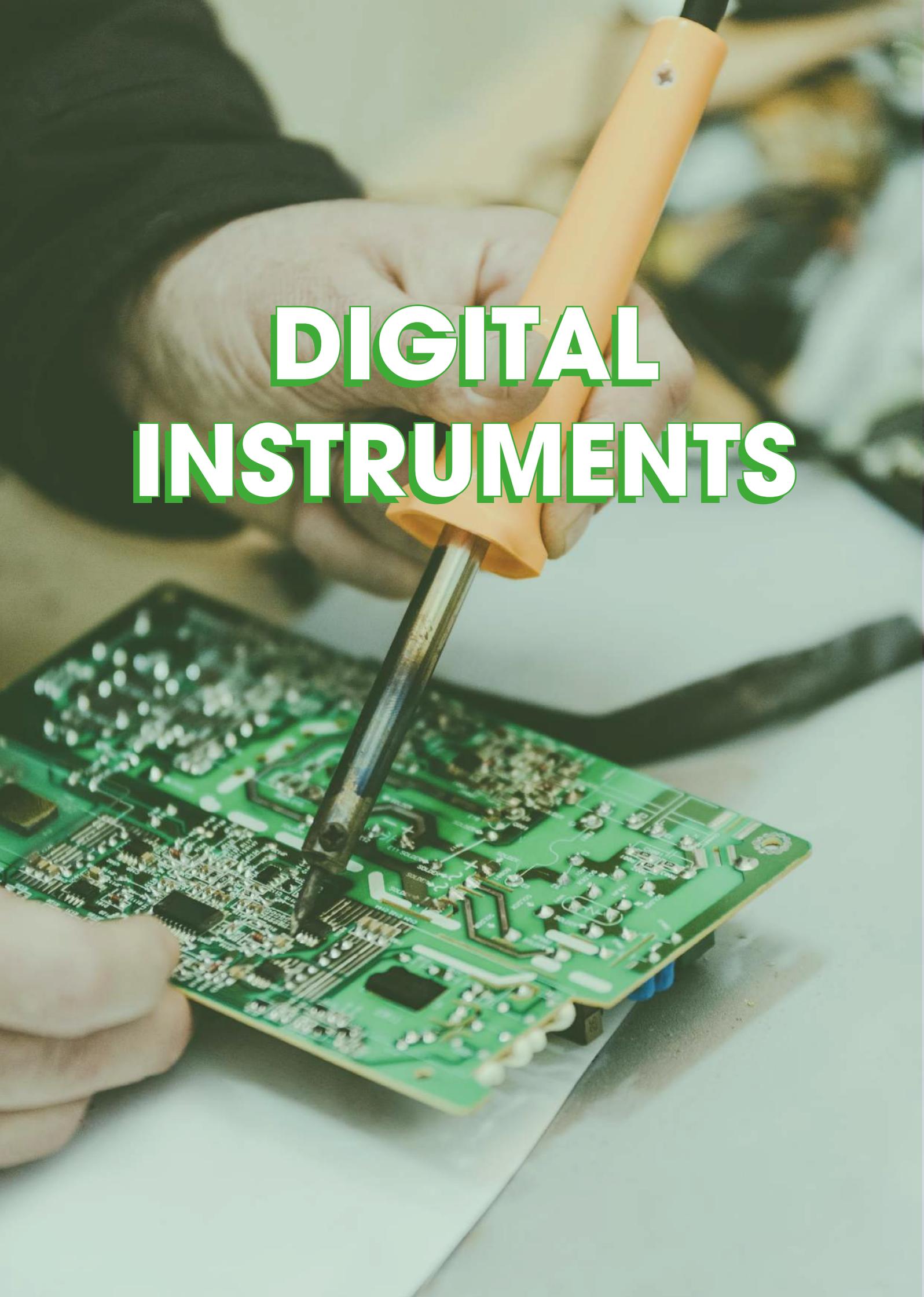
# MEASURING TRANSDUCERS

## Permissible THD in transducers

According to the model

Model	In	Un
<b>Current transducers</b>		
ATI	< 0,5 %	
ATlz	< 0,5 %	
ATI3	< 0,5 %	
ATlz3	< 0,5 %	
ATIa	< 0,5 %	
ATIa3	< 0,5 %	
ATIB	Not affected	
ATIBI	Not affected	
ATIP	Not affected	
<b>Voltage transducers</b>		
ATU		< 0,5 %
ATU3		< 0,5 %
ATUa		< 0,5 %
ATUa3		< 0,5 %
ATUVn		< 0,5 %
ATUP		Not affected
<b>Frequency transducers</b>		
ATF		< 20 %
ATFa		Not affected
<b>Programmable transducers</b>		
ATIP	Not affected	
ATUP		Not affected
CP40	Not affected	Not affected
<b>Active power transducers</b>		
ATW	< 20 %	< 20 %
ATWI	< 20 %	< 20 %
ATWIn	< 20 %	< 20 %
ATWII	< 20 %	< 20 %
ATW3	< 20 %	< 20 %
<b>Reactive power transducers</b>		
ATWr	< 0,5 %	< 0,5 %
ATWIr	< 0,5 %	< 0,5 %
ATWInr	< 0,5 %	< 0,5 %
ATWIIr	< 0,5 %	< 0,5 %
ATW3r	< 0,5 %	< 0,5 %
<b>Combined active and reactive power transducers</b>		
View active and reactive tables		
<b>Phase angle transducers</b>		
ATA		< 20 %
ATAI	< 20 %	< 20 %
ATAU		< 20 %

# DIGITAL INSTRUMENTS



<b>General features</b>	<b>58</b>
<b>Frequency meter (DIN rail) - AC</b>	<b>59</b>
<b>Voltmeter or ammeter (DIN rail) - AC and DC</b>	<b>59</b>
<b>Voltmeter - ammeter - AC and DC</b>	<b>60</b>
<b>Programmable multi-range instruments - AC and DC</b>	<b>61</b>
<b>Dual and triple instruments - AC and DC</b>	<b>62</b>
<b>Programmable indicators - DC</b>	<b>64</b>
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<b>Maximum ammeter (maximeters) - AC and DC</b>	<b>66</b>
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## General features

### Digital instruments

#### General features

- 3 - 3 1/2 - 4 - 4 1/2 digits
- Direct current
- Alternating current

#### General technical specifications

• Test voltage	2 kV, 50 Hz, 1 min
• Electrical impulse test	5 kV, 1,2/50 µs
• Measuring range	0 - 140 % (4 digits) 0 - 120 % (3, 3 1/2 y 4 1/2 digits)
• Reference temperature	23 °C ± 1 °C
• Operating temperature	- 10 °C / + 55 °C
• Storage temperature	- 30 °C / + 70 °C
• Protection degree	Front IP50, Rear IP20
• Permissible overloads <b>Current input</b>	<b>General</b> 1,2 In permanent 2 In, 10s <b>Motor starting</b> 2 In permanent 5 In, 10s
<b>Voltage input</b>	<b>1,2 Vn permanent</b> 2 Vn, 10s

#### Auxiliary voltage

AC Auxiliary power	110 - 230 - 400 V
DC Auxiliary power	12 - 24 - 48 - 110 - 220 V
Universal AC/DC auxiliary power supply	45 - 275 V

#### Standards

- EN 60051 Direct measuring equipment
- EN 60068 Environmental and vibration testing
- EN 61010 Safety requirements for electrical equipment
- EN 60529 Enclosure protection degree (IP codes)
- EN 61000 Electromagnetic compatibility
- UL 94 Flammability test
- IEC 664 Insulation requirements
- IEC 255 Insulation testing

## Digital frequency meter (DIN rail)

Alternating current



### General features

Digital frequency meter for alternating current in DIN rail format. It features a high-brightness red LED display with three digits and a display range of 30 to 500 Hz.

- **Auxiliary voltage:** 45-275 V AC/DC
- **Operating voltage:** 100 and 600 V
- **Overrange indication:** EEE
- **Max reading:** 999
- **No. of digits:** 3

General features	Range	Model
Frequency meter	30-500 Hz	DB5RF

## Digital voltmeter or ammeter (DIN rail)

AC or DC



### General features

This equipment is configurable as either a voltmeter or an ammeter for alternating or direct current, and is available in a DIN rail format. It features a high-brightness red LED display with three digits, offering a display range of amps or volts depending on the connection type.

The primary current is programmable.

- **Auxiliary voltage:** 45-275 V AC/DC  
Optional 24-48 V DC
- **Overrange indication:** EEE
- **DIN rail**
- **No. of digits:** 3
- **Max reading:** 999

Alternating current		
General features	Range	Model
Voltmeter	100 and 600 V	DB5RE
Ammeter x/5 A	5 - 10 - 15 - 20 - 25 - 30 - 40 - 50 - 60 - 75 - 100 - 125 - 150 - 200 - 300 - 400 - 500 - 600 - 750 - 1000 - 1250 - 1500 - 1600 - 2000 - 2500 - 3000 - 4000 - 5000 - 6000 - 8000 A	DB5RE

Direct current		
General features	Range	Model
Voltmeter	100 and 600 V	DB5RC
Ammeter x/60 mV	5 - 10 - 15 - 20 - 25 - 30 - 40 - 50 - 60 - 75 - 100 - 125 - 150 - 200 - 300 - 400 - 500 - 600 - 750 - 1000 - 1250 - 1500 - 1600 - 2000 - 2500 - 3000 - 4000 - 5000 - 6000 - 8000 A	DB5RC



AC device



DC device

## Voltmeter - ammeter

AC and DC current



### General features

Voltmeter-ammeters available in AC or DC with dual-reading display and micro-processor controlled digital display.

Capable of simultaneously measuring current and voltage.

- **Auxiliary voltage:** Self-powered  
Universal 45-275 V AC/DC
- **Max. reading:** 999
- **Overrange indication:** HHH
- **No. of digits:** 3
- **Dimensions:** 2 modules, 35x96mm
- **DIN rail**

### Direct measurement

	AC current	Model
V	63,5 - 110 - 230 V	DB5RE2D
A	80 A	
	DC current	Model
V	12, 24, 48, 110, 125, 220 V	DB5RC2D
A	80A	

### Indirect measurement

	AC current	Model
V	63,5 - 110 - 230 V	DB5RE2
A .. /100mA <sup>(1)</sup>	5 - 10 - 15 - 20 - 25 - 30 - 40 - 50 - 60 - 75 - 100 - 125 - 150 - 200 - 300 - 400 - 500 - 600 - 750 - 1000 - 1250- 1500 - 1600- 2000 - 2500 - 3000 - 4000 - 5000 - 6000 - 8000 A	
	DC current	Model
V	12, 24, 48, 110, 125, 220 V	DB5RC2
A .. /60 mV <sup>(2)</sup>	5 - 10 - 15 - 20 - 25 - 30 - 40 - 50 - 60 - 75 - 100 - 125 - 150 - 200 - 300 - 400 - 500 - 600 - 750 - 1000 - 1250- 1500 - 1600- 2000 - 2500 - 3000 - 4000 - 5000 - 6000 - 8000 A	

(1) Connection to transformers (2) Connection to shunt

## Programmable multirange instruments

4 digits. AC and DC current



### General features

Voltmeter or ammeter for alternating or direct current. Please specify whether you require a voltmeter or an ammeter, as they are two different devices. The primary value of the current-voltage ratio is programmable.

- **No. digits:** 4
- **Max reading:** 9999
- **Selectable display**
- **Overrange indication:** HHHH
- **DIN rail and panel**

Range		
	Alternating current	Direct current
Ammeter	x/ 5 A y x/1 A <sup>(1)</sup>	x/ 60mV ó x/150 mV <sup>(1)</sup>
Voltmeter	x/ 100 V ó x/ 110 V <sup>(1)</sup> 0 - 200 V ó 0 - 500 V	0 - 200 V ó 0 - 500 V

Aux. V.: universal (45-275V) AC/DC - Aux. V.: 380 or 400V ± 10% AC - Aux. V.: 12, 24 or 48V ± 20% DC

AC current						
Model	DH5EM	DH4EM	DH3EM	DH4EM-A <sup>(2)</sup>	DP46EM	DP35EM
Dimensions (mm)	48 x 48	72 x 72	96 x 96	72 x 72	72 x 36	96 x 48

(1) For transformer connection  
(2) Equipment with minimum and maximum contact for programming alarms. Universal auxiliary voltage only

Aux. V.: universal (45-275V) AC/DC - Aux. V.: 380 or 400V ± 10% AC - Aux. V.: 12, 24 or 48V ± 20% DC

DC current					
Model	DH5CM	DH4CM	DH3CM	DP46CM	DP35CM
Dimensions (mm)	48 x 48	72 x 72	96 x 96	72 x 36	96 x 48

(1) For shunt connection



AC voltmeter



AC ammeter



DC voltmeter



DC ammeter

## Double and triple display instruments

4 digits. AC and DC current



### General features

Double or triple 4-digit instruments where ammeters, voltmeters and frequency meters can be combined.

The primary current is programmable in steps.

- **Auxiliary voltage:** Universal 45-275V AC/DC  
380 or 400V  $\pm 10\%$  AC <sup>(1)</sup>  
12, 24 or 48V  $\pm 20\%$  DC <sup>(1)</sup>
- **No. of digits:** 4
- **Max. reading:** 9999
- **Overrange indication:** HHHH
- **Panel mounting**
- **Programmable step**

Model	AC current					DC current
	DH4EM2	DH3EM3	DH3EM3	DH3EM3	DH3EM3	DH3C2M
Dimensions (mm)	72 x 72	96 x 96	96 x 96	96 x 96	96 x 96	96 x 96
Display 1	Voltmeter 0 - 500 V	Voltmeter 0 - 500 V (phase-phase)	Voltmeter 0 - 300 V (phase-neutral)	Ammeter ../1A or ../5A <sup>(1)</sup>	Voltmeter 0 - 500 V	Ammeter x/60mV <sup>(2)</sup>
Display 2	Ammeter x/1A or x/5A <sup>(1)</sup>	Voltmeter 0 - 500 V (phase-phase)	Voltmeter 0 - 300 V (phase-neutral)	Ammeter ../1A or ../5A <sup>(1)</sup>	Ammeter ../1A or ../5A <sup>(1)</sup>	Voltmeter 0 - 500V
Display 3	–	Voltmeter 0 - 500 V (phase-phase)	Voltmeter 0 - 300 V (phase-neutral)	Ammeter ../1A or ../5A <sup>(1)</sup>	Frequency meter 0 - 999 Hz	–
Range	V - A	V <sub>12</sub> - V <sub>13</sub> - V <sub>23</sub>	V <sub>1</sub> - V <sub>2</sub> - V <sub>3</sub>	A <sub>1</sub> - A <sub>2</sub> - A <sub>3</sub>	V - A - Hz	V - A

(1) For connection to transformers (2) For connection to shunt



AC instruments



DC instruments

## Double and triple display instruments

3½ digits. Alternating current



### General features

Double or triple 3 ½ digit instruments where ammeters and voltmeters can be combined.

- **Auxiliary voltage:** 110, 230 or 400V ±10% AC  
12, 24 or 48, 110 or 220V ±20% AC
- **Accuracy:** 0,5% of the reading ±1 digit AC  
0,2% of the reading ±1 digit DC
- **No. of digits:** 3½
- **Max. reading:** 1999
- **Overrange ind.:** 1---
- **Panel mounting**

Range	
Ammeter	199,9 µA
	1,999 - 19,99 - 199,9 mA
	1,999A
Voltmeter	x/60mV or x/150 mV <sup>(3)</sup>
	1,9999 - 19,99 - 199,9 or 600 V
	199,99 mV

Model	DH5C2 <sup>(1)</sup>	DH4C2 <sup>(2)</sup>	DH3C2	DH3C3
Dimensions (mm)	48 x 48	72 x 72	96 x 96	96 x 96
No. of displays	2	2	2	3
Measurement range	A, V or transducer output (mA)			

(1) Auxiliary voltage: 12, 24 or 48 DC. (2) Auxiliary voltage: 12, 24 or 48 DC or 110, 230 or 400V AC. (3) For shunt connection.

## Programmable multirange instruments

4 digits. Alternating current



### General features

The voltage and current can be displayed on its LED screen using a front button. The primary current value can be programmed.

- **No. of digits:** 4
- **Max. reading:** 9999
- **Selectable display**
- **Overrange indication:** HHHH
- **Panel and DIN rail**

Range	
Ammeter	x/ 5 A and x/1 A programmable <sup>(1)</sup>
Voltmeter	500V

Aux. V.: universal (45-275V) AC/DC

Model	DH4B	DH3B	DP46B	DP35B
Dimensions (mm)	72 x 72	96 x 96	72 x 36	96x 48

(1) For transformer connection

## Programmable digital instruments

3½ and 4 digits. DC current



### General features

The equipment can be requested in an milliammeter or voltmeter version, depending on the type of input signal provided by the converter, adapting the display scale to the magnitude to be displayed.

#### 3 ½ digits

- Keypad programmable display scale (offset, end of scale and decimal point).
- Optional keypad programmable alarm.

#### 4 digits

- Keypad programmable display scale (offset, end of scale and decimal point).
- Indication of the measured variable, its integrated value and recording of the integrating maximum.
- Double alarm programmable by keypad, with maximum and minimum threshold.

- **Auxiliary voltage:** 110, 230 or 400 V ± 20% AC  
12, 24, 48 or 110 ± 20% DC
- **Accuracy:** 0,2% of range ± 1 digit
- **Overrange indication:** OFL
- **Alarm circuit:** 1 potential-free contact (250V, 3A, 200VA).  
Optional max or min value.

Range	
Ammeters	0 - 1; 0 - 5; 0 - 10; 0 - 20 or 4 - 20 mA (*)
Voltmeters	0-1; 0-5; 0-10; 1-0-1; 5-0- 5; 10-0-10; 1-5 or 2-10 V (*)

Units
mA - A - kA - mV - V - kV - rpm - % -m- Kg - bar - mm - kN - Hz - W - kW - mW - VA - var - mvar - kVA - °C - °F

Model	DP35CP	DP46CPM
No. of digits	3½	4
Dimensions (mm)	96x48	72x36
Max. reading	±1999	9999; -999 (divided negative)

(\*) For converters connection

## Non programmable instruments

3 ½ and 4 ½ digits. AC and DC current



### General features

Voltmeters and ammeters for alternating or direct current are available in square or rectangular formats for panel installation.

As these devices are non-programmable, it is necessary to specify whether a voltmeter or an ammeter is required, as well as the model and the measurement ratio between the primary and secondary.

- **Max. reading:** 19999
- **DIN rail and panel mounting**

Range		
	AC current	DC current
Ammeters	199,9 or 1999 mA	199,9 µA
	1,999 A	1,999 - 19,99 or 199,9 mA
	x/ 1 or x/ 5 A <sup>(1)</sup>	1,999 A
Voltmeters		x/60 or x/150 mV <sup>(2)</sup>
	1,9999 - 19,99 - 199,9 or 600 V	199,9mV
	x/ 100 or 110 V <sup>(1)</sup>	1,999 - 19,99 - 199,9 or 600 V

Aux. V.: 110 - 230 or 400 V AC

Model	AC current				DC current			
	DQ4E	DQ3E	DQ46E	DQ35E	DQ4C	DQ3C	DQ46C	DQ35C
Dimensions (mm)	72 x 72	96 x 96	72 x 36	96 x 48	72 x 72	96 x 96	72 x 36	96 x 48
No. of digits	4 ½ digits (RMS)							
Overrange indication	0000 (flashing)							

Aux. V.: 12, 24 or 48 V DC

Model	AC current			DC current		
	DP57E	DP47E	DP37E	DP57C	DP47C	DP37C
Dimensions (mm)	48 x 24	72 X 24	96 X 24	48 x 24	72 X 24	96 X 24
No. of digits	3 ½ digits					
Overrange indication	1 - - -					

(1) For transformer connection. (2) For shunt connection



AC voltmeter



AC ammeter



DC voltmeter



DC ammeter

## Programmable maximum demand ammeters



4 digits. AC and DC current



### General features

- Instantaneous, average and maximum current value.
- Average current value (adjustable time interval 8, 15, 20 and 30 min).
- True value RMS.
- Keypad programmable alarm.

- **Auxiliary voltage:** 110, 230V  $\pm$  20% AC  
12, 24, 48 or 110  $\pm$  20% DC
- **Accuracy:** 0,5% of range  $\pm$  1 digit
- **Alarm circuit:** 1 potential free contact (250V, 3A, 200VA)
- **No. of digits:** 4
- **Max. reading:** 9999
- **Overrange ind.:** F.ESC
- **Panel mounting**

Model	AC Current			DC current
	DP46M	DP46M-IR	DP46M-II	DP46MC
Dimensions (mm)	72 X 36			72 X 36
Measurement range	x/1 or x/5A <sup>(1)</sup>			x/60 mV <sup>(2)</sup>
Alarm	Integrated	Instantaneous	Inverted instantaneous	Integrated

(1) For transformers connection. (2) For shunt connection

Alarm programming			
Current type on alarm	Integrated	Instantaneous	Inverted instantaneous
Contacts	NC	NC	NO
Delay	NO	0..99,9 s	NO
Hysteresis	NO	5%	5%

NO: Normally open. NC: Normally closed.

## Digital frequency meters



4 digits. Alternating current



### General features

Accurate frequency measurement in alternating current systems. Equipped with a high-visibility 4-digit display, they allow for clear and quick reading.

- **Auxiliary voltage:** 110, 230 or 400 V  $\pm$  20% AC
- **Operating voltage:** 10 - 500V
- **Accuracy:** 0,05% of reading  $\pm$  1 digit
- **No. of digits:** 4
- **Max reading:** 9999
- **Panel mounting**

Model	DH4F	DH3F	DP46F	DP35F
Dimensions (mm)	72 x 72	96 x 96	72 x 36	96 x 48
Display	0 - 999,9 Hz			

400V for size 72x72mm or 72x36mm consult us.

## DMP3 - Programmable digital multimeter

4 digits. AC current



### General features

It has five displays that can show three currents, one selectable voltage and the frequency simultaneously.

- 3 intensity
  - 3-phase (phase-phase)
  - 3-phase (phase-neutral)
  - Frequency
  - Current and voltage isolated
- **Auxiliary voltage:** 230 V AC
  - **Max. voltage:** 300 V phase-neutral  
520 V phase-phase
  - **Accuracy:** 0,5% FE + 2 digits
  - **Measurement refreshment:** 3 times per sec (aprox.)
  - **Dimensions:** 96x96 mm

General features	Range	Model
Current	5 to 9000/5A (programmable)	DMP3
Frequency	30 - 100 Hz	

## DMP3B - Programmable digital multimeter

4 digits. AC current



### General features

It has five displays that can show three currents, one selectable voltage and the frequency simultaneously.

- 3 intensity
  - 3-phase (phase-phase)
  - 3-phase (phase-neutral)
  - Frequency
  - Current and voltage isolated
- **Auxiliary voltage:** 230 V AC
  - **Max. voltage:** 300 V phase-neutral  
520 V phase-phase
  - **Accuracy:** 0,5% FE + 2 digits
  - **Measurement refreshment:** 3 times per sec (aprox.)
  - **Dimensions:** 96x96 mm

General features	Range	Model
Current	Up to 5000 times the input current	DMP3B
Frequency	30 - 70 Hz	

## Programmable wattmeters and varmeters

4 digits. AC current



### General features

- Keypad-programmable current and voltage transformer ratios.
- Alarm (optional) programmable by keypad.

- **Voltage input:** 100, 110, 230 or 400V AC
- **Current input:** x/1 or x/5 A (\*)
- **Auxiliary voltage:** Self-powered
- **Alarm circuit:** 1 potential-free contact (250V, 3A, 200VA)
- **No. of digits:** 4
- **Max. reading:** -1999 / 9999
- **Overrange indication:** OFL
- **Accuracy:** 0.5% of full scale value  $\pm 1$  digit



Wattmeters



Varmeters

Model	Wattmeters		Varmeters	
	DP35W	DP35WI	DP35Wr	DP35WIr
Dimensions (mm)	96x48	96x48	96x48	96x48
Type	Single-phase	Three-phase balanced	Single-phase	Three-phase balanced

(\*) Connecting to transformers

## Phase angle meters

3 ½ digits. AC current



### General features

They are designed for accurate power factor measurement in alternating current networks. They monitor the phase shift between voltage and current.

- **Voltage input:** 100, 110, 230 or 400V AC
- **Current input:** x/1 or x/5 A (\*)
- **Auxiliary voltage:** self-powered
- **Measurement range:** CAP 0-1-0 IND
- **No. of digits:** 3½
- **Max. reading:** 1000
- **Overrange indication:** ---
- **Accuracy:** 0.5% (90° electrical)

Model	Single-phase				Three-phase balanced			
	DH4S	DP46S	DH3S	DP35S	DH4SI	DP46SI	DH3SI	DP35SI
Dimensions (mm)	72 x 72	72 x 36	96 x 96	96 x 48	72 x 72	72 x 36	96 x 96	96 x 48

(\*) Connection to transformers

## Instruments for transducer output

3½, 4, and 4 ½ digits. DC current



### General features

The range of digital indicators is designed as a complementary instrument for displaying direct current signals from physical or electrical quantity converters.

- **Auxiliary voltage:** 110, 230 or 400V AC  $\pm$  20%
- **Accuracy:** 0,5% of reading  $\pm$ 1 digit AC  
0,2% of reading  $\pm$ 1 digit DC
- **Max. reading:** 19999

Units
mA - A - kA - mV - V - kV - rpm - % - m - Kg - bar - mm - kN - Hz - W - kW - mW - VA - var - kvar - mvar - kVA - °C - °F

Aux. V.: 12, 24 or 48 V DC - Aux. V.: 380 or 400 V AC - Aux. V.: universal (45-275V) AC/DC

Model	DH5C	DH4C	DH3C	DP46C	DP35C
Dimensions (mm)	48x48	72 x 72	96 x 96	72 x 36	96 x 48
No. of digits	4 digits				
Overrange indication	0000 (blinking)				
Transducers output	V		0-1; 0-5 or 0-10; 1-5 or 2-10 V		
	mA		0-1; 0-5; 0-10; 0-20; 4-20 mA		

Aux. V.: 110 - 230 or 400 V AC

Model	DQ4C	DQ3C	DQ46C	DQ35C
Dimensions (mm)	72 x 72	96 x 96	72 x 36	96 x 48
No. of digits	4 ½ digits			
Overrange indication	0000 (blinking)			
Transducers output	V		0-1; 0-5 or 0-10 $\pm$ 1 $\pm$ 5 $\pm$ 10 1-5 or 2-10 V	
	mA		0-1; 0-5; 0-10; 0-20 $\pm$ 1 $\pm$ 5 $\pm$ 20 4-20 mA	

Aux. V.: 12, 24 or 48 V DC

Model	DP57C	DP47C	DP37C
Dimensions (mm)	48 x 24	72 X 24	96 X 24
No. of digits	3 ½ digits		
Overrange indication	1 ---		
Transducers output	V		0-1; 0-5 or 0-10 V
	mA		0-1; 0-5; 0-10; 0-20; 4-20 mA

# ANALOGUE INSTRUMENTS



# ANALOGUE INSTRUMENTS

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# ANALOGUE INSTRUMENTS

## General features

### Analogue instruments

#### General technical specifications

• Overloads	1,2 Vn permanent, 2 Vn 5s
	1,5 In permanent, 5 In 30s, 10 In 5s, 40 In 1s
• Vibration resistance	VDE 0410, Section 27: 2,5g, $\pm$ 0,25 mm, 50 Hz
• Shock resistance	VDE 0410, Section 28: 15g
• Operating temperature	- 25°C .... + 40 °C
• Reference temperature	+ 10°C ... + 30 °C (for accuracy class)
• Test voltage	2 kV, 50 Hz, 1 min
• Tropicalization	DIN 40040 (on request)
• Protection	Casings: IP52 (IP54, IP65 on request)
	Terminals: IP00 (IP20 on request)
• Casings	72 x 72 // 96 x 96 // 144 x 144
	Modular for DIN rail
	IEC 61554
• Scales	Full scale value DIN 43701
	Scale division DIN 438802
• Pointers	DIN 43802

#### Standards

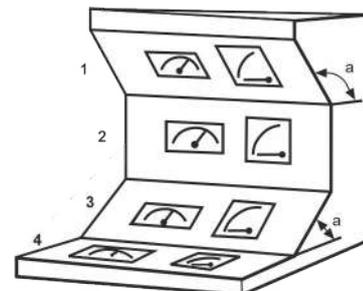
- EN 60051
- BS 89
- EN 50082
- VDE 0410
- EN 50081
- EN 61010

#### Certificates

- ISO 9001: 2015
- DER NORSKE VERITAS

#### Mounting position

Mounting options	
1	$\alpha > 90^\circ$
2	$\perp$
3	$\alpha < 90^\circ$
4	$\square$



## Reed frequency meters

Alternating current



### General features

Measurement of network frequency.

- **Voltage range:**  $\pm 15\% V_n$
- **Voltage (Vn):** 100√3, 110√3, 100, 110, 230, 400, 440V
- **Accuracy:** 0,5%
- **Burden:** 1,2..2,2 VA FC3VI, FC2VI: 2x(1,2..2,2 VA)



Model		FC5V	FC4V	FC3V		FC2V	FC3VI	FC2VI
Dimensions	mm	48x48	72x72	96x96		144x144	96x96	144x144
Reeds	Vn	7	13	13	17	21	2x17	2x21
Scale	50Hz	48,5..51,5	47..53	47..53	46..54	45..55	46..64	45..65
	60Hz	58,5..61,5	57..63	57..63	56..64	55..65		

## Pointer frequency meters

Alternating current - 90° Scale



### General features

- **Scale:** 90°
- **Voltage range:**  $\pm 15\% V_n$
- **Voltage (Vn):** 100, 110, 230, 400, 440V
- **Accuracy:** 0,5%
- **Burden:** 10mA
- **Moving coil with converter**

90° Scale



Model		FC5AR	FC5A	FC4A	FC3A	FC2A	FC5ARI	FC5AI	FC4AI	FC3AI	FC2AI
Dimensions	mm	45x52,2	48x48	72x72	96x96	144x144	45x52,2	48x48	72x72	96x96	144x144
Rated Voltage	Vn	100,110, 230		100, 110, 230, 400, 440			100,110, 230	100, 110, 230, 400, 440			
Scale	In	45..55; 48..52; 55..65; 58..62; 380..420 Hz					45..65Hz				

240° Scale



Model		FC5C*	FC4C	FC3C	FC2C	FC5CI*	FC4CI	FC3CI	FC2CI
Dimensions	mm	48x48	72x72	96x96	144x144	48x48	72x72	96x96	144x144
Rated Voltage	Vn	100, 110, 230, 400, 440				100, 110, 230, 400, 440			
Scale	In	45..55; 48..52; 55..65; 58..62; 380..420 Hz				45...65Hz			

(\*) Additional module included

## Direct input ammeters

Alternating current - 90° Scale



### General features

- Moving-iron device
- Accuracy: 1,5%
- Self-consumption: 0,3 - 1 VA
- Frequency: 15-100Hz



Ammeters (A)



Ammeters (mA)



Model	EC5VR*	EC5V**	EC4V	EC3V	EC2V	ECb7**	ECb3**	ECb8**
Dimensions (mm)	45x52,2	48x48	72x72	96x96	144x144	80x64	105x80	130x100
Ammeters (A)								
Measuring range	In	1; 1,5; 2,5; 4; 5; 6; 10; 15; 20; 25; 30; 40; 50; 60; 75 or 100 A						
	2xIn	1..2; 1,5..3; 2..4; 2,5..5; 3..6; 4..8; 5..10; 6..12; 10..20; 15..30; 20..40; 25..50; 30..60; 40..80; 50..100; 60..120; 75..150 or 100..200A						
	5xIn	1..5; 1,5..7,5; 2..10; 2,5..7,5; 3..15; 4..20; 5..25; 6..30; 10..50; 15..75; 20..100; 25..125; 30..150; 40..200; 50..250; 60..300; 75..375 or 100..500A						
Ammeters (mA)								
Measuring range	In	100; 150; 200; 250; 300; 400; 500; 600mA						
	2xIn	100..200; 150..300; 200..400; 250..500; 300..600; 400..800; 500..1000; 600...1200 mA						
	5xIn	100..500; 150..750; 200..1000; 250..1250; 300..1500; 400..2000; 500..2500; 600...3000 mA						

\* Maximum measuring range for Ammeters (A): 40A; 40-80A; 40-200A. \*\*Maximum measuring range for Ammeters (A): 50A; 50-100A; 50-250A.

## Indirect input ammeters

Alternating current - 90° Scale



### General features

- Moving-iron device
- Accuracy: 1,5%
- Frequency: 15-100Hz
- Self-consumption: 0,4 VA
- Measuring range: x/1 A, x/5A



Model	EC5VR	EC5V	EC4V	EC3V	EC2V	ECb7	ECb3	ECb8
Interchangeable scale					Fixed scale			
Dimensions (mm)	45x52,2	48x48	72x72	96x96	144x144	80x64	105x80	130x100
Module	In	X/5A or X/1A						
Standard scales		10; 15; 20; 25; 30; 40; 50; 60 or 75 A and multiples						
Module	2xIn	2X/5A or 2X/1A						
Standard scales		10..20; 15..30; 20..40; 25..50; 30..60; 40..80; 50..100; 60..120 or 75..150 A and multiples						
Module	5xIn	5X/5A or 5X/1A						
Standard scales		10..50; 15..75; 20..100; 25..125; 30..150; 40..200; 50..250; 60..300 or 75..375A and multiples						

## Ammeters (A)

Alternating current - 240° Scale



### General features

Current measurement in alternating current circuits. True RMS value.

- **Electronic device**
- **Accuracy:** 1,5%
- **Scale:** 240°
- **Burden:** 2,5 VA
- **Frequency:** 20 - 100Hz



Model		EC5CE (*)	EC4CE (*)	EC3CE	EC2CE
Dimensions (mm)		48x48	72x72	96x96	144x144
CT Operated Ammeters					
Module	In	X/5A or X/1A			
Standard scales		10; 15; 20; 25; 30; 40; 50; 60 or 75 A and multiples			
Module	2xIn	2X/5A or 2X/1A			
Standard scales		10..20; 15..30; 20..40; 25..50; 30..60; 40..80; 50..100; 60..120 or 75..150 A and multiples			
Module	5xIn	5X/5A or 5X/1A			
Standard scales		10..50; 15..75; 20..100; 25..125; 30..150; 40..200; 50..250; 60..300 or 75..375A and multiples			
Direct input ammeters					
Measuring range	In	1; 1,5; 2; 2,5; 3; 4; 5; 6 or 10 A			
	2xIn	1..2; 1,5..3; 2..4; 2,5..5; 3..6; 4..8; 5..10; 6..12 or 10..20 A			
	5xIn	1..5; 1,5..7,5; 2..10; 2,5..12,5; 3..15; 4..20; 5..25; 6..30 or 10..50 A			

\*With additional module: model MBRMS

## Ammeters with switch

4 positions - Interchangeable scale - AC



### General features

- **4-position switch:** 0, L1, L2, L3
- **Moving-iron device**
- **Accuracy:** 1,5%
- **Measuring range:** x/1A, X/5A
- **Scale:** 90°
- **Burden:** 0,4 VA
- **Frequency:** 15 - 100Hz



Model		EC4V4	EC3V4
Dimensions (mm)		72x72	96x96
Module	In	X/5A or X/1A	
Standard scales		10; 15; 20; 25; 30; 40; 50; 60 or 75 A and multiples	
Module	2xIn	2X/5A or 2X/1A	
Standard scales		10..20; 15..30; 20..40; 25..50; 30..60; 40..80; 50..100; 60..120 or 75..150 A and multiples	
Module	5xIn	5X/5A or 5X/1A	
Standard scales		10..50; 15..75; 20..100; 25..125; 30..150; 40..200; 50..250; 60..300 or 75..375A and multiples	

## Direct input voltmeters

Alternating current - 90° Scale



### General features

- Moving-iron device
- Accuracy: 1,5%
- Burden: 1,5...3 VA
- Frequency: 45-65Hz



Model	EC5VR	EC5V	EC4V	EC3V	EC2V	ECb7	ECb3	ECb8
Dimensions (mm)	45x52,2	48x48	72x72	96x96	144x144	80x64	105x80	130x100
Measuring range	Vn	6; 10; 15; 25; 30; 40; 50; 60; 100; 150; 250; 300; 400; 500; 600 V						

## Voltmeters - Interchangeable scale

Alternating current - 90° Scale



### General features

- Moving-iron device
- Measuring range: 100V, 110V
- Accuracy: 1,5%
- Burden 1,5 - 3 VA
- Frequency: 45 - 65Hz



Model	EC5VR	EC5V	EC4V*	EC3V*
Dimensions (mm)	45x52,2 DIN	48x48	72x72	96x96
Module (Vn)	x/100 V or x/110V			
Scale (Vn)	1,2 times the primary of the voltage transformer			

\*Standard input 1,2 x/100V or 1,2 x/110V

## Voltmeters (V)

Alternating current - 240° Scale



### General features

Voltage measurement in alternating current circuits. True RMS value.

- **Electronic device**
- **Accuracy:** 1,5%
- **Scale:** 240°
- **Burden:** 2,5 VA
- **Frequency:** 20 - 100Hz



Model		EC5CE (*)	EC4CE (*)	EC3CE	EC2CE
Dimensions (mm)		48x48	72x72	96x96	144x144
VT Operated Voltmeters					
Measuring range	Vn	x/100V or x/110V			
Direct input voltmeters					
Measuring range	Vn	50; 60; 100; 150; 250; 300; 400; 500 or 600 V			

\*With additional module: model MBRMS

## Voltmeters with switch

Alternating current - 3 and 6 positions



### General features

- **Moving-iron device**
- **Scale:** 90°
- **3 position switch:** L12, L23, L31
- **6 position switch:** L1, L2, L3, L12, L23, L31
- **Burden:** 1,5...3 VA
- **Frequency:** 45-65Hz
- **Accuracy:** 1,5%



Model		EC4V3	EC3V3	EC4V6	EC3V6	EC4V7	EC3V7
Switch		3 positions		6 positions		6 positions + sequence meter	
Dimensions (mm)		72x72	96x96	72x72	96x96	72x72	96x96
Operated voltmeters							
Module	Vn	x/100V or x/110V					
Direct input voltmeters							
Measuring range	Vn	150, 200, 250, 300, 400, 500 and 600V					

## Rated value voltmeters

Alternating current - 90° or 240° scale



### General features

Voltmeter calibrated for a specific nominal value, providing higher accuracy within a limited section of the scale.

- **Moving-coil with rectifier device**
- **Scale:** 90° or 240°
- **Accuracy:** 1,5%
- **Burden:** 2 mA
- **Frequency:** 50 or 60 Hz



Model		CC4VGN	CC3VGN	CC2VGN	CC4CGN	CC3CGN	CC2CGN
Dimensions	mm	72x72	96x96	144x144	72x72	96x96	144x144
Measuring range	Vn	100; 110; 230 or 400 V			100; 110; 230 or 400 V		
Standard scales	Vn	0 .. 90 ÷ 110 V or ± 10 % x/100V			0 .. 90 ÷ 110 V or ± 10 % x/100V		
		0 .. 100 ÷ 120 V or ± 10 % x/110V			0 .. 100 ÷ 120 V or ± 10 % x/110V		
		0 .. 210 ÷ 250 V			0 .. 210 ÷ 250 V		
		0 .. 380 ÷ 420 V			0 .. 380 ÷ 420 V		

## Ammeters through resistances (Shunt)

Direct current - Interchangeable scale - 90° scale



### General features

Current Voltage measurement in DC circuits.

- **Moving coil device**
- **Scale:** 90°
- **Measuring range:** 60mV, 150mV
- **Accuracy:** 1,5%
- **Burden:** 60 - 150 Ω



Model		CC5VR	CC5V	CC4V	CC3V
Dimensions	mm	45X52,5 DIN	48X48	72x72	96x96
Module	Vn	X/60mV or X/150mV			
Scale	In	5 - 6 - 10 - 15 - 20 - 25 - 30 - 40 - 50 - 60 - 80 - 100 - 150 - 200 - 250 - 300 - 400 - 500 - 600 - 750 - 800 - 1000 - 1.200 - 1.500 - 2.000 - 2.500 - 3.000 - 4.000 A			

## Ammeters and voltmeters ( $\mu\text{A}$ , mA and A)

### Alternating current



#### General features

Accurate measurement of voltage and current starting from zero (average value of the signal).

- Moving coil with rectifier
- Scale:  $90^\circ$
- Accuracy: 1,5%
- Frequency: 50 or 60 Hz



Voltmeters



Ammeters

#### 90° Scale



Model		CC5VRG	CC5VG	CC4VG	CC3VG	CC2VG	CCb7G	CCb3G	CCb8G
Dimensions	mm	45x52,2	48x48	72x72	96x96	144x144	80x64	105x80	130x100
Direct Input Ammeters ( $\mu\text{A}$ , mA & A)									
Measuring range	In	40; 50; 60; 100,150; 250; 300; 400; 500 or 600 $\mu\text{A}$							
		1; 1,5; 2; 2,5; 3; 4; 5; 6; 10; 15; 20; 25; 40; 50; 60; 100; 150; 250; 300; 400; 500 or 600 mA							
CT operated ammeters									
Measuring range	In	X/5A or X/1A							
VT Operated voltmeters									
Measuring range	Vn	x/100V or x/110V							
Direct input voltmeters									
Measuring range	Vn	100; 150; 250; 300; 400; 500; 600 V							

#### 240° Scale



Model		CC5CG	CC4CG	CC3CG*	CC2CG
Dimensions	mm	48x48	72x72	96x96	144x144
Direct input ammeters ( $\mu\text{A}$ , mA y A)					
Measuring range	In	150; 200; 300; 400; 500 or 600 $\mu\text{A}$			
		1; 1,5; 2,5; 4; 5; 6; 10; 15; 20; 25; 40; 50; 60; 100; 150; 250; 300; 400; 500; 600 mA or 4-20 mA			
		1; 1,5; 2,5; 4; 5; 6; 10; 15 A			
		1..2; 1,5..3; 2..4; 2,5..5; 3..6; 4..8; 5..10; 10..20 or 15..30 A			
	5xIn	1..5; 1,5..7,5; 2..10; 2,5..12,5; 3..15; 4..20; 5..25; 10..50 or 15..75 A			
CT Operated ammeters					
Module	In	X/5A or X/1A			
Standard scales	In	10; 15; 20; 25; 30; 40; 50; 60 or 75A and multiples			
Module	2xIn	2X/5A or 2X/1A			
Standard scales	2xIn	10..20; 15..30; 20..40; 25..50 30..60; 40..80; 50..100; 60..120 or 75..150 A and multiples			
Module	3xIn	5X/5A or 5X/1A			
Standard scales	3xIn	10..50; 15..75; 20..100; 25..125; 30..150; 40..200; 50..250; 60..300 or 75..375A and multiples			
VT Operated voltmeters					
Measuring range	Vn	1,2 x/100V or 1,2 x/110V			
Direct input voltmeters					
Measuring range	Vn	100; 150; 250; 300; 400; 500 or 600 V			

\*Available model **CC3CGS** 96x96mm for 240° interchangeable scale.

## Ammeters ( $\mu\text{A}$ , mA and A) and voltmeters (mV and V)

Direct current



### General features

- Scale: 90°
- Accuracy: 1,5%
- Moving coil device



Voltmeters



Ammeters

### 90° Scale



Model		CC5VR	CC5V	CC4V	CC3V	CC2V	CCb7	CCb3	CCb8
Dimensions	mm	45x52,2	48x48	72x72	96x96	144x144	80x64	105x80	130x100
Ammeters ( $\mu\text{A}$ )									
Measuring range	In	40 - 50 - 60 - 100 - 150 - 250 - 300 - 400 - 500 - 600 $\mu\text{A}$							
Ammeters (mA)									
Measuring range	In	1 - 1,5 - 2,5 - 4 - 5 - 6 - 10 - 15 - 20 - 25 - 40 - 50 - 60 - 100 - 150 - 250 - 300 - 400 - 500 - 600 mA							
		4 - 20 mA <sup>(1)</sup>							
Ammeters (A)									
Measuring range	In	1 - 1,5 - 2,5 - 4 - 5 - 6 - 10 - 15 - 20 - 30 - 25 - 40 - 50 A							
		.../60 mV or .../150 mV <sup>(2)</sup>							
Voltmeters (mV)									
Measuring range	Vn	50 - 60 - 100 - 150 - 250 - 300 - 400 - 500 - 600 mV							
Voltmeters (V)									
Measuring range	Vn	1 - 1,5 - 2,5 - 4 - 5 - 6 - 10 - 15 - 20 - 25 - 30 - 40 - 50 - 60 - 100 - 150 - 250 - 300 - 400 - 500 - 600 V							

(1) Connection to converter  
(2) Connection to external shunt

### 240° Scale



Model		CC5C	CC4C	CC3C	CC2C	CC3CS*
Dimensions	mm	48x48	72x72	96x96	144x144	96x96
Ammeters ( $\mu\text{A}$ )						
Measuring range	In	30 - 40 - 50 - 60 - 100 - 150 - 250 - 300 - 400 - 500 - 600 $\mu\text{A}$				
Ammeters (mA)						
Measuring range	In	1 - 1,5 - 2,5 - 4 - 5 - 6 - 10 - 15 - 20 - 25 - 40 - 50 - 60 - 100 - 150 - 250 - 300 - 400 - 500 - 600 mA				
		4 - 20 mA <sup>(1)</sup>				
Ammeters (A)						
Measuring range	In	1 - 1,5 - 2,5 - 4 - 5 - 6 - 10 - 15 - 20 - 25 - 40				
		.../60 mV or .../150 mV <sup>(2)</sup>				
Voltmeters (mV)						
Measuring range	Vn	50 - 60 - 100 - 150 - 250 - 300 - 400 - 500 - 600 mV				
Voltmeters (V)						
Measuring range	Vn	50 - 60 - 100 - 150 - 250 - 300 - 400 - 500 - 600 mV				

(1) Connection to converter  
(2) Connection to external shunt  
\* Interchangeable scale

## Instruments with contacts

Alternating current or direct current



### General features

2 contacts and 2 control LEDs. Rear adjustment.  
2 channels. 2 potentiometers per channel.

- **Setting:** 0-100% of the final scale value  
±100% (bidirectional)
- **Auxiliary power supply:** 110, 230, 400 V AC
- **Burden (V. Aux):** 3VA
- **Repeatability:** ±1% final scale value
- **Output relays:** 2 (Max. 400V, 1A, 200VA AC)
- **Burden:** <1,5 VA for AC  
<1 mA for DC
- **Scale:** 90°
- **Control cover:** Sealable
- **Mechanical life:** 10<sup>7</sup> operations
- **Delay time:** 0-30s..±10%
- **Accuracy:** 1,5%
- **Frequency:** 50 or 60 Hz



Moving iron (Ammeters)		EC3VA/1	EC3VA/2
	Number of contacts	1 Min. - 1 Max.	2 Max.
mA	100 - 150 - 250 - 300 - 400 - 500 - 600	96 x 96 mm	
A	1 - 1,5 - 2,5 - 4 or 5 // x/1 or x/5 <sup>(1)</sup>		

Moving coil (Ammeters and voltmeters)		CC3VA/1	CC3VA/2
	Number of contacts	1 Min. - 1 Max.	2 Max.
mV	40 - 50 - 60 - 100 - 150 - 200 - 300 - 400 - 500 - 600 - 800	96 x 96 mm	
V	1 - 1,5 - 2,5 - 4 - 5 - 6 - 10 - 15 - 20 - 25 - 40 - 50 - 60 - 100		
µA	20 - 25 - 40 - 50 - 60 - 100 - 150 - 250 - 300 - 400 - 500 - 600		
mA	1 - 1,5 - 2,5 - 4 - 5 - 6 - 10 - 15 - 20 - 25 - 40 - 50 - 60 - 100 - 150 - 250 - 300 - 400 - 500 - 600		
	4 - 20 <sup>(2)</sup>		
A	1 - 1,5 - 2,5 - 4 - 5 // x/60mV or 150mV <sup>(3)</sup>		

Moving coil with rectifier (Ammeters and voltmeters)		CC3VGA/1	CC3VGA/2
	Number of contacts	1 Min. - 1 Max.	2 Max.
mV	60 - 100 - 150 - 250 - 300 - 400 - 500 - 600 - 800	96 x 96 mm	
V	1 - 1,5 - 2,5 - 4 - 5 - 6 - 10 - 15 - 20 - 25 - 40 - 50 - 60 - 100 - 150 - 200 - 250 - 300 - 400 - 500 - 600		
mA	1 - 1,5 - 2,5 - 4 - 5 - 6 - 10 - 15 - 20 - 25 - 40 - 50 - 60 - 100 - 150 - 250 - 300 - 400 - 500 - 600 // 4 - 20 <sup>(2)</sup>		
A	1 - 1,5 - 2,5 - 4 - 5 // x/1 or x/5 <sup>(1)</sup>		

(1) External shunt connection. (2) Connection to inverters. (3) Connection to external transformer  
Auxiliary voltages 12 - 24 - 48 - 110 or 220 V DC

# Maximum demand ammeters

Alternating current - Interchangeable scale



## General features

Measurement of the average effective (RMS) current over 15- or 8-minute periods.

- **Scale:** 90°
- **Burden:** 2,3 VA
- **Measuring range:** 5A, 1A
- **Accuracy:** 2,5%
- **Frequency:** 0..1000 Hz
- **Bimetallic system device**



Model		BC4V	BC3V	BC2V*
Dimensions (mm)		72x72	96x96	144x144
Measuring range		5 - 10 - 15 - 20 - 25 - 30 - 40 - 50 - 60 - 75 - 100 - 125 - 150 - 200 - 250 - 300 - 400 - 500 - 600 - 750 - 800 6 1000 - 1.200 - 1.500 - 2.000 - 2.500 - 3.000 - 4.000 - 5.000 A		
Module	1,2xIn	1,2X/5A or 1,2X/1A		
Scale		1,2; 6; 12; 18; 24; 30; 36; 48; 60; 72, 90 A or 120% and multiples		

\* Interchangeable scale not available

# Maximeters - Double Ammeters

Alternating current - Interchangeable scale



## General features

Measurement of the average effective (RMS) current over 15- or 8-minute periods. In addition, they feature a second scale that measures instantaneous current.

- **Scale:** 90°
- **Burden:** 2,15 VA
- **Measuring range:** 5A, 1A
- **Bimetallic system and moving-iron device**
- **Accuracy:** 2,5% (bimetallic system)  
1,5% (movable iron system)
- **Frequency:** 15..100 Hz



Model		BEC4V	BEC3V	BEC2V*
Dimensions	mm.	72x72	96x96	144x144
Module				
Bimetallic system	1,2xIn	1,2X/5A or 1,2X/1A		
Moving iron	2xIn	2X/5A or 2X/1A		
Scale				
Bimetallic system	1,2xIn	1,2; 6; 12; 18; 24; 30; 36; 48; 60; 72, 90 A or 120%		
Moving iron	2xIn	1..2; 5..10; 10..20; 15..30; 20..40; 25..50; 30..60; 40..80; 50..100; 60..120 or 75..150 A and multiples		

\* Interchangeable scale not available

## Electronic Phase meters

Alternating current with converter



### General features

System power factor measurement.

- **Scale:** 90° or 240°
- **Voltage range:**  $\pm 15\%$   $V_n$
- **Voltage ( $V_n$ ):** 100, 110, 230, 400, 440V
- **Accuracy:** 1,5% of 90° electric
- **Current range:** 20 -120%
- **Current input(In):** 5A, 1A
- **Frequency:** 50 or 60 Hz
- **Scale:** CAP 0,5 - 1 - 0,5 IND



		90° Scale					240° Scale			
Dimensions	mm	45x52,2	48x48	72x72	96x96	144x144	48x48	72x72	96x96	144x144
Model		AC Single phase - Balanced three phase								
AC Single phase	Cos $\phi$	SC5VRE*	SC5VE*	SC4VE*	SC3VE	SC2VE	SC5CE	SC4CE	SC3CE	SC2CE
Three phase 3 wires	Cos $\phi$	SC5VRIE*	SC5VIE*	SC4VIE*	SC3VIE	SC2VIE	SC5CIE	SC4CIE	SC3CIE	SC2CIE

(\*) Additional module included

## Induction Phase meters

Alternating current



### General features

System power factor measurement.

- **Scale:** 90° or 360°
- **Voltage range:**  $\pm 15\%$   $V_n$
- **Voltage ( $V_n$ ):** 100, 110, 230, 400, 440V
- **Scale:** CAP 0,5-1-0,5 IND (90°)  
CAP 0,8-1-0,2 IND (90°)  
CAP 0,1-1-0,1 IND 4 quadrants (360°)
- **Alternating current**
- **Accuracy:** 1,5% of 90° electric
- **Current range:** 20 -120%
- **Current input (In):** 5A, 1A
- **Frequency:** 50 or 60 Hz



		90° Scale		360° Scale	
Dimensions	mm	96x96	144x144	96x96	144x144
		AC Single phase - Balanced three phase			
AC Single phase		SC3V	SC2V	SC3C	SC2C
Three phase 3 wire		SC3VI	SC2VI	SC3CI	SC2CI
		Balanced three phase			
Three phase 3 wire		SC3VII	SC2VII	SC3CII	SC2CII
Three phase 4 wire		SC3VIIIn	SC2VIIIn	SC3CIIIn	SC2CIIIn

## Electronic Wattmeters

Alternating current



### General features

System active power measuring

- **Scale:** 90° or 240°
- **Voltage range:**  $\pm 15\% V_n$
- **Voltage (Vn):** 100, 110, 230, 400, 440V
- **Accuracy:** 1,5%
- **Current range:** 20-120A
- **Current input (In):** 5A, 1A
- **Frequency:** 50 or 60 Hz



		90° Scale					240° Scale			
Dimensions	mm	45x52,2	48x48	72x72	96x96	144x144	48x48	72x72	96x96	144x144
<b>Model</b>		<b>AC Single phase - Balanced three phase</b>								
AC Single phase		WC5VRE*	WC5VE*	WC4VE*	WC3VE	WC2VE	WC5CE	WC4CE	WC3CE	WC2CE
Three phase 3 wires		WC5VRIE	WC5VIE	WC4VIE	WC3VIE	WC2VIE	WC5CIE	WC4CIE	WC3CIE	WC2CIE
Three phase 4 wires		WC5VInRE	WC5VInE	WC4VInE	WC3VInE	WC2VInE	WC5CInE	WC4CInE	WC3CInE	WC2CInE
<b>Model</b>		<b>Unbalanced three phase</b>								
Three phase 3 wires		WC5VRIIE	WC5VRIIE	WC4VRIIE	WC3VRIIE	WC2VRIIE	WC5CIIIE	WC4CIIIE	WC3CIIIE	WC2CIIIE
Three phase 4 wires		WC5VR3E	WC5V3E	WC4V3E	WC3V3E	WC2V3E	WC5C3E	WC4C3E	WC3C3E	WC2C3E

(\*) Additional module included.

## Induction Wattmeters

Alternating current



### General features

System active power measuring

- **Scale:** 90°
- **Voltage range:**  $\pm 15\% V_n$
- **Voltage (Vn):** 100, 110, 230, 400, 440V
- **Accuracy:** 1,5%
- **Current range:** 20-120A
- **Current input (In):** 5A, 1A
- **Frequency:** 50 or 60 Hz



Dimensions	mm	96x96	144x144
<b>Model</b>		<b>AC Single phase - Balanced three phase</b>	
AC Single phase		WC3V	WC2V
Three phase 3 wires		WC3VI	WC2VI
Three phase 4 wires		WC3VIn	WC2VIn
<b>Model</b>		<b>Unbalanced three phase</b>	
Three phase 3 wires		WC3VII	WC2VII
Three phase 4 wires		WC3VIIIn	WC2VIIIn

## Electronic varmeters

Alternating current with converter



### General features

System reactive power measuring.

- **Scale:** 90° or 240°
- **Voltage range:**  $\pm 15\% V_n$
- **Voltage (Vn):** 100, 110, 230, 400, 440V
- **Accuracy:** 1,5%
- **Current range:** 20-120%
- **Current input (In):** 5A, 1A
- **Frequency:** 50 or 60 Hz



		90° Scale					240° Scale			
Dimensions	mm	45x52,2	48x48	72x72	96x96	144x144	48x48	72x72	96x96	144x144
Model		AC Single phase - Balanced three phase								
AC Single phase		WC5VRrE*	WC5VrE*	WC4VrE*	WC3VrE	WC2VrE	WC5CrE	WC4CrE	WC3CrE	WC2CrE
Three phase 3 wires		WC5VRlE	WC5VlE	WC4VlE	WC3VlE	WC2VlE	WC5ClE	WC4ClE	WC3ClE	WC2ClE
Three phase 4 wires		WC5VRInrE	WC5VInrE	WC4VInrE	WC3VInrE	WC2VInrE	WC5CInrE	WC4CInrE	WC3CInrE	WC2CInrE
Model		Unbalanced Three phase								
Three phase 3 wires		WC5VRlIrE	WC5VlIrE	WC4VlIrE	WC3VlIrE	WC2VlIrE	WC5CllrE	WC4CllrE	WC3CllrE	WC2CllrE
Three phase 4 wires		WC5VR3rE	WC5V3rE	WC4V3rE	WC3V3rE	WC2V3rE	WC5C3rE	WC4C3rE	WC3C3rE	WC2C3rE

(\*) Additional module included.

## Induction Varmeters

Alternating current



### General features

System reactive power measuring.

- **Scale:** 90°
- **Voltage range:**  $\pm 15\% V_n$
- **Voltage (Vn):** 100, 110, 230, 400, 440V
- **Accuracy:** 1,5%
- **Current range:** 20-120%
- **Current input (In):** 5A, 1A
- **Frequency:** 50 or 60 Hz



		96x96	144x144
Model		AC Single phase - Balanced three phase	
AC Single phase		WC3Vr	WC2Vr
Three phase 3 wires		WC3Vlr	WC2Vlr
Three phase 4 wires		WC3Vlnr	WC2Vlnr
Model		Unbalanced three phase	
Three phase 3 wires		WC3VlIr	WC2VlIr
Three phase 4 wires		WC3VlInr	WC2VlInr

## Synchronization column



3 instruments



### General features

Equipment with three instruments: double or differential voltmeter; double or differential frequency meter and synchronoscope, for parallel connection of two generators, or of a generator with the network.

Position: Vertical (with rotating arm 180°)  
Horizontal (with 2 supports)

Model	Volmeters	Frequency meters	Synchrosopes
ES3V	EC3VII or CC3VGD	FC3VII or FC3AD	SC3V-360°
ES3VI	EC3VII or CC3VGD	FC3VII or FC3AD	SC3VI-360°
ES3C	CC3CGD	FC3CD	SC3V-360°
ES3CI	CC3CGD	FC3CD	SC3VI-360°
ES2V	EC2VII or CC2VGD	FC2VII or FC2AD	SC2V-360°
ES2VI	EC2VII or CC2VGD	FC3VII or FC2AD	SC2VI-360°
ES2C	CC2CGD	FC2CD	SC2V-360°
ES2CI	CC2CGD	FC2CD	SC2VI-360°

		90° Scale		360° Scale	
Dimension (equipment)	mm	410x223x120	576x258x170	410x223x120	576x258x170
Dim. (instruments)	mm	96x96	144x144	96x96	144x144
Single phase		ES3V	ES2V	ES3C	ES2C
Three phase balanced		ES3VI	ES2VI	ES3CI	ES2CI

## Synchrosopes



For synchronizing instruments



### General features

Phase synchronism measurement (frequency and phase equality) between two alternating current networks, single-phase or three-phase, or between network and generator.

- **Voltage (Vn):** 100, 110, 230, 400, 440 V
- **Burden:** 20..30 mA
- **Voltage range:** ±15% Vn
- **Frequency:** 50 or 60Hz
- **Accuracy:** 1,5% of 90° electric

		AC Single phase		Balanced three phase	
Model		SC3V-360°	SC2V-360°	SC3VI-360°	SC2VI-360°
Dimensions	mm	96x96	144x144	96x96	144x144

## Double frequency meters

For synchronizing instruments



### General features

Double measurement (two systems) of two system frequencies

- **Voltage range:**  $\pm 15\% V_n$
- **Accuracy:** 0,5%
- **Burden:** 1,2..2,2 mA
- **Frequency** 50 - 60 Hz



		Reeds			Pointer
Model		FC3VII		FC2VII	FC3AII
Dimensions	mm	96x96		144x144	96x96
Measuring range	Vn	100, 110, 230, 400, 440			100, 110, 230, 400, 440
Scale	Hz	47 ÷ 53	46 ÷ 54; 56 ÷ 64	45 ÷ 55; 55 ÷ 65	45 ÷ 65Hz 45 ÷ 55; 48 ÷ 52; 55 ÷ 65; 58 ÷ 62; 90 ÷ 110; 140 ÷ 160; 180 ÷ 220; 380 ÷ 420 Hz
Reeds		13	17	21	—



Reeds



Pointer

## Differential frequency meters

For synchronizing instruments



### General features

Detection of the frequency difference between two alternating current networks with more sensitivity than double frequency meters.

- **Voltage (Vn):** 100, 110, 230, 400, 440 V
- **Voltage range:**  $\pm 15\% V_n$
- **Accuracy:** 0,2%
- **Burden:** 10 mA
- **Frequency:** 50 or 60Hz



Model		FC3AD	FC2AD	FC3CD	FC2CD
Dimensions	mm	96x96	144x144	96x96	144x144
Scale type		90°		240°	

## Differential voltmeters

For synchronizing instruments



### General features

Difference (%) between two synchronizing voltages.

- **Scale:** 90° or 240°
- **Alternating current**
- **Measuring range:** 100, 110, 230, 400, 440V
- **Moving coil with rectifier (AC)**
- **Accuracy:** 1,5%
- **Frequency:** 50 or 60 Hz
- **Burden:** 10 mA



Model		CC3VGD	CC2VGD	CC3CGD	CC2CGD
Dimensions	mm	96x96	144x144	96x96	144x144
Scale type		90°		240°	
Scale	Vn	100..15 - 0 - 15..100% ΔV			

## Double voltmeters

For synchronizing instruments



### General features

Two moving iron systems. True RMS

- **Scale:** 90°
- **Alternating current**
- **Measuring range:** 100, 110, 230, 400, 440V
- **Accuracy:** 1,5%
- **Frequency:** 45..65 Hz
- **Burden:** 1,5..3 VA



Model		EC3VII			EC2VII	
Dimensions	mm	96x96			144x144	
Measuring range	Vn	2x100V	2x110V	2x230V	2x400V	2x440V
Scale	Vn	2x165V	2x180V	2x380V	2x660V	2x720V

## Non-electric unit indicators



Direct current



### General features

Measurement from transducers, calibrated according to their function curves.

- **Scale:** 90° or 240°
- **Accuracy:** 1,5%



		90° Scale			240° Scale		
Model		CC5V	CC4V	CC3V	CC5C	CC4C	CC3C
Dimensions	mm	48x48	72x72	96x96	48x48	72x72	96x96
		Voltmeters (V)					
Measuring range	Vn	0-1; 0-5; 0-10; 1-5; 2-10					
		Ammeters (mA)					
Measuring range	In	0-1; 0-5; 0-10; 1-5; 0-20; 4-20					

### Units

mA - A - kA - N - mV - V - kV - kN - Hz - °φ - °C - °F - W - kW - MW - VA - var - kvar - Mvar - kVA - kW - MW - Ω - rpm - % - min<sup>-1</sup> - m - l/h - pH - m<sup>3</sup>/h - m<sup>3</sup>/min - mbar - bar - mm - kg - Kgcm - Kg/cm<sup>2</sup> - mm/sec - mmHg - mmH<sub>2</sub>O - dB - kPa - MPa

## Phase sequence indicators



Alternating current



### General features

Phase sequence detection on a three-phase system

- **Burden:** 1,2VA
- **Frequency:** 50 or 60 Hz

Model	IRC4E	IRC3E
Dimensions (mm)	72x72	96x96
Measuring range	100 ÷ 600 V AC	

## Elapsed time meter

Alternating current



### General features

Control of operating time of machines and equipment.

- **Meter:** mechanical, 7 digits (99999,99)
- **Voltage range:**  $\pm 10\%$  Vn
- **Frequency:** 50 or 60 Hz
- **Burden:** 10mA

Model	HC5	HC4	HC3
Dimensions (mm)	48x48	72x72	96x96
Measuring range		115, 230, 400 V AC 24, 48, 110 V DC	

## Mobile instruments - CR2C

Special executions



### General features

Moving coil instrument for mobile equipment (railways, tractor). Scale colour: black or white. Pointer, numbering and division: white or yellow.

- **Measuring range and scales:** Consult
- **Scale:** 240°
- **Accuracy:** 1,5%
- **Lighting:** 12 or 24 V DC
- **Auxiliary voltage:** 12 or 24 V DC
- **Shock resistance:** 15G
- **Vibration resistance:** 10..55Hz

General features	Model
Mobile equipment for special executions	CR2C

For other electrical specifications, contact us.

## Digital synchronizing relay

Naval Series



### General features

It allows both the display of the phase and the magnitude of the two voltages coming from two networks, as well as the synchronization maneuver between them.

- **Input:** 110, 230, 400, 440 V  $\pm$  20%
- **Frequency range:** 45..65 Hz
- **Phase difference range:**  $\pm$ 180°
- **Voltage difference margin:**  $\pm$ 100%
- **Accuracy:** 0,5%
- **Accuracy:** 0,1%
- **Accuracy:** 1%
- **Accuracy:** 1%

Model		RSS1 (2 wire)	RSS3 (3 wire)
Measuring range	V	110 or 230 V	110, 230, 400, 440V
Dimensions	mm	96x96	

## Reverse power relay

Naval Series



### General features

Wattmeter relay for reverse power limiting (anti-motorization) between two alternating current generators connected in parallel.

- **Accuracy:**  $\pm$  1,5% (of rated power)
- **Frequency:** 50 or 60Hz
- **Setting:** 2 - 15% Pn (kW)

Model		RIC2VI
Dimensions	mm	144x144
Measuring range	V	100, 110, 230, 400 or 440
In	A	x/5
Aux. voltage	V	100, 230 or 400

## Synchronizing relay

Naval Series



### General features

Electronic relay for synchronization of two alternating current generators by comparing their voltage, phase and frequency.

- **Accuracy in phase:**  $\pm 2,5\%$
- **Frequency:** 50 or 60Hz
- **Setting:** 5 - 40°
- **Time:**  $\pm 0,5$  s
- **Un range:**  $\pm 15\%$

Model		RSC2
Dimensions	mm	144x144
Measuring range	V	2x110, 230, 400 or 440

## Sequence relay with alarm

Naval Series



### General features

It displays the correct phase sequence in a three-phase network, and provides a contact to enable connection of the receiving device.

- **Alternating current**
- **Burden:** 1,2VA
- **Frequency:** 50 or 60Hz

Model		RSQ
Dimensions	mm	96x96
Measuring range	V	110, 230, 400, 440 V $\pm 20\%$

## Maximum current relay

Naval Series



### General features

Electronic overcurrent relay which detects the current level in each phase in three-phase alternators.

- **Alternating current**
- **Setting:** 0,6 - 1,6 In
- **Frequency:** 50 or 60Hz
- **Accuracy:** Current:  $\pm 2.5\%$  (Trigger setting value)  
Time:  $\pm 3\% \pm 1s.$  of set value

Model		RMC2	RMC2A
Dimensions	mm	144x144	
Alarm		-	Incorporated
Measuring range	V	110, 230, 400, 440 V $\pm 30\%$ AC	

## Min. / Max. voltage and frequency relay

Naval Series



### General features

Instrument for the control of voltage and frequency in a three-phase or single phase network.

- **Frequency:** 50 or 60Hz
- **Accuracy:**  $\pm 2\%$
- **Min. setting voltage:** 60 -100% Un
- **Max. setting voltage:** 80 -120% Un
- **Min./Max. setting frequency:** 45-55 Hz or 55-60 Hz

Model		RUFC2
Dimensions	mm	144x144
Measuring range	V	100, 110, 230, 400 or 440
Aux. voltage	V	110, 230 or 400 $\pm 30\%$ AC

## Lamp synchronoscope

Naval Series



### General features

Synchronization of groups for manual operation.

- **Voltage (Vn):** 110, 230, 400, 440 V  $\pm$  20%
- **Frequency:** 50 or 60Hz
- **Alternating current**

Model		SC3VL	SC2VL
Dimensions	mm	96x96	144x144
Measuring range	V	110, 230, 400, 440 V $\pm$ 20%	

## Insulation indicators

Naval Series



### General features

Instrument that detects and measures the ground fault of a three phase circuit with insulated neutral, in direct and permanent connection to the network (switch position G). The IAC\_VA models incorporate an alarm system with continuous adjustment control between 0 and 5 M $\Omega$ .

- **Accuracy:**  $\pm$  1,5% (from scale arc Un)
- **Frequency:** 50 or 60Hz
- **Setting:** 0..50..0 M $\Omega$
- **External switch included**

Model		IAC3V	IAC2V	IAC3VA	IAC2VA
Dimensions	mm	96x96	144x144	96x96	144x144
Measuring range	V	230 - 400 or 440 V		230 - 400 or 440 V	
Aux. voltage	V	—		110 or 230 V AC	

For other voltages, consult us.

## RPM indicator

Naval Series



### General features

Fed by the propeller shaft tachodynamo, it indicates the number of RPM of the propeller.

- **Moving coil:** forward: black  
Reverse: red
- **Lighting:** 12 or 24 V
- **Accuracy:**  $\pm 1,5\%$
- **Scale:**  $240^\circ$
- **Burden:**  $10\Omega/V$

Model		CC4C	CC3C	CC2C
Dimensions	mm	72x72	96x96	144x144
Scale		150-0-150; 180-0-180; 200-0-200; 300-0-300		
Range	V	10-0-10		

## Rudder degree indicator for vessels

Naval Series



### General features

Powered by a potentiometer attached to the rudder shaft, it indicates its angular position as a function of the resistance variation.

- **Moving coil:** Port: red bow  
Starboard: green bow
- **Lighting:** 12 or 24 V
- **Accuracy:**  $\pm 1,5\%$
- **Scale:**  $90^\circ$
- **Burden:**  $2000\Omega/V$

Model		CCb8
Dimensions	mm	130x100
Scale		40-0-40 ó 45-0-45
Range	V	Scope: 7-0-7 ó 12-0-12 V

For other voltages, consult us.

## RSN - Naval surveillance relay

Naval Series



### General features

The RSN ship monitoring relay is a unit designed for the protection of generator sets commonly used on ships. It is prepared for connection to a centralized control point, by means of a serial bus, which allows both the configuration and the sending of operating data.

### Configuration types

- Overcurrent relay
- Overvoltage relay
- Undervoltage relay
- Average, maximum and minimum voltage relay
- Maximum average current relay
- Direct and reverse power relay
- Maximum and minimum frequency relay
- Voltage, current, overvoltage and undervoltage unbalance relay

- **No. of digital outputs:** 6
- **Communication:** RS485 / RS232
- **Protocol of com:** Modbus/ JBUS

Model		RSN
Type		Three phase 4 wire
Dimensions	mm	150x75x115
Voltage	V	500 V (phase-phase) Max.
Current	A	x/5A
Vaux	V	110, 230, 400 V AC
		24, 48, 110 V DC
		Universal 85-264 V AC and DC

Measuring parameters	Unit
Phase voltage	V
Line voltage	V
Line current	A
Active, reactive and apparent power	kW, kvar, kVA
Power factor (Cos φ)	PF
Frequency	Hz
THD current and voltage	A, V
Neutral current	A

## R2M/R2MC - Current or power relay

Current input



### General features

Equipment designed to measure the Current or power in a three-phase network, activating the contacts of a step control relay in the event that a certain margin selected on its front control is exceeded.

It has a current  $x/5A$  input, to which the secondary of a current transformer must be connected, and a voltage input which can be connected directly to the mains.

- **Connection delay:** 5s
- **Switch off delay:** 2s
- **Output relay:** 1

### Configuration type

**R2M**  
 -Active power relay  
 -Reactive power relay  
 -Reverse power relay

**R2Mc**  
 -Current relay

Model		R2M/ R2Mc
Dimensions	mm	35mm (2 DIN module)
Rated voltage	Un	230 or 400V AC
Frequency	Hz	50 - 60
Vaux	V	Self-powered
Current	A	$x/5A$

## Voltage and current monitoring relay

Current input



### General features

Designed for the supervision of the connection of metering panels in substation or transformer station installations.

Detection of unbalanced currents, voltages, overvoltage and undervoltage.

- **Detection range:**  
 Unbalance 0 to 20% of  $V_n$   
 Unbalance 0 to 20% of  $I_n$   
 Undervoltage 80 to 100 % of  $V_n$   
 Overvoltage 120 % of  $V_n$
- **Class:** 1
- **General output feature:** 250 V, 3 A, 300 VA
- **Consumption:** 0,48 VA per fase

Model		RVIA	RVIB
Type		Three phase 3 wires	Three phase 4 wires
Dimensions	mm	150x70x112	
Voltage	V	110, 230, 400V	
Current	I	$x/5$ or $x/1$ A	

## Shunts

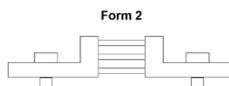
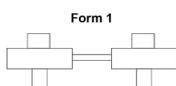
Direct current



### General features

High value current connection on direct current circuits

- **Accuracy:** 0,5%
- **Operating temperature** -20°..+60°C
- **Overloads:** 1,2 In continuously  
10 In 5s (10..500A)  
5 In 5s (600..200A)  
2 In 5s (2500..4000A)



Model		Form 1		Form 2		Form 3	
Voltage drop	mV	60mV	150mV	60mV	150mV	60mV	150mV
Measuring range	In	0 1 - 1,5 - 2,5 - 4 - 5 - 6 - 10 - 15 - 20 - 25 - 30 - 40 - 50 - 60 - 80 - 100 - 150		200 - 250 - 300 - 400 - 500 - 600 - 750 - 800 - 1000 - 1200 - 1500 - 2000 - 2500	200 - 250 - 300 - 400 - 500 - 600 - 750 - 800 - 1000	3000 - 4000	1200 - 1500 - 2000 - 2500

## Rotary switches

Panel mounting



### General features

- **Diameter:** Ø 22,3mm
- **Front panel dimensions:** 48x48mm
- **Working voltage (Ue):** 24 - 110 - 240 - 440 V
- **Number of poles:** 3P and 4P
- **Conventional thermal current (Ith):** 20 A
- **Operated insulation voltage (Ui):** 690 V

General features	Model
Voltmeter switches	
4 positions (line - line measurement)	CTP-4
7 positions (line - line and line - neutral measurement)	CTP-7
Ammeter switches	
4 positions	CCP-4

## Resistance boxes

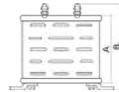
### Accessory



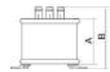
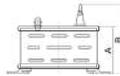
#### General features

Connection to measuring elements.

- **Accuracy:** 0,5%



Model	1.2.1	1.4.1	1.6.1	2.2.1	2.3.1	2.4.1	2.6.1	2.8.1
Terminals	2	4	6	2	3	4	6	8
A - Case dim. (mm)	64 x 50 x 120			99 x 50 x 120				
B - Total dim. (mm)	86 x 50 x 152			121 x 50 x 152				



Model	3.3.1	3.3.2	4.5.1
Terminals	3	3	5
A - Case dim. (mm)	69 x 50 x 120	102 x 50 x 120	100 x 135 x 135
B - Total dim. (mm)	101 x 50 x 155	148 x 50 x 155	123 x 170 x 170

# ANALOGUE INSTRUMENTS

## Specialities

### Panel Instruments

												
	90° Scale				90° Scale			90° Scale	240° Scale			
Dimensions (mm)	48	72	96	144	80x64	105x80	130x100	Modular	48	72	96	144
<b>Pointer</b>												
Knife pointer + fine divisions	—	•	•	•	—	—	—	—	—	—	—	—
Red pointer, set externally	—	•	—	—	•	—	—	—	—	—	—	—
<b>Scale</b>												
Non standard scale (*)	—	•	—	—	•	—	—	•	—	•	—	—
Antiparallax scale	—	—	—	—	—	—	—	—	—	•	•	—
Black background - white figures and pointer	—	•	•	•	•	—	—	—	—	•	•	•
Black background - yellow figures and pointer	—	•	•	•	—	—	—	—	—	•	•	•
Double scale	—	•	•	•	•	—	—	—	—	•	—	—
Double numbering	—	•	•	•	•	—	—	—	—	•	•	•
Red line	—	•	—	—	•	—	—	•	—	•	—	—
Colour arc (up to 20 mm)	—	•	—	—	•	—	—	•	—	•	—	—
Additional text (< 10 letters)	—	•	—	—	•	—	—	•	—	•	—	—
<b>Protections</b>												
Naval series or tropicalized	—	•	—	—	•	—	—	•	—	•	—	—
IP 43 protection	—	•	—	—	•	—	—	—	—	•	—	—
IP 54 protection	—	•	—	—	—	—	—	—	—	•	—	—
IP 20 Terminals protection	•	•	•	—	—	—	—	—	•	•	•	—
Mobile equipment and damping	—	•	—	—	•	—	—	—	—	•	—	—
IP 65 protection	—	•	•	—	—	—	—	—	—	•	•	—
<b>Several</b>												
Makrolon glass	—	•	—	—	•	—	—	—	—	•	—	—
Antireflecting glass	—	•	—	—	•	—	—	—	—	•	—	—
Lighting 12, 24 V (white scale)	—	•	•	•	—	•	•	—	—	•	•	•
Lighting 12, 24 V (black scale)	—	•	•	•	—	•	•	—	—	•	•	•
Rubber gasket (panel)	—	•	•	—	—	—	—	—	—	—	—	—
<b>Moving coil meters</b>												
Non standard input (**)	—	•	—	—	•	—	—	•	—	•	—	—
Insulation 3 Kv	—	•	—	—	•	—	—	•	—	•	—	—
Central zero	—	•	—	—	•	—	—	•	—	•	—	—
Displaced Zero	—	•	—	—	•	—	—	•	—	•	—	—
Mechanically suppressed zero (max 25%)	—	•	—	—	•	—	—	•	—	•	—	—
Non-linear function scale ( $\Omega$ , db, ...)	—	•	—	—	•	—	—	•	—	•	—	—
Internal resistance adjustment (if possible)	—	•	—	—	•	—	—	•	—	•	—	—
Accuracy 1%	—	•	—	—	•	—	—	•	—	•	—	—
600=900V DC (external potentiometric box)	—	•	—	—	•	—	—	•	—	•	—	—
$\geq 1000=2000V$ DC (external potentiom. box)	—	•	—	—	•	—	—	•	—	•	—	—
$\geq 2000=4000V$ DC (ext. potentiom. box)	—	•	—	—	•	—	—	•	—	•	—	—
Potentiometer for 10% end of scale adjustment	—	•	•	•	—	—	—	—	—	•	•	•
Double range	—	•	—	—	•	—	—	•	—	•	—	—

(\*) Scale: Line drawing and numbering.

(\*\*) Current or voltage required to bring the needle to the end of the measuring zone.

# ANALOGUE INSTRUMENTS

## Specialities

### Frame Instruments

												
	90° Scale				90° Scale			90° Scale	240° Scale			
Dimensions (mm)	48	72	96	144	80x64	105x80	130x100	Modular	48	72	96	144

Moving iron meters												
Non standard input (**)		•				•			•			•
Calibrated at 150 or 400 Hz (If possible)		•				•			•			—
Calibrated in DC		•				•			•			—
Accuracy 1%		•				•			•			•
Insulation 3 Kv		•				•			•			•
750 - 1000 V (with external box)		•				•			•			—
200% enlarged scale (A, mA)		•				•			•			•
500% enlarged scale (A, mA)		•				•			•			•
Double range		•				•			•			•

									
	90° Scale				90° Scale	240° Scale			
Dimensions (mm)	48	72	96	144	Modular	48	72	96	144

Induction wattmeters and varmeters									
Non standard voltage		•				—			—
Accuracy 1 %		•				—			—
Current 1A (per system)		•				—			—
Displaced zero		•				—			—
Central zero		•				—			—
Calibrated between 1,3 - 1,5 apparent power		•				—			—
Calibrated between 0,6 - 0,8 apparent power		•				—			—
Calibrated between 0,4 - 0,6 apparent power		•				—			—

Electronics wattmeters and varmeters									
Non standard voltage		•				—			•
Accuracy 1 %		•				—			•
Current 1 A		•				—			•
Displaced zero		•				—			•
Central zero		•				—			•
Calibrated to 400 Hz		•				—			•
Calibrated between 1,3 - 1,5 of apparent power		•				—			•
Calibrated between 0,6 - 0,8 of apparent power		•				—			•
Calibrated between 0,4 - 0,6 apparent power		•				—			•

Induction phase meters									
Non standard voltage (single phase)		•				—			•
Non standard voltage (three phase)		•				—			•
Current 1 A (per system)		•				—			•

Electronics phase meters									
Non standard voltage		•				—			•
Scale 0 - 1 - 0 (single phase) 0,1 - 0 - 0,1 (three phase)		•				—			•
Current 1 A		•				—			•

(\*) Scale: Line drawing and numbering.

(\*\*) Current or voltage required to bring the needle to the end of the measuring zone.



# TRANSFORMERS

# TRANSFORMERS

<b>General features</b>	<b>105</b>	Protection transformers	
Measuring transformers		<b>TU_CP Primary wound (Protection)</b>	<b>134</b>
<b>TU_Primary wound</b>	<b>106</b>	<b>TU_R Primary wound (Protection) - Resin</b>	<b>135</b>
<b>TU_R Primary wound - Resin</b>	<b>108</b>	<b>TUC_ Window-type (Protection)</b>	<b>136</b>
<b>TU_PS Narrow profile. Window-type</b>	<b>110</b>	<b>TL_ Window-type (Protection)</b>	<b>137</b>
<b>TU_PS-3 Triple - Narrow profile. Window-type</b>	<b>113</b>	<b>TUP_R Window-type (Protection) - Resin</b>	<b>138</b>
<b>TU100PSH Narrow profile. Window-type</b>	<b>114</b>	<b>TUP_R Homopolar (Speciality) - Resin</b>	<b>139</b>
<b>TU20PS-1 Narrow profile. Window-type</b>	<b>115</b>	<b>TPR_ Window-type (Protection) - Resin</b>	<b>140</b>
<b>TU_Window-type</b>	<b>116</b>	<b>TPR_B Window-type (Protection) - Resin</b>	<b>141</b>
<b>TL_ Window-type</b>	<b>117</b>	<b>TUP80R Speciality (Protection and measurement)</b>	<b>142</b>
<b>TUC_ Window-type</b>	<b>118</b>	<b>TUP105R Speciality (Protection and measurement)</b>	<b>142</b>
<b>TA_P Split core transformers</b>	<b>120</b>	<b>TUP_R Speciality (Protection) - With cable</b>	<b>143</b>
<b>TA_P(A) Mini Split core transformers</b>	<b>122</b>	Other transformers	
<b>TA_PV Split core transformers</b>	<b>123</b>	<b>TC_ Transformer converters</b>	<b>144</b>
<b>TA_R Split core transformers - Resin</b>	<b>124</b>	<b>TC_CV Transformer converters</b>	<b>145</b>
<b>TUP_R Window-type - Resin</b>	<b>125</b>	<b>TS_ Summation transformers</b>	<b>146</b>
<b>TU_R_ Narrow profile - Horizontal bar - Resin</b>	<b>126</b>	<b>TRS_ Summation transformers - Resin</b>	<b>146</b>
<b>TU_R Narrow profile - Window-type - Resin</b>	<b>128</b>	<b>TE108 Voltage transformers</b>	<b>147</b>
<b>TU60PRI Window-type - Resin</b>	<b>129</b>	<b>TE15P Voltage transformers</b>	<b>147</b>
<b>TU40RGI Advanced LV monitoring</b>	<b>130</b>	<b>TE150P Double secondary transformers</b>	<b>148</b>
<b>TU_RV Low power transformer- Class 0.5s</b>	<b>131</b>	<b>TEH-132 Hall effect sensor</b>	<b>148</b>
<b>TU40RGV Low Power transformer - Class 0.2s</b>	<b>132</b>	<b>RC Rogowski coil</b>	<b>149</b>
<b>TUP80RV Low Power transformer - Class 0.2s</b>	<b>133</b>	<b>DIN rail bracket</b>	<b>149</b>

# General features

## Measuring transformers

### General

- Wound primary, window type and split-core transformers
- For cable or bus-bar
- Plastic or resin-encapsulated casing (depending on type)
- With fixing support and/or busbar fixing screws (depending on type)
- DIN rail mounting (on request)

### General technical specifications

• Safety factor	$F_s < 5$
• Operating voltage (maximum)	720 V
• Test voltage	3 kV CA (1 min)
• Frequency	50 - 60 Hz
• Rated dynamic current	$I_{Dyn} = 2,5 \times I_{th}$
• Continuous overload	$I_D = 1,2 \times I_n$
• Operating temperature	- 5 °C / + 40 °C
• Accuracy	0,5 - 1 - 3 (0,2 - 0,2s - 0,5s on request)
• Rated secondary current	x/5A - x/1A
• Rated thermal short-circuit withstand current	$I_{th} = 60 I_n$ for wound primary transformers $I_{th}$ limited by cable or primary busbar dimensions in other cases
• Insulation class	E class B class (130 °C available)

### Standards

- IEC 60185
- IEC 61010
- UNE EN 618691 (IEC 618691)
- UNE EN 618692 (IEC 618692)
- UNE-EN 61000-6-3
- UNE-EN 61000-6-1
- UL94-V0
- VDE 0414
- DIN 57414
- BS 3938

General specifications. Check the specific features of each model.

## General features

### Protection transformers

#### General

- Wound primary and window type transformers
- For cable or bus-bar
- Plastic or resin-encapsulated casing (depending on type)
- With fixing support and/or busbar fixing screws (depending on type)
- DIN rail mounting (on request)

#### General technical specifications

• Protection factor	5P10; 5P20; 10P10; 10P20
• Operating voltage (maximum)	720 V
• Test voltage	3 kV CA (1 min)
• Frequency	50 - 60 Hz
• Rated thermal short-circuit withstand current	$I_{th} = 60 I_n$ for wound primary transformers $I_{th}$ limited by cable or primary busbar dimensions in other cases
• Rated dynamic current	$I_{Dyn} = 2,5 \times I_{th}$
• Continuous overload	$I_D = 1,2 \times I_n$
• Operating temperature	- 5 °C / + 40 °C
• Model	TP and TPx under demand
• Accuracy	0,5 - 1 - 3 (0,2 - 0,2s - 0,5s on request)
• Rated secondary current	$x/5A - x/1A$
• Insulation class	E class B class (130 °C available)

#### Standards

- IEC 60185
- IEC 61010
- UNE EN 618691 (IEC 618691)
- UNE EN 618692 (IEC 618692)
- UNE-EN 61000-6-3
- UNE-EN 61000-6-1
- UL94-V0
- VDE 0414
- DIN 57414
- BS 3938

General specifications. Check the specific features of each model.

## TU\_ Wound primary

### Measuring transformers



#### General features

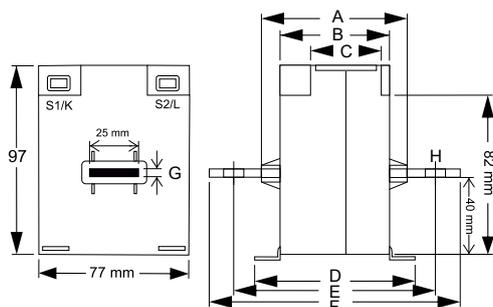
Measuring transformer with horizontal busbar primary, suitable for direct connection via cable or terminal block for low-current applications.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 0,5s - 0,2s
- **Plastic casing**
- **Resin encapsulated option**

#### Wound primary

Model	TU3BAP				TU3BCP				TU3BP	
	4 x 25 mm				4 x 25 mm				4 x 25 mm	
Accuracy class	0,5	1	0,5s	0,2s	0,5	1	0,5s	0,2s	0,5	1
Ip/n	VA				VA				VA	
5	5	7,5			15	20			10	15
10	5	7,5			15	20	5		10	15
15	5	7,5			15	20			10	15
20	5	7,5			15	20			10	15
25	5	7,5			15	20		5	10	15
30	5	7,5			15	20			10	15
40	5	7,5			15	20		5	10	15
50	5	7,5			15	20		5	10	15
60	5	7,5			15	20		5	10	15
75	5	7,5			15	20		5	10	15
100	5	7,5	10	2,5	15	20			10	15
125	5	7,5	10	2,5	15	20			10	15
150	5	7,5	10	2,5	15	20			10	15
200	5	7,5	10	2,5	15	20			10	15
250	5	7,5	10	2,5	15	20			10	15
300	5	7,5	10	2,5	15	20			10	15
400			10	2,5	15	20			10	15
500			10	2,5					10	15
600									10	15

#### Dimensions



Model	Ratio	A	B	C	D	E	F	G	H
TU3BP	5 ~ 300	74	56	36	82	114	137	4	M12
TU3BP	400 ~ 600	74	56	36	82	114	137	10	M12
TU3BCP	5 ~ 300	86	67	36	93	114	137	4	M12
TU3BCP	400	86	67	36	93	114	137	10	M12
TU3BAP	5 ~ 400	63	45	36	71	92	117	4	M10

Dimensions in mm

## TU\_ Wound primary

### Measuring transformers



#### General features

Measuring transformer with wound primary and horizontal screw terminal connection, suitable for low-current applications.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1
- **Plastic casing**
- **Resin encapsulated option**

Wound primary		
Model	TU40CP	
Bus-bar	-	
Accuracy class	0,5	1
I <sub>pn</sub>	VA	
5	5	7,5
10	5	7,5
15	5	7,5
20	5	7,5
25	5	7,5
30	5	7,5
40	5	7,5
50	5	7,5
60	5	7,5
75	5	7,5
100	5	7,5
125	5	7,5
150	5	7,5
200	5	7,5
250	5	7,5
300	5	7,5
400	5	7,5
500	5	7,5
600	5	7,5

Wound primary		
Model	TU3AP	
Bus-bar	-	
Accuracy class	0,5	1
I <sub>pn</sub>	VA	
5	2,5	5
10	2,5	5
15	2,5	5
20	2,5	5
25	2,5	5
30	2,5	5
40	2,5	5
50	2,5	5
60	2,5	5
75	2,5	5
100	2,5	5
125	2,5	5
150	2,5	5
200	2,5	5
250	2,5	5
300	2,5	5
400	2,5	5

#### Dimensions

Model	A	B	C	D	E	F	G	H
TU40CP	51	46	72	64	93,5	89	40	Ø12
TU3AP	33	30	65	48	90	86	37	Ø8

Dimensions in mm

## TU\_R Wound primary

### Measuring transformers



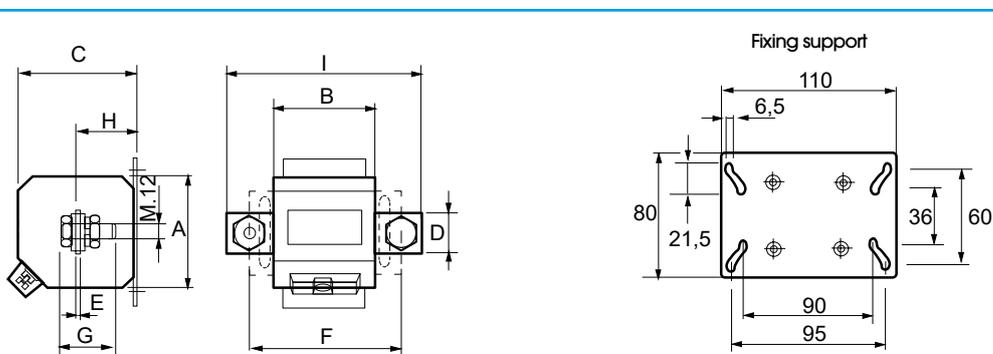
#### General features

Current transformers with primary wound and horizontal bar for connection to cable or terminal block. Their resin casing offers greater robustness.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1
- **Resin encapsulated**

Wound primary				
Model	TU3R		TU50R	
	0,5	1	0,5	1
Accuracy class				
I <sub>pn</sub>	VA		VA	
20	15	25		
25	15	25		
30	15	25		
40	15	25		
50	15	25		
60	15	25		
75	15	25		
100	15	25		
125	15	25		
150	15	25		
200	15	25		
250	15	25		
300	15	25		
400	15	25	15	25
500	15	25	15	25
600	15	25	15	25
750	15	25	15	25
800	15	25	15	25

#### Dimensions



Model	Ratio	A	B	C	D	E	F	G	H	I
TU3R	50/5 - 300/5	80	73,5	96	30	5	110	38	42	140
TU3R	400/5 - 600/5	80	73,5	101	30	10	110	48	47	140
TU50R	400/5 - 800/5	100	73,5	100	50	10	135	48	50	175

Dimensions in mm

# TRANSFORMERS

## TU\_R Wound primary or window-type

Measuring transformers - Class 0,5s



### General features

Current transformers with primary wound or pass-through with a special accuracy of 0.5s.

- **Secondary:** .../5A
- **Extended range:** 150%
- **Accuracy:** 0,5s
- **Resin encapsulated**

	Wound primary		Passing cable / busbar	
Model	TU3R		TUP20R	
Bus-bar	-		100x20 mm	
Cable	-		Ø20 mm	
Accuracy class	0,5s		0,5s	
Ipn	VA		VA	
50	10	2,5		
60	10	2,5		
75	10	2,5		
100	10	2,5		
125	10	2,5		
150	10	2,5		
200	10	2,5		
250	10	2,5		
300	10	2,5		
400	10	2,5		
500	10	2,5		
600	10	2,5		
750			10	2,5
800			10	2,5
1000			10	2,5
1200			10	2,5
1500			10	2,5
2000			10	2,5

### Dimensions

**TU3R**

Fixing support

**TUP20R**

Model	Ratio	A	B	C	D	E	F	G	H	I
TU3R	50/5 - 300/5	80	73,5	96	30	5	110	38	42	140
TU3R	400/5 - 600/5	80	73,5	101	30	10	110	48	47	140

Dimensions in mm

# TRANSFORMERS

## TU\_PS Narrow profile. Window-type

### Measuring transformers



#### General features

Measuring transformer for cable or bus-bar. Its narrow profile design allows a better adaptation to the frame due to its reduced dimensions.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 3
- **Plastic casing**
- **Resin encapsulated option**

Passing cable/busbar									
Model	TU20PS			TU30PS		TU40PS		TU50PS	
Bus-bar	20 x 6 mm			30 x 10 mm		40 x 10 mm		50 x 10 mm	
Cable	Ø18 mm			Ø25 mm		Ø30 mm		Ø40 mm	
Accuracy class	0,5	1	3	0,5	1	0,5	1	0,5	1
l <sub>pn</sub>	VA			VA		VA		VA	
30			0,5						
40			1						
50			1						
60		1	1,5						
75		1,5	1,5		1				
100		1,5	2,5		1,5				
125	1,5	2,5	3,75		1,5				
150	2,5	3,75	5	1,5	2,5		2		
200	3,75	5	7,5	2,5	3,75	2,5	3,75	2,5	
250	5	7,5		3,75	5	2,5	3,75	3,75	
300				3,75	5	5	5		
400				3,75	5	5	5	3,75	5
500				5	7,5	5	7,5	5	7,5
600				5	7,5	5	7,5	7,5	10
750						5	7,5	7,5	10
800						5	7,5	7,5	10
1000								10	15

#### Dimensions

**TU20PS**

Dimensions: 21, 13, 6.5, 6.5, 16, 21, Ø18.5

**TU30PS**

Dimensions: 16, 11, 26, 31, Ø26

**TU40PS**

Dimensions: 31.5, 22, 41, 31, 11, 16.5, Ø30.5

**TU50PS**

Dimensions: 32, 22, 32, 42, 51, 11, Ø42

Dimensions: 9.5, 63.2, 51.5, 63, A-18, A, B, C

Model	A	B	C
TU20PS	50mm	74mm	36mm
TU30PS	58mm	78mm	36mm
TU40PS	62mm	82mm	36mm
TU50PS	72mm	103mm	36mm

# TRANSFORMERS

## TU\_PS Narrow profile. Window-type

### Measuring transformers



#### General features

Measuring transformer for cable or bus-bar. Its narrow profile design allows a better adaptation to the frame due to its reduced dimensions.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 3
- **Plastic casing**
- **Resin encapsulated option**

Passing cable/busbar									
Model	TU60PS		TU80PS		TU100PS		TU125PS		
Bus-bar	60 x 10 mm		80 x 30 mm		100 x 30 mm		125 x 50 mm		
Cable	Ø50 mm		Ø70 mm		-		-		
Accuracy class	0,5	1	0,5	1	0,5	1	0,5	1	
I <sub>pn</sub>	VA		VA		VA		VA		
400	5	5	5	7,5					
500	5	7,5	5	7,5	5	7,5	5	7,5	
600	5	7,5	7,5	10	7,5	10	5	7,5	
750	5	7,5	7,5	10	7,5	10	7,5	10	
800	7,5	10	7,5	10	7,5	10	7,5	10	
1000	10	15	10	15	10	15	10	15	
1200	15	20	15	20	15	20	15	20	
1500	15	20	15	20	15	20	15	20	
1600	15	20	15	20	15	20	15	20	
2000			15	20	15	20	20	25	
2500					20	25	20	25	
3000					20	25	20	25	
3200							20	25	
4000							25	30	

#### Dimensions

**TU60PS**

**TU100PS / TU125PS**

Model	D	E
TU100PS	103mm	33mm
TU125PS	128mm	53mm

Model	A	B	C
TU60PS	86mm	110mm	36mm
TU80PS	106mm	132mm	36mm
TU100PS	95mm	165mm	36mm
TU125PS	115mm	190mm	36mm

## TU\_PS Narrow profile. Window-type

Measuring transformers - Class 0,5s - 0,2 - 0,2s



### General features

Measuring transformer for cable or bus-bar. Its narrow profile design allows a better adaptation to the frame due to its reduced dimensions.

- **Secondary:** .../5A
- **Accuracy:** 0,5s - 0,2 - 0,2s
- **Plastic casing**
- **Resin encapsulated option**

Passing cable/busbar															
Model	TU20PS			TU60PS			TU80PS			TU100PS			TU125PS		
Bus-bar	20 x 6 mm			60 x 10 mm			80 x 30 mm			100 x 30 mm			125 X 50 mm		
Cable	Ø18 mm			Ø50 mm			Ø70 mm			-			-		
Accuracy class	0,5s	0,2	0,2s	0,5s	0,2	0,2s	0,5s	0,2	0,2s	0,5s	0,2	0,2s	0,5s	0,2	0,2s
Ip/n	VA			VA			VA			VA			VA		
150	2,5	2,5													
200	2,5	2,5													
250	5	5													
500				5	5	5	5	2,5							
600				5	5	5	5	5	5						
750				5	5	5	7,5	7,5		7,5	7,5				
800				5	5	5	5	7,5		7,5	7,5		7,5		
1000				7,5	5	5	10	10	5	10	10	7,5	10		
1200				7,5	10	5	10	10	5	10	10	10	5		
1500							15	15	5	10	15	15	10	10	5
1600						5	15	15	5	15	15	15	10	10	5
2000						15	15	15	10	15	15	15	15	15	5
2400										15	15	15	15	15	5
2500										20	20	15	15	15	15
3000										20	20	20	15	15	10
4000													15	15	15

### Dimensions

Dimensions on the previous page

# TRANSFORMERS

## TU\_PS-3 Narrow profile - triple. Window-type

Measuring transformers



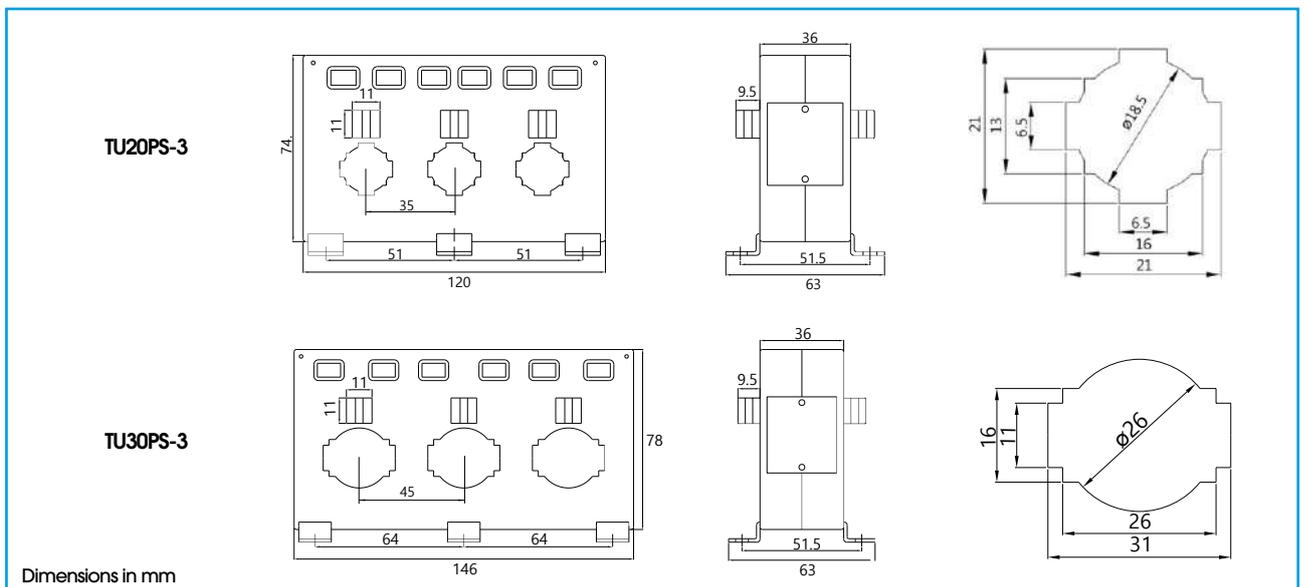
### General features

Precision measuring current transformer for cable or busbar, featuring a triple design for easy integration into electrical panels.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 3
- **Plastic casing**
- **Resin encapsulated option**

Passing cable/busbar					
Model	TU20PS3			TU30PS3	
Bus-bar	20 x 6 mm			30 x 10 mm	
Cable	Ø18 mm			Ø25 mm	
Accuracy class	0,5	1	3	0,5	1
I <sub>pn</sub>	VA			VA	
30			0,5		
40			1		
50			1		
60		1	1		
75		1	1,5		
100		1,25	1,5		
125	1	1,5	2,5		
150	1	1,5	2,5		1,5
200	1,5	2,5	3,75		2,5
250	2,5	3,75	5		2,5
300	2,5	3,75		2,5	2,5
400				2,5	2,5
500				3,75	3,75
600				5	5

### Dimensions



# TRANSFORMERS

## TU100PSH Narrow profile window-type

Measuring transformers



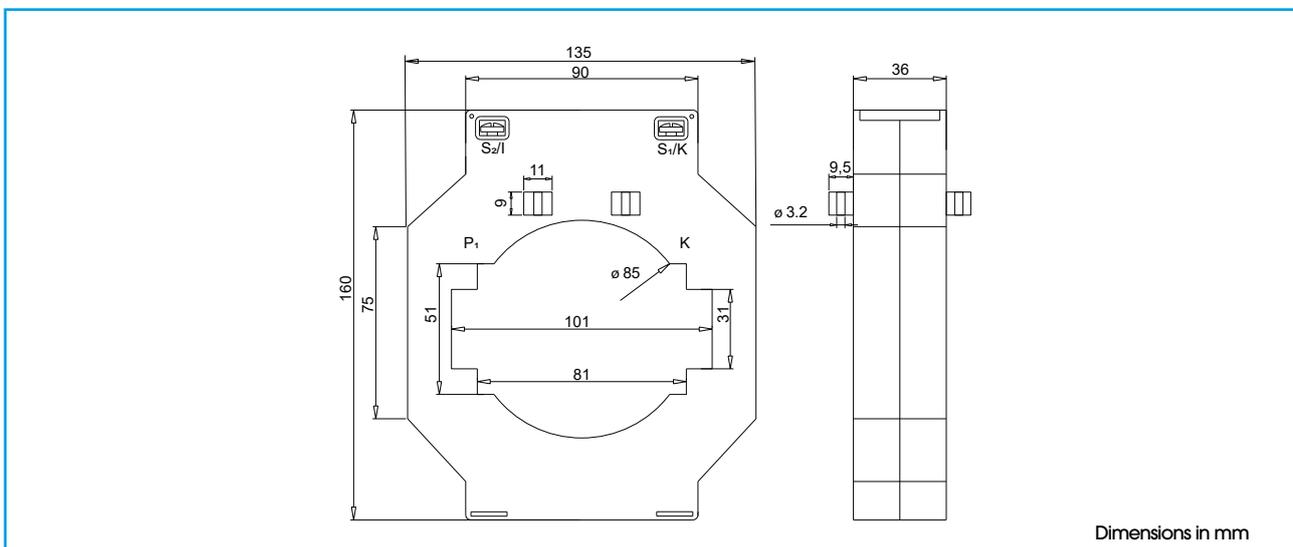
### General features

Current transformer for measurement, suitable for cable or busbar, featuring a slim-profile design for installation in tight spaces between busbars.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1
- **Plastic casing**
- **Resin encapsulated option**

Passing cable/busbar		
Bus-bar	100 x 30 / 80 x 50 mm	
Cable	Ø 85 mm	
Accuracy	0,5	1
I <sub>pn</sub> (A)	VA	
400	5	7,5
500	7,5	10
600	7,5	10
750	7,5	10
800	7,5	10
1000	10	15
1200	15	20
1500	15	20
1600	10	15
2000	15	20
2500	20	25
3000	20	25
4000	25	30
5000	25	30

### Dimensions



## TU20PS-1 Narrow profile window-type

Measuring transformers



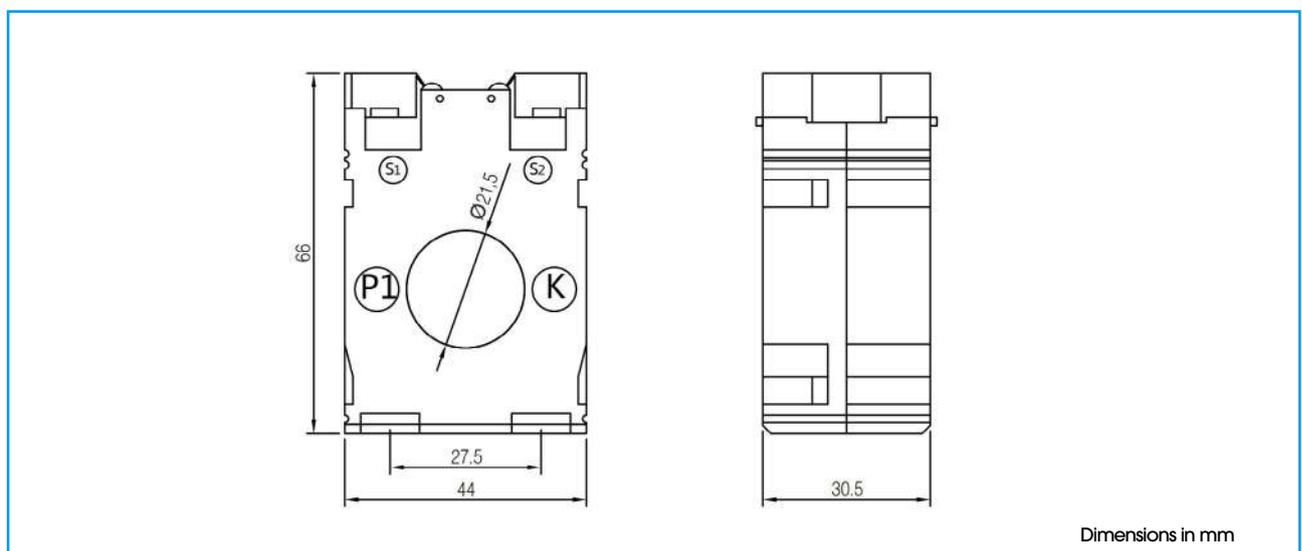
### General features

Measuring transducers with DIN rail mounting option. Its slim profile design allows a better adaptation in the panel due to its reduced dimensions.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 3
- **Plastic casing**

Passing cable/busbar			
Cable	Ø 20 mm		
Accuracy	0,5	1	3
I <sub>pn</sub> (A)	VA		
30			1
40			1
50			1,5
60			1,5
80			1,5
100		1,5	
150	1,5	2,5	
200	2,5	2,5	
250	2,5		
300	2,5		
400	3,75		

### Dimensions



## TU\_Window-type

### Measuring transformers



#### General features

Measuring current transformer for cable or busbar applications, featuring a wider profile and a higher level of accuracy at low current levels.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 3 - 0,5s - 0,2 - 0,2s
- **Plastic casing**
- **Resin encapsulated option**

Passing cable/busbar																
Modelo	TU20						TU30			TU40						
Bus-bar	20 x 5 mm						30 x 10 mm			40 x 10 mm						
Cable	Ø16 mm						Ø22 mm			Ø30 mm						
Accuracy class	0,5	1	3	0,5s	0,2	0,2s	0,5	1	3	0,5	1	3	0,5s	0,2	0,2s	
I <sub>pn</sub>	VA						VA			VA						
30			1													
40			1													
50			1								0,75	1,5				
60		1	2								1,25	2				
75		1,5	2,5								2	3,75				
100		2,5	3,75					1,25	2,5	1	3	5				
125		3,75	5					1,25	2,5	2,5	3,75	5				
150	3,75	5	7,5	2,5	2,5	2,5	1,5	2,5	3,75	3,75	5	7,5				
200	5	7,5	10	3,75	3,75		2,5	3,75	5	3,75	5	7,5				
250	7,5	10	15	5	5		3,75	5	7,5	5	7,5	10				
300							3,75	5	7,5	7,5	10	15				
400							3,75	5	7,5	10	15	20	5	5	5	
500							5	7,5	10	10	15	20	5	5	5	
600							5	7,5	10	10	15	20	5	5	5	
750										10	15	20				
800										15	20	30	5	5	5	
1000										15	20	30	5	5	5	

#### Dimensions

**TU20 - Figure 1**

**TU30 - Figure 2**

**TU40 - Figure 3**

Model	A	B	C	D	E	F	G	H	I	J
TU20	Figure 1		56	74	33	48,5	48,5	60	32,5	37
TU30	Figure 2		60	79	36	51,5	51,5	63	34,5	41
TU40	Figure 3		71	96	45,5	61	61	72,5	44,5	52

Dimensions in mm

## TL\_ Window-type

### Measuring transformers



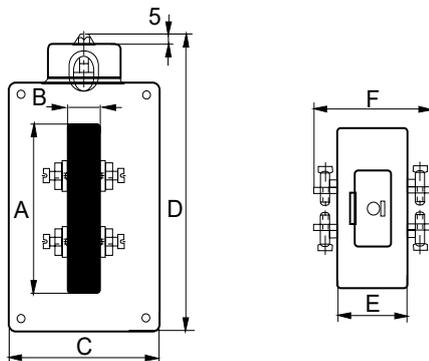
#### General features

Measuring current transformer for cable or busbar applications, featuring a wider profile and a higher level of accuracy at high current levels.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 3 - 0,5s - 0,2 - 0,2s
- **Plastic casing**

Passing cable/busbar																			
Model	TL2						TL3						TL4						
Bus-bar	100 x 20 mm						100 x 30 mm						100 x 60 mm						
Cable	Ø20 mm						Ø30 mm						Ø60 mm						
Accuracy class	0,5	1	3	0,5s	0,2	0,2s	0,5	1	3	0,5s	0,2	0,2s	0,5	1	3	0,5s	0,2	0,2s	
I <sub>pn</sub>	VA						VA						VA						
750	10	20	30	5	5														
800	15	20	30	5	5	5													
1000	20	30	45	10	7,5	5													
1200	20	30	45	10	7,5	5													
1500	30	45	60	10	10	5	10	20	30	10	10	5				10	10	5	
1600	30	45	60	10	10	5	10	20	30	10	10	5				10	10	5	
2000	30	60	90	15	15	5	15	25	40	15	15	5	10	20	30	15	15	5	
2400				15	15	5	15	25	40	15	15	5	10	20	30	15	15	5	
2500							25	30	45	15	15	10	10	20	30	15	15	10	
3000							30	45	60	15	15	10	20	30	45	15	15	10	
3500							30	45					20	30	45				
4000													30	60	90				
5000													30	60	90				
6000													30	60					

#### Dimensions



Model	A	B	C	D	E	F
TL2	102	20	94	178	38	66
TL3	103	32	114	210	45	71
TL4	104	62	156	224	50	78

Dimensions in mm

## TUC\_ Window-type

### Measuring transformers



#### General features

Measuring current transformer for cable or busbar applications, featuring a wider profile and higher secondary burden capacity at low current levels.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 3 - 0,5s - 0,2 - 0,2s
- **Plastic casing**
- **Resin encapsulated option**
- **Protection degree:** IP51

Passing cable/busbar															
Model	TUC30						TUC40						TUC40-1		
Bus-bar	30x10mm						40x10mm						40x10mm		
Cable	Ø25mm						Ø32mm						Ø32mm		
Accuracy class	0,5	1	3	0,5s	0,2	0,2s	0,5	1	3	0,5s	0,2	0,2s	0,5	0,5s	0,2s
I <sub>pn</sub>	VA						VA						VA		
50								0,75	1,5				5	1,5	
60								1,25	2						
75								2	3,75						
100							1	3	5				5	5	1,25
125							2,5	3,75	5						
150	5	5	5	5	5	5	3,75	5	7,5	7,5	1	5	5	5	5
200	15	20	30	5	5	5	3,75	5	7,5	10	1	5	10	5	5
250	15	20	30	5	5	5	5	7,5	10	5	5		10	10	5
300	15	20	30	5	5	5	7,5	10	15	7,5	5	5			
400	15	20	30	5	5	5	10	15	20	10	7,5	5			
500	15	20	30	5	5	5	10	15	20	10	5	5	15	10	5
600	15	20	30	5	5	5	10	15	20	10	5	5			
750							10	15	20	5	10	5	15	15	5
800							15	20	30	5	10	5			
1000							15	20	30	5	5	5	20	15	5

#### Dimensions

**TUC30 -Figure 1**

**TUC40 / TUC40-1**

**TUC\_**

Model	A	B	K	L
TUC30	Figura 1			
TUC40	41	10,5	25	31
TUC40-1	41	11	25	31

Model	C	D	E	F	G	H	I	J
TUC30	77	112	60,5	76	76	87,5	44,5	41
TUC40	71	106,5	45	61	60,5	72	40	47
TUC40-1	71	106,5	75	91	90,5	102	40	47

Dimensions in mm

## TUC\_ Window-type

### Measuring transformers



#### General features

Current transformer for measurement, suitable for cable or busbar, with a wider profile and increased secondary burden capacity at low currents.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 3 - 0,5s - 0,2 - 0,2s
- **Plastic casing**
- **Resin encapsulated option**
- **Protection degree:** IP51

Passing cable/busbar													
Model	TUC50	TUC60						TUC80					
Bus-bar	50x10mm	60x10mm						80x30mm					
Cable	Ø40mm	Ø51mm						Ø65mm					
Accuracy class	0,5s	0,5	1	3	0,5s	0,2	0,2s	0,5	1	3	0,5s	0,2	0,2s
I <sub>pn</sub>	VA	VA						VA					
200			10						10				
250		10	15					3,75					
300		10	20					10					
400	10	15	20	30	5	5	5	15	20	30	10	7,5	
500	10	15	20	30	5	5	5	15	20	30	7,5	7,5	
600	10	15	20	30	5	5	5	15	20	30	7,5	7,5	
750	10	15	20	30	5	5	5	15	20	30	10	10	
800	10	15	20	30	5	5	5	15	20	30	10	10	5
1000	10	15	20	30	10	10	5	15	20	30	10	10	7,5
1200	10	15	20	30	10	10	5	15	20	30	15	15	7,5
1250	10	15	20	30	10	10	5	15	20	30	15	15	7,5
1500	10	15	20	30	10	10	5	15	20	30	15	15	7,5
2000	10	15	20	30	15	10	5	15	20	30	15	15	15
2500								15	20	30	15	15	15
3000											15	15	15

#### Dimensiones

**TUC50**

**TUC60 - TUC80**

**TUC\_**

Model	A	B	K	L	M
TUC50	51	11	31	41	-
TUC60	61	11	31	41	51
TUC80	81	31	41	51	61

Model	C	D	E	F	G	H	I	J
TUC50	84	117	45	61	60,5	72	44,5	64
TUC60	105	136,5	60	76	75,5	87	54	81
TUC80	131	161,5	60	76	75,5	87	69	107

Dimensions in mm

## TA\_P Split core transformers

### Measuring transformers



#### General features

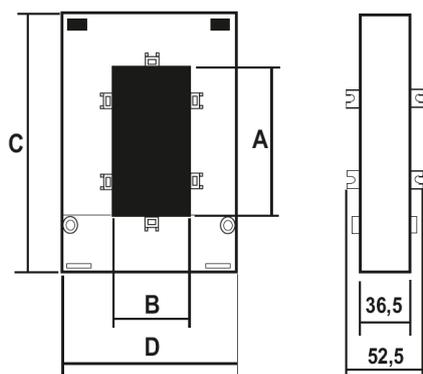
Split-core measuring current transformer, designed to facilitate installation in existing panels or lines.

- **Secondary:** .../5A  
.../1A  
.../250mA
- **Accuracy:** 0,5 - 1 - 3
- **Plastic casing**
- **Resin encapsulated option**
- **With built-in cable option**

Passing cable/busbar															
Model	TA30P			TA40P			TA60P			TA80P			TA85P		
Bus-bar	30x20 mm			40x40 mm			60x30 mm			80x50 mm			85x85 mm		
Cable	Ø20 mm			Ø40 mm			Ø30 mm			Ø50 mm			Ø85 mm		
Accuracy class	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3
I <sub>pn</sub> (A)	VA														
50	1		0,5												
100			3			3						2,5			
125						3									
150			3,75			3,75									
200		2,5	4		2,5	4									
250		3,75	5		2,5	3,75		2,5	3,75		2,5	3,75		2,5	3,75
300	2,5	4	6		3,75	5		3,75	5		3,75	5		3,75	5
400	3,75	5	10	2,5	3,75	7,5	2,5	3,75	7,5	2,5	3,75	7,5	2,5	3,75	7,5
500				3,75	5	15	3,75	5	15	3,75	5	15	3,75	5	15
600							5	7,5	20	5	7,5	20	5	7,5	20
750							7,5	10	20	7,5	10	20	7,5	10	20
800							7,5	10	20	7,5	10	20	7,5	10	20
1000							10	15	20	10	15	20	10	15	20

Other specialities on request, consult us.

#### Dimensions



Model	A	B	C	D
TA30P	32	22	106	90
TA40P	40	40	115	108
TA60P	62	32	136	100
TA80P	82	52	156	120
TA85P	85	85	159	153

Dimensions in mm

## TA\_P Split core transformers

### Measuring transformers



#### General features

Split-core measuring current transformer, designed to facilitate installation in existing panels or lines.

- **Secondary:** .../5A  
.../1A  
.../250mA
- **Accuracy:** 0,5 - 1 - 3
- **Plastic casing**
- **Resin encapsulated option**
- **With built-in cable option**

Passing cable/busbar												
Model	TA100P			TA125P			TA135P			TA160P		
Bus-bar	100x80 mm			128x80 mm			135x135 mm			160x80 mm		
Cable	Ø80 mm			Ø80 mm			Ø135 mm			Ø80 mm		
Accuracy class	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3
I <sub>pn</sub> (A)	VA			VA			VA			VA		
250		2,5	3,75									
300		3,75	5									
400	2,5	3,75	7,5									
500	3,75	5	15		5	7,5		5	7,5	2,5	3,75	7,5
600	5	7,5	20		5	15		5	15	3,75	5	10
750	7,5	10	20	5	10	20	5	10	20	5	10	20
800	7,5	10	20	7,5	10	20	7,5	10	20	7,5	10	20
1000	10	15	20	10	20	30	10	20	30	10	20	30
1200	15	20	30	15	20	30	15	20	30	15	20	30
1250	15	20	30	15	20	30	15	20	30	15	20	30
1500	15	20	30	20	30	45	20	30	45	20	30	45
2000	20	30	45	25	30	45	25	30	45	25	30	45
2500				25	30	45	25	30	45	25	30	45
3000				30	45	60	30	45	60	30	45	60
4000				30	45	60				30	45	60
5000										30	45	60

Other specialities on request, consult us.

#### Dimensions

Model	A	B	C	D
TA100P	104	82	178	150
TA125P	127	82	201	150
TA135P	135	135	209	203
TA160P	162	82	236	150

Dimensions in mm

# TRANSFORMERS

## TA\_P(A) Mini split core transformers

### Measuring transformers



#### General features

Split-core measuring transformer, designed for easy installation in existing panels or lines. Its compact size makes it easy to fit in places with limited space.

- **Secondary:** .../5A  
.../1A  
.../250mA  
.../333mV
- **Precision:** 0,5 - 1 - 3
- **Plastic casing**



TA\_P



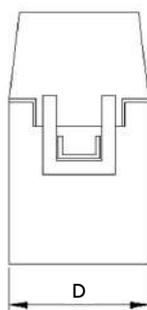
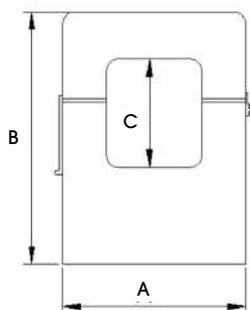
TA\_PA

Passing cable/busbar											
Model	TA10P <sup>3</sup>	TA16P <sup>2</sup>	TA16PA		TA20PA <sup>2</sup>		TA24P <sup>4</sup>	TA36P <sup>4</sup>		TA50P	
Cable	Ø10 mm	Ø16 mm	Ø16 mm		Ø20 mm		Ø24 mm	Ø36 mm		Ø52 mm	
Accuracy class	1	3	1 <sup>1</sup>	3 <sup>2</sup>	1	3	1	0,5	1	0,5	1
I <sub>pn</sub>	VA	VA	VA		VA		VA	VA		VA	
20	1	1		1							
30	1	1		1							
40	1,5	1		1	1	1					
50	1,5	1	1	1	1	1	1		1		
60		1	1	1	1	1					
75		1	1	1	1	1	1		1		
100		1	1	1	1	1	1		1		
150			1	1	1	1	1		1		
200			1	1	1	1	1	1	1		
250							1	1	1		
300							1,5	1	1,5		
400								2,5	5		
500								5	7,5	2,5	5
600								5	10	2,5	5
750										2,5	5
800										2,5	5
1000										2,5	5

(1) Accuracy and load available only for X/5A. (2) Accuracy and load available only for X/1A.

(3) TA10P available only with 250mA and 333mV secondary output. (4) They can be manufactured without cable and with terminals.

#### Dimensions



Model	A	B	C	D
TA10P	23	40	10	26
TA16P	32	46	16	31
TA16PA	50,5	65	16	44
TA20PA	42,5	58	20	34
TA24P	46	65,4	24	35
TA36P	57,5	85,2	36	41,4
TA50P	86,6	118,5	52	58,2

Dimensions in mm

## TA\_PV Split core transformers

Specialities. Measuring transformers



### General features

Split-core current transformer for measurement instrumentation, featuring a pass-through primary for cable or busbar.

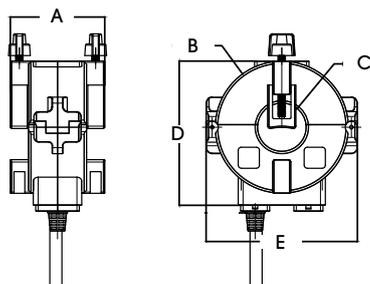
It has an integrated insulation-piercing screw contact that enables direct signal pickup from the conductor or busbar.

- **Secondary:** .../5A
- **Accuracy class:** 0,5s
- **Plastic casing**

Passing cable/busbar			
Model	TU40PV	TU60PV	TU80PV
Cable	Ø40 mm	Ø60 mm	Ø80 mm
Accuracy class	0,5s	0,5s	0,5s
I <sub>pn</sub>	VA	VA	VA
100	2,5		
200	2,5		
250	2,5		
300	2,5	2,5	
400	2,5	2,5	
500	2,5	2,5	
600	5	5	5
750	5	5	5
800	5	5	5
1000		5	5
1500		5	5
2000			5
4000			5

For other ratios, please consult us.

### Dimensions



Model	A	B	C	D	E
TA40PV	78	Ø 110	Ø 40	120	125
TA60PV	78	Ø 129,7	Ø 60	144	145
TA80PV	78	Ø 150	Ø 80	165	165

Dimensions in mm

# TRANSFORMERS

## TA\_R Split core transformers

### Measuring transformers



#### General features

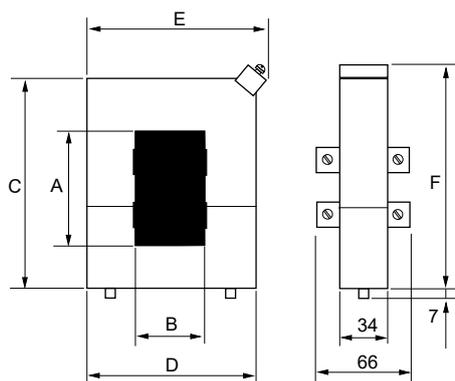
Split core measuring transformer, designed for easy installation in existing panels or lines. Made of resin for greater durability in harsh environments.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 3
- **Resin encapsulated**

Passing cable/busbar																		
Model	TA30R			TA60R			TA80R*			TA100R			TA125R			TA160R		
Bus-bar	30 x 20 mm			60 x 30 mm			80 x 50 mm			100 x 80 mm			125 x 80 mm			160 x 80 mm		
Cable	Ø20 mm			Ø30 mm			Ø50 mm			Ø80 mm			Ø80 mm			Ø80 mm		
Accuracy class	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3
I <sub>pn</sub>	VA			VA			VA			VA			VA			VA		
100			3															
150			3,75															
200		2,5	4		1,5	2,5												
250		3,75	5		2,5	3,75	1	2,5	3,75		2,5	3,75						
300	2,5	4	6		3,75	5	2	3,75	5		3,75	5						
400	3,75	5	10	2,5	3,75	7,5	2,5	3,75	7,5	2,5	3,75	7,5						
500				3,75	5	15	3,75	5	15	3,75	5	15		5	7,5	2,5	3,75	7,5
600				5	7,5	20	5	7,5	20	5	7,5	20		5	15	3,75	5	10
750				7,5	10	20	7,5	10	20	7,5	10	20	5	10	20	5	10	20
800				7,5	10	20	7,5	10	20	7,5	10	20	7,5	10	20	7,5	10	20
1000				10	15	20	10	15	20	10	15	20	10	20	30	10	20	30
1200							10	15		15	20	30	15	20	30	15	20	30
1500										15	20	30	20	30	45	20	30	45
2000										20	30	45	25	30	45	25	30	45
2500													25	30	45	25	30	45
3000													30	45	60	30	45	60
4000																30	45	60
5000																30	45	60
6000																30	45	

(\*) With built-in cable option

#### Dimensions



Model	C	A	B	D	E	F
TA30R	32	21	105	90	99	114
TA60R	62	32	130	100	109	139
TA80R	82	52	150	120	129	159
TA100R	104	82	172	150	159	181
TA125R	127	82	195	150	159	204
TA160R	162	82	230	150	159	239

Dimensions in mm

## TUP\_R Window-type

### Measuring transformers



#### General features

Through-type primary transformer for busbars, resin-encapsulated, suitable for high currents and high secondary burden capacity.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1
- **Resin encapsulated**

Passing cable / busbar								
Model	TUP20RC		TUP20R		TUP60R		TUP95R	
Bus-bar	80 x 20 mm		100 x 20 mm		100 x 60 mm		100 x 95 mm	
Cable	Ø20 mm		Ø20 mm		Ø60 mm		Ø95 mm	
Accuracy class	0,5	1	0,5	1	0,5	1	0,5	1
I <sub>pn</sub>	VA		VA		VA		VA	
500	10	15						
600	15	25						
750	15	25	15	25				
800	15	25	15	25				
1000	15	25	15	25				
1200	15	25	15	25				
1500	15	25	15	25				
2000			15	25	15	25		
2500					15	25		
3000					15	25	15	25
4000					15	25	15	25
5000							15	25

#### Dimensions

**TUP20RC**

**TUP\_R**

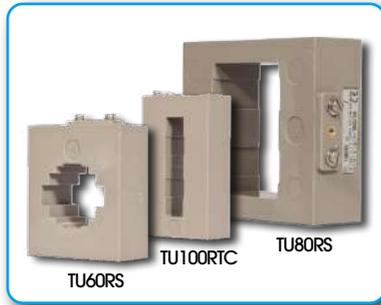
Model	A	B	C	D	E	F	G
TUP20R	105	20	95	160	60	80	60
TUP60R	105	60	150	193	60	80	60
TUP95R	105	95	200	200	60	80	60

Dimensions in mm

# TRANSFORMERS

## TU\_R\_ Narrow profile - Window-type

Current transformer - Horizontal bar



### General features

Transformers featuring a dedicated design for horizontal mounting, with strategically located terminal blocks on each model to simplify installation and connection.

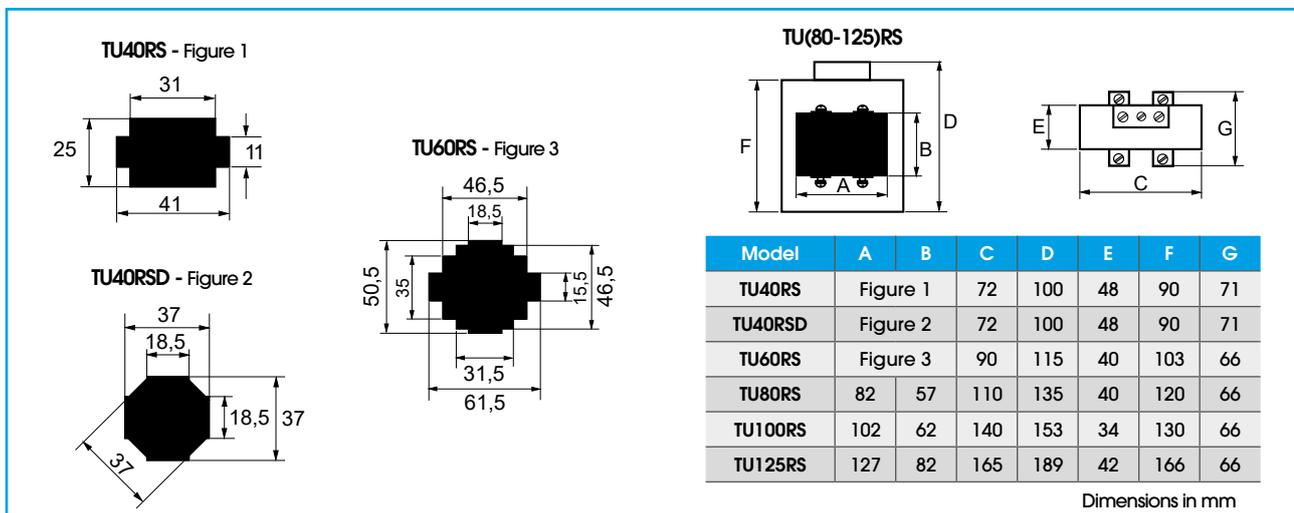
- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 3
- **Resin encapsulated**

### Passing cable/busbar

Model	TU40RS			TU40RSD*			TU60RS			TU80RS			TU100RS			TU125RS		
	Bus-bar			Cable			Accuracy class			I <sub>pn</sub>			VA			VA		
Model	40 x 10 mm			37 x 18 mm			15 x 60 mm			50 x 80 mm			60 x 100 mm			80 x 125 mm		
Cable	Ø25 mm			Ø36 mm			Ø45 mm			Ø50 mm			Ø60 mm			Ø80 mm		
Accuracy class	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3
I <sub>pn</sub>	VA			VA			VA			VA			VA			VA		
200	5	5		5	7,5	10	5											
250	10	7,5		5	7,5	10	5											
300	10	15	20	10	15	20	5											
400	10	15	20	10	15	20	5	7,5	10	5	7,5	10						
500	10	15	20	10	15	20	7,5	10	15	5	7,5	10						
600	10	15	20	10	15	20	10	15	20	10	15	20						
750	10	15	20	10	15	20	10	15	20	10	15	20	15	20	30			
800	10	15	20	10	15	20	10	15	20	10	15	20	15	20	30			
1000	10	15	20	10	15	20	10	15	20	10	15	20	15	20	30			
1200							10	15	20	10	15	20	15	20	30			
1500							10	15	20	10	15	20	15	20	30			
2000							10	15	20	10	15	20	15	20	30	15	20	30
2500										10	15	20	15	20	30	15	20	30
3000													15	20	30	15	20	30
4000																15	20	30
5000																15	20	30
6000																15	20	30

(\*) Optional with built-in cable

### Dimensions



# TRANSFORMERS

## TU\_R\_ Narrow profile - Window-type

Measuring transformers - Horizontal bar



### General features

Transformers featuring a dedicated design for horizontal mounting, with strategically located terminal blocks on each model to simplify installation and connection.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 3
- **Resin encapsulated**

Passing cable/busbar												
Model	TU100RT			TU100RTC			TU125RT*			TU125RTC		
Bus-bar	100 x 20 mm			20 x 100 mm			125 x 35 mm			35 x 125 mm		
Cable	Ø20 mm			Ø20 mm			Ø35 mm			Ø35 mm		
Accuracy class	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3
I <sub>pn</sub>	VA			VA			VA			VA		
600				10	20							
750	10	20	30	10	20	30						
800	15	20	30	15	20	30	7,5	10	15	7,5	10	15
1000	20	30	45	20	30	45	7,5	10	15	7,5	10	15
1200	20	30	45	20	30	45	7,5	10	15	7,5	10	15
1500	30	45	60	30	45	60	10	15	20	10	15	20
2000	30	60	90	30	45	60	15	20	30	15	20	30
2500				30	45	60	20	25	30	20	25	30
3000				30	45	60	25	30	40	25	30	45
3200				30	45		25	30				

(\*) Optional with built-in cable

### Dimensions

Model	A	B	C	D	E	F	G
TU100RT	22	101	83	145	40	55	66
TU125RT	38	127	98	170	40	55	66
TU100RTC	22	101	83	145	40	15	66
TU125RTC	38	127	98	170	40	15	66

Dimensions in mm

# TRANSFORMERS

## TU\_R - Narrow profile - Window-type

Measuring transformers



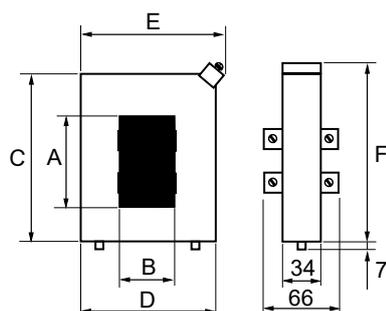
### General features

Current transformer for measurement, suitable for cable or busbar, featuring a slim-profile design for better adaptation in electrical panels with limited space.

- **Secondary:** .../5A  
.../1A
- **Accuracy:** 0,5 - 1 - 3
- **Resin encapsulated**

Passing cable/busbar																			
Model	TU30R			TU60R			TU80R			TU100R			TU125R			TU160R			
Bus-bar	30 x 20 mm			60 x 30 mm			80 x 50 mm			100 x 80 mm			125 x 80 mm			160 x 80 mm			
Cable	Ø20 mm			Ø30 mm			Ø50 mm			Ø80 mm			Ø80 mm			Ø80 mm			
Accuracy class	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3	0,5	1	3	
I <sub>pn</sub>	VA			VA			VA			VA			VA			VA			
100			3,75																
150			3,75			5													
200			5			7,5													
250		5	7,5	10	2,5	3,75	5	2,5	3,75	5	2,5	3,75	5						
300		5	7,5	10	3,75	5	7,5	3,75	5	7,5	3,75	5	7,5						
400		7,5	10	15	5	7,5	10	5	7,5	10	5	7,5	10						
500					7,5	10	15	7,5	10	15	7,5	10	15	10	15	20	10	15	20
600					10	15	20	10	15	20	10	15	20	15	20	30	15	20	30
750					15	20	30	15	20	30	15	20	30	15	20	30	15	20	30
800					15	20	30	15	20	30	15	20	30	15	20	30	15	20	30
1000					15	20	30	15	20	30	15	20	30	15	20	30	15	20	30
1200											15	20	30	15	20	30	15	20	30
1500											15	20	30	15	20	30	15	20	30
2000											15	20	30	15	20	30	15	20	30
2500														15	20	30	15	20	30
3000														15	20	30	15	20	30
4000														15	20	30	15	20	30
5000																	15	20	30
6000																	15	20	30

### Dimensions

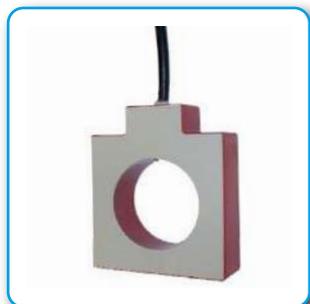


Model	A	B	C	D	E	F
TU30R	32	21	105	90	99	114
TU60R	62	32	130	100	109	139
TU80R	82	52	150	120	129	159
TU100R	104	82	172	150	159	181
TU125R	127	82	195	150	159	204
TU160R	162	82	230	150	159	239

Dimensions in mm

## TU60PRI Window-type

Measuring transformers



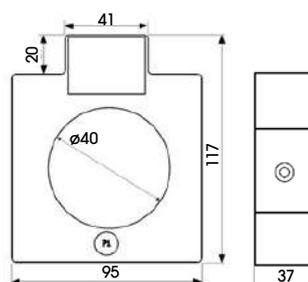
### General features

Resin encapsulated transformer, 150% extended range with built-in cable:  
 - 6 metres (2x1,5mm<sup>2</sup> or 2x2,5mm<sup>2</sup>)  
 - 10 metres (2x2,5mm)

- **Secondary:** .../5A
- **Continuous overload:** 1,5x I<sub>n</sub>
- **Rated dynamic current:** 2,5x I<sub>th</sub>
- **Operating voltage:** 720 V AC
- **Insulation class:** A
- **Test voltage:** 3kV, 1 min.
- **Protection degree:** IP65
- **Rated short-circuit thermal withstand current:** 60 x I<sub>n</sub>
- **Resin encapsulated**

Passing cable/busbar			
Model	TU60PRI		
Cable	Ø62 mm		
Accuracy class	0,5s	0,2	0,2s
I <sub>pn</sub>	VA		
250		2,5	
400	5		
600			5

### Dimensions



Dimensions in mm

# TRANSFORMERS

## TU40RGI Low voltage advanced monitoring

### Measuring transformers



#### General features

Current transformer for advanced low voltage monitoring. Supplied with embedded cable with a length of 2, 3, 5 or 10 metres, with a 2-wire cable of 2.5mm<sup>2</sup> cross-section.

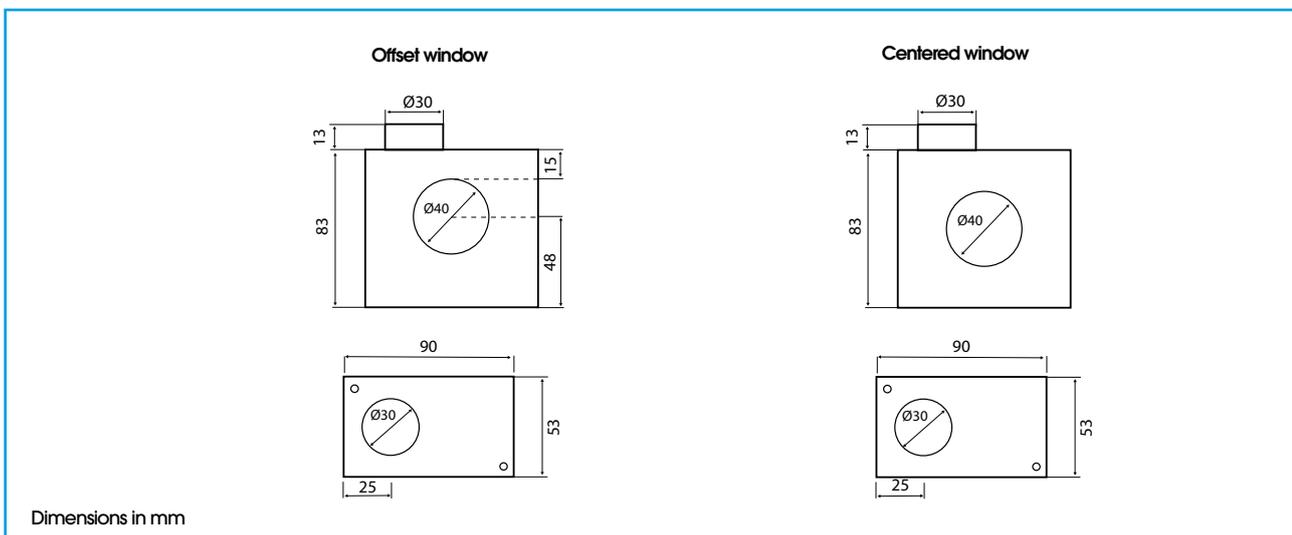
Measurement of neutral or protective earth current.

- **Secondary:** .../1A
- **Rated current:** 0,4%. Error less than 10%
- **Rated short-circuit thermal withstand current (I<sub>th</sub>):** 15kA, 1 seg.
- **Rated dynamic current:** 2,5 x I<sub>th</sub>
- **Resin-filled**

Passing cable/busbar				
Model	TU40RGI - Offset window			
Cable	Ø40 mm			
Accuracy class	0,5	1	0,2	0,5s
I <sub>pn</sub>	VA			
50		0,25		
80	2			
100	2,5			
125	2,5			2,5
150	5			
200	5			5
250			2,5	
300	10			

Passing cable/busbar	
Model	TU40RGI - Centered window
Cable	Ø40 mm
Accuracy class	0,5
I <sub>pn</sub>	VA
150	10
200	10
250	10
300	10
400	10
500	10
600	10

#### Dimensions



# TRANSFORMERS

## TU\_RV Low power transformers

Measuring transformers - Class 0,5s



### General features

Low power current transformers designed to be installed in low voltage or directly on insulated medium voltage cables.

- **Continuous overload:** 1,5x In
- **Short circuit current Ith:** 60 x In
- **Rated dynamic current:** 2,5x Ith
- **Operating voltage:** 720 V AC
- **Conection:** RJ45 connector
- **Permissible load:**  $\geq 10 \text{ k}\Omega$
- **Test voltage:** 3kV, 1 min.
- **Insulation class:** E
- **Protection degree:** IP65
- **Resin-filled**

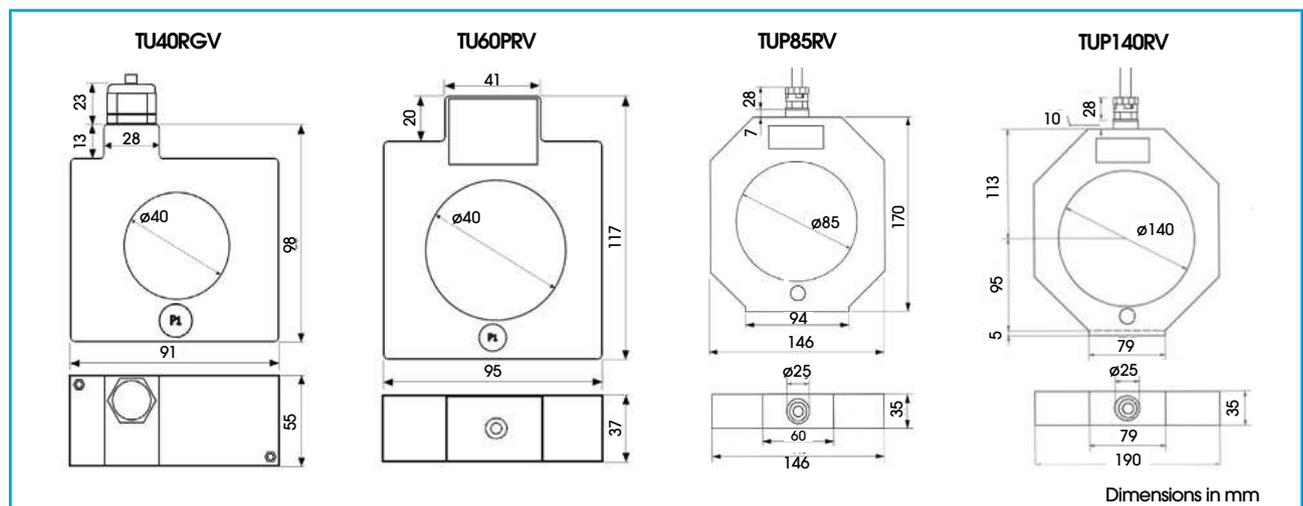
TU40RGV		Cable $\varnothing$ 40 mm						
In / A	300	400	500	600	750	800	1000	
Salida /mV	225							

TU60PRV		Cable $\varnothing$ 61 mm								
In / A	300	400	500	600	750	800	1000	1200	1500	1600
Salida /mV	225									

TUP85RV		Cable $\varnothing$ 85 mm								
In / A	400	500	600	750	800	1000	1200	1500	2000	
Salida /mV	225									

TUP140RV		Cable $\varnothing$ 140 mm								
In / A	500	600	750	800	1000	1200	1500	2000	2500	3000
Salida /mV	225									

### Dimensions



## TU40RGV Low power transformers

Measuring transformers - Class 0,2s



### General features

Low power current transformers designed to be installed directly on low voltage cables for advanced monitoring. Built-in cable.

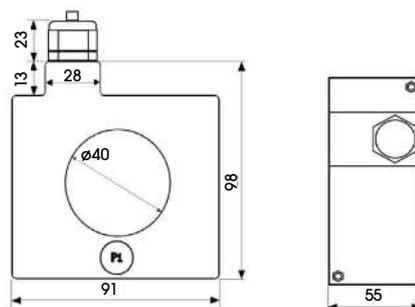
\*Measurement of neutral current.

- **Continuous overload:** 1,5x I<sub>n</sub>
- **Short circuit current I<sub>th</sub>:** 60 x I<sub>n</sub>
- **Rated dynamic current:** 2,5x I<sub>th</sub>
- **Operating voltage:** 720 V AC
- **Connection:** RJ45 connector
- **Permissible load:** ≥10 kΩ
- **Test voltage:** 3kV, 1 min.
- **Insulation class:** B
- **Protection degree:** IP65
- **Resin-filled**

TU40RGV		Cable Ø 40 mm
In / A		50
Output /mV		225

For other ratios, please consult us.

### Dimensions



Dimensions in mm

## TUP80RV Low power transformers

Measuring transformers - Class 0,2s



### General features

Low power current transformers designed for Smart Grid monitoring.

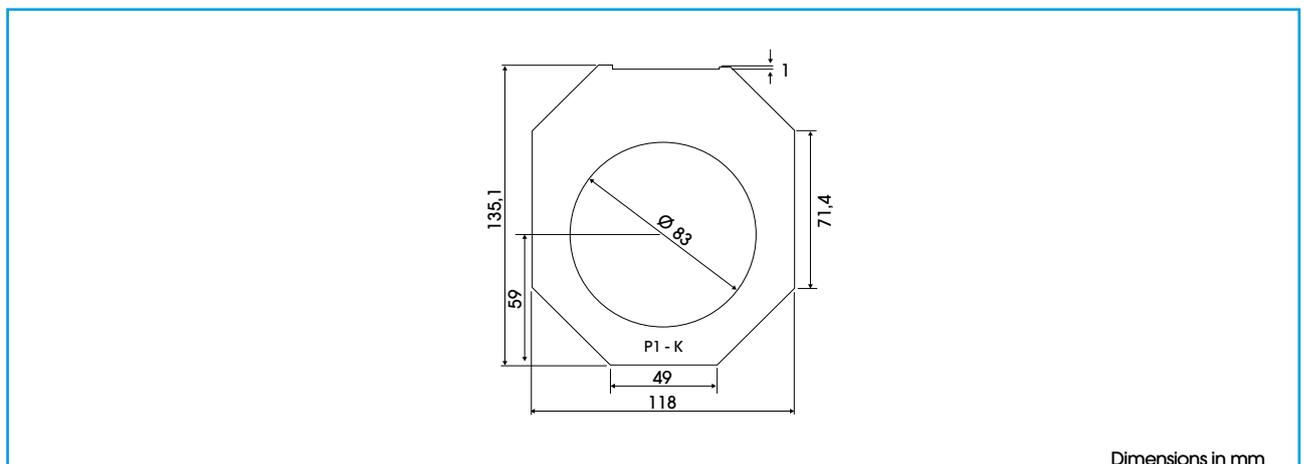
They are installed directly on the insulated medium voltage cables.

\*Mounting on the cover bus-bar.

- **Continuous overload:** 1,5x I<sub>n</sub>
- **Short circuit current I<sub>th</sub>:** 60 x I<sub>n</sub>
- **Rated dynamic current:** 2,5x I<sub>th</sub>
- **Operating voltage:** 720 V AC
- **Connection:** Connector RJ45
- **Permissible load:** ≥10 kΩ
- **Test current:** 3kV, 1 min.
- **Insulation class:** B
- **Protection degree:** IP65
- **Resin-filled**

TUP80RV	Cable Ø 83 mm			
	Built-in cable		RJ45 Terminal	
In / A	500	1000	500	1000
Output /mV	225			

### Dimensions



## TU\_CP Wound primary

Protection transformers



### General features

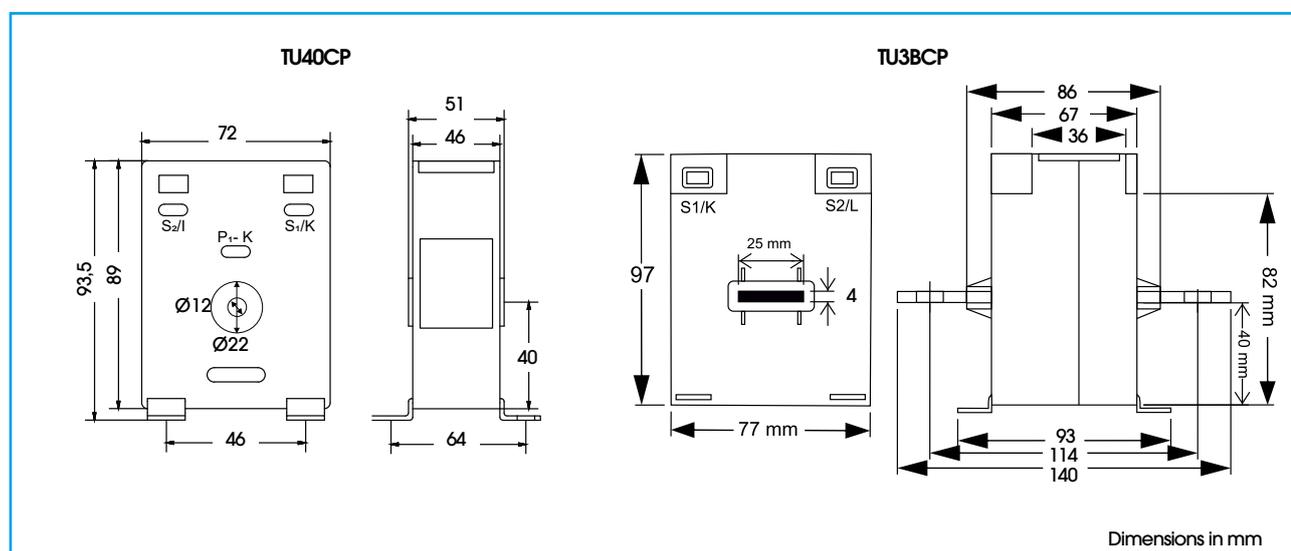
TU40CP wound-primary protection transformer featuring a screw terminal connection in horizontal configuration, suitable for low-current applications.

TU3BCP protection transformer featuring a horizontal bar primary, designed for direct cable or busbar connection in low-current applications.

- Secondary: .../5A  
.../1A
- Accuracy: 5P10 - 10P10
- Plastic casing
- Resin encapsulated option

Wound primary			
Model	TU3BCP		TU40CP
Bus-bar	4x25 mm		-
Accuracy class	5P10	10P10	5P15
l <sub>pn</sub>	VA		VA
50	3,5	3,5	
60	3,5	3,5	
75	3,5	3,5	
100	3,5	3,5	0,5
125	3,5	3,5	0,5
150	3,5	3,5	0,5
200			0,5
250			0,5
300			0,5
400			0,5
500			0,5
600			0,5

### Dimensions



## TU\_R Wound primary

Protection transformers



### General features

Protection transformers featuring a wound primary and a horizontal bar for cable or busbar connection, with a resin enclosure for increased robustness.

- **Secondary:** .../5A
- **Accuracy:** 5P10 - 10P10
- **Resin encapsulated**

Wound primary				
Model	TU3PR		TU50R	
	5P10	10P10	5P10	10P10
Accuracy class	VA		VA	
l <sub>pn</sub>				
50	10	10		
60	10	10		
75	10	10		
100	10	10		
125	10	10		
150	10	10		
200	10	10		
250	10	10		
300	10	10		
400	10	10		
500			7,5	7,5
600			7,5	7,5
750			10	12,5
800			10	12,5

### Dimensions

Fixing support

Model	Ratio	A	B	C	D	E	F	G	H	I
TU3PR	50/5 - 300/5	100	75	110	30	5	110	38	55	140
TU3PR	400/5 - 600/5	100	75	110	30	10	110	48	60	140
TU50R	500 - 800/5	100	75	100	50	10	135	48	50	175

Dimensions in mm

# TRANSFORMERS

## TUC\_Window-type

Protection transformers



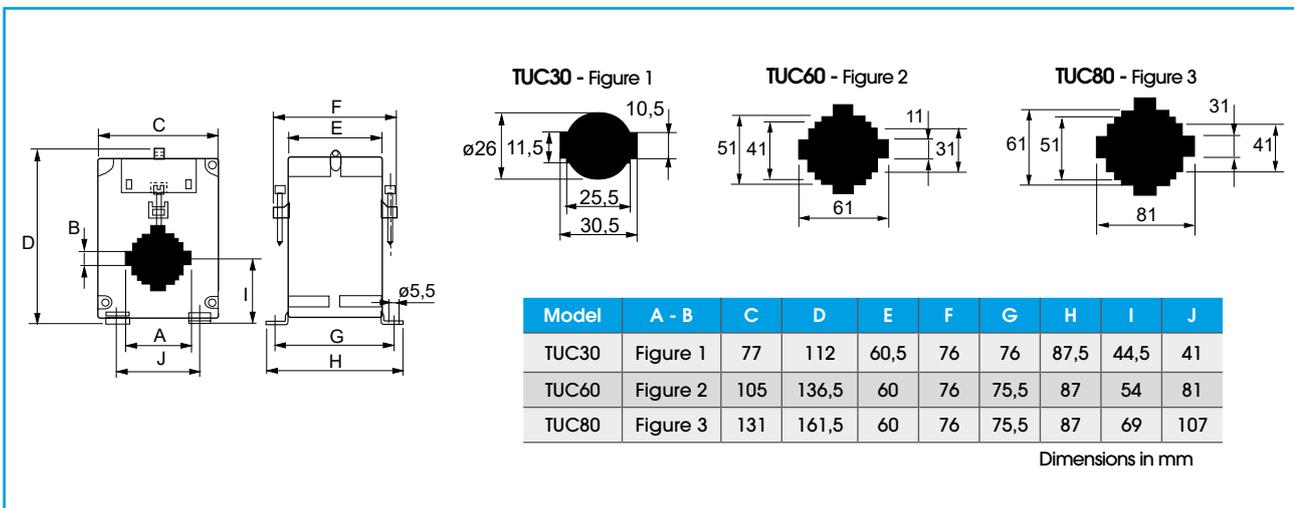
### General features

Protection transformer suitable for cable or busbar, with a wider profile and increased secondary burden capacity at low currents.

- **Secondary:** .../5A
- **Accuracy :** 5P10 - 10P10
- **Plastic casing**

Passing cable/busbar						
Model	TUC30		TUC60		TUC80	
Bus-bar	30x10mm		60x10mm		80x30mm	
Cable	Ø25mm		Ø51mm		Ø65mm	
Accuracy class	5P10	10P10	5P10	10P10	5P10	10P10
l <sub>pn</sub>	VA		VA		VA	
200	2,5	5	3,5	3,5	3,5	3,5
250	5	5	3,5	3,5	3,5	3,5
300	5	7,5	5	5	5	5
400			5	5	5	5
500			5	7,5	5	7,5
600			7,5	10	7,5	10
750			7,5	10	7,5	10
800			10	10	10	10
1000			10	10	10	10
1200			10	10	10	10
1500			10	12,5	10	12,5
2000			10	12,5	10	12,5
2500					10	12,5

### Dimensions



## TL\_ Window-type

Protection transformers



### General features

Protection transformer suitable for cable or busbar, with a wider profile and enhanced accuracy at high currents.

- **Secondary:** .../5A
- **Accuracy :** 5P10 - 10P10
- **Plastic casing**

Passing cable/busbar						
Model	TL2		TL3		TL4	
Bus-bar	100 x 20 mm		100 x 30 mm		100 x 60 mm	
Cable	Ø20 mm		Ø30 mm		Ø60 mm	
Accuracy class	5P10	10P10	5P10	10P10	5P10	10P10
I <sub>pn</sub>	VA		VA		VA	
2000	5	7,5	7,5			
2500	5	7,5	7,5	10	2,5	
3000			7,5	10	5	7,5
4000					7,5	10
5000					7,5	10

### Dimensions

Model	A	B	C	D	E	F
TL2	102	20	94	178	38	66
TL3	103	32	114	210	45	71
TL4	104	62	156	224	50	78

Dimensions in mm

## TUP\_R Window-type

Protection transformers



### General features

Through-type primary transformer for busbars, resin-encapsulated, suitable for high currents and high secondary burden capacity.

- **Secondary:** .../5A
- **Accuracy:** 5P10, 5P10
- **Resin encapsulated**

Passing cable/busbar									
Model	TUP20RC		TUP20R		TUP60R		TUP95R		
Bus-bar	80 x 20 mm		100 x 20 mm		100 x 60 mm		100 x 95 mm		
Cable	Ø20 mm		Ø20 mm		Ø60 mm		Ø95 mm		
Accuracy class	5P10	10P10	5P10	10P10	5P10	10P10	5P10	10P10	
I <sub>pn</sub>	VA		VA		VA		VA		
500	3,5	5							
600	3,5	5		10					
750	3,5	5	7,5	10					
800	3,5	5	7,5	10					
1000	5	5	12,5	15	12,5	15			
1200			15	15	15	15			
1500			15	20	15	20			
2000			15	20	15	20			
2500					15	20	15		
3000					20	30	15	20	
4000							20	30	
5000							20	30	

For other ratios, please consult us.

### Dimensions

**TUP20RC**

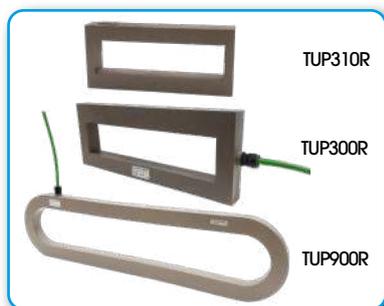
**TUP\_R**

Model	A	B	C	D	E	F	G
TUP20R	105	20	95	160	60	80	60
TUP60R	105	60	150	193	60	80	60
TUP95R	105	95	200	200	60	80	60

Dimensions in mm

## TUP\_R Window-type. Specialities

Protection transformers / zero-sequence (homopolar) transformers



### General features

Zero-sequence (homopolar) transformers feature a low transformation ratio and high sensitivity.

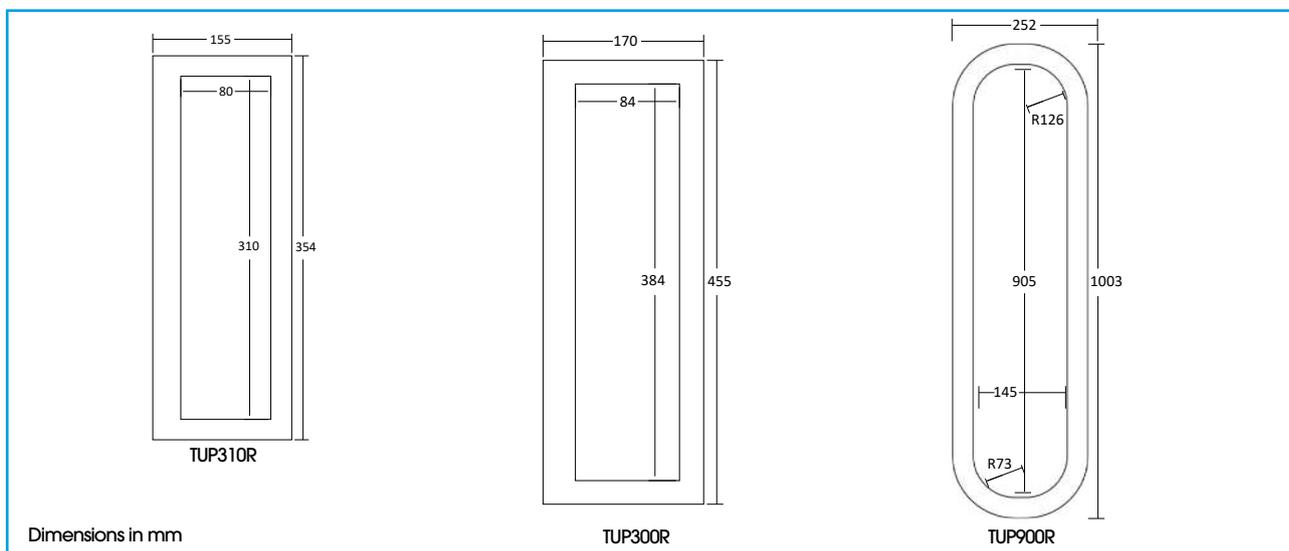
These characteristics, together with their large physical dimensions, allow all three phase conductors to pass through the transformer core in order to detect current imbalances (or earth leakage currents when the neutral conductor is also included).

- **Secondary:** .../5A
- **Accuracy:** 5P10
- **Resin encapsulated**

Passing cable/busbar			
Model	TUP300R	TUP310R	TUP900R
Bus-bar	308x 78 mm	380 x 82 mm	900 x 142 mm
Accuracy class	5P10	5P10	5P10
I <sub>pn</sub>	VA	VA	VA
60	0,25	0,25	0,25

For other ratios, please consult us.

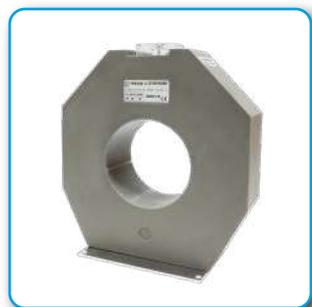
### Dimensions



# TRANSFORMERS

## TPR\_ Window-type

Protection transformers



### General features

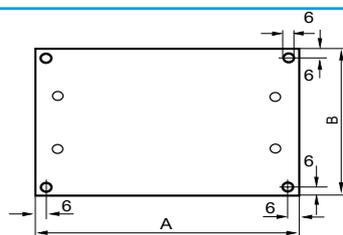
Transformer with a through-type busbar primary, suitable for cable or busbar installation.

Resin enclosure. Maintains accuracy at high power levels.

- **Secondary:** .../5A
- **Accuracy:** 5P10, 5P20
- **Resin encapsulated**
- **With built-in cable option**
- **TPR80-1/TPR125-1 customized Px models. Please consult us.**

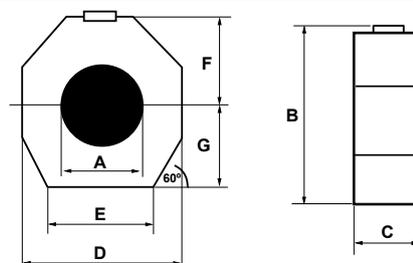
Passing cable								
Model	TPR60		TPR80		TPR100		TPR125	
Cable	Ø60 mm		Ø80 mm		Ø100 mm		Ø125 mm	
Accuracy class	5P10	5P20	5P10	5P20	5P10	5P20	5P10	5P20
I <sub>pn</sub>	VA		VA		VA		VA	
100	10	5						
150	15	7						
200	20	10						
250	25	12	12	5				
300	30	15	15	7				
400	40	20	22	10				
500	50	25	30	12	15	7		
600	60	30	35	15	15	8		
750	75	38	45	18	20	10		
800	80	40	48	20	25	12		
1000	100	50	48	20	30	15	20	10
1200			48	22	30	17	30	15
1500			73	28	40	20	30	15
2000			97	35	60	30	30	15
2500			35		65	35	40	20
3000					65	35	40	20
4000					80	45	50	25
5000					120	70	70	35

### Dimensions



Fixing support

Model	A	B
TPR60	124	120
TPR80 / TPR80-1	136	100
TPR100	150	100
TPR125 / TPR125-1	166	100



Model	A	B	C	D	E	F	G
TPR60	60	211	80	185	124	110	93
TPR80	80	231	60	205	136	120	103
TPR80-1	80	276	95	250	166	143	125
TPR100	100	251	60	225	150	130	113
TPR125	125	276	60	250	166	143	125
TPR125-1	125	276	95	250	166	143	125

Dimensions in mm

## TPR\_B Window-type

Protection transformers



### General features

Transformer with a through-type primary, specially designed for busbar applications due to its cross-shaped window.

Resin-encapsulated enclosure, designed to maintain accuracy at high power levels.

- **Secondary:** .../5A
- **Accuracy:** 5P10, 5P20
- **Resin encapsulated**
- **With built-in cable option**

Passing cable/busbar						
Model	TPR80B		TPR100B		TPR125B	
Busbar	50x50 mm		105x45 mm		122x52 mm	
Cable	Ø50 mm		Ø45 mm		Ø52 mm	
Accuracy class	5P10	5P20	5P10	5P20	5P10	5P20
I <sub>pn</sub>	VA		VA		VA	
250	12	5				
300	15	7				
400	22	10				
500	30	12	15	7		
600	35	15	15	8		
750	45	18	20	10		
800	48	20	25	12		
1000	48	20	30	15	20	10
1200	48	22	30	17	30	15
1500	73	28	40	20	30	15
2000	97	35	60	30	30	15
2500	35		65	35	40	20
3000			65	35	40	20
4000			80	45	50	25
5000			120	70	70	35

### Dimensions

Fixing support

Model	A	B
TPR80B	136	100
TPR100B	150	100
TPR125B	166	100

TPR80B

TPR100B - TPR125B

Model	H	A	B	C	D	E	F	G
TPR80B	50	50	231	60	205	136	120	103
TPR100B	45	105	251	60	225	150	130	113
TPR125B	52	122	276	60	250	166	143	125

Dimensions in mm

## TUP80R Window-type. Specialities

Protection and measuring transformers



### General features

Resin-encapsulated measuring current transformer with universal mounting holes for installation in enclosures.

- **Secondary:** .../1A
- **Accuracy:** 0,2s - 0,5s - 5P10
- **Resin encapsulated**

Passing cable			
Model	TUP80R		TUP80R
Cable	Ø 78 mm		Ø 78 mm
Accuracy class	0,2s	0,5s	5P10
Ipn	VA		VA
200		0,5	0,5
500		0,5	0,5
1000	0,5		0,5

For other ratios, please consult us.

## TUP105R Window-type. Specialities

Protection and measuring transformers

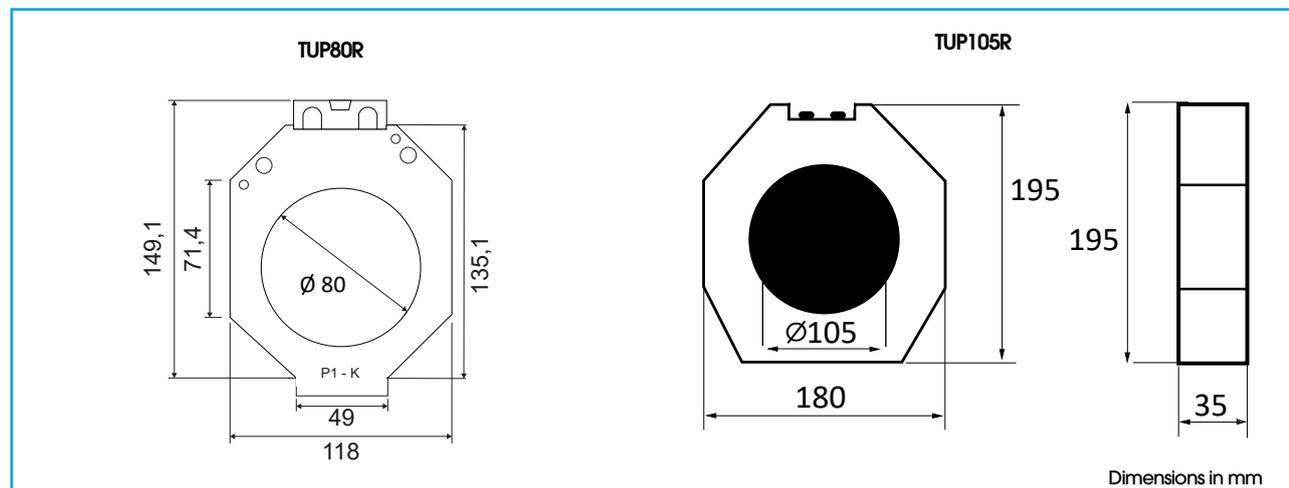


### General features

Custom protection or measurement transformer offering multiple primary and secondary configurations and accuracy classes.

- **Primary:** 400-2500A
- **Secondary:** .../5A  
.../1A
- **Accuracy class:** 0,5 - 0,2s - 5P20 - 5P10
- **Resin encapsulated**

### Dimensions



## TUP\_R Window-type. Specialities

Protection and measuring transformers



### General features

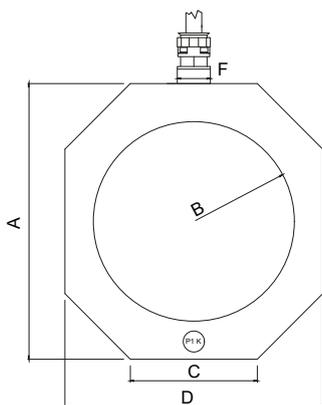
Protection transformer with an embedded two-core 2.5 mm<sup>2</sup> cable, available in lengths of 2, 3, 5, or 10 m.

- **Secondary:** .../1A
- **Accuracy:** 5P10
- **Resin encapsulated**

Passing cable				
Model	TUP85R		TUP140R	TUP150R
Cable	Ø85mm		Ø138 mm	Ø150 mm
Accuracy class	5P10	5P20	5P10	5P20
I <sub>pn</sub>	VA		VA	VA
60			0,25	
100		0,5		
200		0,5		
250	5			
400		0,5		
500				0,5
600	5			

For other ratios, please consult us.

### Dimensions



Model	A	C	D	E	F	G
TUP85R	170	Ø85	94	146	35	Ø25
TUP140R	213	Ø140	79	190	35	Ø25
TUP150R	210	Ø150	96	195	30	Ø25

Dimensions in mm

# TRANSFORMERS

## TC\_Transformers with built-in measuring transducer



Window-type measuring transformers



### General features

Current transformer featuring an integrated AC-to-DC current measurement converter.

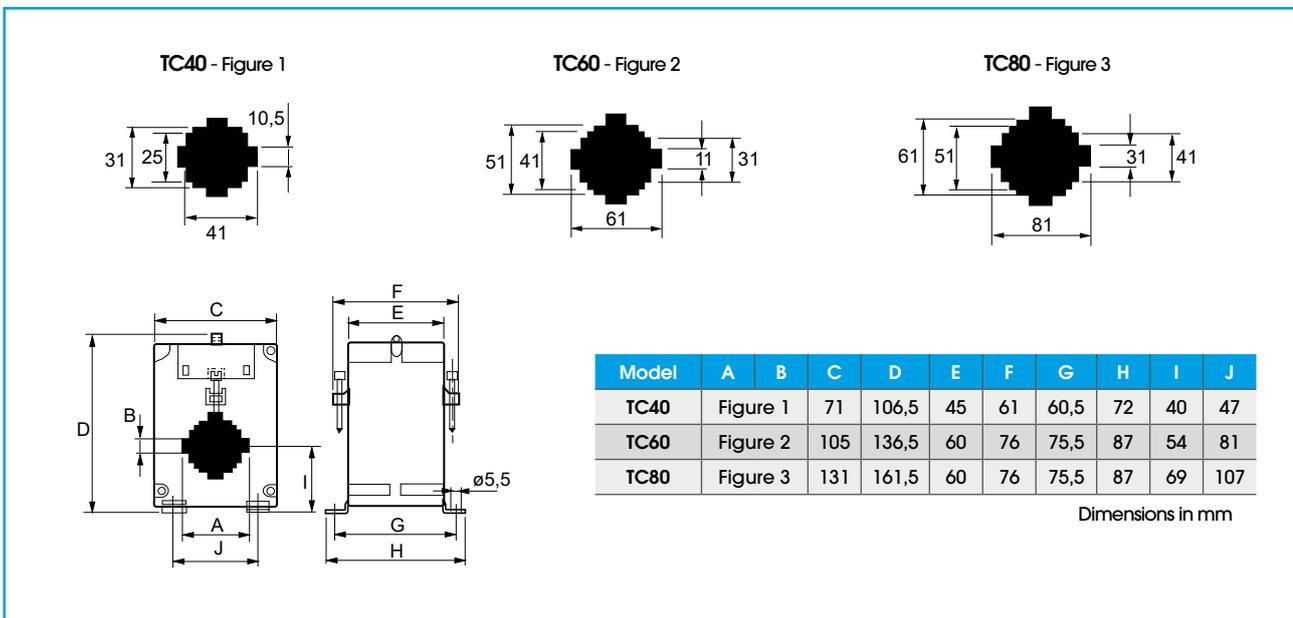
- **Output:** 20 mA DC
- **Class:** 0,5
- **Operating margin:** 10-120%
- **Plastic casing**
- **Frequency:** 50-60 Hz
- **Response time:** <200ms
- **Maximum load impedance:** 600 Ω

TC40	Bus-bar 40 x 10 mm or cable Ø 32 mm
In / A	50 - 60 - 75 - 100 - 125 - 200 - 250 - 300 - 400
Output / mA	20 mA

TC60	Bus-bar 60 x 10 mm or cable Ø 51 mm
In / A	400 - 500 - 600 - 750 - 800 - 1000 - 1200 - 1500 - 2000
Output / mA	20 mA

TC80	Bus-bar 80 x 30 mm or cable Ø 65 mm
In / A	400 - 500 - 600 - 750 - 800 - 1000 - 1200 - 1500 - 2000 - 2500
Output / mA	20 mA

### Dimensions



# TRANSFORMERS

## TC\_CV Transformers with built-in measuring transducer



Window-type measuring transformers



### General features

Current transformer with integrated transducer and switch selectable transformer ratio.

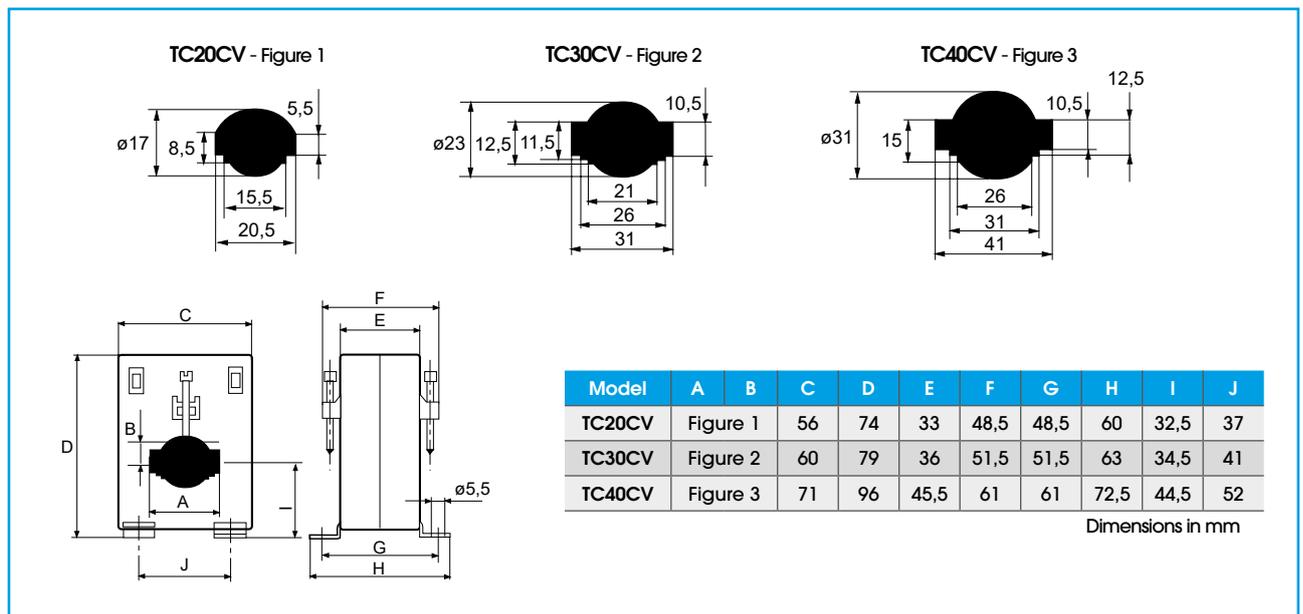
- **Output:** 4 - 20 mA DC
- **Class:** 1
- **Operating margin:** 10-120%
- **Plastic casing**
- **Frequency:** 50-60 Hz
- **Auxiliary voltage:** 10-40 V DC
- **Maximum load impedance:** 600  $\Omega$

TC20CV		Bus-bar 20 x 5 mm or cable $\varnothing$ 16 mm		
In / A	10 - 12,5 - 15 - 20	20 - 25 - 30 - 40	50 - 60 - 75 - 100	125 - 150 - 200 - 250
Output / mA	4 - 20 mA			

TC30CV		Bus-bar 30 x 10 mm or cable $\varnothing$ 22 mm		
In / A	20 - 25 - 30 - 40	50 - 60 - 75 - 100	125 - 150 - 200 - 250	300 - 400 - 500 - 600
Output / mA	4 - 20 mA			

TC40CV		Bus-bar 40 x 10 mm or cable $\varnothing$ 30 mm		
In / A	50 - 60 - 75 - 100	125 - 150 - 200 - 250	300 - 400 - 500 - 600	
Output / mA	4 - 20 mA			

### Dimensions



## TS\_ Summation transformers

Measuring transformers



### General features

Equipment designed to provide, at a single current output, the value of multiple load circuits. It facilitates measurement and monitoring of the installation when it is not possible to install measuring transformers at the main incoming point. Housed in a plastic enclosure.

- **Class:** 0,5 - 10VA
- **Plastic casing**

TS-		TS2	TS3	TS4	TS5
N° of sums		2	3	4	5
In/A		5 + 5 / 5	5 + 5 + 5 / 5	5 + 5 + 5 + 5 / 5	5 + 5 + 5 + 5 + 5 / 5
Class 0,5	VA	10	10	10	10

Other specialities on request, consult us.

## TRS\_ Summation transformers

Measuring transformers



### General features

Equipment designed to provide, at a single current output, the value of multiple load circuits. It facilitates measurement and monitoring of the installation when it is not possible to install measuring transformers at the main incoming point. Housed in a resin enclosure.

- **Class:** 0,5 - 10VA
- **Resin encapsulated**

TRS-		TRS2	TRS3	TRS4	TRS5
N° of sums		2	3	4	5
In/A		5 + 5 / 5	5 + 5 + 5 / 5	5 + 5 + 5 + 5 / 5	5 + 5 + 5 + 5 + 5 / 5
Class 0,5	VA	10	10	10	10

Other specialities on request, consult us.

### Dimensions

**TS2 / TS3**

**TS4 / TS5**

**TRS\_**

Model	A	B	C
TRS2	100	119	135
TRS3	100	119	135
TRS4	150	169	185
TRS5	150	169	185

Dimensions in mm

## TE108 Voltage transformers

Measuring transformers



### General features

Transformer designed to operate with an insulation voltage of up to 6 kV. This model, classified in accuracy class 0.5, can withstand primary voltages of up to 1000 V and secondary voltages of 100, 110, 230 and 400 V.

- **High insulation voltage:** 6kV
- **Class:** 0.2 - 0.5
- **Primary voltage:** Up to 1000 V
- **Secondary voltage:** 100 / 110 / 230 / 400 V
- **Measuring range:** 80-120% V<sub>pn</sub>
- **Load:** 25 - 100% (cosine φ = 0.8)

TE108		
V <sub>p</sub>		From 600 to 1000 V
Class 0,5	VA	10

Other ratios on request.

## TE15\_ Voltage transformers

Measuring transformers



### General features

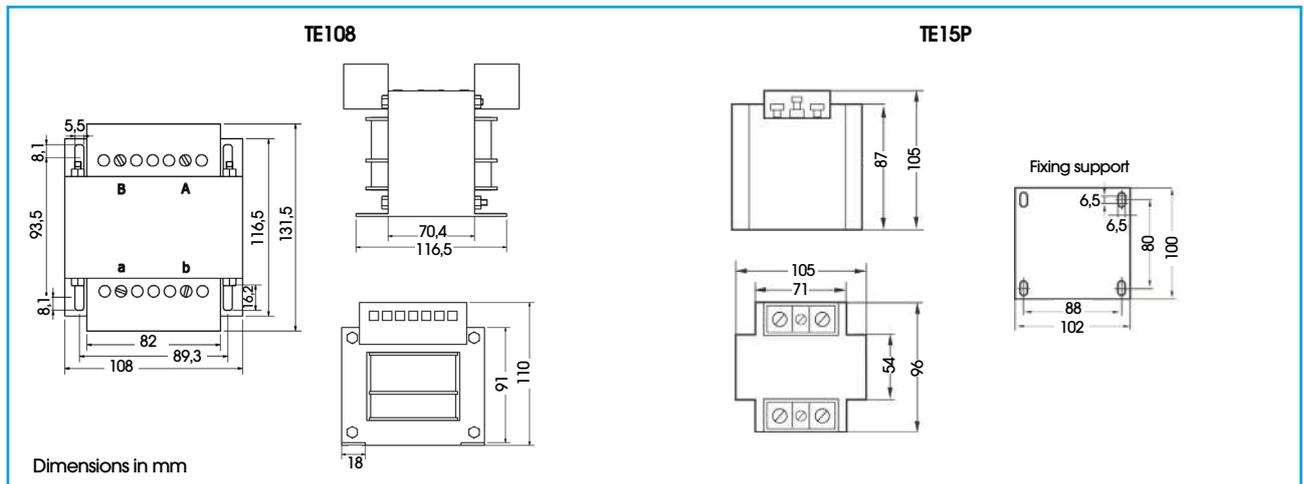
Resin-encapsulated voltage transformers with an insulation rating of up to 3 kV. They can withstand primary voltages of up to 720 V and secondary voltages of 100 V, 110 V, and 230 V.

- **Insulation voltage:** 3kV
- **Class:** 0.5 - 1
- **Primary voltage:** Up to 720V
- **Secondary voltage:** 100 / 110 / 230V
- **Measuring range:** 80-120% V<sub>pn</sub>
- **Load:** 25 - 100% (cosine φ = 0.8)
- **Plastic housing**
- **Resin encapsulation option**

TE15P								
V <sub>p</sub> /V <sub>s</sub>		230 / 110	400 / 100	400 / 110	400 / 230	440 / 110	440 / 100	440 / 230
Class 0,5	VA	10	10	10	10	10	10	10
Class 1	VA	25	25	25	25	25	25	25

Other ratios on request.

### Dimensions



# TRANSFORMERS

## TE150 Voltage transformers

Measuring transformers



### General features

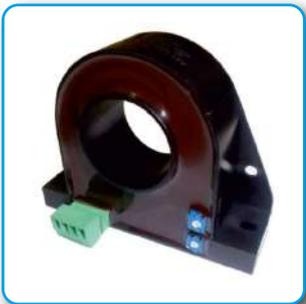
Dual-secondary voltage transformer engineered for metering and protection applications.

- **Insulation voltage:** Up to 6kV
- **Accuracy class:** 0,2 - 0,5
- **Frequency:** 50 - 60 Hz
- **Measuring range:** 80-120% V<sub>pn</sub>
- **Load:** 25 - 100% (coseno φ = 0,8)
- **Weight:** 11,6 kg

TE150	Primary voltage	Secondary voltage	Power	Accuracy class
Secondary I	800 √3 V	100 √3 V	7,5 VA	Cl 0,2
Secondary II	800 √3 V	100 √3 V	5 VA	Cl 0,5

## TEH-132 Window-type

Hall effect sensor



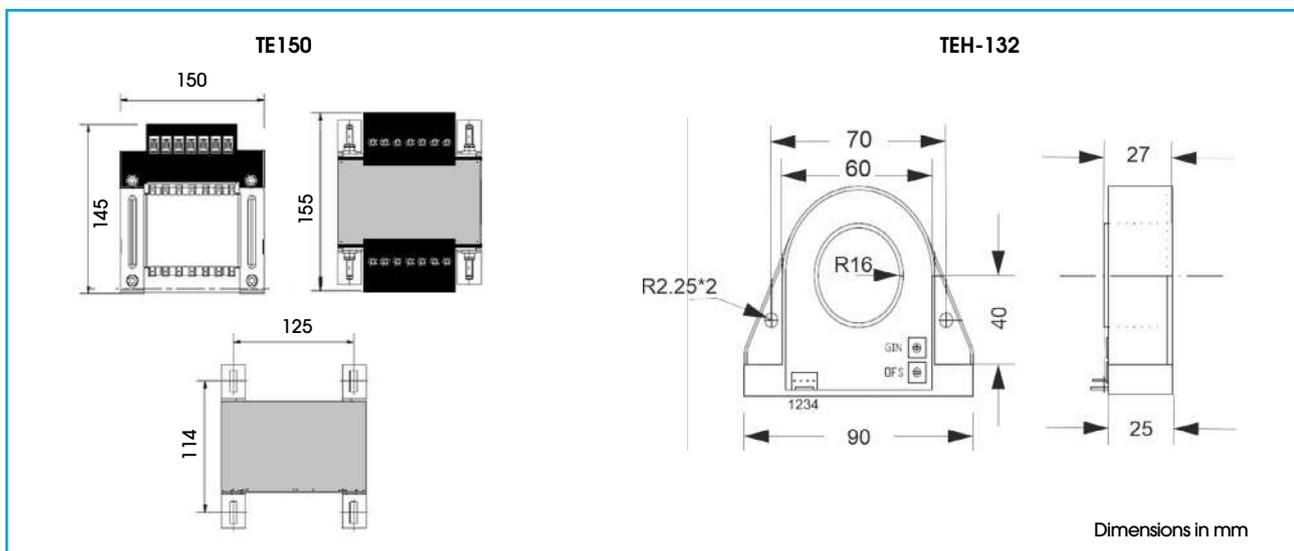
### General features

Enables non-contact current measurement, providing galvanic isolation and the capability to measure direct current (DC).

- **Power supply voltage:** ±12V ÷ ±15V DC (±5%)
- **Load resistance:** >1 kΩ
- **Output voltage (analogue):** ± 4 V
- **Accuracy:** ± 0.5 % CC // ± 1 % AC
- **Linearity error:** ± 0.5 %
- **Offset voltage:** <± 10 mV
- **V<sub>oe</sub> thermal shunt:** <± 1mV / °C
- **V<sub>out</sub> thermal derivative** ± 0.05% / °C
- **Response time:** < 3 μs
- **Insulation voltage:** 5 kV
- **Isolation resistance:** >500 MΩ
- **Current consumption:** < 20 mA

TEH - 132	Cable Ø 32 mm						
I <sub>pn</sub> (A)	100	200	300	400	500	600	1000
Range	±300	±600	±900	±1100	±1200	±1300	±1500

### Dimensions



## RC Rogowski Coil

Measuring transformers



### General features

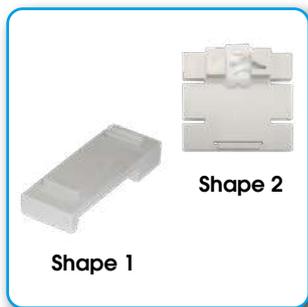
Passive current coil compatible with SACI AHM1 and AHM3 devices. Magnetic closure.

- **Output voltage:** 100uV/A
- **Frequency range:** 50 / 60 Hz
- **Accuracy class:** 0,5
- **Sensor Cable Diameter:**  $\varnothing$  8mm
- **Output cable length:** 2m
- **Linearity:**  $\pm$  0.2%
- **Max. temperature coefficient:**  $\pm$  0.05%
- **Position sensitivity (cable joint):**  $\pm$  3%
- **External fields:**  $\pm$  2%
- **Conector:** RJ12

Passing cable/busbar			
Model	RC-70	RC-120	RC-200
Diameter $\varnothing$ (mm)	70	120	200

## DIN rail bracket

Accessories for transformers



### General features

Accessories for mounting transformers on DIN rails. The ranges of transformers specified have the capacity to incorporate the support.

For other models please contact us.

#### Shape 1

- TU\_PS Window-type, narrow profile
- TA\_P split core transformers

#### Shape 2

- TU\_ Window-type
- TUC\_ Window-type
- TC\_ Transformers with built-in measuring transducer
- TC\_CV Transformers with built-in measuring transducer

### Dimensions

Shape 2	A	B	C
TU20	56	56	36
TU30	56	60,5	36
TU40	56	60,5	36
TUC30	64	66,5	35
TUC40	56	60,5	36
TUC60	64	95	38
TUC80	64	120	38
TC40	56	60,5	36
TC60	64	95	38
TC80	64	120	38
TC20CV	56	56	36
TC30CV	56	60,5	36
TC40V	56	60,5	36

# GENERAL TERMS AND SALES CONDITIONS

## GENERAL CONDITIONS OF SALE AND WARRANTY CONDICIONES GENERALES DE VENTA Y GARANTÍA

This document on Conditions of Sale and Guarantee will apply to all orders placed to S.A de Construcciones Industriales (SACI), and entails the client's acceptance of all the clauses detailed below.

El presente documento sobre Condiciones de Venta y Garantía será de aplicación a todos los pedidos realizados a S.A de Construcciones Industriales (SACI), e implica la aceptación del cliente de todas las cláusulas aquí referidas.

### Intellectual and industrial property Propiedad intelectual e industrial

The intellectual and industrial property of each offer, along with the additional inShapetion supplied (plans, drawings, software, etc.) belongs to SACI, so its use by the buyer for any purpose other than completion of the order.

It is forbidden total or partial copying or transfer of use to third parties without the prior written consent of the seller is prohibited.

La propiedad intelectual e industrial de cada oferta, junto con la inShapetion adicional a la misma (planos, dibujos, software, etc.) pertenece a SACI, por lo que queda prohibido la utilización por parte del Comprador para cualquier fin que no sea la cumplimentación del pedido.

Queda prohibido la copia total o parcial o cesión de uso a terceros sin el consentimiento previo y por escrito del Vendedor.

### Property reservation Reserva de propiedad

SACI reserves the right of ownership of all materials supplied until payment has been fully fulfilled.

SACI se reserva el derecho de propiedad de todos los materiales suministrados hasta el cumplimiento íntegro del pago de los mismos.

### Public prices Precios y alcance de las ofertas

Public prices are those that are shown in this tariff. The prices indicated in this tariff are valid except errors or omissions. SACI reserves the right to modify prices, alter or delete them.

Los precios públicos de venta son los que Figuren en nuestra tarifa. Los precios indicados en dicha tarifa son válidos salvo error u omisión. SACI se reserva el derecho a modificar precios, alterarlos o suprimirlos.

### Billing and Payment Conditions Condiciones de Facturación y Pago

Invoices will be issued prior to the shipment of each order.

The term and method of payment will be agreed with each client in their own billing and payment conditions

Las facturas se emitirán en los términos y plazos establecidos en el artículo 6 y 11 del Real Decreto 1619/2012, de 30 de noviembre.

El plazo y Shape de pago se acordará con cada cliente.

### Shipping conditions Portes

The general conditions of transport are EXW Madrid; At the customer's request, transport cost can be quoted in each particular case and added to the invoice.

Some customers have particular transport conditions agreed.

Las condiciones generales de transporte son EXW Madrid; a solicitud del cliente, se puede cotizar el precio de transporte en cada caso y añadirlo en factura.

Algunos clientes tienen condiciones de transporte particulares acordadas.

### Manufacturer's guarantee. Material returns Garantía del fabricante. Devoluciones de material

Repair or replacement of defective materials will be carried out free of charge during the warranty period. Our products are guaranteed for a period of three years from the invoice date, according to Law 4/2023 of March 22, except for those references that may have a longer warranty period, previously agreed in a special offer.

SACI will not accept the return of material that shows that have been improperly manipulated or assembled, or those that have been specifically adapted for an order without an objective and significant reason

In the case of specially manufactured devices, returns won't be accepted.

SACI's guarantee, where applicable, will be limited to the free delivery of a new product that replaces the damaged one.

There is no liability for damages, expenses, charges or compensation.

Damage or defects due to normal use of the equipment are excluded from the warranty.

In addition, damages and defects caused by inadequate conservation or maintenance, incorrect or negligent storage or handling, abusive use, defective assemblies, variations in the quality of the electrical supply, modifications introduced in the supply without approval of the seller and, in general any reason that is not attributable to the seller, are excluded from the warranty.

The limitation of liability set forth in this clause shall prevail over any other provision contained in any other contractual document that is contradictory or inconsistent with it, unless such provision further limits the Seller's liability.

La reparación o reposición de materiales defectuosos se realizará sin cargo durante el período de garantía. Nuestros productos están garantizados por el plazo de tres años a partir de la fecha de venta, según Ley 4/2023 del 22 de marzo salvo en aquellas referencias que pudieran tener más período de garantía. Estos productos se especificarán de Shape particular.

No se admitirán a devolución materiales que tengan signos de haber sido manipulados indebidamente o montados en equipos e instalaciones, o aquellos que hayan sido adaptados específicamente para un pedido sin que concurra una razón objetiva y razonada.

En el caso de equipos de fabricación especial no se admiten devoluciones.

# GENERAL TERMS AND SALES CONDITIONS

La garantía de SACI, en los casos que resulte exigible, se limitará a la entrega gratuita de un producto nuevo que sustituye al averiado. No cabe responsabilidad por daños y perjuicios, o gastos, cargos o indemnizaciones.

Quedan excluidos de la garantía los daños o defectos debidos al desgaste normal por utilización de los equipos. Además, quedan excluidos de la garantía, la cual se considerará asimismo caducada, los daños y defectos originados por conservación o mantenimiento inadecuados, almacenamiento o manejo erróneo o negligente, uso abusivo, montajes defectuosos, variaciones en la calidad del Suministro eléctrico, modificaciones introducidas en el Suministro sin aprobación del Vendedor y en general cualquier causa que no sea imputable al Vendedor.

La limitación de responsabilidad contenida en la presente cláusula prevalecerá sobre cualquier otra contenida en cualquier otro documento contractual que sea contradictoria o incongruente con la misma, salvo que tal previsión restrinja en mayor medida la responsabilidad del Vendedor.

## Claims and Liability

### Reclamaciones y Responsabilidades

All products referenced in SACI catalogues comply with current International Quality and Safety regulations. You can request all Declarations of Conformity and Quality Certifications for both the company and the products, to the commercial network or download them from our website [www.saci.es](http://www.saci.es)

SACI reserves the right to make changes to its catalogues without prior notice, in order to improve the operation and performance of the products, particularly in relation to the shape, shape, colour, dimensions or materials of the products, software, representations, descriptions and technical specifications presented in their catalogues and brochures.

Todos los productos referenciados en los catálogos de SACI cumplen con las vigentes normativas de Calidad y Seguridad a nivel internacional. Puede solicitar a la red comercial o bien a través del website [www.saci.es](http://www.saci.es) todas las Declaraciones de Conformidad y Certificaciones de Calidad tanto de empresa como de los productos.

SACI, se reserva el derecho a realizar modificaciones en sus catálogos sin previo aviso, a fin de mejorar el funcionamiento y rendimiento de los productos, en particular en relación al shape, la Shape, el color, las Dimensiones o materiales, de los productos, softwares, representaciones, descripciones y especificaciones técnicas presentadas en sus catálogos y folletos.

## Privacy

### Confidencialidad

The Parties must treat confidentially all documents, data, materials and information provided by one of them to the other and will not reveal them to any third party, nor use them for any purpose other than the fulfilment and development of the Supply, unless previously agreement between them by written

The above does not prevent the Seller from providing the name of the Buyer and the basic data of the Supply as part of its commercial references.

Las Partes deberán tratar confidencialmente todos los documentos, datos, materiales e información proporcionada por una de ellas a la otra y no revelarlos a ningún tercero, ni usarlo para ningún otro propósito distinto del cumplimiento y desarrollo del Suministro, a menos que conste previamente por escrito el consentimiento de la otra Parte.

Lo anterior no es obstáculo a que el Vendedor facilite el nombre del Comprador y los datos básicos del Suministro como parte de sus referencias comerciales.

## Jurisdiction

### Jurisdicción

These Conditions will be interpreted in accordance with Spanish laws.

The parties expressly renounce any other jurisdiction that may correspond to them and submit to the competence and jurisdiction of the Courts of Justice of Madrid.

Las presentes Condiciones se regirán e interpretarán conforme a las leyes españolas.

Las partes renuncian expresamente a cualquier otro fuero que pudiese corresponderles y se someten a la competencia y jurisdicción de los Juzgados y Tribunales de Madrid capital.





