Revalco®

Made in Italy

analogue measuring instruments

ANALOGUE INSTRUMENTS

HOUR METERS AND IMPULSE COUNTERS

SWITCHES

Electrical instruments are capable of measuring an electrical parameter, on the basis of their particular application or function as classified below:

- **Indicators** which give an immediate and continuous indication of the measured value
- **Recorders** which record the variation of input throughout time
- **Integrators** which integrate throughout time the input signal applied (KWh meters)

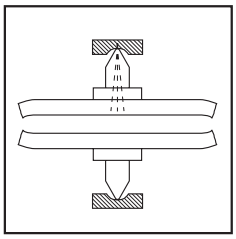
ANALOGUE INDICATING INSTRUMENTS

General characteristics

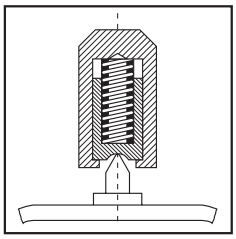
These instruments are produced having a pointer which moves over a graduated dial (scale) and assumes different positions according to the variation of the input signal being measured.

The scales of an instrument can be:
- The linear or uniform type, when the subdivisions are equally divided
- The quadratic type when the subdivision are grouped together at the beginning and are wide at the top, following a quadratic law
- Other types, some in accordance with mathematical laws (logarithmic, exponential etc...), others traced empirically

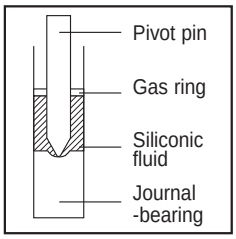
The moving components of an analogue electrical instrument is joined integrally to a rotating axle supported between two fixed brackets which ensure their free rotation. The brackets have a spherical seat with a greater radius than that of the pivots.



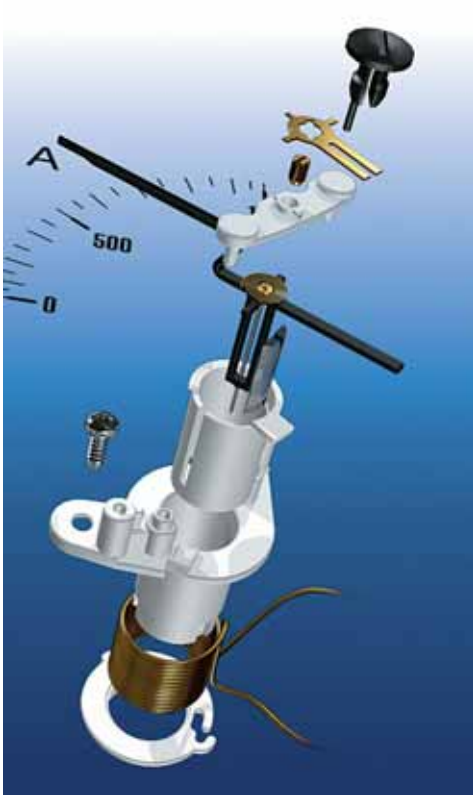
Revalco has adopted pivot suspension with external supports in hard stone which permits a minimum coefficient of wear. The axel is carried by the lower support while the upper one has the task of guiding.



In turn, the upper support has a seat provided with a spring so that it is possible to graduate and maintain throughout time the pressure exercised by the pivots, the spring also has the function of absorbing eventual impacts suffered by the instrument giving greater shock proof qualities.



To enable the pointer to reach the position in a linear and a smooth way, **Revalco** has adopted various methods of damping, causing the axel to move near to the lower support in a chamber containing a very viscous substance with a base of silicones. The vibration of the shaft and other moving parts are thus reduced and, by reducing the action developed by the viscous substance, it is possible to obtain the desired degree of damping which is maintained unaltered throughout.



General description of how the measuring instruments function

Moving iron instruments (AC)
With this type of instrument a fixed coil is magnetised which determines the clockwise movement, of a moving iron which is integrally joined to the pointer. The scale of these instruments is not linear but has a quadratic trend resulting from this type of mechanism.
Specific adjustments of the moving iron make it possible to achieve scales restricted at the bottom. With these instruments the movement is able to withstand peaks of substantial current.
Given the particular principle by which this system operates the instruments can function using either Alternating and Direct Currents, however, in the latter case there is an increase error of indication.

Moving coil instruments (DC)
With this type of instrument the magnetic field, generated by a permanently fixed magnet, acts on a moving coil energised by current and is integrally joined to the pointer, there by determining the clockwise movement of the latter.
This function results in a perfect linear scale.
These instruments function only with DC inputs as the direction in which the moving components rotate depends on the correct direction of the polarity (during connection it is therefore imperative not to invert the + and - cables).
The use of these instruments with alternating current is however possible by using a diode bridge rectifier. By operating in this way however, the instruments become very sensitive to the wave form, if not perfectly sinusoidal, and should therefore be used for measuring low values of voltage and current or if low burden is required.

Bimetal instruments
With these types of instruments the deforming of a bimetal element, heated directly or indirectly by the passing of a current, is transmitted to the equipment, integrally joined to the pointer. With these instruments the indicator drags, when moving, a second pointer (RED) which indicates the maximum value reached. The response time for signals from these instruments is generally eight or fifteen minutes so that short peaks of current are not indicated.
These instruments can also be combined with moving iron movements for instantaneous measuring of the current values.

SYMBOLS AND THEIR MEANINGS

Symbols of the main measuring units and their principal multiples and submultiples

Symbol	Specification
kA	kiloampere
A	ampere
mA	milliampere
µA	microampere
kV	kilovolt
V	volt
mV	millivolt
µV	microvolt
W	watt
MW	megawatt
KW	kilowatt
var	var
Mvar	megavar
kvar	kilovar
Hz	hertz
MHz	megahertz
kHz	kilohertz
Ω	ohm
MΩ	megaohm
KΩ	kiloohm
T	tesla
mT	millitesla
°C	Celsius

Symbols indicating the principle function of the instrument and accessory

Symbol	Specification
	Magnetoelectric instrument (with moving coil and permanent magnet)
	Instrument with moving iron
	Ferrodymanic instrument (electrodynamic with iron)
	Induction instrument
	Bimetal instrument
 (1)	Electronic device in the measuring circuit
	Electronic device in an auxiliary circuit
	Shunt for measuring instrument
 (2)	General accessory

If the (1) symbol is associated with the symbol of the instrument this means that the device is incorporated.
If the (1) symbol is associated with the (2) this means that the device is external.

Symbols indicating the characteristics of the instrument in relation to its connection with the network

Symbol	Specification
	Circuit with direct current
	Single-phase circuit with alternating current
	Single-phase direct and alternating current circuit
	Three-phase alternating current circuit (general symbol)
	Tree-phase alternating current circuit with unbalanced load (general symbol)
	A measuring element for 3 wire networks
	A measuring element for 4 wire networks
	Two measuring elements for 3 wire networks with unbalanced load
	Two measuring elemenrs for 4 wire networks with balanced load
	Three measuring elements for 4 wire networks with unbalanced load

Symbols for accuracy class

Symbol	Specification
1,5	Class indicator (eg. 1.5) with errors expressed in percentage of conventional value, except when the latter is as long as the graduation or the true value
	Class indicator (eg. 1.5) when the conventional value corresponds to the true value.
	Class indicator of an instrument with a non linear scale, contracted in the case where the conventional value is as long as the graduation and the indication of the error is expressed ad a percentage of the true value. (for example: class indicator 1: relative error limit of 5%) (par. 2.3.11.36)

Symbols indicating the working position

Symbol	Specification
	Instrument to use with the dial vertical
	Instrument to use with the dial horizontal
	Instrument to use with dial inclined (60° for example) in relation to the horizontal plane.

Symbols regarding safety

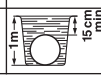
Symbol	Specification
	500V test voltage
	Test voltage of more than 500V (2kV for example)
	Instrument exempt from voltage test
	High voltage on the accessory and/or on the instrument

TABLE OF THE DEGREE OF PROTECTION

1st figure: protection agains solid bodies

IP	Tests	Specification
0		No protection
1		Protected against solid bodies of more than 50 mm (eg.: unintentional contact with a hand)
2		Protected against solid bodies of more than 12mm (eg.: a finger)
3		Protected against solid bodies of more than 2.5mm (tools, wires)
4		Protected against solid bodies of more than 1mm (fine tools, thin wires)
5		Protected against dust (no harmful deposit)
6		Totally protected against dust.

2nd figure: protection against liquids

IP	Tests	Specification
0		No protection
1		Protected against drops of water falling vertically (condensation)
2		Protected against drops of water falling at an angle of up to 15° from vertical
3		Protected against drops of water fall at an angle of up to 60° from vertical
4		Protected against jets of water from all directions
5		Protected against jets of water in all directions
6		Protected against water projections like sea waves
7		Protected against the effects of immersion

3rd figure : mechanical protection

IP	Tests	Specification
0		No protection
1		Impact energy: 0,225 joules
2		Impact energy: 0,375 joules
3		Impact energy: 0,500 joules
4		Impact energy: 2,00 joules
5		Impact energy: 6,00 joules
6		Impact energy: 20,000 joules

The first two characteristic figures are defined exactly in accordance with the UTE C 20 010 - IEC 144 and DIN 40 050 standards
The 3rd characteristic figure is defined by the French UTE C 20 010 standard. It is being studied internationally at the CEE - IEC.

QUALITY GUARANTEE

- The **Revalco** range of measuring instruments are manufactured in accordance with the standards directed by recognise a international organizations.

MEASURING CIRCUITS (CEI EN 61010-1:2001-11)

- Measuring instruments are subjected to WORKING VOLTAGES and transient stresses from the circuit to which they are connected during measurement. When the measuring circuit is used to measure MAINS, the transient stresses can be estimated by the location within the installation at which the measurement is performed. When the measuring circuit is used to measure any other electrical signal, the transient stresses must be considered by the user to assure that they do not exceed the capabilities of the measuring equipment.
- **Revalco** instruments belong to category III (CAT III - 600V AC et CAT III - 300V DC) considering the measures effected in internal houses (panel).
- The information concerned the measurement category and the RATED maximum NOMINAL WORKING VOLTAGE or RATED maximum NOMINAL CURRENT for such terminals,are putted near these terminals on a label.

GENERAL TECHNICAL CHARACTERISTICS

- ⚠ All the instruments present on this catalogue haven't internal fuses protection. It is a matter of specialised technician to consider their installation (if necessary) relating to the declared self-consumption

NORME

- The **Revalco** measuring instruments listed in this catalogue have been manufactured according to the following standards: CEI EN61010-1/CEI EN60051-1-2
- With regard to the dimensional characteristics of the instruments and shunts, reference is made to the DIN 43700/43718 standards.
- The most important among these standards are recalled in the following paragraphs relating to the electrical and mechanical characteristics of the instruments.

TEST VOLTAGE - INSULATION

- The instruments are tested according to CEI EN 61010-1 with an effective voltage of 2000V at 50Hz for 1 minute.
- Greater Test and Insulation voltages can be provided on request for certain types of instruments.

ACCURACY CLASS

- The accuracy class of the instruments is 1.5 unless otherwise specified, according to CEI EN 60688.
- Greater precision classes can be provided on request for certain types of instruments.
  The class of precision is given on the scale of each instrument.

OVERLOAD

- The current coils of all the instruments are capable of withstanding over loading of up to 10 times the nominal current value for periods of less than 1 second; and for up to 1,2 times the nominal value permanently.
- The voltage coils withstands a continuous over loading of up to 1,2 times the nominal voltage and an overloading of up to twice the nominal voltage for periods of less than 0,5 seconds (CEI EN 61010-1)
- For instruments with input by means of C.T., the overload can be greater as the transformer limits the peak of secondary current to values which are generally less than 10 In.
- The zerovoltmeters can withstand up to 4 times the full scale voltage for periods of less than 5 minutes.

OPERATING TEMPERATURE

- The instruments satisfy the requisites of the IEC standards, par. 8.7.1 for which the operating temperature is 20°C +/-10°C. They can however function in continuous service without deterrioration and with an acceptable error of class, with temperatures ranging between -10 °C and +55°C.

STORAGE TEMPERATURE

- The storage temperature should range from -40°C and +70°C. Temperatures which exceed the two limits can alter the chemical conditions of the siliconic fluid.

HUMIDITY

- The instruments are suitable for functioning with a maximum relative humidity of 85% without condensation, at a temperature of +35°C for a maximum of 60 days per year.
- The relative average annual humidity value should not exceed 65% (DIN 40040 standards).
- The instruments used in **tropicalized conditions** can exceed the above-mentioned values and function with a relative maximum humidity of 95% and at a temperature of +35°C. In this case the average annual value of relative humidity should no exceed 75%
- The instruments used in tropicalized conditions are made to the DIN 40040 standards, according to that, these type of instruments must be protected against the entry of humidity; furthermore all the connection terminals, screws, washers, bolts and magnets are galvanically protected against the rust and the printed circuits (if presents) are protected with a special varnish type "Multicolor PC52".

ENVIRONMENTAL CONDITIONS

- The equipments are designed to be safe at least under the following conditions:
  - indoor use
  - altitude up to 2000 m, or above 2000 m if specified by the manufacturer (see clause D.9 for further information on Standars EN61010-1)
  - temperature 0°C to 40°C
  - maximun relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C
  - mains supply voltage fluctuations not to exceed +/-10% of the nominal voltage -other supply voltage fluctuations as stated by the manufacturer
  - transient overvoltages according to installation categories (overvoltage categories) I, II and III (see Annex J on Standards EN61010-1).
    For mains supply the minimun and normal category is II
  - pollution degree 1 or 2 in accordance with IEC 664

RESISTANCE TO VIBRATION

- The instruments in the catalogue have passed resistance to vibration tests as established by the CEI 50-4 standards.

RESISTANCE TO SHOCK

- The instruments have passed shock resistance tests.

MOUNTING POSITION

- This series of instruments are made to function in a vertical position.Thanks to perfect balancing they can also be mounted horizontally.
- Please state mounting method when ordering.

FRONT HOUSING FRAME

- The front frame is narrow, according to been DIN 43718/s, and black in colour. The thermoplastic material has the same characteristics as that used for the housing.

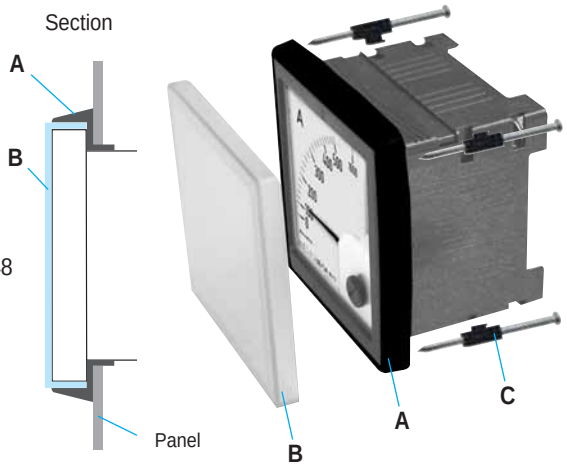
POINTERS

- The pointers of the instruments conform to the DIN 43802 standards. The pointer reaction time is about ≤2 seconds.

HOUSING

- Dimensions conform to the DIN 43700/43718 and UNEL 05111 stds.
- IP52 protection degree for the inside of the instrument (IP40 for modular version), whereas the terminals have an IP00 degree of protection according to CEI 70-1, IEC 529.
- IP40 protection degree on the terminals can be achieved with the special rear terminal covers.
- Housing are made with self-extinguishing thermoplastic according to the UL94 standards, V-O classification, resistant to termites and fungus.
- IP65 protection degree can be achieved with the correspondent accessory AKIP6548 (for instruments 48x48), AKIP6572 (for instruments 72x72), AKIP6596 (for instruments 96x96) and adopting the following instructions:

1) **The hole made in the panel may need to be increased by up 2 mm depending on the accuracy of the original cut out, in respect to the corresponding dimensions**
2) Position from the back the rubber gasket (A) as shown in the figure
3) Position the instrument into the hole made on the panel
4) Adapt the front transparent cover (B)
5) Secure the instrument against the panel using 4 fixing screws(C)



ZEROING

- Instruments can usually be zeroed by means of the special adjustor placed on the front of the instrument.
- Some types do not require this possibility (Sequencemeters, Hour Counters and meters with a Suppressed Movement).

TERMINALS

- Terminals are made of brass and are provided with screws and terminal clamps for a good connection.

FITTING

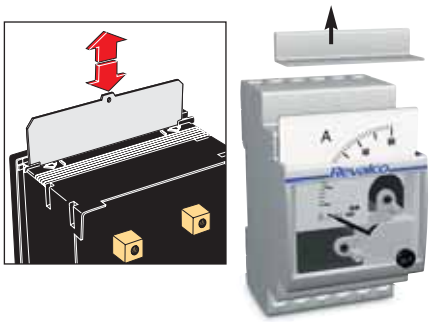
- Instrument is secured by two mounting brackets. The mounting brackets can be fitted in two different positions at the rear of the instrument in the first position the bracket to rear of panel spacing is 0,5 mm and the second spacing is 19 mm. The bracket mounting system conforms to DIN 43700. For modular version the instruments can be directly fixed on the DIN rail.

SCALE PLATES

The scales of the instruments in this catalogue conform to the DIN 43802 standards. **The instruments for use by means of a C.T. or Shunt can have interchangeable scales** and are made in such a way that it is impossible to touch the pointer or damage the movement while the change is carried out.

The interchangeable nature of the scale has been specially designed to provide substantial advantages:

- **Reduction in Storage Costs** — It is in fact no longer necessary to store a vast assortment of instruments (eg. 40/5A, 80/5A, 300/5A etc., or 500A/60mV, 1000A/60mV, 5000A/60mV etc.) but only a few instruments without a scale and a number of loose scale plates provide savings in storage costs.
- **Reduction in Storage Space** — As it is no longer necessary to have a large assortment of complete instruments but only loose scales, it is evident that there is a considerable saving of storage space which is always welcome.
- **Reduction in delivery time** — Those who do not consider it necessary to create their own instrument stocks will be able to find a large assortment of instruments and scales at wholesalers, agents and the central headquarters of Revalco.
- **Rapid replacement of the scales** — The replacement can be carried out by unskilled personnel as it is not necessary to dismantle the instrument. It is however necessary to pay a minimum amount of attention during this operation in order not to damage the front of the scale and to ensure that it has been pressed down fully towards the bottom of the instrument.

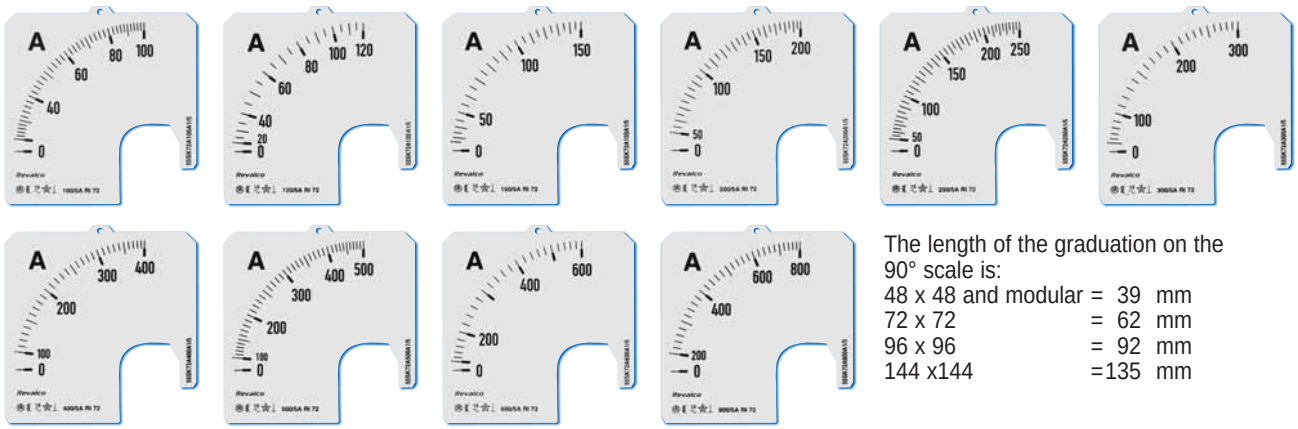


Remove the cover placed in the upper part of the instrument in the direction of the arrows to obtain access to the aperture; when this operation has been completed, replace the cover accurately in its seat to ensure the aperture is completely closed.

Warning: the instrument should not be connected to power during the replacement operation.

In order to avoid problems caused by incorrect insertions, note the following:
the instruments marked 5A1 will only accept scales with a 1 In scale (eg.: 100/5A)
the instruments marked 5A2 will only accept scales with a 2 In scale (eg.: 100/200/5A)
the instruments marked 5A5 will only accept scales with a 5 In scale (eg.: 100/500/5A)

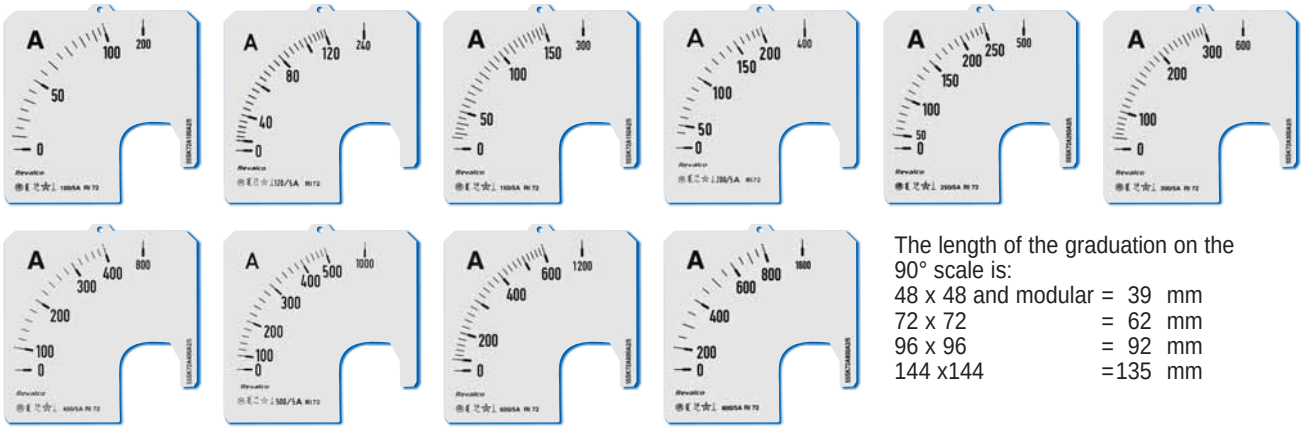
- **The normal scales (1 In) of the instruments are:**
  A) 90° scale plate nominal overload 1In



The length of the graduation on the 90° scale is:

48 x 48 and modular	= 39	mm
72 x 72	= 62	mm
96 x 96	= 92	mm
144 x144	=135	mm

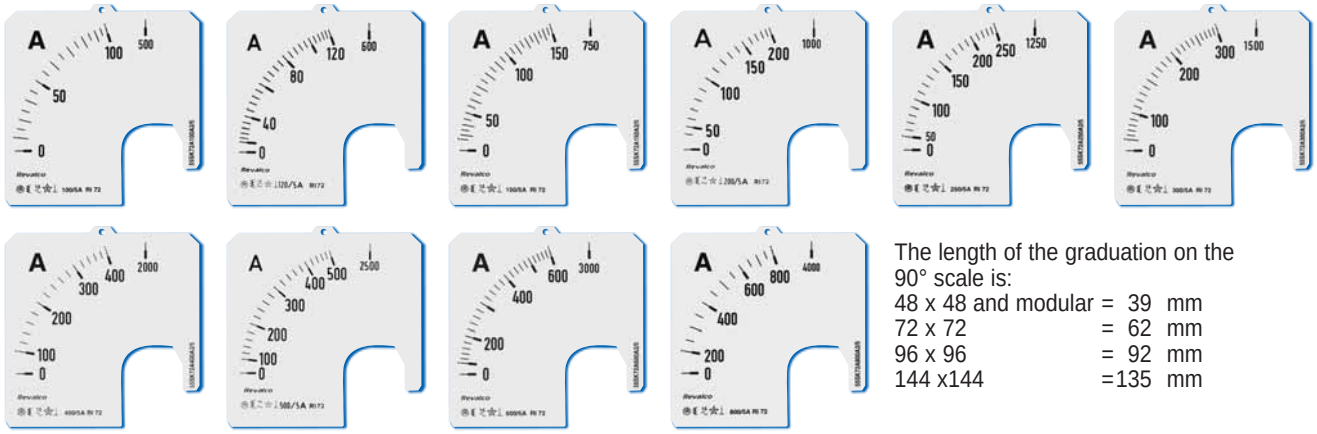
B) 90° Scale plates 100% overload (2 In), where the end scale value corresponds to 2 times the nominal value



The length of the graduation on the 90° scale is:

48 x 48 and modular	= 39	mm
72 x 72	= 62	mm
96 x 96	= 92	mm
144 x144	=135	mm

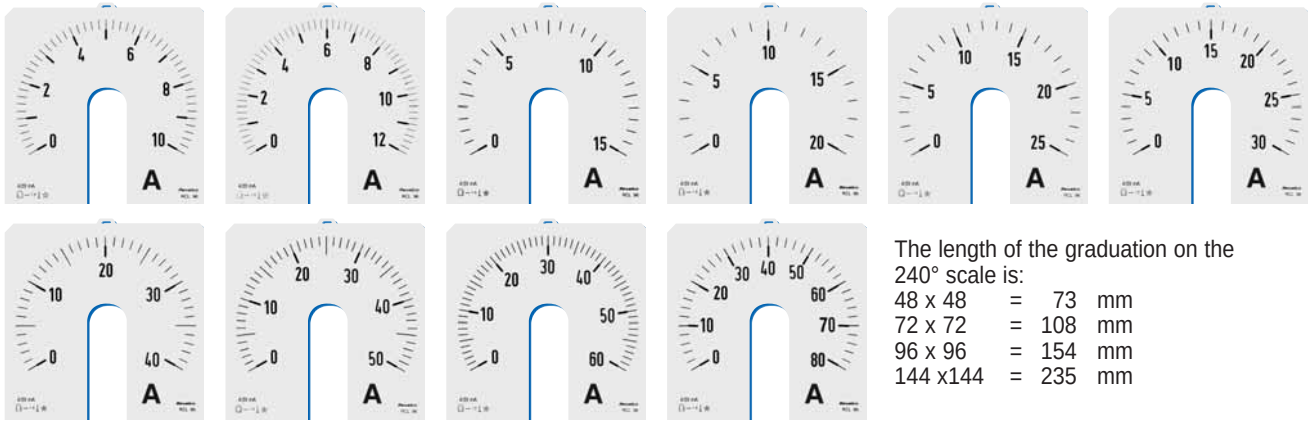
C) 90° Scale plates 500% overload (5 In), where the end scale value corresponds to 5 times the nominal value



The length of the graduation on the 90° scale is:

48 x 48 and modular	= 39	mm
72 x 72	= 62	mm
96 x 96	= 92	mm
144 x144	=135	mm

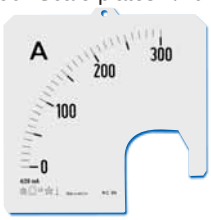
D) 240° Scale plates nominal overload 1In



The length of the graduation on the 240° scale is:

48 x 48	= 73	mm
72 x 72	= 108	mm
96 x 96	= 154	mm
144 x144	= 235	mm

E) 90° Scale plates 4/20 mA



The length of the graduation on the 90° scale is:

48 x 48 and modular	= 39	mm
72 x 72	= 62	mm
96 x 96	= 92	mm
144 x144	=135	mm

F) 240° Scale plates 4/20 mA

The length of the graduation on the 240° scale is:

48 x 48	= 73	mm
72 x 72	= 108	mm
96 x 96	= 154	mm
144 x144	= 235	mm

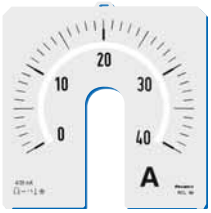
The technology adopted by Revalco on the 4/20mA instruments is with use of mechanical zero. Without any current input the pointer is positioned under the zero marked on the scale plate(Fig.1).Supplying 4mA the pointer goes to the zero (Fig.2), while with 20mA the pointer goes to the end scale value. In this way all the divisions between 4 and 20mA are well defined.

Zero adjuster of these instruments is disconnected in the factory to avoid possible incorrect use by the end user. If working zero adjuster is required, please indicate when placing the order.

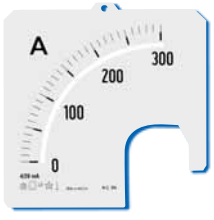
Fig. 1

Fig. 2

G) Antiparallax scale plates



a 240°



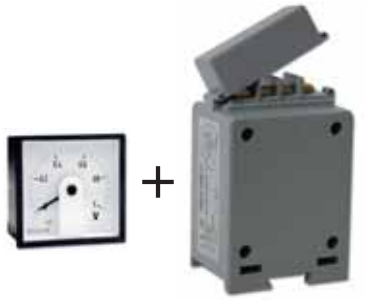
a 90°

The scale plates are provided with a reflective mirror to avoid parallax errors during the reading

SPECIAL IMPLEMENTATIONS

The instruments in the catalogue can be provided, in special housings, with some variations regarding the scales and equipment.
The following table indicates the possible implementation for each series of instruments.

Special implementations for scale plates	For all Instruments	For all A.C. instruments	For all D.C. instruments
Linear scale plates hand drawn		•	
Non linear scale plates hand drawn			•
Red or green mark	•		
Scale plates with unique trace and double or triple numbering	•		
Scale plates with double or triple trace and double or triple numbering	•		
Black scale plates with yellow numbering and divisions	•		
Antiparallax scale plates	•		
Special words or symbols	•		
Coloured sectors	•		
Personalised logo	•		
Special implementations for equipment			
Central or offset zero			•
Class 1 calibration	•		
D.C. calibration		•	
Non standard frequency calibration (400Hz at 5A)		•	
Calibration for other capacities according to curve	•		
Different capacities from the standard	•		
Double ratio	•		
Tropicalised execution	•		
Execution for marine	•		
IP54 protection degree	•		
IP55 protection degree	•		
IP65 protection degree (where possible using the accessory AKIP65)	•		
Antireflex glass	•		
Additional red pointer adjustable from the front	•		
Internal illumination	•		
Certificates			
Certificate of conformity	•		
Test certificate	•		
Type test certificate	•		
UTF certificate (for kWh meters and CTs only)			



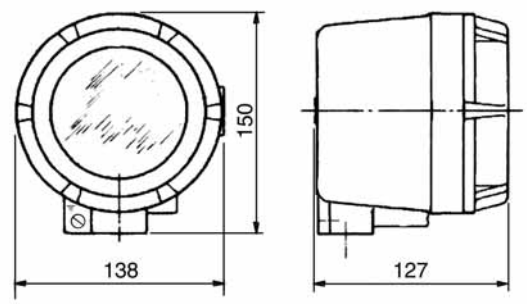
A.C. instruments model ERIL48 (48x48) scale plates 240° are supplied with an external accessory (box equal to the article TARPDE1)

EXPLOSION PROOF VERSION

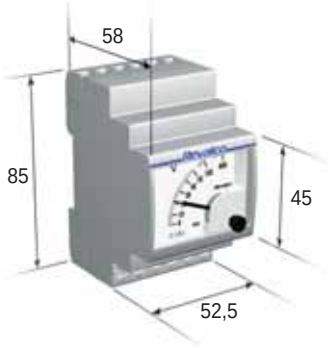
- Explosion proof box for measuring instruments EEx-d IIC REX series
- Zone 1 / 2 / 21 / 22 installation
- Category II 2 GD classification
- EEx-d IIC T6 execution
- IP66 protection degree (EN60 529 standards)
- INERIS 02 ATEX 0069X Certificate
- Mechanical characteristics: marine aluminium cooper free, temperate glass port-hole, O-ring gasket in NBR
- Safety parameters:
  analogue instruments = max voltage input 600VAC or DC
  = max current 5A input
  digital instruments = max auxiliary power supply 110VAC or 230VDC
  = max current 5A input
- Special safety warning:
  - dont open the instrument once powered
  - after disconnection wait for 15 minutes before to open the box
  - this box assures a relative high protection against the shocks; end user has in any case to increase this protection when high risks of damages for glass or box are possible
- All the components and cables particularly must be conform to thhe 94/9/EC directives
- For use in explosive atmosphere the surfaces of various joints must be covered by grease (silicon) while cables must have a protection not less than IP6X and the operator must clean regularly all the device to avoid deposition of dangerous durst over them.
- Weight: 1,5 kg

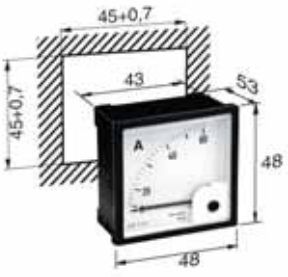
- **EORDER EXAMPLE**
  REXERI▪72500V▪D voltmeter 72x72 direct insertion, end scale 500V in explosion proof box
  REXERB▪7250/5A15MIN maximum demand ammeter, end scale 50/5A, 15 minutes, in explosion proof box

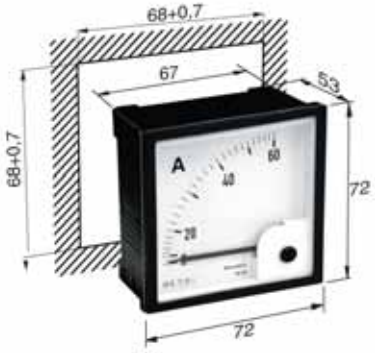
- On request Revalco supplies analogue and digital instruments 72x72, in explosion proof box putting "**REX**" prefix code before the standard code.

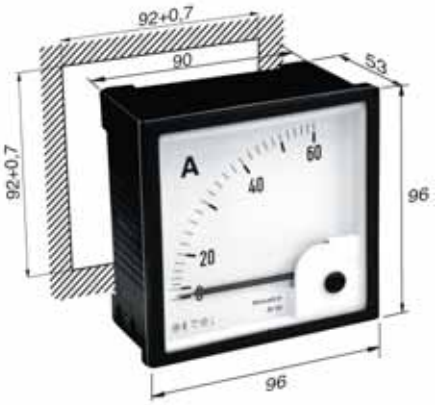


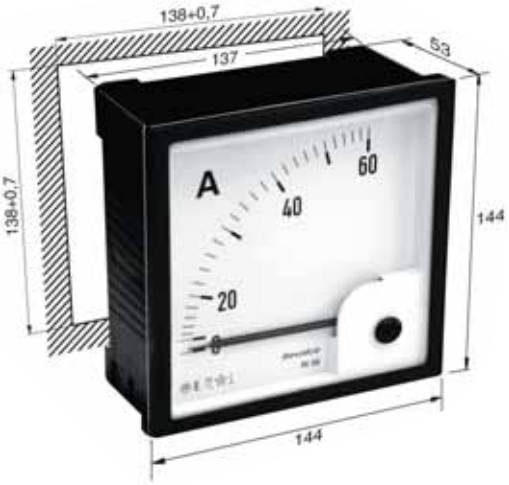
DIMENSIONS IN mm

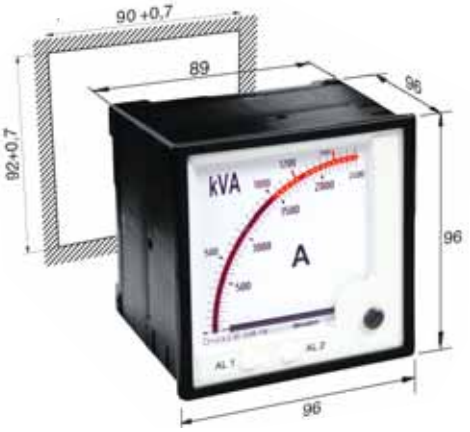




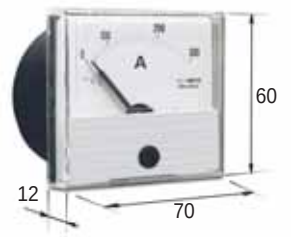






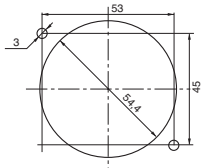


Length graduation: 58 mm

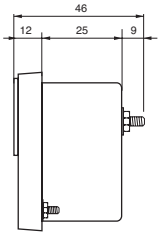


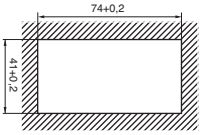
A55NE frame

A55RE frame



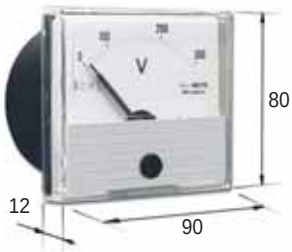
Cut out





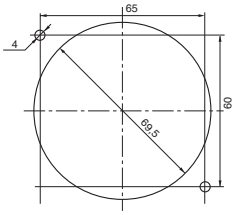
Cut out with use of A55R frame

Length graduation: 78 mm

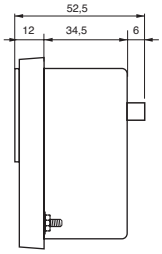


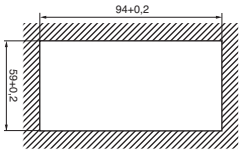
A70N frame

A70R frame

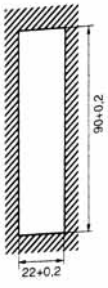


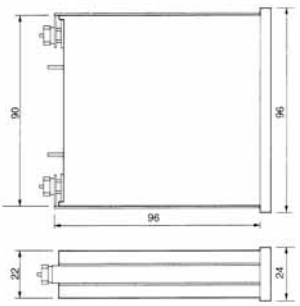
Cut out

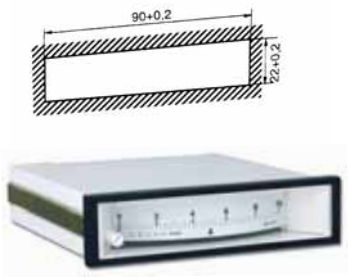


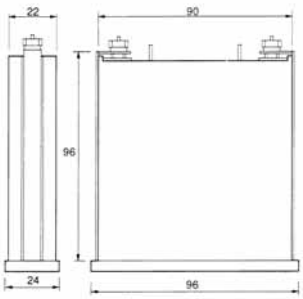


Cut out with use of A70R frame









INDICATIONS FOR ORDERING

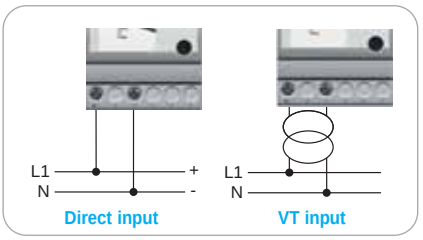
- For simplicity and evidence the codes are not numerical but nominal; i.e. they immediately indicate the products to order. On the pages of each family of instruments however some clarifying examples are given.
- **NOTE:** in same cases the codes show empty spaces between the letters displayed with the symbol " ■ ".
  So: " ■ " means that it is necessary to dial an empty space, " ■■ " means that it is necessary to dial two empty spaces.

VOLTMETERS

MOVING IRON INSTRUMENTS FOR ALTERNATING CURRENT

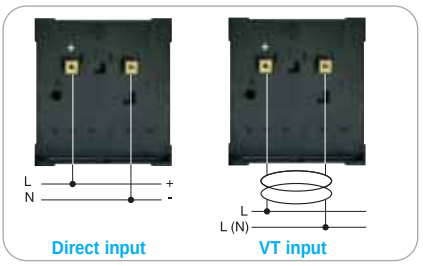
MODULAR VOLTMETER — ERIM

- **BURDEN** 1,5VA
- **OPERATING FREQUENCY** 40÷60 Hz - **CLASS** 1,5
- **RANGES** 6-10-15-25-40-60-100-150-250-300-400-500-600V direct input
  .../100V-.../110V input by means a V.T., secondary 100V or 110V
  Different capacities can be carried out on request
- **DIMENSIONS / WEIGHT** 3 DIN modules / 0,15 kg
- **EXAMPLES WHEN ORDERING**
  ERI▪M▪300V▪D direct input, end scale value 300V
  ERIM500V500/100 input by means a V.T. 500/100V, end scale value 500V



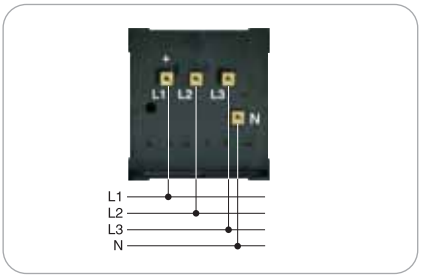
VOLTMETER (90°) — ERI48 - ERI72 - ERI96 - ERI144

- **BURDEN** 48 = 1,2÷2VA; 72/96/144 = 1,5÷4VA
- **OPERATING FREQUENCY** 40÷60 Hz - **CLASS** 1,5
- **RANGES**
  6-10-15-25-40-60-100-150-250-300-400-500-600V direct input
  .../100V-.../110V input by means a V.T., secondary 100V or 110V
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  ERI▪48500V▪D direct input, end scale value 500V
  ERI96500V400/100 input by means a V.T. 400/100V, end scale value 500V
- **WEIGHT (kg)** ERI48 (0,10); ERI72 (0,20); ERI96 (0,30); ERI144 (0,35)



VOLTMETER WITH INCORPORATED SWITCH — ERI72C - ERI96C

- Instruments provided with switch, low voltage, for 3 phase-phase and 3 phase-neutral voltage L1N-L2N-L3N / L1L2-L2L3-L3L1
- **BURDEN** 1,5÷4VA
- **OPERATING FREQUENCY** 40÷60 Hz
- **CLASS** 1,5 - **FRONT PROTECTION DEGREE** IP00
- **RANGES** 6-10-15-25-40-60-100-150-250-300-400-500-600V direct input
  .../100V-.../110V input by means a V.T., secondary 100V or 110V
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  ERI72C▪500V▪D direct input, end scale value 500V
- **WEIGHT (kg)** 0,25

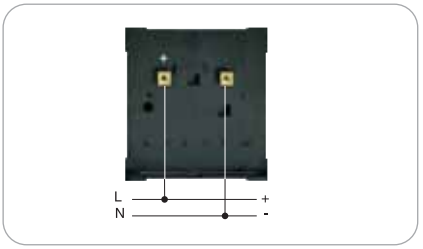


VOLTMETER / FREQUENCY METER — ERI72VH

- These instruments consint of the combination of a analogue voltmeter with 500V end scale value, and a three leds electronic circuit for the reading of the frequency. Principally used in small generating sets where more space is saved.

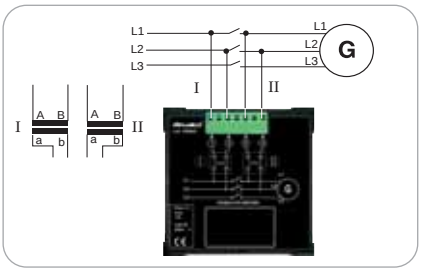
	voltmeter	frequency meter with self-powered circuit
- **BURDEN**	3VA	0,5VA
- **OPERATING FREQUENCY**	40÷60 Hz	50 Hz
- **CLASS**	1,5	1
- **DISPLAY**		three leds circuit
- **RANGES**	500V	48÷52 Hz

- **EXAMPLES WHEN ORDERING**
  ERI▪72VH 500V end scale value, led frequency meter from 48 to 52 Hz
- **WEIGHT (kg)** 0,20



DOUBLE VOLTMETER — ERI96D

- These instruments consist of two equipments mounted on a common axis permitting the two pointers indicating on one graduation. In this way there is the immediate comparison of the parallel adjustment. The moving coil system reduces drastically the burden and permits linear graduations.
- **BURDEN** 1,5VA
- **OPERATING FREQUENCY** 45/65 Hz - **CLASS** 1,5
- **RANGE** 2x500V - Different capacities on request
- **EXAMPLES WHEN ORDERING**
  ERI▪96D500V▪D double voltmeter, 2x500V end scale value
- **WEIGHT (kg)** 0,42

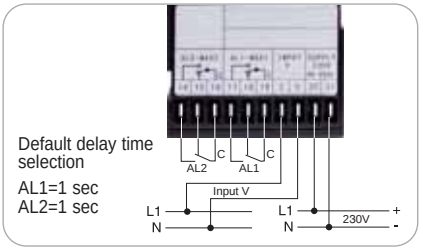


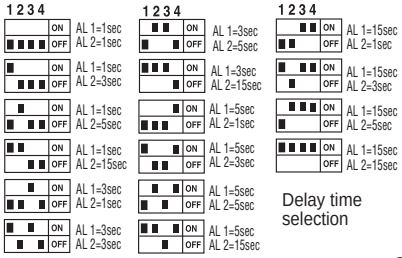
VOLTMETER WITH 2 ALARM THRESHOLDS — ERIC96V - ERIC96V24 - ERIC96V110 - ERIC96VP1 - ERIC96VP2

- **BURDEN** 3VA
- **POWER SUPPLY/ FREQUENCY** 230V +/-10% 45/65 Hz
- **RANGE** 600V - Different capacities on request
- **RELAYS DATA** Max interruption power with resistive laod 2kVA (8A,250V)
  ERIC96V=AL 1 (MIN) AL 2 (MAX) ERIC96VMA=AL 1 (MAX1) AL 2 (MAX2)
  ERIC96VMI=AL 1 (MIN1) AL 2 (MIN2) ERIC96VMM=AL 1 (MAX-) AL 2 (MAX+)
- **SIGNALLING DATA**

Adjustments by 2 frontal buttons
Class +/- 1,5% referred to the end scale value
Hysteresis < 1% of end scale value
Delay time from 1 to 15 seconds, selectable by minidip situated under the white frame

- How to select the alarms: press the button (AL1 or AL2) and maintain pressure until the lower led moves to the needed value. In alarm condition all leds flash quickly
- **EXAMPLES WHEN ORDERING**
  ERIC96V▪▪600V MIN/MAX voltmeter, end scale 600V (230VAC)
  ERIC96VMI600VP1 MIN/MIN voltmeter, end scale 600V (22...36VAC/19...70VDC)
  ERIC96VMA600VP2 MAX/MAX voltmeter, end scale 600V (44...130VAC/70...240VDC)
- **WEIGHT (kg)** 0,50

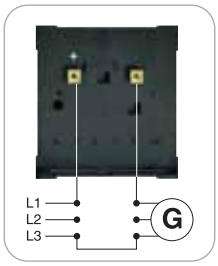




ZEROVOLTMETER (90°) **ERZ48 - ERZ72 - ERZ96 - ERZ144**
ZEROVOLTMETER (240°) **ERZL48 - ERZL72 - ERZL96 - ERZL144**

- These instruments consist of moving coil movements with internal rectifier which can be used to replace the Sinchronoscope in the synchronizing of two generators or one generator in the network. When the two voltages to be synchronized are the same, the instrument indicates “zero”.
- **BURDEN** 1 mA
- **RANGES STANDARD** from 0 to 50V, extended to 800V
  (The instrument can therefore be used with all the voltages as the equipment withstands up to 800V continuously)
- **EXAMPLES WHEN ORDERING**
  ERZ▪96▪50-800V zerovoltmeter 96x96, 90° end scale value
  ERZL72▪50-800V zerovoltmeter 72x72, 240° end scale value
- **WEIGHT (kg)** ERZ48 (0,10); ERZ72 (0,20); ERZ96 (0,22); ERZ144 (0,30); ERZL48 (0,22); ERZL72 (0,30); ERZL96 (0,35); ERZL144 (0,40)

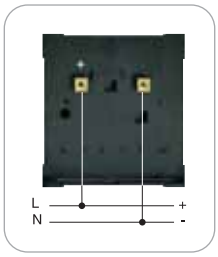
- **Modular version (ERZM) on request**



VOLTMETER WITH SUPPRESSED ZERO (90°) **ERZS48 - ERZS72 - ERZS96 - ERZS144**
VOLTMETER WITH SUPPRESSED ZERO (240°) **ERZSL48 - ERZSL72 - ERZSL96 - ERZSL144**

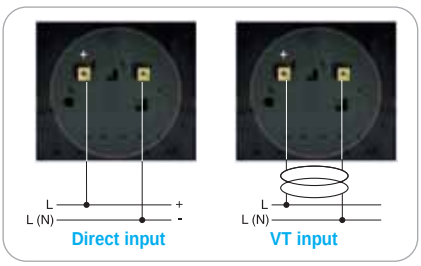
- These instruments consist of moving coil movements and internal rectifier which are used to determine very precisely the normal value of the sinusoidal alternating voltage. Measuring ranges between 90 to 110% approximately of the voltage.
- **BURDEN** 1 VA
- **RANGES** 0-90/110V; 0-100/120V; 0-200/240V; 0-340/420V
- **EXAMPLES WHEN ORDERING**
  ERZS96340-420 90° scale plate
- **WEIGHT (kg)** ERZS48 (0,10); ERZS72 (0,20); ERZS96 (0,22); ERZS144 (0,30) ERZSL48 (0,22); ERZSL72 (0,30); ERZSL96 (0,35); ERZSL144 (0,40)

- **Modular version (ERZSM) on request**



PANEL VOLTMETER **EMI55M - EMI70M**
VOLTMETER WITH 55R OR 70R FRAME **EMI55M+A55RE - EMI70M+A70R**
VOLTMETER WITH 55N OR 70N FRAME **EMI55M+A55NE - EMI70M+A70N**

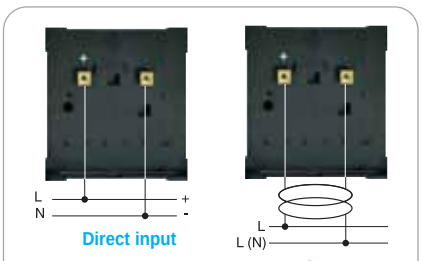
- Front in plastic, transparent acrylic with antistatic as standard
- **BURDEN** 1,5VA
- **CLASS** 1,5
- **OPERATING FREQUENCY** 40 ÷ 60 Hz
- **RANGES**
  6-10-15-25-40-60-100-150-250-300-400-500-600V direct input
  .../100V, .../110V input by means a V.T., secondary 100V or 110V
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  EMI▪55M250V▪D direct input, end scale value 250V, diameter 55mm
  EMI▪70M▪60V▪D direct input, end scale value 60V, diameter 70mm
- **WEIGHT (kg)** 0,15



MOVING COIL INSTRUMENTS FOR ALTERNATING CURRENT

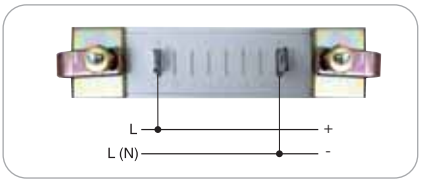
VOLTMETER (90°) **ERR48 - ERR72 - ERR96 - ERR144**
VOLTMETER (240°) **ERIL48 - ERIL72 - ERIL96 - ERIL144**

- These instruments are constructed for the measurement of alternating current, from 25 to 10,000Hz, and are gauged for reading the effective value of the sinusoidal current. For other wave forms please consult us.
- **BURDEN** 1mA about
- **CLASS** 1,5
- **RANGES**
  6-10-15-25-40-60-100-150-250-300-400-500-600V direct input
  .../100V, .../110V input by means a V.T., secondary 100V or 110V
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  ERIL96500V▪D direct input, 500V end scale value, 240°
  ERR▪72100V▪D direct input, 100V end scale value, 90°
- **WEIGHT (kg)** ERR48 (0,10); ERR72 (0,20); ERR96 (0,25); ERR144 (0,35) ERIL48 (0,21); ERIL72 (0,30); ERIL96 (0,40); ERIL144 (0,45)



VOLTMETER (HORIZONTAL PROFILE VERSION) **ERPI24/O**
VOLTMETER (VERTICAL PROFILE VERSION) **ERPI24/V**

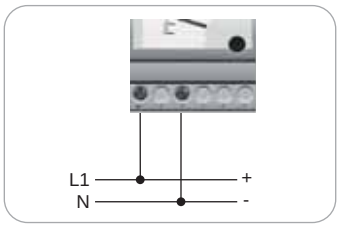
- Instruments with internal rectifier
- **BURDEN** 1mA
- **OPERATING FREQUENCY** 40 ÷ 60 Hz
- **CLASS** 1,5
- **RANGES**
  6-10-15-25-40-60-100-150-250-300-400-500-600V - Different capacities on request
- **EXAMPLES WHEN ORDERING**
  ERPI24/0▪▪60V▪D direct input, end scale value 60V (horizontal)
  ERPI24/V▪300V▪D direct input, end scale value 300V (vertical)



MODULAR VOLTMETER

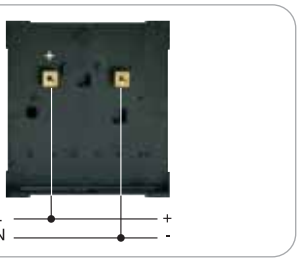
ERCM

- **BURDEN** 1000Ω/V
- **CLASS** 1,5
- **RANGES**
  MILLIVOLTMETERS: from 60 to 600 mV direct input
  VOLTMETERS: 1-1,5-2,5-4-5-6-10-15-20-25-40-60-100-150-250-300-400-500-600V direct input
  Different capacities can be carried out on request
- **DIMENSIONS / WEIGHT** 3 DIN modules / 0,20 kg
- **EXAMPLES WHEN ORDERING**
  ERC▪M▪▪30V▪▪D direct input, end scale value 30V
  ERC▪M▪250V▪▪D direct input, end scale value 250V



VOLTMETER (90°) — ERC48 - ERC72 - ERC96 - ERC144
VOLTMETER (240°) — ERCL48 - ERCL72 - ERCL96 - ERCL144

- The main characteristic of these instruments is their low current consumption, in circuits where high internal consumption and drop in voltage can bring about measuring errors. The low consumption means that these instruments can also be used with converters, tacho generators or thermocouples. Up to 60A they can be provided with an incorporated shunt for direct connection, above 60A use a separate shunt.
- **BURDEN** 1000Ω/V
- **CLASS** 1,5
- **RANGES**
  MILLIVOLTMETERS: 60-100-150-250-400-600mV
  VOLTMETERS: 1-1,5-2,5-4-6-10-15-25-40-60-100-150-250-300-400-500-600V
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  ERC▪72250V▪▪D direct input, end scale value 250V, 90°
  ERC▪96▪▪5V▪▪D direct input, end scale value 5V, 90°
  ERCL72250V▪▪D direct input, end scale value 250V, 240°
- **WEIGHT (kg)** ERC48 (0,10); ERC72 (0,20); ERC96 (0,25); ERC144 (0,35)
  ERCL48 (0,21); ERCL72 (0,30); ERCL96 (0,40); ERCL144 (0,45)



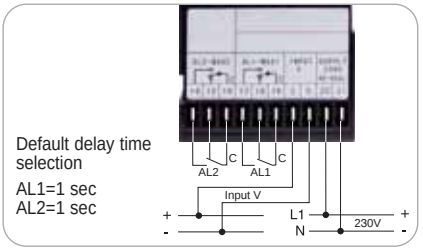
VOLTMETER WITH 2 ALARM THRESHOLDS

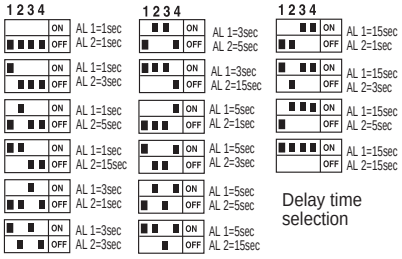
ERCC96V - ERCC96V24 - ERCC96V110 - ERCC96VP1 - ERCC96VP2

- **BURDEN** 3VA
- **POWER SUPPLY/ FREQUENCY** 230V +/-10% 45/65 Hz
- **RANGES** 1-10-50-100-300-600V - Different capacities on request
- **RELAYS DATA** Max interruption power with resistive laod 2kVA (8A,250V)
  ERCC96V=AL 1 (MIN) AL 2 (MAX) ERCC96VMA=AL 1 (MAX1) AL 2 (MAX2)
  ERCC96VMI=AL 1 (MIN1) AL 2 (MIN2) ERCC96VMM=AL 1 (MAX-) AL 2 (MAX+)
- **SIGNALLING DATA**

Adjustments by 2 frontal buttons
Class +/- 1,5% referred to the end scale value
Hysteresis < 1% of end scale value
Delay time from 1 to 15 seconds, selectable by minidip situated under the white frame

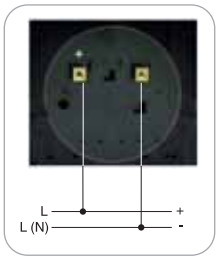
- How to select the alarms: press the button (AL1 or AL2) and maintain pressure until the lower led moves to the needed value. In alarm condition all leds flash quickly
- **EXAMPLES WHEN ORDERING**
  ERCC96V▪▪600V MIN/MAX voltmeter, end scale 600V (230VAC)
  ERCC96VMI600VP1 MIN/MIN voltmeter, end scale 600V (22...36VAC/19...70VDC)
  ERCC96VMA600VP2 MAX/MAX voltmeter, end scale 600V (44...130VAC/70...240VDC)
- **WEIGHT (kg)** 0,50





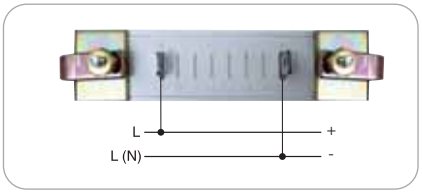
PANEL VOLTMETER — EMC55M - EMC70M
VOLTMETER WITH 55R OR 70R FRAME — EMC55M+A55RE - EMC70M+A70R
VOLTMETER WITH 55N OR 70N FRAME — EMC55M+A55NE - EMC70M+A70N

- Front in plastic, transparent acrylic with antistatic as standard
- **BURDEN** 1000Ω/V
- **CLASS** 1,5
- **RANGES**
  MILLIVOLTMETERS: 60-100-150-250-400-600mV
  VOLTMETERS: 1-1,5-2,5-4-6-10-15-25-40-60-100-150-250-300-400-500-600V
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  EMC▪70M300V▪▪D direct input, end scale value 300V, diameter 70mm
- **WEIGHT (kg)** 0,18



VOLTMETER (HORIZONTAL PROFILE VERSION) — ERPC24/O
VOLTMETER (VERTICAL PROFILE VERSION) — ERPC24/V

- **BURDEN** 1mA
- **CLASS** 1,5
- **RANGES:**
  MILLIVOLTMETERS: 60÷300mV
  VOLTMETERS: 1-1,5-2,5-4-6-10-15-30-40-50-60-80-100-150-200-250-300-400-500-600V
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  ERPC24/V▪100V▪D direct input, end scale value 100V (vertical)
  ERPC24/O▪▪10V▪D direct input, end scale value 10V (horizontal)



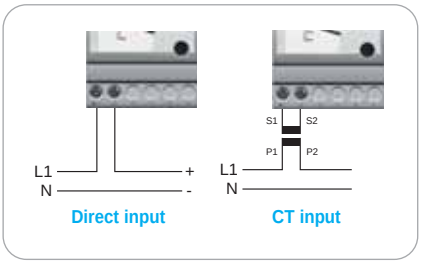
AMMETERS

MOVING IRON INSTRUMENTS FOR ALTERNATING CURRENT

MODULAR AMMETER — ERIM

- **BURDEN** 0,3VA
- **OPERATING FREQUENCY** 40 ÷ 60 Hz
- **CLASS** 1,5
- **RANGES**
  1-1,5-2,5-4-5-6-10-15-20-25-30A direct input
  .../1A-.../5A input by means of C.T. with secondary 1A or 5A
  Different capacities can be carried out on request
- **DIMENSIONS / WEIGHT** 3 DIN modules / 0,15 kg
- **EXAMPLES WHEN ORDERING**

ERI▪M▪▪20A▪5D	direct input, end scale value 20A, 5In (20/100A)
ERI▪M▪▪▪5A▪1	input with C.T., secondary 5A, 1In without scale plate
ESI▪M▪▪40A▪15	scale plate for ERIM, 40A, secondary 5A, 1In

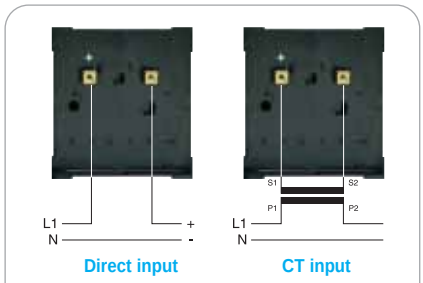


AMMETER (90°) — ERI48 - ERI72 - ERI96 - ERI144

- **BURDEN** 48 = 0,3÷0,8VA; 72/96/144 = 0,3÷1,2VA
- **OPERATING FREQUENCY** 40÷60 Hz
- **CLASS** 1,5
- **RANGES**
  MILLIAMMETERS: 250, 400, 600, 800, 900 mA
  AMMETERS: 1-1,5-2,5-4-5-6-10-15-20-25-30-40-50-60A direct input
  .../1A, .../5A input by means of C.T. with secondary 1A or 5A
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**

ERI▪72▪▪5A▪2	input with C.T., secondary 5A, 2In without scale plate
ESI▪72800A▪25	scale plate for ERI72, 800A, secondary 5A, 2In
ERI▪72▪▪6A▪5D	direct input, end scale value 6A, 5In (6/30A)

- **WEIGHT (kg)** ERI48 (0,10); ERI72 (0,20); ERI96 (0,30); ERI144 (0,35)

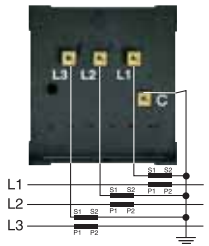


AMMETER WITH INCORPORATED SWITCH — ERI72C - ERI96C

- Instruments provided with switch, low voltage, single pole for 3 lines L1-L2-L3
- **BURDEN** 0,3÷1,2VA
- **OPERATING FREQUENCY** 40 ÷ 60 Hz
- **CLASS** 1,5
- **RANGES** .../5A2 input with C.T., secondary 5A, 2In
  Different capacities can be carried out on request
- **FRONT PROTECTION DEGREE** IP00
- **EXAMPLES WHEN ORDERING**

ERI96C1K0A▪2C5	input with C.T., secondary 5A, 2In, end scale value 1000/2000/5A

- **WEIGHT (kg)** 0,25



MAXIMUM DEMAND AMMETER (INTERCHANGEABLE SCALE PLATE) — ERB48 - ERB72 - ERB96

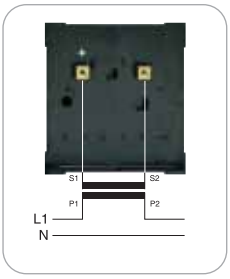
- This type of instrument is used to check long over loading in transformers, cable and substations.
  They also make it possible to check, economically, distribution networks in the place of very costly recorders.
  A special sealable knob makes it possible to zero the general indicator. The capacity is 6A for use with .../5A C.T. and maximum over loading of 20%.
  On request instruments can be provided with a capacity of 1,2A for use with C.T. .../1A.
- **BURDEN** 2,5VA
- **CLASS** 3
- **RANGES**

Primary CT (A)	Scale capacity	Primary CT (A)	Scale capacity	Primary CT (A)	Scale capacity	Primary CT (A)	Scale capacity
100%	**120%**	**100%**	**120%**	**100%**	**120%**	**100%**	**120%**
10	12	80	96	500	600	2500	3000
15	18	120	120	600	720	3000	3600
20	24	125	150	750	900	4000	4800
25	30	150	180	800	960	5000	6000
30	36	200	240	1000	1200		
40	48	250	300	1200	1400		
50	60	300	360	1500	1800		
60	72	400	480	2000	2400		

- **EXAMPLES WHEN ORDERING**

ERB▪48▪▪5A▪15MIN	input with C.T., secondary 5A, 15 minutes, without scale plate
ESB▪48150A	scale plate for ERB48, 150A (150/180/5A)
ERB▪72▪▪5A▪15MIN	input with C.T., secondary 5A, 15 minutes, without scale plate
ESB▪72▪50A	scale plate for ERB72, 50A (50/60/5A)
ERB▪96▪▪1A▪8MIN	input with C.T., secondary 1A, 8 minutes, without scale plate
ESB▪96600A	scale plate for ERB96, 600A (600/720A)

- **WEIGHT (kg)** ERB72 (0,20); ERB96 (0,22)

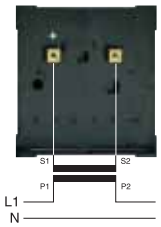


COMBINED MAXIMUM DEMAND AMMETER (INTERCHANGEABLE SCALE PLATE) — ERBC72 - ERBC96

- These instruments exploit the combining of thermal equipment with moving iron equipment, permitting deferred reading (typical of bimetallic systems) combined with instantaneous reading of the current values. The capacity is 6A for moving iron connection .../5A C.T. On request instruments can be provided with a capacity of 1,2A for connection to a 1A C.T. while the normal over loading in the moving iron system is of 100% and 20% in the bimetallic system.
- **BURDEN** of the moving iron system: 0,3÷1,2 VA, of the bimetal system: 2,5 VA
- **CLASS** of the moving iron system: 1,5 of the bimetal system: 3
- **RANGES**

Primary CT (A)	Scale capacity		Primary CT (A)	Scale capacity		Primary CT (A)	Scale capacity		Primary CT (A)	Scale capacity	
	Bimetal	Moving iron		Bimetal	Moving iron		Bimetal	Moving iron		Bimetal	Moving iron
100%	**120%**	**200%**	**100%**	**120%**	**200%**	**100%**	**120%**	**200%**	**100%**	**120%**	**200%**
10	12	20	80	96	160	600	720	1200	4000	4800	8000
15	18	30	100	120	200	800	960	1600	5000	6000	10000
20	24	40	150	180	300	1000	1200	2000			
25	30	50	200	240	400	1200	1400	2400			
30	36	60	250	300	500	1500	1800	3000			
40	48	80	300	360	600	2000	2400	4000			
50	60	100	400	480	800	2500	3000	5000			
60	72	120	500	600	1000	3000	3600	6000			

- **EXAMPLES WHEN ORDERING**
  - ERBC96▪▪5A▪15MIN — input with C.T., secondary 5A, 15 minutes, without scale plate
  - ESBC96150A — scale plate for ERBC96, 150A (150/180A)
- **WEIGHT (kg)** — ERBC72 (0,22); ERBC96 (0,27)



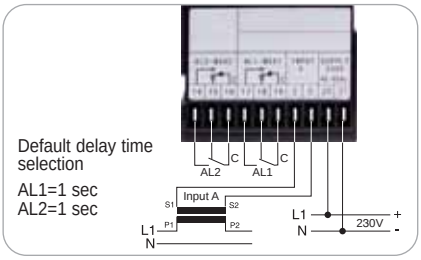
AMMETER WITH 2 ALARM THRESHOLDS

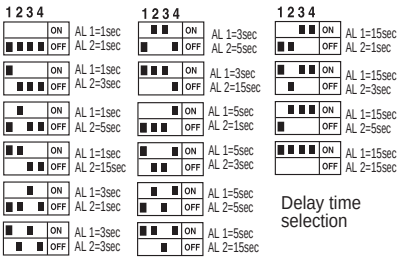
ERIC96A - ERIC96A24 - ERIC96A110 - ERIC96AP1 - ERIC96AP2

- **BURDEN** 3VA
- **POWER SUPPLY/ FREQUENCY** 230V +/-10% 45/65 Hz
- **RANGE** 5A input with C.T., secondary 5A (1A on request)
- **RELAYS DATA** Max interruption power with resistive laod 2kVA (8A,250V)
  - ERCC96V=AL 1 (MIN) AL 2 (MAX) — ERCC96VMA=AL 1 (MAX1) AL 2 (MAX2)
  - ERCC96VMI=AL 1 (MIN1) AL 2 (MIN2) — ERCC96VMM=AL 1 (MAX-) AL 2 (MAX+)
- **SIGNALLING DATA**

Adjustments by 2 frontal buttons
Class +/- 1,5% referred to the end scale value
Hysteresis < 1% of end scale value
Delay time from 1 to 15 seconds, selectable by minidip situated under the white frame

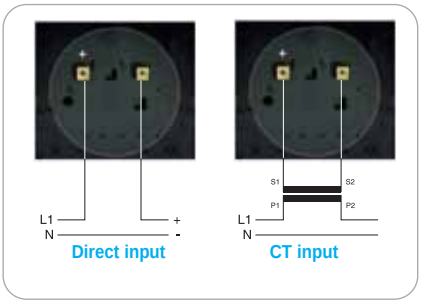
- How to select the alarms: press the button (AL1 or AL2) and maintain pressure until the lower led moves to the needed value. In alarm condition all leds flash quickly
- **EXAMPLES WHEN ORDERING**
  - ERIC96A▪▪100A1 MIN/MAX ammeter, end scale 100/5A (230VAC)
  - ERIC96AMI100AP1 MIN/MIN ammeter, end scale 100/5A (22...36VAC/19...70VDC)
  - ERIC96AMA100AP2 MAX/MAX ammeter, end scale 100/5A (44...130VAC/70...240VDC)
- **WEIGHT (kg)** 0,50





PANEL AMMETER — EMI55M - EMI70M
AMMETER WITH 55R OR 70R FRAME — EMI55M+A55RE - EMI70M+A70R
AMMETER WITH 55N OR 70N FRAME — EMI55M+A55NE - EMI70M+A70N

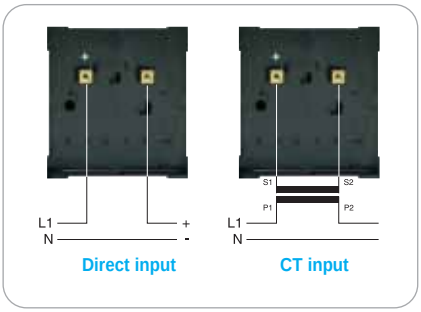
- Front in plastic, transparent acrylic with antistatic as standard
- **BURDEN** 0,3VA
- **CLASS** 1,5
- **OPERATING FREQUENCY** 40 ÷ 60 Hz
- **RANGES**
  - MILLIAMMETERS: 250, 400, 600, 800, 900 mA
  - AMMETERS: 1-1,5-2,5-4-5-6-10-15-25-30- 40-50-60A direct input
    .../1A, .../5A input with C.T., secondary 1A or 5A
  - Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  - EMI▪55M▪75A▪5D — direct input, end scale value 75A, 5In (75/375A), Ø55 mm
  - EMI▪70M100A▪1D — direct input, end scale value 100A, 1In (100A), Ø70 mm
- **WEIGHT (kg)** 0,15



MOVING COIL INSTRUMENTS FOR ALTERNATING CURRENT

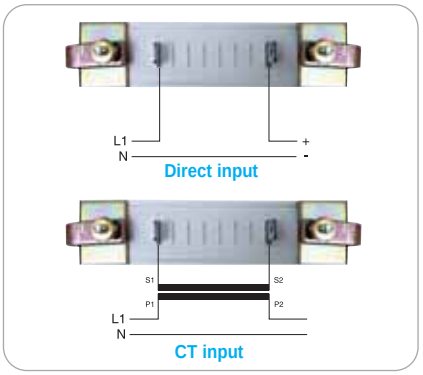
AMMETER INTERCHANGEABLE SCALE PLATE (90°) — ERR48 - ERR72 - ERR96 - ERR144
AMMETER INTERCHANGEABLE SCALE PLATE (240°) — ERIL48 - ERIL72 - ERIL96 - ERIL144

- These instruments are constructed for the measurement of alternating current, from 25 to 10,000Hz, and are gauged for reading the effective value of the sinusoidal current. For other wave forms please consult us.
- **BURDEN** range less than 600mA = 1÷1,5V, higher = 0,25VA
- **CLASS** 1,5
- **RANGES**
  - MILLIAMMETERS: 1-1,5-2,5-4-5-6-10-15-20-25-40-60-100-150-250-400-600mA
  - AMMETERS: 1-1,5-2,5-4-5 direct input
    .../1A, .../5A input with C.T., secondary 1A or 5A
  - Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  - ERIL96▪▪5A1 — input with C.T., secondary 5A, 1In, without scale plate, 240°
  - ESIL961K5A▪5A — scale plate for ERIL96, 1500A (1500/5A), 1In
  - ERR▪48150MA▪D — direct input, 150mA, scale plate 90°
- **WEIGHT (kg)** ERR48 (0,10); ERR72 (0,20); ERR96 (0,25); ERR144 (0,35)
  ERIL48 (0,21); ERIL72 (0,30); ERIL96 (0,40); ERIL144 (0,45)



AMMETER (HORIZONTAL PROFILE VERSION) — ERPI24/O
AMMETER (VERTICAL PROFILE VERSION) — ERPI24/V

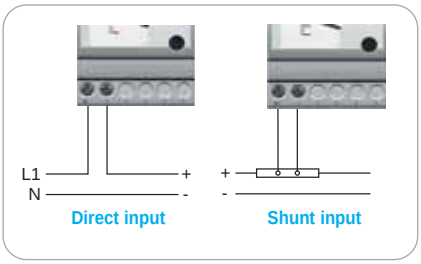
- **BURDEN** 1mA
- **OPERATING FREQUENCY** 40 ÷ 60 Hz
- **CLASS** 1,5
- **RANGES:** 0,5-1-1,5-2-2,5-5A direct input
  .../1A, .../5A input with C.T., secondary 1A or 5A
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  ERPI24/0▪▪10AD direct input, end scale value 10A (horizontal)
  ERPI24/V▪▪50AD direct input, end scale value 50A (vertical)



MOVING COIL INSTRUMENTS FOR DIRECT CURRENT

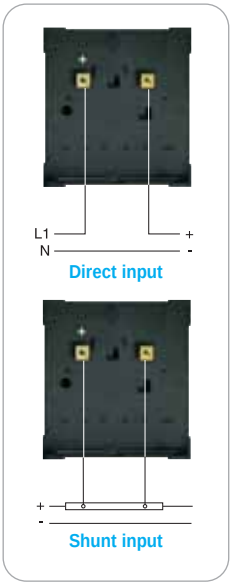
MODULAR AMMETER — ERCM

- **BURDEN** 60mV
- **CLASS** 1,5
- **RANGES**
  MICROAMMETERS: 100-150-250-400-500-600µA direct input
  MILLIAMMETERSI: from 1 to 600 mA 4/20mA direct input
  AMPEROMETRI: 1-1,5-2,5-4-5-6-10-15-20-25-30A direct input
  .../60mV input by shunt, secondary 60mV
  Different capacities can be carried out on request
- **DIMENSIONS / WEIGHT** 3 DIN modules / 0,20 kg
- **EXAMPLES WHEN ORDERING**
  ERC▪M▪▪60MV▪▪S input by shunt, secondary 60mV, without scale plate
  ESC▪M▪200A▪▪60MV scale plate for ERCM, 200A/60mV
  ERC▪M▪▪▪5A▪▪D direct input, end scale value 5A



AMMETER INTERCHANGEABLE SCALE PLATE (90°) — ERC48 - ERC72 - ERC96 - ERC144
AMMETER INTERCHANGEABLE SCALE PLATE (240°) — ERCL48 - ERCL72 - ERCL96 - ERCL144

- The main characteristic of these instruments is their low current consumption, in circuits where high internal consumption and drop in voltage can bring about measuring errors. The low consumption means that these instruments can also be used with converters, tacho generators or thermocouples. Up to 60A they can be provided with an incorporated shunt for direct connection, above 60A use a separate shunt.
- **BURDEN** 60mV
- **CLASS** 1,5
- **RANGES**
  MICROAMMETERS (ERC) 50-60-80-100-150-250-400-600-800-900µA
  MICROAMMETERS (ERCL) 100-150-250-400-600-800-900µA
  MILLIAMMETERS: 1-1,5-2,5-4-5-6-10-15-20-25-40-60-100-150-250-400-600-800-900mA
  4/20mA
  AMMETERS: 1-1,5-2,5-4-6-10-15-25-40-60A direct input
  .../60mV, .../150mV input by shunt, secondary 60mV or 150mV
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  ERC▪96▪60A▪D direct input, end scale value 60A, 90°
  ERC▪96▪60MV▪▪S input by shunt, secondary 60mV, without scale plate
  ESC96300A600MV scale plate for ERC96, 300A/60mV
- **WEIGHT (kg)** ERC48 (0,10); ERC72 (0,20); ERC96 (0,25); ERC144 (0,35)
  ERCL48 (0,21); ERCL72 (0,30); ERCL96 (0,40); ERCL144 (0,45)

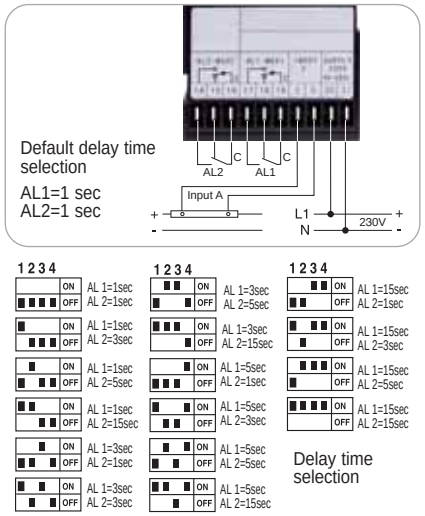


AMMETER WITH 2 ALARM THRESHOLDS
ERCC96A - ERCC96A24 - ERCC96A110 - ERCC96AP1 - ERCC96AP2

- **BURDEN** 3VA
- **POWER SUPPLY/ FREQUENCY** 230V +/-10% 45/65 Hz
- **RANGES**
  MILLIAMMETERS: 1-20-4/20 mA (other on request)
  AMMETERS: 60mV, input by shunt (other on request)
- **RELAYS DATA** Max interruption power with resistive laod 2kVA (8A,250V)
  ERCC96V=AL 1 (MIN) AL 2 (MAX) ERCC96VMA=AL 1 (MAX1) AL 2 (MAX2)
  ERCC96VMI=AL 1 (MIN1) AL 2 (MIN2) ERCC96VMM=AL 1 (MAX-) AL 2 (MAX+)
- **SIGNALLING DATA**

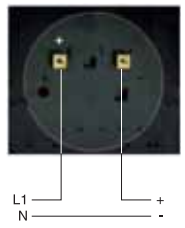
Adjustments by 2 frontal buttons
Class +/- 1,5% referred to the end scale value
Hysteresis < 1% of end scale value
Delay time from 1 to 15 seconds, selectable by minidip situated under the white frame

- How to select the alarms: press the button (AL1 or AL2) and maintain pressure until the lower led moves to the needed value. In alarm condition all leds flash quickly
- **EXAMPLES WHEN ORDERING**
  ERCC96A▪▪100A1 MIN/MAX ammeter, end scale 100/60mV (230VAC)
  ERCC96AMI100AP1 MIN/MIN ammeter, end scale 100/60mV (22...36VAC/19...70VDC)
  ERCC96AMA100AP2 MAX/MAX ammeter, end scale 100/60mV (44...130VAC/70...240VDC)
- **WEIGHT (kg)** 0,50

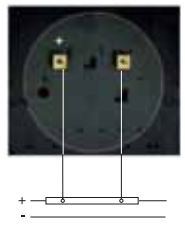


PANEL AMMETER — **EMC55M - EMC70M**
AMMETER WITH 55R OR 70R FRAME — **EMC55M+A55RE - EMC70M+A70R**
AMMETER WITH 55N OR 70N FRAME — **EMC55M+A55NE - EMC70M+A70N**

- Housing in thermoplastic resin. Front in plastic, transparent acrylic with antistatic as standard
- **BURDEN** 60mV
- **CLASS** 1,5
- **RANGES**
  MICROAMMETERS: 50-60-100-150-250-400-500-600-800-900µA direct input
  MILLIAMMETERS: 1-1,5-2,5-4-5-6-10-15-20-25-30-40-60-100-150-250-400-600-800-900mA 4/20mA
  AMMETERS: 1-1,5-2,5-4-5-6-10-15-20-25-30-40-50-60A direct input .../60mV input with Shunt, secondary 60 mV
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  EMC▪70M▪60A▪▪D direct input, end scale value 60A, 1In (60A), Ø70 mm
- **WEIGHT (kg)** 0,18



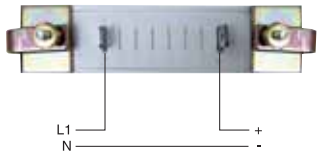
Direct input



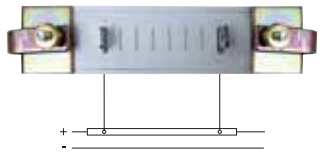
Shunt input

AMMETER (HORIZONTAL PROFILE VERSION) — **ERPC24/O**
AMMETER (VERTICAL PROFILE VERSION) — **ERPC24/V**

- **BURDEN** 1mA
- **CLASS** 1,5
- **RANGES:**
  MICROAMMETERS: 25-50-100-150-200-250-500 µA
  MILLIAMMETERS: 1-5-10-50-100-150-200-250-500-600mA 4/20mA
  AMMETERS: 1-1,5-2-2,5-3-4-5A direct input .../60mV input with Shunt, secondary 60 mV
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  ERPC24/0▪4-20MA direct input, end scale value 4/20mA



Direct input



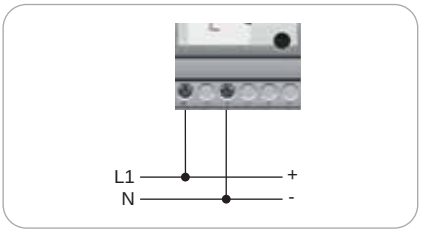
Shunt input

FREQUENCYMETER

WITH POINTER

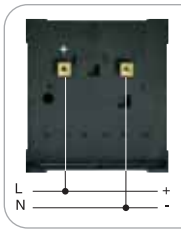
MODULAR VERSION — **ERFM**

- Moving coil system with incorporated electronics
- **BURDEN** 1,5 VA
- **CLASS** 0,5
- **POWER SUPPLY** 110 - 230 - 400V ± 20%
- **THERMIC DRIFT** 0,12%/°C
- **RANGE** 45/65Hz
  Different capacities can be carried out on request
- **DIMENSIONS / WEIGHT** 3 DIN modules / 0,20
- **EXAMPLES WHEN ORDERING**
  ERFM45-65230V power supply 230V, end scale value 45/65Hz
  ERFM45-55110V power supply 110V, end scale value 45/55Hz



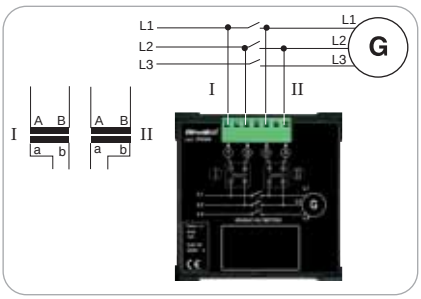
SWITCHBOARD VERSION (90°) — **ERF48 - ERF72 - ERF96 - ERF144**
SWITCHBOARD VERSION (240°) — **ERFL72 - ERFL96 - ERFL144**

- **BURDEN** 1,5 VA
- **CLASS** 0,5
- **THERMIC DRIFT** 0,12% / °C
- **RANGES** 45/65Hz 110V, 230V or 400V
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  ERF▪9645-65400V power supply 400V, end scale value 45/65Hz (90°)
  ERFL7245-65230V power supply 230V, end scale value 45/65Hz (240°)
- **WEIGHT (kg)** ERF48 (0,20); ERF72 (0,22); ERF96 (0,30); ERF144 (0,35)
  ERFL72 (0,27); ERFL96 (0,35); ERFL144 (0,40)



DOUBLE FREQUENCYMETER — **ERF96D**

- These instruments consist of two equipments mounted on a common axis permitting the two pointers indicating on one graduation. In this way there is the immediate comparison of the parallel adjustment. The moving coil system reduces drastically the burden and permits linear graduations.
- **BURDEN** 1,5VA
- **OPERATING FREQUENCY** 45/65 Hz
- **CLASS** 0,5
- **RANGE** 2 x 45/65 Hz (400V)
  Different capacities can be carried out on request
- **EXAMPLES WHEN ORDERING**
  ERF96D400V45-55 power supply 400V, end scale value 2x45/55 Hz
- **WEIGHT (kg)** 0,45



FREQUENCYMETER WITH 2 ALARM THRESHOLDS

ERFC96 - ERFC9624 - ERFC96110 - ERFC96P1 - ERFC96P2

- **BURDEN** 3VA
- **POWER SUPPLY** 230V +/-10%
- **RANGE** 45/65 Hz (other on request) Voltage 100÷600V
- **RELAYS DATA** Max interruption power with resistive laod 2kVA (8A,250V)

ERCC96V=AL 1 (MIN) AL 2 (MAX) ERCC96VMA=AL 1 (MAX1) AL 2 (MAX2)
ERCC96VMI=AL 1 (MIN1) AL 2 (MIN2) ERCC96VMM=AL 1 (MAX-) AL 2 (MAX+)

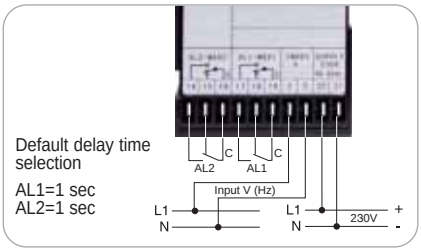
- **SIGNALLING DATA**

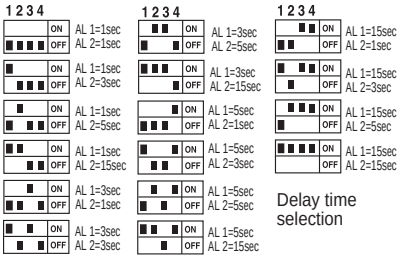
Adjustments by 2 frontal buttons
Class +/- 1,5% referred to the end scale value
Hysteresis < 1% of end scale value
Delay time from 1 to 15 seconds, selectable by minidip situated under the white frame

- How to select the alarms: press the button (AL1 or AL2) and maintain pressure until the lower led moves to the needed value. In alarm condition all leds flash quickly
- **EXAMPLES WHEN ORDERING**

ERFC96▪4565230V MIN/MAX frequencymeter, end scale value 45/65Hz (230VAC)

- **WEIGHT (kg)** 0,50



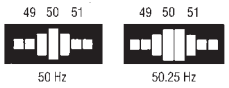


WITH VIBRATING REEDS

FREQUENCYMETER 13 VIBRATING REEDS

ERFV72 - ERFV96

- The difference between the periods of vibration of two adjoining reeds is 0,5 or 1 Hz. In the case of two adjoining reeds vibrating with the same amplitude, the measuring of the frequency will be averaged between the vibration periods of both reeds. If the 50 and 50,5Hz reeds vibrate with the same amplitude, for example, the frequency measured will be 50.25Hz.
Reading example:



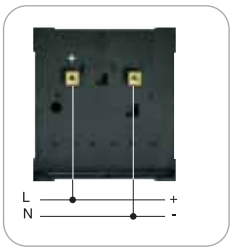
- **BURDEN** 100V = 1,5VA; 230V = 3 VA; 400V = 4 VA
- **CLASS** 0,5
- **RANGES** 47/53Hz 100V / 230V / 400V 57/63Hz 100V / 230V / 400V
45/55Hz 100V / 230V / 400V 55/65Hz 100V / 230V / 400V

Different capacities can be carried out on request

- **EXAMPLES WHEN ORDERING**

ERFV▪96400V57-63 96x96 frequencymeter, power supply 400V, end scale value 47/63Hz
ERFV▪72230V45-55 72x72 frequencymeter, power supply 230V, end scale value 45/55Hz

- **WEIGHT (kg)** ERFV72 (0,25); ERFV96 (0,30); ERFV144 (0,35)



DOUBLE FREQUENCYMETER 2X13 VIBRATING REEDS

ERFVD96

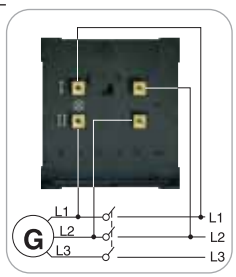
- These instruments are formed of two rows of reeds to permit one instrument alone to measure the frequency of two different lines; it is therefore particulary suitable for paralleling two generators or a generator with the mains.
- **BURDEN** 2x100V = 2x1,5VA; 2x230V = 2x3 VA; 2x400V = 2x4 VA
- **CLASS** 0,5
- **RANGES** 2x47/53Hz 2x100V / 2x230V / 2x400V 2x57/63Hz 2x100V / 2x230V / 2x400V
2x45/55Hz 2x100V / 2x230V / 2x400V 2x55/65Hz 2x100V / 2x230V / 2x400V

Different capacities can be carried out on request

- **EXAMPLES WHEN ORDERING**

ERFVD96400V57-63 96x96 double frequencymeter, power supply 400V, end scale value 57/63Hz

- **WEIGHT (kg)** 0,60



TACHOMETER INDICATOR

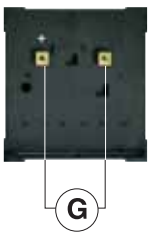
TACHO GENERATOR (D.C.) - 90° **ERCT48D - ERCT72D - ERCT96D - ERCT144D**
TACHO ALTERNATOR (D.C.) - 90° **ERCT48A - ERCT72A - ERCT96A - ERCT144A**
TACHO GENERATOR (D.C.) - 240° **ERCTL48D - ERCTL72D - ERCTL96D - ERCTL144D**
TACHO ALTERNATOR (D.C.) - 240° **ERCTL48A - ERCTL72A - ERCTL96A - ERCTL144A**

- These instruments are moving coil and have an incorporated potentiometer, they are suitable for measuring the number of revolutions on a tacho generator (VDC) or tacho alternator (VAC)
- **BURDEN** 600µA
- **CLASS** 1,5
- When ordering, indicate the scale, unit of measurement, input voltage and number of revolutions.
- **EXAMPLES WHEN ORDERING**

ERCT72D 10VDC 1500G/min indicator for tacho generator where 1500 revs per minute correspond to 10 VDC, 90° scale plate

ERCTL96A 10VCA 100l/h indicator for tacho alternator where 100 litres per hour correspond to 10 VAC, 240° scale plate

- **WEIGHT (kg):** ERCT48 (0,10); ERCT72 (0,20); ERCT96 (0,25); ERCT144 (0,35)
ERCTL48 (0,21); ERCTL72 (0,30); ERCTL96 (0,40); ERCTL144 (0,45)
- **Modular version (ERTCMA for tacho alternator VAC - ERTCMD for tacho generator VDC) on request**



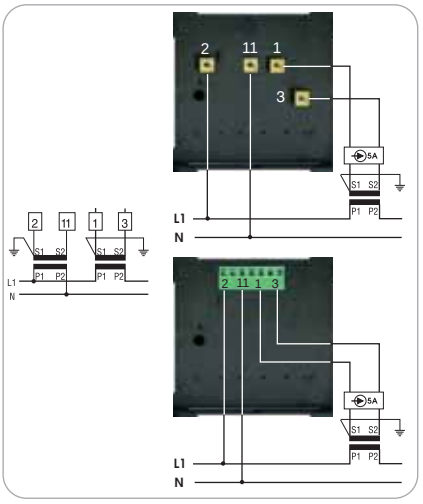
Tacho generator

POWER FACTOR METERS

SINGLE PHASE WITH INCORPORATED ELECTRONICS

POWER FACTOR METER (90°) **ERFA 96/1**
POWER FACTOR METER (240°) **ERFAL 96/1**

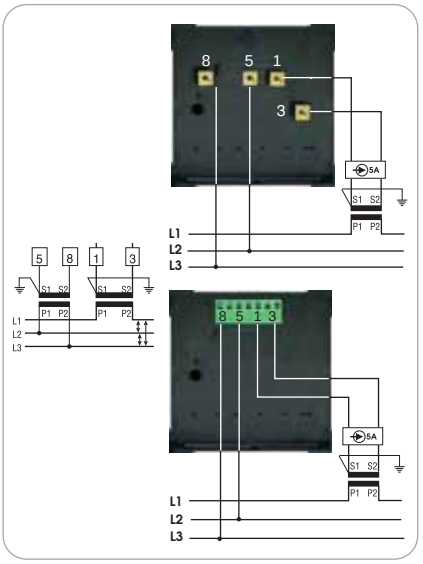
- These instruments are produced in a single housing with an incorporated electronic circuit
- **BURDEN** voltage circuit: 1,5 VA
  current circuit: 0,1 VA
- **CLASS** 2,5
- **RANGE** 0,5-1-0,5 cos φ
- **AUX POWER SUPPLY** 100V, 230V, 400V to be specified when ordering
- **INPUT CURRENT** 5A
- **EXAMPLES WHEN ORDERING**
  ERFA▪96/1▪230V power supply 230V, scale plate 0,5-1-0,5 cos φ, 90°
  ERFAL96/1▪400V power supply 400V, scale plate 0,5-1-0,5 cos φ, 240°
- When testing it is necessary to apply a minimum load of 10% if not the instrument will not indicate any value
- Note: Any operation necessary for installing these instruments must take place in the absolute absence of voltage, as there is no insulation between line and instrument
- On 90° version, pointer is positioned on cos φ =1 when not powered; with capacitive or inductive load the correspondent led will be light on
- **WEIGHT (kg)** ERFA 96/1 (0,45); ERFAL 96/1 (0,50)



THREE PHASE WITH INCORPORATED ELECTRONICS, BALANCED LOAD WITHOUT NEUTRAL

POWER FACTOR METER (90°) **ERFA96/2**
POWER FACTOR METER (240°) **ERFAL96/2**

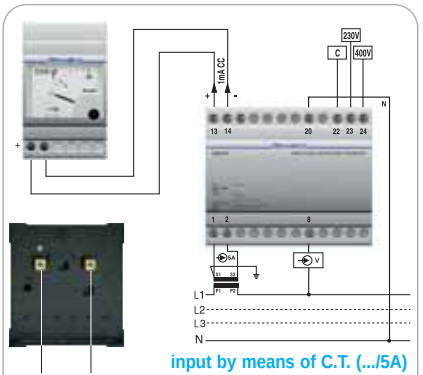
- These instruments are produced in a single housing with an incorporated electronic circuit
- **BURDEN** voltage circuit: 1,5 VA
  current circuit: 0,1 VA
- **CLASS** 2,5
- **RANGE** 0,5-1-0,5 cos φ
- **AUX POWER SUPPLY** 100V, 230V, 400V to be specified when ordering
- **INPUT CURRENT** 5A
- **EXAMPLES WHEN ORDERING**
  ERFA▪96/2▪230V power supply 230V, scale plate 0,5-1-0,5 cos φ, 90°
  ERFAL96/2▪400V power supply 400V, scale plate 0,5-1-0,5 cos φ, 240°
- When testing it is necessary to apply a minimum load of 10% if not the instrument will not indicate any value
- Note: Any operation necessary for installing these instruments must take place in the absolute absence of voltage, as there is no insulation between line and instrument
- On 90° version, pointer is positioned on cos φ =1 when not powered; with capacitive or inductive load the correspondent led will be light on
- **WEIGHT (kg)** ERFA96/2 (0,45); ERFAL96/2 (0,50)



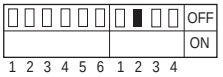
SINGLE PHASE WITH EXTERNAL TRANSDUCER

MODULAR VERSION **ERCM + 1CORFP10**
SWITHCBOARD VERSION (90°) **ERC48/72/96/144 + 1CORFP10**
SWITHCBOARD VERSION (240°) **ERCL48/72/96/144 + 1CORFP10**
SWITHCBOARD VERSION, WITH 2 ALARM THRESHOLDS **ERCC96+ 1CORFP10**

- These measure consist of a 1mA direct current instrument for use with an external multi-voltage accessory (1CORFP10). They have been produced separately to permit the reading of the cosφ with instruments of various designs other than 96x96 mm
- **RANGE** 0,5-1-0,5 cos φA
- **TECHNICAL DATA** ERC... (see the correspondent page)
  1CORFP10 Auxiliary power supply (separate): 230V AC
  Nominal input values:
  voltage: 230V AC
  current: 5A (1A on types 1CORFP10...B)
  Output nominal values: (selectable):
  1 - 5 - 10 - VDC e 1 - 5 - 10 - 20 - 4/20 mADC
  1 mADC degrees value connection with analogue instruments
  Conversion type: proportional to the phase angle
  Resistive load: 700Ω; Class: 0,5
  Overload: Permanent 2 In / 1,2 Un
  Instantaneous 10 In / 2 Un for 1 sec
  Operating frequency: 50 / 60 Hz
  Response time: ≤ 300 ms
  Alternated residual: ≤ 1%
  Burden:
  voltage ≤ 1VA current ≤ 0,8VA aux supply ≤ 4VA
  Galvanic separation between inputs and outputs:
  insulation between inputs and outputs, supply 2kV for 1min at 50Hz
  insulation between all circuits and earth: 4kV for 1min at 50Hz
  Operating temperature: 0 °C ÷ +55 °C
- When testing it is necessary to apply a minimum load of 10% if not the instrument will not indicate any value
- **EXAMPLES WHEN ORDERING**
  CORKIT*=ERC...+1CORFP10 (technical details must be specified)



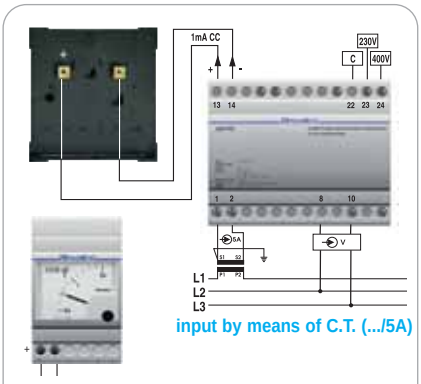
Signal conversion's Dip (present on COR)
proportional to the phase angle (output in degrees, for use with an analogic instrument)



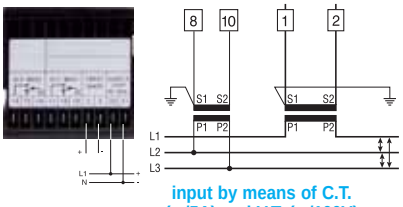
THREE PHASE WITH EXTERNAL TRANSDUCER, BALANCED LOAD WITHOUT NEUTRAL

MODULAR VERSION **ERCM + 1CORFP20**
SWITCHBOARD VERSION (90°) **ERC48/72/96/144 + 1CORFP20**
SWITCHBOARD VERSION (240°) **ERCL48/72/96/144 + 1CORFP20**
SWITCHBOARD VERSION, WITH 2 ALARM THRESHOLDS **ERCC96+ 1CORFP20**

- These measure consist of a 1mA direct current instrument for use with an external multi-voltage accessory (1CORFP20). They have been produced separately to permit the reading of the cosφ with instruments of various designs other than 96x96 mm
- **RANGE** 0,5-1-0,5 cos φA
- **TECHNICAL DATA** ERC... (see the correspondent page)
  1CORFP20 Auxiliary power supply (separate): 230V AC
  Nominal input values:
  voltage: 400V AC
  current: 5A (1A on types 1CORFP20...B)
  Output nominal values: (selectable):
  1 - 5 - 10 - VDC e 1 - 5 - 10 - 20 - 4/20 mADC
  1 mADC degrees value connection with analogue instruments
  Conversion type: proportional to the phase angle
  Resistive load: 700Ω; Class: 0,5
  Overload: Permanent 2 In / 1,2 Un
  Instantaneous 10 In / 2 Un for 1 sec
  Operating frequency: 50 / 60 Hz
  Response time: ≤ 300 ms
  Alternated residual: ≤ 1%
  Burden:
  voltage ≤ 1VA current ≤ 0,8VA aux supply ≤ 4VA
  Galvanic separation between inputs and outputs:
  insulation between inputs and outputs, supply 2kV for 1min at 50Hz
  insulation between all circuits and earth: 4kV for 1min at 50Hz
  Operating temperature: 0 °C ÷ +55 °C
- When testing it is necessary to apply a minimum load of 10% if not the instrument will not indicate any value
- **EXAMPLES WHEN ORDERING**
  CORKIT*=ERC...+1CORFP20 (technical details must be specified)

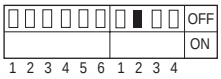


input by means of C.T. (.../5A)



input by means of C.T. (.../5A) and V.T. (.../100V)

Signal conversion's Dip (present on COR)
proportional to the phase angle (output in degrees, for use with an analogic instrument)



WATTMETERS AND VARMETERS

FOR ALTERNATING CURRENT WITH INCORPORATED ELECTRONICS

SINGLE PHASE WATTMETER/VARMETER (90°)	**ERW96/1 - ERV96/1**	**240° INSTRUMENT**	**ERWL96/1 - ERVL96/1**
THREE PHASE WATTMETER/VARMETER (90°)		**240° INSTRUMENT**	
balanced load, 3 wires without neutral	**ERW96/2 - ERV96/2**		**ERWL96/2 - ERVL96/2**
unbalanced load, 3 wires without neutral (ARON)	**ERW96/3 - ERV96/3**		**ERWL96/3 - ERVL96/3**
balanced load, 4 wires with neutral	**ERW96/4 - ERV96/4**		**ERWL96/4 - ERVL96/4**
unbalanced load, 4 wires with neutral	**ERW96/5 - ERV96/5**		**ERWL96/5 - ERVL96/5**

- These instruments are produced in a single housing with an incorporated electronic circuit and indicate the Active and Reactive Power
- **BURDEN** ammeter circuit: 0,5VA, input resistance <50mΩ; voltage circuit: 1,5VA, 16 kΩ / V about
- **INPUT VOLTAGE** 100V, 230V, 400V +/- 20%
- **INPUT CURRENT** 5A
- **OVERLOAD** 1,2 In continuously, 1,5 In for up to two hours; 2 In for up to five seconds
- **WHEN ORDERING PLEASE INDICATE:**
  1) Type of current: single or three-phase; with or without neutral; balanced or unbalanced system; three or four wires
  2) Voltage: between phases, between phase and neutral. If the voltage transformer is used, please indicate the primary and secondary voltage
  3) Current: max 5 A for direct connection. If the current transformer is used please indicate the primary and secondary value.
  4) Scale value. If not indicated, it is calculated by us according to the following table.

By adopting a single instrument with an interchangeable scale and multi-voltage converter it is possible to obtain all the capacities shown on the table below. It is sufficient to select the input voltage on the accessory and to insert the scale corresponding to the current transformer used. If for example there is a need for a mono-phase 380V Wattmeter (Varmeter) with a C.T. ratio of 300/5A; the corresponding scale to insert into the instrument has a 120KW (KVar) scale.
This function only applies if the input voltage is direct and not by means of a V.T. in which case calibration in the factory is preferable. If instead it is necessary to take advantage of the multi-scale function, even if the entry voltage derives from a V.T., eg: 1500/100V, always bearing in mind a mono-phase wattmeter, it is necessary to seek the voltage constant and therefore 1500:100=15.
In order to obtain the scale value to introduce into the indicating instrument, it is necessary to multiply the number found (15) by the value of the scale on the table corresponding to C.T. 300/5A, which is 30KW (KVar). Therefore 15 x 30KW (KVar) = 450KW (KVar)

CT	SINGLE-PHASE WATTMETERS AND VARMETERS			THREE-PHASE WATTMETERS AND VARMETERS		
	100V	230V	400V	100V	230V	400V
5/5 A	500 W (var)	1000 W (var)	2000 W (var)	1000 W (var)	2000 W (var)	4000 W (var)
10/5 A	1000 W (var)	2000 W (var)	4000 W (var)	2000 W (var)	4000 W (var)	8000 W (var)
15/5 A	1500 W (var)	3000 W (var)	6000 W (var)	3000 W (var)	6000 W (var)	12 kW (kvar)
20/5 A	2000 W (var)	4000 W (var)	8000 W (var)	4000 W (var)	8000 W (var)	16 kW (kvar)
25/5 A	2500 W (var)	5000 W (var)	10 kW (kvar)	5000 W (var)	10 kW (kvar)	20 kW (kvar)
30/5 A	3000 W (var)	6000 W (var)	12 kW (kvar)	6000 W (var)	12 kW (kvar)	24 kW (kvar)
40/5 A	4000 W (var)	8000 W (var)	16 kW (kvar)	8000 W (var)	16 kW (kvar)	32 kW (kvar)
50/5 A	5000 W (var)	10 kW (kvar)	20 kW (kvar)	10 kW (kvar)	20 kW (kvar)	40 kW (kvar)
60/5 A	6000 W (var)	12 kW (kvar)	24 kW (kvar)	12 kW (kvar)	24 kW (kvar)	48 kW (kvar)
80/5 A	8000 W (var)	16 kW (kvar)	32 kW (kvar)	16 kW (kvar)	32 kW (kvar)	64 kW (kvar)
100/5 A	10 kW (kvar)	20 kW (kvar)	40 kW (kvar)	20 kW (kvar)	40 kW (kvar)	80 kW (kvar)
150/5 A	15 kW (kvar)	30 kW (kvar)	60 kW (kvar)	30 kW (kvar)	60 kW (kvar)	120 kW (kvar)
200/5 A	20 kW (kvar)	40 kW (kvar)	80 kW (kvar)	40 kW (kvar)	80 kW (kvar)	160 kW (kvar)
250/5 A	25 kW (kvar)	50 kW (kvar)	100 kW (kvar)	50 kW (kvar)	100 kW (kvar)	200 kW (kvar)
300/5 A	**30 kW (kvar)**	60 kW (kvar)	**120 kW (kvar)**	60 kW (kvar)	120 kW (kvar)	240 kW (kvar)
400/5 A	40 kW (kvar)	80 kW (kvar)	160 kW (kvar)	80 kW (kvar)	160 kW (kvar)	320 kW (kvar)
500/5 A	50 kW (kvar)	100 kW (kvar)	200 kW (kvar)	100 kW (kvar)	200 kW (kvar)	400 kW (kvar)
600/5 A	60 kW (kvar)	120 kW (kvar)	240 kW (kvar)	120 kW (kvar)	240 kW (kvar)	480 kW (kvar)
800/5 A	80 kW (kvar)	160 kW (kvar)	320 kW (kvar)	160 kW (kvar)	320 kW (kvar)	640 kW (kvar)
1000/5 A	100 kW (kvar)	200 kW (kvar)	400 kW (kvar)	200 kW (kvar)	400 kW (kvar)	800 kW (kvar)
1500/5 A	150 kW (kvar)	300 kW (kvar)	600 kW (kvar)	300 kW (kvar)	600 kW (kvar)	1200 kW (kvar)
2000/5 A	200 kW (kvar)	400 kW (kvar)	800 kW (kvar)	400 kW (kvar)	800 kW (kvar)	1600 kW (kvar)
2500/5 A	250 kW (kvar)	500 kW (kvar)	1000 kW (kvar)	500 kW (kvar)	1000 kW (kvar)	2000 kW (kvar)

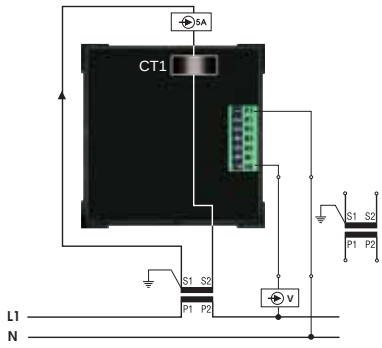
In order to achieve the above, the various converters have been calibrated as follows:
Single phase system
100V, 5A=500W (VAR) 230V, 5A=1000W (VAR) 400V, 5A=2000W (VAR)
Three phase system
100V, 5A=1000W (VAR) 230V, 5A=2000W (VAR) 400V, 5A=4000W (VAR)

Different capacities can be carried out on request

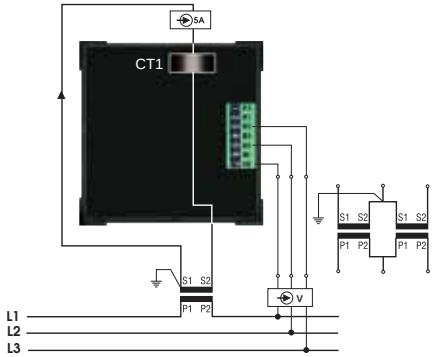
When testing it is necessary to apply a minimum load of 10% if not the instrument will not indicate any value

The scale plates are linear, with values expressed in:
Watt (W), kilowat (kW) Megawatt (MW) for Wattmeters;
Var (Var), kilovar (kvar) Megavar (Mvar) for Varmeters

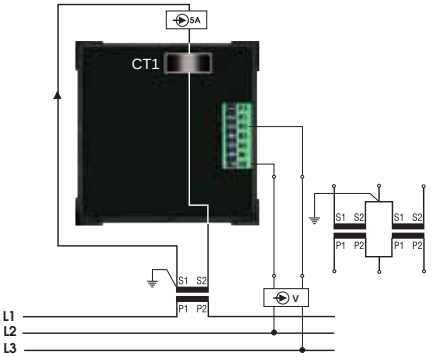
- **EXAMPLES WHEN ORDERING**
  ERW▪96/1▪* (technical details must be specified) Single phase Wattmeter
  ERV▪96/5▪* (technical details must be specified) Three phase Varmeter, unbalanced load, 4 wires with neutral
- **WEIGHT (kg)**
  ERW96 (0,58); ERV96 (0,58); ERWL96 (0,65); ERVL96 (0,65)



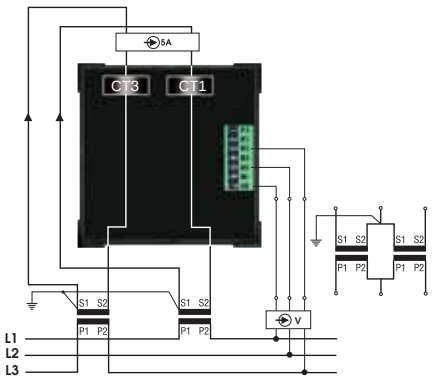
ERW96/1 - ERWL96/1
ERV96/1 - ERVL96/1



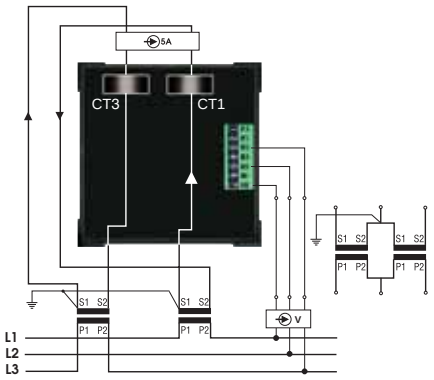
ERW96/2 - ERWL96/2



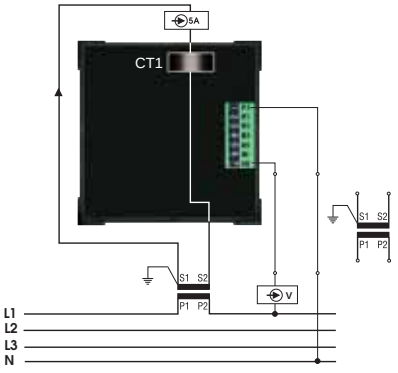
ERV96/2 - ERVL96/2



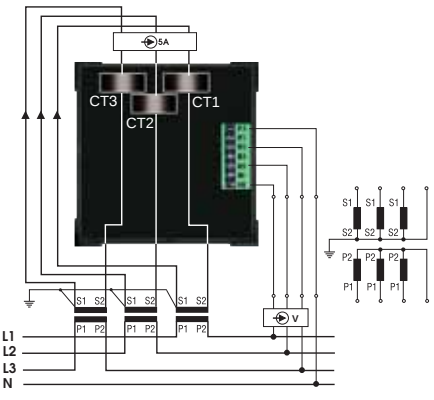
ERW96/3 - ERWL96/3



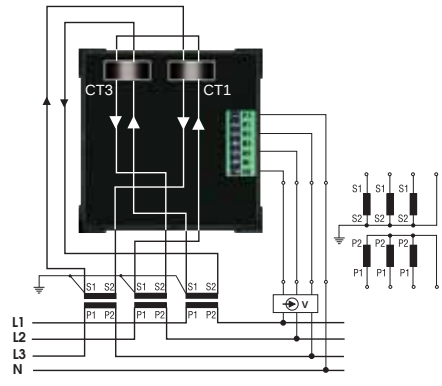
ERV96/3 - ERVL96/3



ERW96/4 - ERWL96/4
ERV96/4 - ERVL96/4



ERW96/5 - ERWL96/5



ERV96/5 - ERVL96/5

	90° INSTRUMENTS ERCM - ERC48 (72-96-144) ERCC96 +	INSTRUMENTS 240° ERCL48 (72-96-144) +
SINGLE PHASE WATTMETER / VARMETER	**1CORPA10 / 1CORPR10**	**1CORPA10 / 1CORPR10**
THREE PHASE WATTMETER / VARMETER		
balanced load, 3 wires without neutral	**1CORPA20 / 1CORPR20**	**1CORPA20 / 1CORPR20**
unbalanced load, 3 wires without neutral (ARON)	**1CORPA30 / 1CORPR30**	**1CORPA30 / 1CORPR30**
balanced load, 4 wires with neutral	**1CORPA40 / 1CORPR40**	**1CORPA40 / 1CORPR40**
unbalanced load, 4 wires with neutral	**1CORPA50 / 1CORPR50**	**1CORPA50 / 1CORPR50**

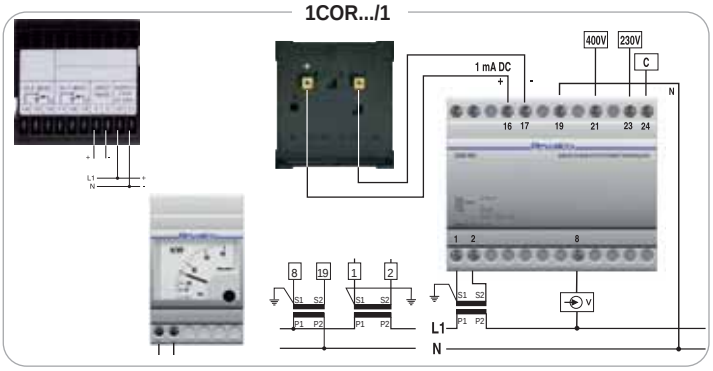
- These measure consist of a 1mA direct current instrument for use with an external multi-voltage accessory (1CORPA/1CORPR). They have been produced separately to permit the reading of the Active and Reactive Power, also with instruments of various designs other than 96x96 mm. This accessory permits the interchangeability of the scale plates as shown on previous page.
- The scale plates are linear with values expressed in: Watt (W), kilowatt (kW), Megawatt (MW), Var (Var), kilovar (kVar) Megavar (MVar)
- **TECHNICAL DATA** ERC... (see the correspondent page)

1CORPA10, 1CORPA20, 1CORPA30, 1CORPA40, 1CORPA50 - 1CORPR10, 1CORPR20, 1CORPR30, 1CORPR40, 1CORPR50:

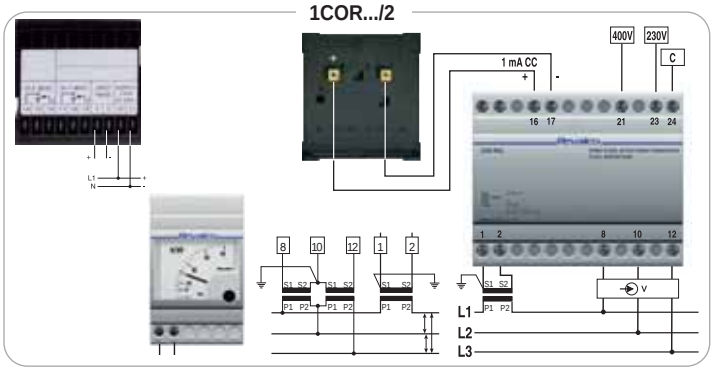
Auxiliary power supply (separate): 230V / 400V AC
Nominal input values: voltage 400V AC; current 5A (1A for model 1CORP...B)
Output nominal values: (selectable): 1 - 5 - 10 - VDC and 1 - 5 - 10 - 20 - 4/20 mA DC
Resistive load: 700Ω; Class: 0,5
Overload: Permanent 2 In / 1,2 Un; Instantaneous 10 In / 2 Un for 1 sec.
Operating frequency: 50 / 60 Hz
Response time: ≤ 300 ms
Alternated residual: ≤ 1%
Burden: voltage ≤ 1VA current ≤ 0,8VA aux supply ≤ 4VA
Galvanic separation between inputs and outputs:
insulation between inputs and outputs, aux supply 2kV for 1min at 50Hz
insulation between all circuits and earth: 4kV for 1min at 50Hz
Operating temperature: 0 °C ÷ +55 °C
Measuring range: 0 ÷ Pn (0 ÷ Qn)
Standard calibration: 100V,5A=500W (Var); 230V,5A=1000W (Var); 400V,5A=2000W (Var)

- **WHEN ORDERING PLEASE INDICATE:**
  1) Reading instrument type: dimensions
  2) System type: single phase or three phase, with or without neutral, balanced or unbalanced load; 3 or 4 wire
  3) Voltage: between phases; between phase and neutral. If the voltage transformer is used please indicate the primary and secondary value.
  4) Current: max 5A for direct connection. If a current transformer is used please indicate the primary and secondary value (the C.T. should however be in class 0,5)
  5) Desired scale value (if different from standard)
- **EXAMPLES WHEN ORDERING** CORKIT*=ERC... +1CORP... (technical details must be specified)

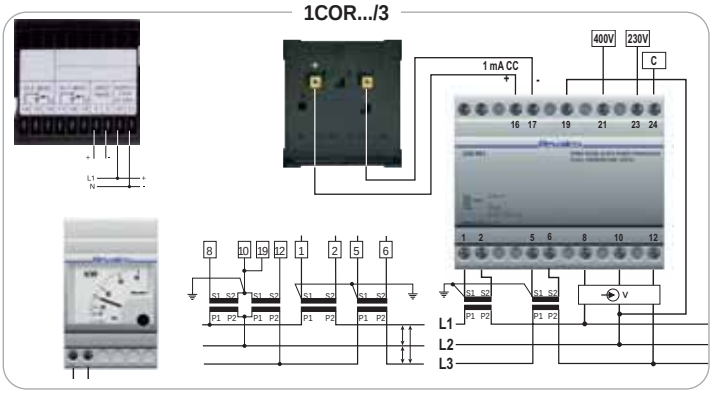
1COR.../1



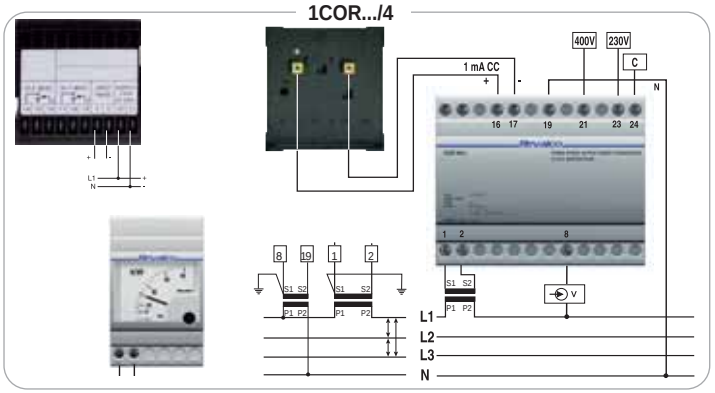
1COR.../2



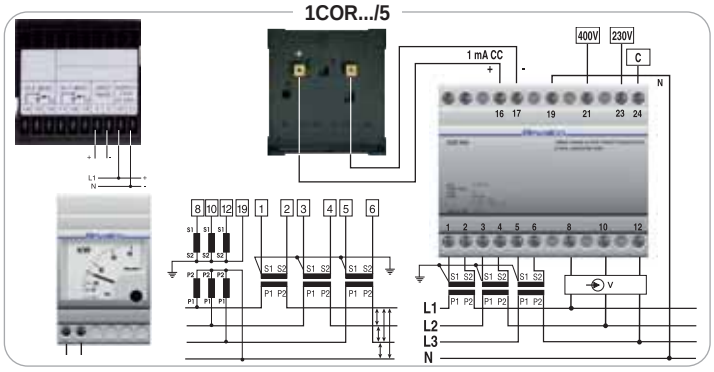
1COR.../3



1COR.../4



1COR.../5



SINGLE PHASE INSULATION INSTRUMENTS

MODULAR VERSION **ERCMMI**

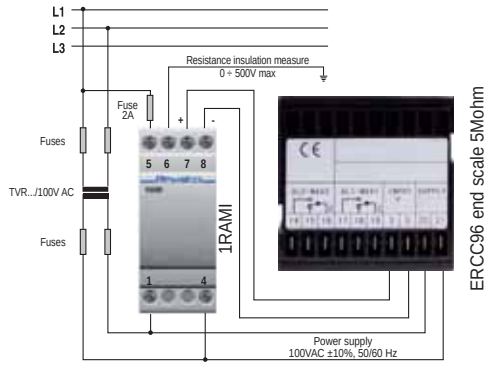
SWITCHBOARD VERSION **ERCC96MI - ERC96MI - ERC72MI - ERC48MI**

- These instruments are used to measure permanently, also with presence of power supply, the insulation toward ground, of single phase lines with insulated neutral; or the insulation toward the positive and negative DC lines. Reading instruments ERCC....MI are furnished with an external power supply accessory (1RAMI)
- **TECHNICAL DATA** ERCC96, ERC..., ERCM (see the correspondent page)
  1RAMI
  - Power supply 100V AC ±10%
  - Frequency: 45 ÷ 65 Hz
  - Temperature: -10°C ÷ +55 °C
  - Overload: 1,2 Vn
  - Measure input voltage: max 500VAC
  - Burden: 1,5 - 2 VA
  - Storage temperature: -40°C ÷ +70 °C
- **EXAMPLES WHEN ORDERING**

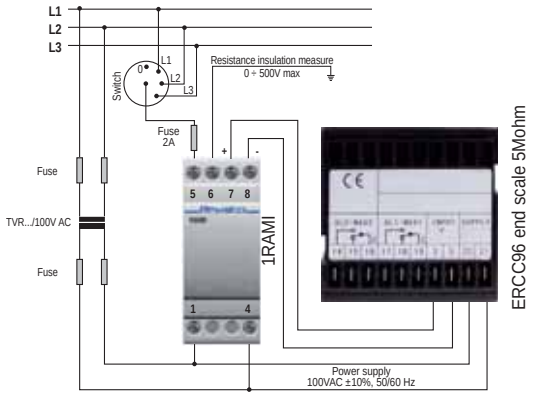
ERCC96MI 100V	(ERCC96 Power supply 100V + 1RAMI Power supply 100V)
ERC96MI 220C	(ERC96 + 1RAMI Power supply 220VDC)
ERC96MI 400	(ERC96 + 1RAMI Power supply 400V)
ERC72MI 24C	(ERC72 + 1RAMI Power supply 24VDC)

A.C. LINE CONNECTION DIAGRAM

WITHOUT switch

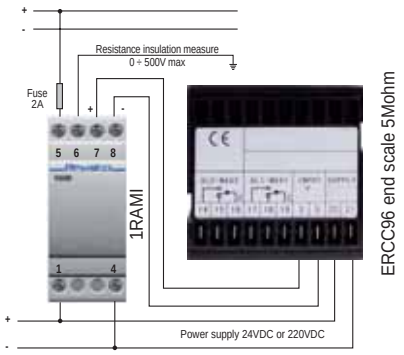


WITH switch

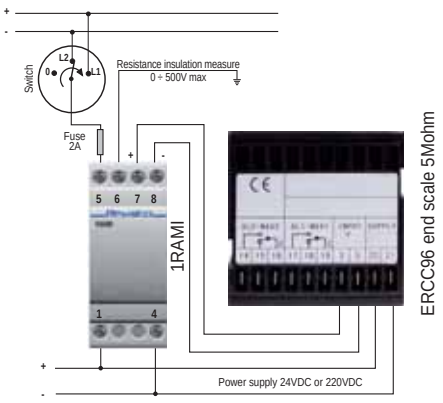


D.C. LINE CONNECTION DIAGRAM

WITHOUT switch



WITH switch



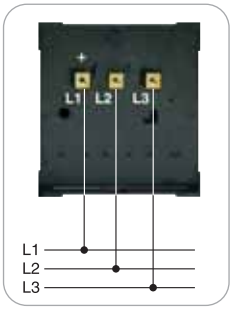
ELECTRONIC SEQUENCY METERS

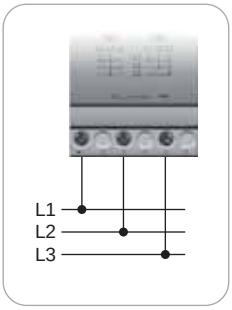
MODULAR VERSION **1RSM**

SWITCHBOARD VERSION **ERS72 - ERS96**

These instruments, for alternating three-phase current, and are used when it is necessary to know whether the sequence of the phases of a three-phase line are correct or not. If the sequence is exact (L1-L2-L3), the green pilot light comes in; if not, the red pilot light will come on. Should one of the phases be missing, the two pilot lights will come on at the same time with a luminous intensity which will be half the original intensity.

- **BURDEN** 1,5VA
- **CLASS** 0,5
- **POWER SUPPLY** sole from 150V to 600V
- **DIMENSIONS / WEIGHT** (1RSM) 3 DIN modules / 0,15 kg
  (ERS72) 72x72/ 0,20 kg
  (ERS96) 96x96/ 0,30 kg
- **EXAMPLES WHEN ORDERING**
  ERS▪M▪▪150-600V ERS▪72▪150-600V ERS▪96▪150-600V



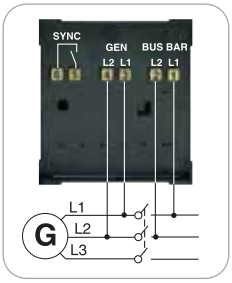


ELECTRONIC SYNCHRONOSCOPES

These instruments are intended for measuring phase difference $\Delta\varphi$ between a bus-bar and a generator.They are provided with a synchronising check relay which enables switch-on of synchronisation when the set parameters are reached. These instruments are equipped with a circular display of phase angle which consists of 18 led's.Momentary phase difference is displayed by led. Within synchronisation range ($\Delta\varphi$=0° between -15°el and +15°el) resolution is increased to 5°el. If difference of frequency between input voltages exceeds 3Hz, three leds above FAST ($f_{gen} > f_{rete}$) or SLOW ($f_{gen} < f_{rete}$) inscription are alternately illuminated. A green SYNC. LED is illuminated when synchronisation conditions are made. A red ΔU led is illuminated when difference between voltages is above the set value or when the bus-bar voltage is lower then 80% of nominal value U_n. In these instruments comparison of the input voltage of generator U_{gen} and net U_{net} method is used ,through and A/D converter of the microprocessor.The input voltages are galvanically insulated by a transformer and a microprocessor controls all the operations of the synchronoscope verifying the values of the input voltages coming from the A/D converter, determining the difference of phase ($\Delta\varphi$) between generator and net. The synchronoscopes are provided with three potentiometers for settting conditions of a synchronisation relay switch-on at the instrument rear side: for setting permitted phase difference $\Delta\varphi$, for setting permitted voltage difference ΔU, for a delay of synchronisation relay switch-on (DELAY). When phase difference and voltage difference between a generator and bus-bar for time of delay of synchronisation check relay are within the set limits, the synchronisation check relay is switched on for approx 150ms. In that time the SYNC. Led is illuminated as well.

SWITHCBOARD VERSION

ERSI96



- **INPUT VOLTAGE TECHNICAL DATA**
  - Nominal voltage U_n: 57, 100, 230, 400 V (to be specified when ordering)
  - Voltage range: Un +/-20%
  - Frequency range: 45/65 Hz
  - Burden (bus-bar): <4 VA
  - Overload: 1,2 U_n continuously; 2 U_n for 3 seconds
- **MEASURING SECTION TECHNICAL DATA:**
  - Resolution of phase difference display: 20° el. Magnification range: ±15° el.
  - Magnification resolution: 5° el. Accuracy class ($\Delta\varphi$=0) ±3° el.
- **SYNCHRONISATION SECTION**
  - Voltage difference setting range: from 1 to 10% accuracy class ± 2,5 %
  - Phase difference setting range: from 2 to 20° el. accuracy class ± 3° el.
  - Switch-on delay time range: from 0,1 to 1 sec accuracy class ± 10%
  - Relay: N.O. 250V/50Hz, 6A - impulse duration 120ms
- **DIMENSIONS / WEIGHT**: 96x96 / 0,45
- **EXAMPLES WHEN ORDERING**: ERSI96▪400V; Synchronoscope with output relay, aux supply 400V

ACCESSORIES

FRONT PROTECTION SYSTEMS

ARP432 - instruments 48x96

ARP433 - instruments 72x72
ARP434 - instruments 96x96

IP65 FRONT PROTECTION

AKIP6548 - instruments 48x48
AKIP6572 - instruments 72x72
AKIP6596 - instruments 96x96

RUBBER GASKETS

A48G - instruments 48x48
A72G - instruments 72x72
A96G - instruments 96x96

REAR TERMINAL COVERS

A48C - instruments 48x48
A72C - instruments 72x72
A96C - instruments 96x96 and 144x144

As indicated remove the terminal cover

BLANK PLATES

ARP48 - instruments 48x48
ARP72 - instruments 72x72
ARP96 - instruments 96x96

ARP4896 - instruments 48x96

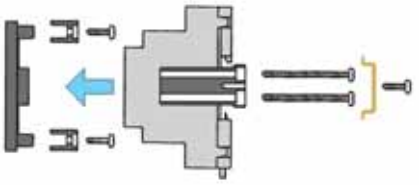
ADAPTERS

ARAD7248 - adapter 72x72, instruments 48x48
ARAD9672 - adapter 96x96, instruments 72x72
ARAD9648 - adapter 96x96, instruments 48x48

ARAD482
adapter 48x96
instruments 36x72

ARAD722 - adapter 72x72, 2 modules instruments
ARAD723 - adapter 72x72, 3 modules instruments
ARAD962 - adapter 96x96, 2 modules instruments
ARAD963 - adapter 96x96, 3 modules instruments
ARAD964 - adapter 96x96, 4 modules instruments

HOW TO MODIFY A 4 DIN MODULES INSTRUMENT INTO A 96X96



ARAD964 +  **4 DIN MODULES INSTRUMENT** =  

96x96 INSTRUMENT

GLASSES

A4890V - instruments 48x48 (90°)
A4890VA - instruments 48x48 (90°) antireflex
APG4890 - instruments 48x48 (90°) policarbonate

A7290V - instruments 72x72 (90°)
A7290VA - instruments 72x72 (90°) antireflex
APG7290 - instruments 72x72 (90°) policarbonate

A9690V - instruments 96x96 (90°)
A9690VA - instruments 96x96 (90°) antireflex
APG9690 - instruments 96x96 (90°) policarbonate

A48240V - instruments 48x48 (240°)
A48240VA - instruments 48x48 (240°) antireflex
APG48240 - instruments 48x48 (240°) policarbonate

A72240V - instruments 72x72 (240°)
A72240VA - instruments 72x72 (240°) antireflex
APG72240 - instruments 72x72 (240°) policarbonate

A96240V - instruments 96x96 (240°)
A96240VA - instruments 96x96 (240°) antireflex
APG96240 - instruments 96x96 (240°) policarbonate

RED POINTER KIT

The kit is composed by: white frame, glass, red pointer and zero adjusting for black pointer

AKIR48 - instruments 48x48
AKIR72 - instruments 72x72
AKIR96 - instruments 96x96

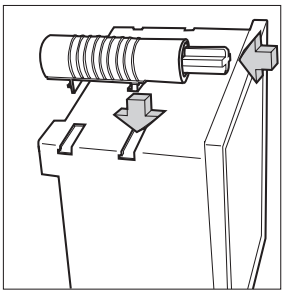
MAXIMUM DEMAND AMMETER KIT

The kit is composed by: white frame, glass, red pointer and zero adjusting

AKB72 - instruments 72x72
AKB96 - instruments 96x96

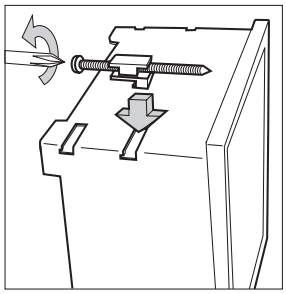
AKBC72 - Combined instruments 72x72
AKBC96 - Combined instruments 96x96

FIXING SYSTEMS



ASF1 - with spring

instruments
48x48, 72x72 and 96x96

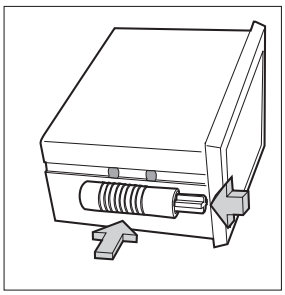


ASF2
screws (standard)

ASF21
screws with flat terminal to avoid holes on plastic panels

ASF22
screws for synotic switchboard

instruments 48x48, 72x72 and 96x96



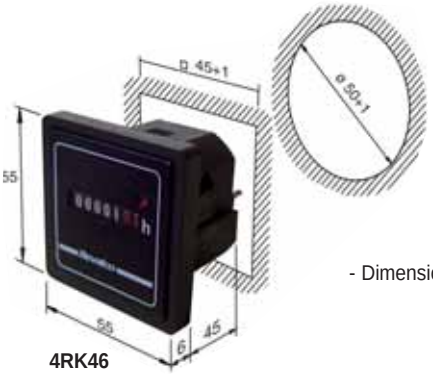
88ASACDGT - with internal spring

instruments 36x72 and 48x96

HOUR METERS

- The hour meters are instruments for measuring time which are particulary suitable for:
  - determing the functioning time of electrical machines, elevators, boilers, electrical stoves etc.
  - determing the intervention time for changing the oil, replacing ball bearings etc. on machinery that is in constant use.
  - determing the functioning time of new machinery with the purpose of establishing when the guarantee expires, such as current rectifiers, valves, lamps etc.
  - determing the sum of the periods during fatigue tests, the duration of electrochemical processes etc.
- In the AC version the instrument is driven by a synchronous motor. The display is composed by 5 entires and 2 decimals (4 mm height)
- In the DC version the movement of the motor is adjusted by a quartz crystal with great stability and a frequency such that, at every 22 degrees of oscillation, an impulse is released when amplified, activates electromagnetic converter. The display is composed by 6 entires and 1 decimal (4 mm height)
- At the end of the counter, the counting begin again automatically from zero. It is not possible to reset the device.
- The necessary voltage is 1,2....1,6V.
- The precision is obtained by means of a variable condenser with a tolerance of +/-0,2 sec/day at room temperature.
- Operating temperature: between -10°C and +55°C.
- Mounting position is indifferent and the housing is in black plastic material.
- The reading class is 1/100 h (36 sec)
- This hourmeters are manufactured following the UL, IEC, TGL21-366, DIN Standards

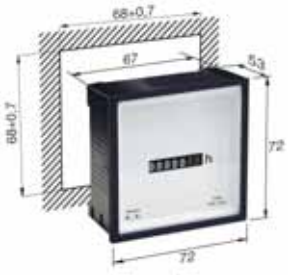
4RK30
Fast-on 6,3x0,8 mm
with screws terminal



4RK46

- Dimensions in mm

4RH96

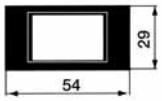


4RH72

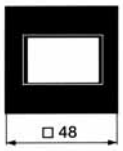
ADAPTER FRAMES

for 4RK30

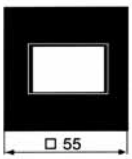
AMRK2448



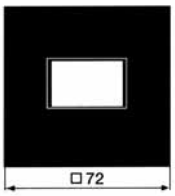
AMRK2954



AMRK4848

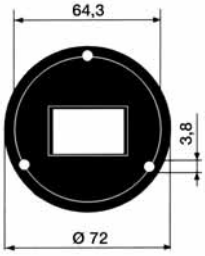


AMRK5555



AMRK7272

AMRKO58



AMRKO72

for 4RK46

AM72

FIXING SYSTEMS

4RK46D
DIN rail mounting

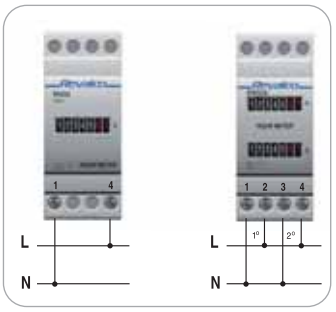
4RK46
4RK46B
Fast and "U-bolt" fixing system

4RK46G
Fast fixing system

MODULAR VERSION

SINGLE: **1RH24-1RH110-1RH230-1RH400-1RH36C**
DOUBLE: **1RHD230**

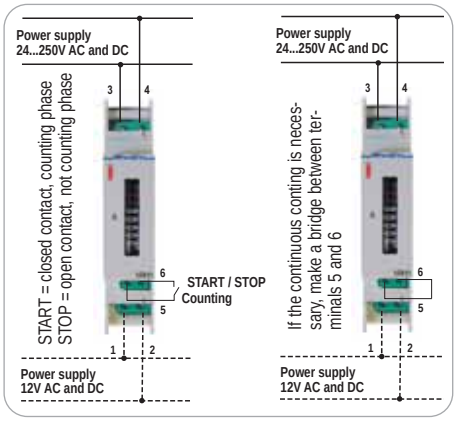
- **BURDEN** — 1 W (single); 2 x 1 W (double)
- **OPERATING FREQUENCY** — 50 or 60 Hz to specify when ordering
- **POWER SUPPLY** (single) — 24 V AC ± 10% Mod. 1RH24 — 110 V AC ± 10% Mod. 1RH110
  230 V AC ± 10% Mod. 1RH230 — 400 V AC ± 10% Mod. 1RH400
  12-36 V DC Mod. 1RH36C
  (double) — 2 x 230V ± 10%
- **PROTECTION DEGREE** — IP20
- **INSULATION CLASS** — II
- **READING CLASS** (single) — 1RH24, 1RH110, 1RH230, 1RH400 1/100h (36 sec)
  1RH36C 1/10h (6 min)
  (double) — 2 x 1/100h (36 sec)
- **TEMPERATURE** — working -10°C ÷ +55°C / storage -25°C ÷ +70°C
- **DISPLAY** — **AC** 99999,99 h; **DC** 99999,9 h / **AC** 2 x 99999,99 h (double)
- **DIMENSIONS / WEIGHT kg.** — 2 DIN modules / 0,10 (single); 0,12 (double)
- **EXAMPLES WHEN ORDERING**
  1RH230 — hourmeter 230V, frequency 50Hz
  1RHD230 — Double hourmeter 230V, frequency 50Hz



MULTI VOLTAGES

1RH1

- **BURDEN** — 0,5 W
- **OPERATING FREQUENCY** — 50/60 Hz
- **SOLE POWER SUPPLY** — 12V AC and DC or from 24 to 250V AC and DC
- **PROTECTION DEGREE** — IP20
- **INSULATION CLASS** — II
- **READING CLASS** — 1/100h
- **TEMPERATURE** — working -10°C ÷ +55°C
  storage -25°C ÷ +70°C
- **DISPLAY** — 99999,99 h
- **INPUT** — not galvanically insulated from power supply
- **DIMENSIONS / WEIGHT kg.** — 1 DIN module / 0,08
- **EXAMPLES WHEN ORDERING**
  1RH1 — modular hourmeter 1DIN module



SWITHCBOARD VERSION

4RK30 - 4RK3024
4RK3048 - 4RK3060
4RK30400 - 4RK301236C

4RK46 - 4RK4624 - 4RK4648
4RK4660 - 4RK46110
4RK46400 - 4RK461050C

4RH72 - 4RH7224 - 4RH7248
4RH7260 - 4RH72110
4RH72400 - 4RH721050C

4RH96 - 4RH9624 - 4RH9648
4RH9660 - 4RH96110
4RH96400 - 4RH961050C

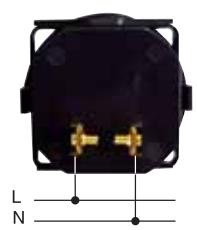
4RK7R

	AC CURRENT		DC CURRENT		AC AND DC CURRENT
	4RH-4RK46	**4RK30**	**4RH**	**4RK30**	**4RK7R - 4RK6Q**
- **BURDEN**	1,5VA	1 VA	from 0,07 to 2W	from 0,04 to 0,2W	
- **POWER SUPPLY** (to specify)	110 - 230VAC (+10% / -15%) 400VAC (± 5%)		10...50 V	12...36V	10...60V
- **FREQUENCY** (to specify)	50Hz or 60Hz				
- **DISPLAY**	99999,99 h (5 entires + 2 decimals)		999999,9 h (6 entires + 1 decimal)		99999,99 h (5 ent. + 2 dec.)
- **PROTECTION DEGREE**	4RK46 = IP54 / 4RH72 / 4RH96 = IP52	IP40	4RK46 = IP54 / 4RH72 / 4RH96 = IP52	IP40	IP65

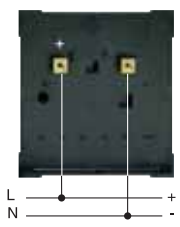
- Using the AM72 frame with the hourmeter type 4RK46, this device change the external dimensions into 74x74 mm
- Model 4RK30 is supplied complete of fast fixing system and AMRK2448 frame
- Model 4RK46 is supplied with fast fixing system and “U-bolt” fixing system
- Model 4RK46D has DIN rail mounting system on the back.
- **EXAMPLES WHEN ORDERING**
  4RK46 — hourmeter 230V, frequency 50Hz
  4RH72▪110▪60HZ — hourmeter 110V, frequency 60Hz
  4RH96▪400 — hourmeter 400V, frequency 50Hz
  4RK30▪▪▪▪▪60HZ — hourmeter 230V, frequency 60Hz
- **WEIGHT (kg):** — 4RK46 (0,09), 4RH72 (0,18), 4RH96 (0,20), 4RK30 (0,05)

4RK46+AM72

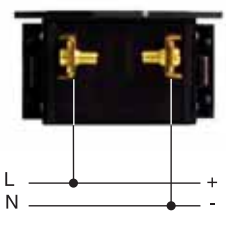
4RK7R



4RH....

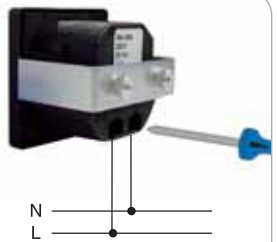


4RK30



4RK46....

4RK46B...

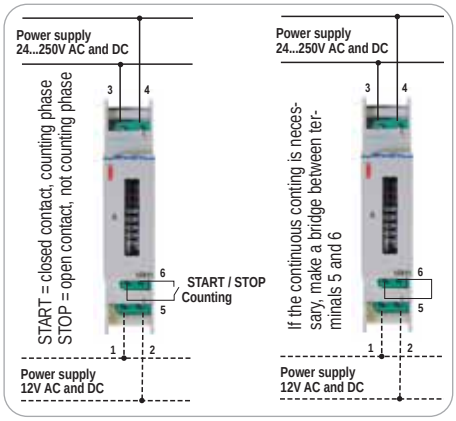


HOUR METERS WITH CERTIFICATIONS FOR FISCAL USE

MULTI VOLTAGES MODULAR VERSION — 1RH1

- **BURDEN** 0,5 W
- **OPERATING FREQUENCY** 50/60 Hz
- **SOLE POWER SUPPLY** 12V AC and DC or from 24 to 250V AC and DC
- **PROTECTION DEGREE** IP20
- **INSULATION CLASS** II
- **READING CLASS** 1/100h
- **TEMPERATURE** working -10°C ÷ +55°C
  storage -25°C ÷ +70°C
- **DISPLAY** 99999,99 h
- **INPUT** not galvanically insulated from power supply
- **DIMENSIONS / WEIGHT kg.** 1 DIN module / 0,08
- **EXAMPLES WHEN ORDERING**

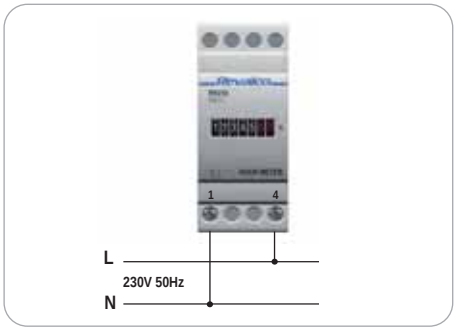
  1RH1 modular hourmeter 1DIN module



MODULAR VERSION — 1RH230

- **BURDEN** 1 W
- **OPERATING FREQUENCY** 50 Hz
- **POWER SUPPLY** 230V ± 10% (other on request)
- **PROTECTION DEGREE** IP20
- **INSULATION CLASS** II
- **READING CLASS** 1/100h
- **TEMPERATURE** working -10°C ÷ +55°C
  storage -25°C ÷ +70°C
- **DISPLAY** 99999,99 h
- **DIMENSIONS / WEIGHT kg.** 2 DIN modules / 0,12
- Customer can seal the hourmeter putting it into the proper box (to buy in the maket)
- **EXAMPLES WHEN ORDERING**

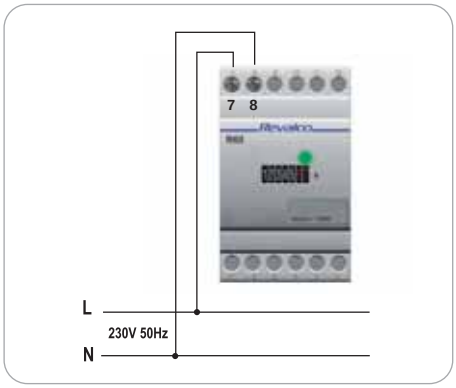
  1RH230 modular hourmeter 2 DIN modules 230V, 50Hz



MODULAR VERSION — 1RH3

- **BURDEN** 1 W
- **OPERATING FREQUENCY** 50 Hz
- **POWER SUPPLY** 230V ± 10% (other on request)
- **PROTECTION DEGREE** IP20
- **INSULATION CLASS** II
- **READING CLASS** 1/100h
- **TEMPERATURE** working -10°C ÷ +55°C
  storage -25°C ÷ +70°C
- **DISPLAY** 99999,99 h
- **LED** light-on = voltage presence
- **DIMENSIONS / WEIGHT kg.** 3 DIN modules / 0,18
- **EXAMPLES WHEN ORDERING**

  1RH3 modular hourmeter 3 DIN modules 230V, 50Hz

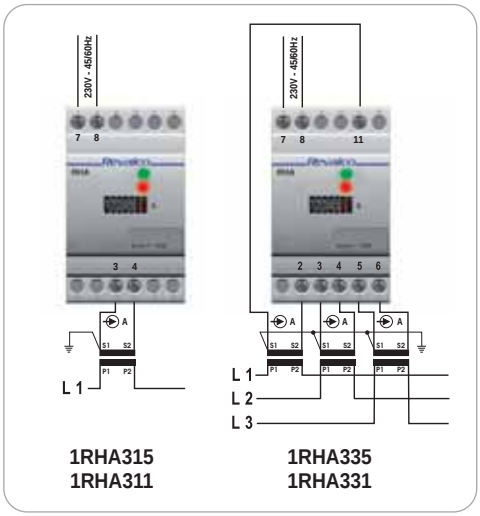


MODULAR VERSION WITH INCORPORATED MINIMUM LOAD THRESHOLD

One input current 5A — **1RHA315**
Three input currents 5A — **1RHA335**
One input current 1A — **1RHA311**
Three input currents 1A — **1RHA331**

- **BURDEN** 1 W
- **OPERATING FREQUENCY** 50/60 Hz
- **POWER SUPPLY** 230V and 100V ± 10% (other on request)
- **PROTECTION DEGREE** IP20
- **INSULATION CLASS** II
- **READING CLASS** 1/100h
- **TEMPERATURE** working -10°C ÷ +55°C
  storage -25°C ÷ +70°C
- **DISPLAY** 99999,99 h
- **LED** **green** light-on = voltage presence
  red light-on = working because the minimum load limit is overpassed
- **DIMENSIONS / WEIGHT kg.** 3 DIN modules / 0,18
- Minimum load threshold limit is calibrated in factory at 1/200 of nominal current
  So: 0,025A in case of nominal current = 5A
  0,005A in case of nominal current = 1A
- **EXAMPLES WHEN ORDERING**

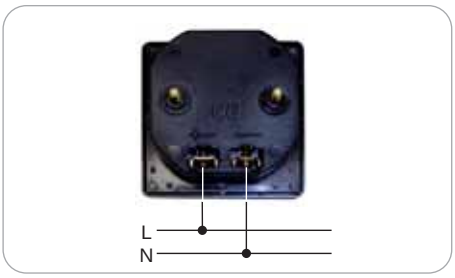
  1RHA315 hourmeter with one input current 5A, 230V
  1RHA331 hourmeter with three input currents 1A, 230V
  1RHA335 100 hourmeter with three input currents 5A, 100V



SWITCHBOARD VERSION **4RK46**

- **BURDEN** 1,5 VA
- **OPERATING FREQUENCY** 50 Hz
- **POWER SUPPLY** 230V ± 10% (other on request)
- **PROTECTION DEGREE** IP54
- **INSULATION CLASS** II
- **READING CLASS** 1/100h
- **TEMPERATURE** working -10°C ÷ +55°C; storage -25°C ÷ +70°C
- **DISPLAY** 99999,99 h
- **DIMENSIONS / WEIGHT kg** 55x55x56 / 0,09
- Customer can seal the hourmeter putting it into the proper box (to buy in the maket)
- **EXAMPLES WHEN ORDERING**

4RK46 hourmeter 230V, 50Hz



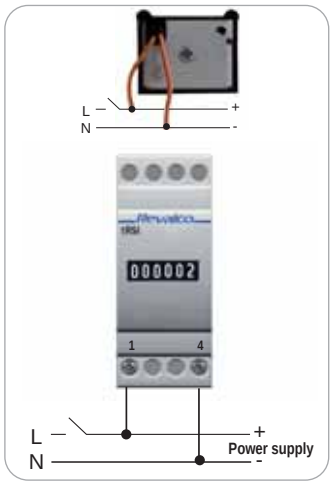
"FULL CERTIFICATION SERVICE " FOR FISCAL USE – RCCM

REVALCO is able to give a complete certification service in order to obtain from the Custom Agency/UTF the FISCAL LICENCE permission relieving the final customer to loose a lot of time.

IMPULSE COUNTERS

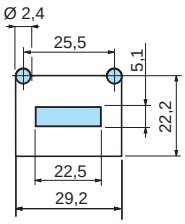
Impulse counters are designed to count electrical impulses received from various sources i.e. photocopies, bottles on a conveyor, rotating wheels etc. The RSI.62 series impulse counters are of robust construction and are designed to withstand mechanical shock.
It is not possible to reset the counters

	AC CURRENT	DC CURRENT
- **BURDEN**	1,2W power supply from 6 to 110 VAC 4W power supply 230VAC	1,2W
- **POWER SUPPLY** to specify when ordering:	6 - 12 - 24 - 48 - 60 - 110 - 230VAC (±10%)	6 - 12 - 24 - 48 - 60 - 110VDC (±10%)
- **DISPLAY**	999999 - 6 entires - height 4 mm	
- **MINIMUM DURATION OF IMPULSE**	100ms	50ms
- **MINIMUM DURATION OF PAUSE**	100ms	50ms
- **OPERATING TEMPERATURE**	-10°C ÷ +50°C	
- **MECHANICAL LIFE**	20 ^{6} operations	
- **TEST VOLTAGE**	500V - 50Hz	
- **COUNTING SPEED**	10 impulses/sec	
- **WEIGHT (kg)**	0,09	
- **EXAMPLES WHEN ORDERING**	5RSI62.4 (impulse counter 230VAC); 5RSI62▪110 (impulse counter 110VAC)	

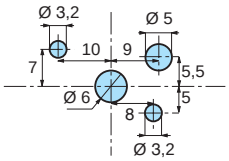


5RSI62.0

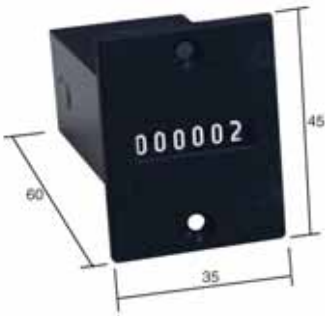
Front fixing

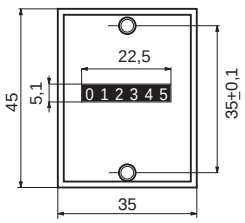


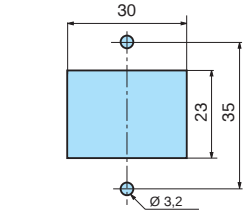
Rear fixing



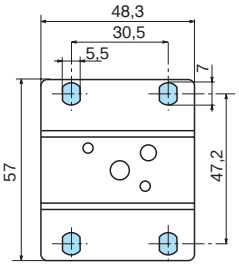
5RSI62.2







5RSI62.4



1RSI

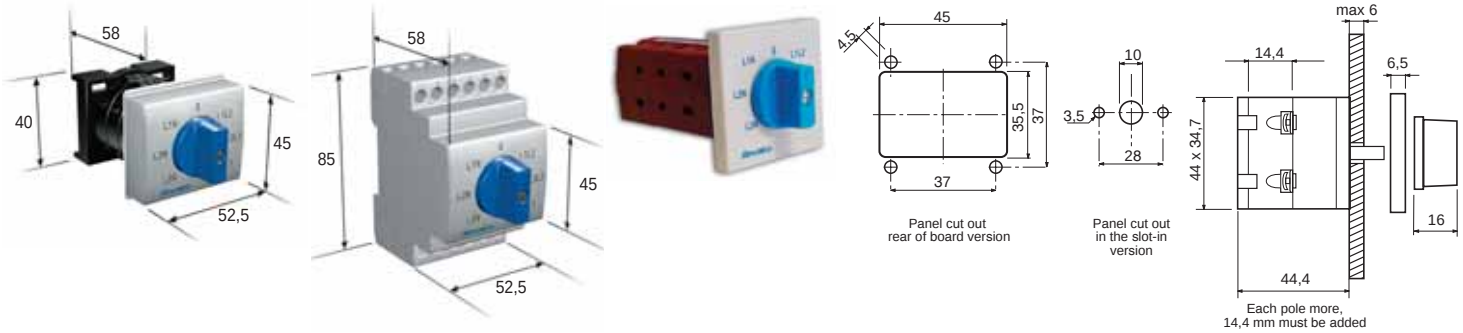
SWITCHES

The cam switches shown in this catalogue have been constructed in accordance with the specifications contained in the CEI 23-11, CEI 17-11, IEC 408, CEE 24, VDE 0660 T107.
- The contacts are electrosoldered in Silver/Nickel, and the contact angle is 45°
- The voltage referring to the insulation is 660V (690V for swithboard version) with AC1 nominal current = 12A
- The mechanical life is 1.5 million operations with running temperature.
  Running temperature ranging from -20°C to + 60°C.
- Burden less than 0,5W/pole
- The degrees of protection on the clamps is in IP40
- This protection can however be increased with the use (after assembly) of the special types of protection.

For these pieces of equipment an earth clamp is not required as all the rotating parts are completely isolated from the parts carrying voltage.
On request, switches with special diagrams are also produced.

Accessory: **AR109DF**
Flexible transparent protective casing for switchboard version)

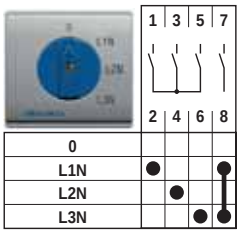
DIMENSIONS in mm



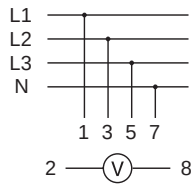
VOLTMETER SELECTOR SWITCHES

PHASE-NEUTRAL CONNECTION
2 elements

1RCO1215QP switchboard version
1RCO1215D modular version

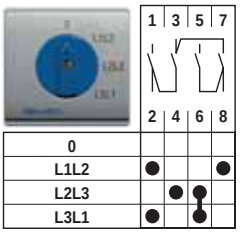


	1	3	5	7	2	4	6	8
0								
L1N	●							●
L2N		●					●	
L3N			●				●	

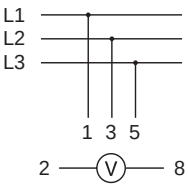


PHASE-PHASE CONNECTION
2 elements

1RCO1216QP switchboard version
1RCO1216D modular version

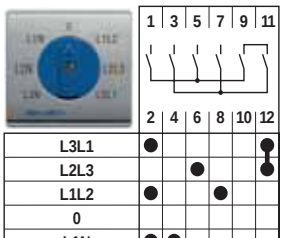


	1	3	5	7	2	4	6	8
0								
L1L2	●							●
L2L3		●					●	
L3L1	●						●	

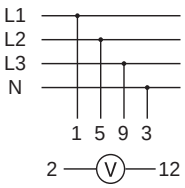


PHASE-PHASE AND PHASE-NEUTRAL CONNECTION
3 elements

1RCO1218QP switchboard version
1RCO1218D modular version

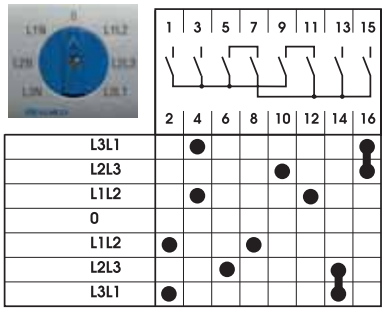


	1	3	5	7	9	11	2	4	6	8	10	12
L3L1	●											●
L2L3									●			●
L1L2	●									●		
0												
L1N	●							●				
L2N								●	●			
L3N								●			●	

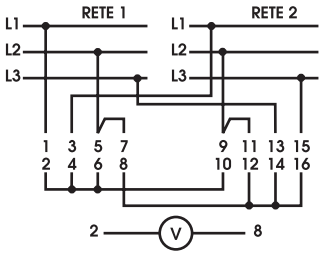


PHASE-PHASE FOR TWO DIFFERENT LINES CONNECTION
4 elements

2RCO1217QP switchboard version

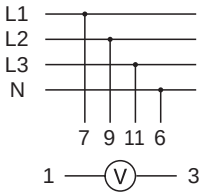


	1	3	5	7	9	11	13	15	2	4	6	8	10	12	14	16
L3L1										●						●
L2L3													●			●
L1L2										●					●	
0																
L1L2	●											●				
L2L3											●					
L3L1	●														●	



PHASE-PHASE AND PHASE-NEUTRAL CONNECTION IN CASE

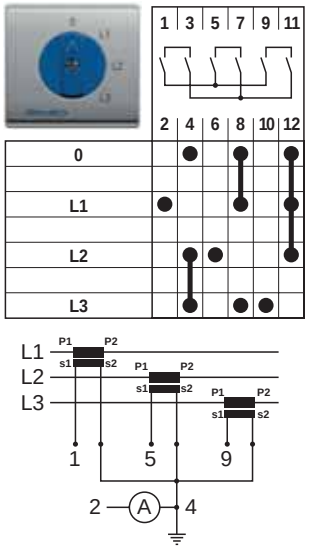
1RCO1218DS 3 DIN modules



AMMETER SELECTOR SWITCHES

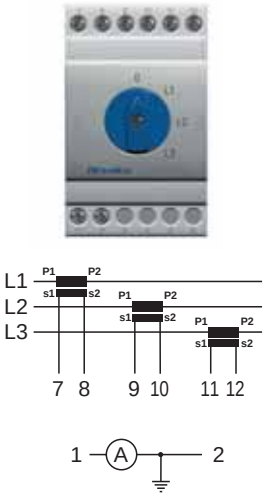
SINGLE POLE 3 CTs
3 elements

1RCO1222QP switchboard version
1RCO1222D modular version



SINGLE POLE 3 CTs IN CASE
3 elements

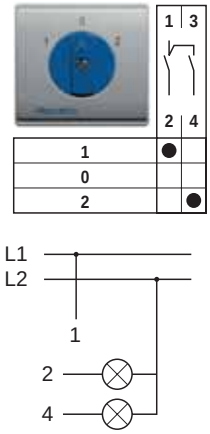
1RCO1222DS 3 DIN modules



CHANGE-OVER SWITCHES

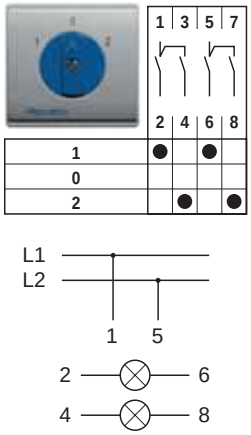
SINGLE POLE
1 element

1RCO1205D modular version



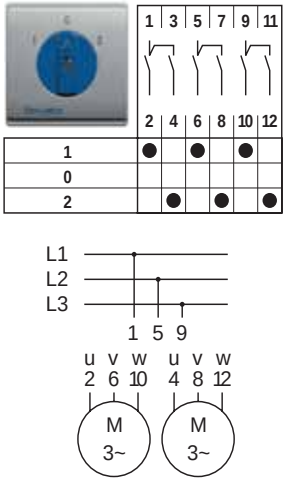
2 POLES
2 elements

1RCO1206D modular version



3 POLES
3 elements

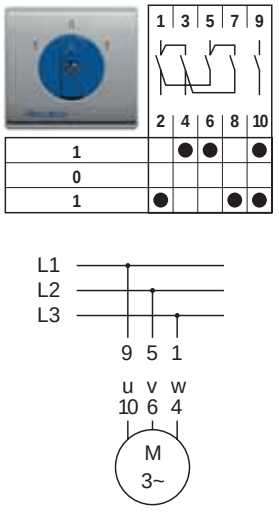
1RCO1207D modular version



REVERSING SWITCHES

3 POLES
3 elements

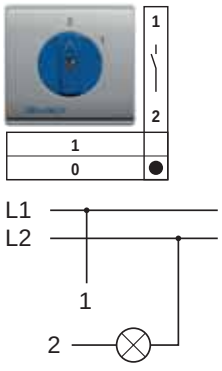
1RINV1206D modular version



ON-OFF SWITCHES

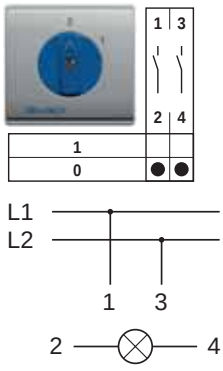
SINGLE POLE
1 element

1RIN1201D modular version



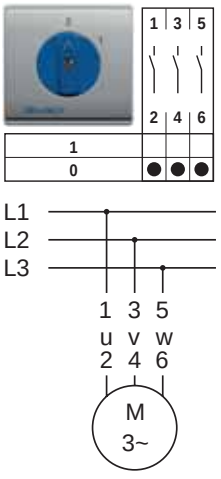
2 POLES
2 elements

1RIN1202D modular version



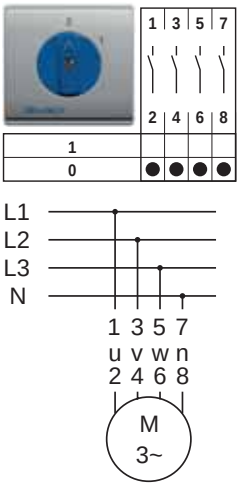
3 POLES
3 elements

1RIN1203D modular version



4 POLES
4 elements

1RIN1204D modular version



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