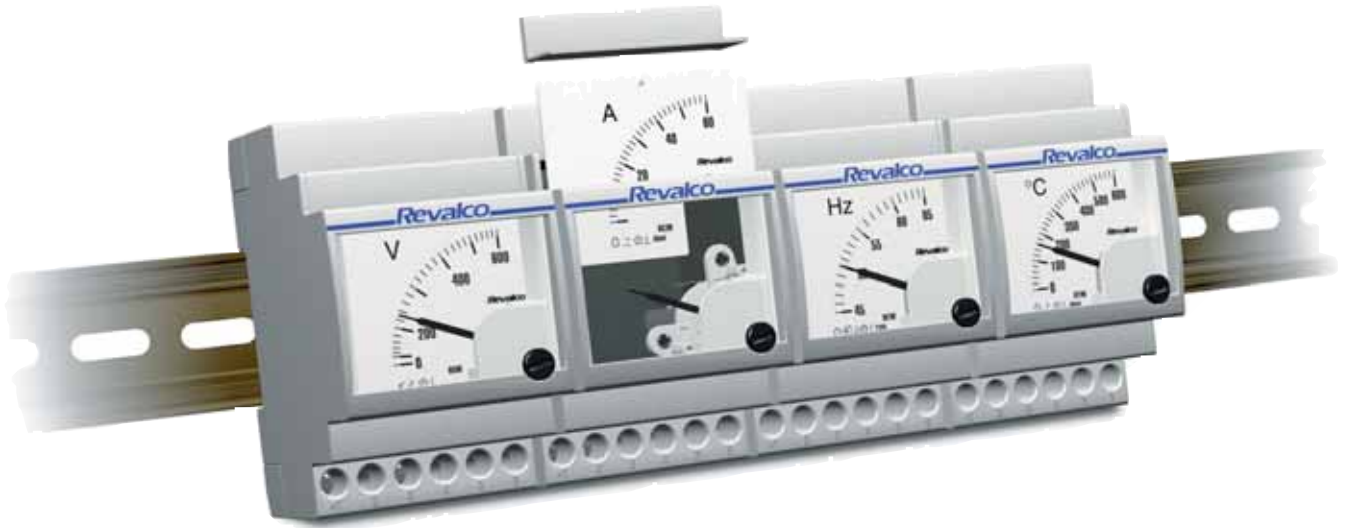
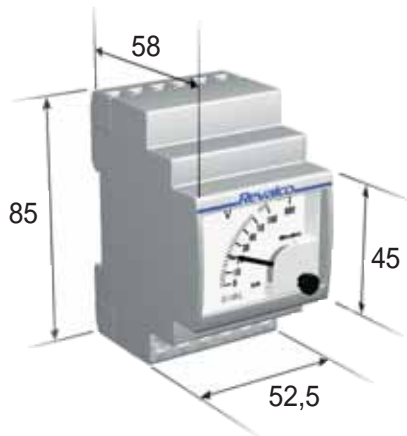


ANALOGUE INSTRUMENTS

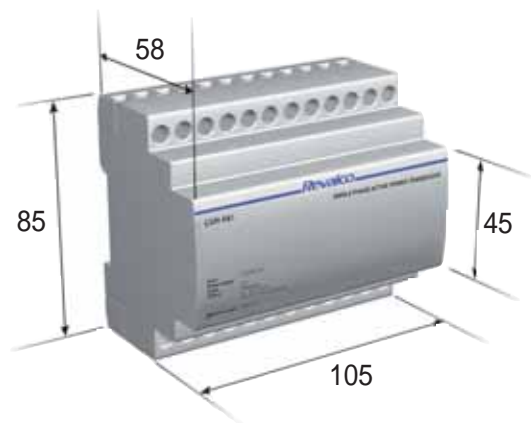


DIMENSIONS in mm



- The 52.5 mm dimensions correspond to 3 DIN modules (17.5 mm each)
- Weight: 0,15 Kg

EXTERNAL TRANSDUCER



- The 105 mm dimensions correspond to 6 DIN modules (17.5 mm each)
- Weight: 0,45 Kg

A.C. MOVING IRON INSTRUMENTS



ERIM

- **BURDEN** Ammeters 0,3 VA - Voltmeters 1,5 VA
- **FREQUENCY** 40 ÷ 60 Hz
- **ACCURACY** Class 1,5
- **AMMETER CAPACITIES** 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
- **VOLTMETER CAPACITIES** 6-10-15-25-40-60-100-150-250-300-400-500-600V direct input
.../100V-.../110V input by means of V.T. with secondary 100V or 110V
- **Different capacities can be carried out on request**
- **DIMENSIONS** 3 DIN modules
- **EXAMPLES WHEN ORDERING**
 - ERIM 5A1 + ESIM 100A1 ammeter input with C.T., secondary 5A with 100/5A scale, **1 In**
 - ERIM 5A2 + ESIM 100A2 ammeter input with C.T., secondary 5A with 100/200/5A scale, **2 In**
 - ERIM 5A5 + ESIM 100A5 ammeter input with C.T., secondary 5A with 100/500/5A scale, **5 In**
 - ERIM 10A1 ammeter direct input with 10A scale, **1 In**
 - ERIM 25A2 ammeter direct input with 25A scale, **2 In (25/50A)**
 - ERIM 1A1 + ESIM 40A1 ammeter input with C.T., secondary 1A with 40/1A scale, **1 In**
 - ERIM 1A2 + ESIM 40A2 ammeter input with C.T., secondary 1A with 40/80/1A scale, **2 In**
 - ERIM 1A5 + ESIM 40A5 ammeter input with C.T., secondary 1A with 40/200/1A scale, **5 In**
 - ERIM 300V voltmeter direct input, 300V scale
 - ERIM 100V + ESIM 500/100V voltmeter input by means of V.T., secondary 100V with 500/100V scale for 500/100V V.T.
- **For connection diagram see page 14**

D.C. MOVING COIL INSTRUMENTS



ERCM

- **BURDEN** Ammeters 60mV - Voltmeters 1000ΩV
- **ACCURACY** Class 1,5
- **MICROAMMETER CAPACITIES** 100-150-250-400-500-600μA direct input
- **MILLIAMMETER CAPACITIES** from 1 to 600 mA 4/20mA direct input
- **AMMETER CAPACITIES** 1-1,5-2,5-4-5-6-10-15-20-25-30A direct input
.../60mV input by means of external 60mV shunt
- **MILLIVOLTMETER CAPACITIES** from 60 to 600 mV direct input
- **VOLTMETER CAPACITIES** 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** 3 DIN modules
- **EXAMPLES WHEN ORDERING**
 - ERCM 15A ammeter for direct input 15A scale
 - ERCM 60mV + ESCM 100A ammeter for input by means of shunt, secondary 60mV with 100A/60mV scale
- **For connection diagram see page 14**

FREQUENCYMETERS



ERFM

- **BURDEN** 1,5 VA
- **ACCURACY** Class 0,5
- **Moving coil system with incorporated electronics**
- **SUPPLY VOLTAGE** 110 - 230 - 400V ± 20%
- **THERMIC DRIFT** 0,12%/°C
- **STANDARD CAPACITY** 45/65Hz
- **Different capacities can be provided on request**
- **DIMENSIONS** 3 DIN modules
- **EXAMPLE WHEN ORDERING**
 - ERFM 230V 45/65Hz frequencymeter with 230V power supply 45/65Hz scale
- **For connection diagram see page 14**

ZEROVOLTMETERS



ERZM

- **BURDEN** 1 mA
- **ACCURACY** Class 1,5
- These instruments are made up of moving components with internal rectifier. The instrument can be used instead of the Synchronoscope in the synchronizing of two generators or of one generator and the network. When the two voltages to be synchronized are the same the instrument indicates "zero".
- **STANDARD CAPACITY** from 0 to 100V extended as far as 800V
(The instrument can, in other words, be used with all the voltages as the equipment withstands up to a continuous 800V)
- **DIMENSIONS** 3 DIN modules
- **EXAMPLE WHEN ORDERING**
ERZM 440V zero-voltmeter with 440V supply
- For the connection diagram see page 14

VOLTMETERS WITH SUPPRESSED ZERO



ERZSM

- **BURDEN** 1 VA
- **ACCURACY** Class 1,5
- These instruments are made up of moving coil movements with internal rectifier and are used to determine very precisely the nominal value of the alternating sinusoidal voltage. The measuring range goes from 90% to 110% approximately of the nominal voltage.
- **CAPACITIES** 0-90/110V, 0-100/120V, 0-200/240V, 0-340/420V
- **DIMENSIONS** 3 DIN modules
- **EXAMPLE WHEN ORDERING**
ERZSM 0-100/120V voltmeter with suppressed zero and 100V supply voltage
- For the connection diagram see page 14

PHASE SEQUENCE METERS



1RSM

- **BURDEN** 1,5 VA
- **SUPPLY VOLTAGE** single from 150V to 600V
- These instruments for three-phase alternating current are used to determine whether the sequence of the phases in a three-phase system are correct. If the sequence is correct (L1-L2-L3) the green pilot light comes on; if not the red light comes on. If one of the phases is lacking both lights will come on but with reduced luminous intensity.
- **DIMENSIONS** 3 DIN modules
- **EXAMPLE WHEN ORDERING**
1RSM 150-600V
- For the connection diagram see page 14

TEMPERATURE INDICATORS



ERTM

- **BURDEN** 500 μ A
 - **ACCURACY** Class 1,5
 - Measuring of the ΔT , for assessing the temperature by means of 500°C thermocouple.
 - Very sensitive moving coil system instruments provided with internal potentiometer for line compensation.
 - **STANDARD CAPACITIES**
- | Fe/CuNi (Fe-Const) | Ra max | NiCr/Ni | Ra max | PtRh/Pt | Ra max |
|--------------------|--------|-----------|--------|-----------|--------|
| 0-600 °C | 20 ohm | 0-600 °C | 20 ohm | 0-1200 °C | 20 ohm |
| 0-900 °C | 20 ohm | 0-900 °C | 20 ohm | 0-1600 °C | 20 ohm |
| | | 0-1200 °C | 20 ohm | | |
- **DIMENSIONS** 3 DIN modules
 - **EXAMPLES WHEN ORDERING**
ERTM 600 °C Fe/CuNi temperature indicator for Fe/CuNi probe 600 °C scale
ERTM 1200 °C NiCr/Ni temperature indicator for Ni/CrNi 1200 °C scale
 - For the connection diagram see page 14

TACHOMETER MULTISCALE INDICATORS



ERTCMD/1/2/3

- **BURDEN** 1000 ohm/V
- **ACCURACY** Class 1,5
- The instruments are made up of moving coil movements with an incorporated potentiometer. The advantage of these instruments is that, with only three pieces of equipment, it is possible to cover the range of voltages from 2 to 280V.
- **CAPACITIES** for tacho generator (V D.C.)

ERTCMD/1	from 2V	to 22V
ERTCMD/2	from 20V	to 114V
ERTCMD/3	from 80V	to 280V
- **DIMENSIONS** 3 DIN modules
- **EXAMPLES WHEN ORDERING**

ERTCMD/2 20-114V 100l/h	indicator for tacho generator for voltages ranging from 20 to 114V, where 100 litres per hour correspond to the previously chosen voltage
ERTCMD/3 80-280V 400m/s	indicator for tacho generator for voltages ranging from 80 to 280V, where 400 metres per second correspond to the previously chosen voltage
- When ordering please indicate the scale value, the unit of measurement and the voltage
- For the connection diagram see page 14

TACHOMETER INDICATORS



ERTCMA - ERTCMD

- **BURDEN** 1000 ohm/V
- **ACCURACY** Class 1,5
- The instruments are made up of moving coil movements with incorporated potentiometer.
- **CAPACITIES** for tacho generator (V DC)
for tacho alternator (V AC)
- **DIMENSIONS** 3 DIN modules
- **EXAMPLES WHEN ORDERING**

ERTCMD 10V 800l/h	indicator for tacho generator, where 800 litres per hour correspond to an input signal of 10V DC
ERTCMA 50V 500g/min	indicator for tacho alternator where 500 RPM correspond to an input signal of 50V AC
- When ordering please indicate the scale value, the unit of measurement and the voltage.
- For the connection diagram see page 14

SINGLE-PHASE POWER FACTOR INDICATORS



ERCM + 1CORFP10

- These instruments are made up of a 1mA indicator direct current (ERCM) and an external accessory (1CORFP10)
- **STANDARD CAPACITY** 0,5 -1 - 0,5 cos φ
- **TECHNICAL DATA**

ERCM	1CORFP10	
see page 10	- Voltage input	230V
3 DIN modules	- Current input	5A
	- Insulation voltage	2kV / 4kV
	- Accuracy	Class 0,5
	- Frequency	50-60Hz
	- Operating temperature	0-40 °C
	- Output current	1mA
	- Output load	700 ohm
	- Accessory for DIN bar fixing	
	- Dimensions: see page 9	
- **EXAMPLE WHEN ORDERING**

ERCM + 1CORFP10 230V power factor metering with 230V supply - 5A input current and 0,5-1-0,5 scale

An ERCM 1mA instrument will be provided with an 0,5-1-0,5 cos φ scale and a 1CORFP10 accessory to which should be connected the terminals corresponding to 230V
- For the connection diagram see page 14

THREE-PHASE POWER FACTOR INDICATORS, BALANCED SYSTEM WITHOUT NEUTRAL



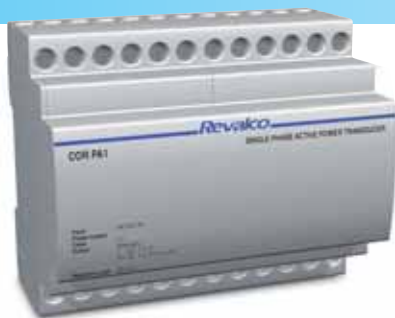
ERCM + 1CORFP20

- These instruments are made up of a 1 mA indicator direct current (ERCM) and by an external accessory (1CORFP20)
- **STANDARD CAPACITY** 0,5 -1 - 0,5 cos φ
- **TECHNICAL DATA**

ERCM	1CORFP20	
see page 10	- Voltage input	400V
3 DIN modules	- Current input	5A
	- Insulation voltage	2kV / 4kV
	- Accuracy	Class 0,5
	- Frequency	50-60Hz
	- Operating temperature	0-40 °C
	- Output current	1mA
	- Output load	700 ohm
	- Accessory for DIN bar fixing	
	- Dimensions: see page 9	
- **EXAMPLE WHEN ORDERING**

ERCM + 1CORFP20 400V threephase metering with 400V power supply - 5A input current and 0,5-1-0,5 scale

An ERCM 1mA instrument will be provided with an 0,5-1-0,5 cos φ scale and 1CORFP20 accessory to which should be connected the terminals corresponding to 400V
- For the connection diagram see page 15



ERCMA + 1CORPA1/2/3/4/5 (1CORPR1/2/3/4/5)

These instruments are made up of a 1mA direct current indicator (ERCMA), an external accessory (1CORPA / 1CORPR). This accessory makes it possible for the scales to be interchangeable as shown at the bottom of this page

- The possible systems are as follows
 - ERCMA + 1CORPA1 (1CORPR1) single-phase Wattmeter (Varmeter)
 - ERCMA + 1CORPA2 (1CORPR2) three-phase balanced Wattmeter (Varmeter) without neutral, 3 wires
 - ERCMA + 1CORPA3 (1CORPR3) three-phase unbalanced Wattmeter (Varmeter) without neutral, 3 wires (ARON)
 - ERCMA + 1CORPA4 (1CORPR4) three-phase balanced Wattmeter (Varmeter) with neutral, 4 wires
 - ERCMA + 1CORPA5 (1CORPR5) three-phase unbalanced Wattmeter (Varmeter) with neutral, 4 wires
- The scales are linear with values expressed in Watt (W), Kilowatt (KW), Megawatt (MW), Var (Var), Kilovar (KVar), Megavar (MVar)

■ **TECHNICAL DATA**

ERCMA	1CORPA1/2/3/4/5 - 1CORPR1/2/3/4/5	
see page 10	- Voltages input	230V standard in single-phase system 400V standard in three-phase system
3 DIN modules	- Current input	5A (1A in types 1CORPA..B - 1CORPR..B)
	- Resistance input	< 50 mohm
	- Overload	2 In / 1,2 Un permanent 10 In / 2 Un for 1 second
	- Insulation voltage	2kV
	- Accuracy	Class 0,5
	- Frequency	50-60Hz
	- Operating temperature	0-40 °C
	- Current output	1mA
	- Load output	700 ohm
	- Dimensions: see page 9	

■ **INDICATIONS NECESSARY WHEN ORDERING**

- Type of current single-phase; threephase with or without neutral; balanced or unbalanced system; 3 or 4 wires
- Voltage between phases; between phase and neutral. If the voltage transformer is used, please indicate the primary and secondary value.
- Current max 5A for direct input. If a current transformer is used please indicate the primary and secondary value. (the C.T. should however be in class 0,5)
- Desired scale value

■ **EXAMPLE WHEN ORDERING**

ERCMA + 1CORPA3 400V 100/5A 80 KW
threephase Wattmeter, unbalanced, without neutral, 3 wires (ARON) for voltage direct input at 400V, ampere input by means of 100A/5A current transformer and 80KW scale.

■ For the connection diagram see pages 15 and 16

A.C. MULTISCALE FUNCTION IN WATTMETERS AND VARMETERS

By adopting a single instrument with an interchangeable scale and multi-voltage converter it is possible to obtain all of the capacities shown on the table below. It is necessary to select the input voltage on the accessory and to insert the scale corresponding to the current transformer.

If for example there is a need for a monophase, 400V Wattmeter (Varmeter) with a C.T. ratio of 300/5A; the corresponding scale to insert into the instrument has a 120KW (KVAR) scale as highlighted in the table below.

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 preferred.

Where it is necessary to take advantage of the multi-scale function, even if the input voltage derives from a V.T., eg: 1500/100V, it is necessary to determine the voltage constant by dividing the primary with the secondary 1500:100=15.

In order to select the scale value to insert into the indicating instrument, it is necessary to multiply the number found 15 (as calculated in the above example) by the value of the scale on the table corresponding to C.T. 300/5A, which is 30KW (KVar)

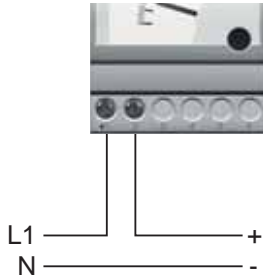
Therefore 15 x 30KW (KVar) = 450KW (KVar)

TABLE OF INTERCHANGEABLE SCALES

CURRENT TRANSFORMER	SINGLE-PHASE WATTMETER AND VARMETER			THREE-PHASE WATTMETER AND VARMETER		
	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)

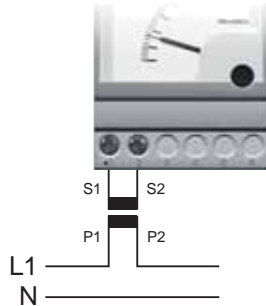
CONNECTION DIAGRAMS FOR ANALOGUE INSTRUMENTS

ERIM - ERCM
 AC Ammeters (ERIM)
 DC Ammeters (ERCM)



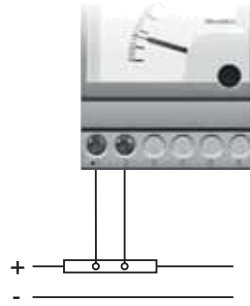
Direct input

ERIM
 AC Ammeters



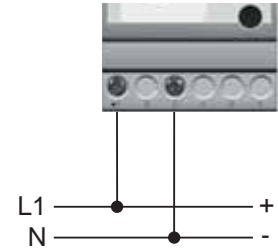
Input by means of C.T.

ERCM
 DC Ammeters



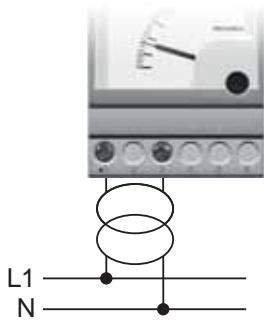
Input by means of shunt

ERIM - ERCM - ERZSM - ERFM
 AC Voltmeters (ERIM)
 DC Voltmeters (ERCM)
 Voltmeters with suppressed zero (ERZSM)
 Frequncymeters (ERFM)



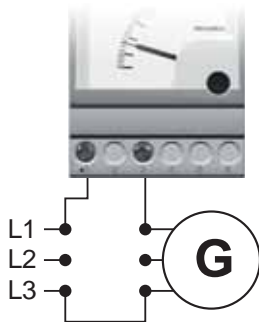
Direct input

ERIM
 AC Voltmeters



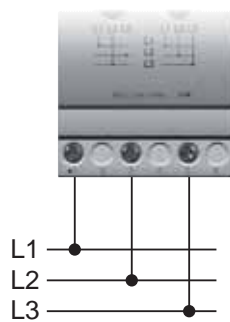
Input by means of V.T.

ERZM
 Zerovoltmeters

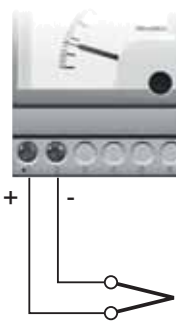


Generator

1RSM
 Sequence meters

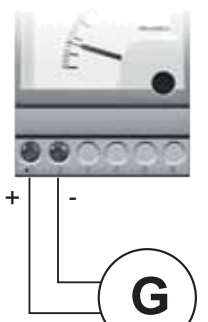


ERTM
 Temperature indicators



Probe

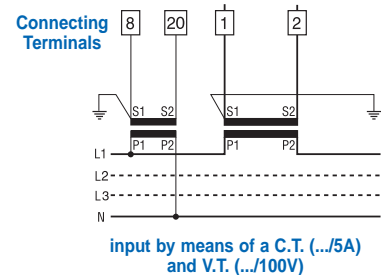
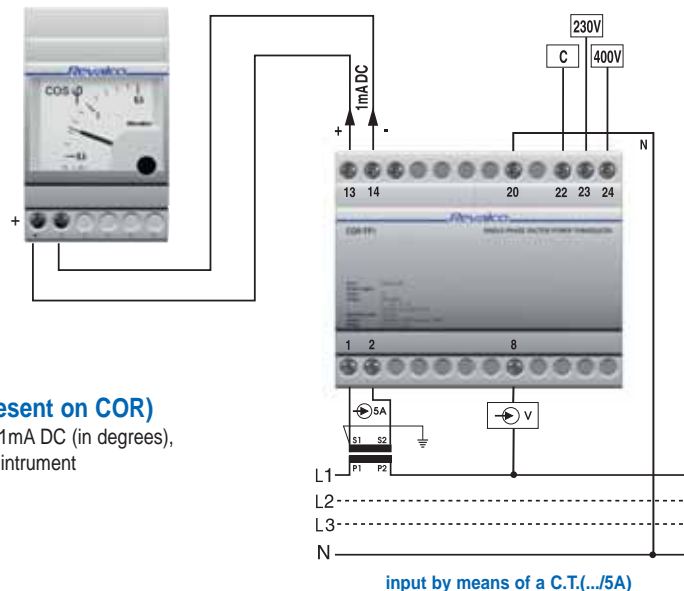
ERTCM
 Tacho indicators



Generator

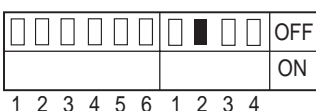
1CORFP10 + ERCM

Single-phase power factor



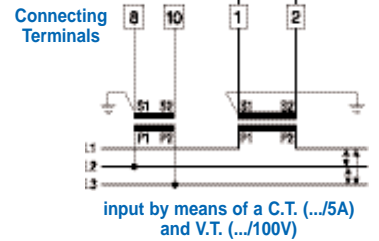
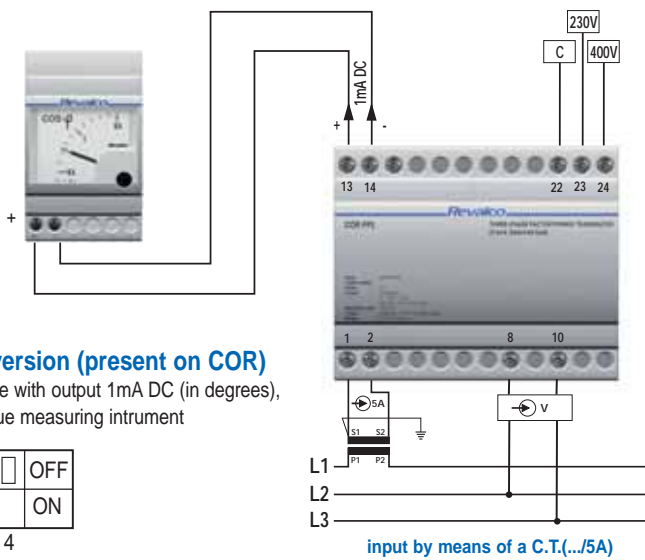
input by means of a C.T. (.../5A) and V.T. (.../100V)

Switch for signal conversion (present on COR)
 proportional to the phase angle with output 1mA DC (in degrees),
 for connection with an analogue measuring instrument



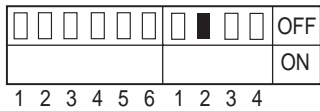
1CORFP20 + ERCM

- Three-phase power factor, balanced load, without neutral



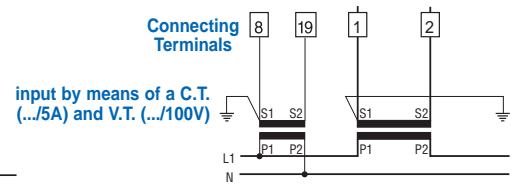
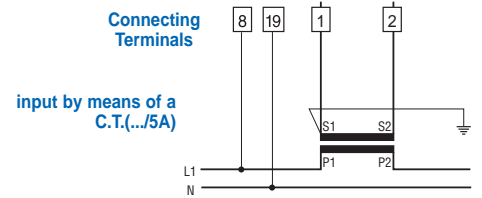
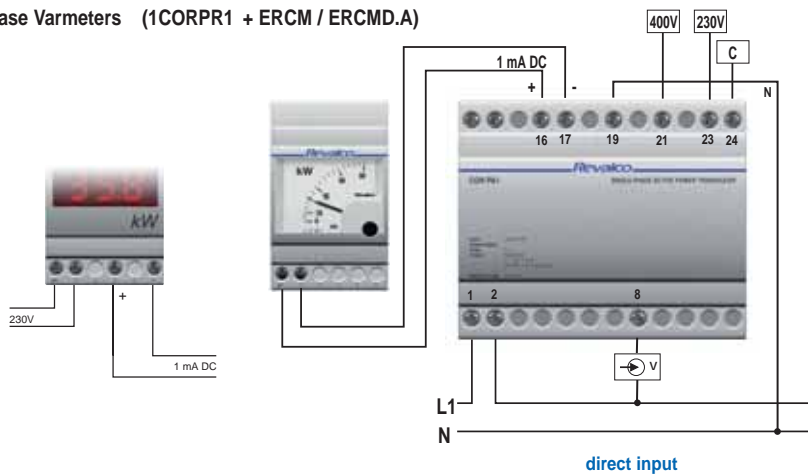
Switch for signal conversion (present on COR)

proportional to the phase angle with output 1mA DC (in degrees), for connection with an analogue measuring instrument



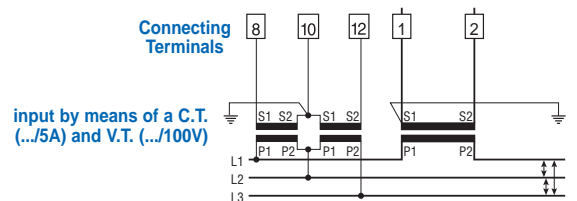
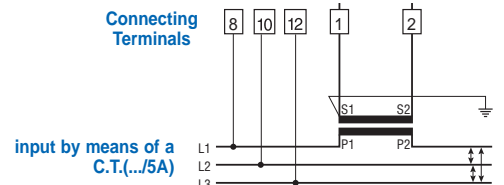
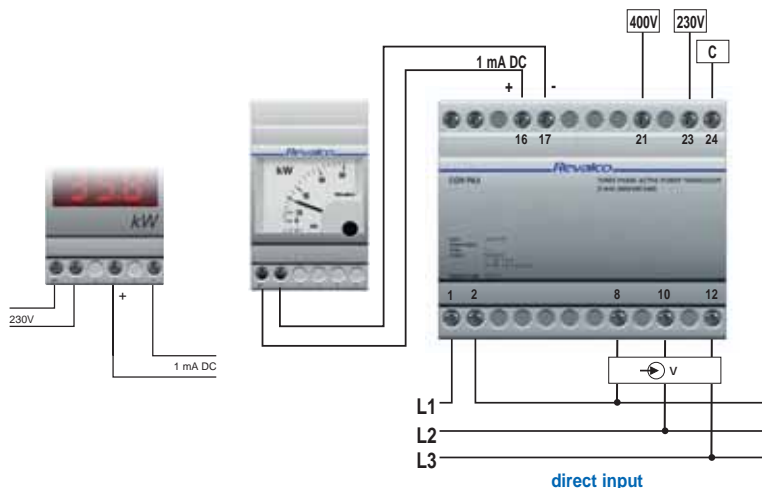
1CORPA1 (1CORPR1) + ERCM / ERCMD.A

- Single-phase Wattmeters (1CORPA1 + ERCM / ERCMD.A)
- Single-phase Varmeters (1CORPR1 + ERCM / ERCMD.A)



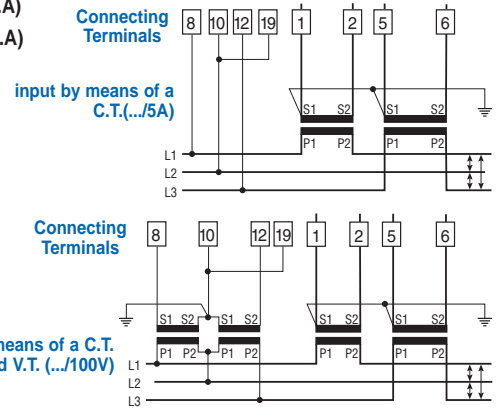
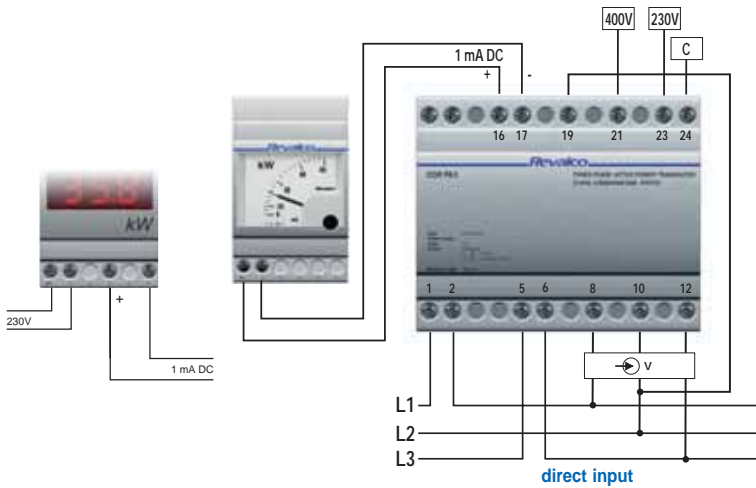
1CORPA2 (1CORPR2) + ERCM / ERCMD.A

- Three-phase Wattmeters, balanced load, without neutral, 3 wire (1CORPA2 + ERCM / ERCMD.A)
- Three-phase Varmeters, balanced load, without neutral, 3 wire (1CORPR2 + ERCM / ERCMD.A)



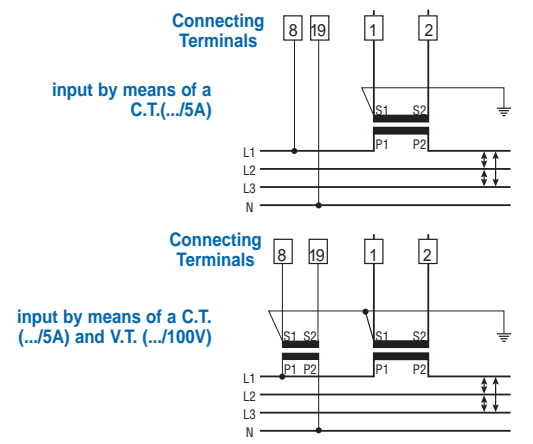
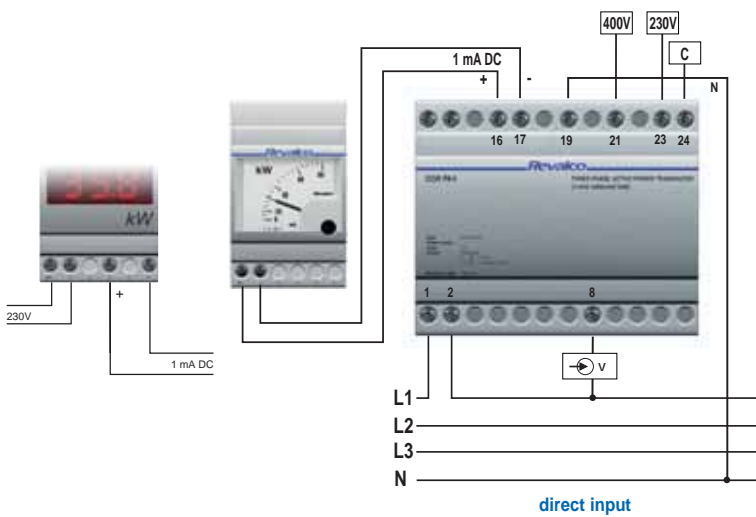
1CORPA3 (1CORPR3) + ERCM / ERCMD.A

- Three-phase Wattmeters, unbalanced load (ARON), without neutral, 3 wire (1CORPA3 + ERCM / ERCMD.A)
- Three-phase Varmeters, unbalanced load (ARON), without neutral, 3 wire (1CORPR3 + ERCM / ERCMD.A)



1CORPA4 (1CORPR4) + ERCM / ERCMD.A

- Three-phase Wattmeters, balanced load, with neutral, 4 wire (1CORPA4 + ERCM / ERCMD.A)
- Three-phase Varmeters, balanced load, with neutral, 4 wire (1CORPR4 + ERCM / ERCMD.A)



1CORPA5 (1CORPR5) + ERCM / ERCMD.A

- Three-phase Wattmeters, unbalanced load, with neutral, 4 wire (1CORPA5 + ERCM / ERCMD.A)
- Three-phase Varmeters, unbalanced load, with neutral, 4 wire (1CORPR5 + ERCM / ERCMD.A)

