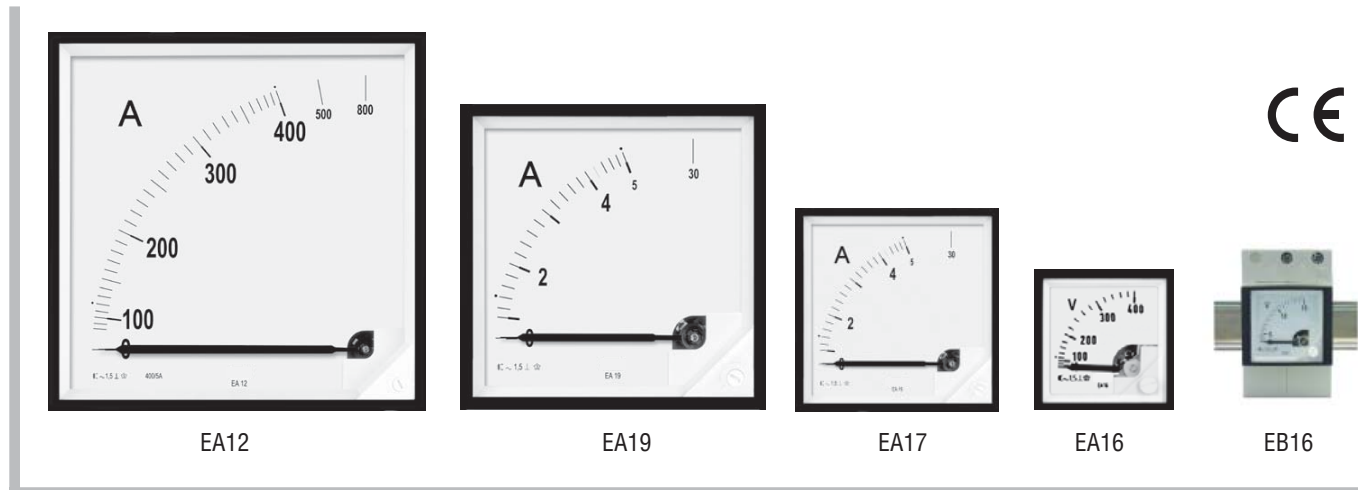


# MOVING-IRON METERS

## EA16, EB16, EA17, EA19, EA12 TYPES

### AMMETERS and VOLTMETERS



EA16, EB16, EA17, EA19 and EA12 moving-iron meters are intended for measuring AC voltage or AC current. These meters measure the true RMS value and their indications are highly independent of the measured value curve shape.

EA16, EA17, EA19 and EA12 meters are designed for mounting into panels. EB16 meters are adapted for a fast assembly rail mounting (35 mm rail) in compliance with EN 60715 standards.

EA16, EA17 and EA19 meters are designed to interchangeable dials.

#### TECHNICAL DATA

<b>Accuracy class</b>	1.5
<b>Measured value frequency</b>	40...45...65...72 Hz
<b>Execution of ammeters</b>	normal scale version or version with 100% overload. Other overcurrent scale, on request after agreement.
<b>Self-consumption</b>	see table 1

#### Matching the measurement range of the meter to transformer ranges

by exchange of the dial. The dial is put forward the slot in upper case side.  
**Note:** EA12 (144 x 144) meters are not provided for interchangeable dials

#### CATEGORIES OF METER CLIMATIC VERSIONS

If it is not written otherwise in the order, these meters are intended to use in moderate climatic conditions. Then, we do not place any symbol on the scale. On customers' request, meters can be adapted to use in conditions of a dry or wet tropical climat. Then, they are marked with the T III symbol.

*EA17 and EA19 meters (ammeters and voltmeters) destined to be used in ambient temperature up to 75°C or higher, are only available after a previous agreement with the manufacturer.*

#### Requirements concerning safety acc. EN 61010-1 standard:

For EA16 and EB16 meters and meters with rectifiers:

- maximal phase-earth working voltage	600 V
- installation category	II
- pollution degree	2

For EA17, EA19 and EA12 meters:

- maximal phase-earth working voltage	600 V
- installation category	III
- pollution degree	2

#### Protection Grade acc. to EN 60529

- in standard option:
  - IP 50 for EA16, EA17, EA19, EA12 meters
  - IP 54 (only for EA12 meter)
  - IP 52 (only for EB16 meter)
- with IP 65 front protection grade (on request):
  - for EA16, EA17, EA19 meters
- IP 20 terminal protection (with a terminal protective cover)

**Case material** thermoplastic material

**Meter glass material** glass

**Additional setting pointer** On customers' request EA17 and EA19 meters can be equipped with an additional setting red pointer fixed in the glass.

#### Exchanging of dials (only EA16, EA17, EA19 meters)

extract the dial, on top of the meter with a suitable tool. After exchanging the dial, carefully close the opening with the cover. The meter must be switched off during the exchange procedure.

#### ACCESSORIES

We deliver with the meter:

- screw holders (for IP50 or IP54 option)..... 2 pcs
- screw holders (for IP65 option) ..... 4 pcs
- spring holders (only for EA16)..... 2 pcs
- terminal protection cover..... 1 pc

We can also deliver on request, current and voltage transformers

## AC CURRENT AND AC VOLTAGE DIRECT MEASUREMENT RANGES

Table 1

Frontal frame dimensions [mm]	48 x 48*)	72 x 72	96 x 96	144 x 144
Scale length [mm]	42	61	95	160
Weight [kg]	0.15	0.2	0.25	0.4
Type	EA16, EB16	EA17	EA19	EA12
Measuring range	Self-consumption $\pm 10\%$			
100 mA	0.43 VA	0.20 VA	0.20 VA	0.48 VA
150 mA	0.46 VA	0.37 VA	0.37 VA	0.46 VA
250 mA	0.44 VA	0.31 VA	0.31 VA	0.38 VA
400 mA	0.43 VA	0.40 VA	0.40 VA	0.48 VA
600 mA	0.42 VA	0.38 VA	0.38 VA	0.46 VA
1 A	0.45 VA	0.31 VA	0.31 VA	0.38 VA
1.5 A	0.47 VA	0.37 VA	0.37 VA	0.45 VA
2.5 A	0.44 VA	0.33 VA	0.33 VA	0.40 VA
4 A	0.45 VA	0.30 VA	0.30 VA	0.36 VA
6 A	0.58 VA	0.44 VA	0.44 VA	0.56 VA
10 A	0.55 VA	0.44 VA	0.44 VA	0.55 VA
15 A	0.65 VA	0.60 VA	0.60 VA	0.65 VA
25 A	0.58 VA	0.60 VA	0.60 VA	0.70 VA
40 A	-	0.85 VA	0.85 VA	0.85 VA
60 A	-	1.20 VA	1.20 VA	1.20 VA
100 A	-	1.90 VA	1.90 VA	1.90 VA
For a transformer. Measuring ranges acc. table 2				
... x/1 A	0.45 VA	0.31 VA	0.31 VA	0.38 VA
... x/5 A	0.48 VA	0.36 VA	0.36 VA	0.44 VA
6 V	2.1 VA	1.40 VA	1.40 VA	1.30 VA
10 V	2.2 VA	1.60 VA	1.60 VA	1.50 VA
15 V	2.0 VA	1.80 VA	1.80 VA	1.70 VA
25 V	2.3 VA	2.00 VA	2.00 VA	1.90 VA
40 V	2.3 VA	1.70 VA	1.70 VA	1.60 VA
60 V	2.4 VA	2.10 VA	2.10 VA	2.00 VA
100 V	2.6 VA	2.20 VA	2.20 VA	2.10 VA
150 V	2.5 VA	2.20 VA	2.20 VA	2.10 VA
250 V	2.1 VA	2.40 VA	2.40 VA	2.20 VA
400 V	2.2 VA	2.40 VA	2.40 VA	2.30 VA
500 V	2.8 VA	2.90 VA	2.90 VA	2.80 VA
600 V	3.0 VA	2.30 VA	2.30 VA	2.20 VA
800 V	-	1.90 VA	1.90 VA	1.80 VA
1000 V	-	2.40 VA	2.40 VA	2.30 VA
For a transformer. Measuring ranges acc. table 2				
.../100 V		2.20 VA	2.20 VA	2.10 VA
.../110 V		2.40 VA	2.40 VA	2.30 VA

\*) It concerns EA16 meters, for the frontal frame dimensions of EB16 meters, see Fig.1.

## MEASURING RANGES WITH MEASURING TRANSFORMERS

Table 2

Ammeters			Voltmeters	
Measuring range	Transformer		Measuring range	Transformer
1 A	-	1/1	4 kV	3000/100 V
5 A	5/5	5/1	6 kV	6000/100 V
6 A	6/5	6/1	10 kV	10 000/100 V
6 A	5/5	-	15 kV	15 000/100 V
10 A	10/5	10/1	20 kV	20 000/100 V
15 A	15/5	15/1	40 kV	30 000/100 V
20 A	20/5	20/1	60 kV	60 000/100 V
30 A	30/5	30/1	150 kV	150 000/100 V
40 A	40/5	40/1	250 kV	250 000/100 V
50 A	50/5	50/1	400 kV	400 000/100 V
60 A	60/5	60/1		
80 A	75/5	-	4 kV	4000/100 V
100 A	100/5	100/1	8 kV	6000/100 V
150 A	150/5	150/1	20 kV	15 000/100 V
200 A	200/5	200/1	150 kV	110 000/100 V
300 A	300/5	300/1	250 kV	220 000/100 V
400 A	400/5	400/1		
500 A	500/5	500/1		
600 A	600/5	600/1		
800 A	750/5	-		
1 kA	1000/5	1000/1		
1.2 kA	1200/5	1200/1		
1.5 kA	1500/5	1500/1		
2 kA	2000/5	2000/1		
3 kA	3000/5	3000/1		
4 kA	4000/5	4000/1		
5 kA	5000/5	5000/1		
6 kA	6000/5	6000/1		
8 kA	8000/5	8000/1		
10 kA	10 000/5	10 000/1		

## EXTERNAL DIMENSIONS

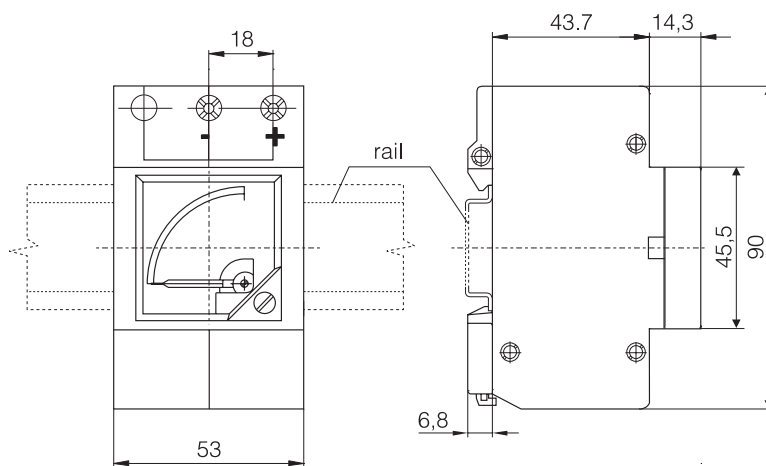


Fig.1. External dimensions of EB16 meters.

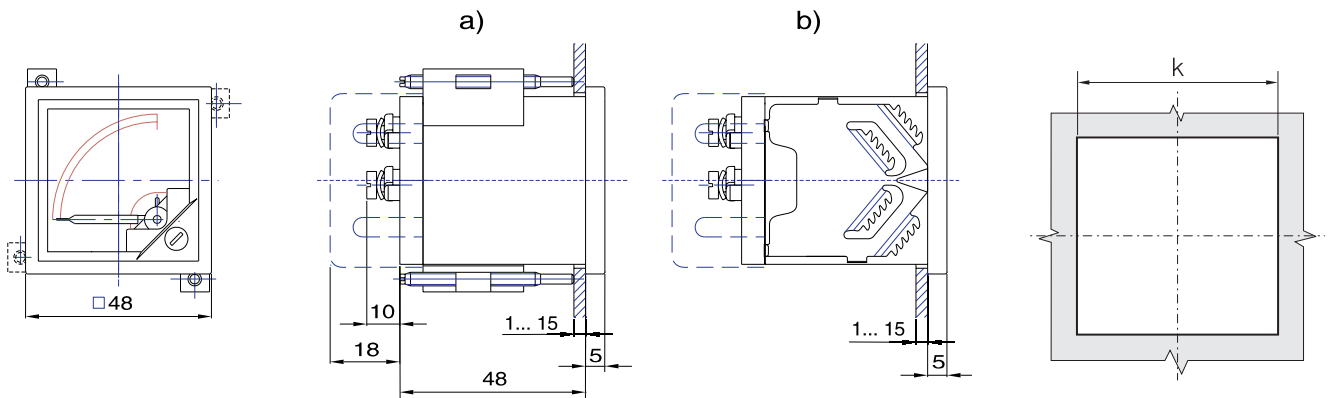
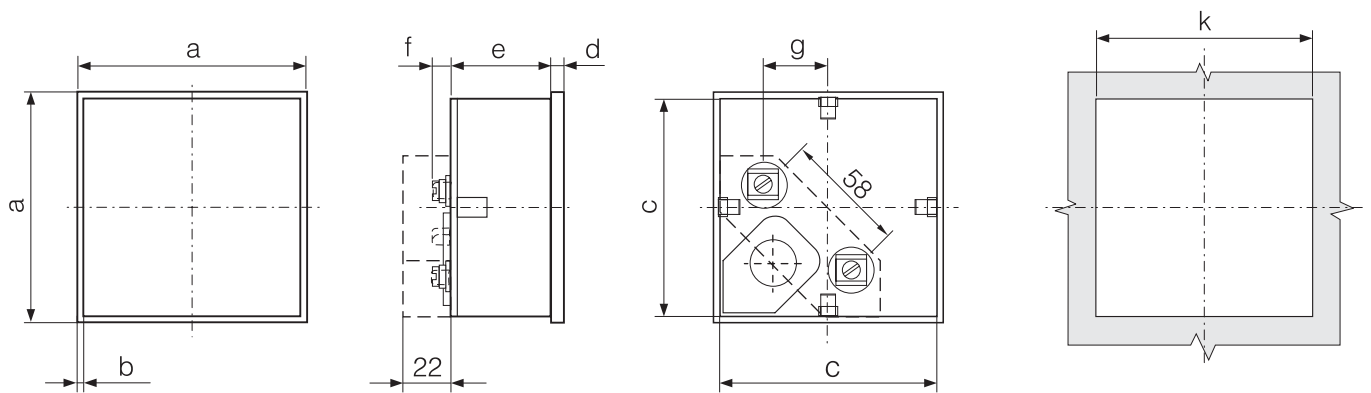
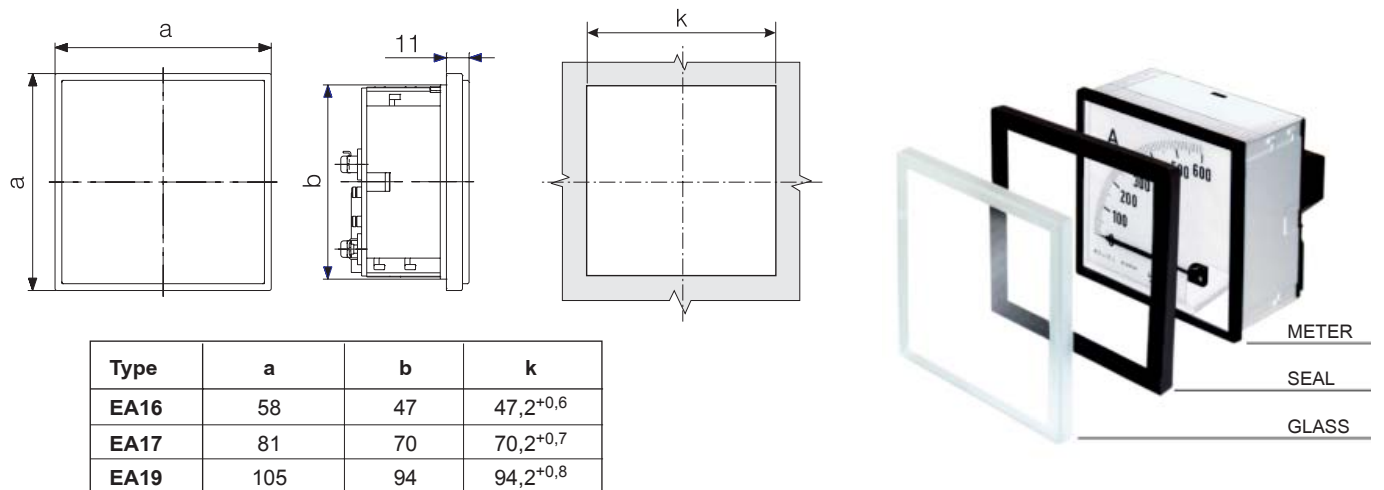


Fig.2. External dimensions of EA16 meters a) with screw holders, b) with spring holders



Type	a	b	c	d	e	f	g	k
	mm							
EA17	72	4	68 <sup>-0,3</sup>	5	45	10... 20	20,5	68 <sup>+0,7</sup>
EA19	96	4	92 <sup>-0,3</sup>	5	45	10... 20	32,5	92 <sup>+0,8</sup>
EA12	144	4,5	137,3 <sup>-0,5</sup>	6	48	10... 20	55,5	138 <sup>+1,0</sup>

Fig.3. External dimensions of EA17, EA19, EA12 meters



Type	a	b	k
EA16	58	47	47,2 <sup>+0,6</sup>
EA17	81	70	70,2 <sup>+0,7</sup>
EA19	105	94	94,2 <sup>+0,8</sup>

Fig.4. External dimensions of meters with IP 65 protection grade

## FASTENING ON PANELS

### • EA16 meters

The meters are adapted to be mounted from the front of panels and then they are equipped with two spring holders, which can be fixed on arbitrary opposite case sides (Fig. 2b) or to be mounted from the rear of panels and then they are equipped with two screw holders which can be fixed on arbitrary, opposite case corners (Fig. 2a).

### • EA17, EA19 and EA12 meters

In their basic execution these meters are adapted to be mounted from the rear of panels by means of two screw holders which can be fixed on arbitrary opposite case corners (Fig. 4).

### • Execution of meters with IP 65

The meter is fixed in the panel by means of 4 screw holders.

After agreeing with the manufacturer, EA17 and EA19 meters can be delivered with a snap fastened frontal frame and then these meters can be mounted from the front of panels by means of two spring holders fixed on arbitrary opposite case sides.

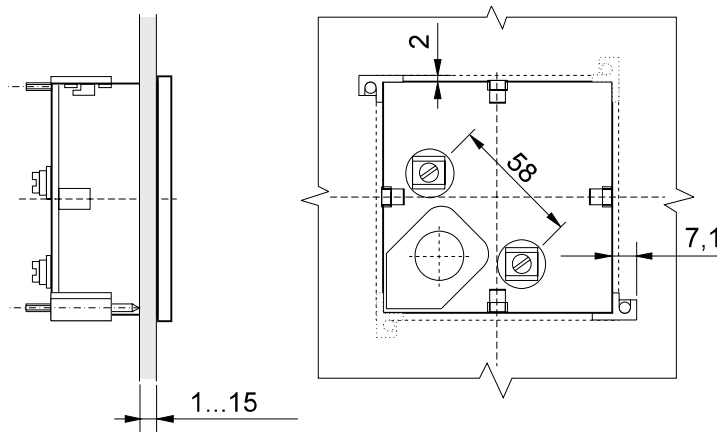


Fig. 5. Fixation on the panel by means of two screw-holders.

## CODING OF THE WORKING POSITION

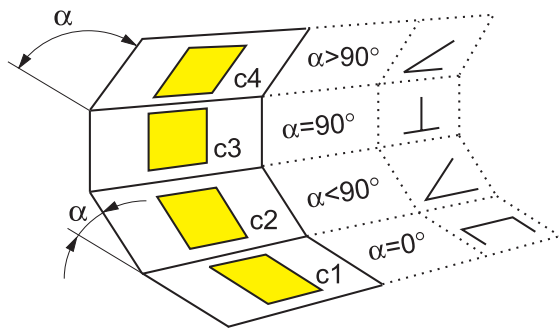


Table 3

Code	Working position
O	c3, $\alpha = 90^\circ$
A	c1, $\alpha = 0^\circ$
B	c2, $\alpha = 15^\circ$
C	c2, $\alpha = 30^\circ$
D	c2, $\alpha = 45^\circ$
E	c2, $\alpha = 60^\circ$
F	c2, $\alpha = 75^\circ$
H	c4, $\alpha = 105^\circ$
I	c4, $\alpha = 120^\circ$

## ORDERING PROCEDURE

In the order one must specify: name and type of meter, measuring range, measuring transformer data - if the meter is foreseen to co-operate with a measuring transformer, working position, kind of climat - only for tropical version, kind of holders - only for EA16 meters, and eventual additional requirements.

### Example of order:

EA17 ammeter, 40/80 A, 40/5 A, 0...40 A, c2 30, TIII, screw holders, IP54

- EA17** – moving-iron meter (72 x 72 mm)
- 40/80** – 40 A range with 0...2 In overload
- 40/5** – to co-operate with a current transformer 40/5 A
- 0...40 A** – measuring range
- c2 30** – working position 30° with relation to horizontal position (table 3)
- TIII** – design and materials adapted to specific tropical climat
- Screw holders** – type of holders
- IP 54** – protection grade of the casing front