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Chapter I
DIN panel meters

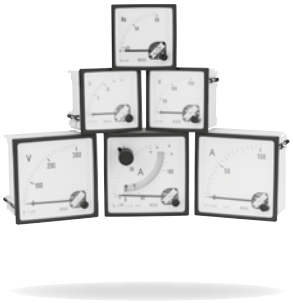
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DIN panel meters

FEATURES

- A range of the most popular short-scale measuring instruments in 4 case sizes
- Shock resistant sprung pivot and jewel movement
- Terminal covers supplied as standard
- EMC hard frequency meters are fully EMC and LVD compliant
- 1/4" 'fast on' terminals available



APPLICATIONS

- Switchgear
- Distribution systems
- Generator sets
- Control panels
- Energy management
- Building management
- Utility power monitoring
- Process control
- Motor control

APPROVALS

- E242,E243 & E244 models
- Short scale 90°
- Moving Coil DC & Moving Coil Rectified AC meters

E203000

- E242,E243 & E244 models
- Short scale 90°
- Moving Iron & Moving Coil meters

BENEFITS

- Low cost
- Local indication
- Ease of installation
- Minimal training
- Low maintenance
- Customised options and features

A range of 48, 72, 96 and 144 mm DIN style panel meters measuring all electrical parameters and featuring moving coil or moving iron movements. All meters incorporate slide-in dials and terminal covers as standard. A range of customised options is available.

MOVEMENTS

MOVING COIL METER

Centre cored, self shielding moving coil movement, using pivots, hairsprings and sprung jewels. Seven variations have been designed in movement ranges: all intermediate ranges are achieved by shunting the next lowest range. All DC voltmeters are 1000 ohms per volt, rectified product run at 900 ohms per volt, millivolt meters use the 5 milliamp movement.

MOVING IRON METER

Clapper type repulsion design using pivots, hairsprings and jewel movements. The bottom jewel is oil filled to provide damping while the top is sprung for resilience. All voltmeters are manufactured with external voltage dropper resistors to substantially reduce the self heating effects.

FREQUENCY METER

Meter uses a 100 microamp 4000 ohm movement driven by an EMC hard frequency conversion circuit.

DIALS, SCALES AND POINTERS

Standard dials are white matt with black printed scales and bar knife-edge pointers. Black dials with white or yellow scales and pointers are also available. Interchangeable slide-in dials are used on the E242, E243, E244 and E246 90° moving iron, moving coil and frequency meter models.

General options include red supplementary pointers, red indexes (quadrant scales), red, green or blue lines, bands or segments, finely spaced divisions, multi-scales, special scales and captions to customer's requirements. 24V Bulb illumination avaliable on E244 Moving Coil & Moving Coil Rectified Meters.

SPECIFICATIONS

Type of instrument	Moving iron for current and voltage	Moving coil for current and voltage	Moving coil with rectifiers for current and voltage	Moving coil with built-in transducer for frequency measurement	Maximum demand indicators	Combined MD with moving iron movement
Format	48 x 48 mm 72 x 72 mm 96 x 96 mm 144 x 144 mm	48 x 48 mm 72 x 72 mm 96 x 96 mm 144 x 144 mm	48 x 48 mm 72 x 72 mm 96 x 96 mm 144 x 144 mm	48 x 48 mm (short scale only) 72 x 72 mm (short scale only) 96 x 96 mm 144 x 144 mm	72 x 72 mm 96 x 96 mm	96 x 96 mm
Movement type	Sprung pivot jewel with silicon oil damping	Sprung pivot jewel with eddy current damping	Sprung pivot jewel with eddy current damping	Sprung pivot jewel with eddy current damping	Sprung pivot jewel with silicon oil damping	Sprung pivot jewel with silicon oil damping
Burden	0.5 VA-15 A then 0.8 VA voltmeters 4.5 VA	See type specific specifications	See type specific specifications	See type specific specifications	2.5 VA	3 VA
Accuracy	1.5% to DIN43780	1.5% to DIN43780	1.5% to DIN43780	0.5% to DIN43780	3%	3% on MDI 1.5% ammeter
Input type	AC current or voltage	DC current or voltage	AC current or voltage	AC voltage	AC current	AC current
Measuring range (short scale)	6-600 V 100 mA-100 A 48 mm only up to 40 A	50 mV-600 V 100 µA-40 A, 48 mm only 25 A	15-600 V 1m A-100 mA and 1 A & 5 A	57.7 V - 500V 45/55Hz 45/65Hz 55/65Hz 360/440Hz 380/420Hz	0-1/1.2 A or 0-5/6 A 8, 15 or 20 minute delays	1-6 A 8, 15 or 20 minute delays 0-5 A/6 A instantaneous
Measuring range (long scale)	N/A	50 mV-600 V 100 µA-40 A 48 mm only 20 A	15-600 V 10 mA-15 A	57.7 V - 500V 45/55Hz 45/65Hz 55/65Hz 360/440Hz 380/420Hz	N/A	N/A
Dielectric voltage withstand test	3 kV AC	3 kV AC	3 kV AC	3 kV AC	3 kV AC	3 kV AC

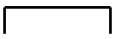
DIN panel meters – short scale

DIN16257 SYMBOL MEANING FOR CALIBRATION POSITION

VERTICAL



HORIZONTAL



INCLINED



Inclination of dial surface. Required orientation must always be stated when ordering if other than vertical mounting is required.

GENERAL SPECIFICATIONS

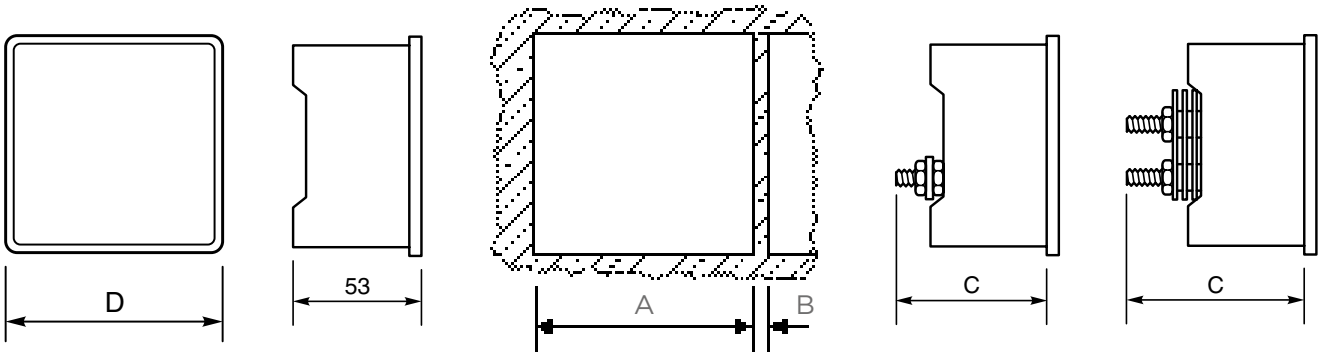
Performance	BS EN60051
Measuring ranges	DIN43701
Accuracy overload	BS EN60051
Dimensions	DIN43700
Scale marking generally to	DIN43802
Magnetic influence	BS EN60051
Safety	BS EN61010-1
Terminals	Clamp strap M4 for up to 25 A. Clamp strap M8 for over 25 A 1/4" spade terminals available for models E243 and E244
Humidity range	Up to 95% RH (non condensing)
Test voltage @50Hz	3 kV RMS for 1 minute
Ammeter ranges	1.0/1.2/1.5/2.5/5/6 and decade multiples thereof
Overload AC current	x 1.2 continuous x 10 for 5 seconds
AC voltage and frequency	x 1.2 continuous x 2 for 5 seconds
Standard calibration	23°C. Calibration at other temperatures available on request
Operating temperature	-20°C to +60°C
Damping time	Less than 3 seconds
Enclosure code	IP52 as standard IP54 on request
Case and base	Grade UL94V0
Case	Dimensions and panel cut out conform to IEC473, DIN43700. Case made from glass filled polycarbonate self-extinguishing and non drip in accordance with UL94V-O
Bezel	Slim-line DIN43802, black as standard
Bezel window	Standard sheet glass, with zero adjusters where appropriate. Non reflecting glass or polycarbonate shatterproof windows are available
Installation	Installations in switchboard panel or mosaic arrangement on equipment or machine with a panel thickness of up to 40 mm in a horizontal or vertical plane
Fixing on panel	Swivel captive fasteners, which can be fixed at either corner
Mounting position	Normal vertical mounting or as indicated on the scale in accordance with DIN16257. A deviation of ±15° is permissible
Insulation group	Insulation resistance more than 5Ω@ 500 V
Environmental	Measurement category III IEC 1010-1 Pollution degree 2 IEC 1010-1 Electrical rating 600 V RMS (920 V peak)
Approvals	EMC, LVD, Lloyds and UL

DIMENSIONS

Moving coil measuring range	Moving iron measuring range
6 - 60 A C=67 mm	0 - 30 A C=64 mm
>60 A C=78 mm	>30 A C=67 mm

MAX. PANEL THICKNESS = 40 MM

D	A	B
48 x 48	45 x 45	4
72 x 72	68 x 68	4
96 x 96	92 x 92	4
144 x 144	138 x 138	4



Short scale moving iron AC ammeters and voltmeters



Designed to measure AC current or voltage, these meters indicate true RMS values and are substantially independent of system waveform. Scales are calibrated down to 20%, and ammeters can have overload scales of x2, x3, x5 or x6 for motor start duty. Ammeters can be supplied for use with -/1 A or -/5 A current transformers, whilst voltmeters can be scaled for use with voltage transformers. Meters can be used to measure DC at reduced accuracy.

PRODUCT CODES

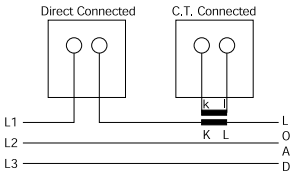
Bezel size mm	48	72	96	144
Scale length mm	42	65	94	145
AC ammeter	E242-75A	E243-02A	E244-02A	E246-02A
x2 overload ammeter	E242-752A	E243-022A	E244-022A	-
x3 overload ammeter	E242-753A	E243-023A	E244-023A	-
x5 overload ammeter	E242-755A	E243-025A	E244-025A	-
x6 overload ammeter	E242-756A	E243-026A	E244-026A	-
AC voltmeter	E242-75V	E243-02V	E244-02V	E246-02V

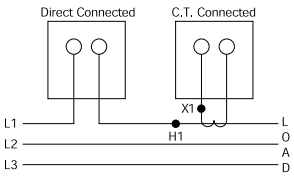
SPECIFICATIONS

Accuracy	Class 1.5
Frequency	50, 60 Hz, (400 Hz on request)
Burden at 50 Hz	Ammeters: 0.5 VA Voltmeters: Up to 4.5 VA maximum
Ratings	Ammeters: 0.5-100 A AC direct connected (40 A for E242-75 A and E246-02 A) Maximum system voltage 600 V AC Low load/high middle, maximum 10 A
Voltmeters	6-600 V

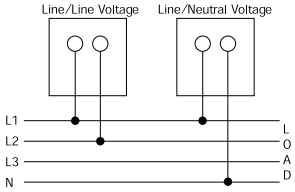
CONNECTIONS

AC ammeter





AC VOLTMETER



Frequency meters



Frequency meters use an integral electronic converter and a moving coil indicator. These easy to read meters have accuracy Class 0.5.

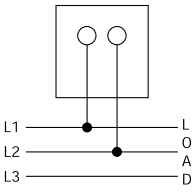
PRODUCT CODES

Bezel size mm	48	72	96
Scale length mm	42	65	94
Product codes	E242-41S	E243-41S	E244-41S

SPECIFICATIONS

Ratings	100 - 125 V AC 200 - 250 V AC 380 - 440 V AC* 500 V AC* *Use E242-89A and 253-THZ in place of E242-41S for voltages over 380 V Models available for use with VTs
Frequency	0.5%: 45/55 Hz, 55/65 Hz, 45/65 Hz, 360/440 Hz
Burden	4 VA maximum

CONNECTIONS



Short scale maximum demand indicators



The thermal/time characteristics of MDI meters monitor the most economic use of cable, fusegear and transformers. The directly heated bimetal element indicates mean RMS current over 8, 15, or 20 minutes, and a red slave pointer shows the highest value reached. The reset knob is wire sealable. Scales are calibrated to match the CT primary plus 20% overload. End values are selected from: 1.2, 1.8, 2.4, 3, 3.6, 4.8, 6, 7.2, 9 amps and their multiples of 10 and 100.

PRODUCT CODES

Bezel size mm	72	96
Scale length mm*	65	94
Product codes		
15 minute time lag		
without limiting CT for use with 5 A CT	E243-16A	E244-16A

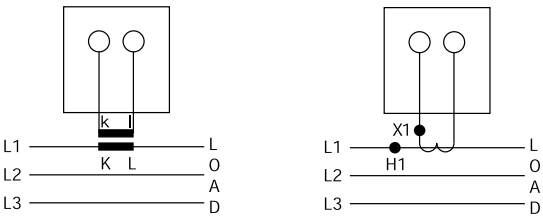
* Scaled 0/100/120% of CT primary value.

SPECIFICATIONS

Accuracy	Class 3
Options	5 A for use with separate CT 5/5 A saturating CT 1/5 A saturating CT
Burden at 50 Hz	MDI - 2.5 VA, CT - 2 VA
Overload withstand	Standard: 5 x FL for 5 seconds, 10 x FL for 1 second. With saturating CT: 10 x FL for 3 seconds, 20 x FL for 1 second
Frequency	50/60 Hz

CONNECTIONS

Maximum demand indicators



Combined AC ammeter and maximum demand indicators



Where measurement of instantaneous and maximum demand currents are required, these instruments combine both movements in one case. The meter can also replace an existing AC ammeter. Meets the same specifications listed above.

PRODUCT CODES

Bezel size mm	72	96
Scale length mm*	65	94
Product codes		
15 minute time lag		
without limiting CT for use with 5 A CT 3 VA	E243-16C	E244-16C

SPECIFICATIONS

Accuracy	Moving iron ammeter: Class 1.5 MDI: Class 3
Burden at 50 Hz	MI - 0.5 VA, MDI - 2.5 VA saturating CT - 2 VA

Short scale moving coil DC meters



Moving coil meters are suitable for all DC systems. The linear scale is calibrated down to zero and the accuracy maintained down to 10%. High currents are measured with separate shunts and suitably scaled indicators. Suppressed, centre and offset zero models are available.

PRODUCT CODES

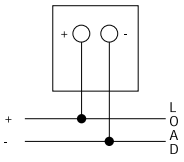
Bezel size mm	48	72	96	144
Scale length mm	42	65	94	145
Product codes				
Ammeters	E242-89A	E243-01A	E244-01A	E246-01A
Ammeters suppressed zero	E242-89R	E243-01R	E244-01R	E246-01R
Ammeters centre zero	E242-89C	E243- 01C	E244-01C	E246-01C
Voltmeters	E242-89V	E243-01V	E244-01V	E246-01V
Voltmeters suppressed zero	E242-89S	E243-01S	E244-01S	E246-01S
Voltmeters centre zero	E242-89N	E243-01N	E244-01N	E246-01N

SPECIFICATIONS

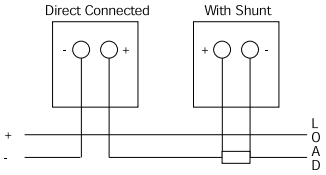
Accuracy	Class 1.5
Ratings	Ammeters: 100 µA-25 A 4/20 mA suppressed zero 40 A for model E242, E243 and E244 up to 100 A Voltmeters: 50 mV-600 V 1/5 V suppressed zero 50, 60, 75, 100, 150 mV for use with shunts
Impedance	Ammeters: 75 mV internal shunt above 60mA Voltmeters: 1000 Ω/V above 1 V

CONNECTIONS

DC voltmeter



DC ammeter



Short scale rectified AC ammeters and voltmeters



For high frequency or linear full scale AC measurements, these instruments measure average values of sinusoidal waveforms and are scaled in RMS values.

The high quality silicon bridge rectifier gives a linear scale down to near zero, where some compression occurs.

PRODUCT CODES

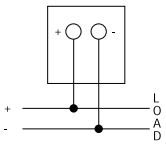
Bezel size mm	48	72	96	144
Scale length mm	42	65	94	145
Product codes				
Ammeters	E242-89B	E243-01B	E244-01B	E246-01B
Voltmeters	E242-89W	E243-01W	E244-01W	E246-01W

SPECIFICATIONS

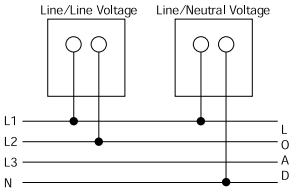
Accuracy	1.5% ES
Ratings	Ammeters: 250 µA-1 A AC Over 1 A via CTs
Voltmeters	15 - 600 V AC direct connected. Models available for use with VTs
Frequency	50/60 Hz, (Single frequencies 25 Hz - 1 kHz on request)

CONNECTIONS

AC ammeter



AC voltmeter



Short scale process indicators



Meters are used to check process functions locally or remotely at centralised controls. These moving coil instruments offer a wide variety of electrical and mechanical readouts and are operated by transducer, tachogenerator, thermocouple, resistance bulb or other DC analogue signals. Suppressed, centre and offset zero models are available on request.

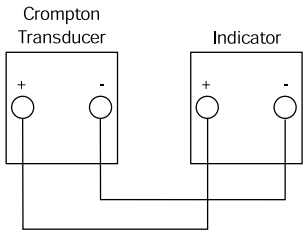
PRODUCT CODES

Bezel size mm	48	72	96	144
Scale length mm	42	65	94	145
Product codes				
AC current	E242-89A	E243-01A	E244-01A	E246-01A
AC voltage	E242-89V	E243-01V	E244 01V	E246-0 V
Phase angle	-	E243-014	E244-014	-
Watts	-	E243-015	E244-015	-
VAr	-	E243-016	E244-016	-
VA	-	E243-017	E244-017	-

SPECIFICATIONS

Accuracy	Class 1.5
Ratings	1, 2, 5, 10, 20 mA 4/20 mA suppressed zero

CONNECTIONS



AC ammeters and voltmeters with selector switch

FEATURES

- Integral selector switch
- True RMS measurement
- Scaled for customer VT or CT primary values
- DIN 72 and DIN 96 models
- Terminal cover as standard
- Shock resistant sprung pivot and jewel movement
- x2 overload ammeters



APPLICATIONS

- Switchgear
- Distribution systems
- Generator sets
- Control panels
- Energy management
- Building management

APPROVALS

- IEC61010-1B2001, EMC and LVD

BENEFITS

- Space and time saving
- Competitive cost
- Local indication
- Ease of installation
- Low maintenance
- Customised options and features

These 96 mm and 72 mm units offer Class 1.5 true RMS measurement of three-phase AC voltage or current with various switch notation options. The integral selector switch eliminates the necessity for a separate selector switch, saving valuable panel space and providing installation benefits. These robust moving iron meters incorporate a clapper type repulsion design which utilises a pivot, hairspring and jewel movement. The bottom jewel is oil filled to provide damping while the top is sprung for resilience. Voltmeters are manufactured with internal voltage dropper resistors.

PRODUCT CODES – AC AMMETERS WITH SELECTOR SWITCH

Code	Case size	Full scale deflection	Switch notation
E243-02E-G-LS**-C7-AMP3	72 mm	0/5 A AC	OFF L1 L2 L3
E244-02E-G-LS**-C7-AMP3	96 mm	0/5 A AC	OFF L1 L2 L3
E243-022E-G-LS**-C7-AMP3	72 mm	0/5/10 A AC	OFF L1 L2 L3
E244-022E-G-LS**-C7-AMP3	96 mm	0/5/10 A AC	OFF L1 L2 L3
E243-02E-G-LA**-C7-AMP3	72 mm	0/1 A AC	OFF L1 L2 L3
E244-02E-G-LA**-C7-AMP3	96 mm	0/1 A AC	OFF L1 L2 L3
E243-022E-G-LA**-C7-AMP3	72 mm	0/1/2 A AC	OFF L1 L2 L3
E244-022E-G-LA**-C7-AMP3	96 mm	0/1/2 A AC	OFF L1 L2 L3

**Insert applicable CT primary value.

PRODUCT CODES – AC VOLTMETERS WITH SELECTOR SWITCH

Code	Case size	Full scale deflection	Switch notation	3-phase
E243-02Q-G-PM**-C7-SW6	72 mm	0/120 V AC	OFF L1L2 L2L3 L3L1	3W
E243-02Q-G-PZ**-C7-SW6	72 mm	0/150 V AC	OFF L1L2 L2L3 L3L1	3W
E243-02Q-G-PZ-PZ-C7-SW6	72 mm	0/150 V AC	OFF L1L2 L2L3 L3L1	3W
E243-02Q-G-RX-RX-C7-SW6	72 mm	0/300 V AC	OFF L1L2 L2L3 L3L1	3W
E243-02Q-G-SF-SF-C7-SW3	72 mm	0/500 V AC	L1L3 L1L2 L2L3 L3N L2N L1N	4W
E243-02Q-G-SJ-SJ-C7-SW3	72 mm	0/600 V AC	L1L3 L1L2 L2L3 L3N L2N L1N	4W
E244-02Q-G-PZ**-C7-SW6	96 mm	0/150 V AC	OFF L1L2 L2L3 L3L1	3W
E244-02Q-G-PZ-PZ-C7-SW6	96 mm	0/150 V AC	OFF L1L2 L2L3 L3L1	3W
E244-02Q-G-RX-RX-C7-SW6	96 mm	0/300 V AC	OFF L1L2 L2L3 L3L1	3W
E244-02Q-G-SF-SF-C7-SW3	96 mm	0/500 V AC	L1L3 L1L2 L2L3 L3N L2N L1N	4W
E244-02Q-G-SJ-SJ-C7-SW3	96 mm	0/600 V AC	L1L3 L1L2 L2L3 L3N L2N L1N	4W

**Insert applicable VT primary and secondary value, e.g. 15 kV/110 V.

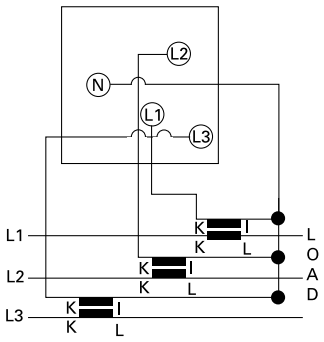
PRODUCT CODES – OPTIONS

Description
Non reflecting glass window
Red supplementary pointer, externally adjustable
Red index mark (triangle)

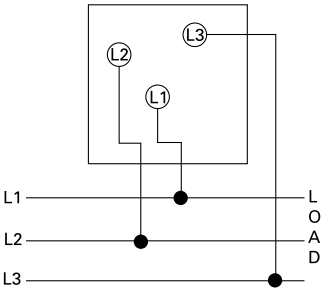
Please state any required options at time of ordering.

CONNECTIONS

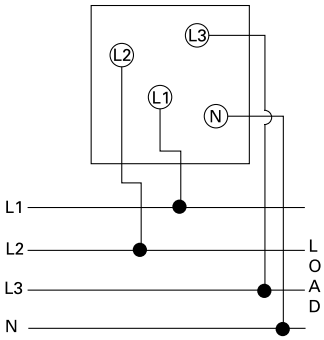
AC ammeter with selector switch



AC voltmeters 3-phase 3-wire



AC voltmeters 3-phase 4-wire

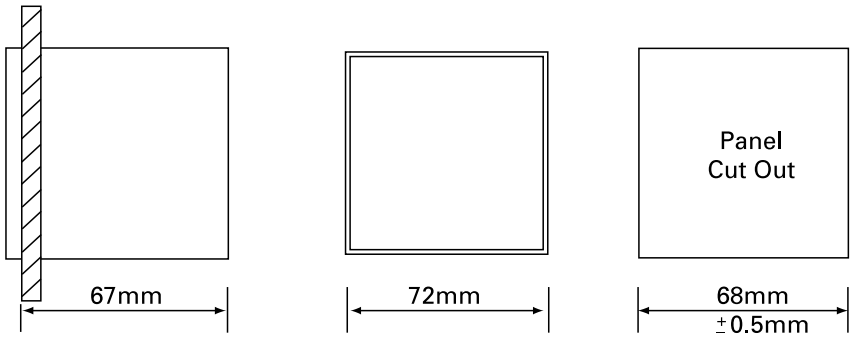


GENERAL SPECIFICATIONS

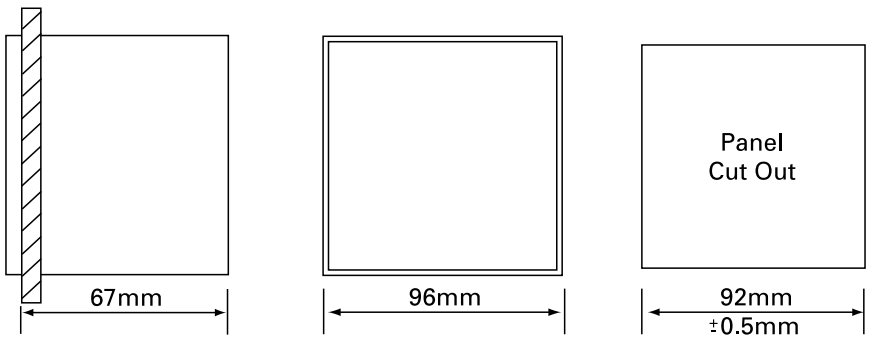
Accuracy	1.5% of full scale deflection (FSD)
Input rating	Ammeter: 1 A, 5 A 1/2 A or 5/10 A moving iron, direct connected Voltmeter: 120, 300, 500 and 600 V AC
Frequency	50, 60 Hz (400 Hz on request)
Burden at 50 Hz	Ammeters: 0.5 VA Voltmeters: 4-5 VA max
Overload ammeter	2 x In continuous for 2 minutes, 4 x In for 1 minute
Overload voltmeter	1.2 x continuous 2 x for 5 seconds
Movement	Moving iron shock resistant sprung pivot and jewel
Scale length	DIN72: 54 mm DIN96: 97 mm
Enclosure style	Panel mount to DIN42700
Enclosure material	Grade UL94 VO
Bezel style	Black matt DIN43802
Window	Standard sheet glass
Terminals	M4 captive screw clamp
Fixing	2 corner fixing clamps with tensioning thumb screws
Mounting position	Vertical mount to DIN16257, inclination of dial surface ±15%
Damping time	Less than 3 seconds
Compliant with	IEC61010-1B2001, CAT III 600V, EMC and LVD
Operating temperature	-20°C to +55°C
Storage temperature	-40°C to +75°C
Calibration temperature	23°C
Relative humidity	95% (non condensing)
Dimensions	96DIN: 96 mm high x 96 mm wide x 63 mm deep 72DIN: 72 mm high x 72 mm wide x 63 mm deep
Panel cut out	DIN96: 92 mm x 92 mm DIN72: 68 mm x 68 mm
IP protection	IP40
Weight	E243-02E 275 g E243-02Q 300 g E244-02E 360 g E244-02Q 390 g

DIMENSIONS

72DIN models



96DIN models



DIN panel meters – long scale

FEATURES

- DIN 48, 72, 96 and 144mm case sizes
- Slide in dials
- Shock resistant sprung pivot & jewel movement
- Terminal covers supplied as standard
- EMC hard frequency meter are fully EMC and LVD compliant

APPROVALS

- EMC
- LVD

BENEFITS

- Local indication
- Ease of installation
- Minimal training
- Low maintenance
- Customised options and features



MOVING COIL METER

Centre cored, self shielding moving coil movement, using pivots, hairsprings and sprung jewels. Seven variations have been designed in movement ranges: all intermediate ranges are achieved by shunting the next lowest range. All DC voltmeters are 1000 ohms per volt, rectified product run at 900 ohms per volt.Millivolt meters use the 5 milliamp movement.

FREQUENCY METER

Meter uses a 100 microamps 4000 ohm movement driven by an EMC hard frequency conversion circuit.

DIALS, SCALES AND POINTERS

Standard dials are white matt with black printed scales and bar knife-edge pointers. Black dials with white or yellow scales and pointers are also available. Interchangeable slide-in dials are used on the E243 and E244 240° moving coil and frequency meter models.

Standard options include red supplementary pointers, and non-reflecting glass.
Other options available on request.

APPLICATIONS

- Switchgear
- Distribution systems
- Generator sets
- Control panels
- Energy management
- Building management
- Utility power monitoring
- Process control
- Motor control

GENERAL SPECIFICATIONS

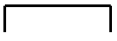
Performance	BS EN60051
Measuring ranges	DIN43701
Accuracy overload	BS EN60051
Dimensions	DIN43700 see detail on following page
Scale marking generally to	DIN43802
Magnetic influence	BS EN60051
Safety	BS EN61010-1
Terminals	Clamp strap M4 for up to 25A. Clamp strap M8 for over 25A
Humidity range	Up to 75% RH (non condensing)
Test voltage @50Hz	3kV RMS for 1 minute
Overload AC current	x 1.2 continuous, or x 10 for 5 seconds max
AC voltage and frequency	x 1.2 continuous, or x 2 for 5 seconds max
Standard calibration	23°C. Calibration at other temperatures available on request
Operating temperature	-10°C to +55°C
Damping time	Less than 3 seconds
Enclosure code	IP52 as standard IP54 on request
Case and base	Grade UL94V0 (Lexan 500R)
Case	Dimensions and panel cut out conform to IEC473, DIN43700. Case made from glass filled polycarbonate self-extinguishing and non drip in accordance with UL94 V-O.
Mounting position	Normal vertical mounting or as indicated on the scale in accordance with DIN16257. A deviation of ±15° is permissible
Bezel	Slim-line DIN43802, black as standard
Bezel window	Standard sheet glass, with zero adjusters where appropriate. Non reflecting glass windows are available
Installation	Installations in switchboard panel or mosaic arrangement on equipment or machine with a panel thickness of up to 40 mm in a horizontal or vertical plane
Fixing on panel	Swivel captive fasteners, which can be fixed at either corner
Insulation group	Insulation resistance more than 5 MΩ@ 500 V
Environmental	Measurement category III IEC 61010-1 Pollution degree 2 IEC 1010-1 Electrical rating 600 V RMS (920 V peak)
Approvals	EMC, LVD

DIN16257 SYMBOL MEANING FOR CALIBRATION POSITION

VERTICAL



HORIZONTAL



INCLINED



Inclination of dial surface.

Required orientation must always be stated when ordering if other than vertical mounting is required.

ENVIRONMENTAL CONDITIONS

Climatic suitability	climatic class 3 according to VDE/VDI 3540
Operating temperature	-10 - + 55 °C
Storage temperature	-25 - + 65 °C
Relative humidity	≤75% annual average, noncondensing
Shock resistance	$15g_n$ for pulse duration 11 ms
Vibration resistance	10-55-10Hz for ampli. 0.15mm (1.5 g at 50Hz)

Long scale rectified AC ammeter and voltmeter

FEATURES

- Measures AC current or voltage
- CT connected ammeters
- Direct and VT connected voltmeters
- Linear scaling
- Glass filled polycarbonate housing (UL 94-V-0)
- Knife edge pointer.
- Easily replaceble glass and bezel
- 240° long scale version

APPROVALS

- CE marked
- UKCA

BENEFITS

- Easy to operate
- Exchangeable dial
- Low consumption
- Terminal cover included



APPLICATIONS

- Control/switchgears panels & machinery consoles

CONSTRUCTION

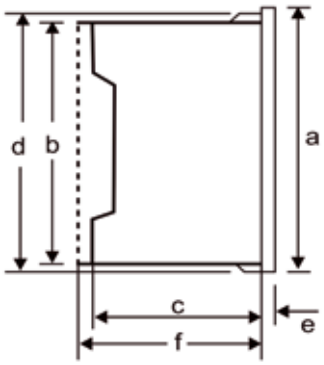
- Polycarbonate, flame retardant & drip proof case as per UL 94 V-0
- Front facia - Glass
- Panel fixing - mounting clamp

PRODUCT CODES

Bezel size (mm)	DIN 48	DIN 72	DIN 96	DIN 144
Scale length (mm)	70	106	142	230
AC ammeter rectified 240°	E242-05B	E243-05B	E244-05B	E246-05B
AC voltmeter rectified 240°	E242-05W	E243-05W	E244-05W	E246-05W
AC ammeter rectified 240° x6 overload	-	E243-056B	E244-056B	-

GENERAL SPECIFICATION

Accuracy class	1.5 IEC 51/ DIN EN 60051
Maximum continuous overload	1.2 times rated voltage / current
Maximum short duration overload	2 times, 5 Sec max:1 overload 10 times, 0.5 Sec max:9 overload
Measured quantity	AC voltage or current
Encloses codes	IP52 - case IP00-terminals with out backcover IP20 for terminals with backcover
Insulation class	Group A according to VDE 0110
Rated insulation voltage	660 V
Proof voltage testing	2 kV
Installation catagory	300 VCAT III
Insulation resistance	> 50 Mohm at 500 V d.c
Ambient temperature	IEC 51/ DIN EN 60051
Position of use	Vertical ±5°
Frequency	40.5 - 71.5 Hz
External magnetic field	At 0.4 kA/m
Impedance	Voltmeters: 900 ohm/V Ammeters: 75mV internal shunt

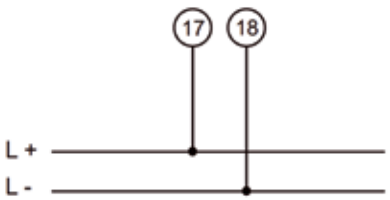


DIMENSIONS

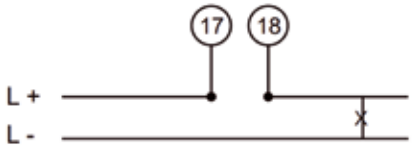
Front dimensions mm	48 x 48	72 x 72	96 x 96	144 x 144
Bezel (a) mm	48	72	96	144
Case (b) mm	43.5	66	90	136
Depth (c) mm	53	53	53	53
Depth (d) mm	44.5	67.5	91.5	137.5
Depth (e) mm	5.5	5.5	5.5	5.5
Depth with back cover (f) mm	64	64	64	64
Cutout size mm	$45^{+0.6}$	$68^{+0.7}$	$92^{+0.8}$	$138^{+0.1}$
Weight Kg	0.13	0.25	0.30	0.43

CONNECTION DIAGRAMS

AC voltage



AC current



Long scale DC ammeter and voltmeter

FEATURES

- Measures DC current or voltage
- Direct and shunt connected ammeters
- Direct connected voltmeters
- Live zero ammeters and voltmeters
- Centre zero ammeters and voltmeters
- Linear scaling
- 240° long scale version

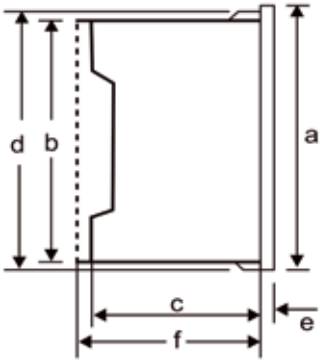


APPLICATIONS

- Control/switchgears panels & machinery consoles

CONSTRUCTION

- Polycarbonate, flame retardant & drip proof case as per UL 94 V-0
- Front facia - Glass
- Panel fixing - mounting clamp



APPROVALS

- CE marked
- UKCA

BENEFITS

- Easy to operate
- Exchangeable dial
- Terminal cover included

PRODUCT CODES

Bezel size (mm)	DIN 48	DIN 72	DIN 96	DIN 144
Scale length (mm)	48	106	142	230
DC ammeter 240°	E242-05A	E243-05A	E244-05A	E246-05A
DC voltmeter 240°	E242-05V	E243-05V	E244-05V	E246-05V
DC ammeter 240° live zero	E242-05R	E243-05R	E244-05R	E246-05R
DC voltmeter 240° live zero	E242-05S	E243-05S	E244-05S	E246-05S
DC ammeter 240° centre zero	E242-05C	E243-05C	E244-05C	E246-05C
DC voltmeter 240° centre zero	E242-05N	E243-05N	E244-05N	E246-05N

GENERAL SPECIFICATION

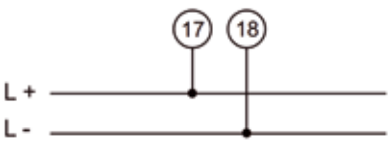
Accuracy class	1.5 IEC 51/ DIN EN 60051
Maximum continuous overload	1.2 times rated voltage / current
Maximum short duration overload - Ammeters	10 times for 5 sec : 1 overload 10 times for 0.5 sec : 9 overloads
Maximum short duration overload - Voltmeters	2 times for 5 sec : 1 overload 2 times for 0.5 sec : 9 overloads
Measured quantity	DC voltage or current
Encloses codes	IP52 - case IP00-terminals with out backcover IP20 for terminals with backcover
Insulation class	Group A according to VDE 0110
Rated insulation voltage	1000 V
Proof voltage testing	3 kV
Installation catagory	600 VCAT III
Insulation resistance	> 50 Mohm at 500 V d.c
Ambient temperature	0 - 50°C
Position of use	Vertical ±5°
Frequency	40.5 - 71.5 Hz
External magnetic field	0.5mT
Impedance	Voltmeters: 900 ohm/V Ammeters: 75mV internal shunt

DIMENSIONS

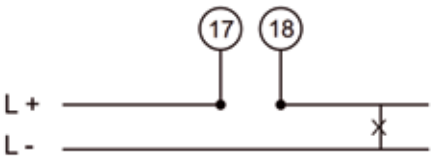
Front dimensions mm	48 x 48	72 x 72	96 x 96	144 x 144
Bezel (a) mm	48	72	96	144
Case (b) mm	43.5	66	90	136
Depth (c) mm	53	53	53	53
Depth (d) mm	44.5	67.5	91.5	137.5
Depth (e) mm	5.5	5.5	5.5	5.5
Depth with back cover (f)mm	64	64	64	64
Cutout size mm	$45^{+0.6}$	$68^{+0.7}$	$92^{+0.8}$	$138^{+0.1}$
Weight Kg	0.13	0.25	0.30	0.43

CONNECTION DIAGRAMS

DC voltage



DC current



Long scale frequency meters

FEATURES

- Measures AC frequencies
- Pointer type available as 240° long scale version
- Direct or VT connected

APPROVALS

- CE marked
- UKCA

BENEFITS

- Easy to operate
- High visibility
- Terminal cover included



PRODUCT CODES

Bezel size (mm)	DIN 96	DIN 144
Scale length (mm)	142	230
Frequency meter 240°	E244-41L	E246-41L

GENERAL SPECIFICATION

Accuracy class	0.5 IEC 51/ DIN EN 60051
Maximum continuous overload	1.2 times rated voltage
Maximum short duration overload	2 times rated voltage, 5 Sec:1 overload 2 times rated voltage, 0.5 Sec:9 overload
Measured quantity	Frequency
Encloses codes	IP52 - case IP00- terminals
Insulation class	Group A according to VDE 0110
Rated insulation voltage	660 V
Proof voltage testing	2 kV
Installation catagory	300 VCAT III
Insulation resistance	> 50 Mohm at 500 V d.c
Ambient temperature	0 - 50°
Position of use	Nominal position ±5
Voltage	Rated voltage ±15%
External magnetic field	At 0.4 kA/m

APPLICATIONS

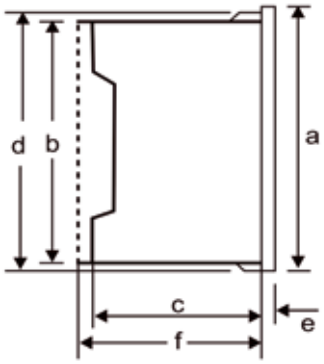
- AC switchgears, panels and distribution boards
- Control board
- Generator sets

CONSTRUCTION

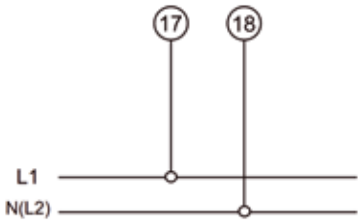
- Polycarbonate, flame retardant & drip proof case as per UL 94 V-0
- Front facia - Antiglare glass
- Panel fixing - mounting clamp

DIMENSIONS

Front dimensions mm	96 x 96	144 x 144
Bezel (a) mm	96	144
Case (b) mm	90	136
Depth (c) mm	53	53
Depth (d) mm	91.5	137.5
Depth (e) mm	5.5	5.5
Depth with back cover (f) mm	64	64
Cutout size mm	$92^{+0.8}$	$138^{+0.1}$
Weight Kg	0.45	0.60



CONNECTION DIAGRAM



Dual voltmeter and frequency meter

FEATURES

- Measures AC frequencies of two independent systems
- Pointer type dual voltmeter and frequency meter with two independent 90° short scale movements
- Direct or VT connected

APPROVALS

- CE marked
- UKCA

BENEFITS

- Easy to operate
- High visibility
- Easy installation
- Terminal cover included





PRODUCT CODES

Bezel size (mm)	96
Voltmeter meter 2 x 90°	E244-80L
Frequency meter 2 x 90°	E244-41D

GENERAL SPECIFICATION

	VOLTMETER	FREQUENCY METER
Accuracy class	1.5 IEC 51/ DIN EN 60051	0.5 DIN EN 60051
Maximum continuous overload	1.2 times rated voltage	1.2 times rated voltage
Maximum short duration overload	2 times for 5 Sec: 1 overload 2 timesfor 0.5 sec: 9 overloads	2 times rated input voltage, 5 sec
Measured quantity	AC voltage	Frequency
Encloses codes	IP52 - case IP00-terminals with out backcover IP20 for terminals with backcover	
Insulation class	Group A according to VDE 0110	
Rated insulation voltage	1000V	660V
Proof voltage testing	2kV	
Installation catagory	300V CAT III	
Insulation resistance	> 50 Mohm at 500 V d.c	
Ambient temperature	0 - 50°	
Position of use	Vertical ±5°	Nominal position ±5°
External magnetic field	At 0.4 kA/m	0.5 mT
Impedance Voltmeters	900 ohm/V	Rated voltage ±20%

APPLICATIONS

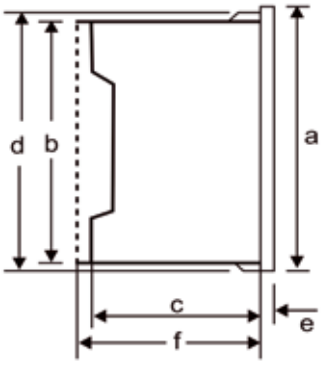
- AC switchgears, panels and distribution boards
- Control board
- Generator sets

CONSTRUCTION

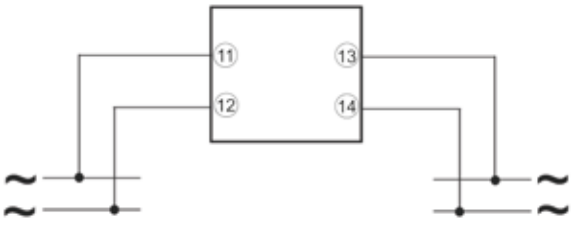
- Polycarbonate, flame retardant & drip proof case as per UL 94 V-0
- Front facia - Glass
- Installation with swivel screws

DIMENSIONS

	VOLTMETER	FREQUENCY METER
Front dimensions mm	96 x 96	96 x 96
Bezel (a) mm	96	96
Case (b) mm	90	90
Depth (c) mm	53	53
Depth (d) mm	91.5	91.5
Depth (e) mm	5.5	5.5
Depth (f) mm	64	64
Cutout size mm	$92^{+0.8}$	$92^{+0.8}$
Weight Kg	0.3	0.2



CONNECTION DIAGRAM



Power factor meters

FEATURES

- Indicates Power factor of electrical systems
- Several voltage ranges available

APPROVALS

- CE marked
- UKCA

BENEFITS

- Easy to operate
- High visibility
- Terminal cover included
- Low self consumption
- Internal power supply from voltage input



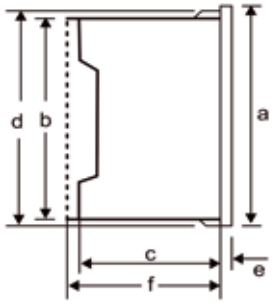
APPLICATIONS

- AC switchgears, panels and distribution boards
- Control boards
- Generator sets

CONSTRUCTION

- Polycarbonate, flame retardant & drip proof case as per UL 94 V-0
- Front facia - Glass
- Installation with mounting clamps

DIMENSIONS



Front dims mm	96 x 96
Bezel (a) mm	96
Case (b) mm	90
Depth (c) mm	106
Depth (d) mm	91.5
Depth (e) mm	5.5
Cutout size mm	$92^{+0.8}$
Weight Kg	0.68

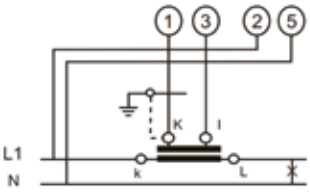
PRODUCT CODES

Bezel size (mm)	DIN 96	DIN 96	DIN 96	DIN 96	DIN 96
Scale length (mm)	97	97	97	97	97
Power factor meter 90°	E244-420 single-phase	E244-421 3P/3W balanced	E244-42C 3P/4W balanced	E244-423 3P/3W unbalanced	E244-424 3P/4W unbalanced
Bezel size (mm)	DIN 96	DIN 96	DIN 96	DIN 96	DIN 96
Scale Length (mm)	142	142	142	142	142
Power factor meter 240°	E244-135 single-phase	E244-136 3P/3W balanced	E244-13D 3P/4W balanced	E244-138 3P/3W unbalanced	E244-139 3P/4W unbalanced

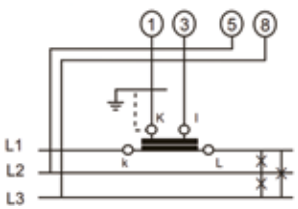
Accuracy class	1.5 IEC 51/ DIN EN 60051
Maximum continuous overload	1.2 times rated voltage / current
Maximum short duration overload 90°	10 times rated current for for 0.5 sec, 9 overloads 10 times rated current for 5 Sec, 1 overload
Maximum short duration overload 240°	2 times for 5 sec : 1 overload 2 times for 0.5 sec : 9 overloads
Voltage circuit	2 times rated current for for 0.5 sec, 9 overloads 2 times rated current for 5 Sec, 1 overload
Measured quantity	Power factor
Encloses codes	IP52 - case IP00 - terminals
Insulation class	Group A according to VDE 0110
Rated insulation voltage	660 V
Proof voltage testing	2 kV
Installation catagory	300 VCAT III
Insulation resistance	> 50 Mohm at 500 V DC
Ambient temperature	0 - 50°
Position of use	Nominal position + 5°
Voltage	Rated voltage ±15%
Current	20 to 120% of rated current
Frequency	49-51 Hz for single phase 45-65 Hz for 3 phase
External magnetic field	At 0.4 kA/m

CONNECTION DIAGRAMS

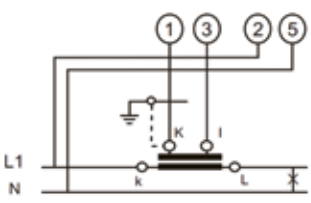
Single phase



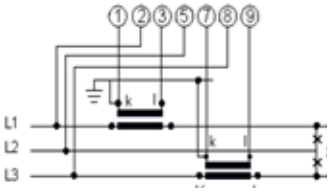
3-phase 3 wire balanced load



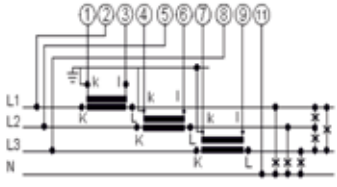
3-phase 4 wire balanced load



3-phase 3 wire unbalanced load



3-phase 4 wire unbalanced load



Power wattmeters

FEATURES

- Indicates active power of electrical systems
- Several voltage ranges available

APPROVALS

- CE marked
- UKCA

BENEFITS

- Easy to operate
- High visibility
- Terminal cover included
- Low self consumption
- Internal power supply from voltage input



PRODUCT CODES

Bezel size (mm)	DIN 96	DIN 96	DIN 96	DIN 96	DIN 96
Scale length (mm)	97	97	97	97	97
Wattmeter 90°	E244-210 single-phase	E244-211 3P/3W balanced	E244-21C 3P/4W balanced	E244-213 3P/3W unbalanced	E244-214 3P/4W unbalanced
Bezel size (mm)	DIN 96	DIN 96	DIN 96	DIN 96	DIN 96
Scale length (mm)	142	142	142	142	142
Wattmeter 240°	E244-215 single-phase	E244-216 3P/3W balanced	E244-21D 3P/4W balanced	E244-218 3P/3W unbalanced	E244-219 3P/4W unbalanced

GENERAL SPECIFICATION

Wattmeter	**90°**	**240°**
Accuracy class	1.5 IEC 51/ DIN EN 60051	
Maximum continuous overload	1.2 times rated voltage	
Maximum short duration overload	2 times rated voltage, 5 Sec max, 10 times rated current, 5 Sec max	2 times for 5 sec : 1 overload 2 times for 0.5 sec : 9 overloads
Measured quantity	Active / Reactive Power	
Encloses codes	IP52 - case IP00- terminals	
Insulation class	Group A according to VDE 0110	
Rated insulation voltage	660 V	
Proof voltage testing	2 kV	
Installation catagory	300 VCAT III	
Insulation resistance	> 50 Mohm at 500 V d.c	
Ambient temperature	10 - 37°C	0- 50°C
Position of use	Nominal position +50	Nominal position + 5°
Voltage	Rated voltage +15%	
External magnetic field	At 0.4 kA/m than 6% of fiducial value (not as a percentage class index)	At 0.4 kA/m

APPLICATIONS

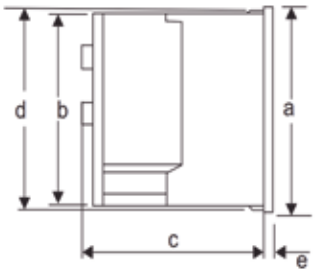
- AC switchgears, panels and distribution boards
- Control boards
- Generator sets

CONSTRUCTION

- Polycarbonate, flame retardant & drip proof case as per UL 94 V-0
- Front facia - Antiglare glass
- Panel fixing - mounting clamp

DIMENSIONS

	90°	240°
Front dims mm	96 x 96	96 x 96
Bezel (a) mm	96	96
Case (b) mm	90	90
Depth (c) mm	106	106
Depth (d) mm	91.5	91.5
Depth (e) mm	5.5	5.5
Cutout size mm	$92^{+0.8}$	$92^{+0.8}$
Weight Kg	0.65-0.75	0.73-0.85



CONNECTION DIAGRAMS

SEE PAGE 22

Power varmeters

FEATURES

- Indicates reactive power of electrical systems
- Several voltage ranges available

APPROVALS

- CE marked
- UKCA

BENEFITS

- Easy to operate
- High visibility
- Terminal cover included
- Low self consumption
- Internal power supply from voltage input



PRODUCT CODES

Bezel size (mm)	96	96	96	96	96
Scale Length (mm)	97	97	97	97	97
Varmeter 90°	E244-310 single-phase	E244-311 3P/3W balanced	E244-31C 3P/4W balanced	E244-313 3P/3W unbalanced	E244-314 3P/4W unbalanced
Bezel size (mm)	96	96	96	96	96
Scale length (mm)	142	142	142	142	142
Varmeter 240°	E244-315 single-phase	E244-316 3P/3W balanced	E244-31D 3P/4W balanced	E244-318 3P/3W unbalanced	E244-319 3P/4W unbalanced

GENERAL SPECIFICATION

Varmeter	90°	240°
Accuracy class	1.5 IEC 51/ DIN EN 60051	
Maximum continuous overload	1.2 times rated voltage	
Maximum short duration overload	2 times rated voltage, 5 Sec max, 10 times rated current, 5 Sec max	2 times for 5 sec : 1 overload 2 times for 0.5 sec : 9 overloads
Measured quantity	Active / Reactive Power	
Encloses codes	IP52 - case IP00- terminals	
Insulation class	Group A according to VDE 0110	
Rated insulation voltage	660 V	
Proof voltage testing	2 kV	
Installation catagory	300 VCAT III	
Insulation resistance	> 50 Mohm at 500 V d.c	
Ambient temperature	10 - 37°C	0- 50°C
Position of use	Nominal position +50	Nominal position + 5°
Voltage	Rated voltage +15%	
External magnetic field	At 0.4 kA/m than 6% of fiducial value (not as a percentage class index)	At 0.4 kA/m

APPLICATIONS

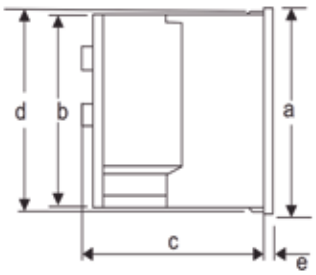
- AC switchgears, panels and distribution boards
- Control boards
- Generator sets

CONSTRUCTION

- Polycarbonate, flame retardant & drip proof case as per UL 94 V-0
- Front facia - Antiglare glass
- Panel fixing - mounting clamp

DIMENSIONS

	90°	240°
Front dims mm	96 x 96	96 x 96
Bezel (a) mm	96	96
Case (b) mm	90	90
Depth (c) mm	106	106
Depth (d) mm	91.5	91.5
Depth (e) mm	5.5	5.5
Cutout size mm	$92^{+0.8}$	$92^{+0.8}$
Weight Kg	0.65-0.75	0.73-0.85



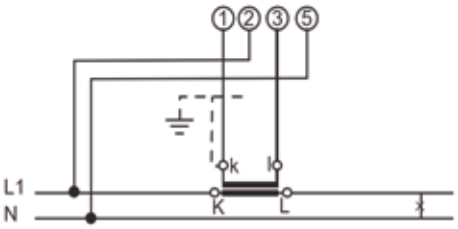
CONNECTION DIAGRAMS

SEE PAGE 22

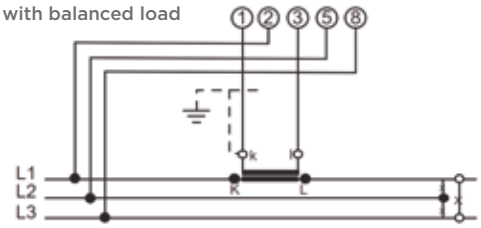
Power wattmeters

CONNECTION DIAGRAMS

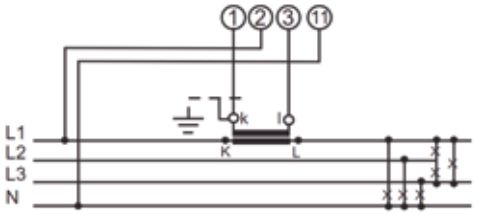
Single phase



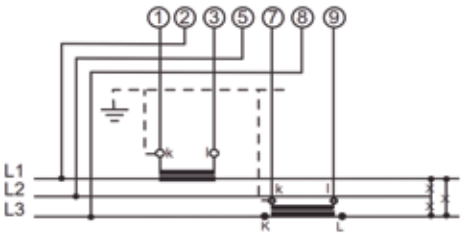
Three phase, three-wire AC Supply with balanced load



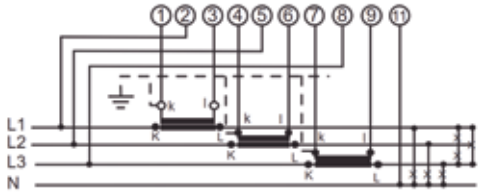
Three phase, four-wire AC Supply with balanced load



Three phase, three-wire AC Supply with unbalanced load



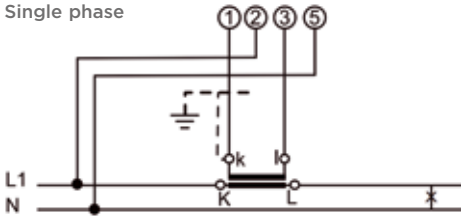
Three phase, four-wire AC Supply with unbalanced load



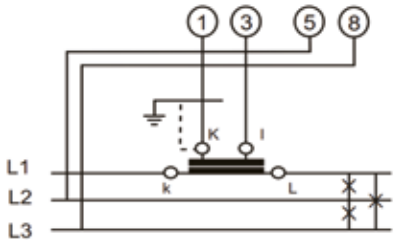
Power varmeters

CONNECTION DIAGRAMS

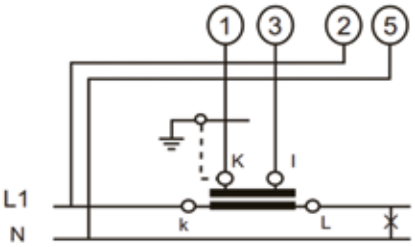
Single phase



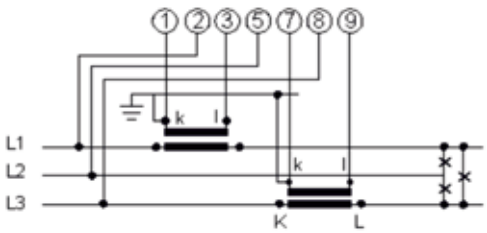
3-phase 3 wire balanced load



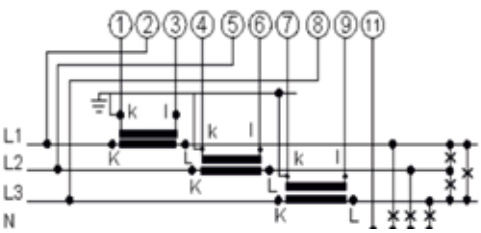
3-phase 4 wire balanced load



3-phase 3 wire unbalanced load



3-phase 4 wire unbalanced load



LED Synchroscope

FEATURES

- Clear synchronising indication
- Relay output for remote indication





APPLICATIONS

- Switchgear panels

APPROVALS

- IEC 61010

CE Approved

360° LED SYNCHROSCOPE

LED Synchroscopes measure and display the frequency difference of two power sources. Monitoring the display allows the user to connect two synchronized power systems.

The LED indication gives real-time feedback on the synchronisation state. When the synchronised state is achieved, the indicator stays in the synchronising position.

The LED indication gives real-time feedback on the synchronisation state with relay output for systems integration. Dead bus monitoring is also available, as an option, combined with the Voltage and phase monitoring.

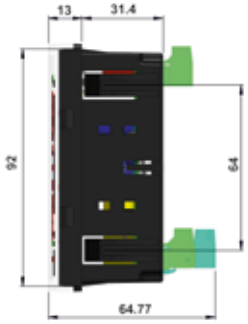
SPECIFICATIONS

Nominal Voltage	±10% of range
Nominal Frequency	45 / 65 Hz
Operating Position	Panel Mounted (Vertical)
Accuracy	1%
Overload	1.2x range max, continuous, 2x for 5 secs
Relay Output Type	Single Pole changeover
Relay Output Rating	250 V, 5 A AC resistive
Operating Temperature	-20°C to +55°C (-4°F to 131°F)
Storage Temperature	-30°C to +70°C (-22°F to 158°F)
Humidity	95% RH (non-condensing)
Pull-in Frequency	56 Hz
Drop Out Frequency	55 Hz
Insulation Between Circuits	2.2 kV
Insulation to Case	4 kV
Overvoltage Category	III
Pollution Degree	II
Enclosure Integrity	UL94-V0
Enclosure Style	DIN 96
Case Material	Polycarbonate
Ingress Protection	IP54 (with gasket)
Electrical Connections	Cage clamp, Plug / Socket
Mounting	Snap-in
Weight	200g
Burden	< 4VA
Phase Difference	Adjustable 0-20 Degrees
Time Delay	Adjustable 0-2.5 Seconds

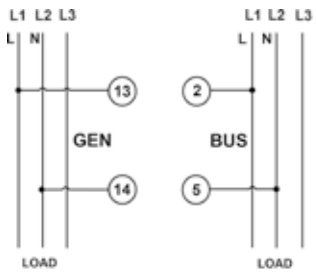
Product codes	Voltage	Operation
244-14HG-L-01	100/120 V	Synchro check relay, Voltage Difference and Dead Bus
244-14HG-M-01	220/240 V	
244-14HG-H-01	380/480 V	
244-14GG-J-01	59/77 V	Synchro check relay, and Voltage Difference
244-14GG-L-01	100/120 V	
244-14GG-M-01	220/240 V	
244-14GG-H-01	380/480 V	

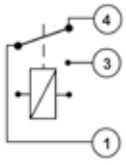
DIMENSIONS





CONNECTIONS





1 = Common
3 = Normally Open
4 = Normally Closed

Elapsed time meters (hours run meters)

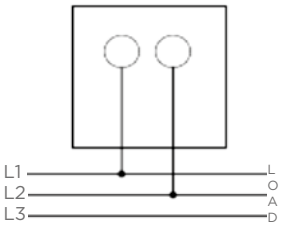


Elapsed time meters (ETM) or hours-run meters monitor “ON/RUN” time of plant and equipment, allowing the user to effectively control production efficiency, cost estimation and service period monitoring for preventative maintenance. Time is measured in increments of 0.01h up to 99999.99 hours after which the meter automatically resets to zero. Meters are non-resettable before this time to prevent accidental resetting.

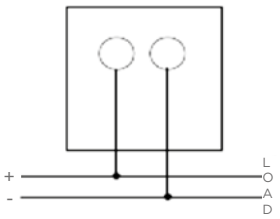
SPECIFICATIONS

AC	
Display	99999.99
Voltage	100-125 V AC 200-250 V AC 380-440 V AC
Frequency	50 or 60 Hz
Operating temperature	-20°C to +70°C
IP Protection	IP52
Burden	1 VA (100-125 V AC) 2 VA (200-250 V AC) 3.5 VA (380-440 V AC)
DC	
Display	99999.99
Voltage	10-30 V DC 12-36 V DC 36-80 V DC 110 V DC
Operating temperature	-20°C to +70°C
IP Protection	IP52
Burden	1 VA (100-125 V AC) 2 VA (200-250 V AC) 3.5 VA (380-440 V AC)

Elapsed time/hours run meters AC

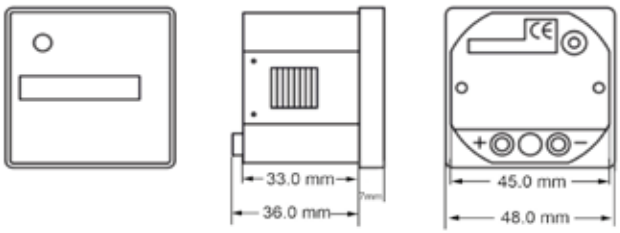


Elapsed time/hours run meters DC

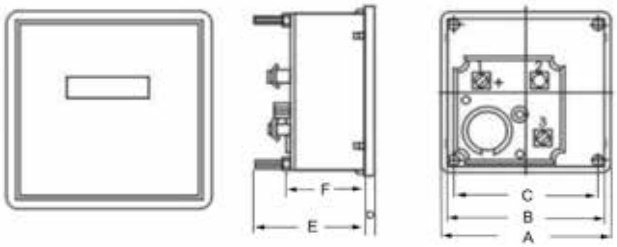


Bezel size product codes	48 mm	72 mm	96 mm
100-125 V - AC 50 Hz	M242-155-G-PL-ZH-C5	M243-155-G-PL-ZH-C5	M244-155-G-PL-ZH-C5
200-250 V - AC 5 0Hz	M242-155-G-RN-ZH-C5	M243-155-G-RN-ZH-C5	M244-155-G-RN-ZH-C5
380-440 V - AC 50 Hz	M242-155-G-RY-ZH-C5	M243-155-G-RY-ZH-C5	M244-155-G-RY-ZH-C5
100-125 V - AC 60 Hz	M242-156-G-PL-ZH-C6	M243-156-G-PL-ZH-C6	M244-156-G-PL-ZH-C6
200-250 V - AC 60 Hz	M242-156-G-RN-ZH-C6	M243-156-G-RN-ZH-C6	M244-156-G-RN-ZH-C6
380-440 V - AC 60 Hz	M242-156-G-RY-ZH-C6	M243-156-G-RY-ZH-C6	M244-156-G-RY-ZH-C6
10-30 V DC	-	M243-157-G-BU-ZH-DC	M244-157-G-BU-ZH-DC
12-36 V DC	M242-157-G-BU-ZH-DC	-	-
36-80 V DC	M242-157-G-NR-ZH-DC	M243-157-G-NR-ZH-DC	M244-157-G-NR-ZH-DC
110 V DC	M242-157-G-PM-ZH-DC	M243-157-G-PM-ZH-DC	M244-157-G-PM-ZH-DC

DIMENSIONS 48 MM



DIMENSIONS 72 & 96 MM



Model	Unit	A	B	C	D	E	F
96 mm	mm	96	90	83	6.0	65	43
	In	3.78	3.54	3.35	0.24	2.56	1.69
72 mm	mm	72	66	59	6.0	65	42
	In	2.83	2.6	2.32	0.24	2.56	1.69

Phase sequence indicators



Electronic phase sequence indicators ensure correct phase rotation and the presence of all 3-phase supplies. Incorrect or loss of phase can cause serious damage in a wide range of electrical machines. Ship-to-shore supplies, mobile generators and remote installations are particularly vulnerable to this problem.

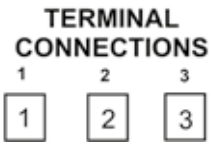
PRODUCT CODES

Bezel size mm	DIN 72	Voltage	Frequency	DIN 96	Voltage	Frequency
Phase sequence indicator	E243-12PG-P3C7	151-300V	50-60Hz	E244-12PG-P2C7	100-150V	50-60Hz
	E243-12PG-P4C7	301-500V	50-60Hz	E244-12PG-P3C7	151-300V	50-60Hz
	E243-12PG-P3C4	151-300V	400Hz	E244-12PG-P4C7	301-500V	50-60Hz
	E243-12PG-P4C4	301-500V	400Hz	E244-12PG-P2C4	100-150V	400Hz
	-	-	-	E244-12PG-P3C4	151-300V	400Hz
	-	-	-	E244-12PG-P4C4	301-500V	400Hz

GENERAL SPECIFICATION

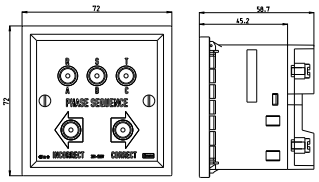
Max system voltage	600V
Frequency	50/60 Hz and 400HZ
Burden	2.5 VA/phase

CONNECTIONS

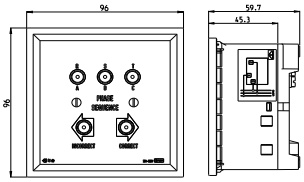


DIMENSIONS

DIN 72



DIN 96



Phase angle meters

Phase angle meters indicate the phase displacement between current and voltage. They are used in applications where the phase angle must be monitored, for example with tariffs having VAr penalties, or to optimise generator power delivery.

PRODUCT CODES - SHORT-SCALE MODELS
DIMENSIONS

Bezel size mm	72	96
Scale length mm	65	94
Product codes		
3-phase 3/4-wire balanced load	E243-42A	E244-42A

SPECIFICATIONS

Accuracy	Class 1.5
Ratings	Current: 1 A or 5 A for CTs Voltage: 110 V, 240 V, 380 V & 400 V for VT use
Frequency	50 Hz, 60 Hz
Burden at 50 Hz	Current: 1 VA Voltage: 3 VA per phase
Current range	20-120%

CONNECTIONS

3-phase, 3/4-wire balanced systems

