

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 meter are fully EMC and LVD compliant

1/4" 'fast on' terminals available

Benefits

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

Applications

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

Approvals

Lloyds:
03/00055 - Moving coil meters
03/00056 - Moving iron meters
03/00057 - Frequency meters

DIN Panel Meters – Short scale

A range of 48, 72, 96 and 144mm 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 matte 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 246 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' requirements.

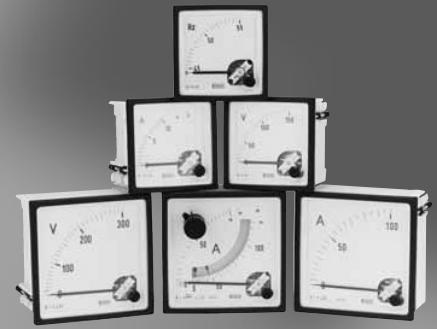
Specifications

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 MDI with moving iron movement
Format	48 x 48mm 72 x 72mm 96 x 96mm 144 x 144mm	48 x 48mm 72 x 72mm 96 x 96mm 144 x 144mm	48 x 48mm 72 x 72mm 96 x 96mm 144 x 144mm	72 x 72mm 96 x 96mm 144 x 144mm	72 x 72mm 96 x 96mm	96 x 96mm
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	0.5VA - 15A then 0.8VA voltmeters 4.5VA	See detailed specifications	See detailed specifications	See detailed specifications	2.5VA	3VA
Accuracy	1.5% to DIN43780	1.5% to DIN43780	2.5% to DIN43780	0.5% to DIN43780	3% on MDI	3% on MDI 1.5% ammeter
Input type	AC current or voltage	DC current or voltage	Rectified AC current or voltage	Frequency for all voltage ranges	Mean RMS value and maximum demand current	Mean RMS value and maximum demand current and instantaneous current
Measuring range	6 - 600V 100mA - 100A	15mV - 600V 25µA - 100A	6 - 600V 100µA - 100mA	57.7V @ 45Hz 500V @ 44Hz	1 - 6A 8, 15 or 20 minute delays	1 - 6A 8, 15 or 20 minute delays 0 - 5A/6A instantaneous
Dielectric voltage withstand test	3kV AC	3KV AC	3KV AC	3KV AC	3KV AC	3KV AC



General Specifications

Performance	BSEN60051
Measuring ranges	DIN 43701
Accuracy overload	BSEN60051
Dimensions	DIN43700
Scale marking generally to	DIN43802
Magnetic influence	BSEN60051
Safety	BSEN61010-1
Terminals	Clamp strap M4 for up to 25A. Clamp strap M8 for over 25A. 1/4" spade terminals available for models E243 and E244
Humidity range	Up to 95% RH (non condensing)
Test voltage @50Hz	3kV RMS for 1 minute
Ammeter ranges	1.0/1.2/1.3/1.5/2.5/4/5/6/8 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 (Lexan 500R)
Case	Dimensions and panel cutout conform to IEC473, DIN 43700. Case made from glass filled polycarbonate self-extinguishing and non drip in accordance with UL94 V-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 40mm 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 DIN 16257. A deviation of $\pm 15^\circ$ is permissible
Insulation group	Insulation resistance more than $5M\Omega @ 500 V$
Environmental	Measurement category III IEC 1010-1 Pollution degree 2 IEC 1010-1 Electrical rating 600V RMS (920V peak)
Approvals	EMC, LVD and Lloyds



DIN 16257 symbol meaning for calibration position

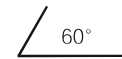
Vertical



Horizontal



Inclined



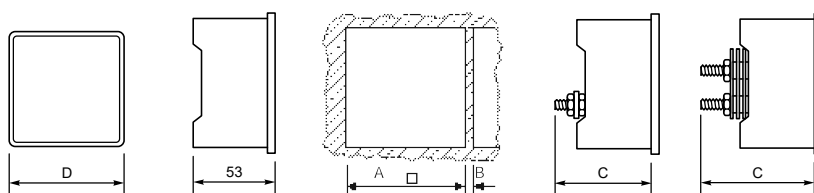
Inclination of dial surface.
Required orientation must always be stated when ordering if other than vertical mounting is required.

Dimensions

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

Max. panel thickness = 40mm

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	135 x 135	4





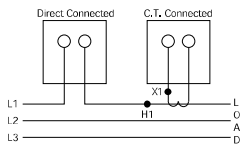
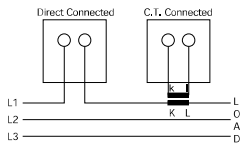
DIN Panel Meters – Short scale

Moving Iron AC Ammeters and Voltmeters

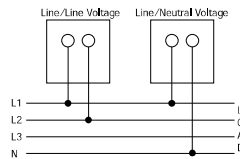
Designed to measure AC current or voltage, these meters indicate true RMS values and are substantially independent of system waveform. Scales are calibrated down to 20%, and ammeters can have overload scales of x2, x3, x5 or x6 for motor start duty. Ammeters can be supplied for use with -/1A or -/5A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

Connections

AC Ammeter



AC Voltmeter



Specifications

Accuracy:	Class 1.5
Frequency:	50 or 60Hz, (400Hz on request)
Burden at 50Hz:	Ammeters: 0.5VA voltmeters: Up to 4.5VA maximum
Ratings:	Ammeters: 0.5 - 100A AC direct connected (40A for E242-75A and E246-07A). Maximum system voltage 600V AC Low load / high middle, maximum 10A
Voltmeters:	6 - 600V

Product Codes

Bezel size mm	48	72	96	144
Scale length mm	42	65	94	145
Product codes				
AC ammeter	E242-75A	E243-02A	E244-02A	246-071A
x2 overload ammeter	E242-752A	E243-022A	E244-022A	246-072
x3 overload ammeter	E242-753A	E243-023A	E244-023A	246-073
x5 overload ammeter	E242-755A	E243-025A	E244-025A	246-075
x6 overload ammeter	E242-756A	E243-026A	E244-026A	246-076
AC voltmeter	E242-75V	E243-02V	E244-02V	246-07V



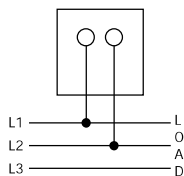
Frequency Meters

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

Specifications

Ratings:	100-125V AC 200-250V AC 380-440V AC* 500V AC* *Use E242-013 and 253-THZ in place of E242-41S for voltages over 380V Models available for use with VTs
Frequency:	0.5%: 45/55Hz, 55/65Hz, 45/65Hz, 360/440Hz
Burden:	4VA maximum

Connections

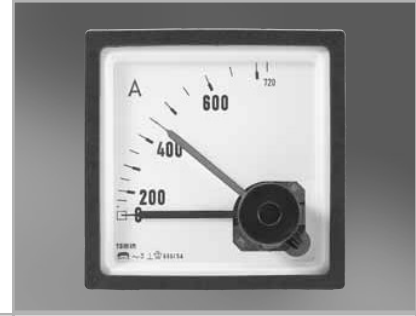


Product Codes

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

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.



Specifications

Accuracy:	Class 3
Options:	5A for use with separate CT 5/5A saturating CT 1/5A saturating CT
Burden at 50 Hz:	MDI - 2.5VA, CT - 2VA
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:	50/60Hz

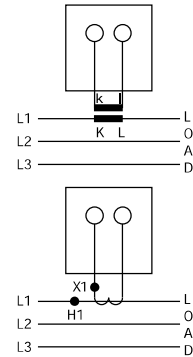
Product Codes

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

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

Connections

Maximum Demand Indicators



Combined AC Ammeter and Maximum Demand Indicator

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.

Specifications

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

Product Codes

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

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



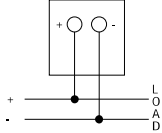


Moving Coil DC Ammeters and Voltmeters

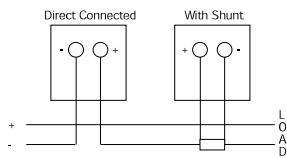
Moving coil meters are suitable for all DC systems. The linear scale is calibrated down to zero and the accuracy maintained down to 10%. High currents are measured with separate shunts and suitably scaled indicators. Suppressed, centre and offset zero models are available.

Connections

DC Voltmeter



DC Ammeter



Specifications

Accuracy:	Class 1.5
Ratings:	Ammeters: 100 μ A-25A, (200 μ A for long-scale model) 4/20mA suppressed zero 40A for model E242, E243 and E244 up to 100A Voltmeters: 50mV-600V 1/5V suppressed zero 50, 60, 75, 100, 150mV for use with shunts
Impedance:	Ammeters: 75mV internal shunt above 60mA Voltmeters: 1000 Ω /V above 1V

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	246-10A
Ammeters suppressed zero	E242-89R	E243-01R	E244-01R	246-10
Voltmeters	E242-89V	E243-01V	E244-01V	246-10V
Voltmeters suppressed zero	E242-89S	E243-01S	E244-01S	246-10S

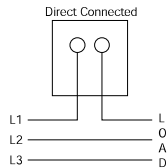


Moving Coil Rectified AC Ammeters and Voltmeters

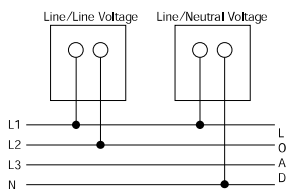
For high frequency or linear full scale AC measurements, these instruments measure average values of sinusoidal waveforms and are scaled in RMS values. The high quality silicon bridge rectifier gives a linear scale down to near zero, where some compression occurs.

Connections

AC Ammeter



AC Voltmeter



Specifications

Accuracy:	1.5% ES
Ratings:	Ammeters: 250 μ A-1A AC Over 1A via CTs Voltmeters: 15 - 600V AC direct connected. models available for use with VTs
Frequency:	50/60Hz, (Single frequencies 25Hz - 3kHz on request)

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	246-10B
Voltmeters	E242-89W	E243-01W	E244-01W	246-10W

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.

Specifications

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

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	246-10A
AC voltage	E242-89V	E243-01V	E244-01V	246-10V
Speed	E242-892	E243-012	E244-012	246-102
Frequency	E242-893	E243-013	E244-013	246-103
Phase angle	E242-894	E243-014	E244-014	246-104
Watts	E242-895	E243-015	E244-015	246-105
VAr	E242-896	E243-016	E244-016	246-106
VA	E242-897	E243-017	E244-017	246-107



Connections

