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Energy Division
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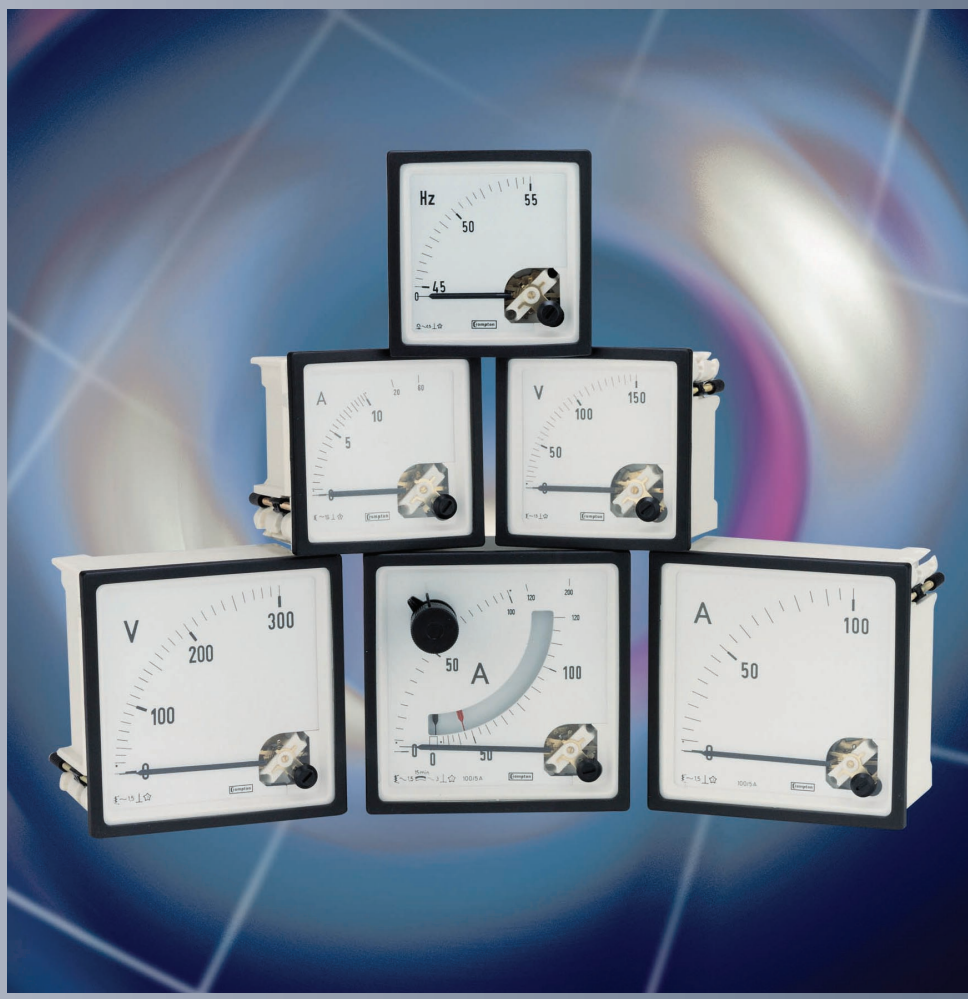
Analogue Instruments



Crompton INSTRUMENTS

Analogue Instruments

Features

Extensive range

Accurate measurement and display of electrical and electronic parameters

Wide range of case styles and specifications

Displays trend better than digital indicators

Maximum reliability in harsh environments

Benefits

Low cost

Local indication

Ease of installation

Minimal training

Low maintenance

Reasonable accuracy

Applications

Switchgear

Distribution systems

Generator sets

Control panels

Energy management

Building management

Utility power monitoring

Process control

Motor control

Approvals

UL, CSA, ABS, LRS, BV and ISSep

High quality analogue instruments designed to measure an extensive range of electrical and electronic parameters. This comprehensive range offers DIN instruments, ANSI switchboard meters, panel indicators, sealed and ruggedised instruments, and complementary selector switches for line to line and line to neutral readings. Instruments are precision engineered and robust in design, ensuring accurate measurement and display in the most demanding of environments. All instruments are available in a range of styles, sizes and specifications to meet the exacting needs of industry.

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A range of 48, 72, 96 and 144mm DIN style panel meters 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. Lloyds approvals.	
240 Series DIN Panel Meters	8 – 28
An extensive range of 48, 72, 96 and 144mm DIN style panel meters offering measurement of all electrical and electronic parameters. Meters are shock resistant and vibration proof and supplied with terminal covers. A selection of slide in dials and customised options are available. LRS and BV Approvals.	
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Panel mounted selector switches offering a 7 position voltmeter switch and a 4 position ammeter switch for the reading of line to line or line to neutral voltage and phase current.	
070 Series ANSI Switchboard Meters	30 – 62
An extensive range of analogue and digital/analogue meters in 4½" and 8¾" ANSI case styles. Meters utilise a high shock oil dampened movement, and provide 1% accuracy for all RMS AC and DC ranges. The range offers various customised options and features. UL, CSA, ABS and ISSeP approvals.	
128 Series Edgewise Meters	63 – 67
Shock and vibration proof instruments providing 1.5% accuracy for any AC or DC parameter which can be converted into a DC analogue signal. These 6" meters provide a high ratio of scale length to panel area where numerous units can stacked together in a single panel cut out. ABS Approvals.	
549 Series Panel Meters	68 – 70
Compact panel meters designed to fit standard 17/32" switch knock outs. The range offers high accuracy AC and DC ammeters and voltmeters, elapsed time meters and impulse counters. ABS Approvals.	
Saxon Series Panel Indicators	71 – 72
A range of 2½", 3½" and 4½" surface mount panel meters utilising taut band mechanisms and offering IP54 protection. The range offers iron vane and moving coil AC and DC ammeters and voltmeters, elapsed time and frequency meters. UL Approvals.	
016 Series Fiesta Panel Indicators	73 – 75
A robust range of shortscale and longscale 3½" surface mount panel meters offering IP55 protection and featuring a wide viewing contoured window. The range offers iron vane and moving coil AC and DC ammeters and voltmeters, elapsed time and frequency meters. UL Approvals.	
PR and EX Series Panel Indicators	76 – 78
Surface mount and rear panel mounted meters available in five case sizes from 1½" to 5½". The range offers AC and DC moving coil ammeters and voltmeters, moving iron AC meters, elapsed time, frequency and true VU meters which are vibration and shock resistant.	
050 Series Unifix Panel Indicators	79 – 80
An extensive range of shortscale and longscale meters in 94mm, 129mm and 181mm bezel sizes. Meters utilise taut band mechanisms and provide 1.5% accurate measurement of a wide range of individual electrical parameters. Options include intrinsically safe and meter relay versions. ISSeP Approvals.	
078/080/087 Series Sealed and Ruggedised Indicators	81 – 85
Designed to comply with industrial, marine and military specifications, these 240° and 90° scale meters meters are resistant to extreme shock, vibration, temperature, dirt and humidity. The range offers a wide range of bezel sizes fitted with toughened glass.	
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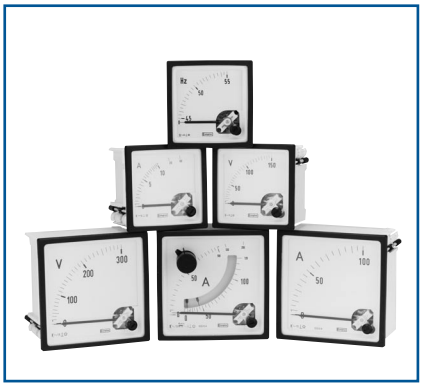
EURODIN Panel Meters



A range of 48, 72, 96 and 144mm DIN style panel meters offering measurement of 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.

Features

A range of the most popular shortscale measuring instruments in 4 case sizes

Shock resistant sprung pivot and jewel movement

Terminal covers supplied as standard

EMC hard frequency meter –fully EMC and LVD compliant

¼" '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

Movements

Moving Coil Meter

This is a centre cored, self shielding moving coil movement, using pivots, hairsprings and sprung jewels. Variations in movement ranges are limited by design to 7: all intermediate ranges are achieved by shunting the next lowest range. All D.C. voltmeters are 1000 ohms per volt, rectified product run at 900 ohms per volt, millivolt meters use the 5 milliamp movement.

Moving Iron Meter

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

Frequency Meter

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

Dials, Scales and Pointers

Standard dials are matt white 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 models E242, E243, E244 and E246 90° moving iron, moving coil and frequency meters.

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.

Specification

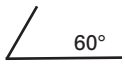
Type of Instrument	Moving Iron for Current and Voltage	Moving Coil for Current and Voltage	Moving Coil with rectifiers for Current and Voltage	Moving Coil with built in transducer for frequency measurement	Maximum Demand Indicators	Combined MDI with Moving Iron Movement
Format	48 x 48 mm 72 x 72 mm 96 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	72 x 72 mm 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	0.5VA to 15A then 0.8VA Voltmeters 4.5VA	See detailed specification	See detailed specification	See detailed specification	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	A.C. Current or Voltage	D.C. Current or Voltage	Rectified A.C. 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	6V - 750V 100 mA - 100A	15mV - 600V 25µA - 100A	6V - 600V 100µA - 100mA	57.7V @ 45 Hz-500V @ 44Hz	1A - 6A 8, 15 or 20 minute delays	1A - 6A 8, 15 or 20 minute delays 0 - 5A/6A instantaneous
Isolation	3 kV A.C. (2kV A.C. on 48 x 48)	3 kV A.C. (2kV A.C. on 48 x 48)	3 kV A.C. (2kV A.C. on 48 x 48)	2 kV A.C.	3 kV A.C.	3 kV A.C.

DIN 16257 symbol meaning for calibration position

Vertical

Horizontal

Inclined



Inclination of dial surface to the horizontal e.g 60°.

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

General Specification

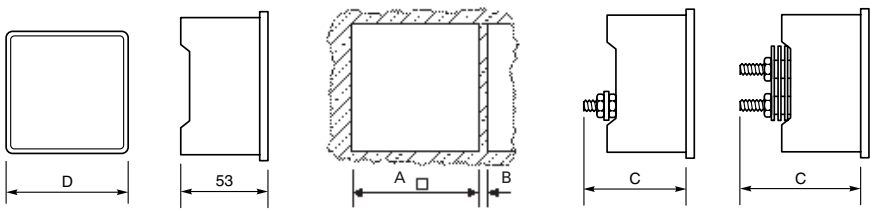
Performance	BSEN60051
Measuring Ranges	DIN 43701
Accuracy Overload	BSEN60051
Dimensions	DIN43700
Scale Marking Generally To	DIN43802
Magnetic Influence	BSEN60051
Safety	BSEN60051
Terminals	Clamp strap M4 up to 25A. Clamp strap M8 over 25A 1/4" spade terminals available for models E243 & E244
Humidity 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 & 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 ±15° is permissible
Insulation Group	Insulation resistance more than 5MΩ@ 500 V
Environmental	Environmental category II
Approvals	EMC, LVD and Lloyds

Dimensions

For Moving Coil measuring range:		For Moving Iron measuring range:	
6A to 60A	C=67mm	0 to 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



Moving Iron A.C. Ammeters and Voltmeters

Designed to measure A.C. current or voltage, these meters indicate true r.m.s. values and are substantially independent of system waveform. Scales are calibrated down to 20%, and ammeters can have overload scales 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 D.C. at reduced accuracy.

Specification

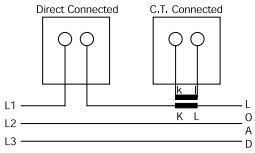
Accuracy:	Class 1.5
Frequency:	50 or 60Hz, (400Hz on request)
Burden at 50Hz:	Ammeters: 0.5VA Voltmeters: Up to 4.5VA maximum
Ratings:	Ammeters: 0.5A to 100A A.C. direct connected (40A for E242-75A and E246-07A). Maximum system voltage 600V A.C. Low load / high middle maximum 10A
Voltmeters:	6V to 600V

Product Codes

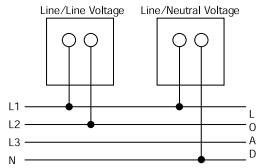
Bezel Size mm	48	72	96	144
Scale length mm	42	65	94	145
Product Codes				
A.C. ammeter	E242-75A	E243-02A	E244-02A	E246-02A
x2 overload ammeter	E242-752A	E243-022A	E244-022A	E246-022A
x3 overload ammeter	E242-753A	E243-023A	E244-023A	E246-023A
x5 overload ammeter	E242-755A	E243-025A	E244-025A	E246-025A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

Connections

A.C. Ammeter



A.C. Voltmeter



Frequency Meters

These Frequency meters use an integral electronic converter and a moving coil indicator. This meter is easy to read with an accuracy class 0.5.

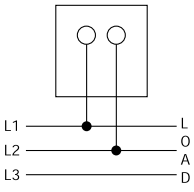
Specification

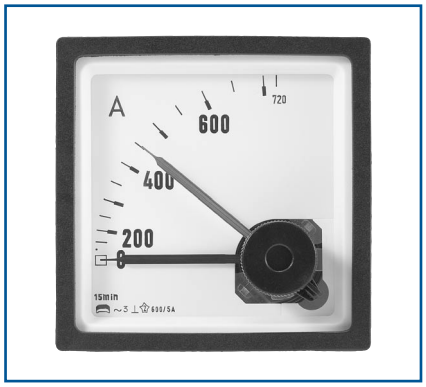
Ratings:	100V-125V A.C 200V-250V A.C. 380V-440V A.C.* 500V A.C.* *Use E242-013 and 253-THZ in place of E242-41S on voltages over 380V Models available for use with V.T.s
Frequency:	0.5%: 45/55Hz, 55/65Hz, 45/65Hz, 360/440Hz
Burden:	4VA Maximum

Product Code

Bezel Size mm	48	72	96	144
Scale length mm	42	65	94	145
Product Code	E242-41S	E243-41S	E244-41S	E246-41S

Connections





Maximum Demand Indicators

The thermal/time characteristic of an MDI monitors the most economic use of cable, fusegear and transformers. The directly heated bimetal element indicates mean r.m.s. current over 8, 15, or 20 mins, and a red slave pointer shows the highest value reached. The reset knob is wire sealable. Scales are calibrated to match the C.T. 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.

Specification

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

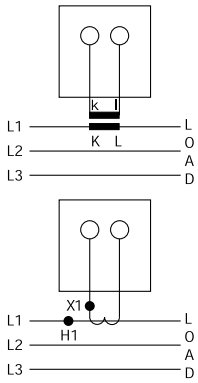
Product Codes

Bezel Size mm	72	96
Scale length mm*	65	94
Product Codes		
8 Minute Time Lag Without limiting C.T. for use with 5A C.T.	E243-16B	E244-16B
15 Minute Time Lag Without limiting C.T. for use with 5A C.T.	E243-16A	E244-16A
20 Minute Time Lag Without limiting C.T. for use with 5A C.T.	E243-16J	E244-16J

* Scaled 0/100/120% of C.T. primary value.

Connections

Maximum Demand Indicators



Combined A.C. Ammeter and Maximum Demand Indicator

Where the instantaneous and maximum demand currents are required, these instruments combine both movements in one case. It can also replace an existing A.C. Ammeter. Specification as above.

Specification

Accuracy:	Moving Iron Ammeter: Class 1.5 MDI: Class 3
Burden at 50Hz:	MI - 0.5VA, MDI - 2.5VA Saturating C.T. - 2VA

Product Codes

Bezel Size mm	96
Scale length mm*	94
Product Codes	
8 Minute Time Lag Without limiting C.T. for use with 5A C.T. 3VA	E244-16Q
15 Minute Time Lag Without limiting C.T. for use with 5A C.T. 3VA	E244-16C
20 Minute Time Lag Without limiting C.T. for use with 5A C.T. 3VA	E244-16H

* Scaled 0/100/120% of C.T. primary value.

Moving Coil D.C. Ammeters and Voltmeters

Moving Coil Meters are suitable for all D.C. 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.

Specification

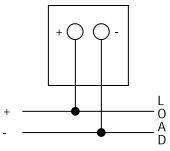
Accuracy:	Class 1.5
Ratings:	Ammeters: 100µA to 25A, (200µA for 05 model) 4/20mA suppressed zero 40A for model E242, E243 & E244 up to 100A Voltmeters: 50mV to 600V 1/5V suppressed zero 50, 60, 75, 100, 150mV for use with shunts
Impedance:	Ammeters: 75mV internal shunt above 60mA Voltmeters: 1000Ω/V above 1V

Product Codes

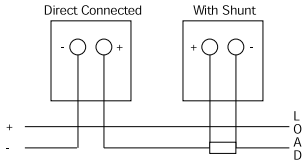
Bezel Size mm	48	72	96	144
Scale length mm	42	65	94	145
Product Codes				
Ammeters	E242-89A	E243-01A	E244-01A	E246-10A
Ammeters suppressed zero	E242-89R	E243-01R	E244-01R	E246-10R
Voltmeters	E242-89V	E243-01V	E244-01V	E246-10V
Voltmeters suppressed zero	E242-89S	E243-01S	E244-01S	E246-10S

Connections

D.C. Voltmeter



D.C. Ammeter



Moving Coil Rectified A.C. Ammeters and Voltmeters

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

Specification

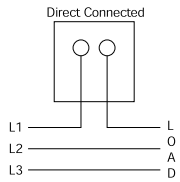
Accuracy:	1.5% ES
Ratings:	Ammeters: 250µA to 1A A.C. Over 1A via C.T.s Voltmeters: 15V to 600V a.c. direct connected Models available for use with V.T.s
Frequency:	50/60Hz, (Single Frequencies 25Hz to 3kHz on request)

Product Codes

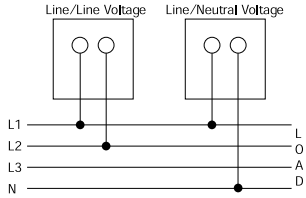
Bezel Size mm	48	72	96	144
Scale length mm	42	65	94	145
Product Codes				
Ammeters	E242-89B	E243-01B	E244-01B	E246-10B
Voltmeters	E242-89W	E243-01W	E244-01W	E246-10W

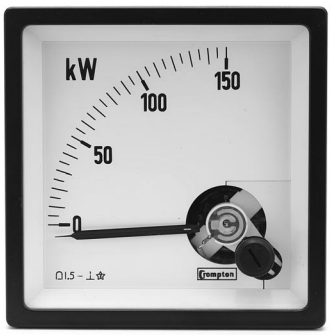
Connections

A.C. Ammeter

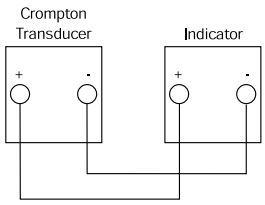


A.C. Voltmeter





Connections



Process Indicators

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

Specification

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				
A.C. Current	E242-89A	E243-01A	E244-01A	E246-10A
A.C. Voltage	E242-89V	E243-01V	E244-01V	E246-10V
Speed	E242-892	E243-012	E244-012	E246-102
Frequency	E242-893	E243-013	E244-013	E246-103
Phase Angle	E242-894	E243-014	E244-014	E246-104
Watts	E242-895	E243-015	E244-015	E246-105
VArs	E242-896	E243-016	E244-016	E246-106
VA	E242-897	E243-017	E244-017	E246-107

240 Series DIN Panel Meters

An extensive range of 48, 72, 96 and 144mm DIN style panel meters offering measurement of all electrical and electronic parameters. Meters are shock resistant and vibration proof and supplied with terminal covers. A selection of slide in dials and customised options are available.

Features

An extensive range of specialist measuring meters in 4 case sizes

Shock resistant taut band suspension

Vibration-proof Hi-Q damping

Slide in dials for 90°current, voltage and frequency on models 242, 243 and 244

Terminal covers supplied as standard

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

LRS and BV Approvals.

Movements

In Crompton Instruments' world-patented 'Hi-Q' taut band suspension, all the delicate parts of the traditional instruments are eliminated. There are no pivots, no jewel bearings, no hair-springs and no air damping vane. Instead, a tough platinum ribbon suspends the moving element between front and rear tension springs. Specially contoured pads are fitted to the ends of the spindle, and the working gap at each end is filled with a high quality silicon fluid. The pads, together with the fluid reservoir, form a system which acts as a resilient built-in shock absorber. This provides both rotational and longitudinal damping as the moving element floats on oil with no bearing friction and is effectively cushioned against shock and vibration. 360° Synchroscopes and power factor meters have robust pivot and jewel bearings with oil damping.

Dials, Scales and Pointers

Standard dials are matt white 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 models 242, 243 and 244 90° moving iron, moving coil and frequency meters.

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.

Illumination

Internal illumination is available in the following models:

- 244 and 246 shortscale moving coil and moving iron vane.
- 243, 244 and 246 longscale moving coil and moving iron vane.

Through dial (Translucent) illumination on 244 and 246 models.

Edge illumination on 243, 244 and 246 models.

Replaceable 6, 12 or 24V lamps are used on all models except 243 longscale meters, where the lamps are internal.

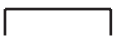
Specification

Performance	BSEN60051
Measuring Ranges	DIN 43701
Accuracy Overload	BSEN60051
Dimensions	DIN 43700
Scale Marking Generally	DIN43802
Magnetic Influence	BSEN60051
Safety	IEC414
Terminals	Clamp strap M4 up to 25A. Clamp strap M8 over 25A
Humidity Range	Up to 95% RH (non condensing)
Test Voltage @50Hz	2kV RMS for 1 minute
Overload AC Current	x 1.2 continuous x 10 for 5 seconds
Overload AC Voltage	x 1.2 continuous x 2 for 5 seconds
Frequency	See main pages for other instruments
Damping Time	Less than 3 seconds is standard. More heavily damped movements are available on request.
Standard Calibration	23°C
Operating Temperature	-20°C to +60°C
Enclosure Code	IP54 as standard (to BSEN60529). IP55 consult factory Terminals IP20B with terminal cover or terminal boots fitted
Case	Grade UL94V0
Base	Grade UL94V1

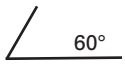
DIN 16257 symbol meaning for calibration position

Vertical

Horizontal

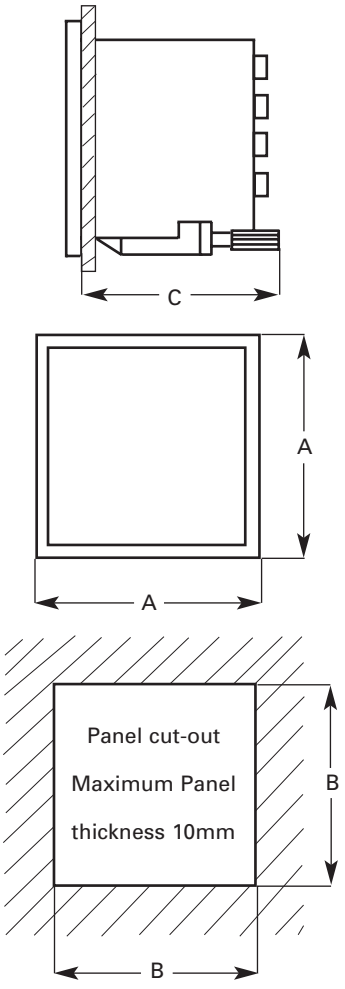


Inclined



Inclination of dial surface to the horizontal e.g 60°.

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



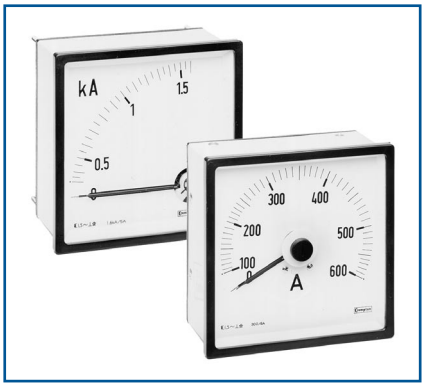
Specification Continued

Case	Dimensions and panel cutout conform to IEC473, DIN 43700. Models 242, 243 and 244 have cases and bezels injection moulded in flame retardant engineering thermoplastic, recognised by Underwriters Laboratory materials specification. All 246 models have pressed steel cases.
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. Installation Category III
Fixing on Panel	Models 242, 243 and 244 – 2 corner fixing clamps and tensioning thumb screws Model 242 – available with a one piece 'push on' clamp. Model 246 - 2 side fixing spring clips
Mounting Position	Normal vertical mounting or as indicated on the scale in accordance with DIN 16257. A deviation of ±15° is permissible
Approvals	Lloyds Shipping (LRS), Bureau Veritas (BV), EMC and LVD

Dimensions

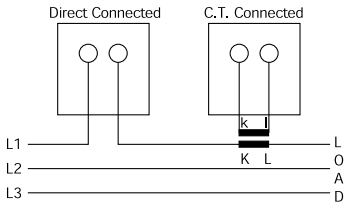
Model	**242**	**243**	**244**	**246**
Bezel 'A'	48 x 48	72 x 72	96 x 96	144 x 144
Panel cut-out 'B'	45 x 45	68 x 68	92 x 92	138 x 138
Scale Length: 90°	42	65	94	145
Scale Length: 240°	72	112	150	230
Maximum overall depth 'C':				
Ammeters and Voltmeters A.C. & D.C.*	64	64	64	60
Ammeters and Voltmeters with switch*	–	–	64	–
Dual Meters*	–	–	64	–
Elapsed Time Meter/Hours Run*	64	64	64	–
Maximum Demand Indicator*	–	64	64	60
Combined MDI & MI Indicator*	–	–	64	60
Maximum Demand Indicator with relay*	–	–	90	–
Frequency Meter 90°*	64	64	64	60
Frequency Meter 240°*	§	§	120	125
Phase Angle, Power Factor Meter 90°*	§	§	107	§
240°*	§	§	107	§
M.C. Indicator with separate transducer*	64	64	64	60
Dynamometer 360° Synchroscope*	–	–	120	125
Dynamometer 360° Power Factor Meter*	–	–	120	–
Phase Sequence Indicator*	–	64	64	–
Position Indicator*	§	§	120	125
Speed Indicator*	64	64	64	60
Temperature Indicators*	–	–	120	125
Quadra Meters*	–	–	64	–
Impulse Counters*	64	64	64	–
Wattmeter, Varmeter 90°	§	§	107	125
Wattmeter, Varmeter 240°	§	§	107	125
Model 244-21Y & 244-21Z	–	–	142	–
LED Synchroscope & Synchro Check Relay	–	–	80	–
LED 360° Synchroscope	–	–	80	–

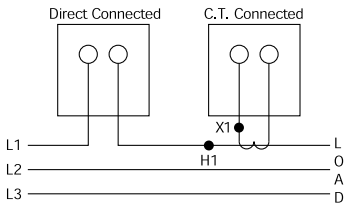
§ Indicator Only
* If separate terminal cover is used add 20 mm to dimension C
– Not available



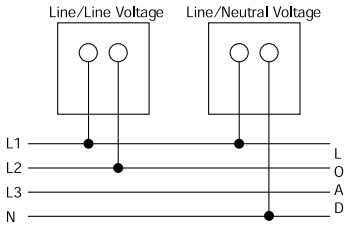
Connections

A.C. Ammeter





A.C. Voltmeter



Moving Iron A.C. Ammeters and Voltmeters

Designed to measure A.C. current or voltage, these meters indicate true r.m.s. values and are substantially independent of system waveform. Scales are calibrated down to 20%, and ammeters can have overload scales 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 D.C. at reduced accuracy.

Specification – Short Scale

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: 0.5A to 100A A.C. direct connected (40A for 242-75A and 246-07A). Maximum system voltage 720V A.C. Low load / high middle maximum 10A Voltmeters: 6V to 600V

Product Codes – Short Scale

Bezel Size mm	48	72	96	144
Scale length mm	42	65	94	145
Product Codes				
A.C. ammeter	242-75A	243-02A	244-02A	246-07A
x2 overload ammeter	242-752	243-022	244-022	246-072
x3 overload ammeter	242-753	243-023	244-023	246-073
x5 overload ammeter	242-755	243-025	244-025	246-075
x6 overload ammeter	242-756	243-026	244-026	246-076
Low load ammeter	–	243-02H	244-02H	–
A.C. voltmeter	242-75V	243-02V	244-02V	246-07V
Low middle voltmeter	–	243-02M	244-02M	–

Specification – Long Scale

Accuracy:	Class 1.5
Frequency:	50 or 60Hz, (400Hz on request)
Burden at 50Hz:	Ammeters: 1.5VA Voltmeters: 4.5VA maximum
Ratings:	Ammeters: 0.5A to 25A A.C. direct connected Maximum system voltage 720V A.C. Low load / high middle (maximum 10A) Voltmeters: 6V to 600V A.C.

Product Codes – Long Scale

Bezel Size mm	48	72	96	144
Scale length mm	72	112	150	230
Product Codes				
Ammeter	242-03A	243-03A	244-03A	246-03A
x2 overload ammeters	242-032	243-032	244-032	246-032
x3 overload ammeters	242-033	243-033	244-033	246-034
x5 overload ammeters	242-035	243-035	244-035	246-035
x6 overload ammeters	242-036	243-036	244-036	246-036
Low load ammeters	–	243-03H	244-03H	–
Voltmeter	242-03V	243-03V	244-03V	246-03V

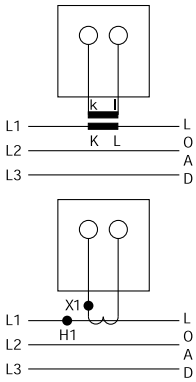
Maximum Demand Indicators

The thermal/time characteristic of an MDI monitors the most economic use of cable, fusegear and transformers. The directly heated bimetal element indicates mean r.m.s. current over 8, 15, or 20 mins, and a red slave pointer shows the highest value reached. The reset knob is wire sealable. Scales are calibrated to match the C.T. 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.

Specification

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

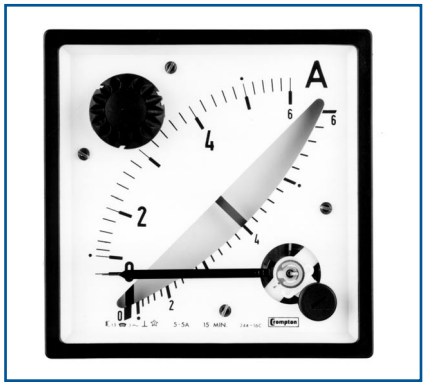
Connections



Product Codes

Bezel Size mm	72	96	144
Scale length mm*	65	94	145
Product Codes			
8 Minute Time Lag			
Without limiting C.T. for use with 5A C.T.	243-16B	244-16B	–
With self-contained 5/5A limiting C.T.	–	244-16R	–
15 Minute Time Lag			
Without limiting C.T. for use with 5A C.T.	243-16A	244-16A	246-16A
With self-contained 5/5A limiting C.T.	–	244-16E	–
20 Minute Time Lag			
Without limiting C.T. for use with 5A C.T.	243-16J	244-16J	246-16J
With self-contained 5/5A limiting C.T.	–	244-16K	–

* Scaled 0/100/120% of C.T. primary value.



Combined A.C. Ammeter and Maximum Demand Indicator

Where the instantaneous and maximum demand currents are required, these instruments combine both movements in one case. It can also replace an existing A.C. Ammeter. Specification as above.

Specification

Accuracy:	Moving Iron Ammeter: Class 1.5, MDI: Class 3
Burden at 50Hz:	MI - 0.5VA, MDI - 2.5VA, Saturating C.T. - 2VA

Product Codes

Bezel Size mm	72	96	144
Scale length mm*	65	94	145
Product Codes			
8 Minute Time Lag			
Without limiting C.T. for use with 5A C.T. 3VA	–	244-16Q	–
With self-contained 5/5A limiting C.T. 5VA	–	244-16T	–
15 Minute Time Lag			
Without limiting C.T. for use with 5A C.T. 3VA	–	244-16C	246-16C
With self-contained 5/5A limiting C.T. 5VA	–	244-16F	246-16F
20 Minute Time Lag			
Without limiting C.T. for use with 5A C.T. 3VA	–	244-16H	–
With self-contained 5/5A limiting C.T. 5VA	–	244-16L	–

* Scaled 0/100/120% of C.T. primary value.

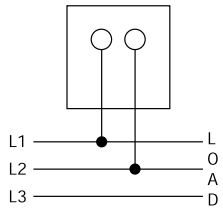
Frequency Meters

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

Specification

Accuracy:	Class 0.5
Ratings:	100V-125V A.C 200V-250V A.C. 380V-440V A.C.* 500V A.C.* *For voltages above 380V use 242-013 with a 253-THZ, in place of 242-41S Models available for use with V.T.s
Frequency 0.5%:	45/55Hz, 55/65Hz, 45/65Hz, 360/440Hz Other scalings available on request
Burden:	4VA Maximum

Connections



Product Code

Bezel Size mm	48	48	72	72	96	96	144	144
Scale length mm	42	72	65	112	94	145		
Product Code	242-41S	242-053 +253-THZ	243-41S +253-THZ	243-053	244-41S	244-41L	246-41S	246-41L

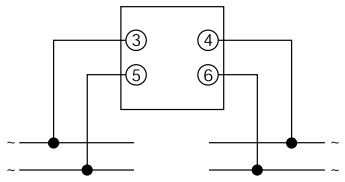
Dual Frequency Meters

Two instruments in one case can be used to measure a wide range of frequencies. These dual instruments save both panel space and assemly time. The 244-41D is an ideal component in sychronising applications.

Specification

Accuracy:	Class 0.5
Ratings:	100V-125V A.C 200V-250V A.C. 380V-440V A.C. 500V A.C. Models available for use with V.T.s
Frequency 0.5%:	45/55Hz, 55/65Hz, 45/65Hz, 360/440Hz
Burden:	4VA Maximum

Connections



Product Code

Bezel Size mm	96
Scale length mm	65
Product Code	244-41D

Moving Coil Rectified A.C. Ammeters and Voltmeters

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

Specification – Short Scale

Accuracy:	1.5% ES
Ratings:	Ammeters: Model 242 from 250µA to 20mA Model 243 from 250µA to 1A Models 244/246 from 250µA to 20A Voltmeters: 15V to 600V a.c. direct connected Models available for use with V.T.s
Frequency:	50/60Hz, (Single Frequencies 25Hz to 3kHz on request)

Product Codes – Short Scale

Bezel Size mm	48	72	96	144
Scale length mm	42	65	94	145
Product Codes				
Ammeters	242-89B	243-01B	244-01B	246-10B
Voltmeters	242-89W	243-01W	244-01W	246-10W

Specification – Long Scale

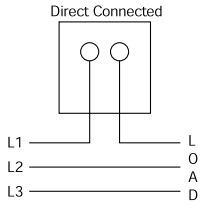
Accuracy:	1.5 % ES
Ratings:	Ammeters: 250µA to 1A A.C.Up to 30A on models 244/246-05B Voltmeters: 15V to 600V Direct connected Models available for use with V.Ts
Frequency:	50/60Hz. (Single frequencies 25Hz to 3kHz on request)

Product Codes – Long Scale

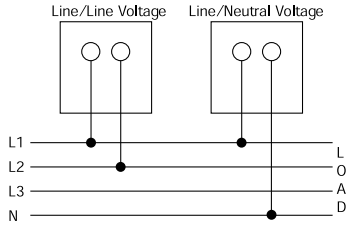
Bezel Size mm	48	72	96	144
Scale length mm	72	112	150	230
Product Codes				
Ammeters	242-05B	243-05B	244-05B	246-05B
Voltmeters	242-05W	243-05W	244-05W	246-05W

Connections

A.C. Ammeter



A.C. Voltmeter



Dual A.C. Ammeters and Voltmeters

The two instruments in one case can be used for independent measurement of 2 parameters or the comparison of the two inputs. For example, when an A.C. generator is to be connected in parallel with mains supply where voltage, phase and frequency must coincide.

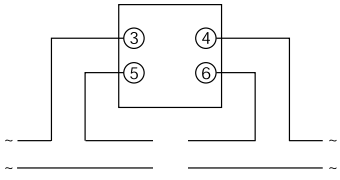
Specification

Accuracy:	1.5% ES
Ratings:	Ammeter: 250µA to 10A A.C. Voltmeter: 15 to 600V direct connected
Frequency:	50/60Hz (single frequencies 25Hz to 3kHz on request)

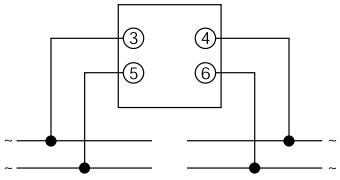
Product Codes

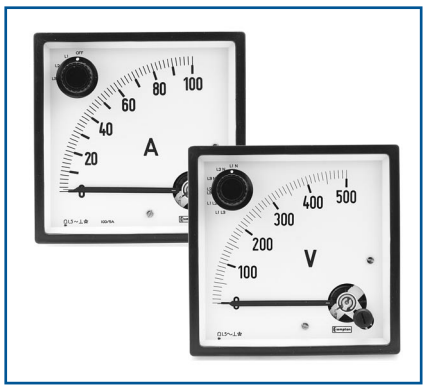
Bezel Size mm	96
Scale length mm	65
Product Codes	
Ammeters Voltmeters	244-80F 244-80L

Dual A.C. Ammeter
Direct Connected



Dual A.C. Voltmeter





Moving Coil Rectified A.C. Ammeters and Voltmeters with Selector Switch

These moving coil rectified A.C. meters measure voltage or current and incorporate a selector switch which eliminates the need to fit a separate selector switch, thus saving panel space and assembly time.

A.C. Ammeters with selector switch are suitable for:

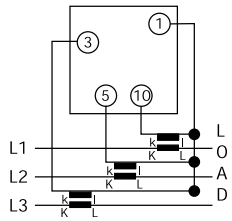
- *Line current measurement in a single 96 DIN housing with an 'off' position.*
- *Internal 1A or 5A/10mA C.T.s are fitted to ensure the primary C.T.s are always in circuit.*

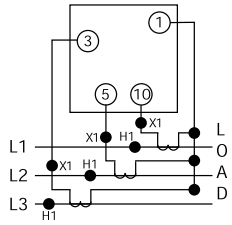
A.C. Voltmeters with selector switch are suitable for:

- *Three phase four wire line to line and line to neutral voltage measurement in a single 96 DIN housing.*
- *Three phase three wire line to line voltage measurement in a single 96 DIN housing with 'off' position.*

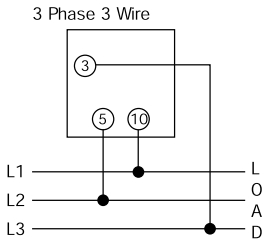
Connections

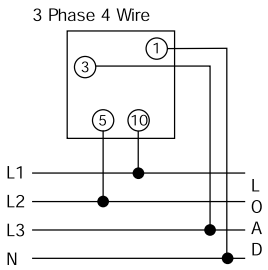
A.C. Ammeters with Selector Switch





A.C. Voltmeters with Selector Switch





Specification

Accuracy:	1.5% ES
Frequency:	50/60Hz (single frequencies 25Hz to 3kHz on request)
Ratings:	Ammeters: 250µA to 5A A.C. via 1:1 C.T. Over 5A via C.T.s.
	Voltmeters: 15V to 600V direct connected Models available for use with V.T.s
Bezel Size:	96mm
Scale Length:	94mm

Product Codes – A.C. Ammeter with Selector Switch

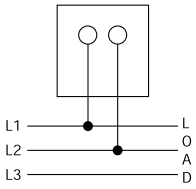
Model	Switch Notation	
244-01E-AMP1	3 (+off) switch pos;	T, S, R, Off
244-01E-AMP2	3 (+off) switch pos;	B, Y, R, Off
244-01E-AMP3	3 (+off) switch pos;	L3, L2, L1, Off
244-01E-AMP4	3 (+off) switch pos;	Off, R, W, B

Product Codes – A.C. Voltmeters with Selector Switch

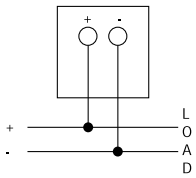
Model	Switch Notation	
244-01Q-SW1	6 switch pos;	RT, ST, RS, RO, SO, TO
244-01Q-SW2	6 switch pos;	RB, YR, BY, BN, YN, RN
244-01Q-SW3	6 switch pos;	L1L3, L1L2, L2L3, L3N, L2N, L1N
244-01Q-SW4	3 (+off) switch pos;	RT, ST, RS, Off
244-01Q-SW5	3 (+off) switch pos;	RY, YB, RB, Off
244-01Q-SW6	3 (+off) switch pos;	L1L2, L2L3, L3L1, Off
244-01Q-SW7	6 switch pos;	RN, WN, BN, BW, WR, RB
244-01Q-SW8	3 (+off) switch pos;	RW, WB, RB, Off

Connections

Elapsed Time/Hours Run Meters A.C.



Elapsed Time/Hours Run Meters D.C.



Elapsed Time Meter or Hours Run Meters

Elapsed time meters or hours run meters monitor "ON/RUN" time of plant and equipment allowing the user to perform functions such as production efficiency, cost estimating and service period monitoring for preventative maintenance etc. The time is measured in increments of 0.01h up to 99999.99 hours after which time the meter resets to zero. Meters are non resettable to prevent accidental resetting.

Specification

Display:	99999.99
Voltage:	100-125V A.C. 200-250V A.C. 380-440V A.C.
Frequency:	50 or 60Hz
Burden:	2.5VA for D.C. input models
Voltage:	10/27V (12, 24V) D.C. 38/58V (48V) D.C. 90/132V (110V) D.C.

Product Codes

Bezel Size mm	48	72	96
Scale length	99999.99h	99999.99h	99999.99h
Product Code			
50Hz	242-158	243-155	244-155
60Hz	242-159	243-156	244-156
D.C. Input	242-157	243-151	244-151

Impulse Counters

Impulse counters can be used to measure any parameter where a pulse can be applied that is directly proportional to the parameter being measured. For example. the number of motor starts or by using a combination of Paladin Transducers, kW.h., Ampere hour, VA hour etc., can be recorded. The Impulse counter counts one digit every time an on/off voltage pulse is applied to the input terminals, and is non resettable to prevent accidental resetting.

Specification

Accuracy:	Pulse for Pulse
Display:	6 Digit 999999
Ratings:	110V,120V, 220V, 230V, 240V, or 415V A.C.±10% 50/60Hz 12V or 24V D.C. ±10%
Burden:	0.75VA (110V A.C.) 2.70VA (415V A.C.) 80mW (12V D.C.)
Pulse width:	50ms Minimum
Mark/Space Ratio:	1:1

Product Codes

Bezel Size mm	48	72	96
Scale length	999999	999999	999999
Product Codes			
D.C. Input			
12V	242-259G-MU	243-259G-MU	244-259G-MU
24V	242-259G-BD	243-259G-BD	244-259G-BD
A.C. Input			
110V	242-259G-PM	243-259G-PM	244-259G-PM
120V	242-259G-PQ	243-259G-PQ	244-259G-PQ
220V	242-259G-R4	243-259G-R4	244-259G-R4
230V	242-259G-RQ	243-259G-RQ	244-259G-RQ
240V	242-259G-RR	243-259G-RR	244-259G-RR
380V	242-259G-RU	243-259G-RU	244-259G-RU
415V	242-259G-SB	243-259G-SB	244-259G-SB

Quadra 3 in 1 and 4 in 1

A range of 96mm² DIN style 3 in 1 and 4 in 1 meters offering reduced stock holding and savings on space, installation and commissioning. Ideally suited for generator set applications, the range offers measurement of A.C. and D.C., current and voltage, frequency or elapsed time. Options include customer logo on dial, coloured dial, panel mounting gasket and heavily dampened movements.

Specification

Voltmeter:	110, 120, 200, 230, 240, 380, 400, 415, 440, 480V A.C. nominal. Maximum end scale 600 volts.
Frequency Meter Inputs:	45/55Hz, 55/65Hz, 45/65Hz, 360/440Hz Voltage inputs: As voltmeter inputs above
Ammeter inputs:	10mA A.C. 1 or 5A input (internal C.T.)
Hours Run:	110, 120, 220, 230, 240, 380, 400, 415, 440 Volts 50 or 60Hz
Hour Run Counting Range:	99999.99 hours
D.C. Current:	250µA to 1 Amp D.C. including 1, 5, 10, 20 and 4-20mA D.C. for transducer inputs
D.C. Volts:	50mV to 600 Volts D.C. including 50, 60, 75 and 150mV for shunt inputs
Burden:	Current: 0.75VA per phase Hours Run: 2.5VA LCD Hours Run: 0.5VA Voltage: 0.5VA Frequency: 4VA

When ordering please specify the inputs for each parameter and the scaling required.

Product Codes

Code	Description
244-80C	ACV + DCI + ACA + DCA
244-80D	3 x DCI + D.C. ETM (LCD)
244-80G	3 x ACA
244-80H	3 x ACV + FRQ
244-80I	3 x ACA + ETM
244-80J	3 x ACA + ETM (LCD)
244-80K	FRQ + ACV +DCI
244-80N	ACA + ACV + FRQ + ETM
244-80P	3 x ACV
244-80Q	ACV // FRQ // ETM + ACA
244-80R	ACV // ETM + 2 x ACV
244-80S	2 x ACV + 2 x ACA
244-80T	FRQ // ETM + ACV
244-80U	3 x ACA + ACV
244-80W	ETM // FRQ + DCI + ACV
244-80X	4 x DCI
244-80Y	ETM // FRQ + DCI
244-80Z	ACV + ACA + FRQ // ETM
244-802	2 x ACV + ACA + ETM
244-803	ACV + FRQ + 2 x ACA
244-804	3 x ACA + DCI
244-806	3 x ACV + ACA
244-807	V, Hz, ETM + SWITCH

Description

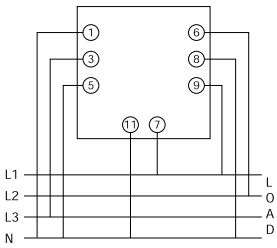
ACV	= Rectified A.C. voltmeter
ACA	= Rectified A.C. ammeter
DCA	= D.C. ammeter
DCI	= D.C. indicator
ETM	= Elapsed time meter
ETM(LCD)	= LCD elapsed time meter
FRQ	= Frequency Meter
//	= In parallel with

Quadra 3 in 1 and 4 in 1

Connections

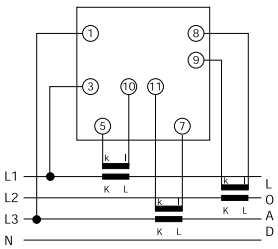
244-80H
Terminals

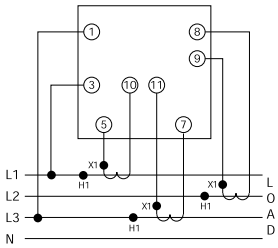
1 Volt Neutral L3
3 Volt Live L3
5 Frequency Neutral
6 Volt Live L2
7 Frequency Live
8 Volt Neutral L1
9 Volt Live L1
11 Volt Neutral L2



244-80I
Terminals

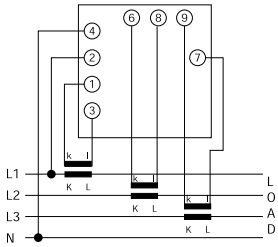
1 Neutral Hours Run
3 Live Hours Run
5 Current Start Red L1
10 Current Finish Black L1
11 Current Start Red L3
7 Current Finish Black L3
9 Current Start Red L2
8 Current Finish Black L2

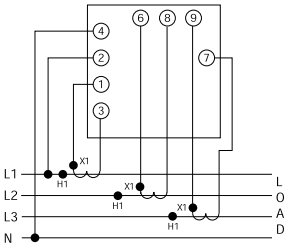




244-80J
Terminals

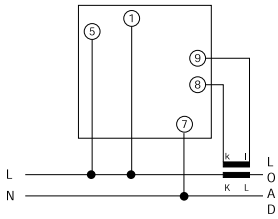
1 Current Start Red L1
3 Current Finish Black L1
2 Live Hours Run
4 Neutral Hours Run
6 Current Start Red L2
8 Current Finish Black L2
9 Current Start Red L3
7 Current Finish Black L3

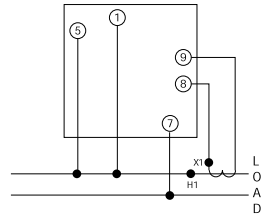




244-80Q
Terminals

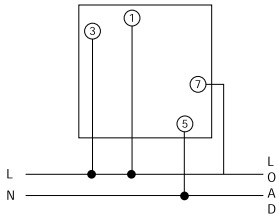
1 Live Hours Run
5 Live Volts and Frequency
7 Neutral
8 Current Start Red
9 Current Finish Black





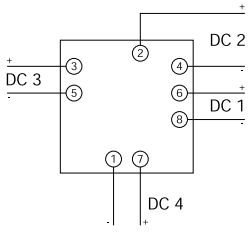
244-80T
Terminals

1 Voltmeter Input
3 Voltmeter Input
5 Hours Run & Frequency Meter Input
6 Hours Run & Frequency Meter Input



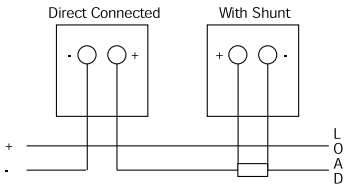
244-80X
Terminals

2	Positive	DC 2
3	Positive	DC 3
4	Negative	DC 2
5	Negative	DC 3
6	Positive	DC 1
7	Positive	DC 4
8	Negative	DC 1
11	Negative	DC 4

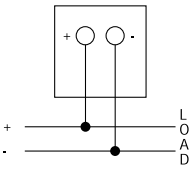


Connections

D.C. Ammeter

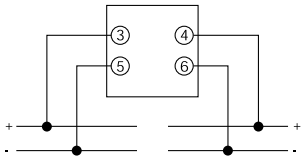


D.C. Voltmeter

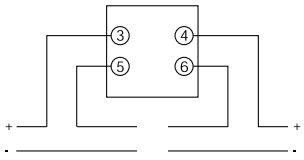


Connections

Dual D.C. Ammeter



Dual D.C. Voltmeter



Moving Coil D.C. Ammeters and Voltmeters

Moving Coil Meters are suitable for all D.C. 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.

Specification

Accuracy:	Class 1.5
Ratings:	Ammeters: 100µA to 25A, (200µA for 05 model) 4/20mA suppressed zero 40A for model 243/244-01A Voltmeters: 50mV to 600V 1/5V suppressed zero 50, 60, 75, 100, 150mV for use with shunts
Impedance:	Ammeters: 75mV internal shunt above 60mA Voltmeters: 1000Ω/V above 1V

Further details on our T-Sheet T118 available on request.

Product Codes – Short Scale

Bezel Size mm	48	72	96	144
Scale length mm	42	65	94	145
Product Codes				
Ammeters	242-89A	243-01A	244-01A	246-10A
Ammeters suppressed zero	242-89R	243-01R	244-01R	246-10R
Voltmeters	242-89V	243-01V	244-01V	246-10V
Voltmeters suppressed zero	242-89S	243-01S	244-01S	246-10S

Product Codes – Long Scale

Bezel Size mm	48	72	96	144
Scale length mm	72	112	150	230
Product Codes				
Ammeter	242-05A	243-05A	244-05A	246-05A
Ammeters suppressed zero	242-05R	243-05R	244-05R	246-05R
Voltmeters	242-05V	243-05V	244-05V	246-05V
Voltmeters suppressed zero	242-05S	243-05S	244-05S	246-05S

Moving Coil Dual D.C. Ammeters and Voltmeters

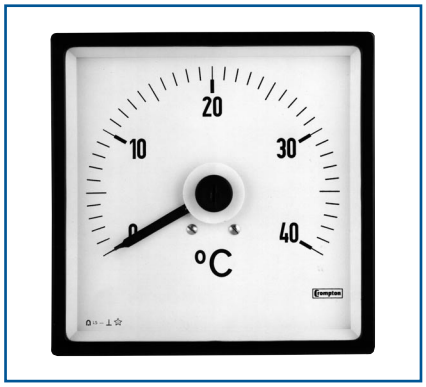
Dual instruments can be used to measure a wide range of currents and voltages, and save both space and time by requiring only one panel cut-out.
The 244-80M allows for independent measurement of two D.C. currents in one case.
The 244-80E allows for independent measurement of two D.C. voltages in one case.

Specification

Accuracy:	Class 1.5
Ratings:	D.C. Current: 100µA to 25A direct connected 4/20mA suppressed zero. D.C. Volts: 50mV to 600V 1/5 volt suppressed zero 50, 60, 75, 150mV for use with shunts.

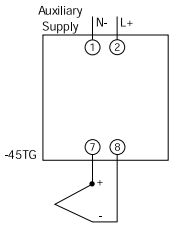
Product Codes

Bezel Size mm	96
Scale length mm	94
Product Code	
Ammeters	244-80M
Voltmeters	244-80E



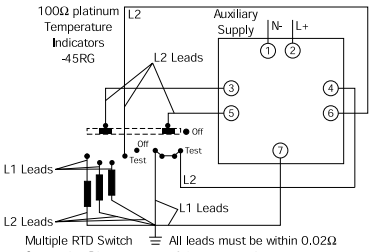
Connections

Thermocouple Indicators -45TG



Customer's Thermocouple

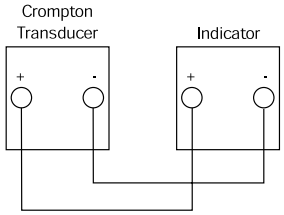
RTD Indicators -45RG



Multiple RTD Switch Connection Diagram

All leads must be within 0.02Ω of the same resistance.
L1 leads should not exceed 3Ω each.
L2 leads should not exceed 0.02Ω each.

Connections



Temperature Indicators

Longscale Indicators to read temperature values, usually remotely with RTD or thermocouple sensors supplied by the customer. RTD (Resistance Temperature Detector) indicators measure the change in resistance of the sensor. A 2 or 3 wire system may be used. Thermocouple indicators accept standard millivolt input signals. Cold junction compensation is provided and thermocouple break indication is incorporated.

Specification

Accuracy:	Class 1.5 - Indicator only. RTD indicator suitable for 10Ω copper 100Ω platinum, 100 & 120Ω nickel sensors Power in RTD is 100µW approximately. Thermocouple indicator suitable for J (0-700°C), K (0-1200°C) 50Ω maximum Circuit Resistance.
Auxiliary Supply:	Model 45R: from 63.5V to 480V A.C. at 50/60Hz Model 45T: 110, 115, 220, 240, 380, 400, 480V A.C. and 12, 24, 48, 110, 125V D.C.
Burden:	-45R 2VA, -45T 3VA

Product Codes

Bezel Size mm	96	144
Scale length mm	150	230
Product Codes		
RTD	244-45R	246-45R
Thermocouple	244-45T	246-45T

Process Indicators

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

Specification

Accuracy:	Class 1.5
Ratings:	1, 2, 5, 10 & 20mA. 4/20mA suppressed zero.
Burden:	See our technical data sheet T118.

Product Codes – Short Scale Models

Bezel Size mm	48	72	96	144
Scale length mm	42	65	94	145
Product Codes				
A.C. Current	242-89A	243-01A	244-01A	246-10A
A.C. Voltage	242-89V	243-01V	244-01V	246-10V
Speed	242-892	243-012	244-012	246-102
Frequency	242-893	243-013	244-013	246-103
Phase Angle	242-894	243-014	244-014	246-104
Watts	242-895	243-015	244-015	246-105
VArs	242-896	243-016	244-016	246-106
VA	242-897	243-017	244-017	246-107

Product Codes – Long Scale Models

Bezel Size mm	48	72	96	144
Scale length mm	72	112	150	230
Product Codes				
A.C. Current	242-05A	243-05A	244-05A	246-05A
A.C. Voltage	242-05V	243-05V	244-05V	246-05V
Speed	242-052	243-052	244-052	246-052
Frequency	242-053	243-053	244-053	246-053
Phase Angle	242-054	243-054	244-054	246-054
Watts	242-055	243-055	244-055	246-055
VArs	242-056	243-056	244-056	246-056
VA	242-057	243-057	244-057	246-057

Moving Coil Tap Position Indicators

These longscale position Indicators monitor transformer tap position, hoist or valve position, etc. They employ a 3 wire system and 11 to 18 positions can be provided using 400Ω steps. The measuring system comprises a moving coil indicator, stabilised power supply & transducer. The remote potentiometer or resistance thermometer sensor to be supplied by the customer.

Specification

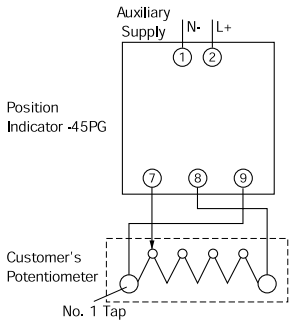
Accuracy:	Class 1.5
Auxiliary Supply:	A.C.: 50, 110, 220, 240V 50/60Hz D.C.: 50, 110, 125, 220V ±15%
Burden:	2VA

Product Code

Bezel size mm	96	144
Scale length mm	150	230
Product Code		
Position Indicator	244-45P	246-45P

Connections

Tap position indicator with self contained power source



Phase Sequence Indicators

An Electronic Phase Sequence Indicator ensures correct phase rotation and the presence of all 3 phase supplies. Incorrect phase 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.

Specification

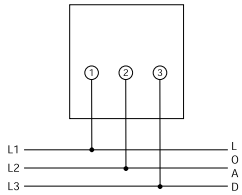
Voltage:	151/300V, 301/500V 100/150V (Model 244-12P only)
Frequency:	50/60Hz
Burden:	2.5VA/phase

Product Code

Bezel size mm	72	96
Product Code		
Phase Sequence Indicator	243-12P	244-12P

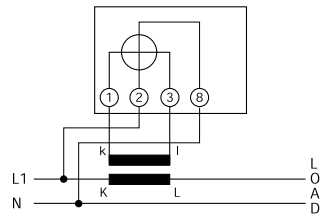
Connections

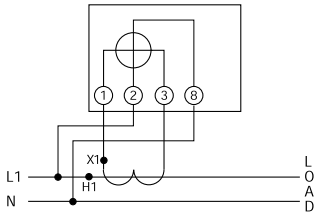
Phase Sequence Indicators



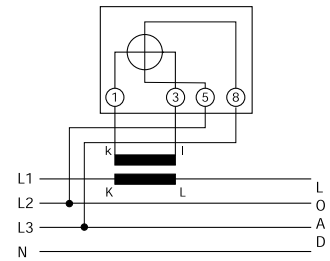
Connections

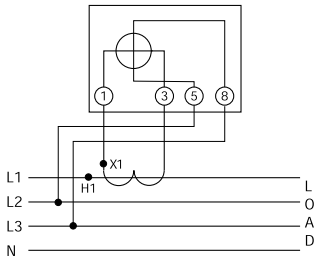
Single Phase Systems





3 Phase, 3 or 4 Wire Balanced Systems





Electronic Phase Angle Meters

These Phase Angle meters indicate the phase displacement between current and voltage. Used in applications where the phase angle must be monitored, for example with tariffs having VAr penalties, or to optimise generator power delivery.
The measuring system comprises a moving coil indicator and a phase angle transducer. The 244 and 246 models are self contained.

Specification

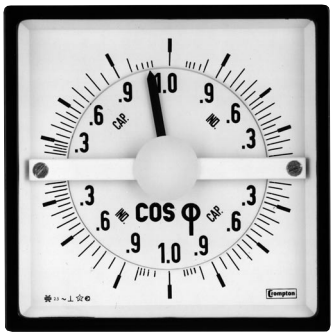
Accuracy:	Class 2.5 (2° electrical)
Ratings:	Current: 1A or 5A for C.T.s Voltage: 100/130V, 200-250V & 380-450V 100 - 110 for V.T. use.
Frequency:	50Hz, 60Hz, 400Hz.
Burden at 50Hz:	Current: 1VA Voltage: 4VA per Phase
Current range:	20% to 125%

Product Code - Short Scale Models

Bezel Size mm	72	96	144
Scale length mm	65	94	145
Product Code			
Single Phase	243-014G-FA+ 256-TPS	244-42B	246-425
3 Phase 3/4 wire Balanced Load	243-014G-FA+ 256-TPT	244-42A	246-42A

Product Code - Long Scale Models

Bezel Size mm	72	96	144
Scale length mm	112	150	230
Product Code			
Single Phase	243-054G-FA+ 256-TPS	244-425	246-425
3 Phase 3/4 wire Balanced Load	–	244-427	246-427



360° Dynamometer Power Factor Indicators

These Power Factor Indicators are suitable for generators or supplies operating in parallel. The four quadrant 360° scale calibrated cos ø 0-1-0-1-0 indicates forward (export) and reverse (import) power flow for inductive and capacitive loads.

Specification

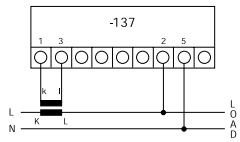
Accuracy:	Class 2.5 (2° electrical)
Ratings:	Current: -/1A or -/5A for C.T.'s Voltage: 60 to 600V, 100/110 for V.T. use.
Frequency:	50Hz or 60Hz
Burden:	Current: 2VA per coil @ 50Hz Voltage: 4VA per coil @ 50hz (7.5VA above 250V)

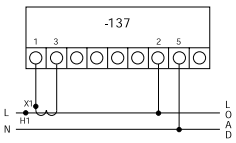
Product Codes

Bezel size mm	96	144
Scale length	360°	360°
Product Codes		
Single Phase	244-137	246-137
3 Phase 3 or 4 Wire 3 Currents + 1 Voltage	244-131	246-131
3 Phase 3 or 4 Wire 1 Current + 3 Voltages	244-132	246-132
3 Phase 3 or 4 Wire Unbalanced Load	244-136	246-136

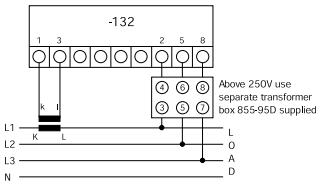
Connections

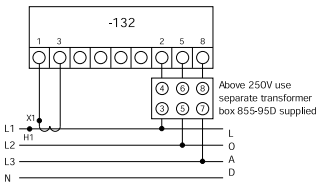
Single Phase



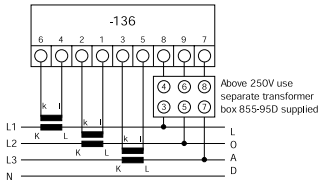


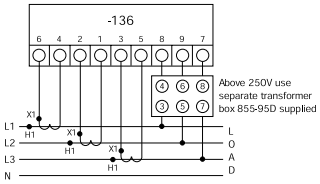
3 Phase 3 or 4 Wire 1 Current 3 Voltages Balanced Load



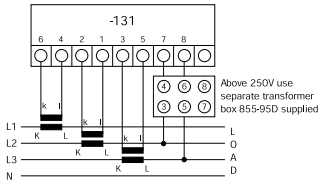


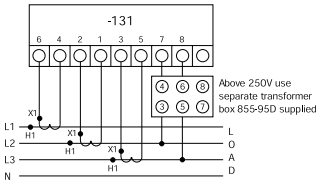
3 Phase 3 or 4 Wire Unbalanced Load



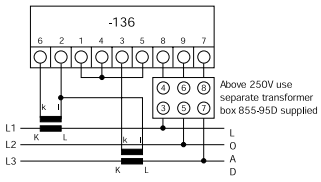


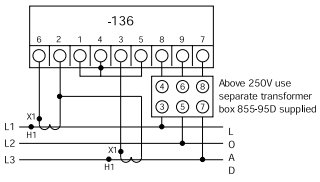
3 Phase 3 or 4 Wire 3 Currents 1 Voltage Balanced Load





3 Phase 3 Wire Using Two C.T.s Unbalanced Load





360° Dynamometer Synchroscope

Where manual parallelling of two A.C. systems is necessary, the frequency of both systems can be monitored by a Synchroscope. The systems are synchronised when the pointer is stationary in the 12 o'clock position. The instrument is rated for continuous operation and connection, and silicon oil damping is employed.

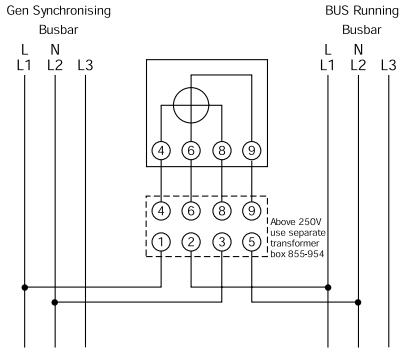
Specification

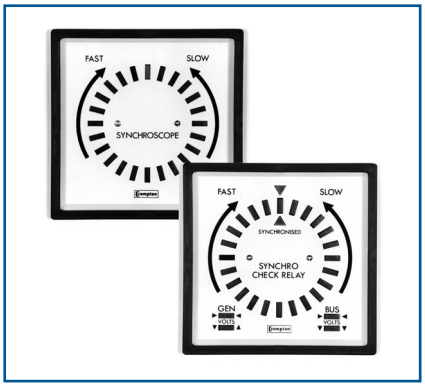
Accuracy:	Class 2.5 (2° electrical)
Ratings Voltage:	100-125V, 200-250V, 380-450V* * Use transformer box 855-954 100-110V for V.T. use
Frequency:	50Hz,60Hz, 50/60Hz, 400Hz
Burden at 50Hz:	5VA maximum.

Product Codes

Bezel size mm	96	144
Scale length	360°	360°
Product Codes		
50Hz	244-145	246-145
60Hz	244-146	246-146
50/60Hz	244-147	246-147
400Hz	244-144	246-144

Connections





360° LED Synchroscope and Synchro Check Relay

Where manual parallelling of two A.C. systems is desired, the frequency of both systems can be monitored by an LED Synchroscope. The systems are synchronised when the green LED is lit in the 12 o'clock position. The instrument is rated for continuous operation and connection. Where semi-automatic parallelling of two A.C. systems is desired, the voltage, phase displacement and the frequency of both systems can be monitored by an LED Synchroscope and Synchro Check Relay. Voltage, Phase angle and time delay controls are provided. The systems are synchronised when the green triangular LEDs are lit together with the GEN/BUS green LEDs. A dead bus option is also available.

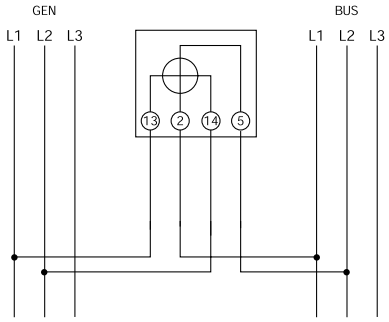
Specification

Ratings Voltage:	63.5, 110, 120, 220, 230, 240, 380, 400, 415, 440, 480V 110/120V (115V Nominal) 220/240V (230V nominal) 380/480V (430V nominal) Volts A.C. or via V.T.
Frequency:	40/65Hz
Burden at 50Hz:	4VA maximum Suitable for single or three phase systems
Safety:	IEC1010-1 (300V A.C. rms installation degree 2)
Dielectric:	4kV rms for 1 minute
Isolation:	BUS/GEN/RELAY
Vibration:	To Lloyds shipping specification
*Phase difference:	+0 to 20°. +/-1°
*Voltage difference:	+0 to 20% +/-2% 0 to 10% for models G & H
*Time Delay:	0 to 2.5 seconds +10%
*Accuracy:	Synchronisation at T.D.C. is +1°

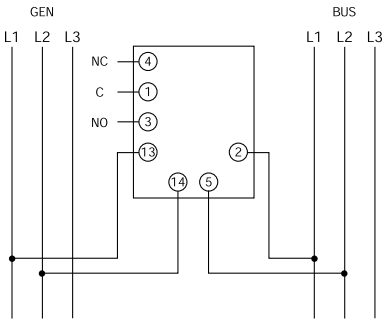
*360° LED Synchroscope and Synchro Check Relay Only.

Connections

360° LED Synchroscope



360° LED Synchroscope and Synchro Check Relay



Product Codes

Bezel Size mm	96	96	96
Scale Length mm	360° LED	360° LED	360° LED
3 or 4 Wire 40-65Hz	Synchroscope	Synchroscope and Synchro Check	Synchroscope and Synchro Check Relay Relay (Dead Bus)
Product Code			
110/120V	–	244-14GG-POBX	244-14HG-POBX
220/240V	–	244-14GG-R5BX	244-14HG-R5BX
380/480V	–	244-14GG-RUBX	244-14HG-RUBX
63.5V	244-14AG-NXYY	244-14LG-NXBX	244-14DG-NXBX
110V	244-14AG-PMYY	244-14LG-PMBX	244-14DG-PMBX
220V	244-14AG-R4YY	244-14LG-R4BX	244-14DG-R4BX
230V	244-14AG-RQYY	244-14LG-RQBX	244-14DG-RQBX
240V	244-14AG-RRYY	244-14LG-RRBX	244-14DG-RRBX
380V	244-14AG-RUYY	244-14LG-RUBX	244-14DG-RUBX
400V	244-14AG-SCYY	244-14LG-SCBX	244-14DG-SCBX
415V	244-14AG-SBYY	244-14LG-SBBX	244-14DG-SBBX
440V	244-14AG-SHYY	244-14LG-SHBX	244-14DG-SHBX
480V	244-14AG-SEYY	244-14LG-SEBX	244-14DG-SEBX

For the 244-14L and 244-14D models, the generator voltage is compared to the nominal input (bus) voltage specified at time of ordering. For the 244-14G and 244-14H models, the generator voltage is compared to the measured bus voltage.

Wattmeters & Varmeters

The 244/246 models are self contained and are available to measure active power and reactive power in both balanced and unbalanced, single and 3 phase 3 or 4 wire systems. These Wattmeters are ideal for clear precise analogue indication of power in applications such as power generation, industrial control panels and power distribution.

Specification

Accuracy:	Shortscale Class 2.5 Longscale Class 1.5
Measuring Ranges:	Voltage 94-106% Current 0-120%
Frequency Influence:	0.4% / Hz
Rating:	Current: 0.2A to 5A direct connected 1A or 5A for C.T.'s. Voltages: From 57.7 to 480V
Overload:	120% of nominal continuous voltage up to 600V maximum
Maximum Input:	600V
Frequency:	50Hz or 60Hz
Power factor:	Unity Power Factor assumed range 0.5/1/0.5
Burden:	Current: 1VA per phase Voltage: 1VA per phase
Warm-up-Time:	<15 minutes

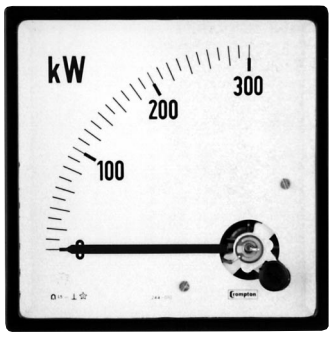
Product Codes – Short Scale Models

Bezel Size mm	72	96	144
Scale Length mm	65	95	145
Wattmeters Product Code			
Single Phase	243-015G-FA+256-TWK	244-210	246-210
3 Phase 3 Wire Balanced Load	243-015G-FA+256-TWL	244-211	246-211
3 Phase 4 Wire Balanced Load	243-015G-FA+256-TWH	244-21C	246-21C
3 Phase 3 Wire Unbalanced Load	243-015G-FA+256-TWM	244-213	246-213
3 Phase 4 Wire Unbal. Star C.T.s	243-015G-FA+256-TWN	244-214	246-214
3 Phase 4 Wire Unbal. Delta C.T.s	243-015G-FA+256-TWJ	244-21E	246-21E
3 Phase 4 Wire 3 Element	243-015G-FA+256-XWW	244-21Y	246-21Y
Varmeters Product Codes			
3 Phase 3 or 4 Wire Balanced Load	243-016G-FA+256-TXG	244-310	246-310
3 Phase 3 Wire Unbalanced Load	243-016G-FA+256-TXM	244-31S	246-31S
3 Phase 4 Wire Unbal. Star C.T.s	243-016G-FA+256-TXN	244-314	246-314
3 Phase 4 Wire Unbal. Delta C.T.s	243-016G-FA+256-TXJ	244-31E	246-31E

Product Codes – Long Scale Models

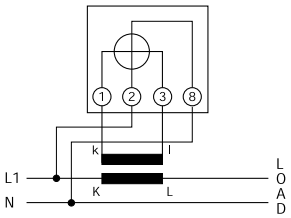
Bezel Size mm	72	96	144
Scale Length mm	112	150	230
Wattmeters Product Code			
Single Phase	243-055G-FA+256-TWK	244-215	246-215
3 Phase 3 Wire Balanced Load	243-055G-FA+256-TWL	244-216	246-216
3 Phase 4 Wire Balanced Load	243-055G-FA+256-TWH	244-21D	246-21D
3 Phase 3 Wire Unbalanced Load	243-055G-FA+256-TWM	244-218	246-218
3 Phase 4 Wire Unbal. Star C.T.s	243-055G-FA+256-TWN	244-219	246-219
3 Phase 4 Wire Unbal. Delta C.T.s	243-055G-FA+256-TWJ	244-21F	246-21F
3 Phase 4 Wire 3 Element	243-055G-FA+256-XWW	244-21Z	246-21Z
Varmeters Product Codes			
3 Phase 3 or 4 Wire Balanced Load	243-056G-FA+256-TXG	244-315	246-315
3 Phase 3 Wire Unbalanced Load	243-056G-FA+256-TXM	244-31L	246-31L
3 Phase 4 Wire Unbal. Star C.T.s	243-056G-FA+256-TXN	244-319	246-319
3 Phase 4 Wire Unbal. Delta C.T.s	243-056G-FA+256-TXJ	244-31F	246-31F

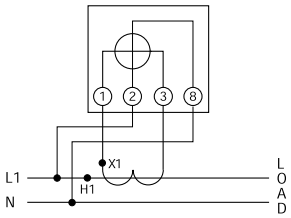
Models 243-015, 243-016, 243-055 & 243-056 use a separate transducer.
Our transducer range is ideal for this application. Our product code reference assumes a 1mA output. Other outputs of 5, 10, 20 or 4/20mA can also be used.



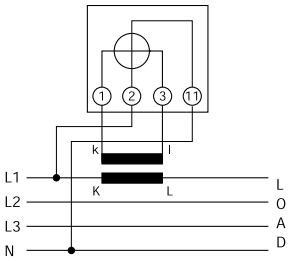
Wattmeter Connection Diagrams

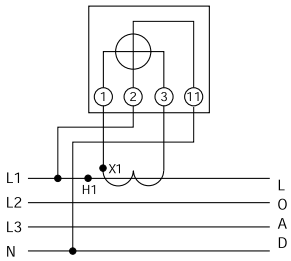
Single Phase
224-210, 244-215, 246-210, 246-215



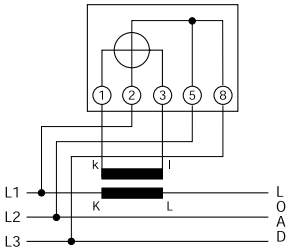


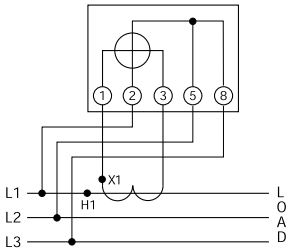
3 Phase 4 Wire Balanced Load
244-21C, 246-21C, 244-21D, 246-21D



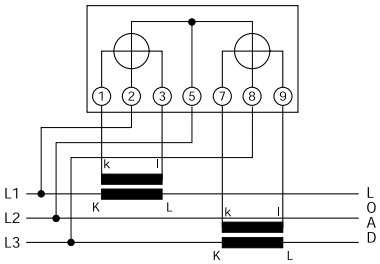


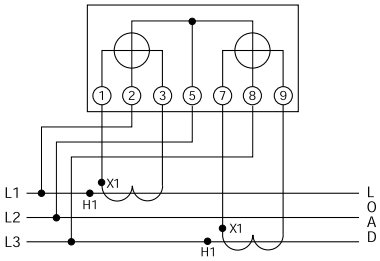
3 Phase 3 Wire Balanced Load
244-211, 246-211, 244-216, 246-216

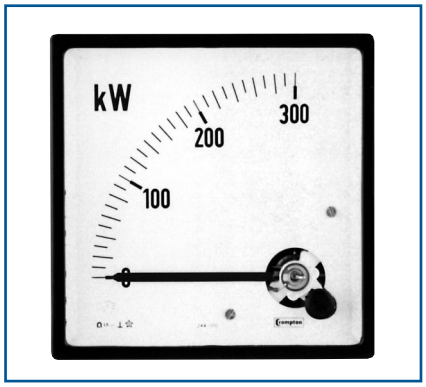




3 Phase 3 Wire Unbalanced Load 2 Element
244-213, 246-213, 244-218, 246-218

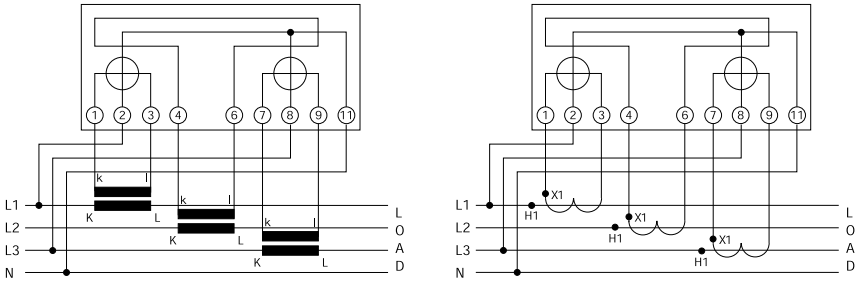




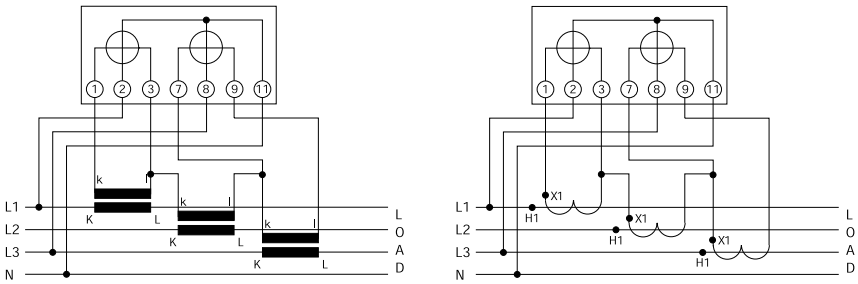


Wattmeter Connection Diagrams

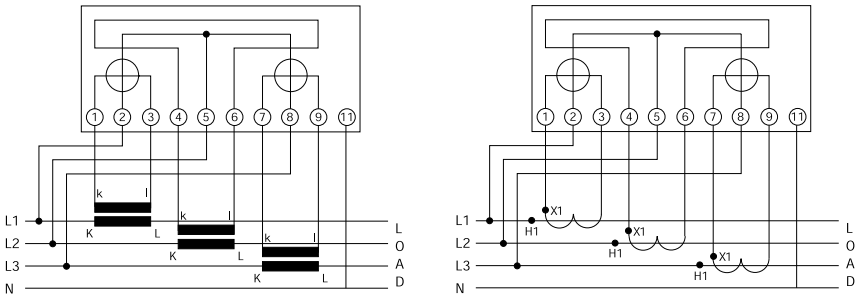
3 Phase 4 Wire Unbalanced Load Star Connected C.T.s 2 1/2 Element
244-214, 246-214, 244-219, 246-219

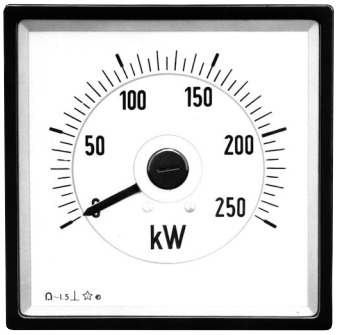


3 Phase 4 Wire Unbalanced Load Delta Connected C.T.s
244-21E, 246-21E, 244-21F, 246-21F



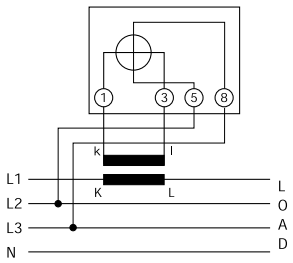
3 Phase 4 Wire Unbalanced Load Star Connected C.T.s 3 Element
244-21Y, 246-21Y, 244-21Z, 246-21Z

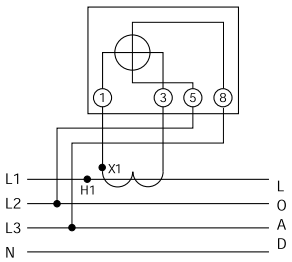




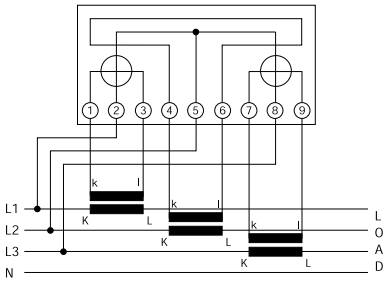
Varmeter Connection Diagrams

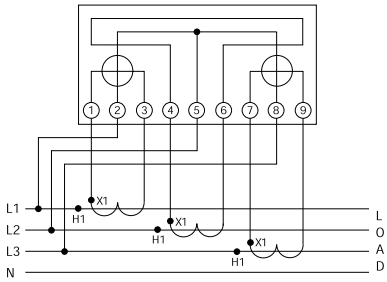
3 Phase 3 or 4 Wire Balanced Load 1 Element
244-310, 246-310, 244-315, 246-315



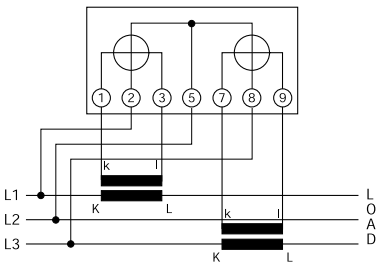


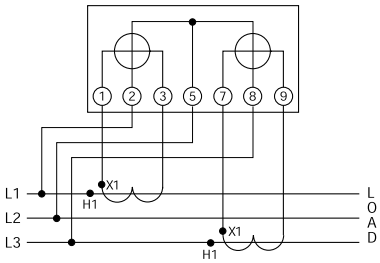
3 Phase 4 Wire Unbalanced Star Connected C.T.s 2 1/2 Element
244-314, 246-314, 244-319, 246-319



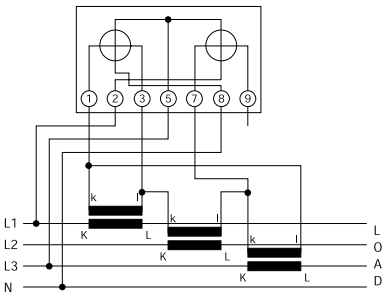


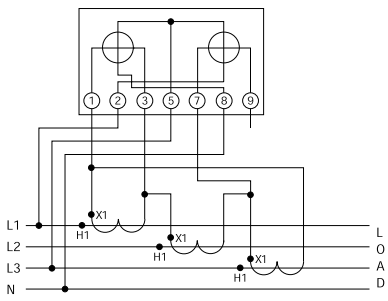
3 Phase 3 Wire Unbalanced Load 2 Element
244-31S, 246-31S, 244-31L, 246-31L





3 Phase 4 Wire Unbalanced Delta Connected C.T.s 2 1/2 Element
244-31E, 246-31E, 244-31F, 246-31F





Instrument Selector Switches

Panel mounted selector switches offer a 7-position voltmeter switch and a 4-position ammeter switch, for the reading of line to line or line to neutral voltage and phase current. Each switch can be supplied with either numbered or coloured annotation of phase.

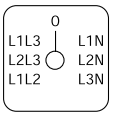
Specification

Loading capacity:	SO1 & SO2: 20A, 500V SO3: 12A/480V
Switching Capacity:	3kW at 220V, 5kW at 380V, 5.5kW at 500V
Isolating Voltage:	SO1 & SO2: 500V AC SO3: 480V AC
Operating Temperature:	-20°C to + 70°C
Mounting Installation:	Two point front fixing
Dimensions:	48mm x 48mm
Panel Cut Out:	3 drilled holes
Compliant With:	LVD and EMC
IP Protection:	SO1 & SO2: IP65 SO3: IP54

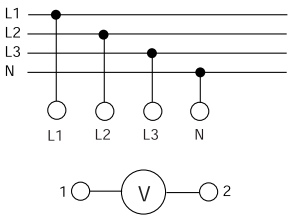
Connections

Voltmeter-change-over switches

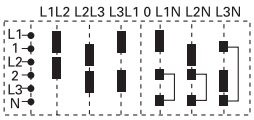
To measure 3 interconnected voltages and 3 phase voltage against N



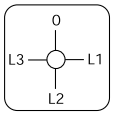
SO1 & SO2



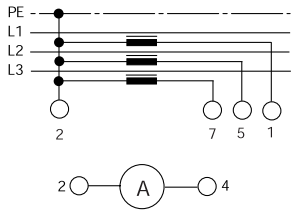
SO3



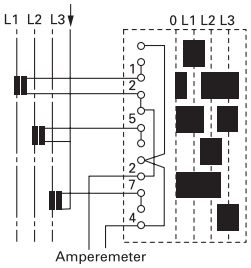
Ammeter-change-over switches



SO1 & SO2



SO3



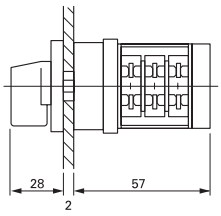
Product Codes

SO1 Three Hole Fixing 20A	
SO1-SAB	4-position ammeter switch, L1-L2-L3-0
SO1-SAA	4-position ammeter switch, R-Y-B-O
SO1-SVE	7-position voltmeter switch, RY-YB-RB-0-RN-YN-BN
SO1-SVD	7-position voltmeter switch, L1L2-L2L3-L3L1-0-L1N-L2N-L3N
SO2 Single Hole Mount 20A	
SO2-SAB	4-position ammeter switch, L1-L2-L3-0
SO2-SAA	4-position ammeter switch, R-Y-B-O
SO2-SVE	7-position voltmeter switch, RY-YB-RB-0-RN-YN-BN
SO2-SVD	7-position voltmeter switch, L1L2-L2L3-L3L1-0-L1N-L2N-L3N
SO3 Three Hole Fixing 12A	
SO3-SAB	4-position ammeter switch, L1-L2-L3-0
SO3-SVD	7-position voltmeter switch, L1L2-L2L3-L3L1-0-L1N-L2N-L3N

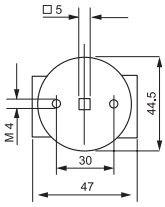
Dimensions

SO1 Three Hole Fixing 20 Amp

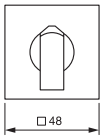
Switch insert



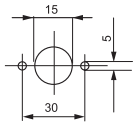
Front view



Face plate

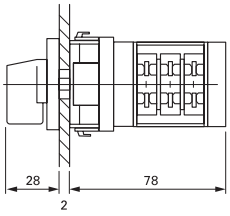


Panel drilling

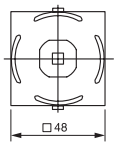


SO2 Single Hole Fixing 20 Amp

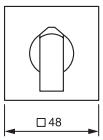
Switch insert



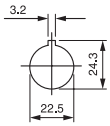
Front view



Face plate

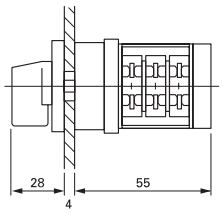


Panel drilling

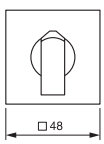


SO1 Three Hole Fixing 12 Amp

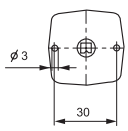
Switch insert



Face plate



Panel drilling



070 Series ANSI Switchboard Meters

This high quality range of Switchboard instruments complies with the American specification ANSI-C39.1 (1981) accuracy class 1. Available in 4½" and 8¾" case sizes, their rugged design characteristics suit the most demanding of environmental applications. This extensive range of analogue and digital/analogue meters utilise a high shock oil dampened movement, and provide 1% accuracy for all RMS AC and DC ranges. The range offers various customised options and features.

Features

Rugged Hi-Q taut-band suspension

Accuracy class 1

JIS dimensioned product available on request

Benefits

Meets all the requirements of ANSI-C39.1 (1981)

Parallax error-free platform dials

Bump, Shock and vibration proof

Customised options and features

Applications

Switchgear

Distribution systems

Generator sets

Control panels

Energy management

Building management

Utility power monitoring

Process control

Motor control

Approvals

UL approvals file No: E87815

CSA approvals file No: LR99712-1

ABS American Bureau of Shipping approvals 93-LD 17806-X

ISSeP Institute Scientifique de Service Public approvals 97D.101.226x

Description

070 series offers two case sizes, 4½" (Models 075, 077 & 078) and 8¾" (Model 079). Model 078 is high shock hermetically sealed and all models have heavy gauge pressed steel cases. Mounting is by four integral studs.

Models 075 & 077 are a one piece flame retardant polycarbonate moulding with a matt black finished bezel area, and a specially contoured window to minimise reflection from adjacent light sources. Model 079 has a black pressed steel bezel with a toughened glass window, and Model 078 has a die-cast bezel and a projecting moulded toughened glass window, which incorporates a gas tight zero adjuster.

Scales are 240° moving iron and 250° moving coil with parallax error-free platform dials. Standard dials are matt white with black printed scales and bar knife-edge pointers. Black dials with white or yellow scales and pointers are also available.

General options include supplementary red pointer (075 & 077), slave pointer, calibration for non standard ambient temperatures, special scales, trim potentiometers, and Illuminated dials with white or red light sources.

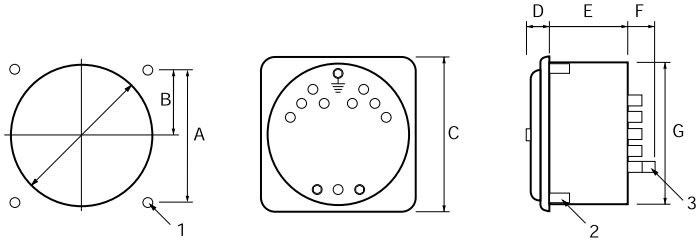
Specification

Performance:	ANSI C39.1 (1981)
Accuracy:	Class 1
Terminals:	10-32 UNF terminals (M5 screw clamp terminal for Model 075)
Dielectric Voltage:	Withstand test 2.3kV for 1 minute
Response Time:	Approximately 2.5 seconds to full scale (077 and 078) and 3.5 seconds (079)
Overshoot:	33% maximum
Standard Calibration:	23°C
Operating Temperature:	0°C to +40°C. Model 078: -40°C to +70°C.
Storage Temperature:	-10°C to +50°C
Extreme Temp Range:	-20°C -to +65°C
Enclosure Integrity:	Models 075/077/079 to IP54(NEMA 3S) splash proof IP55 (NEMA 4) hoseproof is an optional extra Model 078 to IP67 (NEMA 6 & 6P)
Fixing on Panel:	4 integral ¼-28 UNF fixing studs
Approvals:	EMC and LVD, UL, CSA, ABS and ISSep Approvals

Dimensions

Model	Panel Cut-out			Rear View				
	Dia	A	B	C	D	E	F	G
075	103	86	43	110	17	-	30	101
077	103	86	43	110	17	-	30	101
078	103	86	43	110	17	-	30	101
079	229	86	43	229	17	-	30	101

Dimension E varies with measured parameter - see product code table overleaf.



1 – 4 Fixing holes Ø 8mm. 2 – 1/4-28 UNF fixing studs. 3 – 10-32 UNF Terminals (M5 screw clamp terminal on model 075).

070 Series ANSI Switchboard Meters

Product Codes

Type of Instrument	Ranges	Case Code 075	077	078	079	Product Code
A.C. Ammeter Moving iron	0.5-10A	56	56	-	-	075/077-08A
A.C. Ammeter Moving iron	0.5-10A	-	-	86	86	078/079-08A
A.C. Ammeter Moving iron	10.1-30A	-	86	86	86	077/078/079-08A
Slave Pointer Ammeter	1 or 5A		86			077-08D
6 x overload A.C. Ammeter	5/30A - 30/180A	-	86	86	86	077/078/079-086
A.C Voltmeter Moving iron	30-800V	-	86	86	86	077/078/079-08V
A.C. Rectified Ammeter	1-30A	56	56	86	56	075/077/078/079-05B
A.C. Rectified Voltmeter	30-800V	56	56	86	56	075/077/078/079-05W
A.C. Voltmeter expanded scale	110-130V	-	86	86	86	077/078/079-05Y
A.C. RMS Ammeter	1-30A	56	56	86	56	075/077/078/079-05F
A.C. RMS Voltmeter	150-750V	56	56	86	56	075/077/078/079-05G
Slave Pointer Voltmeter	50-300V		86			077-05X
Elapsed time meter (99999.99)	50 or 60Hz / 100-440V* and D.C.	-	56	56	-	077/078-155/156/077-151
Frequency meter	50 or 60 or 400Hz/100-440V**	86	86	86	86	075/077/078/079-41L
A.C. Wattmeter or Varmeter	0.2-10A/100-440V*	-	132	132	132	077/078/079-21 or 31
360° Rotary Power factor meter	0.2-10A/100-600V	-	132	132	132	077/078/079-13
360° Rotary synchroscope	100/125V, 200/250, 380/450***	-	132	132	132	077/078/079-14
LED Synchroscope only	63.5-480V****	-	86	-	-	077-14A
LED Synchroscope & Synchro Check Relay	63.5-480V****	-	86	-	-	077-14
A.C. Meter relay	A.C.6V-500V, 100µA-1A, 5A via C.T.	-	86	-	-	077-30 (see Meter Relay section)
Phase sequence indicator	100-150, 151-300, 301-500V	-	56	-	-	077-12P
Maximum demand Indicator	1 or 5A	-	86	-	-	077-16
Tap position indicator	1-18 steps. 400Ω	-	86	-	-	077-45P
Transducer operated indicator	1, 5, 10, 20, or 4/20mA	56	56	56	56	075/077/078/079-05
D.C. Ammeter Moving Coil	200µA - 30A	56	56	56	56	075/077/078/079-05A
D.C. Voltmeter Moving Coil	50mV-600V	56	56	56	56	075/077/078/079-05V
D.C. Meter relay	100mV-500V, 10µA-15A	-	86	-	-	077-30 (see Meter Relay section)
Temperature Indicator	RTD	-	86	86	86	077/078/079-45R
Temperature Indicator	Thermocouple	-	86	86	86	077/078/079-45T
240° Phase Angle /Power Factor	1 or 5A, 100-400V 50, 60 or 400Hz	-	132	132	132	077/078/079-42
Watt/hour Indicators:						
Watt/hour indicator	1 or 5A / 69-277V****	-	132	-	-	077-KH
Transducer operated	1, 5, 10, 20, or 4/20mA	-	132	132	-	077-KH
Analogue/LED Digital indicators						
A.C. Ammeter	1mA - 10A	-	86	-	-	077-DIB
A.C. Voltmeter	200mV - 600V	-	86	-	-	077-DIW
A.C. Wattmeter	69V/5A, 120V/5A, 50 or 60Hz	-	86	-	-	077-DW
A.C. Varmeter	120V/5A, 208V/5A, 50 or 60Hz	-	86	-	-	077-DX
Phase Angle meter	69V/5A, 120V/5A, 50 or 60Hz	-	86	-	-	077-DP
Frequency meter	110/130V, 50 or 60Hz	-	86	-	-	077-DZ
D.C. Ammeter	1mA - 1A	-	86	-	-	077-DIA
D.C. Voltmeter	20mV - 600V	-	86	-	-	077-DIV
Transducer Indicator	D.C. Milliamps	-	86	-	-	077-DIT
Tachometer	A.C. or D.C. rated	-	86	-	-	077-DI2

* 100-440V = (100/125, 200/250, 380/440)

** 100-440V = (100/125,200/250, 380/440). Frequencies 45/55,55/65,45/65, 47/53, 57/63, 360/440.

*** Using transformer box 855-954

**** Nominal voltage to be specified

For specification and connection diagrams, please refer to equivalent models in 240 Series DIN Panel Meter section. Replace 244 with 077 etc., e.g. 244-210 becomes 077-210.

A.C. & D.C. Ammeters, Voltmeters and Frequency Meters

This range of self contained Hi-Q taut band moving coil meters feature with 250° linear scale and oil dampened mechanisms for superior performance in high vibration situations. AC instruments are available with true RMS converting circuit or RMS compensated rectifier. Some types of frequency meters can be damaged by transient supply voltage spikes. Crompton 077-41 frequency meters can withstand, without damage, 10 successive applications of transient spikes of 1250 volts. The range offers UL and CSA approvals. JIS dimensioned products are available on request.

Specification – General

Manufactured in accordance with American National Standards ANSI C39.1, 1981

Accuracy:	±1% full scale at 23°C (73°F)
Scale Arc:	250° full scale deflection
Scale Length:	077 & 078: 175.2 mm (6.9") 079: 353 mm (13.9")
Scale Plate:	2 piece, platform type
Response Time:	077 & 078: Approximately 2.5 seconds to full scale
	079: Approximately 3.5 seconds to full scale
Operating Temperature:	0 to 40°C (32 to 104°F)
Storage Temperature:	-10 to +50°C (14 to 122°F)
Extreme Temp Range:	-20° to +65°C (-4° to +149°F)
Terminals:	Standard 10-32 UNF stud Optional M5 screw clamp
Position of Use:	Vertical (scale)
Dielectric Withstand:	2300V A.C. for 1 minute between electrical circuit and case
Overshoot:	33% maximum
Enclosure Code:	077 & 079: IP54, optional IP55 078: IP67
Approvals:	EMC and LVD. UL recognised File No: E87815. CSA recognised File No: LR99712-1

Specification – Ammeters and Voltmeters

Overload Rating:	A.C. Ammeters - 2 x continuous, 50 x for 1 second A.C. Voltmeters and frequency meters - 1.2 x continuous D.C. Ammeters - 2 x continuous 10 x for 1 second D.C. Voltmeters - 1.2 x continuous
Frequency Range:	A.C. calibration 60Hz ±20%

Specification – Frequency Meters

Response Time:	3 seconds maximum
External Temperature Influence:	0.6 times accuracy maximum with ±10°C from reference temperature
External Field Influence:	2.0 times accuracy maximum with 0.5mT field
Acceptable input Harmonic Content:	Up to 30% distortion

Maximum Frequency Hz	Center Scale Hz	Error In Hz
45-55	50	0.15
46-54	50	0.15
45-65	55	0.25
50-70	60	0.25
55-65	60	0.15
56-64	60	0.15
58-62	60	0.08
350-450	400	1.30
360-440	400	1.25
380-420	400	0.80

A.C. Overload Ammeters

Moving Iron A.C. Ammeters

Product Codes – Self Contained 40/70Hz (Accuracy ±1%, 60Hz)***

Rating	Scaling*	4½" Square Flange		8¾" Square Flange
		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
1A	0-1A	•/+077-08AA-LALA-C6	078-08AJ-LALA-C6	•079-08AA-LALA-C6
1.5A	0-1.5A	•/+077-08AA-LCLC-C6	078-08AJ-LCLC-C6	•079-08AA-LCLC-C6
2A	0-2A	•/+077-08AA-LELE-C6	078-08AJ-LELE-C6	•079-08AA-LELE-C6
3A	0-3A	•/+077-08AA-LJLJ-C6	078-08AJ-LJLJ-C6	•079-08AA-LJLJ-C6
5A	0-5A	•/+077-08AA-LSLS-C6	078-08AJ-LSLS-C6	•079-08AA-LSLS-C6
7.5A	0-7.5A	•/+077-08AA-MFMF-C6	078-08AJ-MFMF-C6	•079-08AA-MFMF-C6
10A	0-10A	•/+077-08AA-MTMT-C6	078-08AJ-MTMT-C6	•079-08AA-MTMT-C6
15A	0-15A	•/+077-08AA-NDND-C6	078-08AJ-NDND-C6	•079-08AA-NDND-C6
20A	0-20A	•/+077-08AA-NGNG-C6	078-08AJ-NGNG-C6	•079-08AA-NGNG-C6
30A	0-30A	•/+077-08AA-NLNL-C6	078-08AJ-NLNL-C6	•079-08AA-NLNL-C6

Product Codes – Transformer Rated 40/70Hz - Burden 0.3VA***

5 A	0-10A	•/+077-08AA-LSMT-C6	078-08AJ-LSMT-C6	•079-08AA-LSMT-C6
5 A	0-15A	•/+077-08AA-LSND-C6	078-08AJ-LSND-C6	•079-08AA-LSND-C6
5 A	0-20A	•/+077-08AA-LSNG-C6	078-08AJ-LSNG-C6	•079-08AA-LSNG-C6
5 A	0-25A	•/+077-08AA-LSNJ-C6	078-08AJ-LSNJ-C6	•079-08AA-LSNJ-C6
5 A	0-30A	•/+077-08AA-LSNL-C6	078-08AJ-LSNL-C6	•079-08AA-LSNL-C6
5 A	0-40A	•/+077-08AA-LSNP-C6	078-08AJ-LSNP-C6	•079-08AA-LSNP-C6
5 A	0-50A	•/+077-08AA-LSNT-C6	078-08AJ-LSNT-C6	•079-08AA-LSNT-C6
5 A	0-75A	•/+077-08AA-LSPB-C6	078-08AJ-LSPB-C6	•079-08AA-LSPB-C6
5 A	0-100A	•/+077-08AA-LSPK-C6	078-08AJ-LSPK-C6	•079-08AA-LSPK-C6
5 A	0-150A	•/+077-08AA-LSPZ-C6	078-08AJ-LSPZ-C6	•079-08AA-LSPZ-C6
5 A	0-200A	•/+077-08AA-LSRL-C6	078-08AJ-LSRL-C6	•079-08AA-LSRL-C6
5 A	0-250A	•/+077-08AA-LSRS-C6	078-08AJ-LSRS-C6	•079-08AA-LSRS-C6
5 A	0-300A	•/+077-08AA-LSRX-C6	078-08AJ-LSRX-C6	•079-08AA-LSRX-C6
5 A	0-400A	•/+077-08AA-LSSC-C6	078-08AJ-LSSC-C6	•079-08AA-LSSC-C6
5 A	0-500A	•/+077-08AA-LSSF-C6	078-08AJ-LSSF-C6	•079-08AA-LSSF-C6
5 A	0-600A	•/+077-08AA-LSSJ-C6	078-08AJ-LSSJ-C6	•079-08AA-LSSJ-C6
5 A	0-800A	•/+077-08AA-LSSN-C6	078-08AJ-LSSN-C6	•079-08AA-LSSN-C6
5 A	0-1000A	•/+077-08AA-LSSS-C6	078-08AJ-LSSS-C6	•079-08AA-LSSS-C6
5 A	0-1200A	•/+077-08AA-LSSU-C6	078-08AJ-LSSU-C6	•079-08AA-LSSU-C6
5 A	0-1500A	•/+077-08AA-LSTC-C6	078-08AJ-LSTC-C6	•079-08AA-LSTC-C6
5 A	0-1600A	•/+077-08AA-LSTE-C6	078-08AJ-LSTE-C6	•079-08AA-LSTE-C6
5 A	0-2000A	•/+077-08AA-LSTM-C6	078-08AJ-LSTM-C6	•079-08AA-LSTM-C6
5 A	0-2500A	•/+077-08AA-LSTU-C6	078-08AJ-LSTU-C6	•079-08AA-LSTU-C6
5 A	0-3000A	•/+077-08AA-LSUA-C6	078-08AJ-LSUA-C6	•079-08AA-LSUA-C6
5 A	0-4000A	•/+077-08AA-LSUE-C6	078-08AJ-LSUE-C6	•079-08AA-LSUE-C6
5 A	0-5000A	•/+077-08AA-LSUJ-C6	078-08AJ-LSUJ-C6	•079-08AA-LSUJ-C6
5 A	0-6000A	•/+077-08AA-LSUP-C6	078-08AJ-LSUP-C6	•079-08AA-LSUP-C6
5 A	0-7000A	•/+077-08AA-LSUS-C6	078-08AJ-LSUS-C6	•079-08AA-LSUS-C6
5 A	0-8000A	•/+077-08AA-LSUW-C6	078-08AJ-LSUW-C6	•079-08AA-LSUW-C6

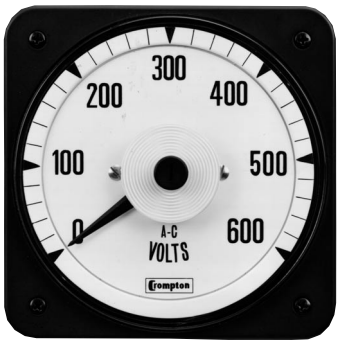
Product Code – A.C. Overload Ammeters - True RMS Reading*** Self contained 40/70Hz (Accuracy ±1%)

5/30A	TO SUIT	077-086A-LS**-C6	078-086J-LS**-C6	079-086A-LS**-C6

077 moving iron ammeters available as listed above

Rated 5A for standard C.T's with 6 x full scale. Overload portion of the scale is not subject to the accuracy guarantee.
• UL recognised File # E87815
+ CSA Approved File # LR52592

* Other scales are available
** Specify scale required
*** Case types 077/078/079 use 10-32 UNF terminals. For M5 screw clamp terminals stipulate case type 075



A.C. Voltmeter

Moving Iron A.C. Voltmeters

Product Codes – Self Contained 60Hz ±20% (Accuracy ±1%)***

Rating	Scaling*	4½" Square Flange		8¾" Square Flange
		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
150V	0-150V	•/+077-08VA-PZPZ-C6	078-08VJ-PZPZ-C6	•079-08VA-PZPZ-C6
250V	0-250V	•/+077-08VA-RSRS-C6	078-08VJ-RSRS-C6	•079-08VA-RSRS-C6
300V	0-300V	•/+077-08VA-RXRX-C6	078-08VJ-RXRX-C6	•079-08VA-RXRX-C6
500V	0-500V	•/+077-08VA-SFSF-C6	078-08VJ-SFSF-C6	•079-08VA-SFSF-C6
600V	0-600V	•/+077-08VA-SJSJ-C6	078-08VJ-SJSJ-C6	•079-08VA-SJSJ-C6
750V	0-750V	077-08VA-SMSM-C6	078-08VJ-SMSM-C6	079-08VA-SMSM-C6

Product Codes – Transfomer Rated 50/60HZ (Accuracy ±1%) 0.8VA @150V***

150V	0-300V	•/+077-08VA-PZRX-C6	078-08VJ-PZRX-C6	•079-08VA-PZRX-C6
150V	0-600V	•/+077-08VA-PZSJ-C6	078-08VJ-PZSJ-C6	•079-08VA-PZSJ-C6
150V	0-750V	•/+077-08VA-PZSM-C6	078-08VJ-PZSM-C6	•079-08VA-PZSM-C6
150V	0-3000V	•/+077-08VA-PZUA-C6	078-08VJ-PZUA-C6	•079-08VA-PZUA-C6
150V	0-5250V	•/+077-08VA-PZUL-C6	078-08VJ-PZUL-C6	•079-08VA-PZUL-C6
150V	0-6000V	•/+077-08VA-PZUP-C6	078-08VJ-PZUP-C6	•079-08VA-PZUP-C6
150V	0-9000V	•/+077-08VA-PZUY-C6	078-08VJ-PZUY-C6	•079-08VA-PZUY-C6
150V	0-15KV	•/+077-08VA-PZWC-C6	078-08VJ-PZWC-C6	•079-08VA-PZWC-C6
150V	0-18KV	•/+077-08VA-PZWD-C6	078-08VJ-PZWD-C6	•079-08VA-PZWD-C6
150V	0-45KV	•/+077-08VA-PZWJ-C6	078-08VJ-PZWJ-C6	•079-08VA-PZWJ-C6
250V	0-600V	•/+077-08VA-RSSJ-C6	078-08VJ-RSSJ-C6	•079-08VA-RSSJ-C6

• UL recognised File # E87815
+ CSA Approved File # LR52592

* Other scales are available
*** Case types 077/078/079 use 10-32 UNF terminals. For M5 screw clamp terminals stipulate case type 075

A.C. Ammeter

RMS Reading A.C. Ammeters

Product Codes – Self Contained 40/70Hz (Accuracy ±1%, 60Hz)***

Rating	Scaling*	4½" Square Flange		8¾" Square Flange
		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
1A	0-1A	•/+077-05FA-LALA-C6	078-05FJ-LALA-C6	•079-05fA-LALA-C6
1.5A	0-1.5A	•/+077-05FA-LCLC-C6	078-05fJ-LCLC-C6	•079-05fA-LCLC-C6
2A	0-2A	•/+077-05FA-LELE-C6	078-05fJ-LELE-C6	•079-05fA-LELE-C6
3A	0-3A	•/+077-05FA-LJLJ-C6	078-05fJ-LJLJ-C6	•079-05fA-LJLJ-C6
5A	0-5A	•/+077-05FA-LSLS-C6	078-05fJ-LSLS-C6	•079-05fA-LSLS-C6
7.5A	0-7.5A	•/+077-05FA-MFMF-C6	078-05fJ-MFMF-C6	•079-05fA-MFMF-C6
10A	0-10A	•/+077-05FA-MTMT-C6	078-05fJ-MTMT-C6	•079-05fA-MTMT-C6
15A	0-15A	•/+077-05FA-NDND-C6	078-05fJ-NDND-C6	•079-05fA-NDND-C6
20A	0-20A	•/+077-05FA-NGNG-C6	078-05fJ-NGNG-C6	•079-05fA-NGNG-C6
30A	0-30A	•/+077-05FA-NLNL-C6	078-05fJ-NLNL-C6	•079-05fA-NLNL-C6

For A.C. rectified non-RMS compensated meter please replace the -05F in the product code with -05B.

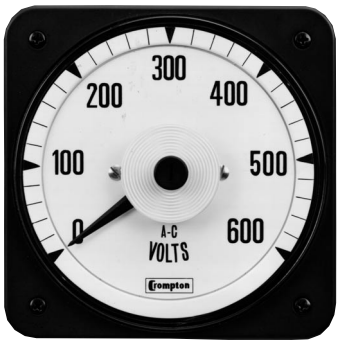
Product Codes – Transformer Rated 40/70Hz - Burden 0.3VA***

5 A	0-10A	•/+077-05FA-LSMT-C6	078-05FJ-LSMT-C6	•079-05FA-LSMT-C6
5 A	0-15A	•/+077-05FA-LSND-C6	078-05FJ-LSND-C6	•079-05FA-LSND-C6
5 A	0-20A	•/+077-05FA-LSNG-C6	078-05FJ-LSNG-C6	•079-05FA-LSNG-C6
5 A	0-25A	•/+077-05FA-LSNJ-C6	078-05FJ-LSNJ-C6	•079-05FA-LSNJ-C6
5 A	0-30A	•/+077-05FA-LSNL-C6	078-05FJ-LSNL-C6	•079-05FA-LSNL-C6
5 A	0-40A	•/+077-05FA-LSNP-C6	078-05FJ-LSNP-C6	•079-05FA-LSNP-C6
5 A	0-50A	•/+077-05FA-LSNT-C6	078-05FJ-LSNT-C6	•079-05FA-LSNT-C6
5 A	0-75A	•/+077-05FA-LSPB-C6	078-05FJ-LSPB-C6	•079-05FA-LSPB-C6
5 A	0-100A	•/+077-05FA-LSPK-C6	078-05FJ-LSPK-C6	•079-05FA-LSPK-C6
5 A	0-150A	•/+077-05FA-LSPZ-C6	078-05FJ-LSPZ-C6	•079-05FA-LSPZ-C6
5 A	0-200A	•/+077-05FA-LSRL-C6	078-05FJ-LSRL-C6	•079-05FA-LSRL-C6
5 A	0-250A	•/+077-05FA-LSRS-C6	078-05FJ-LSRS-C6	•079-05FA-LSRS-C6
5 A	0-300A	•/+077-05FA-LSRX-C6	078-05FJ-LSRX-C6	•079-05FA-LSRX-C6
5 A	0-400A	•/+077-05FA-LSSC-C6	078-05FJ-LSSC-C6	•079-05FA-LSSC-C6
5 A	0-500A	•/+077-05FA-LSSF-C6	078-05FJ-LSSF-C6	•079-05FA-LSSF-C6
5 A	0-600A	•/+077-05FA-LSSJ-C6	078-05FJ-LSSJ-C6	•079-05FA-LSSJ-C6
5 A	0-800A	•/+077-05FA-LSSN-C6	078-05FJ-LSSN-C6	•079-05FA-LSSN-C6
5 A	0-1000A	•/+077-05FA-LSSS-C6	078-05FJ-LSSS-C6	•079-05FA-LSSS-C6
5 A	0-1200A	•/+077-05FA-LSSU-C6	078-05FJ-LSSU-C6	•079-05FA-LSSU-C6
5 A	0-1500A	•/+077-05FA-LSTC-C6	078-05FJ-LSTC-C6	•079-05FA-LSTC-C6
5 A	0-1600A	•/+077-05FA-LSTE-C6	078-05FJ-LSTE-C6	•079-05FA-LSTE-C6
5 A	0-2000A	•/+077-05FA-LSTM-C6	078-05FJ-LSTM-C6	•079-05FA-LSTM-C6
5 A	0-2500A	•/+077-05FA-LSTU-C6	078-05FJ-LSTU-C6	•079-05FA-LSTU-C6
5 A	0-3000A	•/+077-05FA-LSUA-C6	078-05FJ-LSUA-C6	•079-05FA-LSUA-C6
5 A	0-4000A	•/+077-05FA-LSUE-C6	078-05FJ-LSUE-C6	•079-05FA-LSUE-C6
5 A	0-5000A	•/+077-05FA-LSUJ-C6	078-05FJ-LSUJ-C6	•079-05FA-LSUJ-C6
5 A	0-6000A	•/+077-05FA-LSUP-C6	078-05FJ-LSUP-C6	•079-05FA-LSUP-C6
5 A	0-7000A	•/+077-05FA-LSUS-C6	078-05FJ-LSUS-C6	•079-05FA-LSUS-C6
5 A	0-8000A	•/+077-05FA-LSUW-C6	078-05FJ-LSUW-C6	•079-05FA-LSUW-C6

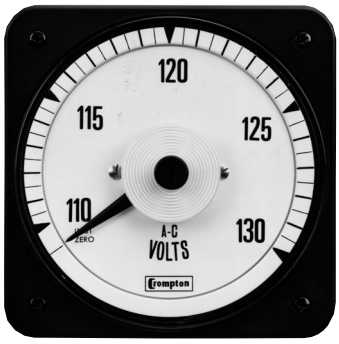
For A.C. rectified non-RMS compensated meter please replace the -05F in the product code with -05B.

Rated 5A for standard C.T's with 6 x full scale. Overload portion of the scale is not subject to the accuracy guarantee.
• UL recognised File # E87815
+ CSA Approved File # LR52592

* Other scales are available
** Specify scale required
*** Case types 077/078/079 use 10-32 UNF terminals. For M5 screw clamp terminals stipulate case type 075



A.C. Voltmeter



A.C. Voltmeter – Expanded Scale

RMS Reading AC Voltmeters

Product Codes – Self Contained 60Hz ±20% (Accuracy ±1%)***

Rating	Scaling*	4½" Square Flange		8¾" Square Flange
		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
150V	0-150V	•/+077-05GA-PZPZ-C6	078-05GJ-PZPZ-C6	•079-05GA-PZPZ-C6
250V	0-250V	•/+077-05GA-RSRS-C6	078-05GJ-RSRS-C6	•079-05GA-RSRS-C6
300V	0-300V	•/+077-05GA-RXRX-C6	078-05GJ-RXRX-C6	•079-05GA-RXRX-C6
500V	0-500V	•/+077-05GA-SFSF-C6	078-05GJ-SFSF-C6	•079-05GA-SFSF-C6
600V	0-600V	•/+077-05GA-SJSJ-C6	078-05GJ-SJSJ-C6	•079-05GA-SJSJ-C6
750V	0-750V	077-05GA-SMSM-C6	078-05GJ-SMSM-C6	079-05GA-SMSM-C6

For A.C. rectified non-RMS compensated meter please replace the -05G in the product code with -05W.

Product Codes – Transfomer Rated 50/60HZ (Accuracy ±1%) 0.8VA @150V***

150V	0-300V	•/+077-05GA-PZRX-C6	078-05GJ-PZRX-C6	•079-05GA-PZRX-C6
150V	0-600V	•/+077-05GA-PZSJ-C6	078-05GJ-PZSJ-C6	•079-05GA-PZSJ-C6
150V	0-750V	•/+077-05GA-PZSM-C6	078-05GJ-PZSM-C6	•079-05GA-PZSM-C6
150V	0-3000V	•/+077-05GA-PZUA-C6	078-05GJ-PZUA-C6	•079-05GA-PZUA-C6
150V	0-5250V	•/+077-05GA-PZUL-C6	078-05GJ-PZUL-C6	•079-05GA-PZUL-C6
150V	0-6000V	•/+077-05GA-PZUP-C6	078-05GJ-PZUP-C6	•079-05GA-PZUP-C6
150V	0-9000V	•/+077-05GA-PZUY-C6	078-05GJ-PZUY-C6	•079-05GA-PZUY-C6
150V	0-15KV	•/+077-05GA-PZWC-C6	078-05GJ-PZWC-C6	•079-05GA-PZWC-C6
150V	0-18KV	•/+077-05GA-PZWD-C6	078-05GJ-PZWD-C6	•079-05GA-PZWD-C6
150V	0-45KV	•/+077-05GA-PZWJ-C6	078-05GJ-PZWJ-C6	•079-05GA-PZWJ-C6
250V	0-600V	•/+077-05GA-RSSJ-C6	078-05GJ-RSSJ-C6	•079-05GA-RSSJ-C6

For A.C. rectified non-RMS compensated meter please replace the -05G in the product code with -05W.

Product Codes – Expanded Scale - Moving Coil Zener Diode*** (Accuracy ±0.3% of mid scale value) Self contained, 20-1000Hz

110-130V	110-130V	077-05YA-PNPN-C6	078-05YJ-PNPN-C6	079-05YA-PNPN-C6
110-130V	TO SUIT P.T	077-05YA-PN**-C6	078-05YJ-PN**-C6	079-05YA-PN**-C6

Product Codes – Instantaneous A.C. Voltmeter*** with Instantaneous Maximum Reading Slave Pointer

150V	TO SUIT P.T.	077-05XA-PZ**-C6		
250V	TO SUIT P.T	077-05XA-RS**-C6		
300V	TO SUIT P.T	077-05XA-RX**-C6		

077 moving iron ammeters and voltmeters available as listed above.

• UL recognised File # E87815
+ CSA Approved File # LR52592

* Other scales are available
** Specify scale required
*** Case types 077/078/079 use 10-32 UNF terminals. For M5 screw clamp terminals stipulate case type 075

D.C. Ammeter

Intrinsically Safe Milliammeters (Accuracy ±1%) ISSEP Certified	
Rating	**Std Case Catalogue No.**
1mA D.C.	077-11AF-FA**
5mA D.C.	077-11AF-FX**
10mA D.C.	077-11AF-HA**
20mA D.C.	077-11AF-HF**
4/20mA D.C.	077-11RFHG**

** State scale marking as required

D.C. Ammeters

Product Codes – Self Contained (Accuracy ±1%)****

Rating	Scaling*	4½" Square Flange		8¾" Square Flange
		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
0-200µA	0-200µA	•/+077-05AA-EAEA	078-05AJ-EAEA	•079-05AA-EAEA
0-300µA	0-300µA	•/+077-05AA-EEEE	078-05AJ-EEEE	•079-05AA-EEEE
0-500µA	0-500µA	•/+077-05AA-EMEM	078-05AJ-EMEM	•079-05AA-EMEM
0-800µA	0-800µA	•/+077-05AA-EWEW	078-05AJ-EWEW	•079-05AA-EWEW
0-1mA	0-1mA	•/+077-05AA-FAFA	078-05AJ-FAFA	•079-05AA-FAFA
0-2mA	0-2mA	•/+077-05AA-FGFG	078-05AJ-FGFG	•079-05AA-FGFG
0-5mA	0-5mA	•/+077-05AA-FXFX	078-05AJ-FXFX	•079-05AA-FXFX
0-10mA	0-10mA	•/+077-05AA-HAHA	078-05AJ-HAHA	•079-05AA-HAHA
0-20mA	0-20mA	•/+077-05AA-HFHF	078-05AJ-HFHF	•079-05AA-HFHF
0-30mA	0-30mA	•/+077-05AA-HMHM	078-05AJ-HMHM	•079-05AA-HMHM
0-50mA	0-50mA	•/+077-05AA-HXHY	078-05AJ-HXHY	•079-05AA-HXHY
0-100mA	0-100mA	•/+077-05AA-JRJR	078-05AJ-JRJR	•079-05AA-JRJR
0-200mA	0-200mA	•/+077-05AA-KAKA	078-05AJ-KAKA	•079-05AA-KAKA
0-300mA	0-300mA	•/+077-05AA-KGKG	078-05AJ-KGKG	•079-05AA-KGKG
0-500mA	0-500mA	•/+077-05AA-KMKM	078-05AJ-KMKM	•079-05AA-KMKM
0-800mA	0-800mA	•/+077-05AA-KWKW	078-05AJ-KWKW	•079-05AA-KWKW
0-1A	0-1A	•/+077-05AA-LALA	078-05AJ-LALA	•079-05AA-LALA
0-5A	0-5A	•/+077-05AA-LSLS	078-05AJ-LSLS	•079-05AA-LSLS
0-10A	0-10A	•/+077-05AA-MTMT	078-05AJ-MTMT	•079-05AA-MTMT
0-15A	0-15A	•/+077-05AA-NDND	078-05AJ-NDND	•079-05AA-NDND
0-20A	0-20A	•/+077-05AA-NGNG	078-05AJ-NGNG	•079-05AA-NGNG
0-30A	0-30A	•/+077-05AA-NLNL	078-05AJ-NLNL	•079-05AA-NLNL

Product Codes – Milliammeters - Suppressed Zero, No zero set unless specified****

1/5mA	To Suit	•/+077-05RA-GM**	078-05RJ-GM**	•079-05RA-GM**
4/20mA	To Suit	•/+077-05RA-HG**	078-05RJ-HG**	•079-05RA-HG**
10/50mA	To Suit	•/+077-05RA-HZ**	078-05RJ-HZ**	•079-05RA-HZ**

Product Codes – Shunt Rated (Accuracy ±1%)****

50mV (4mA)	To suit	•/+077-05AA-EY**	078-05AJ-EY**	079-05AA-EY**
50-0-50mV	shunt	•/+077-05CA-GB**	078-05CJ-GB**	079-05CA-GB**
100mV (4mA)	rating	•/+077-05AA-GB**	078-05AJ-GB**	079-05AA-GB**
100-0-100mV		•/+077-05CA-GM**	078-05CJ-GM**	079-05CA-GM**

Product Codes – Zero Left For Use With 50mV Shunts And 0.05 Ohm Shunt Leads*** & ****

50mV	0-15A	•/+077-05AA-EYND	078-05AJ-EYND	079-05AA-EYND
50mV	0-20A	•/+077-05AA-EYNG	078-05AJ-EYNG	079-05AA-EYNG
50mV	0-30A	•/+077-05AA-EYNL	078-05AJ-EYNL	079-05AA-EYNL
50mV	0-40A	•/+077-05AA-EYNP	078-05AJ-EYNP	079-05AA-EYNP
50mV	0-75A	•/+077-05AA-EYPB	078-05AJ-EYPB	079-05AA-EYPB
50mV	0-100A	•/+077-05AA-EYPK	078-05AJ-EYPK	079-05AA-EYPK
50mV	0-150A	•/+077-05AA-EYPZ	078-05AJ-EYPZ	079-05AA-EYPZ
50mV	0-200A	•/+077-05AA-EYRL	078-05AJ-EYRL	079-05AA-EYRL
50mV	0-300A	•/+077-05AA-EYRX	078-05AJ-EYRX	079-05AA-EYRX
50mV	0-400A	•/+077-05AA-EYSC	078-05AJ-EYSC	079-05AA-EYSC
50mV	0-500A	•/+077-05AA-EYSF	078-05AJ-EYSF	079-05AA-EYSF
50mV	0-750A	•/+077-05AA-EYSM	078-05AJ-EYSM	079-05AA-EYSM
50mV	0-1000A	•/+077-05AA-EYSS	078-05AJ-EYSS	079-05AA-EYSS
50mV	0-1200A	•/+077-05AA-EYSU	078-05AJ-EYSU	079-05AA-EYSU
50mV	0-1500A	•/+077-05AA-EYTC	078-05AJ-EYTC	079-05AA-EYTC
50mV	0-2000A	•/+077-05AA-EYTM	078-05AJ-EYTM	079-05AA-EYTM
50mV	0-3000A	•/+077-05AA-EYUA	078-05AJ-EYUA	079-05AA-EYUA

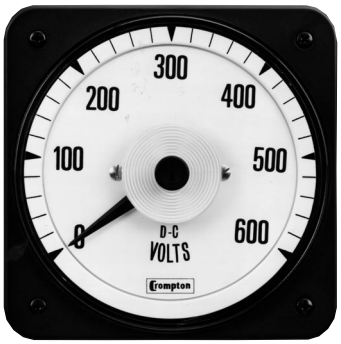
- • UL recognised File # E87815
- \+ CSA Approved File # LR52592

Specify shunt lead resistance value if in excess of 0.05 OHMS for calibration purposes.

D.C. shunt rated ammeters have thermistor circuit ambient temperature compensation.

Separate shunt and shunt leads are not included.

- * Other scales are available
- ** Specify scale required.
- *** Other mV ratings and scale options available upon request.
- **** Case types 077/078/079 use 10-32 UNF terminals. For M5 screw clamp terminals stipulate case type 075.



D.C. Voltmeter

D.C. Voltmeters

Product Codes – Sensitivity 1000 ohms / Volt (Accuracy ±1%)***

Rating	Scaling*	4½" Square Flange		8¾" Square Flange
		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
50mV to 800V	TO SUIT	•/+077-05VA-**	078-05VJ-**	079-05VA-**
0-15V	0-15V	•/+077-05VA-NDND	078-05VJ-NDND	079-05VA-NDND
0-30V	0-30V	•/+077-05VA-NLNL	078-05VJ-NLNL	079-05VA-NLNL
0-50V	0-50V	•/+077-05VA-NTNT	078-05VJ-NTNT	079-05VA-NTNT
0-75V	0-75V	•/+077-05VA-PBPB	078-05VJ-PBPB	079-05VA-PBPB
0-150V	0-150V	•/+077-05VA-PZPZ	078-05VJ-PZPZ	079-05VA-PZPZ
0-300V	0-300V	•/+077-05VA-RXRX	078-05VJ-RXRX	079-05VA-RXRX
0-400V	0-400V	•/+077-05VA-SCSC	078-05VJ-SCSC	079-05VA-SCSC
0-500V	0-500V	•/+077-05VA-SFSF	078-05VJ-SFSF	079-05VA-SFSF
0-600V	0-600V	•/+077-05VA-SJSJ	078-05VJ-SJSJ	079-05VA-SJSJ
0-750V	0-750V	077-05VA-SMSM	078-05VJ-SMSM	079-05VA-SMSM
0-800V	0-800V	077-05VA-SNSN	078-05VJ-SNSN	079-05VA-SNSN

Product Codes – Zero Centre - Sensitivity 2000 Ohms / Volt (Accuracy ±1%)***

150-0-150V	150-0-150V	•/+077-05NA-RXRX	078-05NJ-RXRX	079-05NA-RXRX
300-0-300V	300-0-300V	•/+077-05NA-SJSJ	078-05NJ-SJSJ	079-05NA-SJSJ
500-0-500V	500-0-500V	•/+077-05NA-SSSS	078-05NJ-SSSS	079-05NA-SSSS
600-0-600V	600-0-600V	•/+077-05NA-SUSU	078-05NJ-SUSU	079-05NA-SUSU

Product Code – Suppressed Zero***

1 - 5V	TO SUIT	•/+077-05S-LM	078-05S-LM	•079-05S-LM

Frequency Meter

Frequency Meters

Product Code –120V Self Contained***

Rating	Scaling*	4½" Square Flange		8¾" Square Flange
		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
50Hz+/-0.15	45-55Hz	•/+077-41LA-PNAG-AG	078-41LJ-PNAG-AG	•079-41LA-PNAG-AG
50Hz+/-0.15	46-54Hz	•/+077-41LA-PNAH-AH	078-41LJ-PNAH-AH	•079-41LA-PNAH-AH
50Hz+/-0.25	45-65Hz	•/+077-41LA-PNAJ-AJ	078-41LJ-PNAJ-AJ	•079-41LA-PNAJ-AJ
60Hz+/-0.25	50-70Hz	•/+077-41LA-PNAL-AL	078-41LJ-PNAL-AL	•079-41LA-PNAL-AL
60Hz+/-0.15	55-65Hz	•/+077-41LA-PNAN-AN	078-41LJ-PNAN-AN	•079-41LA-PNAN-AN
60Hz+/-0.15	56-64Hz	•/+077-41LA-PNAO-AO	078-41LJ-PNAO-AO	•079-41LA-PNAO-AO
60Hz+/-0.08	58-62Hz	•/+077-41LA-PNAT-AG	078-41LJ-PNAG-AG	•079-41LA-PNAG-AG
400Hz+/-1.3	350-450Hz	•/+077-41LA-PNBH-BH	078-41LJ-PNBH-BH	•079-41LA-PNBH-BH
400Hz+/-1.25	360-440Hz	•/+077-41LA-PNBI-BI	078-41LJ-PNBI-BI	•079-41LA-PNBI-BI
400Hz+/- 0.8	380-420Hz	•/+077-41LA-PNBK-BK	078-41LJ-PNBK-BK	079-41LA-PNBK-BK

Alternative voltage rating 200-250V use code RN instead of PN
Alternative voltage rating 380-480V use code SE instead of PN
• UL recognised File number E87815

* Other scales are available
** Specify scale required
*** Case types 077/078/079 use 10-32 UNF terminals. For M5 screw clamp terminals stipulate case type 075

A.C. Maximum Demand Ammeter

Thermal Maximum Demand Directly Heated Element Type

Indicates the maximum average ampere demand of a system. A red resettable slave pointer is driven upscale by the indicating pointer to show maximum average value of current since the previous setting. 4½" square flange.

Specification

Burden:	3.5VA with limiting C.T., 2.5VA without limiting C.T.
Time lag:	15 minutes
Accuracy:	3% 50 or 60Hz

Product Codes

5/6A with 20% overload and internal limiting C.T.	•077-16EU-LS**
5A - without overload, with internal limiting C.T.	•077-16EU-LS**- NO

Thermal Instantaneous Maximum Demand Ammeter

Thermal / Instantaneous Maximum Demand Ammeter (MDA)

Allows instantaneous values of current to be read independently of the thermal indicator. This meter combines a thermal movement, with a rugged shortscale iron vane indicator.

Specification

Burden:	4VA with limiting C.T., 3VA without limiting C.T.
Time Lag:	15 mins
Accuracy:	3% MDA, 2% Iron Vane 50 or 60Hz

Product Codes

Thermal / Instantaneous MDA	
5/6A with 20% overload scale and internal limiting C.T.	•077-16FU-LS**
5A - without 20% overload scale, with internal limiting C.T.	•077-16FU-LS** - NO
Dual Range - Thermal Instantaneous	
3/6A - with 20% overload scale	•077-16FU-LK**
2.5/5A - without 20% overload scale	•077-16FU-LK** - NO
6/12A with 20% overload scale and internal limiting C.T.	•077-16FU-LV**
5/10A - without 20% overload scale with internal limiting C.T.	•077-16FU-LV** - NO

Instantaneous Maximum Demand Ammeter

Instantaneous Maximum Demand Ammeter with Slave Pointer

Designed to be compatible with other 4½" switchboard meters. This instrument enhances panel appearance and indicates maximum instantaneous values of load current. The meter incorporates a longscale high torque taut band iron vane movement to drive the red slave pointer.

Specification

Burden:	5VA, Accuracy -1% 50 or 60Hz

Product Code

5A - without overload scale	077-08DA-LS**

** Specify scale required
• UL recognised

A.C. Wattmeters & Varmeters

The Crompton 70 series of A.C. Wattmeters and Varmeters incorporate a DC moving coil taut band indicator with the Crompton designed micro-circuit Watt transducer PCB to read power on single phase or three phase systems. Varmeters can be supplied with internal phase shifter or with external phase shifter if preferred. In the interest of standardisation, preferred Wattmeter scale marking for common current and voltage transformers are listed on the following pages. Instruments may be supplied with zero left or center zero scales at the same list price.

Scaling

Since Wattmeter and Varmeter current circuits are frequently connected in series, they should have equal current carrying capacity. This means that to assure equality the sum of the left and right end-scale values of the Varmeters should be equal to or greater than the full scale value of the Wattmeter (or the higher of the end-scale values if center or offset zero). Instruments 10,000 kilowatts and over are marked in megawatts. Center zero or offset zero Watt and Varmeters are marked “IN” for left deflection and “OUT” for right deflection. Preferred scales may be calculated for Wattmeters and varmeters not listed on the charts. Scale Watts must be one of the standard full scale dial markings shown on the charts.

Calibration

For full load value of Watts or Vars, assuming unity power factor:

1ph 2 wire Watts = amps x volts

3ph 3 wire Watts = amps x line to line volts x $\sqrt{3}$

3ph 4 wire Watts = amps x line to neutral volts x 3

Minimum scale values are obtained by multiplying resultant Watts using above formula x 0.7 and selecting next highest standard scale.

For maximum scale value multiply x 1.3 and select next lowest standard.

If scale calculates to an exact listed value use it rather than the next higher or lower value.

Note: When ordering Wattmeters and Varmeters specify C.T. ratio, V.T. ratio and required scale.

Specification

Burden per element:	Current circuit: 2VA Voltage circuit: 1VA
Accuracy Class:	1.0
Ambient range:	0° to +60°C, (32° to 140°F) standard calibration 20°C (68°F)
Ambient influence:	0.05% per 1°C maximum
Overloads-current:	10 x rating for 5 seconds., 1.2 x continuously
Voltage:	2 x rating for 5 seconds., 1.2 x continuously
Voltage influence:	Accuracy maintained, 80-110% rated voltage
Power Factor influence:	Accuracy maintained 0.1 lag to 0.1 lead
Enclosure code:	077: IP54 optional IP55 078: IP67 079: IP54 optional IP55
Response Time:	077,078: approximately 2.5 seconds 079: approximately 3.5 seconds
Dielectric test:	Live parts to case including panel 2600V RMS for 1 minute

Wattmeter/Varmeter Scale Selector Guide

PRIMARY POTENTIAL TRANSFORMER VOLTAGE		120 (1:1)	208 (1.73:1)	240 (2:1)	480 (4:1)	600 (5:1)	2400 (20:1)	3600 (30:1)	4200 (35:1)	4800 (40:1)	6000 (50:1)	7200 (60:1)	8400 (70:1)
SYSTEM VOLTAGE 3 PHASE 3 WIRE (L-L)		120	208	240	480	600	2400	3600	4200	4800	6000	7200	8400
SYSTEM VOLTAGE 3 PHASE 4 WIRE (L-N)		69	120	139	277	347	1390	2100	2400	2770	3500	4160	4800
CURRENT TRANSFORMER													
RATIO	NORMAL	5KW	10KW	10KW	20KW	25KW	100KW	150KW	175KW	200KW	250KW	300KW	350KW
25/5	MAX.	6	10	12	25	30	120	200	200	250	300	400	450
(5:1)	MIN.	3	5	6	12.5	15	60	100	100	125	150	200	225
RATIO	NORMAL	10KW	20KW	20KW	40KW	50KW	200KW	300KW	350KW	400KW	500KW	600KW	700KW
50/5	MAX.	12	20	25	50	60	250	400	450	500	600	800	900
(10:1)	MIN.	6	10	12.5	25	30	125	200	250	250	300	400	450
RATIO	NORMAL	15KW	25KW	30KW	60KW	75KW	300KW	500KW	500KW	600KW	750KW	900KW	1000KW
75/5	MAX.	20	30	40	80	100	400	600	700	800	1000	1200	1200
(15:1)	MIN.	10	15	20	40	50	200	300	350	400	500	600	600
RATIO	NORMAL	20KW	30KW	40KW	75KW	100KW	400KW	600KW	700KW	800KW	1000KW	1200KW	1200KW
100/5	MAX.	25	40	50	100	120	500	800	900	1000	1200	1500	1500
(20:1)	MIN.	12.5	20	25	50	60	250	400	450	500	600	750	750
RATIO	NORMAL	30KW	50KW	50KW	100KW	150KW	600KW	800KW	1000KW	1200KW	1500KW	1800KW	2000KW
150/5	MAX.	40	70	75	150	200	800	1200	1200	1500	2000	2400	2500
(30:1)	MIN.	20	35	35	75	100	400	600	600	750	1000	1000	1250
RATIO	NORMAL	40KW	75KW	75KW	150KW	200KW	800KW	1200KW	1200KW	1500KW	2000KW	2500KW	3000KW
200/5	MAX.	50	80	100	200	250	1000	1500	1500	2000	2500	3000	3500
(40:1)	MIN.	25	40	50	100	125	500	750	750	1000	1250	1500	1500
RATIO	NORMAL	70KW	100KW	100KW	200KW	300KW	1200KW	1500KW	2000KW	2500KW	3000KW	3500KW	4500KW
300/5	MAX.	75	120	150	300	400	1500	2000	2500	3000	4000	4000	5000
(60:1)	MIN.	35	60	75	150	200	750	1000	1250	1500	2000	2000	2500
RATIO	NORMAL	75KW	125KW	150KW	300KW	400KW	1500KW	2500KW	3000KW	3000KW	4000KW	5000KW	6000KW
400/5	MAX.	100	150	200	400	500	2000	3000	3600	4000	5000	6000	7000
(80:1)	MIN.	50	75	100	200	250	1000	1500	1500	2000	2500	3000	3500
RATIO	NORMAL	125KW	200KW	200KW	450KW	600KW	2000KW	3000KW	4000KW	5000KW	6000KW	7500KW	8000KW
600/5	MAX.	150	250	300	600	800	3000	4000	5000	6000	8000	8000	10MW
(120:1)	MIN.	75	125	150	300	400	1500	2000	2500	3000	4000	4000	5000KW
RATIO	NORMAL	150KW	250KW	300KW	600KW	800KW	3000KW	5000KW	6000KW	6000KW	8000KW	10MW	12MW
800/5	MAX.	200	350	400	800	1000	4000	6000	7500	8000	10MW	12	15
(160:1)	MIN.	100	175	200	400	500	2000	3000	3000	40000	5000KW	6000KW	7500KW
RATIO	NORMAL	200KW	350KW	400KW	800KW	1000KW	4000KW	6000KW	6000KW	8000KW	10MW	12MW	15MW
1000/5	MAX.	250	450	500	1000	1200	5000	8000	8000	10MW	12	15	18
(200:1)	MIN.	125	225	250	500	600	2500	4000	4000	5000KW	6000KW	7500KW	10
RATIO	NORMAL	250KW	400KW	500KW	1000KW	1200KW	5000KW	7000KW	8000KW	10MW	12MW	15MW	10MW
1200/5	MAX.	300	500	600	1200	1500	6000	8000	10MW	12	15	18	20
(240:1)	MIN.	150	250	300	600	750	3000	4000	5000KW	6000KW	7500KW	10	10
RATIO	NORMAL	300KW	500KW	600KW	1200KW	1500KW	6000KW	10MW	10MW	12MW	15MW	20MW	20MW
1500/5	MAX.	400	700	750	1500	2000	8000	12	12	15	20	20	25
(300:1)	MIN.	200	350	375	1000	1000	4000	6000KW	6000KW	7500KW	10	10	12.5
RATIO	NORMAL	400KW	750KW	800KW	1600KW	2000KW	8000KW	12MW	12MW	15MW	20MW	25MW	30MW
2000/5	MAX.	500	800	1000	2000	2500	10MW	15	15	20	25	30	35
(400:1)	MIN.	250	400	500	750	1250	5000	7500KW	7500KW	10	12.5	15	20
RATIO	NORMAL	750KW	1000KW	1200KW	2000KW	3000KW	12MW	18MW	20MW	25MW	30MW	35MW	40MW
3000/5	MAX.	800	1200	1500	3000	4000	15	20	25	30	40	40	50
(600:1)	MIN.	400	600	750	1500	2000	7500KW	10	12.5	15	20	20	25
RATIO	NORMAL	800KW	1200KW	1500KW	3000KW	4000KW	15MW	20MW	25MW	30MW	40MW	50MW	50MW
4000/5	MAX.	1000	1500	2000	4000	5000	20	30	30	40	50	60	75
(800:1)	MIN.	500	750	1000	2000	2500	10	15	15	20	25	30	40
RATIO	NORMAL	1000KW	1500KW	2000KW	4000KW	5000KW	20MW	30MW	20MW	40MW	50MW	60MW	75MW
5000/5	MAX.	1250	2000	2500	5000	6000	25	40	25	50	60	80	80
(1000:1)	MIN.	500	1000	1250	2500	3000	12.5	20	12.5	25	30	40	40
RATIO	NORMAL	1200KW	2000KW	2500KW	5000KW	6000KW	25MW	35MW	40MW	50MW	60MW	60MW	80MW
6000/5	MAX.	1500	2500	3000	3000	8000	30	40	50	60	80	80	100
(1200:1)	MIN.	750	1250	1500	1500	4000	15	20	25	30	40	40	50

Wattmeter/Varmeter Scale Selector Guide

PRIMARY POTENTIAL TRANSFORMER VOLTAGE		12KV (100:1)	14.4KV (120:1)	24KV (200:1)	34.5KV (300:1)	38KV (330:1)	46KV (400:1)	92KV (800:1)	115KV (1000:1)	138KV (1200:1)	345KV (3000:1)	765KV (6000:1)
SYSTEM VOLTAGE 3 PHASE 3 WIRE (L-L)		12KV	14.4KV	24KV	34.5KV	38KV	46KV	92KV	115KV	138KV	345KV	765KV
SYSTEM VOLTAGE 3 PHASE 4 WIRE (L-N)		6900	8300	13.8KV	20KV	22KV	26.5KV	53KV	66KV	80KV	200KV	440KV
CURRENT TRANSFORMER												
RATIO	NORMAL	500KW	600KW	1000KW	1500KW	1500KW	1500KW	3000KW	5000KW	6000KW	15MW	30MW
25/5	MAX.	650	800	1200	1500	2000	2500	200	200	250	300	400
(5:1)	MIN.	325	400	600	750	1000	1250	100	100	125	150	200
RATIO	NORMAL	1000KW	1200KW	2000KW	3000KW	3000KW	3500KW	8000KW	10MW	12MW	30MW	60MW
50/5	MAX.	1200	1500	2500	3500	4000	5000	10MW	12	15	35	80
(10:1)	MIN.	600	750	1250	1750	2000	2500	5000KW	6000KW	7500KW	15	40
RATIO	NORMAL	1500KW	1800KW	3000KW	4000KW	5000KW	5000KW	10MW	15MW	15MW	45MW	100MW
75/5	MAX.	2000	2000	4000	5000	6000	7500	15	15	20	50	125
(15:1)	MIN.	1000	1000	2000	2500	3000	3000	7500KW	7500KW	10	25	50
RATIO	NORMAL	2000KW	2500KW	4000KW	6000KW	6000KW	7500KW	15MW	20MW	25MW	60MW	125MW
100/5	MAX.	2500	3000	5000	7500	8000	10MW	20	25	30	70	150
(20:1)	MIN.	1250	1500	2500	3000	4000	5000KW	10	12.5	15	35	75
RATIO	NORMAL	3000KW	3500KW	6000KW	10MW	10MW	10MW	20MW	30MW	35MW	90MW	200MW
150/5	MAX.	4000	4000	4000	10	12	15	30	35	40	100	250
(30:1)	MIN.	2000	2000	2000	5000KW	6000KW	7500KW	15	15	20	50	100
RATIO	NORMAL	4000KW	4500KW	8000KW	12MW	12MW	15MW	30MW	35MW	50MW	100MW	250MW
200/5	MAX.	5000	6000	5000	15	15	20	40	50	60	150	300
(40:1)	MIN.	2500	3000	2500	7500KW	7500KW	10	20	25	30	75	150
RATIO	NORMAL	6000KW	7000KW	12MW	18MW	18MW	20MW	45MW	60MW	75MW	150MW	400MW
300/5	MAX.	8000	8000	15	20	25	30	60	75	80	200	500
(60:1)	MIN.	4000	4000	7.5	10	12.5	15	30	30	40	100	250
RATIO	NORMAL	8000KW	10MW	15MW	24MW	25MW	30MW	60MW	80MW	100MW	200MW	500MW
400/5	MAX.	10MW	12	20	30	30	40	80	100	120	300	600
(80:1)	MIN.	5000KW	6000KW	10	15	15	20	40	50	60	150	300
RATIO	NORMAL	12MW	15MW	25MW	35MW	40MW	45MW	90MW	100MW	150MW	350MW	800KW
600/5	MAX.	15	18	30	40	50	60	120	150	180	450	1000
(120:1)	MIN.	7500KW	10	15	20	25	30	60	75	75	225	500
RATIO	NORMAL	15MW	20MW	30MW	50MW	50MW	60MW	120MW	150MW	200MW	500MW	1000MW
800/5	MAX.	20	25	40	60	60	80	150	200	200	600	1200
(160:1)	MIN.	10	12.5	20	30	30	40	75	100	100	300	600
RATIO	NORMAL	20MW	25MW	40MW	50MW	60MW	75MW	150MW	200MW	250MW	600MW	1200MW
1000/5	MAX.	25	30	50	60	80	100	200	250	300	750	1500
(200:1)	MIN.	12.5	15	25	30	40	50	100	125	150	300	750
RATIO	NORMAL	25MW	30MW	50MW	60MW	80MW	100MW	175MW	250MW	300MW	750MW	1500MW
1200/5	MAX.	30	35	60	80	100	120	200	300	350	900	2000
(240:1)	MIN.	15	20	30	40	50	60	100	150	175	450	1000
RATIO	NORMAL	30MW	35MW	60MW	75MW	100MW	120MW	250MW	3000MW	350MW	900MW	2000MW
1500/5	MAX.	40	40	80	100	120	150	300	350	450	1000	2500
(300:1)	MIN.	20	20	40	50	60	75	150	175	225	500	1250
RATIO	NORMAL	40MW	50MW	80MW	100MW	120MW	150MW	300MW	400MW	5000MW	1000MW	2500MW
2000/5	MAX.	50	60	100	150	150	200	400	500	600	1500	3000
(400:1)	MIN.	25	30	50	75	75	100	200	250	300	750	1500
RATIO	NORMAL	60MW	75MW	100MW	150MW	200MW	200MW	400MW	600MW	700MW	1500MW	3500MW
3000/5	MAX.	80	80	150	200	250	300	500	750	900	2000	5000
(600:1)	MIN.	40	40	75	100	125	150	250	350	450	1000	2500
RATIO	NORMAL	80MW	100MW	150MW	200MW	250MW	300MW	5000MW	800MW	1000MW	2000MW	500MW
4000/5	MAX.	100	125	200	300	300	400	800	1000	1200	3000	6000
(800:1)	MIN.	50	60	100	150	150	200	400	500	600	1500	3000
RATIO	NORMAL	100MW	125MW	200MW	250MW	300MW	4000MW	750MW	1000MW	1200MW	3000MW	6000MW
5000/5	MAX.	120	150	250	300	400	500	1000	1200	1500	3500	8000
(1000:1)	MIN.	60	75	125	150	200	250	500	600	750	1750	400
RATIO	NORMAL	120MW	150MW	250MW	350KW	400MW	450MW	1000MW	1200MW	1500MW	3500MW	8000MW
6000/5	MAX.	150	175	300	400	500	600	1200	1500	1750	4000	10000
(1200:1)	MIN.	75	80	150	200	250	300	600	750	800	2000	5000

A.C. Wattmeter

A.C. Wattmeters

Product Codes – 1 element, transformer rated. 50/60Hz. Taut Band. Integral transducer. Accuracy 1.0%. 50/60Hz

Measured System				Scales	4½" Square Flange		8¾" Square Flange
Phases	Wires	Amperes 1 VA max. Burden	Volts 1 VA max. Burden		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
1	2	5	120V	TO SUIT	•/+077-215A-QQ**	078-215J-QQ**	•079-215A-QQ**
1	2	5	240V	TO SUIT	077-215A-QS**	078-215J-QS**	079-215A-QS**

For connection diagram please see Fig. 21 page 60.

Product Codes – 2 element, transformer rated. 50/60Hz. Taut Band. Integral transducer. Accuracy 1.0%. 50/60Hz

3	3	5	120V	TO SUIT	•/+077-218A-QQ**	078-218J-QQ**	•079-218A-QQ**
3	3	5	208V	TO SUIT	•/+077-218A-QR**	078-218J-QR**	•079-218A-QR**
3	3	5	240V	TO SUIT	•/+077-218A-QS**	078-218J-QS**	079-218A-QS**
3	3	5	380V	TO SUIT	•/+077-218A-QX**	078-218J-QX**	079-218A-QX**
3	3	5	480V	TO SUIT	•/+077-218A-QT**	078-218J-QT**	079-218A-QT**

For connection diagram please see Fig. 25 page 60.

Product Codes – 21/2 element, transformer rated. 50/60Hz. Taut Band. Integral transducer. Accuracy 1.0%. 50/60Hz

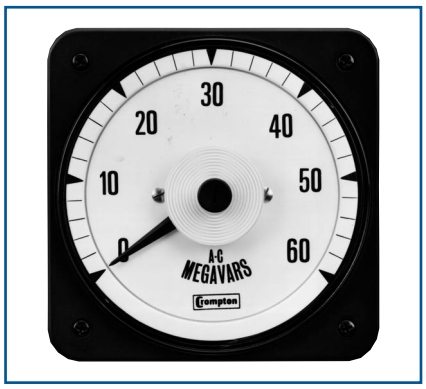
3	4	5	69V	TO SUIT	•/+077-219A-QL**	078-219J-QL**	•079-219A-QL**
3	4	5	120V	TO SUIT	•/+077-219A-QQ**	078-219J-QQ**	•079-219A-QQ**
3	4	5	277V	TO SUIT	077-219A-QY**	078-219J-QY**	079-219A-QY**
3	4	5	346V	TO SUIT	077-219A-QZ**	078-219J-QZ**	079-219A-QZ**

For connection diagram please see Fig. 28 page 60.

Product Codes – Phase Shifting Transformers

For use with above Wattmeters, when VAr measurement with external phase shifter is required.

3	3	120V		855-956A-PR	855-956J-PR	855-956A-PR
3	4	120V		855-957A-PR	855-957J-PR	855-957A-PR
3	4	69V		855-957A-NZ	855-957J-NZ	855-957A-NZ



A.C. Varmeter

A.C. Varmeters

Product Codes – 2 element, transformer rated. 50/60Hz. Taut Band. Integral transducer. Accuracy 1.0%. 50/60Hz

3	3	5	120V	TO SUIT	•/+077-31LA-QQ**	078-31LJ-QQ**	
3	3	5	208V	TO SUIT	•/+077-31LA-QR**-C6	078-31LJ-QR**	
3	3	5	240V	TO SUIT	077-31LA-QS**	078-31LJ-QS**	
3	3	5	380V	TO SUIT	077-31LA-QX**	078-31LJ-QX**	
3	3	5	480V	TO SUIT	077-31LA-QT**	078-31LJ-QT**	

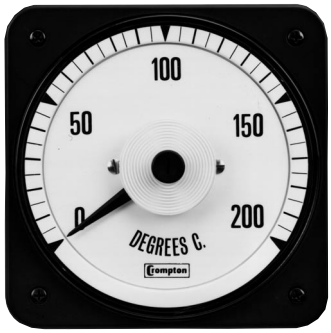
For connection diagram please see Fig. 32 page 61.

Product Codes – 21/2 element, transformer rated. 50/60Hz. Taut Band. Integral transducer. Accuracy 1.0%.50/60Hz

3	4	5	120V	TO SUIT	•/+077-31UA-QQ**	078-31UJ-QQ**	•079-31UA-QQ**
3	4	5	208V	TO SUIT	077-31UA-QR**	078-31UJ-QR**	•079-31UA-QR**
3	4	5	480V	TO SUIT	077-31UA-QT**	078-31UJ-QT**	079-31UA-QT**

For connection diagram please see Fig. 32 page 61.

• UL recognised File # E87815 + CSA Approved File # LR52592
** Specify C.T. (Current Transformer) and V.T. (Voltage Transformer) ratios if used, and preferred scale at time of ordering.



RTD Temperature Meter

RTD Temperature Meters*

Product Codes – Accuracy 1.0% of span.

Self-contained for 10 Ohm copper or 100 Ohm platinum RTD. (Resistance Temperature Detector) - Specify copper or platinum at time of ordering.

Rating	Scaling*	4½" Square Flange	
		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.
110/130V 50/60Hz	20-140°C	077-45RA-**QF-PQ	078-45RJ-**QF-PQ
110/130V 50/60Hz	0-150°C	077-45RA-**QE-PQ	078-45RJ-**QE-PQ
110/130V 50/60Hz	0-200°C	077-45RA-**QG-PQ	078-45RJ-**QG-PQ

For connection diagrams please see Fig. 17 page 59.

Thermocouple Temperature Meters

Product Code – Accuracy 1% of span.

Suitable for type J and K. Cold junction compensation and thermocouple break indication is provided. Specifiy type J or K and temperature at time of ordering.

Rating	4½" Square Flange Standard Case Catalogue No.
110/130V 50/60Hz	077-45TA-••PM

For connection diagrams please see Fig. 18 page 59.

Tap Position Indicator

Product Code

To show transformer tap, hoist or valve position using 3 wire system for 1-18 tap positions using 400 Ohm steps.

Rating	Scaling*	4½" Square Flange		8¾" Square Flange
		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
110/220/240V 50/60Hz	1-18 taps	077-45P-	Not available	Not available

For connection diagrams please see Fig. 20 page60.

Select nearest higher rated voltmeter and specify requirement

- UL recognised File # E87815
- •• JT for type J, KT for type K thermocouple

* Other ranges available upon request - Consult Factory.

** RI for 10 ohm Copper or R2 for 100ohm platinum.

*** Specify input and scale

Elapsed Time Meter

Elapsed Time Meters

Product Codes – 99,999.99 hours, non reset. Burden 2.5VA. 50 or 60Hz

Synchronous motor running time meter with a running indicator.

Rating	4½" Square Flange		8¾" Square Flange
	Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
110/130V 50Hz	•077-155A-PNZH-C5	078-155J-PNZH-C5	Not available
200/250V 50Hz	•077-155A-RNZH-C5	078-155J-RNZH-C5	Not available
480V 50Hz	•077-155A-SEZH-C5	078-155J-SEZH-C5	Not available
110/130V 60Hz	•077-156A-PNZH-C6	078-156J-PNZH-C6	Not available
200/250V 60Hz	•077-156A-RNZH-C6	078-156J-RNZH-C6	Not available
480V 60Hz	•077-156A-SEZH-C6	078-156J-SEZH-C6	Not available
12/24/40/110V D.C.	077-151A-		

A.C. Phase Sequence and Phase Failure Indicator

A.C. Phase Sequence, Phase Failure Indicators

Product Codes – Neon Bulb Type. Burden 2.5VA

2 neon bulbs for phase sequence indication - first marked correct 1-2-3, second marked incorrect 3-2-1. 3 neon bulbs for phase failure indication - first marked 1, second marked 2, third marked 3.

Rating	4½" Square Flange		8¾" Square Flange
	Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
100/150V 50/60Hz	077-12PA-P2C6	Not available	Not available
151/300V 50/60Hz	077-12PA-P3C6	Not available	Not available
301/500V 50/60Hz	077-12PA-P4C6	Not available	Not available

For connection diagrams please see Fig. 1 page 58.

D.C. Indicators for Tachometer Generators

Product Code

Rating	4½" Square Flange		8¾" Square Flange
	Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
D.C. Volts	077-052A-***	078-052J-***	079-052A-***

Select nearest higher rated voltmeter and specify requirement

• UL recognised File # E87815

•• JT for type J, KT for type K thermocouple

* Other ranges available upon request - Consult Factory.

** RI for 10 ohm or R2 to 100ohm platinum.

*** Specify input and scale

A.C. Power Factor Meter

A.C. Power Factor Meter

Specification

Ratings, self-contained:	Current windings 5 amperes. Voltage windings minimum 50 volts, maximum 600 volts
Accuracy Class:	1.0
Overshoot:	33%
External Temperature Influence:	0.5% fid max.
External Field Influence:	3% fid max.
Frequency Range:	50Hz or 60Hz standard, 25-3000Hz optional (Specify)
Frequency Influence:	Single phase instruments, 59 to 61Hz 1.0% fid max. Polyphase instruments ±10% deviation from 69Hz: 1.0%
Overload capacity:	Current coils 1000% momentarily, 100% for 15 minutes and 25% indefinitely. Voltage circuits 25% indefinitely.
Burdens:	Each current circuit, 1.5VA approx Each voltage circuit 1VA approx Measuring systems 077-427 - 3 or 4 wire
Ranges available:	Lag 0.5-1 - 0.5 lead power factor Lag 0.2-1 - 0.8 lead power factor

JIS dimension product available on request. Instruments may be used on loads down to 20% of current rating and between 90% and 110% of voltage rating.

Product Codes – Balanced Load Accuracy ±1%

Measured System					Scales	4½" Square Flange		8¾" Square Flange
Phases	Wires	Amperes 2 VA max. Burden	Volts 1 VA max. Burden			Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
1	2	5	120V		0.5-1-0.5	•/+077-425A-QQAD	078-425J-QQAD	•079-425A-QQAD
1	2	5	240V		0.5-1-0.5	•/+077-425A-QSAD	078-427J-QSAD	•079-427A-QSAD
3	3/4	5	120V		0.5-1-0.5	•/+077-427A-QQAD	078-427J-QQAD	•079-427A-QAAD
3	3/4	5	208V		0.5-1-0.5	•/+077-427A-QRAD	078-427J-QRAD	•079-427A-QRAD
3	3/4	5	240V		0.5-1-0.5	•/+077-427A-QSAD	078-427J-QSAD	•079-427A-QSAD
3	3/4	5	480V		0.5-1-0.5	077-427A-QTAD	078-427J-QTAD	079-427A-QTAD

For connection diagrams please see Fig. 13 & 15 page 59.

Product Codes – Unbalanced Load Accuracy ±1%

Measured System					Scales	4½" Square Flange		8¾" Square Flange
Phases	Wires	Amperes 2 VA max. Burden	Volts 1 VA max. Burden			Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
3	3	5	120V		0.5-1-0.5	077-TFUA-QQAD	–	–
3	3	5	240V		0.5-1-0.5	077-TFUA-QSAD	–	–

For connection diagrams please see Fig. 12 page 59.

• UL Recognised File # E87815	+ CSA Approved File # LR52592

360° Power Factor Meter

360° Power Factor

Specification

Ratings, self-contained:	Current windings minimum, 0.5 amps, maximum 20 amps. Voltage windings min. 50 volts, maximum 240 volts, for higher voltages up to 480 volts an external box is supplied.			
Normal Operating Position:	On vertical panel unless otherwise specified at the time of order.			
Position Influence:	Not more than 1% of scale length for up to 60° tilt from normal operating position			
Accuracy Class:	1.0			
Overshoot:	33%			
External Temp. Influence:	0.5% fid. max.			
External Field Influence:	3% fid. max			
Frequency Influence:	Single phase instruments from 59 to 61Hz 1% max. fid. max. Polyphase instrument ±10% deviation from 60Hz: 1% fid. max.			
Overload Capacity:	Current coils 1000% momentarily, 100% for 15 minutes, and 50% indefinitely. Voltage circuits 50% indefinitely.			
Characteristics	**077-132**		**077-136**	
	A	**V**	**A**	**V**
Impedance ohms:	0.162	3380	0.043	3380
Resistance ohms:	0.147	3300	0.04	3300
Resistance ohms:	0.082	750	0.016	750
Watts:	3.5	1.39	1.0	1.30
Volt-Amperes:	4.05	1.42	1.07	1.42
Reactive VA:	2.03	0.281	0.4	0.281
Power Factor:	0.86	0.96	0.93	0.98

Product Codes – Rotary Power Factor - 360°

3 3/4 5 120V	0-1-0	077-136A-QQAB	078-136J-QQAB	079-136A-QQAB
3 3/4 5 208V	0-1-0	077-136A-QRAB	078-136J-QRAB	079-136A-QRAB
3 3 5 120V	0-1-0	077-132A-QQAB	078-132J-QSAB	079-132A-QSAB
3 3 5 208V	0-1-0	077-132A-QRAB	078-132J-QTAB	079-132A-QTAB

For connection diagrams please see Fig. 4, 6 & 7 page 58.
Rotating iron 360° products are only suitable for use on 50 and 60 Hz systems.

3 Phase 4 Wire Power Factor Meters are connected L-L ie. 120V L-N system will be rated at 208V L-L.	Model -136 unbalanced load, -132 balanced load • UL Recognised File # E87815 + CSA Approved File # LR52592

360° Rotary Synchroscope

360° Rotary Synchroscope

Specification

Rating, self-contained:	120V A.C.	
Frequency rating:	50 or 60Hz (specify), 400Hz optional	
Normal Operating Position:	On vertical panel unless otherwise specified at time of order	
Position Influence:	Not more than 3.6 mechanical degrees deviation for up to 60° tilt from normal operating position.	
Accuracy:	2 degrees	
Overshoot:	33% maximum	
Response time:	3 seconds maximum for 180° deflection	
Sensitivity at synchronism:	3 electrical degrees maximum	
External field influence:	3% maximum in 5 oersted field	
Pull in frequency:	58Hz	
Drop-out frequency:	57Hz	
Dielectric test:	Live parts to case, including panel: 2600V RMS for 1 minute.	
Between running and incoming circuits:	1500V RMS for 1 minute	
Overload capacity:	50% indefinitely	
Characteristics	**Incoming circuit**	**Running circuit**
Impedance ohms:	4670	5335
Resistance ohms:	4020	5240
Resistance ohms:	2380	1058
Reactive Volt amps:	1.57	0.535
Volt-amps:	3.08	2.7
Power factor:	0.86	0.98
Watts:	2.66	2.65

Product Codes – Pivot and Jewel

Rating	Scaling*	4½" Square Flange		8¾" Square Flange
		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
120V 50Hz	SLOW FAST	•/+077-145A-PRAE-C5	078-145J-PRAE-C5	•079-145A-PRAE-C5
120V 60Hz	SLOW FAST	•/+077-146A-PRAE-C6	078-146J-PRAE-C6	•079-146A-PRAE-C6
120V 400Hz	SLOW FAST	077-144A-PRAE-C4	078-144J-PRAE-C4	079-144A-PRAE-C4

For connection diagrams please see Fig. 10 page 59.

Alternate voltage of 240V, use code RR instead of PR.

• UL Recognised File # E87815
+ CSA Approved File # LR52592

360° A.C. LED Synchroscope

360° A.C. LED Synchroscope

Specification

Voltage:	120, 240, 480 Volts A.C. or via P.T.
Frequency:	40/65Hz
Burden @ 60Hz:	4VA maximum Suitable for single or three phase systems
Safety:	IEC1010-1(300V A.C. rms installation degree 2)
Dielectric:	4kV rms for 1 minute
Isolation:	BUS/GEN/RELAY
Vibration:	To Lloyds shipping specification

Product Codes

Rating	Scaling	4½" Square Flange Standard Case Catalogue No.
120V 40/65Hz	SLOW FAST	077-14AU-PQYY-FQ
240V 40/65Hz	SLOW FAST	077-14AU-RRYY-FQ
480V 40/65Hz	SLOW FAST	077-14AU-SEYY-FQ

For connection diagrams please see Fig. 8 page 58.

A.C. Synchrocheck Relay & LED 360° Synchroscope

A.C. Synchrocheck Relay and LED 360° Synchroscope

Specification

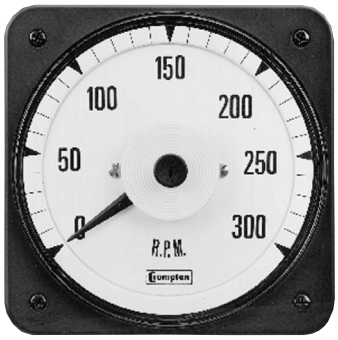
Voltage:	110/120V (115V nominal) 220/240V (230V nominal) 380/480V (430V nominal)
Phase Difference:	+0 to 20° ±1°
Voltage Difference:	+0 to 20% ±2%
Time Delay:	0 to 2.5 seconds +10%

Product Codes

Rating	Scaling	4½" Square Flange Standard Case Catalogue No.
Live Bus		
110/120V 40/65Hz	SLOW FAST	077-14GU-POYY-FQ
220/240V 40/65Hz	SLOW FAST	077-14GU-RSYY-FQ
380/480V 40/65Hz	SLOW FAST	077-14GU-SZYY-FQ
Dead Bus		
110/120V 40/65Hz	SLOW FAST	077-14HU-POYY-FQ
220/240V 40/65Hz	SLOW FAST	077-14HU-RSYY-FQ
380/480V 40/65Hz	SLOW FAST	077-14HU-SZYY-FQ
Live Bus		
120V 40/65Hz	SLOW FAST	077-14LU-PQYY-FQ
240V 40/65Hz	SLOW FAST	077-14LU-RRYY-FQ
480V 40/65Hz	SLOW FAST	077-14LU-SEYY-FQ
Dead Bus		
120V 40/65Hz	SLOW FAST	077-14DU-PQYY-FQ
240V 40/65Hz	SLOW FAST	077-14DU-RRYY-FQ
480V 40/65Hz	SLOW FAST	077-14DU-SEYY-FQ

For connection diagrams please see Fig. 9 page 58.

In the 0.77-14G and 0.77-14H models, the generator voltage is free to track the bus voltage (+ the voltage difference preset) over the input voltage range. In the 077-14L and 077-14D models, the generator voltage is to match the nominal input (bus) voltage specified (within the voltage difference preset).



D.C. Transducer Indicator

D.C. Transducer Indicators

Product Codes

Rating	Scaling*	4½" Square Flange		8¾" Square Flange
		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
WATTS 1mA	TO SUIT	•/+077-055A-FA**	078-055J-FA**	•079-055A-FA**
VARS 1mA	TO SUIT	•/+077-056A-FA**	078-056J-FA**	•079-056A-FA**
FREQUENCY 1mA	TO SUIT	•/+077-053A-FA**	078-053J-FA**	•079-053A-FA**
POWER FACTOR 1mA	TO SUIT	•/+077-054A-FA**	078-054J-FA**	•079-054A-FA**
A.C. AMPS 1mA	TO SUIT	•/+077-05AA-FA**	078-05AJ-FA**	•079-05AA-FA**
A.C. VOLTS 1mA	TO SUIT	•/+077-05VA-LT**	078-05VJ-LT**	•079-05VA-LT**
SPEED 1mA	TO SUIT	•/+077-052A-FA**	078-052J-FA**	•079-052A-FA**
VA 1mA	TO SUIT	•/+077-057A-FA**	078-057J-FA**	•079-057A-FA**

For use with the following transducers:-
Watts, VArs, Frequency, Power Factor,
A.C. Amperes, A.C. Volts & Temperature

* Case types 077/078/079 use 10-32 UNF terminals. For M5 screw clamp terminals stipulate case type 075

** Specify scale. Input: 1mA D.C. for 4/20mA change "FA" to "HG"

A.C. Watt/Watt Hour Meter

A.C. Watt & Watt Hour Meters

Moving coil indication gives instantaneous reading of Watts. Self Contained circuitry drives an impulse counter to give Watt hour indication.

Product Codes – Transducer Driven Accuracy ±1%.

With internal linear integrator and six digit impulse counter. Externally powered.

Rating	Scaling	4½" Square Flange		8¾" Square Flange
		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
120V, 240V 1mA	TO SUIT	077-KHAU-FA**	078-KHAJ-FA**	Not available
50/60Hz 4-20mA		077-KHAU-HG**	078-KHAJ-HG**	

For connection diagrams please see Fig. 19 page 59.

Product Codes – Self Contained - Accuracy instantaneous 1%.

Kilowatt hour 0.5% of pulse rate/hour.

Single element. Transformer rated 50/60Hz. Hi-Q Taut Band. Integral transducer.

Measured System				Scales	4½" Square Flange		8¾" Square Flange
Phases	Wires	Amperes 2VA max. Burden	Volts 1 VA max. Burden		Standard Case Catalogue No.	Sealed Case Hi-Shock Catalogue No.	Standard Case Catalogue No.
1	2	5	120	TO SUIT	077-KHBU-QQ**	078-KHBJ-QQ**	Not available

For connection diagrams please see Fig. 21 page 60.

2 element. Transformer rated. 50/60Hz. Hi-Q Taut Band. Integral transducer.

3	3	5	120	TO SUIT	077-KHEU-QQ**	078-KHEJ-QQ**	Not available
3	3	5	208	TO SUIT	077-KHEU-QR**	078-KHEJ-QR**	Not available

For connection diagrams please see Fig. 25 page 60.

2½ Element.Transformer rated. 50/60Hz. Hi-Q Taut Band. Integral transducer.

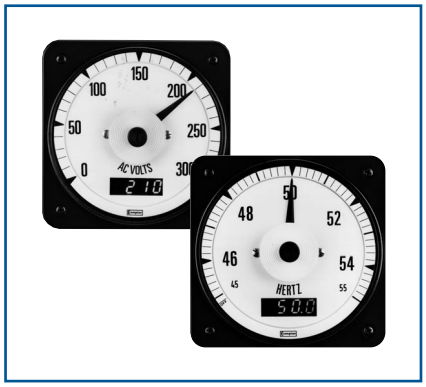
3	4	5	69	TO SUIT	077-KHGU-QL**	078-KHGJ-QL**	Not available
3	4	5	120	TO SUIT	077-KHGU-QQ**	078-KHGJ-QQ**	Not available
3	4	5	277	TO SUIT	077-KHGU-QY**	078-KHGJ-QY**	Not available

For connection diagrams please see Fig. 28 page 60.

** Specify pulse rate and external power supply

• UL Recognised File # E87815

+ CSA Approved File # LR52592



Features

Rugged shock and vibration taut band design

High accuracy LED display

Wide selection of AC and DC inputs

Maximum trend indication visibility

Input isolation

External decimal point selection option

Interchangeable with 4½" switchboard meters

Benefits

Cost effective

Meets all the requirements of ANSI-C39.1 (1981)

IP54 (NEMA 3) protection.

Optional IP55 (NEMA 4) gasket

Bump, shock and vibration proof

Customised options and features

Applications

Switchgear

Distribution systems

Generator sets

Control panels

Energy management

Building management

Utility power monitoring

Process control

Motor control

Approvals

UL recognised File No: E140758

LED Digital / Analogue Combination

The Crompton model 077-DI features a combination of the traditional 250° 4½" switchboard indicator with the benefits of wide angle visibility plus trend indication. This rugged shock and vibration resistant taut band design provides precision accuracy and instantaneous reading via the bright in dial mounted 3½ digit LED display.

Description

Model 077-DI digital analogue indicators are ideal for all applications where moving pointer instruments are preferable to indicate trend while simultaneously displaying a high visibility precision LED readout for increased user interface.

Packaged in a weather resistant case, the 077-DI is interchangeable with other analogue and digital instruments designed to directly mount in to a standard ANSI-C39. 4½" switchboard cut-out.

Available in side, center, or off-set zero versions the 077-DI can accept A.C. Current, Voltage, Frequency, Watts, VArs and Phase Angle or D.C.Current and Voltage direct inputs as well as a wide range of transducer outputs making it suitable for a variety of other applications including low-load current, temperature, speed, watt/vars,percent and level.

Specification

Inputs:	D.C. Voltage: 20mV-600V (1MΩ input impedance as standard) D.C. Current: 1mA-1A, 4 to 20mA (Voltage drop 200mV nominal). External shunt operation (50mV and 100mV). A.C. Voltage: 200mV-600V (1 kΩ / volt) A.C. Current: 1mA-999mA (Using internal shunt, voltage drop 200mV nominal). 1A, 2A, 5A & 10A using internal current transformer.
Common mode rejection:	=>80dB @ 50/60Hz
Overload:	Voltage: x 1.2 continuous. x1.5 for 10 seconds. Current using internal CT: x 1.2 continuous. x 10 for 10 seconds.
External Power Requirement:	Standard: 120 & 240V ±15%. Optional: 480V ±15% A.C. 40 to 60Hz
Burden:	3VA @ 60Hz
D.C.:	Standard: 12, 24, 48,110 & 125V ±15%
Display Analogue:	Long scale moving coil. 250° deflection. Scale length 6.8inches. Response time less than 2.5 seconds.
Display Options:	Center or offset zero. Scale plate in colors other than white. Colored lines or segments on scale. Slower response time.
Digital Display:	3½ digit red LED. 7 segment (7.6mm, 0.3" high). Right hand decimal points. Polarity indication: positive / none. Negative / horizontal bar " - ". Update time (standard): 1 per second
Accuracy – Analogue:	D.C & A.C: ±1% of FSD (calibrated at 25°C)
Accuracy – Digital:	DC: ±0.05% of reading ±1 count ±100ppm of reading / °C. (Maximum). A.C. current: 0-1 Amp ±0.1% reading ±3 counts ±150ppm of reading / °C. A.C. current: 0-10 amps ±0.1% reading ±10 counts ±150ppm of reading / °C (maximum) A.C. Voltage: ±0.1% of reading ±3 counts ±150ppm of reading / °C. (maximum) Zero ±1 count ±0.2 counts/°C (maximum) D.C. offset scale only Warm up time: 1 minute
Long Term Stability:	±2 counts
Calibration Check:	Recommended 12 monthly intervals
Enclosure Code:	IP54 (Optional IP55 using panel gasket)
Operational Temperature:	0 to +60°C (32° to 140°F).
Storage Temperature:	-20 to +60°C (-4° to 140°F)
Humidity:	Up to 90% relative @ 55°C. Tests to BS2011 part 2DA.
Isolation Test Voltage:	2kV RMS 60Hz for 1 minute
Interference Rejection:	To IEEE STD472, ANSI C37 90A, SEN 361503, IEC 255-4
Approvals:	EMC and LVD UL recognised file E140758

A.C. Voltmeter

LED Digital/Analogue Combination

Product Codes – A.C. Voltmeters - direct reading (40/2000Hz)***

Digital accuracy ±0.1% ±3 counts analogue accuracy ±1%.

Rating	Scaling*	Catalogue No.
200mV	0-200mV	077-DIWA-KAKA-C6-**
250mV	0-250mV	077-DIWA-KDKD-C6-**
500mV	0-500mV	077-DIWA-KMKM-C6-**
1V	0-1V	077-DIWA-LALA-C6-**
5V	0-5V	077-DIWA-LSLS-C6-**
10V	0-10V	077-DIWA-MTMT-C6-**
15V	0-15V	077-DIWA-NDND-C6-**
30V	0-30V	077-DIWA-NLNL-C6-**
150V	0-150V	077-DIWA-PZPZ-C6-**
250V	0-250V	077-DIWA-RSRS-C6-**
300V	0-300V	077-DIWA-RXRX-C6-**
500V	0-500V	077-DIWA-SFSF-C6-**
600V	0-600V	077-DIWA-SJSJ-C6-**

For connection diagrams please see Fig. 45 page 62.

Product Codes – A.C. Voltmeters Transformer Rated (40/2000Hz)***

Rating	Scaling*	Catalogue No.
150V	0-300V	077-DIWA-PZRX-C6-**
150V	0-600V	077-DIWA-PZSJ-C6-**
150V	0-750V	077-DIWA-PZSM-C6-**
150V	0-3000V	077-DIWA-PZUA-C6-**
143V	0-5000V	077-DIWA-PTUJ-C6-**
150V	0-5250V	077-DIWA-PZUL-C6-**
150V	0-6000V	077-DIWA-PZUP-C6-**
150V	0-9000V	077-DIWA-PZUY-C6-**
150V	0-15KV	077-DIWA-PZWC-C6-**
150V	0-18KV	077-DIWA-PZWD-C6-**
150V	0-45KV	077-DIWA-PZWJ-C6-**
150V	0-60KV	077-DIWA-PZWL-C6-**

For connection diagrams please see Fig. 45 page 62.

A.C. Ammeter

Product Codes – A.C. Ammeters - direct reading (40/2000Hz)***

Rating	Scaling*	Catalogue No.
1A	0-1A	077-DIBA-LALA-C6-**
1.5A	0-1.5A	077-DIBA-LCLC-C6-**
2A	0-2A	077-DIBA-LELE-C6-**
3A	0-3A	077-DIBA-LJLJ-C6-**
5A	0-5A	077-DIBA-LSLS-C6-**
8A	0-8A	077-DIBA-MJMJ-C6-**
10A	0-10A	077-DIBA-MTMT-C6-**

For connection diagrams please see Fig. 45 page 62.

Product Codes – Power Supply

MU - 12 Volts D.C.	PQ - 120 Volts A.C.
Z2 - 130 Volts D.C.	PR - 120 Volts D.C.
BD - 24 Volts D.C.	RR - 240 Volts A.C.
PO - 115 Volts A.C.	PS - 125 Volts D.C.
NR - 48 Volts D.C.	

* Other scalings available.
** Specify power supply voltage, for the code, see Power Supply Codes table.
*** Case types 077/078/079 use 10-32 UNF terminals.
For M5 screw clamp terminals stipulate case type 075

A.C. Ammeter

LED Digital/Analogue Combination

Product Codes – A.C. Ammeters Transformer Rated (40/2000Hz)

Digital accuracy ±0.1% ±1 counts analogue accuracy ±1%.

Rating	Scaling*	Catalogue No.
5A	0-10A	077-DIBA-LSMT-C6-**
5A	0-15A	077-DIBA-LSND-C6-**
5A	0-20A	077-DIBA-LSNG-C6-**
5A	0-25A	077-DIBA-LSNJ-C6-**
5A	0-30A	077-DIBA-LSNL-C6-**
5A	0-40A	077-DIBA-LSNP-C6-**
5A	0-50A	077-DIBA-LSNT-C6-**
5A	0-60A	077-DIBA-LSNW-C6-**
5A	0-75A	077-DIBA-LSPB-C6-**
5A	0-80A	077-DIBA-LSPD-C6-**
5A	0-100A	077-DIBA-LSPK-C6-**
5A	0-150A	077-DIBA-LSPZ-C6-**
5A	0-200A	077-DIBA-LSRL-C6-**
5A	0-250A	077-DIBA-LSRS-C6-**
5A	0-300A	077-DIBA-LSRX-C6-**
5A	0-400A	077-DIBA-LSSC-C6-**
5A	0-500A	077-DIBA-LSSF-C6-**
5A	0-600A	077-DIBA-LSSJ-C6-**
5A	0-750A	077-DIBA-LSSM-C6-**
5A	0-800A	077-DIBA-LSSN-C6-**
5A	0-1000A	077-DIBA-LSSS-C6-**
5A	0-1200A	077-DIBA-LSSU-C6-**
5A	0-1500A	077-DIBA-LSTC-C6-**
5A	0-1600A	077-DIBA-LSTE-C6-**

For connection diagrams please see Fig. 45 page 62.

A.C. Frequency Meter

Product Codes – A.C. Frequency Meters

Self contained 110/130• Volts rating. Moving Coil Indicator Integral transducer

Centre Frequency	Accuracy	Scaling*	Catalogue No.
50Hz	±0.15	45-55Hz	077-DZLA-PNAG-AG
50Hz	±0.15	46-54Hz	077-DZLA-PNAH-AH
55Hz	±0.25	45-65Hz	077-DZLA-PNAJ-AJ
60Hz	±0.25	50-70Hz	077-DZLA-PNAL-AL
60Hz	±0.15	55-65Hz	077-DZLA-PNAN-AN
60Hz	±0.15	56-64Hz	077-DZLA-PNAO-AO
60Hz	±0.08	58-62Hz	077-DZLA-PNAT-AT
400Hz	±1.3	350-450Hz	077-DZLA-PNBH-BH
400Hz	±1.25	360-440Hz	077-DZLA-PNBI-BI
400Hz	±0.08	380-420Hz	077-DZLA-PNBK-BK

For connection diagrams please see Fig. 44 page 62.

Product Codes – Power Supply

MU - 12 Volts D.C.	PQ - 120 Volts A.C.
Z2 - 130 Volts D.C.	PR - 120 Volts D.C.
BD - 24 Volts D.C.	RR - 240 Volts A.C.
PO - 115 Volts A.C.	PS - 125 Volts D.C.
NR - 48 Volts D.C.	

- • Alternative voltage rating 200/250V specify RN instead of PN
- • Alternative voltage rating 380/480V specify SE instead of PN
- * Other scales are available.
- ** Specify power supply voltage, for the code, see Power Supply Codes table.

D.C. Voltmeter

LED Digital/Analogue Combination

Product Codes – D.C. Voltmeters - Direct Reading

Digital accuracy ±0.5% ±1 counts analogue accuracy ±1%.

Rating	Scaling*	Catalogue No.
200mV	0-200mV	077-DIVA-KAKA-**
250mV	0-250mV	077-DIVA-KDKD-**
500mV	0-500mV	077-DIVA-KMKM-**
1V	0-1V	077-DIVA-LALA-**
5V	0-5V	077-DIVA-LSLS-**
10V	0-10V	077-DIVA-MTMT-**
15V	0-15V	077-DIVA-NDND-**
30V	0-30V	077-DIVA-NLNL-**
50V	0-50V	077-DIVA-NTNT-**
75V	0-75V	077-DIVA-PBPB-**
80V	0-80V	077-DIVA-PDPD-**
150V	0-150V	077-DIVA-PZPZ-**
300V	0-300V	077-DIVA-RXRX-**
400V	0-400V	077-DIVA-SCSC-**
500V	0-500V	077-DIVA-SFSF-**
600V	0-600V	077-DIVA-SJSJ-**
150-0-150V	150-0-150V	077-DINA-RXRX-**
300-0-300V	300-0-300V	077-DINA-SJSJ-**
600-0-600V	600-0-600V	077-DINA-SUSU-**

For connection diagrams please see Fig. 45 page 62.

Transducer Indicator

Product Codes – Transducer Indicators***

For use with the following transducers:	Catalogue No.
Watts, VArs, Frequency, Power Factor, A.C. Amperes A.C. Volts, Temperature	077-DITA-****-**

For connection diagrams please see Fig. 45 page 62.

Product Codes – Indicators for Tachometer Generators

Rating	Scaling*	Catalogue No.
A.C. or D.C.	FPM or RPM	077-DI2A-****-**

For connection diagrams please see Fig. 45 page 62.

Product Codes – Power Supply

MU - 12 Volts D.C.	PQ - 120 Volts A.C.
Z2 - 130 Volts D.C.	PR - 120 Volts D.C.
BD - 24 Volts D.C.	RR - 240 Volts A.C.
PO - 115 Volts A.C.	PS - 125 Volts D.C.
NR - 48 Volts D.C.	

*	Other scales are available.
**	Specify power supply voltage, for the code, see Power Supply Codes table.
***	Case types 077/078/079 use 10-32 UNF terminals. For M5 screw clamp terminals stipulate case type 075
****	Specify input and scaling

D.C. Ammeter

LED Digital/Analogue Combination

Product Codes – D.C. Ammeters - Shunt Rated

Digital accuracy ±0.5% ±1 counts analogue accuracy ±1%.

Rating	Scaling*	Catalogue No.
50mV-4mA	Scaled to suit standard shunt ratings	077-DIAA-EY
50-0-50mV-2-0-2mA		077-DICA-GB
100-0-100mV		077-DICA-GM
100-0-100mV-2-0-2mA		077-DICA-FM

For connection diagrams please see Fig. 45 page 62.

Product Codes – D.C. Ammeters - Suppressed Zero

Digital accuracy ±0.5% ±1 counts analogue accuracy ±1%

Rating	Scaling*	Catalogue No.
1-5mA	To suit requirements	077-DIAA-GM
4-20mA		077-DIAA-HG
10-50mA		077-DIAA-HZ

For connection diagrams please see Fig. 45 page 62.

Product Codes – D.C. Ammeters – Direct Reading

Digital accuracy ±0.5% ±1 counts analogue accuracy ±1%.

Rating	Scaling*	Catalogue No.
1mA	0-1mA	077-DIAA-FAFA-**
2mA	0-2mA	077-DIAA-FGFG-**
5mA	0-5mA	077-DIAA-FXFY-**
10mA	0-10mA	077-DIAA-GZGZ-**
20mA	0-20mA	077-DIAA-HFHF-**
30mA	0-30mA	077-DIAA-HMHM-**
50mA	0-50mA	077-DIAA-HYHY-**
100mA	0-100mA	077-DIAA-JRJR-**
200mA	0-200mA	077-DIAA-KAKA-**
300mA	0-300mA	077-DIAA-KGKG-**
500mA	0-500mA	077-DIAA-KMKM-**
800mA	0-800mA	077-DIAA-KWKW-**
1A	0-1A	077-DIAA-LALA-**

For connection diagrams please see Fig. 45 page 62.

Product Codes – Power Supply

MU - 12 Volts D.C.	PQ - 120 Volts A.C.
Z2 - 130 Volts D.C.	PR - 120 Volts D.C.
BD - 24 Volts D.C.	RR - 240 Volts A.C.
PO - 115 Volts A.C.	PS - 125 Volts D.C.
NR - 48 Volts D.C.	

* Other scales are available.
** Specify power supply voltage, for the code, see Power Supply Codes table.

A.C. Wattmeter

A.C. Varmeter

Power Factor/Phase Angle Meter

LED Digital/Analogue Combination

Product Codes – A.C. Wattmeters. Accuracy ±1%. Single Phase 50/60Hz

Measured System				Scales	4½" Square Flange Standard Case Catalogue No.
Phases	Wires	Amperes 1 VA max. Burden	Volts 1 VA max. Burden		
1	2	5A	120V	TO SUIT	077-DW5A-QQ**-C6
1	2	5A	240V	TO SUIT	077-DW5A-QS**-C6

For connection diagrams please see Fig. 37 page 61.

Product Codes – A.C. Wattmeters. 2 Element, Transformer Rated. 50/60Hz. Integral Transducer. Accuracy 1.0%

3	3	5A	120V	TO SUIT	077-DW8A-QQ**-C6
3	3	5A	208V	TO SUIT	077-DW8A-QR**-C6

For connection diagrams please see Fig. 38 page 62.

Product Codes – A.C. Wattmeters. 3 Element, Transformer Rated. 50/60Hz. Integral Transducer.

3	4	5A	69V	TO SUIT	077-DW9A-QL**-C6
3	4	5A	120V	TO SUIT	077-DW9A-QQ**-C6

For connection diagrams please see Fig. 39 page 62.

Product Codes – A.C. Varmeters. 2 Element Transformer Rated 50/60Hz. Integral Transducer.

3	3	5A	120V	TO SUIT	077-DXLA-QQ**-C6
3	3	5A	208V	TO SUIT	077-DXLA-QR**-C6

For connection diagrams please see Fig. 40 page 62.

Product Codes – A.C. Varmeters. 2½ Element, Transformer Rated. 50/60Hz. Hi-Q Taut Band. Integral Transducer. Accuracy 1.0%.

3	4	5A	120V	TO SUIT	077-DXUA-QQ**-C6
3	4	5A	208V	TO SUIT	077-DXUA-QR**-C6

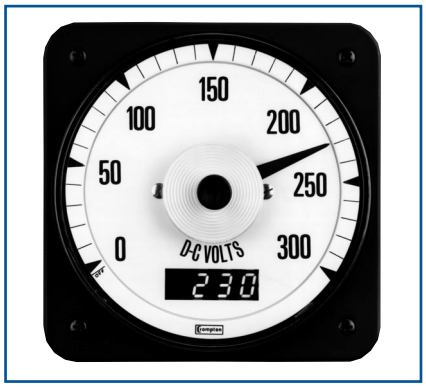
For connection diagrams please see Fig. 41 page 62.

Product Codes – Power Factor & Phase Angle Meters. Accuracy 1.0% (Balanced Loads). Self Contained. 60Hz. Integral Transducer.

1	2	5A	120V	0.5-1-0.5 LAG/LEAD & 60/0/60 DEG	077-DP5A-QQAD-C6
1	2	5A	240V	0.5-1-0.5 LAG/LEAD & 60/0/60 DEG	077-DP5A-QSAD-C6
3	¾	5A	120V	0.5-1-0.5 LAG/LEAD & 60/0/60 DEG	077-DP7A-QQAD-C6
3	¾	5A	208V	0.5-1-0.5 LAG/LEAD & 60/0/60 DEG	077-DP7A-QRAD-C6
3	¾	5A	240V	0.5-1-0.5 LAG/LEAD & 60/0/60 DEG	077-DP7A-QSAD-C6
3	¾	5A	480V	0.5-1-0.5 LAG/LEAD & 60/0/60 DEG	077-DP7A-QTAD-C6

For connection diagrams please see Fig. 42 & 43 page 62.

** Specify C.T. (Current Transformer) and V.T. (Voltage Transformer) ratios if used, and preferred scale at time of ordering.



LED Digital/Analogue Combination

Scale – Options

Options	Option Code
1. Blank, uncalibrated dial (zero and full scale marks in pencil).	SA
2. Red or coloured line or mark (specify position).	SR
3. Coloured zones or segments (specify limits and color(s).	SZ
4. Non-standard caption (other than listed below).	SD
5. Black dial with white figures and pointer.	SB
6. Customer/user logo imprinted on dial.	SM
7. Finely divided scale.	-
8. Standard rating, single unlisted scale	-

Calibration – Options

Options	Option Code
10. Zero-center scale. Not available for A.C. ammeters & voltmeters	-
11. Offset-zero scale wattmeters, varmeters, DC ammeters & voltmeters.	-
12. Calibration to customer specification including special caption.	-
13. Calibration at other than vertical, specify required angle from vertical.	CM
14. Non-listed ratings.	-
15. Temperature calibration, other than 23°C ambient.	CT
16. a) Calibration at 400Hz. b) Calibration to other specific frequencies between 25 and 500Hz.	C4
17. Potentiometer, externally mounted ±10% range adjustment.	
18. Suppressed zero other than listed. D.C. only.	RA
19. Heavily damped movement.	PD

Construction – Options

Options	Option Code
20. Anti-glare window.	BR
21. Internal illumination Specify 6, 12, 24 or 36V D.C.	EL
22. Neoprene panel gasket.	MG
23. Red manual set pointer.	ER
25. Coloured bezel.	FA
26. Hermetically sealed case.	

Connection Diagrams

Fig. 1 Model 077-12P
Phase Sequence Indicator 3 phase 3 or 4 wire systems.

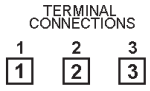


Fig. 2 Model 077-137
360° Dynamometer Power Factor Indicator Single Phase.

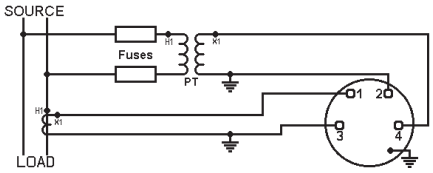


Fig. 3 Model 077-131
360° deg Dynamometer Power Factor Indicator 3 Phase 3 or 4 Wire Balanced Load (3 Currents 1 Voltage).

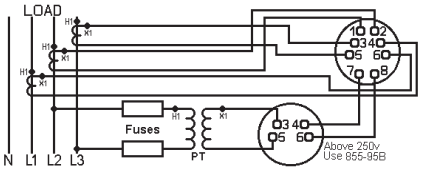


Fig. 4 Models 077-132, 078-132J
360° Dynamometer Power Factor Indicator 3 Phase 3 or 4 Wire Balanced Load (1 Current 3 Voltages).

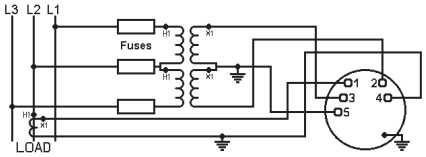


Fig. 5 Model 078-132B
360° Dynamometer Power factor Indicator Indicator 3 Phase 3 or 4 Wire Balanced Load (1 Current 3 Voltages).

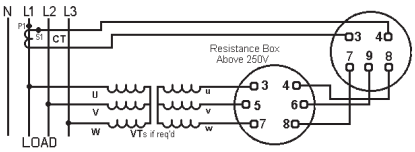


Fig. 6 Models 077-136, 077-136A, 078-136J
360° Dynamometer Power factor Indicator 3 Phase 3 or 4 Wire Unbalanced Load.

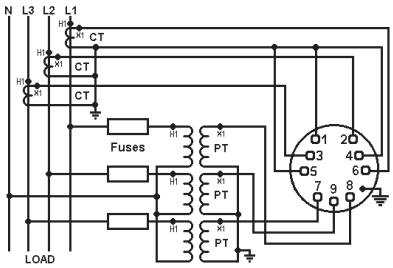


Fig. 7 Model 078-136B
360° Dynamometer Power factor Indicator 3 Phase 3 or 4 Wire Unbalanced Load.

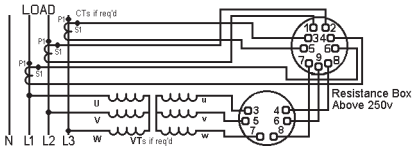


Fig. 8 Models 077-14A
360° LED Synchroscope.

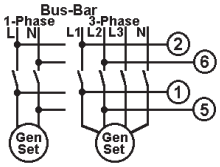
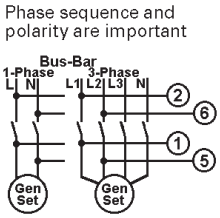


Fig. 9 Models 077-14D, 077-14G, 077-14H, 077-14L
360° LED Synchroscope and Synchro Check relay.



Connection Diagrams

Fig. 10 Models 077-144, 077-145
077-146, 077-147, 078-144J, 078-145J
078-146J, 078-147J, 079-144, 079-145
079-146
360 Degree Dynamometer Synchroscope.

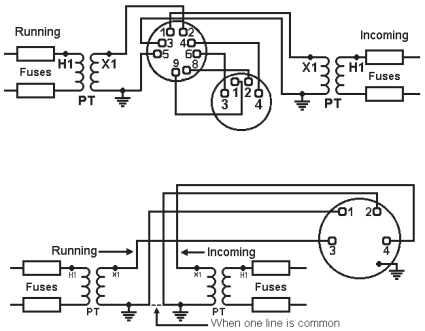


Fig. 11 Models 078-144B, 078-145B
078-146B, 078-147B
360 Degree Dynamometer Synchroscope.

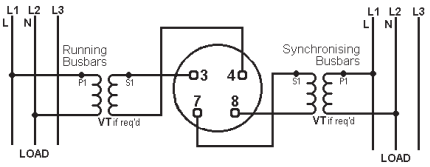


Fig. 12 Model 077-TFU
Power Factor Meter 3 Phase 3 Wire
Unbalanced Load.

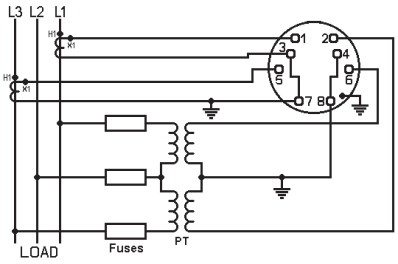


Fig. 13 Models 077-425, 078-425J
079-425
Electronic Phase Angle Meter Single
Phase.

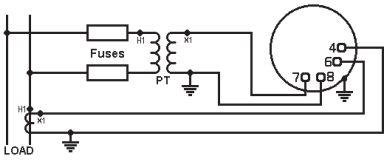


Fig. 14 Model 078-425B
Electronic Phase Angle Meter Single
Phase.

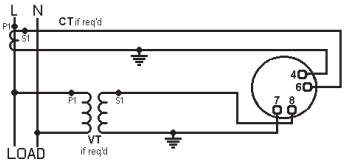


Fig. 15 Models 075-427, 077-427
078-427J, 079-427
Electronic Phase Angle Meter 3 phase 3
or 4 wire Balanced Load.

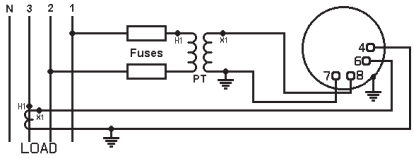


Fig. 16 Model 078-427B
Electronic Phase Angle Meter 3 phase 3
or 4 wire Balanced Load.

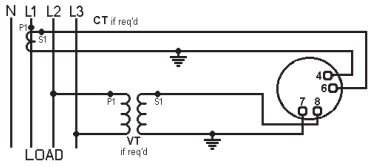
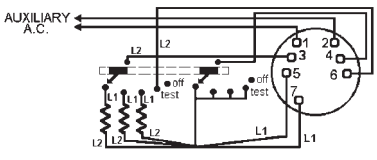


Fig. 17 Models 077-45R, 078-45R
Temperature Indicator for Resistance
Temperature Detector (RTD).



NOTE
All L1 Leads must be within 0.02 ohms of the same resistance
L1 Leads should not exceed 3 ohms each
L2 Leads should not exceed 0.02 ohms each

Fig. 18 Model 077-45T
Temperature Indicator for Thermocouple
Detector.

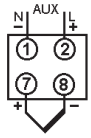
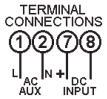


Fig. 19 Models 077-KHA, 078-KHA
AC Kilowatts/Kilowatthours (Transducer)
Indicator.



Connection Diagrams

Fig. 20 Model 077-45P
Tap Position Indicator.

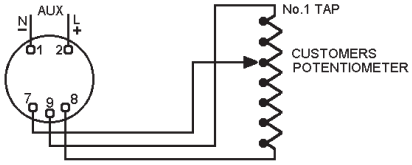


Fig. 21 Models 077-215, 077-KHB
078-215J, 078-KHBJ, 079-215
Wattmeter Single Phase.

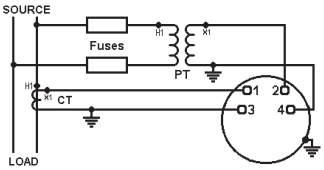


Fig. 22 Model 078-215B, 078-KHBB
Wattmeter Single Phase.

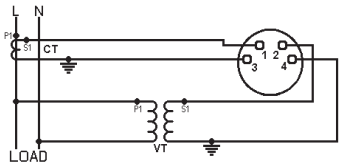


Fig. 23 Models 077-216, 078-216J
Wattmeter 3 Phase 3 Wire Balanced Load.

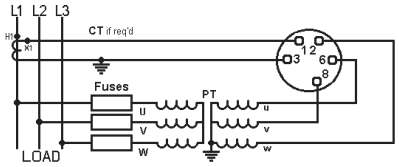


Fig. 24 Model 078-216B
Wattmeter 3 Phase 3 Wire Balanced Load.

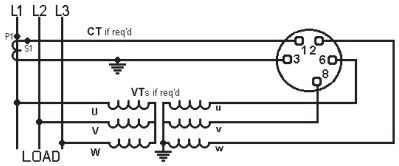


Fig. 25 Models 077-218, 077-KHE
078-218J, 078-KHEJ, 079-218
Wattmeter 3 Phase 3 Wire Unbalanced Load.

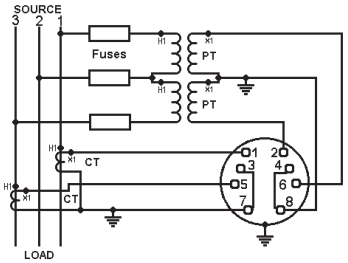


Fig. 26 Models 078-218B, 078-KHEB
Wattmeter 3 Phase 3 Wire Unbalanced Load.

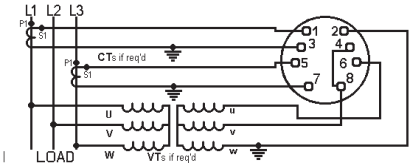


Fig. 27 Model 077-21D
Wattmeter 3 Phase 4 Wire Balanced Load.

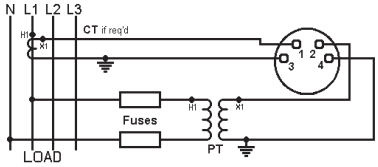
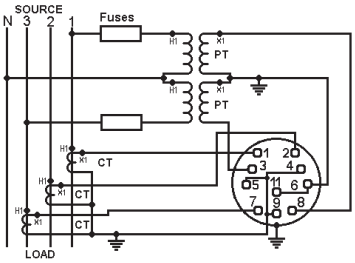


Fig. 28 Models 077-219, 077-KHG
078-219J, 078-KHGJ, 079-219
Wattmeter 3 Phase 4 Wire Unbalanced Load.



Connection Diagrams

Fig. 29 Models 078-219B, 078-KHGB
Wattmeter 3 Phase 4 Wire Unbalanced Load.

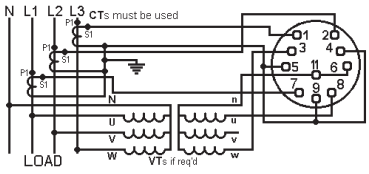


Fig. 30 Models 077-21B
Wattmeter 3 Phase 3 Wire Balanced Load 2 Reverse Connected CTs.

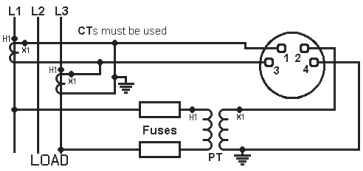


Fig. 31 Model 077-21F
Wattmeter 3 Phase 4 Wire Unbalanced Load Delta Connected CTs.

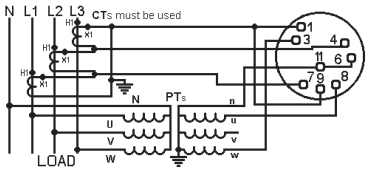


Fig. 32 Models 077-31L, 078-31LJ
Varmeter 3 Phase 3 Wire Unbalanced Load.

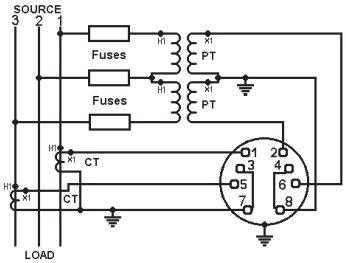


Fig. 33 Models 077-315
Varmeter 3 Phase 3 or 4 Wire Balanced Load.

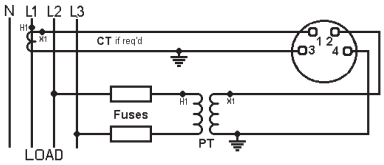


Fig. 34 Model 077-319
Varmeter 3 Phase 4 Wire Unbalanced Load.

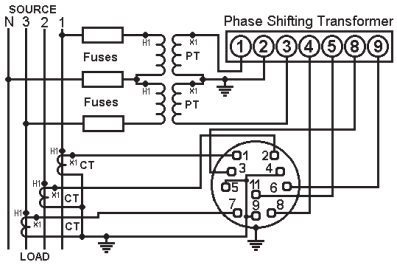


Fig. 35 Models 077-31U, 077-KXG
078-31U, 079-31U
Varmeter 3 Phase 4 Wire Unbalanced Load.

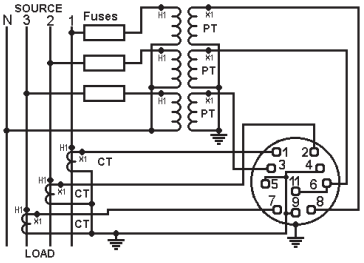


Fig. 36 Model 077-31F
Varmeter 3 Phase 4 Wire Unbalanced Load Delta Connected CTs.

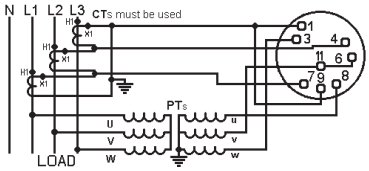
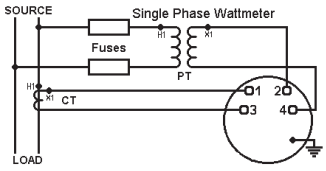


Fig. 37 Model 077-DW5
LED Digital/Analogue Wattmeter Single Phase.



Connection Diagrams

Fig. 38 Model 077-DW8
LED Digital/Analogue Wattmeter 3 Phase 3 Wire Unbalanced Load.

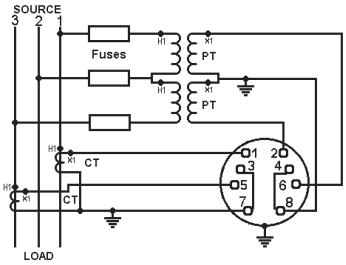


Fig. 39 Model 077-DW9
LED Digital/Analogue Wattmeter 3 Phase 4 Wire Unbalanced Load.

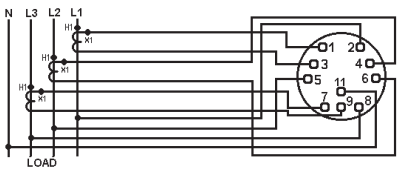


Fig. 40 Model 077-DXL
LED Digital/Analogue Varmeter 3 Phase 3 Wire Unbalanced Load.

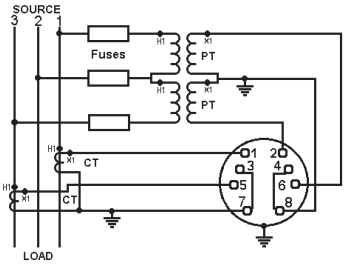


Fig. 41 Model 077-DXU
LED Digital/Analogue Varmeter 3 Phase 4 Wire Unbalanced Load.

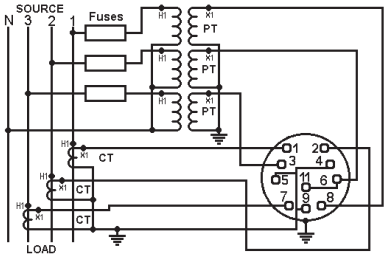


Fig. 42 Model 077-DP5
LED Digital/Analogue Phase Angle Meter Single Phase.

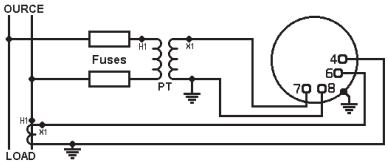


Fig. 43 Model 077-DP7
LED Digital/Analogue Phase Angle Meter 3 Phase 3 or 4 Wire Balanced Load.

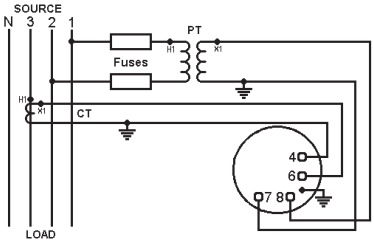


Fig. 44 Model 077-DZL
LED Digital/Analogue Frequency Meter.

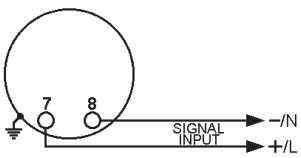


Fig. 45 Models 077-DI2, 077-DIA
077-DIB, 077-DIC, 077-DIN, 077-DIT
077-DIV, 077-DIW
LED Digital/Analogue Meter.

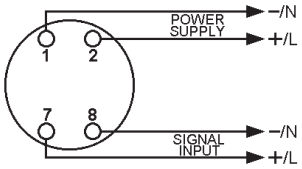
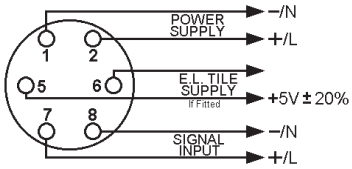


Fig. 46 Models 077-DA2, 077-DAA
077-DAB, 077-DAK, 077-DAT
077-DAV, 077-DAW
LCD Digital/Analogue Meter.



128 Series Edgewise Meters

Features

Rugged Hi-Q taut-band suspension

Accuracy class 1.5

Shock tested to 50G

Numerous units can stacked together in a single panel cut out

Internal illumination option

Benefits

Meets all the requirements of ANSI-C39.1 (1981)

Panel space saving

Parallax error-free platform dials

Customised options and features

Applications

Switchgear

Distribution systems

Generator sets

Control panels

Energy management

Building management

Utility power monitoring

Process control

Motor control

Marine

Approvals

ABS American Bureau of Shipping approvals 93-LD 17806-X

6" Edgewise meters provide a high ratio of scale length to a panel area. Several units can be stacked together in a single rectangular panel cut-out to facilitate adjacent comparisons and the mounting arrangement is as simple as possible. Instruments are available to measure A.C. or D.C. current and voltage, Watts, VArs, Frequency, Power Factor, Speed or any other parameter that can be converted to a D.C. analogue signal. Dimensions comply with ANSI C39.1.

Description

The shatterproof polycarbonate case is a single moulding which has no joints at the panel front and the enclosure is splashproof. The materials used for case and terminal plate tray are non drip self extinguishing engineering thermoplastics which meet the U.S. Bureau of Underwriters specification Grade SE1. Case and bezels are finished matt black, aluminium silver is available if specified.

Movements are available to measure most electrical quantities. They are fully self-shielding and unaffected by stray magnetic fields, the panel thickness or the material used. The high-torque system and large clearances between fixed and moving elements enhance their reliability and robustness which is inherent in the Hi-Q taut band suspension system.

Two simple screw clamps secure the instrument so that only one cut out is required in the panel. Panel thickness from 0.073 inches (1.5mm) to 0.375" (10mm) is acceptable. Any number of units may be stacked flush against each other horizontally or vertically on one cut-out, In this arrangement, the detachable side bezels which conceal the cut edge of the panel are attached only to the outside faces of end units.

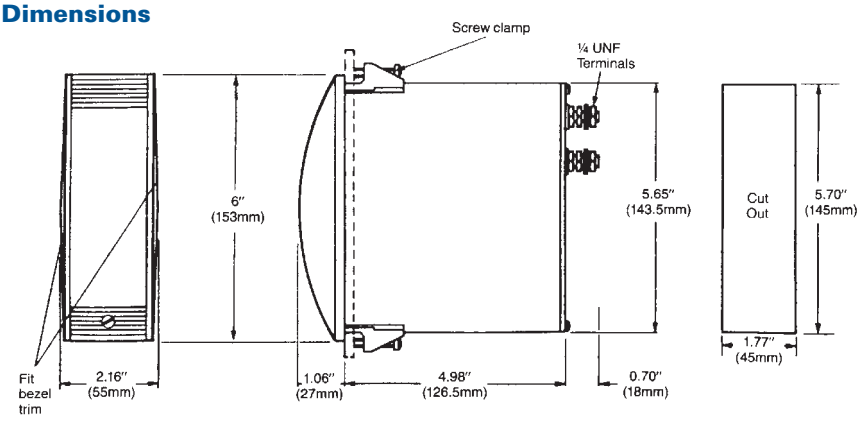
Specification

Performance:	U.S.A. specification ANSI C39.1
Accuracy:	Iron vane and moving coil: 1.5% Moving Coil Rectifier: 2.5%
Overload Capacity:	1.2 times rated current or voltage for 2 hours. 10 times rated current or 2 times rated voltage for 5 seconds.
Movements:	Self shielding Hi-Q taut band 60° rotation.
Shock:	Type tested to 50G
Panel Material:	No restrictions
Dielectric Test:	2kV AC for 1 minute, case to terminals.
Terminals:	¼ UNF terminals
Ambient Temperature:	Calibrated to 23°C. Other values may be specified
Operating Temperature:	-10°C to +55°C (14 to 131°F)
Enclosure Code:	IP54 to BS5490/IEC529 (NEMA 3S)
Case and Base:	Matt black base UL94V1. Polycarbonate cover.
Bezel:	Matt black as standard. Aluminium silver available
Bezel Window:	Shatterproof polycarbonate
Installation:	A panel thickness from 0.073" (1.5mm) to 0.375" (10mm) is acceptable
Fixing on Panel:	Two simple screw clamps
Mounting Position:	Horizontal or vertical mounting. Any number of units may be stacked against each other.
Approvals:	EMC and LVD. ABS American Bureau of Shipping approvals.

Optional Features

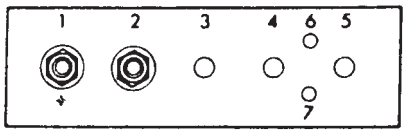
Construction	Option code
1. Internal illumination	EL
2. Anti-glare window	BR
3. Aluminium finish to case (standard is black)	FS
4. Other trim colours (specify)	-
5. Additional sealing	-
Scale Variations	
1. Spare black dial and legend plate	SA
2. Black scale, white markings and pointer	SB
3. Coloured index marker on scale	SL
4. Coloured zone(s)	SZ
5. Standard scale with non-standard caption or legend	SD
Ratings and Calibration	
1. 1 percent accuracy (D.C. only)	C1
2. Calibrated for 400Hz	C4
3. Heavily damped movement	PD
4. Special calibration to customer specifications	SX
5. Calibration angle other than standard	CM
6. Externally adjustable calibration potentiometer	EP

Dimensions

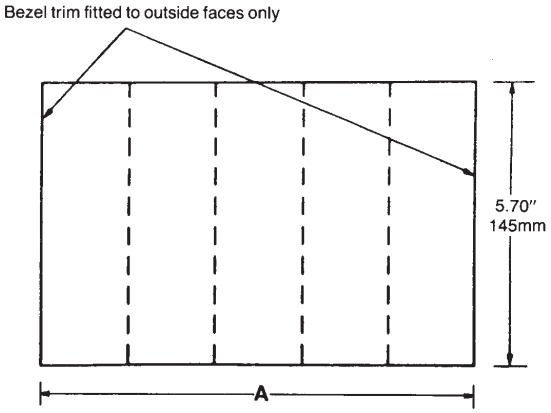


Terminal Plate Viewed from Rear

M2.5 terminals fitted to positions 6 and 7 when illumination option fitted.



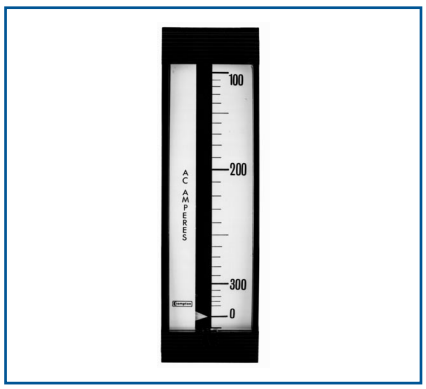
Stack Mounting Cut-Out



Dimensions A

Units	inches	mm
1	1.77	45
2	3.50	89
3	5.24	133
4	6.97	177
5	8.70	221
6	10.43	265
7	12.16	309
8	13.89	353

Net Weight: 1lb. 2oz. - 0.51Kg



A.C. Ammeter

A.C. Ammeter

Product Codes – 60Hz, Iron Vane Self Contained Burden 1VA - Accuracy ±1.5%

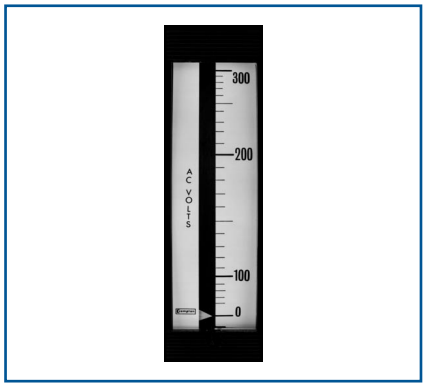
Rating	Scaling	Transformer	Horizontal Catalogue No.	Vertical Catalogue No.
1A	0-1A	-	128-07AA-LALA-C6	128-07CA-LALA-C6
3A	0-3A	-	128-07AA-LJLJ-C6	128-07CA-LJLJ-C6
5A	0-5A	-	128-07AA-LSLS-C6	128-07CA-LSLS-C6
10A	0-10A	-	128-07AA-MTMT-C6	128-07CA-MTMT-C6
15A	0-15A	-	128-07AA-NDND-C6	128-07CA-NDND-C6
20A	0-20A	-	128-07AA-NGNG-C6	128-07CA-NGNG-C6
30A	0-30A	-	128-07AA-NLNL-C6	128-07CA-NLNL-C6

Product Codes – Transformer Rated

5A	0-10A	10/5	128-07AA-LSMT-C6	128-07CA-LSMT-C6
5A	0-15A	15/5	128-07AA-LSND-C6	128-07CA-LSND-C6
5A	0-20A	20/5	128-07AA-LSNG-C6	128-07CA-LSNG-C6
5A	0-25A	25/5	128-07AA-LSNJ-C6	128-07CA-LSNJ-C6
5A	0-30A	30/5	128-07AA-LSNL-C6	128-07CA-LSNL-C6
5A	0-40A	40/5	128-07AA-LSNP-C6	128-07CA-LSNP-C6
5A	0-50A	50/5	128-07AA-LSNT-C6	128-07CA-LSNT-C6
5A	0-75A	75/5	128-07AA-LSPB-C6	128-07CA-LSPB-C6
5A	0-100A	100/5	128-07AA-LSPK-C6	128-07CA-LSPK-C6
5A	0-150A	150/5	128-07AA-LSPZ-C6	128-07CA-LSPZ-C6
5A	0-200A	200/5	128-07AA-LSRL-C6	128-07CA-LSRL-C6
5A	0-300A	300/5	128-07AA-LSRX-C6	128-07CA-LSRX-C6
5A	0-400A	400/5	128-07AA-LSSC-C6	128-07CA-LSSC-C6
5A	0-500A	500/5	128-07AA-LSSF-C6	128-07CA-LSSF-C6
5A	0-600A	600/5	128-07AA-LSSJ-C6	128-07CA-LSSJ-C6
5A	0-800A	800/5	128-07AA-LSSN-C6	128-07CA-LSSN-C6
5A	0-1KA	1000/5	128-07AA-LSSS-C6	128-07CA-LSSS-C6
5A	0-1.2KA	1200/5	128-07AA-LSSU-C6	128-07CA-LSSU-C6
5A	0-1.5KA	1500/5	128-07AA-LSTC-C6	128-07CA-LSTC-C6
5A	0-2KA	2000/5	128-07AA-LSTM-C6	128-07CA-LSTM-C6
5A	0-3KA	3000/5	128-07AA-LSUA-C6	128-07CA-LSUA-C6
5A	0-4KA	4000/5	128-07AA-LSUE-C6	128-07CA-LSUE-C6

Product Codes – Moving Coil Rectified

1A	-	-	128-10BA-LALA-C6-HL	128-10BA-LALA-C6-VL



A.C. Voltmeter

A.C. Voltmeter

Product Codes – 60Hz, Iron Vane Self Contained Burden 3VA - Accuracy ±1.5%

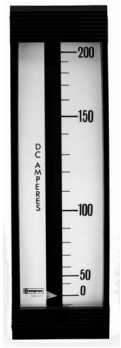
150V	0-150V	-	128-07VA-PZPZ-C6	128-07PA-PZPZ-C6
300V	0-300V	-	128-07VA-RXRX-C6	128-07PA-RXRX-C6
500V	0-500V	-	128-07VA-SFSF-C6	128-07PA-SFSF-C6
600V	0-600V	-	128-07VA-SJSJ-C6	128-07PA-SJSJ-C6

Product Codes – Transformer Rated

150V	0-300V	240/120	128-07VA-PZRX-C6	128-07PA-PZRX-C6
150V	0-600V	480/120	128-07VA-PZSJ-C6	128-07PA-PZSJ-C6
150V	0-750V	600/120	128-07VA-PZSM-C6	128-07PA-PZSM-C6
150V	0-3KV	2400/120	128-07VA-PZUA-C6	128-07PA-PZUA-C6
150V	0-5.25KV	4200/120	128-07VA-PZUL-C6	128-07PA-PZUL-C6
150V	0-6KV	4800/120	128-07VA-PZUP-C6	128-07PA-PZUP-C6
150V	0-9KV	7200/120	128-07VA-PZUY-C6	128-07PA-PZUY-C6
150V	0-15KV	12,000/120	128-07VA-PZW4-C6	128-07PA-PZW4-C6
150V	0-18KV	14,400/120	128-07VA-PZWD-C6	128-07PA-PZWD-C6

Product Codes – Moving Coil Rectified

600V	-	-	128-10WA-SJSJ-C6-HL	128-10WA-SJSJ-C6-VL



D.C. Ammeter

D.C. Ammeter

Product Codes – Shunt Rated - Accuracy ±1.5%

Rating	Scaling	Horizontal Catalogue No.	Vertical Catalogue No.
50mV	0-10A	128-10AA-ECMT	128-10GA-ECMT
50mV	0-20A	128-10AA-ECNG	128-10GA-ECNG
50mV	0-30A	128-10AA-ECNL	128-10GA-ECNL
50mV	0-40A	128-10AA-ECNP	128-10GA-ECNP
50mV	0-60A	128-10AA-ECNW	128-10GA-ECNW
50mV	0-80A	128-10AA-ECPD	128-10GA-ECPD
50mV	0-100A	128-10AA-ECPK	128-10GA-ECPK
50mV	0-200A	128-10AA-ECRL	128-10GA-ECRL
50mV	0-300A	128-10AA-ECRX	128-10GA-ECRX
50mV	0-400A	128-10AA-ECSC	128-10GA-ECSC
50mV	0-500A	128-10AA-ECSF	128-10GA-ECSF
50mV	0-600A	128-10AA-ECSJ	128-10GA-ECSJ
50mV	0-800A	128-10AA-ECSN	128-10GA-ECSN
50mV	0-1000A	128-10AA-ECSS	128-10GA-ECSS
50mV	0-1500A	128-10AA-ECB2	128-10GA-ECB2
50-0-50mV	TO SUIT	128-10CA-GB**-HL	128-10CA-GB**-VL
100mV	TO SUIT	128-10AA-GB**	128-10GA-GB**
100-0-100mV	TO SUIT	128-10CA-GJ**-HL	128-10CA-GJ**-VL

Product Codes – Moving Coil - Accuracy ±1.5%

200µA	0-200µA	128-10AA-EAEA	–
500µA	0-500µA	128-10AA-EMEM	–
800µA	0-800µA	128-10AA-EWEW	–
1mA	0-1mA	128-10AA-FAFA	128-10GA-FAFA
2mA	0-2mA	128-10AA-FGFG	–
5mA	0-5mA	128-10AA-FXFX	–
10mA	0-10mA	128-10AA-HAHA	–
50mA	0-50mA	128-10AA-HXHX	–
100mA	0-100mA	128-10AA-JRJR	–
200mA	0-200mA	128-10AA-KAKA	–
500mA	0-500mA	128-10AA-KMKM	–
800mA	0-800mA	128-10AA-KWKW	–
1A	0-1A	128-10AA-LALA	–
2A	0-2A	128-10AA-LELE	–
5A	0-5A	128-10AA-LSLS	–
10A	0-10A	128-10AA-MTMT	–
15A	0-15A	128-10AA-NDND	–
20A	0-20A	128-10AA-NGNG	–
30A	0-30A	128-10AA-NLNL	–

D.C. Voltmeter

Product Codes – 1000Ω / Volt - Moving Coil

1V	0-1V	128-10VA-LALA	128-10PA-LALA
5V	0-5V	128-10VA-LSLS	128-10PA-LSLS
15V	0-15V	128-10VA-NDND	128-10PA-NDND
30V	0-30V	128-10VA-NLNL	128-10PA-NLNL
50V	0-50V	128-10VA-NTNT	128-10PA-NTNT
80V	0-80V	128-10VA-PDPD	128-10PA-PDPD
150V	0-150V	128-10VA-PZPZ	128-10PA-PZPZ
300V	0-300V	128-10VA-RXRX	128-10PA-RXRX
600V	0-600V	128-10VA-SJSJ	128-10PA-SJSJ
150-0-150V	150-0-150V	128-10NA-RXRX-HL	128-10NA-RXRX-VL
300-0-300V	300-0-300V	128-10NA-SJSJ-HL	128-10NA-SJSJ-VL

Product Codes – D.C. Volts - Suppressed Zero

1-5V	TO SUIT	128-10SA-LM**-HL	128-10SA-LM**-VL

D.C. Milliammeter

Product Code – Suppressed Zero

Rating	Scaling	Horizontal Catalogue No.	Vertical Catalogue No.
4-20mA	TO SUIT	128-10RA-HG**-HL	128-10RA-HG**-VL

Transducers Indicator

Product Codes – (1mA D.C. Rated)

Rating	Scaling	Horizontal Catalogue No.	Vertical Catalogue No.
Volts	TO SUIT	128-108A-FA**-HL	128-108A-FA**-VL
Amps	TO SUIT	128-109A-FA**-HL	128-109A-FA**-VL
Watts	TO SUIT	128-105A-FA**-HL	128-105A-FA**-VL
VArs	TO SUIT	128-106A-FA**-HL	128-106A-FA**-VL
Hertz	TO SUIT	128-103A-FA**-HL	128-103A-FA**-VL
Power Factor	TO SUIT	128-104A-FA**-HL	128-104A-FA**-VL
Speed	TO SUIT	128-102A-FA**-HL	128-102A-FA**-VL

Temperature Indicator

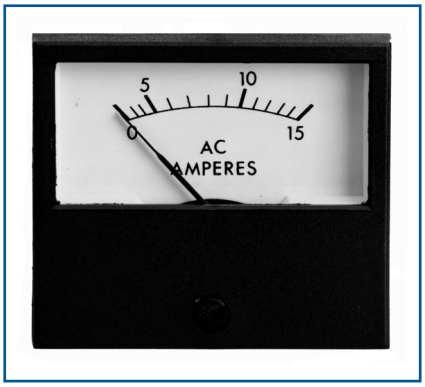
Product Codes

Rating	Scaling	Horizontal Catalogue No.	Vertical Catalogue No.
Thermocouple inputs J and K	TO SUIT	128-45T	128-45T

Notes for Ordering

1. Only one scale, one set of figures and one legend can be supplied.
2. Specify horizontal or vertical mounting at time of ordering.
3. Where asterisks (**) are shown in the catalogue number, describe scale detail.

549 Series Panel Meters



Compact panel meters designed to fit standard 17/32" switch knock outs. The range offers high accuracy AC and DC ammeters and voltmeters, elapsed time meters and impulse counters.

Specification

Enclosure Code:	IP42 (IEC 529)
System Frequencies:	A.C. Ammeters: 50, 60 or 400Hz A.C. Voltmeters: 50 or 60Hz Elapsed Time Meter: 50 or 60Hz
System Voltage:	Elapsed Time Meter: 110/130V A.C., 200/250V A.C., 6 or 12V D.C.
Input Ratings Available:	A.C. Ammeter: 50mA to 5A (self contained) extendible to 50A with external wound primary CT A.C. Voltmeter: 30 to 600V D.C. Ammeter: 100µA to 20mA D.C. Voltmeter: 50mV to 600V
Scale:	Angle: 90 degrees. Length: 1 inch (26mm)
Operating Temperature:	-10°C to +55°C (15 to 130°F).
Bezel Window:	Toughened glass
Fixing on Panel:	Simple clamp fixing
Approvals:	EMC and LVD, ABS American Bureau of Shipping

Features

Compact size

Fits standard 17/32 inch switch knock out

Toughened glass window

A.C. and D.C. ammeters and voltmeters available

"Hours Run" and impulse counters available

Benefits

Simple clamp fixing

Easy installation on replacement

Panel space saving

Customised options and features

Applications

Switchgear

Distribution systems

Generator sets

Control panels

Energy management

Building management

Utility power monitoring

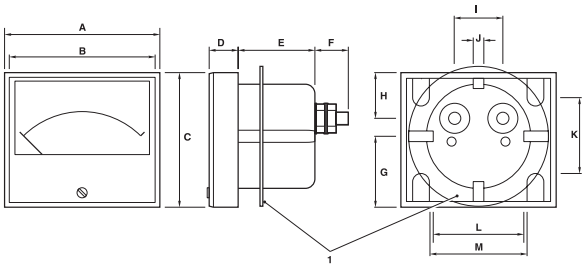
Process control

Motor control

Approvals

ABS American Bureau of Shipping approvals 93-LD 17806-X

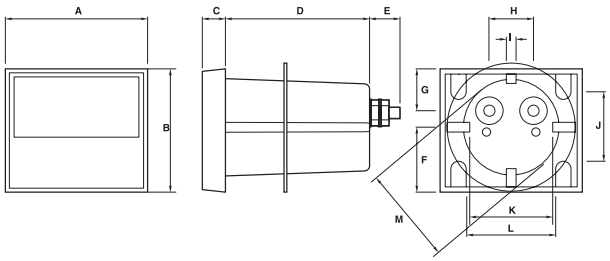
Dimensions



Retaining Clip

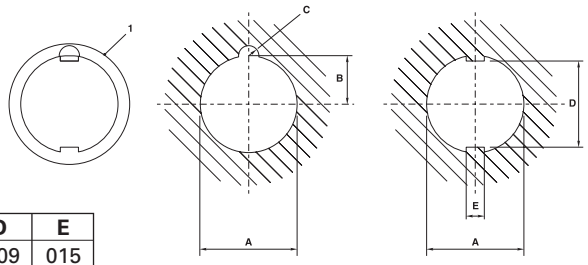
	A	B	C	D	E*	F	G	H	I	J	K	L	M
in	1.81		1.56	0.34	0.91	0.51	0.85	0.24	0.51	0.16	1.08	1.08	1.18
mm	46		39.6	8.6	23	13	21.6	6.1	13	4	27.5	27.5	30

Elapsed Time Meters

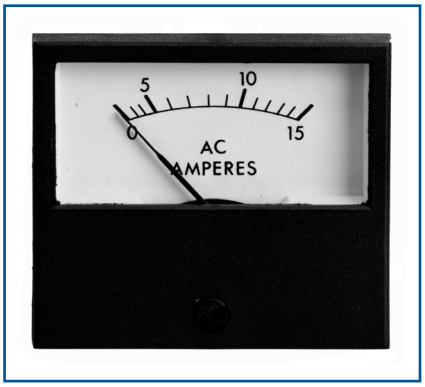


	A	B	C	D	E	F	G	H	I	J	K	L	M
in	1.84	1.59	0.34	1.75	0.51	0.86	0.24	0.51	0.16	1.08	1.08	1.18	1.18
mm	46.8	40.4	8.6	44.3	13	21.9	6	13	4.1	27.5	27.5	30	30

Panel cut-out



	A	B	C	D	E
in	1.2	0.57	0.25	1.09	015
mm	30.5	14.5	6.4	27.8	3.9



A.C. Ammeter

A.C. Ammeter

Product Codes – Self Contained rating 50mA for use with separate wound primary current transformer

Input	Scaling	Catalogue No.
50mA	0-1A	549-78AA-HXLA
50mA	0-5A	549-78AA-HXLS
50mA	0-7.5A	549-78AA-HXMF
50mA	0-10A	549-78AA-HXMT
50mA	0-15A	549-78AA-HXND
50mA	0-20A	549-78AA-HXNG
50mA	0-30A	549-78AA-HXNL
50mA	0-40A	549-78AA-HXNP
50mA	0-50A	549-78AA-HXNT

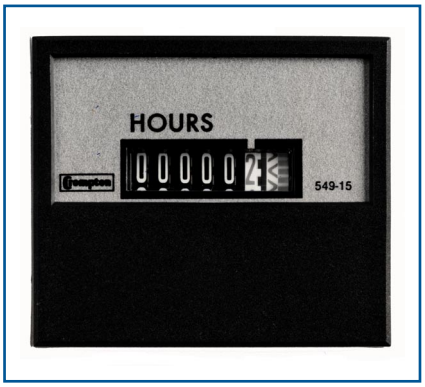
Product Codes – For use with external current transformer. Other scales are available.

Input	Scaling	Catalogue No.
5A	0-50A	549-78AA-LSNT
5A	0-60A	549-78AA-LSNW
5A	0-75A	549-78AA-LSPB
5A	0-80A	549-78AA-LSPD
5A	0-100A	549-78AA-LSPK
5A	0-150A	549-78AA-LSPZ
5A	0-200A	549-78AA-LSRL
5A	0-300A	549-78AA-LSRX
5A	0-400A	549-78AA-LSSC
5A	0-500A	549-78AA-LSSF
5A	0-600A	549-78AA-LSSJ
5A	0-800A	549-78AA-LSSN
5A	0-1000A	549-78AA-LSSS
5A	0-1200A	549-78AA-LSSU
5A	0-1500A	549-78AA-LSTC
5A	0-1600A	549-78AA-LSTE
5A	0-2000A	549-78AA-LSTM

A.C. Voltmeter

Product Codes – Other scales are available.

Input	Scaling	Catalogue No.
150V	0-150V	549-78VA-PZPZ
150V	0-300V	549-78VA-PZRX
150V	0-600V	549-78VA-PZSJ
150V	0-750V	549-78VA-PZSM



Elapsed Time Meter

Elapsed Time Meter

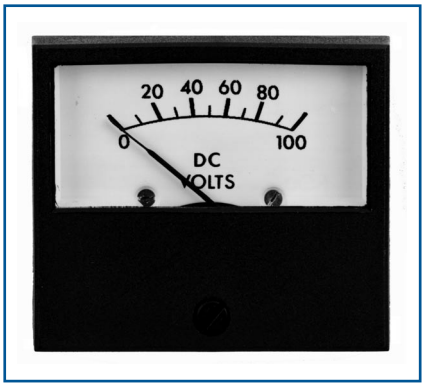
Product Codes

Input	Scale	Catalogue No.
110/130V A.C., 50Hz	99999.99	549-155A-PNC5-ZH
110/130V A.C., 60Hz	99999.99	549-156A-PNC6-ZH
200/250V A.C., 50Hz	99999.99	549-155A-RNC5-ZH
200/250V A.C., 60Hz	99999.99	549-156A-RNC6-ZH
6V D.C., D.C.	99999.99	549-151A-LWZH
12V D.C., D.C.	99999.99	549-151A-MUZH

Impulse Counters

Product Codes

Input	Scale	Catalogue No.
120V A.C., 60Hz	999999	549-257A-PQC6



D.C. Voltmeter

D.C. Ammeter

Product Codes – For use with current shunts

Input	Scaling	Catalogue No.
0-50mV	0-5	549-80AA-ECLS
0-50mV	0-10	549-80AA-ECMT
0-50mV	0-15	549-80AA-ECND
0-50mV	0-20	549-80AA-ECNG
0-50mV	0-30	549-80AA-ECNL
0-50mV	0-50	549-80AA-ECNT
0-50mV	0-80	549-80AA-ECPD
0-50mV	0-100	549-80AA-ECPK
0-50mV	0-150	549-80AA-ECPZ
0-50mV	0-200	549-80AA-ECRL
0-50mV	0-250	549-80AA-ECRS
0-50mV	0-300	549-80AA-ECRX
0-50mV	0-400	549-80AA-ECSC
0-50mV	0-500	549-80AA-ECSF
0-50mV	0-600	549-80AA-ECSJ
0-50mV	0-800	549-80AA-ECSN
0-50mV	0-1000	549-80AA-ECSS
0-50mV	0-1200	549-80AA-ECSU
0-50mV	0-1500	549-80AA-ECTC
0-50mV	0-2000	549-80AA-ECTM

Product Codes – Direct Connected

Input	Scaling	Catalogue No.
0-100µA	TO SUIT	549-80AA-DR**
0-1mA	TO SUIT	549-80AA-FA**
0-20mA	TO SUIT	549-80AA-HF**
4-20mA	TO SUIT	549-80AA-HG*

D.C. Voltmeter

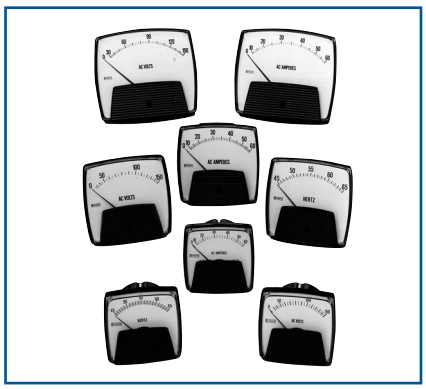
Product Code

Input	Scaling	Catalogue No.
0-50mV to 0-150V	TO SUIT	549-80VA-****

** Specify scale required
**** Specify input and scale required

100mV shunt rated D.C. ammeters are available, replace the code EC with the code GB

Saxon Indicators



A range of 2½", 3½" and 4½" surface mount panel meters utilising pivot and jewel mechanisms and offering IP54 protection. The range offers iron vane and moving coil AC and DC ammeters and voltmeters, elapsed time and frequency meters designed to perform in demanding environmental applications.

Features

Three compact case sizes

Withstands high levels of shock, vibration, dirt and humidity

Pivot and jewel mechanisms

Benefits

Complies with ANSI C39.1 (IEC 51)

IP54 (NEMA 3) protection

Instruments comply with BSEN61010-1 and meet IEC414 (BS5458)

Dielectric Test (2600V for 1min)

Applications

Switchgear

Distribution systems

Generator sets

Control panels

Energy management

Building management

Utility power monitoring

Process control

Motor control

Approvals

UL approvals file no. E203000

Specification – Elapsed Time Meter and Frequency Meter

Accuracy:	0.15 = 60Hz, 1.25 = 400Hz, 0.15 = 50Hz, 0.25 = 55Hz
Voltage:	110/130V, 200/250V
Frequency:	50Hz or 60Hz
Burden:	4VA Maximum

Specification – Moving Iron A.C. Ammeter & Voltmeter

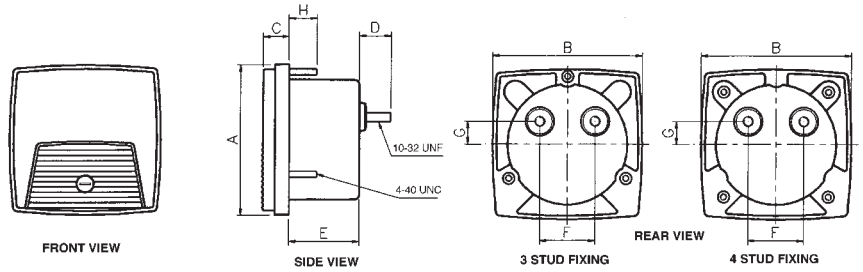
Accuracy:	±2%
Rating:	Ammeters: 1 to 30A Voltmeters: 10V to 600V
Overload:	Ammeters: x1.2 for 2 hours, x10 for 5 seconds Voltmeters: x1.2 for 2 hours, x2 for 5 seconds
Burden:	Ammeters: 0.5VA Voltmeters: 4.5VA maximum

Specification – Moving Coil D.C. Ammeter & Voltmeter

Accuracy:	±2%
Rating:	Ammeters: 100µA to 30A Voltmeters: 50mV - 600V
Operating Temp:	-20°C to 60°C (-4°F to 140°F)
Storage Temp:	-30°C to 70°C (-22°F to 158°F)

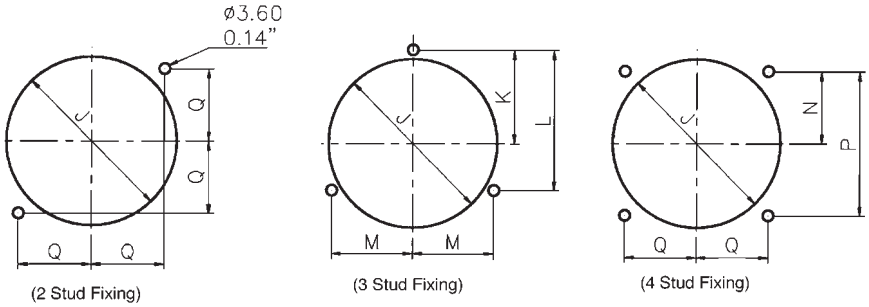
Dimensions

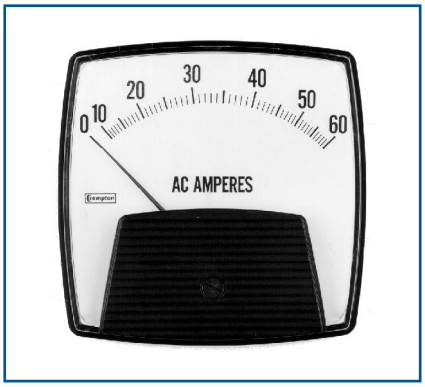
Specify number of fixing studs when ordering 2½" and 3½" meters. 4½" meters are supplied with 4 fixing studs.



		A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
2 1/2	mm	68.6	68.6	11.8	14.6	32.0	25.4	10.4	12.7	55.9	31	46.5	26.9	23.9	47.8	23.9
	inch	2.70	2.70	0.46	0.57	1.26	1.00	0.41	0.50	2.20	1.22	1.83	1.06	0.94	1.88	0.94
3 1/2	mm	88.9	88.9	11.8	14.6	36.0	25.4	10.4	12.7	69.9	40.2	60.3	34.8	28.5	57.0	28.5
	inch	3.5	3.5	0.46	0.57	1.42	1.00	0.41	0.50	2.75	1.58	2.37	1.37	1.12	2.24	1.12
4 1/2	mm	112.0	123.2	12.7	16.3	30.5	28.4	0.38	12.7	70.9				51.6	90.4	50.8
	inch	4.41	4.85	0.50	0.64	1.20	1.12	0.41	0.50	2.78				2.03	3.56	2.00

Panel cut-out





A.C. Ammeter

A.C. Voltmeter

Frequency Meter

Product Codes – A.C. Ammeter True RMS Reading - Accuracy ±2% ES

Rating	Scaling	Catalogue No.
5A	0-5A	(01*)-75AA-LSLS-C6-B*
10A	0-10A	(01*)-75AA-MTMT-C6-B*
15A	0-15A	(01*)-75AA-NDND-C6-B*
20A	0-20A	(01*)-75AA-NGNG-C6-B*
30A	0-30A	(01*)-75AA-NLNL-C6-B*
1A	Transformer Rated	(01*)-75AA-LA**-C6-B*
5A	Transformer Rated	(01*)-75AA-LS**-C6-B*

Product Codes – A.C. Voltmeter True RMS Reading - Accuracy ±2% ES

150V	0-150V	(01*)-75VA-PZPZ-C6-B*
300V	0-300V	(01*)-75VA-RXRX-C6-B*
600V	0-600V	(01*)-75VA-SJSJ-C6-B*
150V	Transformer Rated	(01*)-75VA-PZ**-C6-B*

Product Codes – D.C. Ammeters - Accuracy ±2% ES

0-1mA	To Suit Requirements	(01*)-01AA-FA**-B*
0-5mA	0-5mA	(01*)-01AA-FXFX-B*
0-10mA	0-10mA	(01*)-01AA-GZGZ-B*
0-20mA	0-20mA	(01*)-01AA-HFHF-B*
0-50mA	0-50mA	(01*)-01AA-HYHY-B*
0-100mA	0-100mA	(01*)-01AA-JRJR-B*
0-200mA	0-200mA	(01*)-01AA-KAKA-B*
0-500mA	0-500mA	(01*)-01AA-KMKM-B*
0-1A	0-1A	(01*)-01AA-LALA-B*
0-2A	0-2A	(01*)-01AA-LELE-B*
0-5A	0-5A	(01*)-01AA-LSLS-B*
0-10A	0-10A	(01*)-01AA-MTMT-B*
0-50mV	To Suit	(01*)-01AA-EC**-B*

Product Codes – Milliammeters Suppressed Zero - Accuracy ±2% ES

4-20mA	To Suit Requirements	(01*)-01RA-HG**-B* **Specify scale value

Product Codes – D.C. Voltmeters Sensitivity 1000Ω/Volt - Accuracy ±2% ES

0-15V	0-15V	(01*)-01VA-NDND-B*
0-30V	0-30V	(01*)-01VA-NLNL-B*
0-50V	0-50V	(01*)-01VA-NTNT-B*
0-150V	0-150V	(01*)-01VA-PZPZ-B*
0-300V	0-300V	(01*)-01VA-RXRX-B*
0-600V	0-600V	(01*)-01VA-SJSJ-B*

Product Codes – Frequency Meters 120V - Self Contained

50Hz	45-55Hz	(01*)-41SA-PNAG-AG-B*
55Hz	45-65Hz	(01*)-41SA-PNAJ-AJ-B*
60Hz	55-65Hz	(01*)-41SA-PNAN-AN-B*

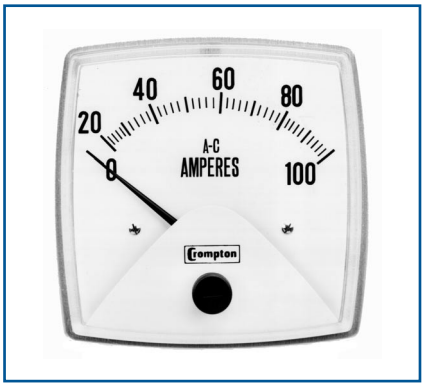
Product Codes – Elapsed Time Meters 99999.99 hours - non reset

110/130V, 50Hz	–	(01*)-155A-PNZH-C5-B*
200/250V, 50Hz	–	(01*)-155A-RNZH-C5-B*
480V, 50Hz	–	(01*)-155A-SEZH-C5-B*
110/130V, 60Hz	–	(01*)-156A-PNZH-C6-B*
200/250V, 60Hz	–	(01*)-156A-RNZH-C6-B*
480V, 60Hz	–	(01*)-156A-SEZH-C6-B*

To denote the required case size, replace the 01* in the catalogue number with 012, 013 or 014 for 2½", 3½" or 4½" respectively.

To denote the required stud fixing configuration, replace B* with B2 (2 stud), B3 (3 stud) or B4 (4 stud)

016 Series Fiesta Indicators



A robust range of shortscale and longscale 3½" surface mount panel meters offering IP55 protection and featuring a wide viewing contoured window. The range offers iron vane and moving coil AC and DC ammeters and voltmeters, elapsed time and frequency meters ideally suited for demanding environmental applications. Options include supplementary pointer, non reflecting window, heavily damped movement, panel gasket, clamp band fixing long scale and coloured internal gasket.

Specification – Elapsed Time Meter and Frequency Meter

Voltage:	100/125V, 200/250V or 480V A.C.
Frequency:	50Hz or 60Hz
Burden:	4VA Maximum
Operating Temperature:	-20°C to 65°C (-4°F to 149°F)
Storage Temperature:	-30°C to 70°C (-22°F to 158°F)

Specification – Iron Vane A.C. Ammeter & Voltmeter

Accuracy:	Shortscale: ammeters 2.5%; Longscale: 1.5 %
Ratings:	Ammeters: Shortscale 1 to 80A, Longscale 1 to 20A Voltmeters: 10V to 600V
Overload:	Ammeters: x1.2 for 2 hours, 10 x for 5 seconds Voltmeters: x1.2 for 2 hours, 2 x for 5 seconds
Burden:	Ammeters: Shortscale 0.5VA; Longscale 1.5VA Voltmeters: 4.5VA maximum
Operating Temperature:	-20°C to 65°C (-4°F to 149°F)
Storage Temperature:	-30°C to 70°C (-22°F to 158°F)

Specification – Moving Coil D.C. Ammeter & Voltmeter

Accuracy Class:	Shortscale 1.5; Longscale 1.5
Ratings:	Ammeters: 200µA to 30A, (100µA Shortscale) Voltmeters: 50mV to 600V
Overload:	Ammeters: x1.2 for 2 hours, 10 x for 5 seconds Voltmeters: x1.2 for 2 hours, 2 x for 5 seconds
Impedance:	Voltmeters 1000 ohms per Volt nominal
Operating Temperature:	-20°C to 65°C (-4°F to 149°F)
Storage Temperature:	-30°C to 70°C (-22°F to 158°F)

Features

Contoured window providing an exceptionally high viewing angle

Withstands high levels of shock, vibration, dirt and humidity

Benefits

Complies with ANSI C39.1 (IEC 51)

IP55 (NEMA 4) protection

Instruments comply with BSEN61010-1 and meet IEC414 (BS5458)

Dielectric Test (2600V for 1min)

Customised options and features

Applications

Switchgear

Distribution systems

Generator sets

Control panels

Energy management

Utility power monitoring

Process control

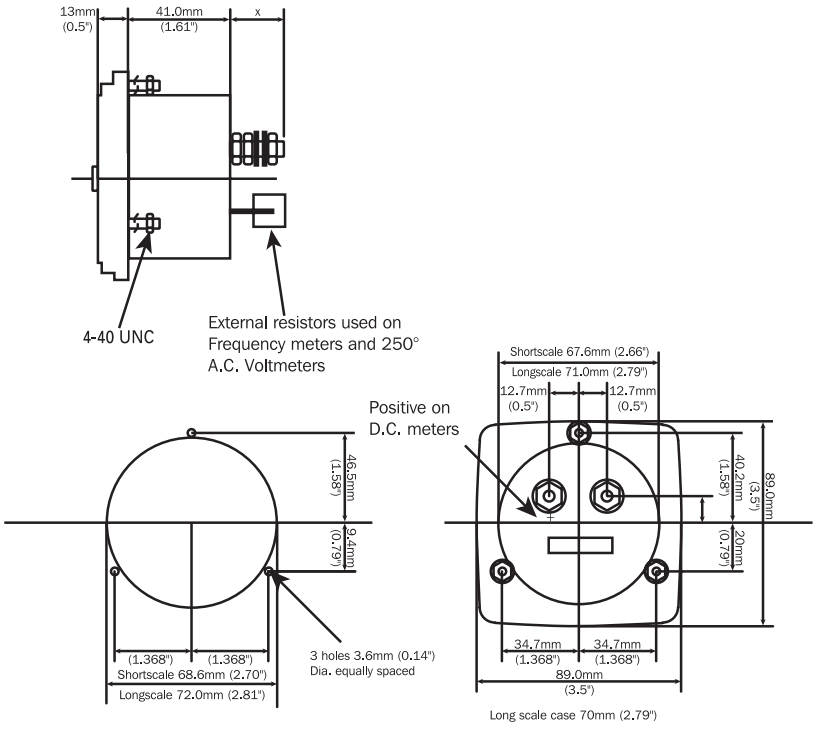
Motor control

Approvals

UL approvals file no. E87815

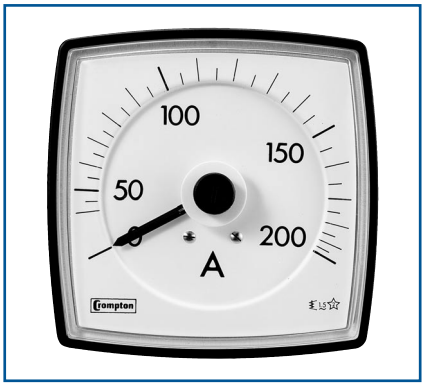
Dimensions

x = Terminals. 1/4 - 28 UNF up to 59.9A 0.72" long. 5/16 - 24UNF over 60A 0.94" long.

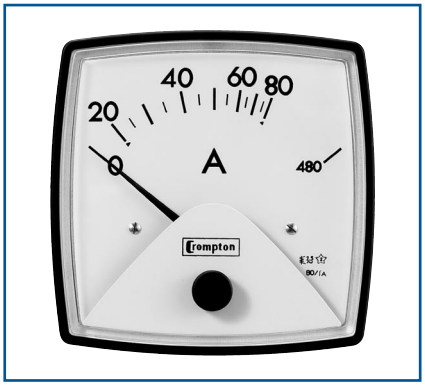


016 Series Fiesta Indicators

A.C. Ammeter Shortscale



A.C. Ammeter Longscale



A.C. Overload Ammeter

A.C. Voltmeter

A.C. Ammeter

Product Codes – True RMS Reading - Self Contained 50/60Hz

Rating	Scaling	ShortScale Catalogue No.	LongScale Catalogue No.
5A	0-5A	•016-02A*-LSLS-C7	016-03A*-LSLS-C7
10A	0-10A	016-02A*-MTMT-C7	016-03A*-MTMT-C7
15A	0-15A	016-02A*-NDND-C7	016-03A*-NDND-C7
20A	0-20A	016-02A*-NGNG-C7	016-03A*-NGNG-C7
30A	0-30A	016-02A*-NLNL-C7	016-03A*-NLNL-C7
5A	Transformer Rated	•016-02A*-LS**-C7	016-03A*-LS**-C7

Product Code – Moving Coil Rectified

100µA to 1A	To Suit	016-01B*-	016-05B*-

A.C. Overload Ammeter

Product Codes – True RMS Reading - Self Contained 50/60Hz

Rating	Scaling	ShortScale Catalogue No.	LongScale Catalogue No.
5A	0-5-30A	016-026*-LSLS-C7	016-036*-LSLS-C7
10A	0-10-60A	016-026*-MTMT-C7	016-036*-MTMT-C7
15A	0-15-90A	016-026*-NDND-C7	016-036*-NDND-C7
20A	0-20-120A	016-026*-NGNG-C7	016-036*-NGNG-C7
30A	0-30-180A	016-026*-NLNL-C7	016-036*-NLNL-C7
5A	Transformer Rated	016-026*-LS**-C7	016-036*-LS**-C7

A.C. Voltmeter

Product Codes – True RMS Reading

150V	0-150V	•016-02V*-PZPZ-C7	016-03V*-PZPZ-C7
300V	0-300V	•016-02V*-RXRX-C7	016-03V*-RXRX-C7
600V	0-600V	•016-02V*-SJSJ-C7	016-03V*-SJSJ-C7
150V	Transformer Rated	•016-02V*-PZ**-C7	016-03V*-PZ**-C7

Product Codes – Moving Coil Rectified

15V to 600V	To suit	016-01W*-	016-05W*-

D.C. Ammeters

Product Codes

0-50mV	To Suit	016-01A*-EC**	016-05A*-EC**
0-1mA	To Suit	•016-01A*-FA**	016-05A*-FA**
0-5mA	To Suit	016-01A*-FX**	016-05A*-FX**
0-10mA	To Suit	016-01A*-HA**	016-05A*-HA**
0-20mA	To Suit	•016-01A*-HF**	016-05A*-HF**

Suppressed Zero

Product Codes – Milliammeters - No zero set unless specified

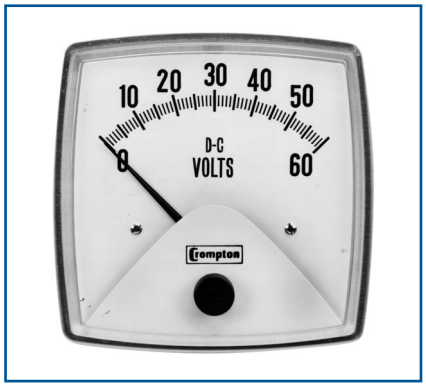
4/20mA	To Suit	•016-01RA*-HG**	016-05RA-HG**

Product Codes – Voltage Suppressed Zero - No zero set unless specified

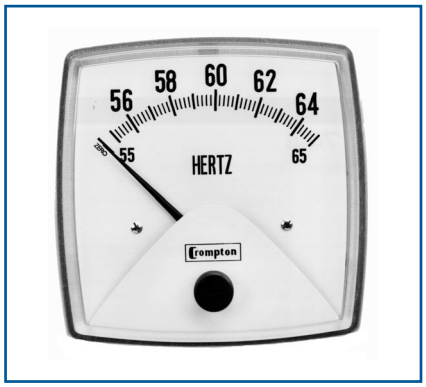
1-5V	To Suit	016-01S*-LM**	–

* Please state A or B at time of ordering. A = ANSI B = BS89
** Customer to state required scaling at time of ordering
• UL recognised

016 Series Fiesta Indicators



D.C. Voltmeter



Frequency Meter

Elapsed Time Meter

D.C. Voltmeters

Product Codes – Sensitivity 1000Ω/Volt

Rating	Scaling	ShortScale Catalogue No.	LongScale Catalogue No.
0-15V	0-15V	016-01V*-NDND	016-05V*-NDND
0-30V	0-30V	016-01V*-NLNL	016-05V*-NLNL
0-50V	0-50V	•016-01V*-NTNT	016-05V*-NTNT
0-150V	0-150V	•016-01V*-PZPZ	016-05V*-PZPZ
0-300V	0-300V	•016-01V*-RXRX	016-05V*-RXRX
0-600V	0-600V	016-01V*-SJSJ	016-05V*-SJSJ

Frequency Meters

Product Codes – 120V - Self Contained

Rating	Scaling	ShortScale Catalogue No.	LongScale Catalogue No.
		Standard Case	
50Hz Centre Frequency, -0.15 Accuracy	45-55Hz	•016-41S*-PNAG-AG	Use 016-053 plus 253-THZ
55Hz Centre Frequency, -0.25 Accuracy	45-65Hz	•016-41S*-PNAJ-AJ	
60Hz Centre Frequency, -0.15 Accuracy	55-65Hz	•016-41S*-PNAN-AN	
400Hz Centre Frequency, -1.25 Accuracy	360-440Hz	016-41S*-PNBI-BI	

Elapsed Time Meters

Product Codes – 99999.99 hours - non resettable

		Standard Case	
110/130V, 50Hz	–	•016-155*-PNZH-C5	–
200/250V, 50Hz	–	•016-155*-RNZH-C5	–
480V, 50Hz	–	016-155*-SEZH-C5	–
110/130V, 60Hz	–	•016-156*-PNZH-C6	–
200/250V, 60Hz	–	•016-156*-RNZH-C6	–
480V, 60Hz	–	016-156*-SEZH-C6	–

Maximum Demand Ammeter

Product Codes – Transformer Rated 5A

15 minute time lag	To Suit	016-16A*-LS**	–

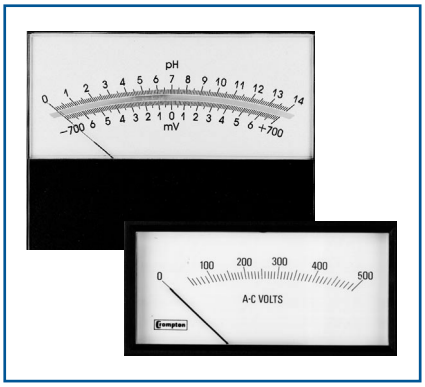
Transducer Indicators

Product Codes – D.C. Milliamp Rated

Speed	To Suit	016-012*	016-052
Frequency	To Suit	016-013*	016-053
Phase Angle	To Suit	016-014*	016-054
Watts	To Suit	016-015*	016-055
VArs	To Suit	016-016*	016-056
VA	To Suit	016-017*	–

* Please state A or B at time of ordering. A = ANSI B = BS89
** Customer to state required scaling at time of ordering
• UL recognised

PR and EX Series Indicators



Features

Surface mount PR series or rear panel mounting EX series

Five case sizes from 1½" to 5½"

True VU meters which are vibration and shock resistant.

Iron vane AC meters for true RMS reading

Benefits

Complies with ANSI C39.1 (IEC 51)

IP54 (NEMA 3) protection

VU meters comply to ANSI C16.5 1954 – BBC and Bell Spec's

Customised options and features

Applications

Switchgear

Distribution systems

Generator sets

Control panels

Energy management

Utility power monitoring

Process control

Motor control

Approvals

UL recognised components
File No: E189308

Surface mount and rear panel mounted meters available in five case sizes from 1½" to 5½". The range offers AC and DC moving coil ammeters and voltmeters, moving iron AC meters, elapsed time, frequency and true VU meters which are vibration and shock resistant.

All iron vane mechanisms used in the A.C. ammeters and voltmeters utilise ruggedised pivot and jewel suspension systems. Rectified ammeters and voltmeters, frequency meters and all D.C. meter designs combine taut band suspension with fluid dampening.

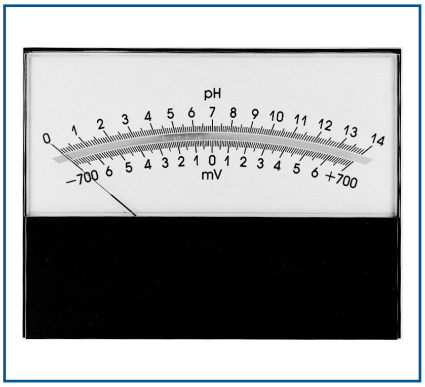
Specification

Accuracy:	D.C. Ammeters and Voltmeters: Moving Coil +/- 2% ES A.C. Ammeters and Voltmeters: Iron Vane +/- 2% Rectified +/- 3% ES
Enclosure Code:	IP54 (NEMA 3)
Frequency:	+/- 0.5% of mid frequency
Burden (A.C.Meters):	Ammeters and Voltmeters: Iron Vane 2VA Max Ammeters and Voltmeters: Rectified 0.5VA Max Frequency Meters & ETM: Less than 1VA
Terminal Resistance +/- 10% (D.C. Meters):	50µA: 2600 ohms 100µA: 640 ohms 200µA: 220 ohms 1mA: 35 ohms 50mV: 50 ohms (1mA) Voltmeters: 1000 ohms per Volt
Mechanism Type:	D.C. Ammeters and Voltmeters: Moving coil A.C. Ammeters and Voltmeters: Iron vane (inherently RMS) A.C. Ammeters and Voltmeters rectified: Moving coil, average sensing Frequency Meters: Moving coil with zero crossing detector circuit Elapsed Time Meters: Cyclometer type, non resettable
Response Time:	Less than 3 seconds to indication mark.
Operating Temp.:	0 to +40°C (32°F to 104°F)
Storage Temp.:	-10 to +50°C (14°F to 122°F)
Approvals:	EMC and LVD. UL recognised components

Options

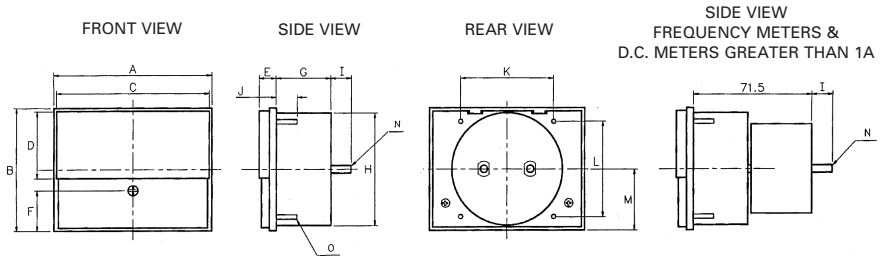
Description	Option Code
Scales:	
Standard rating - non standard scale or - non standard caption	
Custom scaling to customer specs	SX
Red, green or blue line (specify)	SL
Red, green or blue band (specify limits)	SZ
Black dial/white figures and pointers	SB
Black dial/yellow figures and pointers	SY
Mirrored dial plate	MD
White edging on EX front window	W2
Black edging on EX front window	W3
Customer logo (one time charge) Price based on standard one or two colours. Artwork supplied by customer.	SM
No Crompton logo on dial	SN
Calibration/Mechanical:	
Heavily dampened movement	PD
Supplementary red pointer	ER
Illuminated meter (specify D.C. volts)	EL
Rear zero	RZ
Right hand zero reset	BX
Center zero	CZ
Flying lead termination (specify MM)	CZ

PR Series Indicators



The PR series Panel Meters are supplied with rectangular fronts, round barrels and various combination of mounting studs for conventional front of panel mounting ("Surface Mount").

Dimensions



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
PR 15															
in	2.24	1.75	2.16	0.87	0.33	0.63	1.30	1.52	0.25	0.5	1.32	1.31	0.83	10-32	4-40
mm	56.9	44.5	54.9	22.1	8.6	15.9	33.0	38.6	6.4	12.7	33.6	33.3	21.1	UNF	UNC
PR 25															
in	3.0	2.27	2.91	1.24	0.40	0.85	1.30	2.12	0.5	0.5	1.88	1.88	1.13	10-32	4-40
mm	75.9	57.7	73.9	31.5	10.2	21.6	33.0	53.8	12.7	12.7	47.8	47.8	28.7	UNF	UNC
PR 35															
in	3.70	2.87	3.62	1.55	0.41	0.96	1.30	2.66	0.5	0.5	2.24	2.25	1.44	10-32	4-40
mm	94.0	72.9	92.0	39.4	10.4	24.3	33.0	67.6	12.7	12.7	56.8	57.2	36.6	UNF	UNC
PR 45															
in	5.10	3.96	5.02	2.20	0.51	1.39	1.30	2.66	0.5	0.5	4	3.56	1.74	10-32	4-40
mm	129.5	100.6	127.5	55.9	12.9	35.2	33.0	67.6	12.7	12.7	101.6	90.45	44.2	UNF	UNC
PR 55															
in	5.85	4.48	5.75	2.5	0.55	1.48	1.30	2.66	0.5	0.5	5.26	4.48	1.60	10-32	4-40
mm	148.6	113.8	146.0	63.5	14.0	37.7	33.0	67.6	12.7	12.7	133.6	113.8	40.4	UNF	UNC

Window Mount Panel Cut-out	PR 15	PR 25	PR 35	PR 45	PR 55
in	2.16 x 0.87	2.91 x 1.24	3.62 x 1.55	5.02 x 2.20	5.75 x 2.5
mm	54.9 x 22.1	73.9 x 31.5	92 x 39.4	127.5 x 55.9	146 x 63.5

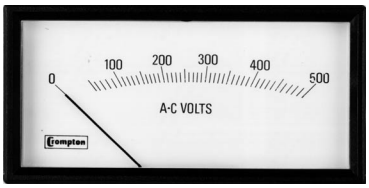
Product Codes – D.C. Models

Model	Moving Coil D.C. Micro-Ammeters	Moving Coil D.C. Milli-Ammeters	Moving Coil D.C. Ammeters	Moving Coil D.C. Milli-Voltmeters	Moving Coil D.C. Voltmeters
PR15	PR15-DUA	PR15-DMA	PR15-DAA	PR15-DMV	PR15-DVV
PR25	PR25-DUA	PR25-DMA	PR25-DAA	PR25-DMV	PR25-DVV
PR35	PR35-DUA	PR35-DMA	PR35-DAA	PR35-DMV	PR35-DVV
PR45	PR45-DUA	PR45-DMA	PR45-DAA	PR45-DMV	PR45-DVV
PR55	PR55-DUA	PR55-DMA	PR55-DAA	PR55-DMV	PR55-DVV

Product Codes – A.C. Models

Model	Moving Coil Rectified A.C.-Millameters	Moving Coil Rectified A.C.-Voltmeters	Moving Iron A.C. Ammeters	Moving Iron A.C. Voltmeters	Frequency Meters	Elapsed Time Meters
PR25	PR25-RMA	PR25-RVV	PR25-AAA	PR25-AVV	PR25-FREQ	PR25-ETM
PR35	–	PR35-RVV	PR35-AAA	PR35-AVV	PR35-FREQ	PR35-ETM
PR45	–	–	PR45-AAA	PR45-AVV	PR45-FREQ	PR45-ETM

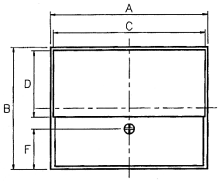
EX Series Indicators



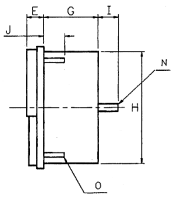
EX Panel Meters are supplied with rectangular fronts and round barrels. Their primary method of mounting is from the rear of the panel, whereby the meter window becomes flush with the front panel surface.

Dimensions

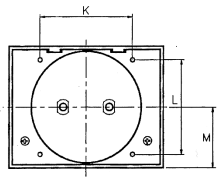
FRONT VIEW



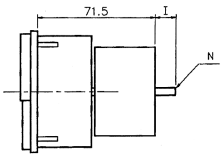
SIDE VIEW



REAR VIEW



SIDE VIEW
FREQUENCY METERS &
D.C. MEERS GREATER THAN 1A



		A	B	C	D	E	F	G	H	I	M	N	Panel cut-out
EX 15	in	2.24	1.75	2.14	0.93	0.42	0.54	1.30	1.52	0.5	0.82	0.41	2.15 x 0.93
	mm	56.9	44.5	54.4	23.5	10.7	13.7	33.0	38.6	12.7	20.8	10.32	54.6 x 23.7
EX 25	in	3.0	2.27	2.89	1.26	0.44	0.64	1.30	2.12	0.5	1.15	0.41	2.9 x 1.27
	mm	75.9	57.7	73.4	32.0	11.2	16.25	33.0	53.8	12.7	29.2	10.32	73.7 x 32.3
EX 35	in	3.70	2.87	3.60	1.58	0.46	0.81	1.30	2.66	0.5	1.45	0.41	3.61 x 1.6
	mm	94.0	72.9	91.5	40.3	11.8	20.6	33.0	67.6	12.7	36.8	10.32	91.7 x 40.5
EX 45	in	5.10	3.96	5.00	2.33	0.52	0.86	1.30	2.66	0.5	1.79	0.41	5.02 x 2.35
	mm	129.5	100.6	127.2	59.3	13.1	21.85	33.0	67.6	12.7	45.5	10.32	127.5 x 59.6
EX 55	in	5.85	4.48	5.77	2.58	0.52	1.29	1.30	2.66	0.5	1.65	0.41	5.78 x 2.6
	mm	148.6	113.8	146.63	65.6	13.1	32.7	33.0	67.6	12.7	41.9	10.32	146.8 x 65.8

Product Codes – D.C. Models

Model	Moving Coil D.C. Micro-ammeters	Moving Coil D.C. Milli-ammeters	Moving Coil D.C. Ammeters	Moving Coil D.C. Milli-ammeters	Moving Coil D.C. Voltmeters	Moving Coil D.C. VU Meters
EX15	EX15-DUA	EX15-DMA	EX15-DAA	EX15-DMV	EX15-DVV	–
EX25	EX25-DUA	EX25-DMA	EX25-DAA	EX25-DMV	EX25-DVV	EX25-DVU
EX35	EX35-DUA	EX35-DMA	EX35-DAA	EX35-DMV	EX35-DVV	–
EX45	EX45-DUA	EX45-DMA	EX45-DAA	EX45-DMV	EX45-DVV	EX45-DVU
EX55	EX55-DUA	EX55-DMA	EX55-DAA	EX55-DMV	EX55-DVV	EX55-DVU

Product Codes – A.C. Models

Model	Moving Coil Rectified A.C.- Millameters	Moving Coil Rectified A.C.- Ammeters	Moving Coil Rectified A.C.- Milli-voltmeters	Moving Coil Rectified A.C.- Voltmeters	Moving Iron A.C. Ammeters	Moving Iron A.C. Voltmeters	Frequency Meters	Elapsed Time Meters	True VU Meters
EX15	EX15-RMA	–	EX15-RMV	EX15-RVV	–	–	–	–	–
EX25	EX25-RMA	EX25-RAA	EX25-RMV	–	EX25-AAA	EX25-AVV	EX25-FREQ	EX25-ETM	EX25-AVU
EX35	EX35-RMA	EX35-RAA	EX35-RMV	EX35-RVV	EX35-AAA	EX35-AVV	EX35-FREQ	EX35-ETM	–
EX45	EX45-RMA	EX45-RAA	EX45-RMV	EX45-RVV	EX45-AAA	EX45-AVV	EX45-FREQ	EX45-ETM	EX45-AVU
EX55	EX55-RMA	EX55-RAA	EX55-RMV	EX55-RVV	–	–	–	–	–

050 Series Unifix Indicators

An extensive range of shortscale and longscale meters in 94mm, 129mm and 181mm bezel sizes. Meters utilise taut band mechanisms and provide 1.5% accurate measurement of a wide range of individual electrical parameters. Options include intrinsically safe and meter relay versions and supplementary red pointer, slave pointer, calibration for non-standard ambient temperatures, special scales, trim potentiometers, etc.

Features

An extensive range in 3 case sizes

Rugged Hi-Q taut-band suspension

Meter relay version

Contoured window providing an exceptionally high viewing angle

Benefits

Complies with BS EN 60051 (IEC51)

IP54 (NEMA 3) protection with IP55 (NEMA 4) option

Customised options and features

Applications

Switchgear

Distribution systems

Generator sets

Control panels

Energy management

Utility power monitoring

Process control

Motor control

Approvals

ISSeP approvals

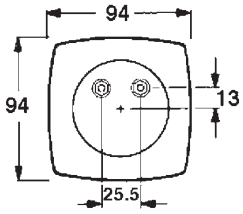
Intrinsically safe options to EEx ia 11C T4 for inputs of 0/1, 0/5, 0/10, 0/20 & 4/20mA only

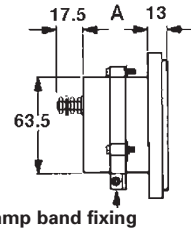
Specification

Performance	BS EN60051 (IEC51)
Accuracy	Class 1.5
Enclosure Code	Standard: IP55 (NEMA 4) Option: IP55 (NEMA 4)
Case	Models 057 and 058: Heavy gauge pressed steel Model 056: Grey thermoplastic flame retardant to UL94V-0
Front	One piece flame retardant polycarbonate
Bezel	Matt black
Bezel Window	Contoured to minimize reflection
Ambient Temp.	10°C to +60°C (50°F to 140°F)
Standard Calibration	23°C (73°F)
Fixing on Panel	Single hole fixing with clamp band
Approvals	EMC and LVD. ISSeP approvals Intrinsically safe options to EEx ia 11C T4 for inputs of 0/1, 0/5, 0/10, 0/20 & 4/20mA only

Dimensions

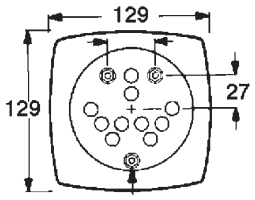
Model 056 Short & Long Scales
Panel cut-out Ø 65mm.



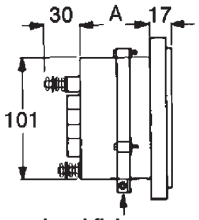


Clamp band fixing

Model 057 Short Scale
Panel cut-out Ø 103mm.

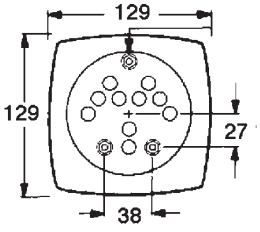


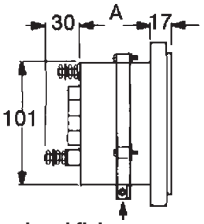
Earth terminal 20mm long



Clamp band fixing

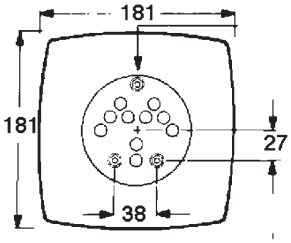
Model 057 Long Scale & Meter Relay
Panel cut-out Ø 103mm.

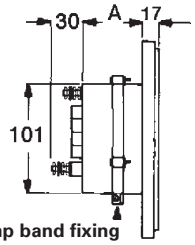




Clamp band fixing

Model 058 Long Scale
Panel cut-out Ø 103mm.





Clamp band fixing

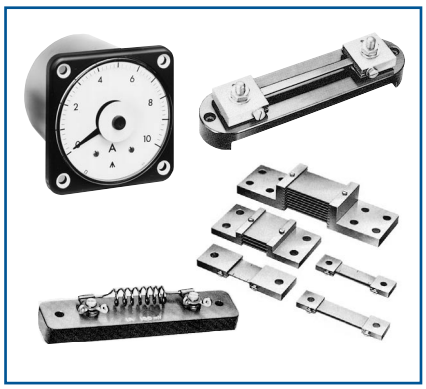
050 Series Unifix Indicators

Product Range

Type of Instrument	Ranges	Case Code Dimension A (mm)			Product Code
		056	057	058	
A.C. Ammeter Moving Iron	0.5-30A, 50, 60 or 400Hz	41	-	-	056-02A
A.C. Ammeter Moving Iron Shortscale	0.5-30A, 50, 60 or 400Hz	-	56	-	057-02A
A.C. Ammeter Moving Iron Longscale	0.5-30A, 50, 60 or 400Hz	41	86	86	056-03A & 057/058-08A
A.C. Voltmeter Moving Iron	10-600V, 50, 60 or 400Hz	41	-	-	056-02V
A.C. Voltmeter Moving Iron Shortscale	10-600V, 50, 60 or 400Hz	-	56	-	057-02V
A.C. Voltmeter Moving Iron Longscale	10-600V, 50, 60 or 400Hz	41	86	86	056-03V & 057/058-08V
D.C. Ammeter	100µA-30A D.C.	41	-	-	056-01A
D.C. Voltmeter Shunt Operated	50, 60, 75, 100, 150mV	41	-	-	056-01A
D.C. Ammeter Shortscale	200µA-30A D.C.	-	56	-	057-01A
D.C. Voltmeter Shortscale Shunt Operated	50, 60, 75, 100, 150mV	-	56	-	057-01A
D.C. Ammeter Longscale	200µA-30A D.C.	41	86	86	056/057/058-05A
D.C. Voltmeter Longscale Shunt Operated	50, 60, 75, 100, 150mV	41	86	86	056/057/058-05A
D.C. Ammeter, Suppressed Zero Short Scale	4/20mA	41	-	-	056-01R
D.C. Ammeter, Suppressed Zero Short Scale	4/20mA	-	56	-	057-01R
D.C. Ammeter, Suppressed Zero Long Scale	4/20mA	41	86	86	056/057/058-05R
D.C. Voltmeter	50mV-600V D.C.	41	-	-	056-01V
D.C. Voltmeter Shortscale	50mV-600V D.C.	-	56	-	057-01V
D.C. Voltmeter Longscale	50mV-600V D.C.	41	56	56	056/057/058-05V
D.C. Voltmeter, Suppressed Zero Long Scale	1-5V	41	86	86	056/057/058-05S
A.C. Rectified Ammeter	1mA-1A, 25Hz/3kHz, 50Hz STD	41	-	-	056-01B
A.C. Rectified Ammeter Shortscale	1mA-30A, 25Hz/3kHz, 50Hz STD	-	56	-	057-01B
A.C. Rectified Ammeter Longscale	1mA-30A, 25Hz/3kHz, 50Hz STD	41	86	86	056/057/058-05B
A.C. Rectified Voltmeter	15-600V, 25Hz/3kHz, 50Hz STD	41	-	-	056-01W
A.C. Rectified Voltmeter Shortscale	15-600V, 25Hz/3kHz, 50Hz STD	-	56	-	057-01W
A.C. Rectified Voltmeter Longscale	15-600V, 25Hz/3kHz, 50Hz STD	41	56	56	056/057/058-05W
Elapsed Time Meter.	50 or 60Hz / 100-440V*	41	-	-	056-155 or 156
Elapsed Time Meter.	50 or 60Hz / 100-440V*	-	56	-	057-155 or 156
Frequency Meter. Shortscale	50 or 60 or 400Hz/100-440V*	41	-	-	056-41S
Frequency Meter. Shortscale	50 or 60 or 400Hz/100-440V*	-	56	-	057-41S
Frequency Meter. Longscale	50 or 60 or 400Hz/100-440V*	41	86	86	056/057/058-41L
Wattmeter or Varmeter	0.2-10A/100-440V*	-	132	132	057/058-21 or 31
240° Phase Angle	1 or 5A 100-400V 50, 60 or 400Hz	-	132	132	057/058-42
360° Power Factor Meter	1 or 5A 100-440V* 50 or 60Hz	-	132	132	057/058-13
360° Rotary Synchroscope	100/125V, 200/250, 380/450**	-	132	132	057/058-14
Maximum Demand Indicator	1 or 5A, 50/60Hz, 15 or 20 min	-	86	-	057-16
Combined MDI	1 or 5A, 50/60Hz, 15 or 20 min	-	86	-	057-16
Temperature Indicator	RTD or Thermocouple	-	86	86	057/058-45 R or T
Tap position indicator	1-18 steps. 400Ω	-	86	-	057-45P
Transducer Operated Indicator Shortscale	1, 5, 10, 20, or 4/20mA	-	56	-	057-01
Transducer Operated Indicator Longscale	1, 5, 10, 20, or 4/20mA	41	56	56	056/057/058-05
Intrinsically Safe Indicators Longscale	1, 5, 10, 20mA only	-	86	86	057/058-11AF
Intrinsically Safe Indicators Longscale	4/20mA only	-	86	86	057-058-11RF
D.C. Meter relay	D.C. 10mV-500V, 10µA-15A	-	86	-	057-30
Temperature Meter Relay	RTD's or Thermocouples	-	86	-	057-30 R or T
A.C. Meter relay	A.C.6V-500V, 100µA-1A 5A via C.T.	-	86	-	057-30

*100-440V = (100/125, 200/250, 380/440) **Using transformer box 855-95

For specification and connection diagrams, please refer to equivalent models in the 240 Series DIN Panel Meter section. Replace 244 with 057 etc., e.g. 244-210 becomes 057-210.



Features

Designed specifically for stringent industrial, marine and military specifications

An extensive range of high accuracy measuring instruments in 3 case sizes

Rugged Hi-Q taut-band suspension

Bump, shock and vibration proof

Benefits

Complies with BS EN 60051 (IEC51)

IP67 (NEMA 6 and 6P) protection

Dial illumination option

Parallax error-free platform dials for 078/087. Optional for 083/084

Applications

Switchgear

Distribution systems

Generator sets

Control panels

Utility power monitoring

Process control

Motor control

Marine

Military

Approvals

DEF STAN 66.7

Intrinsically safe options to EEx ia 11C T4

078/080/087 Series 240° scale

The Crompton 078/080/ 087 Series of heavy duty sealed instruments are designed to comply with the most stringent industrial, marine and military specifications. This metal cased range offers bezel sizes of 57mm, 83mm and 110mm which are fitted with toughened glass. Indicators comply with Ministry of Defence specification DEF STAN 66.7. and operate efficiently in the most adverse environments where extreme conditions of shock, vibration, dirt, humidity and temperature variation are present.

Description

Metal cases with bezel sizes of 57 x 57mm (083), 83mm Ø (084) and 110mm x 110mm (078/087) fitted with toughened glass windows, are used throughout the series in standard matt black finish, which can be replaced with the optional light admiralty grey to BS3181C No:697. In order to avoid fogging they are dried, evacuated and filled with dry nitrogen.

The sealing provided is such that with the interior of the case is maintained at a constant pressure of at least 94kPa above the exterior, the leakage does not exceed the equivalent of 1.33 Pa ml/s of air. Except on model 083, panel sealing gaskets are provided as standard.

Standard instrument dials are finished in acrylic matt white with black printing and a parallel pointer. The scales form a true arc with zero on the left hand-side. Options available include dial illumination, a centre zero, off-set zero or suppressed zero, colour index lines, bands, zones or segments, black dial with white printing, and customers logo.

Specification

Performance:	BS EN60051 (IEC51) DEF STAN 66-7 on request (087 only)
Accuracy:	Refer to Product Range table
Scaling:	BS89, BS3693 or DEF STAN 66-7 and 66-9
Dielectric Test:	2kV r.m.s to BSEN61010-1
Overloads:	x 1.2 rated current for 2 hours x 10 rated current for 5 seconds x 1.2 rated voltage for 2 hours x 2 rated voltage for 5 seconds
Enclosure Code:	IP67 (NEMA 6 & 6P)
Case:	Matt black metal filled with dry nitrogen
Bezel:	Matt black metal. Optional admiralty grey No. 697
Bezel Window:	Toughened glass
Operating Temp.:	-40°C to +70°C (-40°F to +158°F)
Storage Temp:	-55°C to +85°C (-67°F to 185°F)
Standard Calibration:	23°C (73°F)
Approvals:	EMC and LVD. DEF 66.7 Intrinsically safe option to EEx ia 11C T4

Product Range – 078/080/087 Series 240° scale

Type of Instrument	Ranges	Accuracy Class	Burden VA	Case Code Depth behind the Bezel				Product Code
A.C. Ammeter Moving Iron	0.75-20A	2.5	2	57	-	-	-	083-03A
A.C. Ammeter Moving Iron	0.75-20A	1.5	2	-	59	-	-	084-03A
A.C. Ammeter Moving Iron	0.5-30A	1.5	2	-	-	86	-	078-08A
A.C. Ammeter Moving Iron	0.5-30A	1.5	2	-	-	-	86	087-08A
A.C. Voltmeter Moving Iron	5-800V	2.5	5	57	-	-	-	083-03V
A.C. Voltmeter Moving Iron	5-800V	1.5	5	-	59	-	-	084-03V
A.C. Voltmeter Moving Iron	5-800V	1.5	5	-	-	86	-	078-08V
A.C. Voltmeter Moving Iron	5-800V	1.0	5	-	-	-	86	087-08V
D.C. Ammeter Shunt Operated	50, 60, 75, 100, 150mV	2.5	See T118***	57	-	-	-	083-05A
D.C. Ammeter Shunt Operated	50, 60, 75, 100, 150mV	1.5	See T118***	-	59	-	-	084-05A
D.C. Ammeter Shunt Operated	50, 60, 75, 100, 150mV	1.5	See T118***	-	-	86	-	078-05A
D.C. Ammeter Shunt Operated	50, 60, 75, 100, 150mV	1.5	See T118***	-	-	-	86	087-11A
D.C. Ammeter	200µA-30A	2.5	See T118***	57	-	-	-	083-05A
D.C. Ammeter	200µA-30A	1.5	See T118***	-	59	-	-	084-05A
D.C. Ammeter	200µA-30A	1.0	See T118***	-	-	86		078-05A
D.C. Ammeter	200µA-30A	1.0	See T118***	-	-	-	86	087-11A
D.C. Ammeter Suppressed Zero	4/20mA	2.5	See T118***	57	-	-	-	083-05R
D.C. Ammeter Suppressed Zero	4/20mA	1.5	See T118***	-	59	-	-	084-05R
D.C. Ammeter Suppressed Zero	4/20mA	1.5	See T118***	-	-	86	-	078-05R
D.C. Ammeter Suppressed Zero	4/20mA	1.5	See T118***	-	-	-	86	087-11R
D.C. Voltmeter	50mV-600V	2.5	See T118***	57	-	-	-	083-05V
D.C. Voltmeter	50mV-600V	1.5	See T118***	-	59	-	-	084-05V
D.C. Voltmeter	50mV-800V	1.5	See T118***	-	-	86	-	078-05V
D.C. Voltmeter	50mV-800V	1.0	See T118***	-	-	-	86	087-11V
D.C. Voltmeter Suppressed Zero	1/5V	1.5	See T118***	-	-	86	-	078-05S
D.C. Voltmeter Suppressed Zero	1/5V	1.5	See T118***	-	-	-	86	087-11S
A.C. Rectified Ammeter	200µA-1A	2.5	See T118***	57	-	-	-	083-05B
A.C. Rectified Ammeter	200µA-1A	2.5	See T118***	-	59	-	-	084-05B
A.C. Rectified Ammeter	200µA-30A	1.5	See T118***	-	-	86	-	078-05B
A.C. Rectified Ammeter	200µA-30A	1.5	See T118***	-	-	-	86	087-11B
A.C. Rectified Voltmeter	15-600V 25Hz/3kHz	2.5	See T118***	57	-	-	-	083-05W
A.C. Rectified Voltmeter	15-600V 25Hz/3kHz	2.5	See T118***	-	59	-	-	084-05W
A.C. Rectified Voltmeter	15-600V 25Hz/3kHz	1.5	See T118***	-	-	86	-	078-05W
A.C. Rectified Voltmeter	15-600V 25Hz/3kHz	1.5	See T118***	-	-	-	86	087-11W
Elapsed Time Meter	50 or 60Hz, 100-400V*			57	-	-	-	083-155 or 156
Elapsed Time Meter	12, 24V D.C.			57	-	-	-	083-151
Elapsed Time Meter	50 or 60Hz, 100-400V*			-	59	-	-	084-155 or 156
Elapsed Time Meter	12, 24V D.C.			-	59	-	-	084-151
Elapsed Time Meter	50 or 60Hz, 100-400V*			-	-	86	-	078-155 or 156
Frequency Meter	50/60/400Hz 100-440V*	0.5%	4	57	-	-	-	083-41S
Frequency Meter	50/60/400Hz 100-440V*	0.5%	4	-	59	-	-	084-41S/089-41S
Frequency Meter	50/60/400Hz 100-440V*	0.5%	4		-	86	86	078/087-41L
Temperature Indicator	RTD	1.5	See T118***	-	-	86	-	078-45 R
Wattmeter or Varmeter	0.2-10A/100-440V*	Balanced	Current	-	-	132	132	078/087-21 or 31
360° Power Factor Meter	1 or 5A 100-440V* 50 or 60Hz	2°		-	-	132	132	078-13
360° Power Factor Meter	1 or 5A 100-440V* 50, 60 or 400Hz	2°		-	-	132	132	087-13
360° Rotary Synchroscope	100/125V, 200/250 380/450**	2°		-	-	132	132	078/087-14
Transducer Operated Indicator	1, 5, 10, 20 or 4/20mA	1.0	See T118***	57	-	-	-	083-05
Transducer Operated Indicator	1, 5, 10, 20 or 4/20mA	1.0	See T118***	-	59	-	-	084-05
Transducer Operated Indicator	1, 5, 10, 20 or 4/20mA	1.0	See T118***	-	-	86	-	078-05
Transducer Operated Indicator	1, 5, 10, 20 or 4/20mA	1.0	See T118***	-	-	-	86	087-11

* 100-440V = (100/125, 200/250, 380/440)

** Using transformer box 855-954

*** T118 is a Technical Sheet available on request.

For specification and connection diagrams, please refer to equivalent models in the 240 Series DIN Panel Meter section. Replace 244 with 078 etc., e.g. 244-210 becomes 078-210.

Features

Designed specifically for stringent industrial, marine and military specifications

An extensive range of high accuracy measuring instruments in 5 case sizes

Rugged Hi-Q taut-band suspension

Bump, shock and vibration proof

Benefits

Complies with BS EN 60051 (IEC51) for models 081 to 084

IP67 (NEMA 6 and 6P) protection for models 083/084 and 089

IP68 for models 081 and 082

Dial illumination option

Applications

Switchgear

Distribution systems

Generator sets

Control panels

Energy management

Utility power monitoring

Process control

Motor control

Industrial, marine and military specifications

Approvals

DEF STAN 66.7 and 66.9
(Models 081, 084 and 089)

080 Series 90° scale

A range of metal cased, sealed instruments for use in industrial and military applications involving extreme shock, vibration, temperature, dirt or humidity. Bezel sizes 32mm, 45mm, 57mm, 83mm comply with Ministry of Defence specification DEF STAN 66-7 or DEF STAN 66-9 for all ratings listed in the standard. Bezel size 89mm complies with MIL-M-10304 dimensionally.

Description

Five bezel sizes of 32mm Ø (081), 45mm Ø (082), 57 x 57mm (083), 83mm Ø (084) and 89mm Ø (089) with barrel diameters of 26mm (081), 37mm (082), 53mm (083), and 67mm (084 and 089) and toughened glass windows are used throughout the series. In order to avoid fogging they are dried, evacuated and filled with dry nitrogen. Except on model 083, panel sealing gaskets are provided as standard. The smaller cases, Models 081 and 082, are made from nickel-plated brass and anodised aluminium alloy. Single hole fixing is made by means of a threaded clamp ring which screws onto the barrel, they also have ceramic insulated terminals and no zero adjuster is fitted. Models 083, 084 and 089 have steel cases with fixing holes in the flange. Sealed zero adjusters are provided. Standard instrument dials are finished in matt white with black printing and parallel pointer. The scales form a true arc with zero on the left.

Options

Options available include dial illumination a centre zero, off-set zero or suppressed zero, colour index lines, bands, zones or segments, black dial with white printing, customer logo. Instruments operated by separate transducers to indicate watts, VArs, frequency, phase angle, current, voltage or physical/mechanical parameters are also available. Illumination options as follows:

Model 081: Through dial, white or red bulb, 12 or 24V illumination.

Models 081/082: Betalite through dial, 12 or 24V, illumination.

Models 082/083/084/089: Through dial, red or clear LED 12 or 24V illumination.

Models 083/084/089: Edge, White or Red bulb, 12 or 24V, illumination.

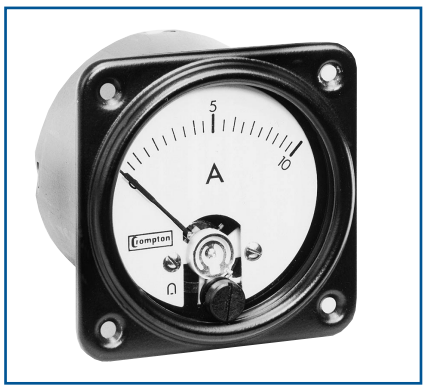
Specification

Performance:	BS EN60051 (IEC51) for models 081 to 084 DEF STAN 66-7 and 66.9 on request (081/084 & 089)
Accuracy:	Model 081: Class 5. Others: Class 2.5 Frequency Meter 0.5% of Mid Frequency (083, 084, 089)
Scaling:	To BS89, BS3693 or DEF STAN 66-7 and 66-9 (081 to 084)
Dielectric Test @ 50 Hz:	750V r.m.s (081); 1kV r.m.s (082); 2kV r.m.s (083/084/089); <50V 500V r.m.s All for 1 minute
Overloads:	x 1.2 rated current or voltage for 2 hours x 10 rated current for 5 seconds x 2 rated voltage for 5 seconds
Burden:	A.C. Ammeter: 1VA Maximum A.C. Voltmeter: 3VA Maximum Frequency Meter: 4VA Maximum Elapsed Time Meter: 2.5VA Maximum
Enclosure Code :	083/084/089: to IP67 (NEMA 6 & 6P) 081/082: to IP68
Case:	081/084 & 089: Matt black metal filled with dry nitrogen 081 and 082: Nickel-plated brass and anodised aluminium alloy.
Bezel:	Matt black metal
Bezel Window:	Toughened glass
Operating Temp:.	Model 081 to 084: -40°C to +70°C (-45F to +158°F) Model 089: -55°C to 65°C (-67°F to +185°F)
Standard Calibration:	23°C (73°F)
Approvals:	EMC and LVD. DEF 66.7 and 66.9

Product Range – 080 Series 90° scale

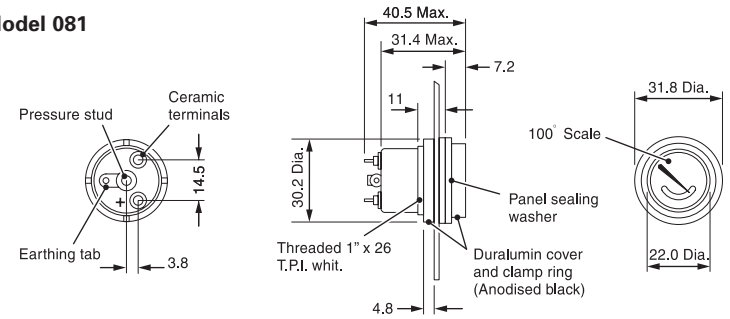
Type of Instrument	Ranges	Case Code 081	082	083	084	089	Product Code
A.C. Ammeter Moving Iron	1-30A	–	–	✓	–	–	083-75A
A.C. Ammeter Moving Iron	1-30A	–	–	–	✓	–	084-75A
A.C. Ammeter Moving Iron	1-30A	–	–	–	–	✓	089-75A
A.C. Voltmeter Moving Iron	5-300V	–	–	✓	–	–	083-75V
A.C. Voltmeter Moving Iron	5-500V	–	–	–	✓	–	084-75V
A.C. Voltmeter Moving Iron	5-500V	–	–	–	–	✓	089-75V
D.C. Ammeter Shunt Operated	50, 60, 75, 100, 150mV	✓	–	–	–	–	081-80A
D.C. Ammeter Shunt Operated	50, 60, 75, 100, 150mV	–	✓	–	–	–	082-80A
D.C. Ammeter Shunt Operated	50, 60, 75, 100, 150mV	–	–	✓	–	–	083-80A
D.C. Ammeter Shunt Operated	50, 60, 75, 100, 150mV	–	–	–	✓	–	084-80A
D.C. Ammeter Shunt Operated	50, 60, 75, 100, 150mV	–	–	–	-	✓	089-80A
D.C. Ammeter	50µA-20mA	✓	–	–	–	–	081-80A
D.C. Ammeter	50µA-10A	–	✓	–	–	–	082-80A
D.C. Ammeter	50µA-30A	–	–	✓	–	–	083-80A
D.C. Ammeter	50µA-30A	–	–	–	✓	–	084-80A
D.C. Ammeter	50µA-30A	–	–	–	–	✓	089-80A
D.C. Ammeter Suppressed Zero	4/20mA	✓	–	–	–	–	081-80R
D.C. Ammeter Suppressed Zero	4/20mA	–	✓	–	–	–	082-80R
D.C. Ammeter Suppressed Zero	4/20mA	–	–	✓	–	–	083-80R
D.C. Ammeter Suppressed Zero	4/20mA	–	–	–	✓	–	084-80R
D.C. Voltmeter	50mV-300V	✓	–	–	–	–	081-80V
D.C. Voltmeter	50mV-300V	–	✓	–	–	–	082-80V
D.C. Voltmeter	50mV-300V, 1000Ω/V	–	–	✓	–	–	083-80V
D.C. Voltmeter	50mV-300V	–	–	–	✓	–	084-80V
D.C. Voltmeter	50mV-300V	–	–	–	–	✓	089-80V
D.C. Voltmeter Suppressed Zero	1/5V	–	✓	–	–	–	082-80S
D.C. Voltmeter Suppressed Zero	1/5V	–	–	–	✓	–	084-80S
A.C. Rectified Ammeter	100µA-500mA.25Hz/3kHz	–	✓	–	–	–	082-80B
A.C. Rectified Ammeter	100µA-500mA.25Hz/3kHz	–	–	✓	–	–	083-80B
A.C. Rectified Ammeter	100µA-500mA.25Hz/3kHz	–	–	–	✓	–	084-80B
A.C. Rectified Voltmeter	15-300V	–	✓	–	–	–	082-80W
A.C. Rectified Voltmeter	15-600V, 900Ω/V	–	–	✓	–	–	083-80W
A.C. Rectified Voltmeter	15-600V	–	–	–	✓	–	084-80W
A.C. Rectified Voltmeter	15-600V	–	–	–	–	✓	089-80W
Elapsed Time Meter (99999.9)	12 or 24V D.C.	–	✓	✓	✓	–	082/083/084-151
Elapsed Time Meter (99999.9)	50Hz / 100-440V*	–	–	✓	✓	–	083/084-155
Elapsed Time Meter (99999.9)	60Hz / 100-440V*	–	–	✓	✓	–	083/084-156
Elapsed Time Meter (99999.9)	50Hz / 100-440V*	–	–	–	–	✓	089-155
Elapsed Time Meter (99999.9)	60Hz / 100-440V*	–	–	–	–	✓	089-156
Frequency Meter	50 or 60 or 400Hz/100-440V*	–	–	✓	–	–	083-41S
Frequency Meter	50 or 60 or 400Hz/100-440V*	–	–	–	✓	–	084-41S
Frequency Meter	50 or 60 or 400Hz/100-440V*	–	–	–	–	✓	089-41S
Transducer Indicator Speed	1, 5, 10, 20 & 4/20mA				✓		084/802
Transducer Indicator Frequency	1, 5, 10, 20, & 4/20mA				✓		084/803
Transducer Indicator Phase Angle	1, 5, 10, 20, & 4/20mA				✓		084/804
Transducer Indicator Watts	1, 5, 10, 20, & 4/20mA				✓		084/805
Transducer Indicator Vars	1, 5, 10, 20, & 4/20mA				✓		084/806
Transducer Indicator VA	1, 5, 10, 20, & 4/20mA				✓		084/807

* 100-440V = (100/125 or 200/250 or 380/440)

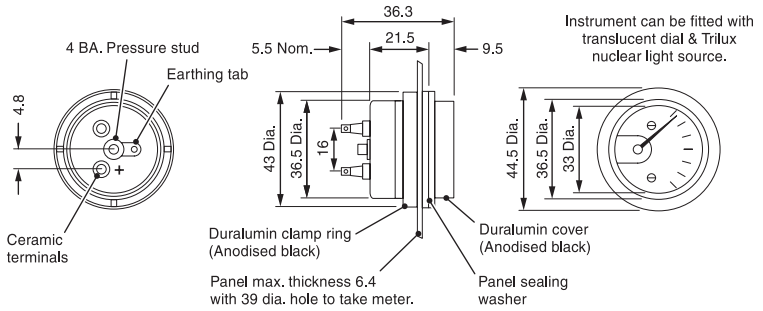


Dimensions

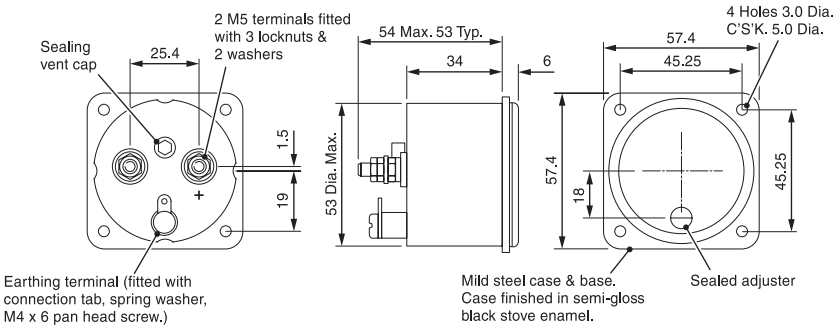
Model 081



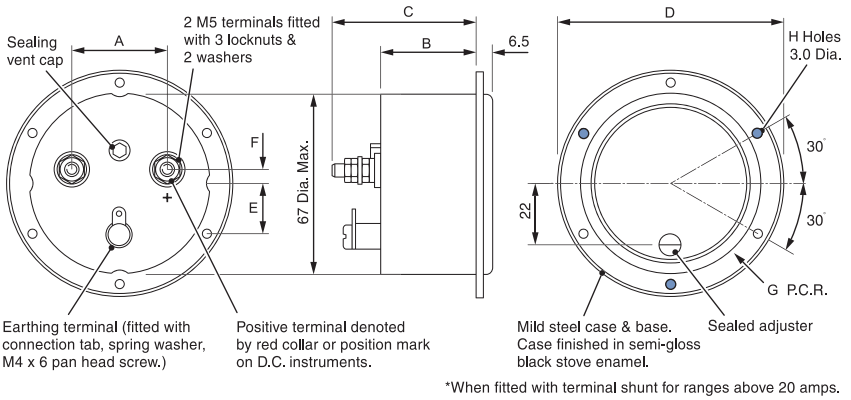
Model 082



Model 083



Model 084/089



*When fitted with terminal shunt for ranges above 20 amps.

	A	B	C	D	E	F	G	H
084-80	35	33.5	59	82.5	20	5	36.5	6 off
089-80	35	33.5	59	88.9	20	5	36.5	3 off
084-75	35	38	64	82.5	20	5	36.5	6 off
089-75	35	38	64	88.9	20	5	36.5	3 off

Panel Cut out 68.3ø - Holes 3.8ø

These ● holes on 084 only.

Catalogue Numbering System

Guide to Catalogue Numbering System Example Code: 244 - 03AG - LSPK - C6 - ER

244 — **03** — **A** — **G** — **LS** — **PK** — **C6** — **ER**

SERIES
016 – Fiesta
075 – Short case switchboard
077 – Standard switchboard
078 – Hi-shock sealed
079 – 8¾" switchboard
083 – 2" sealed
084 – 2½" sealed
242 – 48mm DIN
243 – 72mm DIN
244 – 96m DIN
246 – 144mm DIN
E242 – Eurodin 48mm
E243 – Eurodin 72mm
E244 – Eurodin 96mm

TYPE / FUNCTION
A – Amperes DC
B – Rectified amperes
C – Center zero amps
D – Zero offset current
F – Amperes AC
G – Volts AC
H – High middle
K – DC input non electrical scaling
L – Vars self contained
N – Center zero voltage
P – Zero offset voltage
R – Live zero current
S – Live zero voltage
V – Volts DC
W – Rectified voltage
Y – Expanded scale AC
Z – Expanded scale DC
2 – 2 x overload ammeters
3 – 3 x overload ammeters
5 – 1 phase 2 wire watts
6 – 6 x overload ammeters
8 – 3 phase 3 wire watts
9 – 3 phase 4 wire watts

INPUT OR MOVEMENT RATING
LA – 1A
LS – 5A
PZ – 150V
RX – 300V
SJ – 600V
PN – 120V
RP – 240V
SE – 480V
QQ – 120V 5A
QS – 240V 5A
QT – 480V 5A etc

OPTIONS
Indicate as required

SYSTEM FREQUENCY
(AC Meters)
C4 – 400Hz
C5 – 50Hz
C6 – 60Hz
C7 – 50/60Hz

MOVEMENT CODE
01 – Shortscale AC & DC
02 – Shortscale AC
03 – Longscale AC & DC
05 – Longscale AC & DC
07 – Edgewise AC DC
08 – Longscale AC
10 – Edgewise AC & DC
11 – Longscale DC
12 – Phase sequence meter
13 – 360 rotating iron PFI
14 – Synchroscope
15 – Elapsed time meter
16 – Thermal demand ammeter
21 – Wattmeter
30 – Meter relay
31 – Varmeter
41L – Frequency meter longscale
41S – Frequency meter shortscale
42 – Power factor meter
45 – RTD temperature
92 – Shunts
94 – Current transformers
HW – Kilowatt hour class 1.0
KH – Kilowatt hours
KW – Kilowatt hours class 2.0

NATIONAL STANDARD
A – ANSI C39.1
B – BS 89
G – DIN
I – ANSI fixing captions
J – Japanese instrument Standard

SCALING OR OUTPUT
BX – Volt free relay contacts
FA – 1mA
HG – 4/20mA
PK – 0/100
PZ – 0/150
RL – 0/200
RX – 0/300
SC – 0/400
SJ – 0/600
SS – 0/1000
TM – 0/2000
UB – 0/4000
UJ – 0/5000 etc

This guide is not inclusive of all catalogue numbers and should be used for reference only, as improper combinations can be achieved.

Glossary of Terms

MI	Moving iron also called 'iron vane' in the North American market for measuring AC amps and volts.
MC	Moving coil for measuring DC amps and volts.
Taut band Suspension Movement	A meter movement held under tension usually on a ligament.
Ligament	The taut band.
Pivot and Jewell (P&J)	A movement which rotates on a spindle, and pivots within an oil filled jewel. This type of movement typically offers excellent vibration resistance characteristics.
Short Scale	Angle of deflection for a movement usually 90 degrees but ANSI is 100 degrees in some products.
Long Scale	Angle of deflection for a movement usually 240 degrees but is frequently referred to as 270 degree.
FSD	Full scale deflection.
ES	End scale.
Input	Electrical value from which the measurement is derived to achieve the full scale deflection of the movement.
Linear	A term used to state that the input is constant, allowing for an even scaling.
Non Linear	The opposite of linear, giving a scale shape which will cramp at some point on the dial. Usually inaccurate below 20% of the full scale value.
Logarithmic Scaling	A log scale usually derived from a non linear DC output.
Scale	The graphical representation of the value being measured.
Dual Arc	More than one set of figures on a dial plate.
Dial Plate/Scale Plate	Surface on which the dial is drawn.
Calibration Chart	A chart matching input values to scale mark, mainly used for complicated scales.
Enclosure Rating	Usually expressed in the form of IP rating or in America NEMA. It is the statement of the products resistance to the ingress of moisture and dust.
DIN	European standard meter shape. Based on multiplies of 24mm i.e. 48, 72, 96, 144 mm.
ANSI	American National Instrument Standard.
JIS	Japanese Instrument Standard.
BS89	Old British Standard usually refers to rectangular meter or "Fiesta" style product.
Switchboard Meter	General term for long scale instruments.
Panel Meter	General name for shortscale instruments.
Analogue Indicator	Generic term for instruments usually refers to a low accuracy meter. An indicator only.

Notes

Energy Division – a pioneer in the development of economical solutions for the electrical power industry. Our product range includes: Cable accessories, connectors & fittings, electrical equipment, instruments, lighting, insulators & insulation enhancement and surge arresters.

For more information and your country contact person, please visit us at:
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