



070 Series ANSI Switchboard Meters

High quality range of switchboard instruments with Class 1 accuracy and which complies with American ANSI-C39.1 (1981) specifications. Available in 4 1/2" and 8 3/4" case sizes, their rugged design characteristics meet the needs of the most demanding environmental applications. This extensive range of analogue and digital/analogue meters utilises high shock oil dampened movements and provides 1% accuracy for all RMS AC and DC ranges. The range offers various customised options and features.

Features

- Rugged Hi-Q taut band suspension
- Class 1 accuracy
- 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 file no: E87815
- CSA file no: LR99712-1
- ABS (American Bureau of Shipping) 93-LD 17806-X
- ISSeP (Institute Scientifique de Service Public) 97D.101.226x

Description

070 series offers two case sizes, 4 1/2" (Models 075, 077 and 078) and 8 3/4" (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 and 077 are a one piece flame retardant polycarbonate moulding with a black matte 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 white matte 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 and 077), slave pointer, calibration for non standard ambient temperatures, special scales, trim potentiometers, and illuminated dials with white or red light sources.

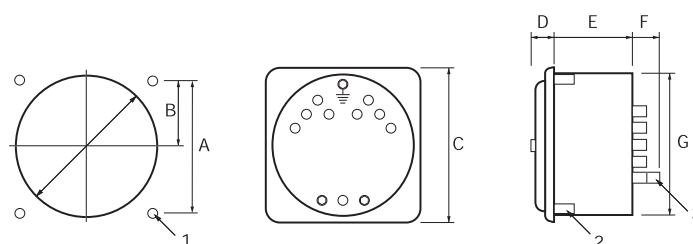
Specifications

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 and 6P)
Fixing on panel:	4 integral 1/4-28 UNF fixing studs
Approvals:	EMC and LVD, UL, CSA, ABS and ISSep

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).



Product Codes

Type of instrument	Ranges	Case codes				Product codes
		075	077	078	079	
AC ammeter moving iron	0.5-10A	56	56	-	-	075/077-08A
AC ammeter moving iron	0.5-10A	-	-	86	86	078/079-08A
AC 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 AC ammeter	5/30A - 30/180A	-	86	86	86	077/078/079-086
AC voltmeter moving iron	30-800V	-	86	86	86	077/078/079-08V
AC rectified ammeter	1-30A	56	56	86	56	075/077/078/079-05B
AC rectified voltmeter	30-800V	56	56	86	56	075/077/078/079-05W
AC voltmeter expanded scale	110-130V	-	86	86	86	077/078/079-05Y
AC RMS ammeter	1-30A	56	56	86	56	075/077/078/079-05F
AC 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 DC	-	56	56	-	077/078-155/156/077-151
Frequency meter	50, 60 400Hz/100-440V**	86	86	86	86	075/077/078/079-41L
AC 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 and synchro check relay	63.5-480V****	-	86	-	-	077-14
AC meter relay	AC6V-500V, 100µA-1A, 5A via CT	-	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
DC ammeter moving coil	200µA - 30A 56	56	56	56		075/077/078/079-05A
DC voltmeter moving coil	50mV-600V 56	56	56	56		075/077/078/079-05V
DC 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						
AC ammeter	1mA - 10A	-	86	-	-	077-DIB
AC voltmeter	200mV - 600V	-	86	-	-	077-DIW
AC wattmeter	69V/5A, 120V/5A, 50 or 60Hz	-	86	-	-	077-DW
AC 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
DC ammeter	1mA - 1A	-	86	-	-	077-DIA
DC voltmeter	20mV - 600V	-	86	-	-	077-DIV
Transducer indicator	DC mA	-	86	-	-	077-DIT
Tachometer	AC or DC 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.



AC and DC Ammeters, Voltmeters and Frequency Meters

This range of self contained, Hi-Q, taut band moving coil meters feature 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. While types of frequency meters can be damaged by transient supply voltage spike. Crompton 077-41 frequency meters can withstand, without damage, 10 successive transient spikes of 1250 volts. The range offers UL and CSA approvals. JIS dimensioned products are available on request.

Specifications – 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 and 078: 175.2 mm (6.9") 079: 353 mm (13.9")
Scale plate:	2 piece, platform type
Response time:	077 and 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. M5 screw clamp is optional.
Position:	Vertical (scale)
Dielectric withstand:	2300V AC for 1 minute between electrical circuit and case
Overshoot:	33% maximum
Enclosure code:	077 and 079: IP54, optional IP55 078: IP67
Approvals:	EMC and LVD. UL file no: E87815. CSA file no: LR99712-1

Specifications – Ammeters and Voltmeters

Overload rating:	AC ammeters - 2 x continuous, 50 x for 1 second AC voltmeters and frequency meters - 1.2 x continuous DC ammeters - 2 x continuous 10 x for 1 second DC voltmeters - 1.2 x continuous
Frequency range:	AC calibration 60Hz ±20%

Specifications – 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

Moving Iron AC Ammeters

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

Rating	Scaling*	4 1/2" square flange		8 3/4" square flange
		Standard case catalogue no.	Sealed case hi-shock catalogue no.	Standard case catalogue no.
1A0-1A		•/+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
2A0-2A		•/+077-08AA-LELE-C6	078-08AJ-LELE-C6	•079-08AA-LELE-C6
3A0-3A		•/+077-08AA-LJLJ-C6	078-08AJ-LJLJ-C6	•079-08AA-LJLJ-C6
5A0-5A		•/+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



AC Overload Ammeters

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

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

Product Code – AC 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 CTs with 6 x full scale.
Overload portion of the scale is not subject to the accuracy guarantee.
• UL approved file no. E87815
+ CSA approved file no. LR52592

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



AC Voltmeter

Moving Iron AC Voltmeters

Product Codes – Self Contained 60Hz $\pm 20\%$ (Accuracy $\pm 1\%$)***

Rating	Scaling*	4 1/2" square flange		8 3/4" 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-RXRXC6	078-08VJ-RXRXC6	•079-08VA-RXRXC6
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 – Transformer Rated 50/60HZ (Accuracy $\pm 1\%$)
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 approved file no. E87815
- + CSA approved file no. LR52592

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

RMS Reading AC Ammeters

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

Rating	Scaling*	4 1/2" square flange		8 3/4" square flange
		Standard case catalogue no.	Sealed case hi-shock catalogue no.	Standard case catalogue no.
1A0-1A		•/+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 AC rectified non-RMS compensated meter, please replace the -05F in the product code with -05B.

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

150V	0-300V	•/+077-08VA-PZRX-C6	078-08VJ-PZRX-C6	•079-08VA-PZRX-C6
5A	0-10A	•/+077-05FA-LSMT-C6	078-05FJ-LSMT-C6	•079-05FA-LSMT-C6
5A	0-15A	•/+077-05FA-LSND-C6	078-05FJ-LSND-C6	•079-05FA-LSND-C6
5A	0-20A	•/+077-05FA-LSNG-C6	078-05FJ-LSNG-C6	•079-05FA-LSNG-C6
5A	0-25A	•/+077-05FA-LSNJ-C6	078-05FJ-LSNJ-C6	•079-05FA-LSNJ-C6
5A	0-30A	•/+077-05FA-LSNL-C6	078-05FJ-LSNL-C6	•079-05FA-LSNL-C6
5A	0-40A	•/+077-05FA-LSNP-C6	078-05FJ-LSNP-C6	•079-05FA-LSNP-C6
5A	0-50A	•/+077-05FA-LSNT-C6	078-05FJ-LSNT-C6	•079-05FA-LSNT-C6
5A	0-75A	•/+077-05FA-LSPB-C6	078-05FJ-LSPB-C6	•079-05FA-LSPB-C6
5A	0-100A	•/+077-05FA-LSPK-C6	078-05FJ-LSPK-C6	•079-05FA-LSPK-C6
5A	0-150A	•/+077-05FA-LSPZ-C6	078-05FJ-LSPZ-C6	•079-05FA-LSPZ-C6
5A	0-200A	•/+077-05FA-LSRL-C6	078-05FJ-LSRL-C6	•079-05FA-LSRL-C6
5A	0-250A	•/+077-05FA-LSRS-C6	078-05FJ-LSRS-C6	•079-05FA-LSRS-C6
5A	0-300A	•/+077-05FA-LSRX-C6	078-05FJ-LSRX-C6	•079-05FA-LSRX-C6
5A	0-400A	•/+077-05FA-LSSC-C6	078-05FJ-LSSC-C6	•079-05FA-LSSC-C6
5A	0-500A	•/+077-05FA-LSSF-C6	078-05FJ-LSSF-C6	•079-05FA-LSSF-C6
5A	0-600A	•/+077-05FA-LSSJ-C6	078-05FJ-LSSJ-C6	•079-05FA-LSSJ-C6
5A	0-800A	•/+077-05FA-LSSN-C6	078-05FJ-LSSN-C6	•079-05FA-LSSN-C6
5A	0-1000A	•/+077-05FA-LSSS-C6	078-05FJ-LSSS-C6	•079-05FA-LSSS-C6
5A	0-1200A	•/+077-05FA-LSSU-C6	078-05FJ-LSSU-C6	•079-05FA-LSSU-C6
5A	0-1500A	•/+077-05FA-LSTC-C6	078-05FJ-LSTC-C6	•079-05FA-LSTC-C6
5A	0-1600A	•/+077-05FA-LSTE-C6	078-05FJ-LSTE-C6	•079-05FA-LSTE-C6
5A	0-2000A	•/+077-05FA-LSTM-C6	078-05FJ-LSTM-C6	•079-05FA-LSTM-C6
5A	0-2500A	•/+077-05FA-LSTU-C6	078-05FJ-LSTU-C6	•079-05FA-LSTU-C6
5A	0-3000A	•/+077-05FA-LSUA-C6	078-05FJ-LSUA-C6	•079-05FA-LSUA-C6
5A	0-4000A	•/+077-05FA-LSUE-C6	078-05FJ-LSUE-C6	•079-05FA-LSUE-C6
5A	0-5000A	•/+077-05FA-LSUJ-C6	078-05FJ-LSUJ-C6	•079-05FA-LSUJ-C6
5A	0-6000A	•/+077-05FA-LSUP-C6	078-05FJ-LSUP-C6	•079-05FA-LSUP-C6
5A	0-7000A	•/+077-05FA-LSUS-C6	078-05FJ-LSUS-C6	•079-05FA-LSUS-C6
5A	0-8000A	•/+077-05FA-LSUW-C6	078-05FJ-LSUW-C6	•079-05FA-LSUW-C6

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

Rated 5A for standard CT's with 6 x full scale.
Overload portion of the scale is not subject to the accuracy guarantee.
• UL approved file no. E87815
+ CSA approved file no. LR52592

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



AC Ammeter



AC Voltmeter



AC Voltmeter – Expanded Scale

RMS Reading AC Voltmeters

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

Rating	Scaling*	4 1/2" square flange		8 3/4" 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 AC rectified non-RMS compensated meter, please replace the -05G in the product code with -05W.

**Product Codes – Transformer 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 AC 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 PT	077-05YA-PN**-C6	078-05YJ-PN**-C6	079-05YA-PN**-C6

Product Codes – Instantaneous AC Voltmeter*
with Instantaneous Maximum Reading Slave Pointer**

150V	To suit PT	077-05XA-PZ**-C6		
250V	To suit PT	077-05XA-RS**-C6		
300V	To suit PT	077-05XA-RX**-C6		

077 moving iron ammeters and voltmeters available as listed above.

- UL approved file no. E87815
- + CSA approved file no. LR52592

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

DC Ammeters

Product Codes – Self Contained (Accuracy $\pm 1\%$)****

Rating	Scaling*	4 1/2" square flange		8 3/4" square flange
		Standard case catalogue no.	Sealed case hi-shock catalogue no.	Standard case catalogue no.
0-200 μ A	0-200 μ A	•/+077-05AA-EAEA	078-05AJ-EAEA	•079-05AA-EAEA
0-300 μ A	0-300 μ A	•/+077-05AA-EEEE	078-05AJ-EEEE	•079-05AA-EEEE
0-500 μ A	0-500 μ A	•/+077-05AA-EMEM	078-05AJ-EMEM	•079-05AA-EMEM
0-800 μ A	0-800 μ A	•/+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 $\pm 1\%$)****

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

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



DC Ammeter

Intrinsically safe milliammeters (accuracy $\pm 1\%$) ISSEP certified

Rating	Standard case catalogue no.
1mA DC	077-11AF-FA**
5mA DC	077-11AF-FX**
10mA DC	077-11AF-HA**
20mA DC	077-11AF-HF**
4/20mA DC	077-11RFHG**

** State scale marking as required

- UL approved file no. E87815
- + CSA approved file no. LR52592

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

DC 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.

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



DC Voltmeter

DC Voltmeters

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

Rating	Scaling*	4 1/2" square flange		8 3/4" square flange
		Standard case catalogue no.	Sealed case hi-shock catalogue no.	Standard case catalogue no.
50mV-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-RXR X	078-05VJ-RXR X	079-05VA-RXR X
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-RXR X	078-05NJ-RXR X	079-05NA-RXR X
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 Codes – Suppressed Zero* **

1 - 5V	To suit	•/+077-05S-LM	078-05S-LM	•079-05S-LM
--------	---------	---------------	------------	-------------



Frequency Meter

Frequency Meters

Product Codes –120V Self Contained* **

Rating	Scaling*	4 1/2" square flange		8 3/4" 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

For alternative voltage rating 200-250V, use code RN instead of PN
 For alternative voltage rating 380-480V, use code SE instead of PN
 • UL approved file no. E87815

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

Thermal Maximum Demand Directly Heated Element Type

Meter 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 current value since the previous setting. 4 1/2" square flange.

Specifications

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

Product Codes

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

Thermal / Instantaneous Maximum Demand Ammeter (MDA)

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

Specifications

Burden:	4VA with limiting CT, 3VA without limiting CT
Time lag:	15 minutes
Accuracy:	3% MDA, 2% iron vane, 50 or 60Hz

Product Codes

Thermal / instantaneous MDA	
5/6A with 20% overload scale and internal limiting CT	•077-16FU-LS**
5A - without 20% overload scale, with internal limiting CT	•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 CT	•077-16FU-LV**
5/10A - without 20% overload scale with internal limiting CT	•077-16FU-LV** - NO

Instantaneous Maximum Demand Ammeter with Slave Pointer

Designed for compatibility with other 4 1/2" switchboard meters, this instrument enhances panel appearance and indicates maximum instantaneous load current values. A long-scale high torque, taut band iron vane movement drives the red slave pointer.

Specifications

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

Product Code

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

** Specify scale required
 • UL approved



AC Maximum Demand Ammeter



Thermal Instantaneous Maximum Demand Ammeter



Instantaneous Maximum Demand Ammeter



AC Wattmeters and VArmeters

The Crompton 70 series of AC 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 or three-phase systems. VArmeters can be supplied with internal or external phase shifter according to user preferences. The most frequently selected wattmeter scale marking for common current and voltage transformers are listed on the following pages. In addition, these instruments may be supplied with zero-left or center-zero scales at the same list price.

Scaling

Wattmeter and VArmeter current circuits should have equal carrying capacity because they are frequently connected in series. This means that 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 have higher end-scale values if the instruments are center or offset-zero). Instruments measuring 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. Customised scales may be calculated for wattmeters and VArmeters not listed on the charts. Scales for watts must be one of the standard full-scale dial markings shown in the charts.

Calibration

For full load value of watts or VAr, assuming unity power factor:

1-phase 2-wire watts = amps x volts

3-phase 3-wire watts = amps x line-to-line volts x $\sqrt{3}$

3-phase 4-wire watts = amps x line-to-neutral volts x 3

Minimum scale values are obtained by multiplying resultant watts, using the above formula x 0.7 and selecting next higher standard scale.

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

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

Note: When ordering wattmeters and VArmeters, please specify CT ratio, VT ratio and required scale.

Specifications

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 influence:	2 x rating for 5 seconds., 1.2 x continuously 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

		120	208	240	480	600	2400	3600	4200	4800	6000	7200	8400
Primary potential transformer voltage system		(1:1)	(1.73:1)	(2:1)	(4:1)	(5:1)	(20:1)	(30:1)	(35:1)	(40:1)	(50:1)	(60:1)	(70:1)
3-phase 3-wire (L-L) system voltage		120	208	240	480	600	2400	3600	4200	4800	6000	7200	8400
3-phase 4-wire (L-N) current transformer		69	120	139	277	347	1390	2100	2400	2770	3500	4160	4800
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	4000	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

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

AC Wattmeters

Product Codes – 1-Element, Transformer Rated. 50/60Hz. Taut Band Integral Transducer. (Accuracy 1.0%. 50/60Hz)

Measured system					Scales	4½" square flange		8½" 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
1	2	5	240V	To suit	077-215A-QS**	078-215J-QS**	079-215A-QS**	

For connection diagram, see Fig. 21 on 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, see Fig. 25 on page 60.

Product Codes – 2½-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, see Fig. 28 on 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

AC 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, see Fig. 32 on page 61.

Product Codes – 2½-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, see Fig. 32 on page 61

- UL approved file no. E87815 + CSA approved file no. LR52592
- ** Specify CT (Current Transformer) and VT (Voltage Transformer) ratios if used, and preferred scale at time of ordering.



AC Wattmeter



AC VArmeter



RTD Temperature Meter

RTD Temperature Meters*

Product Codes – Span Accuracy of 1.0%

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

Rating	Scaling*	4 1/2" 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, see Fig. 17 on page 59.

Thermocouple Temperature Meters

Product Code – Span Accuracy of 1.0%

Meters are suitable for J and K type cold junction compensation and include thermocouple break indication. Specify J or K type and temperature at time of ordering.

Rating	4 1/2" square flange standard case catalogue no.
110/130V 50/60Hz	077-45TA-**PM

For connection diagrams, see Fig. 18 on page 59.

Tap Position Indicator

Product Code

Indicator shows transformer tap, hoist or valve position a using 3-wire system for 1-18 tap positions with 400 ohm steps.

Rating	Scaling*	4 1/2" square flange		8 3/4" 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-	-	-

For connection diagrams, see Fig. 20 on page 60.

Select nearest higher rated voltmeter and specify requirement

- UL approved file no. E87815
- JT for J type, KT for K type thermocouple
- * Other ranges available on request
- Consult with the factory.
- ** RI for 10 ohm copper or R2 for 100ohm platinum.
- *** Specify input and scale.

Elapsed Time Meters

**Product Codes – 99,999.99 hours, Non Reset. Burden 2.5VA.
50 or 60Hz**

Synchronous motor running time meter with a non resettable indicator.

Rating	4 1/2" square flange		8 3/4" 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 DC	077-151A-		



Elapsed Time Meter

AC Phase Sequence, Phase Failure Indicators

Product Codes – Neon Bulb Tytpe. Burden 2.5VA

Two neon bulbs for phase sequence indication - first marked the caption "correct 1-2-3", the second marked "incorrect 3-2-1". Three neon bulbs for phase failure indication - first marked 1, second marked 2, third marked 3.

Rating	4 1/2" square flange		8 3/4" 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



AC Phase Sequence and Phase Failure Indicator

For connection diagrams, see Fig. 1 on page 58.

DC Indicators for Tachometer Generators

Product Code

Rating	4 1/2" square flange		8 3/4" square flange
	Standard case catalogue no.	Sealed case hi-shock catalogue no.	Standard case catalogue no.
DC Volts	077-052A-**	078-052J-***	079-052A-***

Select nearest higher rated voltmeter and specify requirement

- UL approved file no. E87815
- JT for J type, KT for K type thermocouple
- * Other ranges available upon request - Consult with the factory.
- ** RI for 10 ohm or R2 for 100 ohm platinum.
- *** Specify input and scale



AC Power Factor Meter

AC Power Factor Meter

Specifications

Ratings, self-contained:	Current windings 5A. Voltage windings minimum 50V, maximum 600V
Accuracy:	Balanced Load: Class 1, Unbalanced Load: Class 3
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 $\pm 10\%$ deviation from 69Hz: 1.0%
Overload capacity: and 25% indefinitely.	Current coils 1000% momentarily, 100% for 15 minutes 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.

Product Codes – Balanced Load (Accuracy $\pm 1\%$)

Measured system		Scales	4 1/2" square flange		8 3/4" square flange		
Phases	Wires		Standard case catalogue no.	Sealed case hi-shock catalogue no.	Standard case catalogue no.		
	Amperes 2 VA max. burden						
	Volts 1 VA max. burden						
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

Instruments may be used on loads down to 20% of current and between 90% and 110% of voltage rating.

For connection diagrams, see Fig. 13 and 15 on page 59.

Product Codes – Unbalanced Load (Accuracy $\pm 3\%$ of scale)

Measured system		Scales	4 1/2" square flange		8 3/4" square flange		
Phases	Wires		Standard case catalogue no.	Sealed case hi-shock catalogue no.	Standard case catalogue no.		
	Amperes 2 VA max. burden						
	Volts 1 VA max. burden						
3	3	5	120V	0.5-1-0.5	077-TFUA-QQAD	–	–
3	3	5	240V	0.5-1-0.5	077-TFUA-QSAD		

Instruments may be used on loads between 50% and 110% of rated current and between 80% and 110% rated voltage.

For connection diagram, see Fig. 12 on page 59.

• UL approved file no. E87815

+ CSA approved file no. LR52592

360° Power Factor

Specifications

Ratings, self-contained:	Current windings minimum, 0.5A, maximum 20A. Voltage windings min. 50-240V, for higher voltages of up to 480V an external box is supplied.
Normal operating position:	On vertical panels 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 59-61Hz 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 (VAr):	2.03	0.281	0.4	0.281
Power factor:	0.86	0.96	0.93	0.98

Product Codes – 360° Rotary Power Factor

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, see Fig. 4, 6 and 7 on page 58.

360° rotating iron 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 approved file no. E87815
+ CSA approved file no. LR52592



360° Power Factor Meter



360° Rotary Synchroscope

360° Rotary Synchroscope

Specifications

Rating, self-contained:	120V AC	
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*	4 1/2" square flange		8 3/4" 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, see Fig. 10 on page 59.

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

• UL approved file no. E87815
+ CSA approved file no. LR52592

360° AC LED Synchroscope

Specifications

Voltage:	120, 240, 480 Volts AC or via PT
Frequency:	40/65Hz
Burden @ 60Hz:	4VA maximum Suitable for single or three-phase systems
Safety:	IEC1010-1(300V AC RMS installation degree 2)
Dielectric:	4kV RMS for 1 minute
Isolation:	BUS/GEN/RELAY
Vibration:	Meets Lloyds shipping specifications

Product Codes

Rating	Scaling	4 1/2" 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, see Fig. 8 on page 58.



360° AC LED Synchroscope

AC Synchrocheck Relay and LED 360° Synchroscope

Specifications

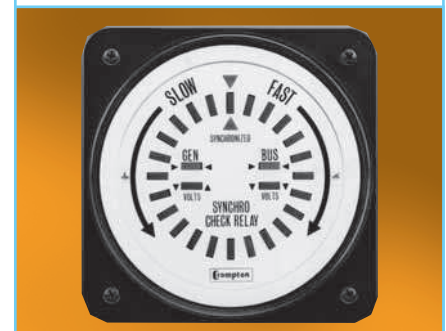
Voltage:	110/120V (115V nominal) 220/240V (230V nominal) 380/480V (430V nominal)
Phase difference:	+0 to 20° ±1°
Voltage difference:	+0 to 20% ±2%
Time delay:	0 to 2.5 seconds +10%

Product Codes

Rating	Scaling	4 1/2" square flange standard case catalogue no.
Live Bus 110/120V 40/65Hz 220/240V 40/65Hz 380/480V 40/65Hz	SLOW FAST SLOW FAST SLOW FAST	077-14GU-POYY-FQ 077-14GU-RSYY-FQ 077-14GU-SZYY-FQ
Dead Bus 110/120V 40/65Hz 220/240V 40/65Hz 380/480V 40/65Hz	SLOW FAST SLOW FAST SLOW FAST	077-14HU-POYY-FQ 077-14HU-RSYY-FQ 077-14HU-SZYY-FQ
Live Bus 120V 40/65Hz 240V 40/65Hz 480V 40/65Hz	SLOW FAST SLOW FAST SLOW FAST	077-14LU-PQYY-FQ 077-14LU-RRYY-FQ 077-14LU-SEYY-FQ
Dead Bus 120V 40/65Hz 240V 40/65Hz 480V 40/65Hz	SLOW FAST SLOW FAST SLOW FAST	077-14DU-PQYY-FQ 077-14DU-RRYY-FQ 077-14DU-SEYY-FQ

For connection diagrams, see Fig. 9 on 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)



AC Synchrocheck Relay and LED 360° Synchroscope



DC Transducer Indicator



AC Watt/Watt Hour Meter

DC Transducer Indicators

Product Codes

Rating	Scaling*	4 1/2" square flange		8 3/4" 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**
AC amps 1mA	To suit	•/+077-05AA-FA**	078-05AJ-FA**	•079-05AA-FA**
AC 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,
AC amperes, AC volts and temperature

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

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

AC Watt and Watt Hour Meters

Moving coil indication gives instantaneous watt reading. An impulse counter driven by self-contained circuitry gives the watt hour indication.

Product Codes – Transducer Driven (Accuracy ±1%)

Externally powered meter with internal linear integrator and six digit impulse counter.

Rating	Scaling*	4 1/2" square flange		8 3/4" 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**	-
50/60Hz 4-20mA		077-KHAU-HG**	078-KHAJ-HG**	-

For connection diagrams, see Fig. 19 on 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 with Integral Transducer

Measured system	Scales	4 1/2" square flange		8 3/4" square flange
		Standard case catalogue no.	Sealed case hi-shock catalogue no.	Standard case catalogue no.
Phases Wires Amperes 2 VA max. burden Volts 1 VA max. burden				
1 2 5 120	To suit	077-KHBU-QQ**	078-KHBJ-QQ**	-

For connection diagrams, see Fig. 21 on page 60.

2-Element, Transformer Rated 50/60Hz, Hi-Q Taut Band with Integral Transducer

3 3 5 120	To suit	077-KHEU-QQ**	078-KHEJ-QQ**	-
3 3 5 208	To suit	077-KHEU-QR**	078-KHEJ-QR**	-

For connection diagrams, see Fig. 25 on page 60.

2 1/2-Element, Transformer Rated 50/60Hz, Hi-Q Taut Band with Integral Transducer

3 4 5 69	To suit	077-KHGU-QL**	078-KHGX-QL**	-
3 4 5 120	To suit	077-KHGU-QQ**	078-KHGX-QQ**	-
3 4 5 277	To suit	077-KHGU-QY**	078-KHGX-QY**	-

For connection diagrams, see Fig. 28 on page 60.

** Specify pulse rate and external power supply.
+ CSA approved file no. LR52592

• UL approved file no. E87815

LED Digital / Analogue Combination

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 with the simultaneous display of 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 AC current, voltage, frequency, watts, VAR and phase angle or DC 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.

Specifications

Inputs:	DC Voltage: 20mV-600V (1MΩ input impedance as standard) DC Current: 1mA-1A, 4 to 20mA (Voltage drop 200mV nominal). External shunt operation (50mV and 100mV). AC Voltage: 200mV-600V (1 kΩ / volt) AC Current: 1mA-999mA (Using internal shunt, voltage drop 200mV nominal). 1A, 2A, 5A and 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 and 240V ±15%. Optional: 480V ±15% AC 40-60Hz
Burden:	3VA @ 60Hz
DC:	Standard: 12, 24, 48,110 and 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 colours other than white. Coloured 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:	DC and AC ±1% of FSD (calibrated at 25°C)
Accuracy – digital:	DC: ±0.05% of reading ±1 count ±100ppm of reading / °C. (Maximum). AC current: 0-1 Amp ±0.1% reading ±3 counts ±150ppm of reading / °C. AC current: 0-10 amps ±0.1% reading ±10 counts ±150ppm of reading / °C (maximum) AC voltage: ±0.1% of reading ±3 counts ±150ppm of reading / °C. (maximum) Zero ±1 count ±0.2 counts/°C (maximum), DC 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 approved file no. E140758



Features

- Rugged shock and vibration resistant 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 approved file no. E140758



AC Voltmeter

LED Digital/Analogue Combination

Product Codes – AC Voltmeters – Direct Reading (40/2000Hz)***

(Digital accuracy $\pm 0.1\%$ ± 3 counts, analogue accuracy $\pm 1\%$)

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, see Fig. 46 on page 62.

Product Codes – AC 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, see Fig. 45 on page 62.

Product Codes – AC Ammeters – Direct Reading (40/2000Hz)***



AC Ammeter

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, see Fig. 45 on page 62.

Product Codes – Power Supply

MU - 12V DC	PQ - 120V AC
Z2 - 130V DC	PR - 120V DC
BD - 24V DC	RR - 240V AC
PO - 115V AC	PS - 125V DC
NR - 48V DC	

* Other scalings available.

** Specify power supply voltage according to Power Supply Codes table.

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

LED Digital/Analogue Combination

Product Codes – AC Ammeters Transformer Rated (40/2000Hz)

(Digital accuracy $\pm 0.1\%$ ± 1 counts, analogue accuracy $\pm 1\%$)

Rating	Scaling*	Catalogue no.
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, see Fig. 45 on page 62.

Product Codes – AC Frequency Meters

Self contained meter with a 110/130 voltage rating and a 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, see Fig. 44 on page 62.

Product Codes – Power Supply

MU - 12V DC	PQ - 120V AC
Z2 - 130V DC	PR - 120V DC
BD - 24V DC	RR - 240V AC
PO - 115V AC	PS - 125V DC
NR - 48V DC	

- For alternative voltage rating 200/250V, specify RN instead of PN.
- For alternative voltage rating 380/480V, specify SE instead of PN.
- * Other scales are available.
- ** Specify power supply voltage, according to Power Supply Codes table.



AC Ammeter



AC Frequency Meter



DC Voltmeter

LED Digital/Analogue Combination

Product Codes – DC Voltmeters – Direct Reading

(Digital accuracy $\pm 0.5\%$ ± 1 counts, analogue accuracy $\pm 1\%$)

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-RXR-**
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-RXR-**
300-0-300V	300-0-300V	077-DINA-SJSJ-**
600-0-600V	600-0-600V	077-DINA-SUSU-**

For connection diagrams, see Fig. 45 on page 62.

LED Digital/Analogue Combination

Product Codes – DC Ammeters – Shunt Rated

(Digital accuracy $\pm 0.5\%$ ± 1 counts, analogue accuracy $\pm 1\%$)

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

For connection diagrams, see Fig. 45 on page 62.

Product Codes – DC Ammeters – Suppressed Zero

(Digital accuracy $\pm 0.5\%$ ± 1 counts, analogue accuracy $\pm 1\%$)

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, see Fig. 45 on page 62.

Product Codes – DC Ammeters – Direct Reading

(Digital accuracy $\pm 0.5\%$ ± 1 counts, analogue accuracy $\pm 1\%$)

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, see Fig. 45 on page 62.

Product Codes – Power Supply

MU - 12V DC	PQ - 120V AC
Z2 - 130V DC	PR - 120V DC
BD - 24V DC	RR - 240V AC
PO - 115V AC	PS - 125V DC
NR - 48V DC	

* Other scales are available.

** Speedy power supply voltage according to Power Supply Codes table.



DC Ammeter



AC Wattmeter

LED Digital/Analogue Combination

Product Codes – AC Wattmeters, Single Phase 50/60Hz (Accuracy ±1%)

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 diagram, see Fig. 37 on page 61.

Product Codes – AC 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 240V	To suit	077-DW8A-QR**-C6

For connection diagram, see Fig. 38 on page 62.

Product Codes – AC 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 diagram, see Fig. 39 on page 62.



AC VArmeter

Product Codes – AC 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 diagram, see Fig. 40 on page 62.

Product Codes – AC VArmeters, 2 Element, Transformer Rated, 50/60Hz, Integral Transducer

3	4	5A 120V	To suit	077-DXUA-QQ**-C6
3	4	5A 208V	To suit	077-DXUA-QR**-C6

For connection diagram, see Fig. 41 on page 62.

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

1	2	5A 120V	0.5-1-0.5 LAG/LEAD and 60/0/60 DEG	077-DP5A-QQAD-C6
1	2	5A 240V	0.5-1-0.5 LAG/LEAD and 60/0/60 DEG	077-DP5A-QSAD-C6
3	3/4	5A 120V	0.5-1-0.5 LAG/LEAD and 60/0/60 DEG	077-DP7A-QQAD-C6
3	3/4	5A 208V	0.5-1-0.5 LAG/LEAD and 60/0/60 DEG	077-DP7A-QRAD-C6
3	3/4	5A 240V	0.5-1-0.5 LAG/LEAD and 60/0/60 DEG	077-DP7A-QSAD-C6
3	3/4	5A 480V	0.5-1-0.5 LAG/LEAD and 60/0/60 DEG	077-DP7A-QTAD-C6

For connection diagram, see Fig. 42 and 43 on page 62.

** Specify CT (Current Transformer) and VT (Voltage Transformer) ratios if used, and preferred scale at time of ordering.



Power Factor/Phase Angle Meter

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 colour(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 AC ammeters and voltmeters	-
11. Offset-zero scale wattmeters, VARmeters, DC ammeters and voltmeters.	-
12. Calibration to customer specification including special caption.	-
13. Calibration 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 $\pm 10\%$ range adjustment.	-
18. Suppressed zero other than listed. DC 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 DC	EL
22. *Neoprene™ polychloroprene panel basket.	MG
23. Red manual set pointer.	ER
25. Coloured bezel.	FA
26. Hermetically sealed case.	-



*Neoprene is a Trademark of E.I. DuPont de Nemours.

Connection Diagrams

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

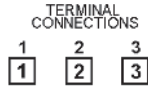


Fig. 2 Model 077-137
360° Dynamometer Power Factor
Indicator Single Phase

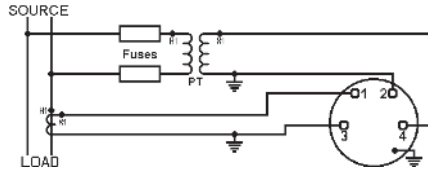


Fig. 3 Model 077-131
360° Dynamometer Power Factor
Indicator 3-Phase 3- or 4-Wire Balanced
Load (3 Currents 1 Voltage)

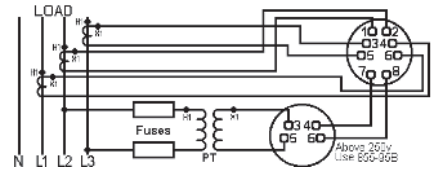


Fig. 4 Models 077-132, 078-132J
360° Dynamometer Power Factor
Indicator 3-Phase 3- or 4-Wire Balanced
Load (1 Current 3 Voltages)

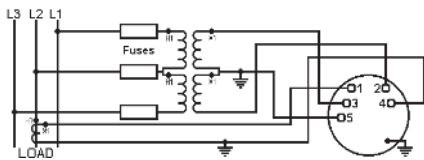


Fig. 5 Model 078-132B
360° Dynamometer Power Factor
Indicator 3-Phase 3- or 4-Wire
Balanced Load (1 Current 3 Voltages)

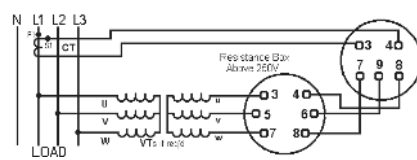


Fig. 6 Models 077-136, 077-136A,
078-136J
360° Dynamometer Power Factor
Indicator 3-Phase 3- or 4-Wire
Unbalanced Load

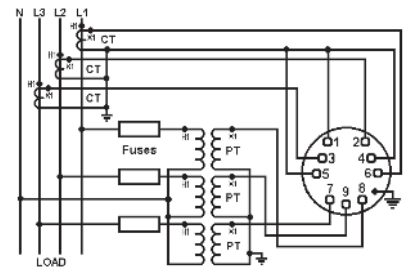


Fig. 7 Model 078-136B
360° Dynamometer Power Factor
Indicator 3-Phase 3- or 4-Wire
Unbalanced Load

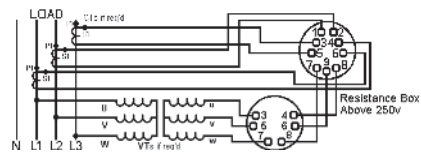


Fig. 8 Models 077-14A
360° LED Synchroscope

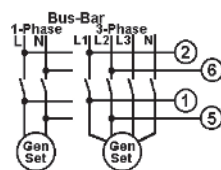
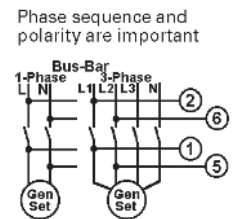


Fig. 9 Models 077-14D, 077-14G,
077-14H, 077-14L
360° LED Synchroscope and
Synchro Check Relay



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° Dynamometer Synchroscope

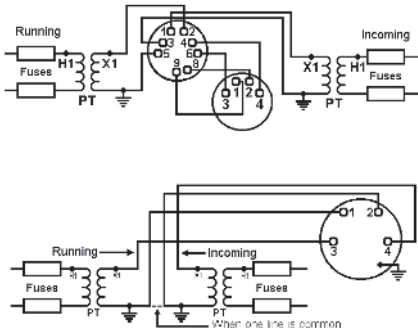


Fig. 11 Models 078-144B, 078-145B
078-146B, 078-147B
360° Dynamometer Synchroscope

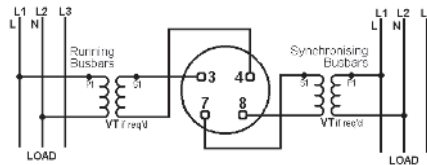


Fig. 12 Model 077-TFU
Power Factor Meter 3-Phase 3-Wire
Unbalanced Load

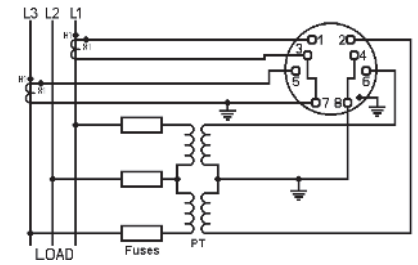


Fig. 13 Models 077-425, 078-425J
079-425
Electronic Phase Angle Meter
Single Phase

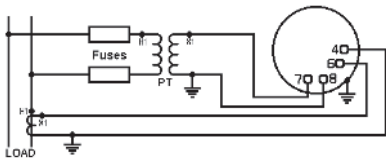


Fig. 14 Model 078-425B
Electronic Phase Angle Meter
Single Phase

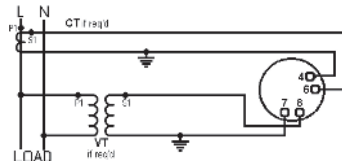


Fig. 15 Models 075-427, 077-427
078-427J, 079-427
Electronic Phase Angle Meter 3-phase
3- or 4-wire Balanced Load

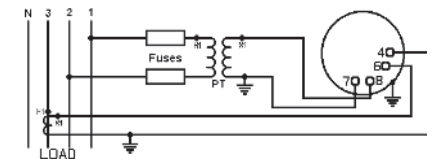


Fig. 16 Model 078-427B
Electronic Phase Angle Meter 3-Phase
3- or 4-Wire Balanced Load

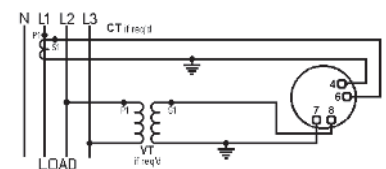
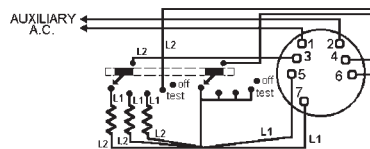


Fig. 17 Models 077-45R, 078-45R
Temperature Indicator for Resistance
Temperature Detector (RTD)



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

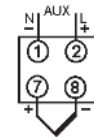
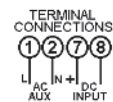


Fig. 19 Models 077-KHA, 078-KHA
AC Kilowatts/Kilowatthours
(Transducer) Indicator



Connection Diagrams

Fig. 20 Model 077-45P
Tap Position Indicator

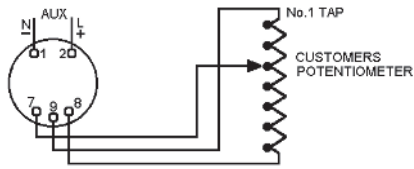


Fig. 21 Models 077-215, 077-KHB
078-215J, 078-KHBJ, 079-215
Wattmeter Single Phase

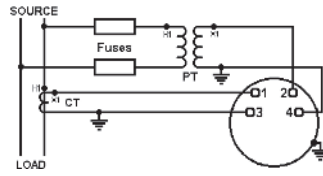


Fig. 22 Model 078-215B, 078-KHBB
Wattmeter Single Phase

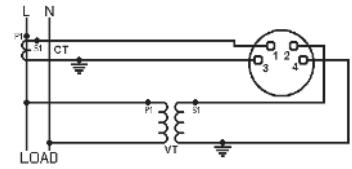


Fig. 23 Models 077-216, 078-216J
Wattmeter 3-Phase 3-Wire
Balanced Load

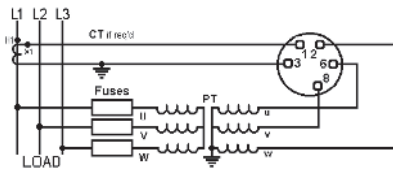


Fig. 24 Model 078-216B
Wattmeter 3-Phase 3-Wire
Balanced Load

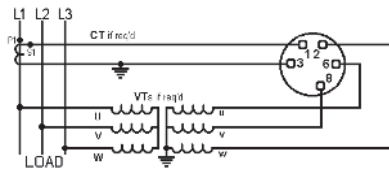


Fig. 25 Models 077-218, 077-KHE
078-218J, 078-KHEJ, 079-218
Wattmeter 3-Phase 3-Wire
Unbalanced Load

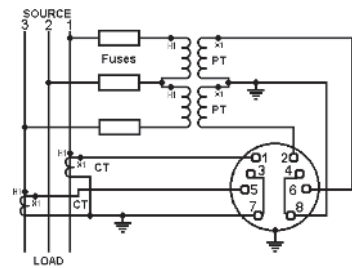


Fig. 26 Models 078-218B, 078-KHEB
Wattmeter 3-Phase 3-Wire
Unbalanced Load

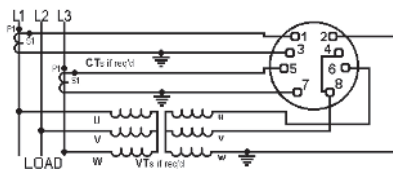


Fig. 27 Model 077-21D
Wattmeter 3-Phase 4-Wire
Balanced Load

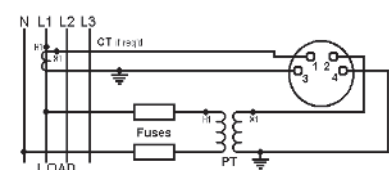
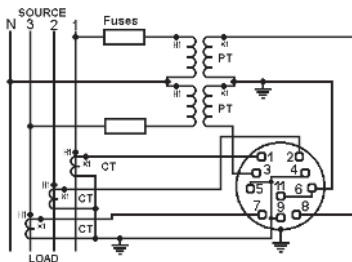


Fig. 28 Models 077-219, 077-KHG
078-219J, 078-KHGJ, 079-219
Wattmeter 3-Phase 4-Wire
Unbalanced Load



Connection Diagrams

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

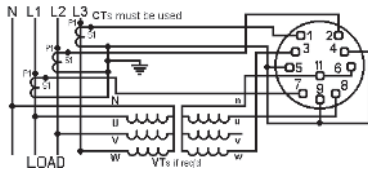


Fig. 30 Models 077-21B
Wattmeter 3-Phase 3-Wire Balanced Load
2 Reverse Connected CTs

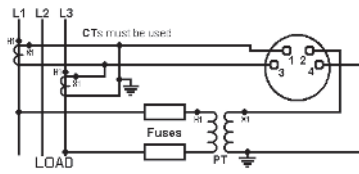


Fig. 31 Model 077-21F
Wattmeter 3-Phase 4-Wire Unbalanced
Load Delta Connected CTs

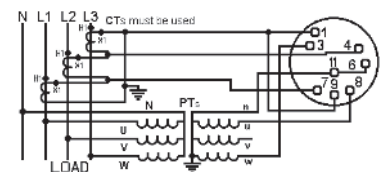


Fig. 32 Models 077-31L, 078-31LJ
VArmeter 3-Phase 3-Wire
Unbalanced Load

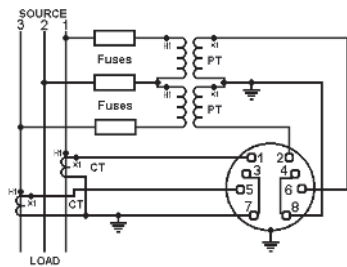


Fig. 33 Models 077-315
VArmeter 3-Phase 3- or 4-Wire
Balanced Load

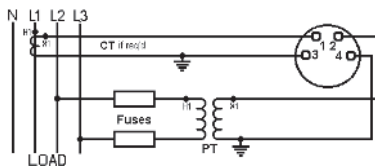


Fig. 34 Model 077-319
VArmeter 3-Phase 4-Wire
Unbalanced Load

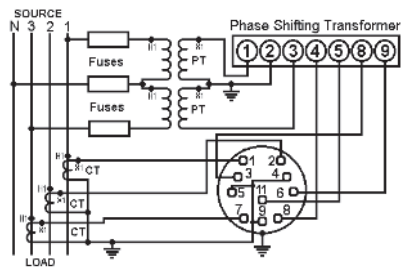


Fig. 35 Models 077-31U, 077-KXG
078-31U, 079-31U
VArmeter 3-Phase 4-Wire
Unbalanced Load

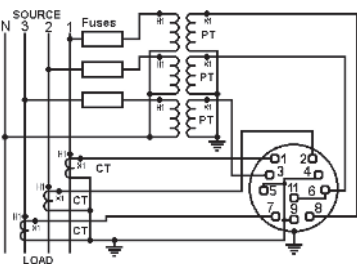


Fig. 36 Model 077-31F
VArmeter 3-Phase 4-Wire Unbalanced
Load Delta Connected CTs

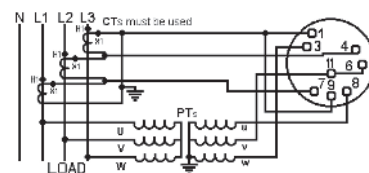
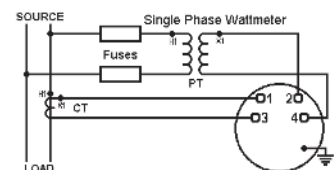


Fig. 37 Model 077-DW5
LED Digital/Analogue Wattmeter
Single Phase



Connection Diagrams

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

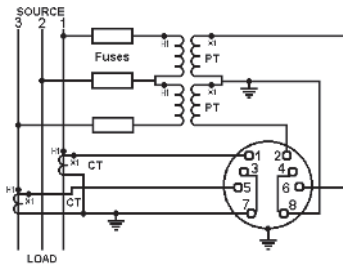


Fig. 39 Model 077-DW9
LED Digital/Analogue Wattmeter
3-Phase 4-Wire Unbalanced Load

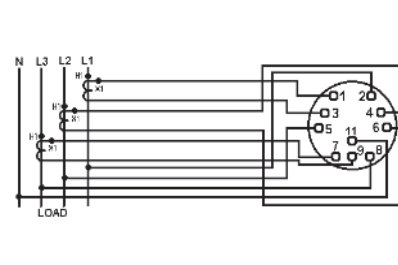


Fig. 40 Model 077-DXL
LED Digital/Analogue VArmeter 3-Phase
3-Wire Unbalanced Load

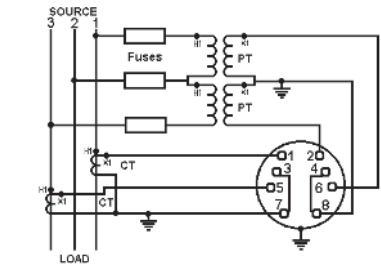


Fig. 41 Model 077-DXU
LED Digital/Analogue VArmeter 3-Phase
4-Wire Unbalanced Load

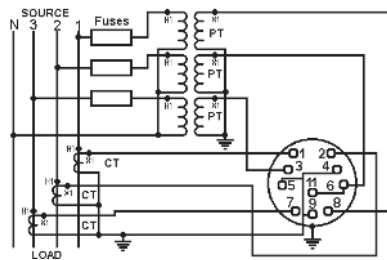


Fig. 42 Model 077-DP5
LED Digital/Analogue Phase Angle Meter
Single Phase

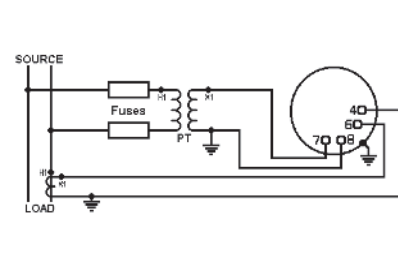


Fig. 43 Model 077-DP7
LED Digital/Analogue Phase Angle Meter
3-Phase 3- or 4-Wire Balanced Load

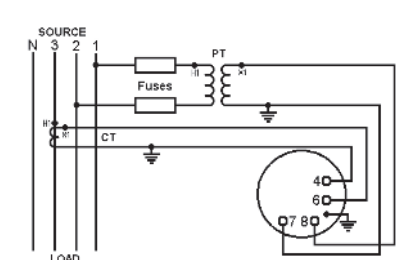


Fig. 44 Model 077-DZL
LED Digital/Analogue Frequency Meter

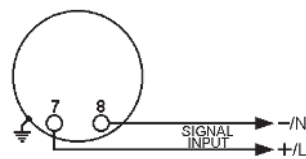


Fig. 45 Models 077-DI2, 077-DIA
077-DIB, 077-DIC, 077-DIN, 077-DIT
077-DIV, 077-DIW
LED Digital/Analogue Meter

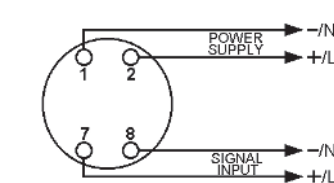
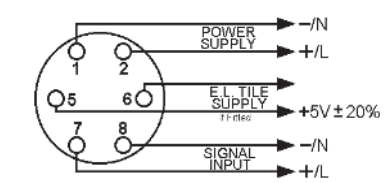
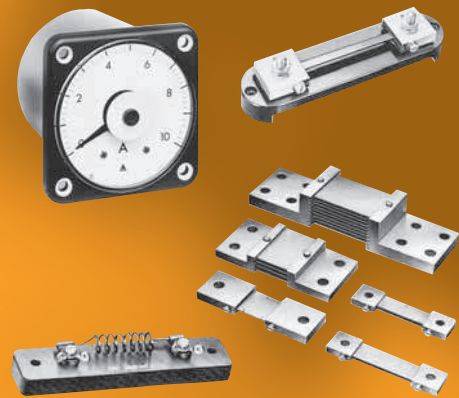


Fig. 46 Models 077-DA2, 077-DAA
077-DAB, 077-DAK, 077-DAT
077-DAV, 077-DAW
LCD Digital/Analogue Meter





Sealed and Ruggedised Indicators

078/080/087 Series 240° Scale

The Crompton Instruments 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 all 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.

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

Description

Indicators have metal cases with bezel sizes of 50 x 57mm (083), 83mm Ø (084) and 110mm x 100mm (078/087). All indicators are fitted with toughened glass windows. The standard black matte finish can be replaced with options ranging from light admiralty grey to BS3181C No:697. To prevent fogging, all indicators have been dried, evacuated and filled with dry nitrogen during manufacturing. The case interior retains a constant pressure of at least 94kPa above the exterior with leakage not above the equivalent of 1.33 Pa ml/s of air. Except on model 083, panel sealing gaskets are standard equipment.

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

Specifications

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 and 6P)
Case:	Black matte metal filled with dry nitrogen
Bezel:	Black matte 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				Product code
				depth behind the bezel				
AC ammeter moving iron	0.75-20A	2.5	2	57	-	-	-	083-03A
AC ammeter moving iron	0.75-20A	1.5	2	-	59	-	-	084-03A
AC ammeter moving iron	0.5-30A	1.5	2	-	-	86	-	078-08A
AC ammeter moving iron	0.5-30A	1.5	2	-	-	-	86	087-08A
AC voltmeter moving iron	5-800V	2.5	5	57	-	-	-	083-03V
AC voltmeter moving iron	5-800V	1.5	5	-	59	-	-	084-03V
AC voltmeter moving iron	5-800V	1.5	5	-	-	86	-	078-08V
AC voltmeter moving iron	5-800V	1.0	5	-	-	-	86	087-08V
DC ammeter shunt operated	50, 60, 75, 100, 150mV	2.5	See T118***	57	-	-	-	083-05A
DC ammeter shunt operated	50, 60, 75, 100, 150mV	1.5	See T118***	-	59	-	-	084-05A
DC ammeter shunt operated	50, 60, 75, 100, 150mV	1.5	See T118***	-	-	86	-	078-05A
DC ammeter shunt operated	50, 60, 75, 100, 150mV	1.5	See T118***	-	-	-	86	087-11A
DC ammeter	200µA-30A	2.5	See T118***	57	-	-	-	083-05A
DC ammeter	200µA-30A	1.5	See T118***	-	59	-	-	084-05A
DC ammeter	200µA-30A	1.0	See T118***	-	-	86	-	078-05A
DC ammeter	200µA-30A	1.0	See T118***	-	-	-	86	087-11A
DC ammeter suppressed zero	4/20mA	2.5	See T118***	57	-	-	-	083-05R
DC ammeter suppressed zero	4/20mA	1.5	See T118***	-	59	-	-	084-05R
DC ammeter suppressed zero	4/20mA	1.5	See T118***	-	-	86	-	078-05R
DC ammeter suppressed zero	4/20mA	1.5	See T118***	-	-	-	86	087-11R
DC voltmeter	50mV-600V	2.5	See T118***	57	-	-	-	083-05V
DC voltmeter	50mV-600V	1.5	See T118***	-	59	-	-	084-05V
DC voltmeter	50mV-800V	1.5	See T118***	-	-	86	-	078-05V
DC voltmeter	50mV-800V	1.0	See T118***	-	-	-	86	087-11V
DC voltmeter suppressed zero	1/5V	1.5	See T118***	-	-	86	-	078-05S
DC voltmeter suppressed zero	1/5V	1.5	See T118***	-	-	-	86	087-11S
AC rectified ammeter	200µA-1A	2.5	See T118***	57	-	-	-	083-05B
AC rectified ammeter	200µA-1A	2.5	See T118***	-	59	-	-	084-05B
AC rectified ammeter	200µA-30A	1.5	See T118***	-	-	86	-	078-05B
AC rectified ammeter	200µA-30A	1.5	See T118***	-	-	-	86	087-11B
AC rectified voltmeter	15-600V 25Hz/3kHz	2.5	See T118***	57	-	-	-	083-05W
AC rectified voltmeter	15-600V 25Hz/3kHz	2.5	See T118***	-	59	-	-	084-05W
AC rectified voltmeter	15-600V 25Hz/3kHz	1.5	See T118***	-	-	86	-	078-05W
AC 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 DC			57	-	-	-	083-151
Elapsed time meter	50 or 60Hz, 100-400V*			-	59	-	-	084-155 or 156
Elapsed time meter	12, 24V DC			-	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)

*** The T118 technical sheet is available on request.

** Using transformer box 855-954.

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 options

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)

Sealed and Ruggedised Indicators

080 Series 90° Scale

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

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. To avoid fogging they are dried, evacuated and filled with dry nitrogen. Panel sealing gaskets are provided as standard with the exception of Model 083. The smaller cases on Models 081 and 082, are made from nickel-plated brass and anodised aluminium alloy. Single hole fixing is made with 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 a white matte with black printing and parallel pointer. The scales form a true arc with zero on the left.

Options

Available options include dial illumination, a centre, off-set or suppressed zero, colour index lines, bands, zones or segments, a black dial with white printing and customer logo. Instruments operated by separate transducers indicate watts, VAR, frequency, phase angle, current, voltage and other 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.

Specifications

Performance:	BS EN60051 (IEC51) for models 081 to 084 DEF STAN 66-7 and 66.9 on request (081/084 and 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 RMS (081); 1kV RMS (082); 2kV RMS (083/084/089); <50V 500V RMS 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:	AC ammeter: 1VA maximum AC voltmeter: 3VA maximum Frequency meter: 4VA maximum Elapsed time meter: 2.5VA maximum
Enclosure code :	083/084/089: to IP67 (NEMA 6 and 6P) 081/082: to IP68
Case:	081/084 and 089: Black matte metal filled with dry nitrogen 081 and 082: Nickel-plated brass and anodised aluminium alloy.
Bezel:	Black matte 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

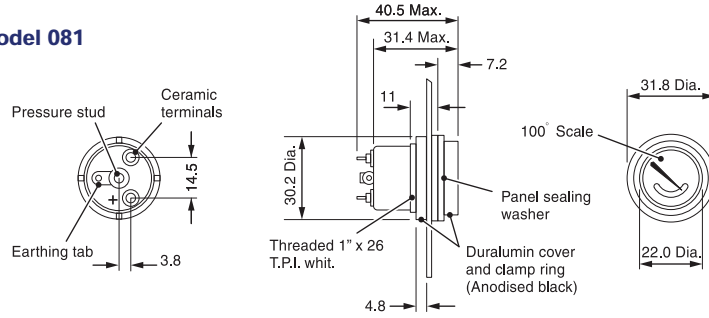
Type of instrument	Ranges	Case code					Product code
		081	082	083	084	089	
AC ammeter moving iron	1-30A	-	-	✓	-	-	083-75A
AC ammeter moving iron	1-30A	-	-	-	✓	-	084-75A
AC ammeter moving iron	1-30A	-	-	-	-	✓	089-75A
AC voltmeter moving iron	5-300V	-	-	✓	-	-	083-75V
AC voltmeter moving iron	5-500V	-	-	-	✓	-	084-75V
AC voltmeter moving iron	5-500V	-	-	-	-	✓	089-75V
DC ammeter shunt operated	50, 60, 75, 100, 150mV	✓	-	-	-	-	081-80A
DC ammeter shunt operated	50, 60, 75, 100, 150mV	-	✓	-	-	-	082-80A
DC ammeter shunt operated	50, 60, 75, 100, 150mV	-	-	✓	-	-	083-80A
DC ammeter shunt operated	50, 60, 75, 100, 150mV	-	-	-	✓	-	084-80A
DC ammeter shunt operated	50, 60, 75, 100, 150mV	-	-	-	-	✓	089-80A
DC ammeter	50µA-20mA	✓	-	-	-	-	081-80A
DC ammeter	50µA-10A	-	✓	-	-	-	082-80A
DC ammeter	50µA-30A	-	-	✓	-	-	083-80A
DC ammeter	50µA-30A	-	-	-	✓	-	084-80A
DC ammeter	50µA-30A	-	-	-	-	✓	089-80A
DC ammeter suppressed zero	4/20mA	✓	-	-	-	-	081-80R
DC ammeter suppressed zero	4/20mA	-	✓	-	-	-	082-80R
DC ammeter suppressed zero	4/20mA	-	-	✓	-	-	083-80R
DC ammeter suppressed zero	4/20mA	-	-	-	✓	-	084-80R
DC voltmeter	50mV-300V	✓	-	-	-	-	081-80V
DC voltmeter	50mV-300V	-	✓	-	-	-	082-80V
DC voltmeter	50mV-300V, 1000Ω/V	-	-	✓	-	-	083-80V
DC voltmeter	50mV-300V	-	-	-	✓	-	084-80V
DC voltmeter	50mV-300V	-	-	-	-	✓	089-80V
DC voltmeter suppressed zero	1/5V	-	✓	-	-	-	082-80S
DC voltmeter suppressed zero	1/5V	-	-	-	✓	-	084-80S
AC rectified ammeter	100µA-500mA.25Hz/3kHz	-	✓	-	-	-	082-80B
AC rectified ammeter	100µA-500mA.25Hz/3kHz	-	-	✓	-	-	083-80B
AC rectified ammeter	100µA-500mA.25Hz/3kHz	-	-	-	✓	-	084-80B
AC rectified voltmeter	15-300V	-	✓	-	-	-	082-80W
AC rectified voltmeter	15-600V, 900Ω/V	-	-	✓	-	-	083-80W
AC rectified voltmeter	15-600V	-	-	-	✓	-	084-80W
AC rectified voltmeter	15-600V	-	-	-	-	✓	089-80W
Elapsed time meter (99999.9)	12 or 24V DC	-	✓	✓	✓	-	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, and 4/20mA				✓		084/802
Transducer indicator frequency	1, 5, 10, 20, and 4/20mA				✓		084/803
Transducer indicator phase angle	1, 5, 10, 20, and 4/20mA				✓		084/804
Transducer indicator watts	1, 5, 10, 20, and 4/20mA				✓		084/805
Transducer indicator VArS	1, 5, 10, 20, and 4/20mA				✓		084/806
Transducer indicator VA	1, 5, 10, 20, and 4/20mA				✓		084/807

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

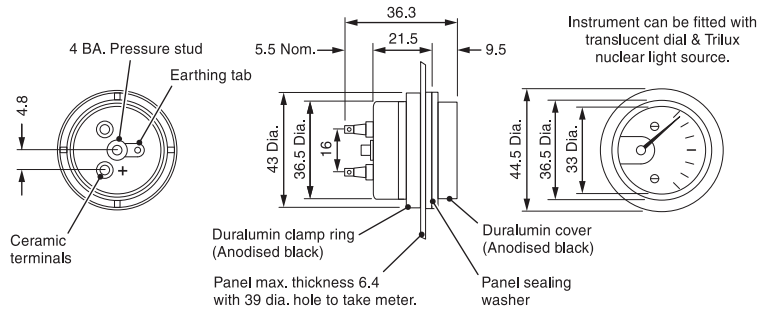


Dimensions

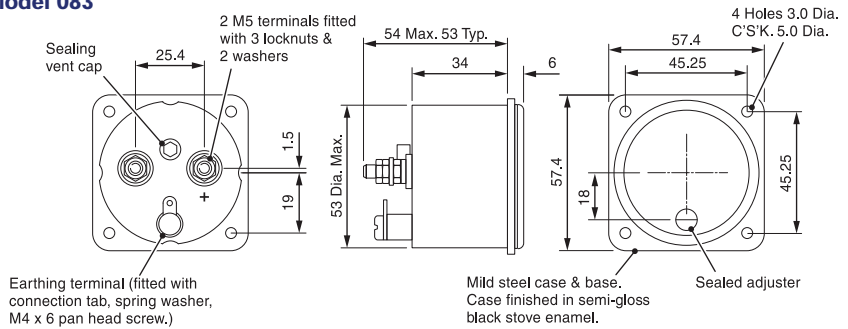
Model 081



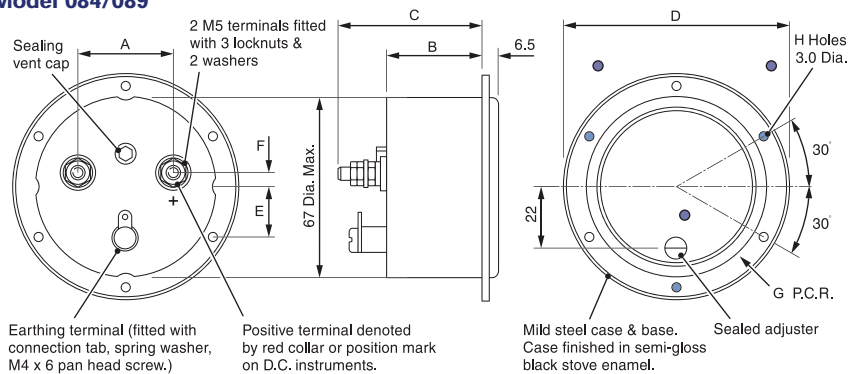
Model 082



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 – 8 ³ / ₄ " switchboard 083 – 2" sealed 084 – 2 ¹ / ₂ " sealed 242 – 48mm DIN 243 – 72mm DIN 244 – 96m DIN 246 – 144mm DIN E242– 48mm short-scale E243– 72mm short-scale E244– 96mm short-scale	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 – VAr 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 – Short-scale AC and DC 02 – Short-scale AC 03 – Long-scale AC and DC 05 – Long-scale AC and DC 07 – Edgewise AC DC 08 – Long-scale AC 10 – Edgewise AC and DC 11 – Long-scale 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 long-scale 41S – Frequency meter short-scale 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

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 jewel (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 is usually 90 degrees but ANSI is 100 degrees in some products.
Long-scale	Angle of deflection for a movement is 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 as NEMA in America. This states the product, resistance to the ingress of moisture and dust.
DIN	European standard meter shape. It is based on multiples 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 products.
Switchboard meter	General term for long-scale instruments.
Panel meter	General name for short-scale instruments.
Analogue indicator	Generic term for instruments usually refers to a low accuracy meter. An indicator only.