

070 Series ANSI Switchboard Meters

LED Digital/Analog Combination

MetersUSA
Meters@MetersUSA.com
www.metersusa.com

Approvals



Features

- » **Cost effective**
- » **Wide A.C. or D.C. input selection**
- » **High accuracy LED display**
- » **Maximum trend indication visibility**
- » **Rugged shock and vibration resistant taut band design**
- » **Input isolation**
- » **External decimal point selection option**
- » **Interchangeable with other 4-1/2 inch switchboard meters**
- » **U.L. Recognized (File # E140758)**

The Crompton model 077-DI features a combination of the traditional 250° 4 1/2 inch switchboard indicator with the benefits of wide angle visibility plus trend indication together with the precision accuracy and instantaneous reading available from the bright in dial mounted 3 1/2 digit LED display.

Application

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

Packaged in a weather resistant case, the 077-DI is interchangeable with other analog and digital instruments designed to directly mount in to a standard ANSI-C39. 4 1/2 inch switchboard cut-out.

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

Specification

Inputs:

D.C. Voltage:	20mV-600V (1MΩ input impedance as standard)
D.C. Current:	1mA-1A, 4 to 20mA (Voltage drop 200mV nominal). External shunt operation (50mV and 100mV).
A.C. Voltage:	200mV-600V (1 kΩ / volt)
A.C. Current:	1mA-999mA (Using internal shunt, voltage drop 200mV nominal). 1A, 2A, 5A & 10A using internal current transformer.

Common mode

rejection:	= >80dB @ 50/60Hz
Overload:	Voltage: x 1.2 continuous. x 1.5 for 10 seconds. Current using internal CT: x 1.2 continuous. x 10 for 10 seconds.

External Power Requirement:

Standard:	120 & 240V ±15%.
Optional:	480V ±15% A.C. 40 to 60Hz
Burden:	3VA @ 60Hz

D.C.:

Standard:	12, 24, 48, 110 & 125V ±15%
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Display

Analog:	Long scale moving coil. 250° deflection. Scale length 6.8 inches. Response time less than 2.5 seconds.
Options:	Center or offset zero. Scale plate in colors other than white. Colored lines or segments on scale. Slower response time.
Digital:	3 1/2 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

Analog:	D.C. & A.C.: ±1% of FSD (calibrated at 25°C)
Digital:	DC: ±0.05% of reading ±1 count ±100ppm of reading / °C. (Maximum).
A.C. current:	0-1 Amp ±0.1% reading ±3 counts ±150ppm of reading / °C.
A.C. current:	0-10 amps ±0.1% reading ±10 counts ±150ppm of reading / °C (maximum)
A.C. Voltage:	±0.1% of reading ±3 counts ±150ppm of reading / °C. (maximum) Zero ±1 count ±0.2 counts/°C (maximum) D.C. offset scale only Warm up time: 1 minute ±2 counts
Long term stability:	Recommended calibration check: 12 monthly intervals
Enclosure code:	IP54 (Optional IP55 using panel gasket)
Climatic:	Operational: 0 to +60°C (32° to 140°F).
Temperature:	Storage: -20 to +60°C (-4° to 140°F)
Humidity:	Up to 90% relative @ 55°C. Tests to BS2011 part 2DA.
Electrical:	Isolation test voltage: 2kV RMS 60Hz for 1 minute Interference rejection: To IEEE STD 472, ANSI C37 90A, SEN 361503, IEC 255-4



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A.C. Voltmeter



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

Digital accuracy $\pm 0.1\%$ ± 3 counts analog accuracy $\pm 1\%$

Rating	Scaling*	Catalogue No.
200mV	0-200mV	077-DWA-KAKA-C6-**
250mV	0-250mV	077-DWA-KDKD-C6-**
500mV	0-500mV	077-DWA-KMKM-C6-**
1V	0-1V	077-DWA-LALA-C6-**
5V	0-5V	077-DWA-LSLS-C6-**
10V	0-10V	077-DWA-MTMT-C6-**
15V	0-15V	077-DWA-NDND-C6-**
30V	0-30V	077-DWA-NLNL-C6-**
150V	0-150V	077-DWA-PZPZ-C6-**
250V	0-250V	077-DWA-RSRS-C6-**
300V	0-300V	077-DWA-RXRXC6-**
500V	0-500V	077-DWA-SFSF-C6-**
600V	0-600V	077-DWA-SJSJ-C6-**

For connection diagram please see page 54 Fig. 4

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

Rating	Scaling*	Catalogue No.
150V	0-300V	077-DWA-PZRX-C6-**
150V	0-600V	077-DWA-PZSJ-C6-**
150V	0-750V	077-DWA-PZSM-C6-**
150V	0-3KV	077-DWA-PZUA-C6-**
143V	0-5KV	077-DWA-PTUJ-C6-**
150V	0-5.25KV	077-DWA-PZUL-C6-**
150V	0-6KV	077-DWA-PZUP-C6-**
150V	0-9KV	077-DWA-PZUY-C6-**
150V	0-15KV	077-DWA-PZWC-C6-**
150V	0-18KV	077-DWA-PZWD-C6-**
150V	0-45KV	077-DWA-PZWJ-C6-**
150V	0-60KV	077-DWA-PZWL-C6-**

For connection diagram please see page 54 Fig. 5

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

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

For connection diagram please see page 54 Fig. 1

A.C. Ammeter



Power Supply Codes

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

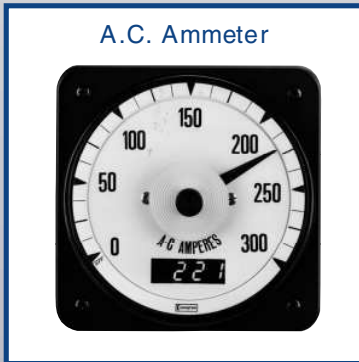
* Other scalings available.
 ** Specify power supply voltage, for the code, see Power Supply Codes table.
 *** Case types 077/078/079 use 10-32 UNF terminals.
 For M5 screw clamp terminals stipulate case type 075

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

Digital accuracy $\pm 0.1\%$ ± 1 counts analog accuracy $\pm 1\%$

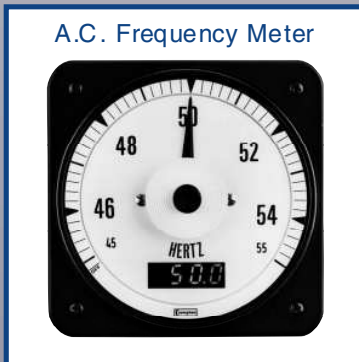


A.C. Ammeter

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Rating	Scaling*	Catalogue No.
5A	0-10A	077-DIBA-L-SMT-C6.**
5A	0-15A	077-DIBA-L-SND-C6.**
5A	0-20A	077-DIBA-L-SNG-C6.**
5A	0-25A	077-DIBA-L-SNJ-C6.**
5A	0-30A	077-DIBA-L-SNL-C6.**
5A	0-40A	077-DIBA-L-SNP-C6.**
5A	0-50A	077-DIBA-L-SNT-C6.**
5A	0-60A	077-DIBA-L-SNW-C6.**
5A	0-75A	077-DIBA-L-SPB-C6.**
5A	0-80A	077-DIBA-L-SPD-C6.**
5A	0-100A	077-DIBA-L-SPK-C6.**
5A	0-150A	077-DIBA-L-SPZ-C6.**
5A	0-200A	077-DIBA-L-SRL-C6.**
5A	0-250A	077-DIBA-L-SRS-C6.**
5A	0-300A	077-DIBA-L-SRX-C6.**
5A	0-400A	077-DIBA-L-SSC-C6.**
5A	0-500A	077-DIBA-L-SSF-C6.**
5A	0-600A	077-DIBA-L-SSJ-C6.**
5A	0-750A	077-DIBA-L-SSM-C6.**
5A	0-800A	077-DIBA-L-SSN-C6.**
5A	0-1000A	077-DIBA-L-SSS-C6.**
5A	0-1200A	077-DIBA-L-SSU-C6.**
5A	0-1500A	077-DIBA-L-STC-C6.**
5A	0-1600A	077-DIBA-L-STE-C6.**

For connection diagram please see page 54 Fig. 2



A.C. Frequency Meter

A.C. Frequency Meters

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

Centre Frequency	Accuracy	Scaling*	Catalogue No.
50Hz	± 0.15	45-55Hz	077-DZLA-PNAGAG
50Hz	± 0.15	46-54Hz	077-DZLA-PNAHAH
55Hz	± 0.25	45-65Hz	077-DZLA-PNAIAJ
60Hz	± 0.25	50-70Hz	077-DZLA-PNALAL
60Hz	± 0.15	55-65Hz	077-DZLA-PNANAN
60Hz	± 0.15	56-64Hz	077-DZLA-PNAOAO
60Hz	± 0.08	58-62Hz	077-DZLA-PNATAT
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 diagram please see page 54 Fig. 10 or Fig. 11

Power Supply Codes

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

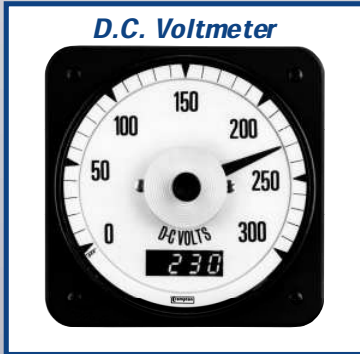
- Alternative voltage rating 200/250V specify RN instead of PN
- Alternative voltage rating 380/480V specify SE instead of PN
- * Other scales are available.
- ** Specify power supply voltage, for the code, see Power Supply Codes table.

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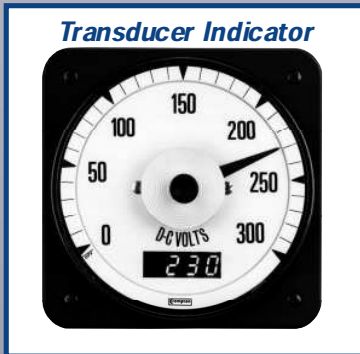
D.C. Voltmeters - Direct Reading

Digital accuracy $\pm 0.5\%$ ± 1 counts analog accuracy $\pm 1\%$



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

For connection diagram please see page 54 Fig. 7



Transducer Indicators***

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

For connection diagram please see page 54 Fig. 8

Indicators for Tachometer Generators

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

Power Supply Codes

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

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

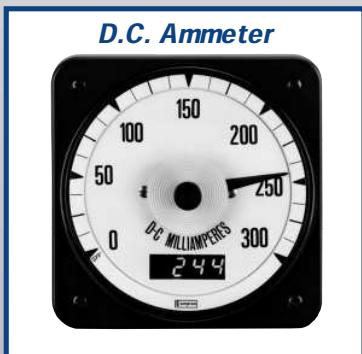
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D.C. Ammeters - Shunt Rated

Digital accuracy $\pm 0.5\%$ ± 1 counts analog accuracy $\pm 1\%$

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

For connection diagram please see page 54 Fig. 3

D.C. Ammeters - Suppressed Zero

Digital accuracy $\pm 0.5\%$ ± 1 counts analog accuracy $\pm 1\%$

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

For connection diagram please see page 54 Fig. 8

D.C. Ammeters - Direct Reading

Digital accuracy $\pm 0.5\%$ ± 1 counts analog accuracy $\pm 1\%$

Rating	Scaling*	Catalogue No.
1mA	0-1mA	077-DIAA-Fafa-**
2mA	0-2mA	077-DIAA-FGFG-**
5mA	0-5mA	077-DIAA-FXFX-**
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 diagram please see page 54 Fig. 8

Power Supply Codes

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

* Other scales are available.

** Specify power supply voltage, for the code, see Power Supply Codes table.

070 Series ANSI Switchboard Meters

LED Digital/Analog Combination

A.C. Wattmeter



Measured System	
Phases	Wires
Amperes	1 VA max. Burden
Volts	1 VA max. Burden

Scales

4 1/2" Square Flange

Standard Case
Catalogue No.

A.C. Wattmeters

Accuracy ±1% Single Phase 50/60Hz

1	2	5A	120V	TO SUIT	077-DW5A-QQ**C6
1	2	5A	240V	TO SUIT	077-DW5A-QS**C6

For connection diagram please see page 55 Fig. 13

2 Element, Transformer Rated. 50/60Hz. Integral Transducer. Accuracy 1.0%

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

For connection diagram please see page 55 Fig. 14

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 please see page 57 Fig. 29

A.C. Varmeter



A.C. Varmeters

2 Element Transformer Rated 50/60Hz. Integral Transducer.

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

For connection diagram please see page 55 Fig. 14

2 1/2 Element, Transformer Rated. 50/60Hz. Hi-Q Taut Band. Integral Transducer. Accuracy 1.0%.

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

For connection diagram please see page 55 Fig. 17

Power Factor/Phase Angle Meter



Power Factor / Phase Angle Meters

Accuracy 1.0% (Balanced Loads). Self Contained. 60Hz. Integral Transducer.

1	2	5A	120V	0.5-1-0.5 (60/0/60)	077-DP5A-QQAD-C6
1	2	5A	240V	0.5-1-0.5 (60/0/60)	077-DP5A-QSAD-C6
3	3/4	5A	120V	0.5-1-0.5 (60/0/60)	077-DP7A-QQAD-C6
3	3/4	5A	208V	0.5-1-0.5 (60/0/60)	077-DP7A-QRAD-C6
3	3/4	5A	240V	0.5-1-0.5 (60/0/60)	077-DP7A-QSAD-C6
3	3/4	5A	480V	0.5-1-0.5 (60/0/60)	077-DP7A-QTAD-C6
3	3/4	5A	600V	0.5-1-0.5 (60/0/60)	077-DP7A-QVAD-C6

For connection diagram please see page 56 Fig. 21 or Fig. 23

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

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Compton
INSTRUMENTS

Analogue Instruments

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Meter Options

Scale

Options	Option Code	Options	Option Code
1. Blank, uncalibrated dial (zero and full scale marks in pencil).	SA	5. Black dial with white figures and pointer.	SB
2. Red or colored line or mark (specify position).	SR	6. Customer /user logo imprinted on dial.	SM
3. Colored zones or segments (specify limits and color(s)).	SZ	7. Finely divided scale.	-
4. Non-standard caption (other than listed below).	SD	8. Standard rating, single unlisted scale	-
		9. No name on dial.	SN

Calibration

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

Construction

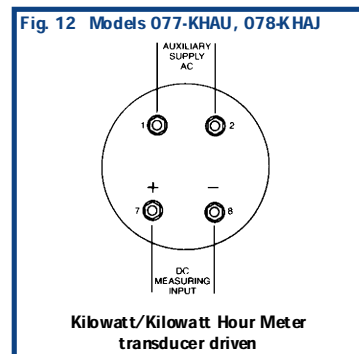
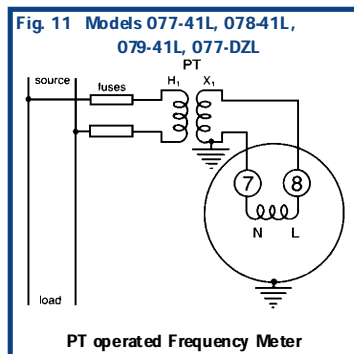
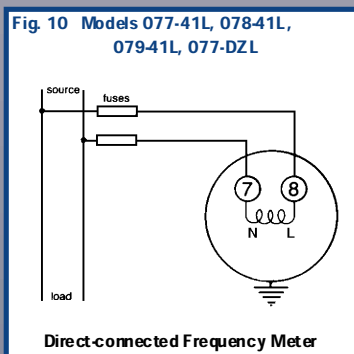
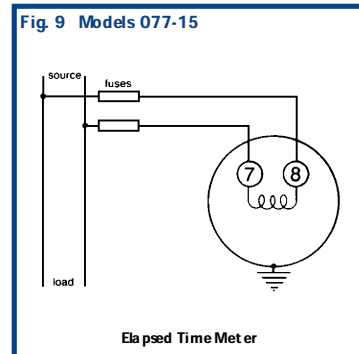
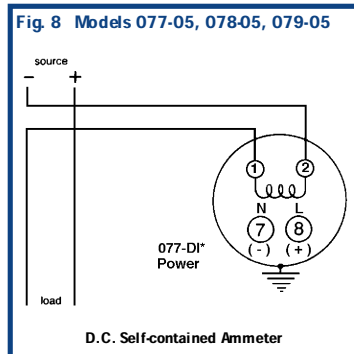
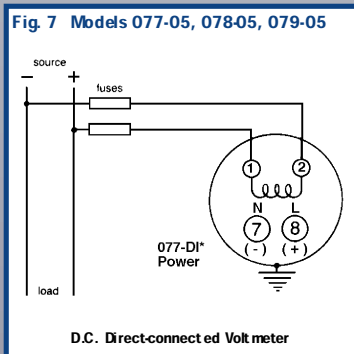
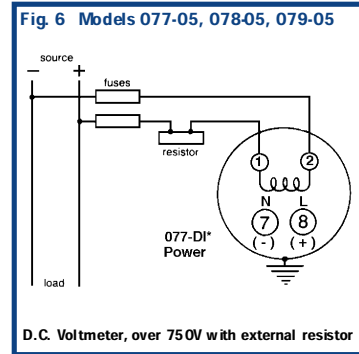
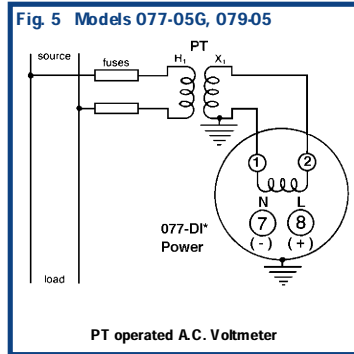
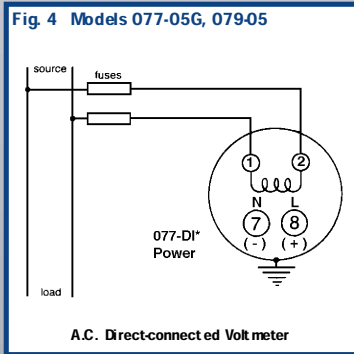
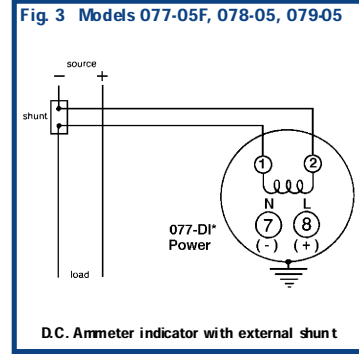
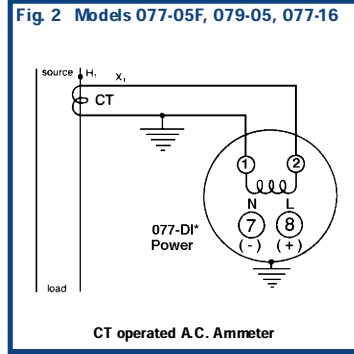
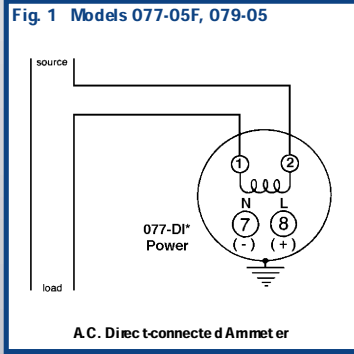
Options	Option Code	Options	Option Code
20. Anti-glare window.	BR	23. Red manual set pointer.	ER
21. Internal illumination Specify 6, 12, 24 or 36V D.C.	EL	25. Colored bezel.	
22. Neoprene panel gasket.	MG	26. Hermetically sealed case.	



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Connection Diagrams

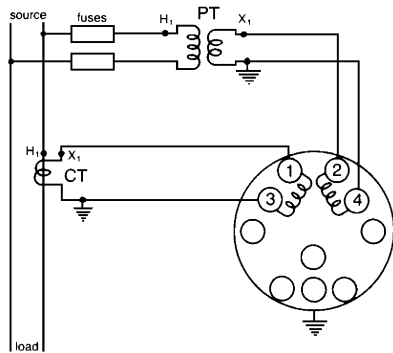


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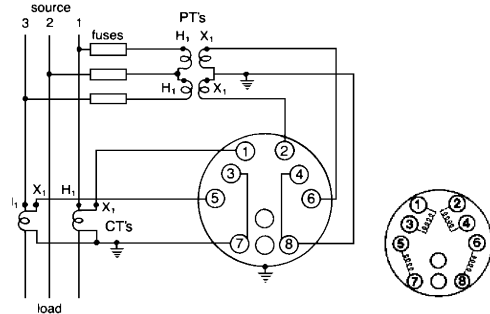
Connection Diagrams

Fig. 13 Models 077-215, 078-215, 079-215, 077-KH, 078--KH, 077-DW5



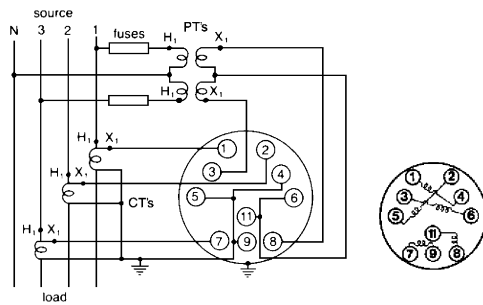
1 phase 2 wire Wattmeter, transformer operated

Fig. 14 Models 077-218, 078-218, 079-218, 077-31L, 078-31L, 079-31L, 077-KH, 078-KH, 077-DXL, 077-DW8, 077-TFU



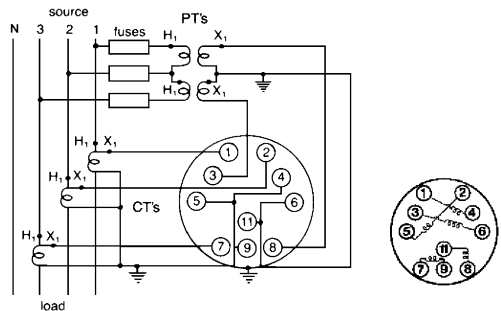
Wattmeter/Varmeter with two current circuits for 3 phase 3 wire system, transformer operated.
Model 077-218 (WATT), Model 077-31L (VAR with internal phase shifter).

Fig. 15 Models 077-219, 078-219, 079-219, 077-KH, 078--KH



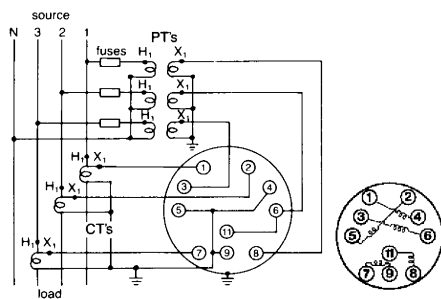
Wattmeter with three current circuits for 3 phase 4 wire system, transformer operated.

Fig. 16 Models



Varmeter with three current circuits for 3 phase 3 wire system.
Transformer operated without phase shifter.

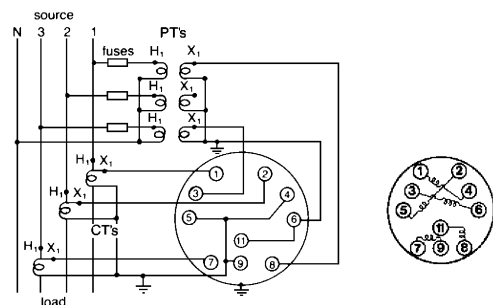
Fig. 17 Models 077-31U, 078-31U, 079-31U, 077-DXU



Varmeter with three current circuits for 3 phase 4 wire system.
Transformer operated without phase shifting transformer.

Note: If transformer's secondary voltage is 120V L-N Varmeter should be rated 208V.

Fig. 18 Models 077-219, 078-219, 079-219, 077-KH, 078-KH



Wattmeter with three current circuits for 3 phase 4 wire System, transformer operated.

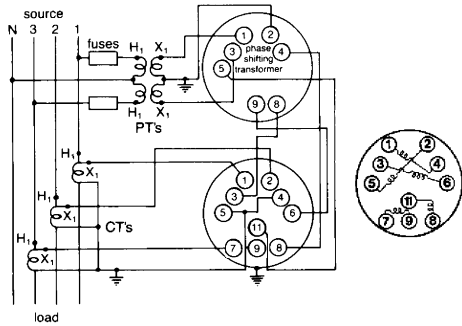
Note: If transformer's secondary voltage is 120V L-N Wattmeter should be rated 120V.

Alternative connections when 3 phase 4 wire wattmeters, and 3 phase 4 wire Varmeters without phase shifting transformer are connected in the same circuit.

070 Series ANSI Switchboard Meters

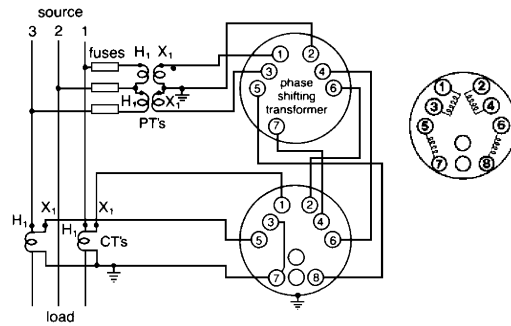
Connection Diagrams

Fig. 19 Models 077-219, 078-219, 079-219



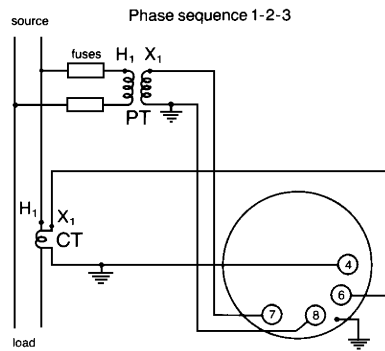
Double element Varmeter with three current circuits for 3 phase 4 wire system, transformer operated.
For use with Phase Shifter 855-957

Fig. 20 Models 077-218, 078-218, 079-218



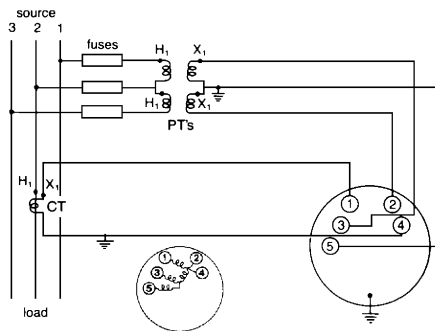
Double element Varmeter with three current circuits for 3 phase 3 wire system, transformer operated.
For use with Phase Shifter 855-957

Fig. 21 Models 077-425, 078-425, 079-425, 077-DP5



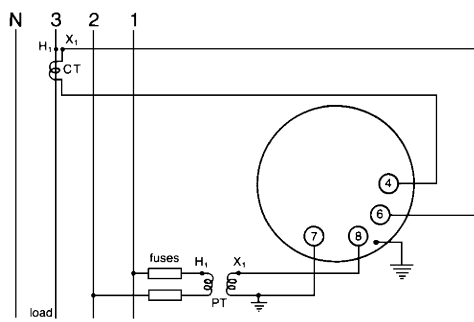
Single phase transformer operated Power Factor Meter

Fig. 22 Models 077-132, 078-132, 079-132



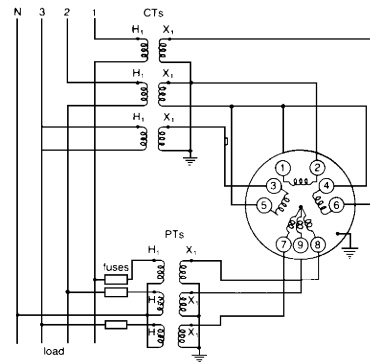
Power Factor Indicator 3 phase 3 wire transformer operated

Fig. 23 Models 077-427, 078-427, 079-427, 077-DP7



Power Factor Indicator 3 phase 3 or 4 wire balanced load

Fig. 24 Models 077-136, 078-136, 079-136



Power Factor Indicator 3 phase 4 wire unbalanced load

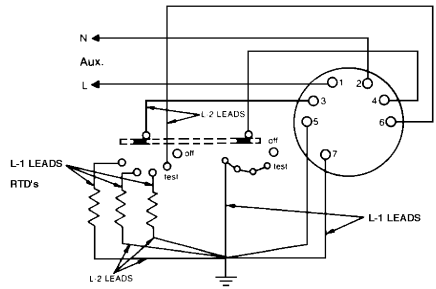


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070 Series ANSI Switchboard Meters

Connection Diagrams

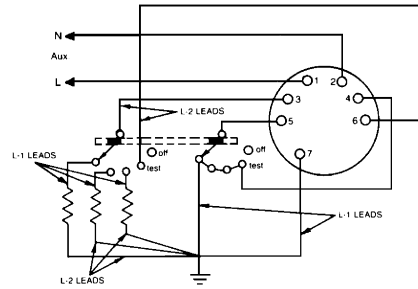
Fig. 25 Models 077-45RA, 078-45RA, 079-45RA



Single or multiple circuit for Resistance Temperature Detector 10Ω Copper.

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

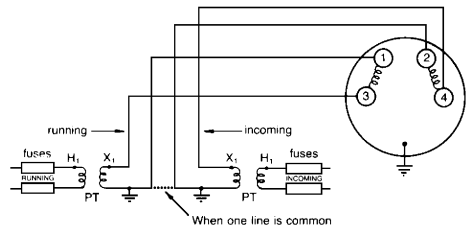
Fig. 26 Models 077-45RA, 078-45RA, 079-45RA



Single or multiple circuit for Resistance Temperature Detector 100Ω Platinum.

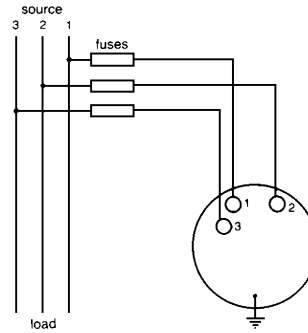
Note: All L1 leads must be within 0.02Ω of the same resistance. L1 leads should not exceed 3Ω each L2 leads should not exceed 0.02Ω each.

Fig. 27 Models 077-14, 078-14, 079-14



PT operated Rotary Synchroscope

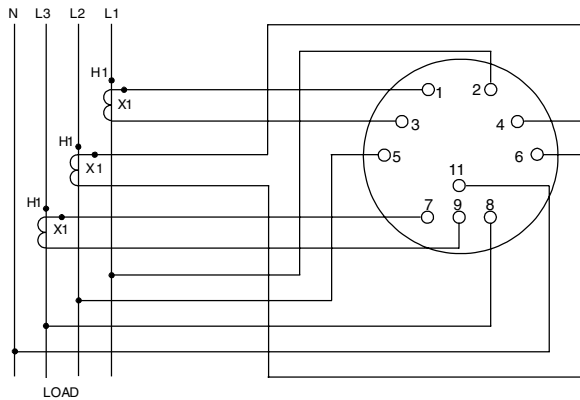
Fig. 28 Models 077-12



Phase Sequence Meter

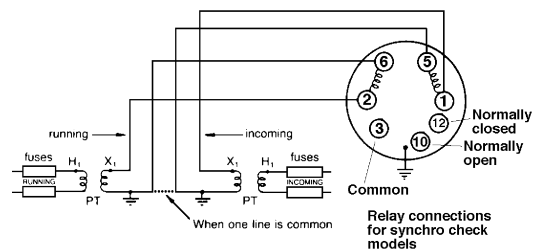
Phase Sequence Indicator 3phase, 3 or 4 wire system

Fig. 29 Model 077-DW9



3 phase 4 wire Wattmeter

Figure 30: Models 077-14A, 077-14L, 077-14D, 077-14G, 077-14H



VT operated LED Synchroscope and Synchro Check Relay



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