

070 Series ANSI Switchboard Meters

Power Factor Meters and Synchrosopes



A.C. Power Factor Specifications

Ratings, self-contained:	Current windings 5 amperes. Voltage windings minimum 50 volts, maximum 600 volts	Overload capacity:	Current coils 1000% momentarily, 100% for 15 minutes and 25% indefinitely. Voltage circuits 25% indefinitely.
Accuracy Class:	1.0	Burdens:	Each current circuit 1.5VA approx. Each voltage circuit 1VA approx
Overshoot:	33%	Measuring systems	077-427 - 3 or 4 wire
External Temperature Influence:	0.5% fid max.	Ranges available:	Lag 0.5-1 - 0.5 lead power factor Lag 0.2-1 - 0.8 lead power factor
External field Influence:	3% fid max.		
Frequency Range:	50Hz or 60Hz standard		
Optional:	25-3000Hz (Specify)		
Frequency Influence:	Single phase instruments 59 to 61Hz 1.0% fid max. Polyphase instruments $\pm 10\%$ deviation from 69Hz: 1.0%		JIS dimension product available on request. Instruments may be used on loads down to 20% of current rating and between 90% and 110% of voltage rating.

360° Power Factor Specifications

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

A.C. Synchrosopes Specifications

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

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INSTRUMENTS

Analogue Instruments

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070 Series ANSI Switchboard Meters

A.C. Power Factor Meter



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				

Balanced Load Accuracy ±1%

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
3	3/4	5	600V	0.5-1-0.5	077-427A-QVAD	078-427J-QVAD	079-427A-QVAD

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

Unbalanced Load Accuracy ±1%

3	3	5	120V	0.5-1-0.5	077-TFUA-QQAD	-	-
3	3	5	240V	0.5-1-0.5	077-TFUA-QSAD	-	-

For connection diagram please see page 55 Fig. 14

Rotary Power Factor - 360°

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

For connection diagram please see page 56 Fig. 22 or Fig 24

Rotating iron 360° products are only suitable for use on 50 and 60 Hz systems.

3 Phase 4 Wire Power Factor Meters are connected L-L-L-L Model -136 unbalanced load, -132 balanced load
L ie. 120V L-N system will be rated at 208V L-L.

360° Rotary Synchronoscope

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	50HZ	SLOW FAST	077-144A-PRAE-C4	078-144J-PRAE-C4	079-144A-PRAE-C4

Pivot and Jewel

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	50HZ	SLOW FAST	077-144A-PRAE-C4	078-144J-PRAE-C4	079-144A-PRAE-C4

For connection diagram please see page 57 Fig. 27

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

070 Series ANSI Switchboard Meters

360° A.C. LED Synchroscope

Specification

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

360° A.C. LED Synchroscope



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 diagram please see page 57 Fig 30

A.C. Synchrocheck Relay and LED 360° Synchroscope

Specification

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

Rating	Scaling	4 1/2" Square Flange Standard Case Catalogue No.
Live Bus		
110/120V 40/65HZ	SLOW FAST	077-14GU-POYY-FQ
220/240V 40/65HZ	SLOW FAST	077-14GU-RSYY-FQ
380/480V 40/65HZ	SLOW FAST	077-14GU-SZYY-FQ
Dead Bus		
110/120V 40/65HZ	SLOW FAST	077-14HU-POYY-FQ
220/240V 40/65HZ	SLOW FAST	077-14HU-RSYY-FQ
380/480V 40/65HZ	SLOW FAST	077-14HU-SZYY-FQ
Live Bus		
120V 40/65HZ	SLOW FAST	077-14LU-PQYY-FQ
240V 40/65HZ	SLOW FAST	077-14LU-RRYY-FQ
480V 40/65HZ	SLOW FAST	077-14LU-SEYY-FQ
Dead Bus		
120V 40/65HZ	SLOW FAST	077-14DU-PQYY-FQ
240V 40/65HZ	SLOW FAST	077-14DU-RRYY-FQ
480V 40/65HZ	SLOW FAST	077-14DU-SEYY-FQ

For connection diagram please see page 57 Fig. 30

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).

