



AC Wattmeters and VArmeters

The Crompton Instruments Switchboard series of AC Wattmeters and VArmeters incorporate a DC moving coil, pivot and jewel indicator with a micro-circuit watt transducer PCB to read power on single or three-phase systems. 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 scale.

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. On ordering, Wattmeter and VArmeter scales will be calculate, the nearest preferred scale will be offered from the charts on the following pages. Custom scales are available but at an extra cost.

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° (32° to 104°F) std. 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 voltage
Power factor influence	Accuracy maintained, 0.1 lag to 0.1 lead
Enclosure code	007 IP54 optional IP55 078 IP67
Response time	007 and 078 approximately 2.5 seconds
Dielectric withstand	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 25/5 (5:1)	Normal	5KW	10KW	10KW	20KW	25KW	100KW	150KW	175KW	200KW	250KW	300KW	350KW	
	Max.	6	10	12	25	30	120	200	200	250	300	400	450	
	Min.	3	5	6	12.5	15	60	100	100	125	150	200	225	
RATIO 50/5 (10:1)	Normal	10KW	20KW	20KW	40KW	50KW	200KW	300KW	350KW	400KW	500KW	600KW	700KW	
	Max.	12	20	25	50	60	250	400	450	500	600	800	900	
	Min.	6	10	12.5	25	30	125	200	250	250	300	400	450	
RATIO 75/5 (15:1)	Normal	15KW	25KW	30KW	60KW	75KW	300KW	500KW	500KW	600KW	750KW	900KW	1000KW	
	Max.	20	30	40	80	100	400	600	700	800	1000	1200	1200	
	Min.	10	15	20	40	50	200	300	350	400	500	600	600	
RATIO 100/5 (20:1)	Normal	20KW	30KW	40KW	75KW	100KW	400KW	600KW	700KW	800KW	1000KW	1200KW	1200KW	
	Max.	25	40	50	100	120	500	800	900	1000	1200	1500	1500	
	Min.	12.5	20	25	50	60	250	400	450	500	600	750	750	
RATIO 150/5 (30:1)	Normal	30KW	50KW	50KW	100KW	150KW	600KW	800KW	1000KW	1200KW	1500KW	1800KW	2000KW	
	Max.	40	70	75	150	200	800	1200	1200	1500	2000	2400	2500	
	Min.	20	35	35	75	100	400	600	600	750	1000	1000	1250	
RATIO 200/5 (40:1)	Normal	40KW	75KW	75KW	150KW	200KW	800KW	1200KW	1200KW	1500KW	2000KW	2500KW	3000KW	
	Max.	50	80	100	200	250	1000	1500	1500	2000	2500	3000	3500	
	Min.	25	40	50	100	125	500	750	750	1000	1250	1500	1500	
RATIO 300/5 (60:1)	Normal	70KW	100KW	100KW	200KW	300KW	1200KW	1500KW	2000KW	2500KW	3000KW	3500KW	4500KW	
	Max.	75	120	150	300	400	1500	2000	2500	3000	4000	4000	5000	
	Min.	35	60	75	150	200	750	1000	1250	1500	2000	2000	2500	
RATIO 400/5 (80:1)	Normal	75KW	125KW	150KW	300KW	400KW	1500KW	2500KW	3000KW	3000KW	4000KW	5000KW	6000KW	
	Max.	100	150	200	400	500	2000	3000	3600	4000	5000	6000	7000	
	Min.	50	75	100	200	250	1000	1500	1500	2000	2500	3000	3500	
RATIO 600/5 (120:1)	Normal	125KW	200KW	200KW	450KW	600KW	2000KW	3000KW	4000KW	5000KW	6000KW	7500KW	8000KW	
	Max.	150	250	300	600	800	3000	4000	5000	6000	8000	8000	10MW	
	Min.	75	125	150	300	400	1500	2000	2500	3000	4000	4000	5000KW	
RATIO 800/5 (160:1)	Normal	150KW	250KW	300KW	600KW	800KW	3000KW	5000KW	6000KW	6000KW	8000KW	10MW	12MW	
	Max.	200	350	400	800	1000	4000	6000	7500	8000	10MW	12MW	15	
	Min.	100	175	200	400	500	2000	3000	3000	4000	5000KW	6000KW	7500KW	
RATIO 1000/5 (200:1)	Normal	200KW	350KW	400KW	800KW	1000KW	4000KW	6000KW	6000KW	8000KW	10MW	12MW	15MW	
	Max.	250	450	500	1000	1200	5000	8000	8000	10MW	12MW	15	18	
	Min.	125	225	250	500	600	2500	4000	4000	5000KW	6000KW	7500KW	10	
RATIO 1200/5 (240:1)	Normal	250KW	400KW	500KW	1000KW	1200KW	5000KW	7000KW	8000KW	10MW	12MW	15MW	10MW	
	Max.	300	500	600	1200	1500	6000	8000	10MW	12MW	15	18	20	
	Min.	150	250	300	600	750	3000	4000	5000KW	6000KW	7500KW	10	10	
RATIO 1500/5 (300:1)	Max.	300KW	500KW	600KW	1200KW	1500KW	6000KW	10MW	10MW	12MW	15MW	20MW	20MW	
	Max.	400	700	750	1500	2000	8000	12	12	15	20	20	25	
	Min.	200	350	375	1000	1000	4000	6000KW	6000KW	7500KW	10	10	12.5	
RATIO 2000/5 (400:1)	Normal	400KW	750KW	800KW	1600KW	2000KW	8000KW	12MW	12MW	15MW	20MW	25MW	30MW	
	Max.	500	800	1000	2000	2500	10MW	15	15	20	25	30	35	
	Min.	250	400	500	750	1250	5000	7500KW	7500KW	10	12.5	15	20	
RATIO 3000/5 (600:1)	Normal	750KW	1000KW	1200KW	2000KW	3000KW	12MW	18MW	20MW	25MW	30MW	35MW	40MW	
	Max.	800	1200	1500	3000	4000	15	20	25	30	40	40	50	
	Min.	400	600	750	1500	2000	7500KW	10	12.5	15	20	20	25	
RATIO 4000/5 (800:1)	Normal	800KW	1200KW	1500KW	3000KW	4000KW	15MW	20MW	25MW	30MW	40MW	50MW	50MW	
	Max.	1000	1500	2000	4000	5000	20	30	30	40	50	60	75	
	Min.	500	750	1000	2000	2500	10	15	15	20	25	30	40	
RATIO 5000/5 (1000:1)	Normal	1000KW	1500KW	2000KW	4000KW	5000KW	20MW	30MW	20MW	40MW	50MW	60MW	75MW	
	Max.	1250	2000	2500	5000	6000	25	40	25	50	60	80	80	
	Min.	500	1000	1250	2500	3000	12.5	20	12.5	25	30	40	40	
RATIO 6000/5 (1200:1)	Normal	1200KW	2000KW	2500KW	5000KW	6000KW	25MW	35MW	40MW	50MW	60MW	60MW	80MW	
	Max.	1500	2500	3000	3000	8000	30	40	50	60	80	80	100	
	Min.	750	1250	1500	1500	4000	15	20	25	30	40	40	50	

Wattmeter VArmeter Scale Selector Guide														
	Primary potential transformer voltage system			12kV (100:1)	14.4kV (120:1)	24kV (200:1)	34.5kV (300:1)	38kV (330:1)	46kV (400:1)	92kV (800:1)	115kV (1000:1)	138kV (1200:1)	345kV (3000:1)	765kV (6000:1)
				12KV	14.4kV	24kV	34.5kV	38kV	46kV	92kV	115kV	138kV	345kV	765kV
	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	Normal Max. Min.		500KW 650 325	600KW 800 400	1000KW 1200 600	1500KW 1500 750	1500KW 2000 1000	1500KW 2500 1250	3000KW 200 100	5000KW 200 100	6000KW 250 125	15MW 300 150	30MW 400 200
				1000KW 1200 600	1200KW 1500 750	2000KW 2500 1250	3000KW 3500 1750	3000KW 4000 2000	3500KW 5000 2500	8000KW 10MW 5000KW	10MW 12 6000KW	12MW 15 7500KW	30MW 35 15	60MW 80 40
	RATIO	Normal Max Min.		1500KW 2000 1000	1800KW 2000 1000	3000KW 4000 2000	4000KW 5000 2500	5000KW 6000 3000	5000KW 7500 3000	10MW 15 7500KW	15MW 15 7500KW	15MW 20 10	45MW 50 25	100MW 125 50
				2000KW 2500 1250	2500KW 3000 1500	4000KW 5000 2500	6000KW 7500 3000	6000KW 8000 4000	7500KW 10MW 5000KW	15MW 20 10	20MW 25 12.5	25MW 30 15	60MW 70 35	125MW 150 75
	RATIO	Normal Max. Min.		3000KW 4000 2000	3500KW 4000 2000	6000KW 4000 2000	10MW 10 5000KW	10MW 12 6000KW	10MW 15 7500KW	20MW 30 15	30MW 35 15	35MW 40 20	90MW 100 50	200MW 250 100
				4000KW 5000 2500	4500KW 6000 3000	8000KW 5000 2500	12MW 15 7500KW	12MW 15 7500KW	15MW 20 10	30MW 40 20	35MW 50 25	50MW 60 30	100MW 150 75	250MW 300 150
	RATIO	Normal Max. Min.		6000KW 8000 4000	7000KW 8000 4000	12MW 15 7.5	18MW 20 10	18MW 25 12.5	20MW 30 15	45MW 60 30	60MW 75 30	75MW 80 40	150MW 200 100	400MW 500 250
				8000KW 10MW 5000KW	10MW 12 6000KW	15MW 20 10	24MW 30 15	25MW 30 15	30MW 40 20	60MW 80 40	80MW 100 50	100MW 120 60	200MW 300 150	500MW 600 300
	RATIO	Normal Max. Min.		12MW 15 7500KW	15MW 18 10	25MW 30 15	35MW 40 20	40MW 50 25	45MW 60 30	90MW 120 60	100MW 150 75	150MW 180 75	350MW 450 225	800KW 1000 500
				15MW 20 10	20MW 25 12.5	30MW 40 20	50MW 60 30	50MW 60 30	60MW 80 40	120MW 150 75	150MW 200 100	200MW 200 100	500MW 600 300	1000MW 1200 600
	RATIO	Normal Max. Min.		20MW 25 12.5	25MW 30 15	40MW 50 25	50MW 60 30	60MW 80 40	75MW 100 50	150MW 200 100	200MW 250 125	250MW 300 150	600MW 750 300	1200MW 1500 750
				25MW 30 15	30MW 35 20	50MW 60 30	60MW 80 40	80MW 100 50	100MW 120 60	175MW 200 100	250MW 300 150	300MW 350 175	750MW 900 450	1500MW 2000 1000
	RATIO	Normal Max. Min.		30MW 40 20	35MW 40 20	60MW 80 40	75MW 100 50	100MW 120 60	120MW 150 75	250MW 300 150	3000MW 350 175	350MW 450 225	900MW 1000 500	2000MW 2500 1250
				40MW 50 25	50MW 60 30	80MW 100 50	100MW 150 75	120MW 150 75	150MW 200 100	300MW 400 200	400MW 500 250	5000MW 600 300	1000MW 1500 750	2500MW 3000 1500
	RATIO	Normal Max. Min.		60MW 80 40	75MW 80 40	100MW 150 75	150MW 200 100	200MW 250 125	200MW 300 150	400MW 500 250	600MW 750 350	700MW 900 450	1500MW 2000 1000	3500MW 5000 2500
				80MW 100 50	100MW 125 60	150MW 200 100	200MW 300 150	250MW 300 150	300MW 400 200	5000MW 800 400	800MW 1000 500	1000MW 1200 600	2000MW 3000 1500	500MW 6000 3000
	RATIO	Normal Max. Min.		100MW 120 60	125MW 150 75	200MW 250 125	250MW 300 150	300MW 400 200	4000MW 500 250	750MW 1000 500	1000MW 1200 600	1200MW 1500 750	3000MW 3500 1750	6000MW 8000 400
				120MW 150 75	150MW 175 80	250MW 300 150	350KW 400 200	400MW 500 250	450MW 600 300	1000MW 1200 600	1200MW 1500 750	1500MW 1750 800	3500MW 4000 2000	8000MW 10000 5000

AC VArmeters

Product Codes - Element, Transformer Rated, 50/60Hz
Integral Transducer - Accuracy 1.0%, 50/60Hz

Measured System					Scaling	4 1/2" square flange	
Phases	Wires	Amperes 1VA max. burden	Volts 1 VA max. burden			Std. case catalog number	Std. case hi-shock catalog number
3	3	5	120V		To suit	•007-31LA-QQ**-C7	078-31LJ-QQ**-C6
3	3	5	208V		To suit	•007-31LA-QR**-C7	078-31LJ-QR**-C6
3	3	5	240V		To suit	•007-31LA-QS**-C7	078-31LJ-QS**-C6
3	3	5	380V		To suit	•007-31LA-QX**-C7	078-31LJ-QX**-C6
3	3	5	480V		To suit	•007-31LA-QT**-C7	078-31LJ-QT**-C6

For connection diagram refer to Figure D1 & D2.

Product Codes - 2 1/2-Element, Transformer Rated, 50/60Hz
Taut Band Integral Transducer - Accuracy 1.0%, 50/60Hz

3	4	5	120V	To suit	•007-31UA-QQ**-C7	078-31UJ-QQ**-C6
3	4	5	208V	To suit	•007-31UA-QR**-C7	078-31UJ-QR**-C6
3	4	5	480V	To suit	•007-31UA-QT**-C7	078-31UJ-QT**-C6

For connection diagram refer to Figure D1 & D2.

- * Other scales are available.
 - ** Specify CT (Current Transformer) and VT (VoltageTransformer) ratios if used and preferred scale at time of ordering.
 - c-UL-us certified.



AC VArmeter

Fig. D1 Models 007-31L VArmeter
3-Phase 3-Wire Unbalanced Load

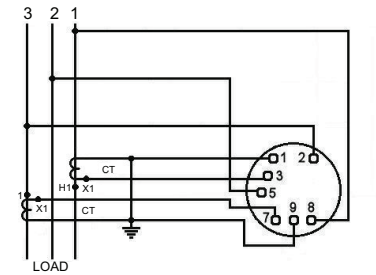


Fig. D2 Models 078-31L VArmeter
3-Phase 3-Wire Unbalanced Load

