

### INCLUDES PHASE-FIRED & ZERO-CROSSING MEASUREMENTS

#### DESCRIPTION

The PC5 Series Watt transducers utilize Hall-effect multipliers to provide continuous multiplication of voltage and current to accurately measure real power delivered to a load. Full-scale current ranges up to 1000A and full-scale voltage ranges up to 600V are available in one-, two-, 2½- or three-element transducers.

These highly-reliable units have been used for many years in industrial monitoring and control applications by thousands of customers. They are widely used in applications with chopped or distorted waveforms where they have advantages over pulse-width modulated units.

#### FEATURES

- Accurate regardless of variations in voltage, current, power factor, or load.
- Output is proportional to true power delivered to a load;  $P = EI(\cos \Phi)$ .
- Accuracy maintained when supplied with internal or external current sensors. **Factory calibrated.**

#### APPLICATIONS

- Equipment power consumption.
- For use with SCR controls, chopped waveforms, or where harmonic components exist.
- Standard outputs provide signal for interface with meters, recorders, or data acquisition equipment.



**5 YEAR  
WARRANTY**

#### ORDERING INFORMATION

Example: Three-Phase, Three-Wire, Self-Powered, 120V, 5A Input with 0-1000 Watts = 0-10Vdc Output.

**PC5-004C**

400Hz Models: To order for use on 400Hz applications, substitute "PC4-" for "PC5-" in model number.

### MODEL SELECTION

#### SINGLE-PHASE, TWO-WIRE (ONE-ELEMENT) MODELS WITH INTERNAL CURRENT SENSOR



INPUTS		F.S. (WATTS)	STANDARD DC OUTPUT MODEL PC5- OR PC4-								
AC VOLTS	AC AMPS		0-±1mA*	0-±1mA	0-±10V*	0-±10V	4-20mA	4-12-20mA	4-20mA**	0-±5V*	0-±5V
0-150	0 - 1	100	103A	103B	103C	103D	103E	103EM	103E2	103CX5	103X5
	0 - 2.5	250	106A	106B	106C	106D	106E	106EM	106E2	106CX5	106X5
	0 - 5	500	001A	001B	001C	001D	001E	001EM	001E2	001CX5	001X5
	0 - 10	1k	010A	010B	010C	010D	010E	010EM	010E2	010CX5	010X5
	0 - 15	1.5k	019A	019B	019C	019D	019E	019EM	019E2	019CX5	019X5
	0 - 20	2k	117A	117B	117C	117D	117E	117EM	117E2	117CX5	117X5
	0 - 25	2.5k	118A	118B	118C	118D	118E	118EM	118E2	118CX5	118X5
0-300	0 - 1	200	104A	104B	104C	104D	104E	104EM	104E2	104CX5	104X5
	0 - 2.5	500	107A	107B	107C	107D	107E	107EM	107E2	107CX5	107X5
	0 - 5	1k	002A	002B	002C	002D	002E	002EM	002E2	002CX5	002X5
	0 - 10	2k	011A	011B	011C	011D	011E	011EM	011E2	011CX5	011X5
	0 - 15	3k	020A	020B	020C	020D	020E	020EM	020E2	020CX5	020X5
	0 - 20	4k	110A	110B	110C	110D	110E	110EM	110E2	110CX5	110X5
	0 - 25	5k	119A	119B	119C	119D	119E	119EM	119E2	119CX5	119X5
0-600	0 - 1	500	105A	105B	105C	105D	105E	105EM	105E2	105CX5	105X5
	0 - 2.5	1k	108A	108B	108C	108D	108E	108EM	108E2	108CX5	108X5
	0 - 5	2k	003A	003B	003C	003D	003E	003EM	003E2	003CX5	003X5
	0 - 10	4k	012A	012B	012C	012D	012E	012EM	012E2	012CX5	012X5
	0 - 15	6k	021A	021B	021C	021D	021E	021EM	021E2	021CX5	021X5
	0 - 20	8k	111A	111B	111C	111D	111E	111EM	111E2	111CX5	111X5

\* "A", "C" and "CX5" models are self-powered. Input voltage range is limited to:

85-135V for 150V models

200-280V for 300V models

380-550V for 600V models

\*\* "E2" models require only 15-40Vdc loop power.

"B", "D" and "X5" models require 85-135Vac instrument power.

"E" and "EM" models require 105-135Vac instrument power.

Add suffix "-22" for optional 230Vac instrument power.

NOTE: "A", "B", "C", "CX5", "D", "X5" and "EM" models operate bi-directionally. Positive (+) output at terminal 2 (greater than 12mA for "EM" models) indicates forward/consumed power. Negative (-) output at terminal 2 (less than 12mA for "EM" models) indicates reverse/generated power.

"E" and "E2" models are unidirectional only. Reverse power conditions may cause the output to drop below 4mA but not below 0mA.

Add suffix "Y25" for use on zero-crossing SCR controllers.

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### SINGLE-PHASE, TWO-WIRE (ONE-ELEMENT) MODELS SUPPLIED WITH EXTERNAL SENSOR



INPUTS		F.S. (WATTS)	SENSOR SIZE	STANDARD DC OUTPUT MODEL PC5- OR PC4-								
AC VOLTS	AC AMPS			0-±1mA*	0-±1mA	0-±10V*	0-±10V	4-20mA	4-12-20mA	4-20mA**	0-±5V*	0-±5V
0-150	0 - 100	10k	W	058A	058B	058C	058D	058E	058EM	058E2	058CX5	058X5
	0 - 200	20k	W	067A	067B	067C	067D	067E	067EM	067E2	067CX5	067X5
	0 - 400	40k	X	076A	076B	076C	076D	076E	076EM	076E2	076CX5	076X5
	0 - 600	60k	X	085A	085B	085C	085D	085E	085EM	085E2	085CX5	085X5
	0 - 1000	100k	Y	094A	094B	094C	094D	094E	094EM	094E2	094CX5	094X5
0-300	0 - 100	20k	W	059A	059B	059C	059D	059E	059EM	059E2	059CX5	059X5
	0 - 200	40k	W	068A	068B	068C	068D	068E	068EM	068E2	068CX5	068X5
	0 - 400	80k	X	077A	077B	077C	077D	077E	077EM	077E2	077CX5	077X5
	0 - 600	120k	X	086A	086B	086C	086D	086E	086EM	086E2	086CX5	086X5
	0 - 1000	200k	Y	095A	095B	095C	095D	095E	095EM	095E2	095CX5	095X5
0-600	0 - 100	40k	W	060A	060B	060C	060D	060E	060EM	060E2	060CX5	060X5
	0 - 200	80k	W	069A	069B	069C	069D	069E	069EM	069E2	069CX5	069X5
	0 - 400	160k	X	078A	078B	078C	078D	078E	078EM	078E2	078CX5	078X5
	0 - 600	240k	X	087A	087B	087C	087D	087E	087EM	087E2	087CX5	087X5
	0 - 1000	400k	Y	096A	096B	096C	096D	096E	096EM	096E2	096CX5	096X5

Note: Current Transformer is supplied as part of the model. Refer also to notes below table on first page.

### THREE-PHASE, THREE-WIRE (TWO-ELEMENT) MODELS WITH INTERNAL CURRENT SENSORS



INPUTS		F.S. (WATTS)	STANDARD DC OUTPUT MODEL PC5- OR PC4-								
AC VOLTS	AC AMPS		0-±1mA*	0-±1mA	0-±10V*	0-±10V	4-20mA	4-12-20mA	4-20mA**	0-±5V*	0-±5V
0-150	0 - 1	200	120A	120B	120C	120D	120E	120EM	120E2	120CX5	120X5
	0 - 2.5	500	129A	129B	129C	129D	129E	129EM	129E2	129CX5	129X5
	0 - 5	1k	004A	004B	004C	004D	004E	004EM	004E2	004CX5	004X5
	0 - 10	2k	013A	013B	013C	013D	013E	013EM	013E2	013CX5	013X5
	0 - 15	3k	022A	022B	022C	022D	022E	022EM	022E2	022CX5	022X5
	0 - 20	4k	112A	112B	112C	112D	112E	112EM	112E2	112CX5	112X5
	0 - 25	5k	123A	123B	123C	123D	123E	123EM	123E2	123CX5	123X5
0-300	0 - 1	400	121A	121B	121C	121D	121E	121EM	121E2	121CX5	121X5
	0 - 2.5	1k	130A	130B	130C	130D	130E	130EM	130E2	130CX5	130X5
	0 - 5	2k	005A	005B	005C	005D	005E	005EM	005E2	005CX5	005X5
	0 - 10	4k	014A	014B	014C	014D	014E	014EM	014E2	014CX5	014X5
	0 - 15	6k	023A	023B	023C	023D	023E	023EM	023E2	023CX5	023X5
	0 - 20	8k	113A	113B	113C	113D	113E	113EM	113E2	113CX5	113X5
	0 - 25	10k	124A	124B	124C	124D	124E	124EM	124E2	124CX5	124X5
0-600	0 - 1	800	122A	122B	122C	122D	122E	122EM	122E2	122CX5	122X5
	0 - 2.5	2k	131A	131B	131C	131D	131E	131EM	131E2	131CX5	131X5
	0 - 5	4k	006A	006B	006C	006D	006E	006EM	006E2	006CX5	006X5
	0 - 10	8k	015A	015B	015C	015D	015E	015EM	015E2	015CX5	015X5
	0 - 15	12k	024A	024B	024C	024D	024E	024EM	024E2	024CX5	024X5
	0 - 20	16k	114A	114B	114C	114D	114E	114EM	114E2	114CX5	114X5

Note: Refer to notes below table on first page.

### THREE-PHASE, THREE-WIRE (TWO-ELEMENT) MODELS SUPPLIED WITH EXTERNAL SENSORS



INPUTS		F.S. (WATTS)	SENSOR SIZE	STANDARD DC OUTPUT MODEL PC5- OR PC4-								
AC VOLTS	AC AMPS			0-±1mA*	0-±1mA	0-±10V*	0-±10V	4-20mA	4-12-20mA	4-20mA**	0-±5V*	0-±5V
0-150	0 - 100	20k	W	061A	061B	061C	061D	061E	061EM	061E2	061CX5	061X5
	0 - 200	40k	W	070A	070B	070C	070D	070E	070EM	070E2	070CX5	070X5
	0 - 400	80k	X	079A	079B	079C	079D	079E	079EM	079E2	079CX5	079X5
	0 - 600	120k	X	088A	088B	088C	088D	088E	088EM	088E2	088CX5	088X5
	0 - 1000	200k	Y	097A	097B	097C	097D	097E	097EM	097E2	097CX5	097X5
0-300	0 - 100	40k	W	062A	062B	062C	062D	062E	062EM	062E2	062CX5	062X5
	0 - 200	80k	W	071A	071B	071C	071D	071E	071EM	071E2	071CX5	071X5
	0 - 400	160k	X	080A	080B	080C	080D	080E	080EM	080E2	080CX5	080X5
	0 - 600	240k	X	089A	089B	089C	089D	089E	089EM	089E2	089CX5	089X5
	0 - 1000	400k	Y	098A	098B	098C	098D	098E	098EM	098E2	098CX5	098X5
0-600	0 - 100	80k	W	063A	063B	063C	063D	063E	063EM	063E2	063CX5	063X5
	0 - 200	160k	W	072A	072B	072C	072D	072E	072EM	072E2	072CX5	072X5
	0 - 400	320k	X	081A	081B	081C	081D	081E	081EM	081E2	081CX5	081X5
	0 - 600	480k	X	090A	090B	090C	090D	090E	090EM	090E2	090CX5	090X5
	0 - 1000	800k	Y	099A	099B	099C	099D	099E	099EM	099E2	099CX5	099X5

Note: Current Transformer is supplied as part of the model. Refer also to notes below table on first page.

### THREE-PHASE, FOUR-WIRE (THREE-ELEMENT) MODELS WITH INTERNAL CURRENT SENSORS



INPUTS		F.S. (WATTS)	STANDARD DC OUTPUT MODEL PC5- OR PC4-								
AC VOLTS	AC AMPS		0-±1mA*	0-±1mA	0-±10V*	0-±10V	4-20mA	4-12-20mA	4-20mA**	0-±5V*	0-±5V
0-150 L-N	0 - 1	300	125A	125B	125C	125D	125E	125EM	125E2	125CX5	125X5
	0 - 2.5	750	132A	132B	132C	132D	132E	132EM	132E2	132CX5	132X5
	0 - 5	1.5k	007A	007B	007C	007D	007E	007EM	007E2	007CX5	007X5
	0 - 5	1.5k	7.5A	7.5B	7.5C	7.5D	7.5E	7.5EM	7.5E2	7.5CX5	7.5X5
	0 - 10	3k	016A	016B	016C	016D	016E	016EM	016E2	016CX5	016X5
	0 - 15	4.5	025A	025B	025C	025D	025E	025EM	025E2	025CX5	025X5
	0 - 20	6k	115A	115B	115C	115D	115E	115EM	115E2	115CX5	115X5
	0 - 25	7.5k	127A	127B	127C	127D	127E	127EM	127E2	127CX5	127X5
0-300 L-N	0 - 1	600	126A	126B	126C	126D	126E	126EM	126E2	126CX5	126X5
	0 - 2.5	1.5k	133A	133B	133C	133D	133E	133EM	133E2	133CX5	133X5
	0 - 5	3k	008A	008B	008C	008D	008E	008EM	008E2	008CX5	008X5
	0 - 5	3k	8.5A	8.5B	8.5C	8.5D	8.5E	8.5EM	8.5E2	8.5CX5	8.5X5
	0 - 10	6k	017A	017B	017C	017D	017E	017EM	017E2	017CX5	017X5
	0 - 15	9k	026A	026B	026C	026D	026E	026EM	026E2	026CX5	026X5
	0 - 20	12k	116A	116B	116C	116D	116E	116EM	116E2	116CX5	116X5
	0 - 25	15k	128A	128B	128C	128D	128E	128EM	128E2	128CX5	128X5

Note: Part Numbers 7.5 and 8.5 denote 2½-element units. Refer also to notes below table on first page.

### THREE-PHASE, FOUR-WIRE (THREE-ELEMENT) MODELS SUPPLIED WITH EXTERNAL SENSORS



INPUTS		F.S. (WATTS)	SENSOR SIZE	STANDARD DC OUTPUT MODEL PC5- OR PC4-									
AC VOLTS	AC AMPS			0±1mA*	0±1mA	0±10V*	0±10V	4-20mA	4-12-20mA	4-20mA**	0±5V*	0±5V	
0-150 L-N	0 - 100	30k	W	064A	064B	064C	064D	064E	064EM	064E2	064CX5	064X5	
	0 - 200	60k	W	073A	073B	073C	073D	073E	073EM	073E2	073CX5	073X5	
	0 - 400	120k	X	082A	082B	082C	082D	082E	082EM	082E2	082CX5	082X5	
	0 - 600	180k	X	091A	091B	091C	091D	091E	091EM	091E2	091CX5	091X5	
	0 - 1000	300k	Y	100A	100B	100C	100D	100E	100EM	100E2	100CX5	100X5	
0-300 L-N	0 - 100	60k	W	065A	065B	065C	065D	065E	065EM	065E2	065CX5	065X5	
	0 - 200	120k	W	074A	074B	074C	074D	074E	074EM	074E2	074CX5	074X5	
	0 - 400	240k	X	083A	083B	083C	083D	083E	083EM	083E2	083CX5	083X5	
	0 - 600	360k	X	092A	092B	092C	092D	092E	092EM	092E2	092CX5	092X5	
	0 - 1000	600k	Y	101A	101B	101C	101D	101E	101EM	101E2	101CX5	101X5	

Note: Current Transformers are supplied as part of the model. Refer also to notes below table on first page.

## SPECIFICATIONS

## INPUT

Voltage, Current.....	(See Tables)
Frequency Range .....	PC5- models ..... 48-70Hz
	PC4- models ..... 400Hz
Power Factor.....	Any
Response (Transient, to 90% F.S.)	
With Internal Sensors .....	<100μs
With Current Transformers .....	1ms
Burden	
Voltage and Current .....	1.25VA/phase
Output Amplifier .....	2W
Current Overload (Continuous)....	1-10A models ..... 2 X F.S.
15A, 20A, and 25A models .....	..... F.S.
Transient (all models) .....	6 X F.S. (10 seconds)

## DIELECTRIC TEST

Input/Output/Case..... 1500Vac (RMS)  
Surge ..... Withstands IEEE SWC test

## INSTRUMENT POWER

"A", "C", "CX5" models.....	not required
"B", "D", "X5" models.....	85-135Vac, 50-400Hz, 5VA
"E", "EM" models.....	105-135Vac, 50-400Hz, 5VA
"E2" models.....	15-40Vdc loop power only
"-22" option.....	230Vac, $\pm 10\%$ , 50/60Hz, 5VA

## OUTPUT

Type.....	(See tables)
Watt Output, Loading	
“A” & “B” models .....	(0-±1mA <sub>dc</sub> ) ..... 0-10kΩ
“C” & “D” models .....	(0-±10V <sub>dc</sub> ) ..... 2kΩ min.
“CX5” & “X5” models ...	(0-±5V <sub>dc</sub> ) ..... 2kΩ min.
“E”, “EM” models.....	(4-20mA <sub>dc</sub> ) ..... 0-1500Ω
“E2” models.....	(loop powered) .. @24V <sub>dc</sub> ..... 0-600Ω
	@40V <sub>dc</sub> ... 0-1400Ω
Response Time (to 90% F.S.)...standard .....	250ms
Suffix “Y25” (for use on zero-crossing SCR controllers).....	5s
Field Adjustable Calibration .....	±10%

**ACCURACY**.....±0.5% F.S.

Includes combined effects of power factor, repeatability,  
linearity, and current sensor.

Output Ripple ..... <1% F.S.

## TEMPERATURE

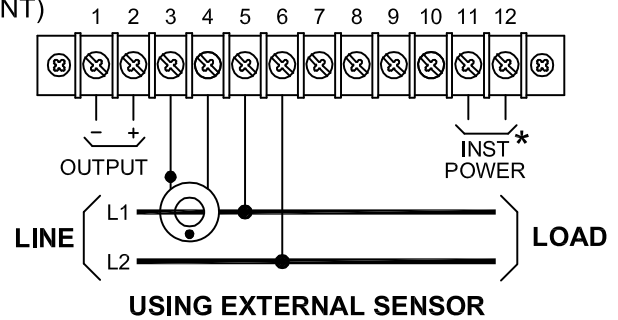
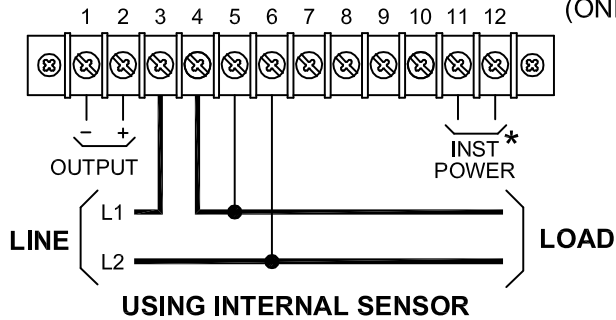
Operating Range..... -10°C to +60°C  
Effect.....  $\pm 1.0\%$  of Rdg.  $\pm 0.1\%$  F.S. output

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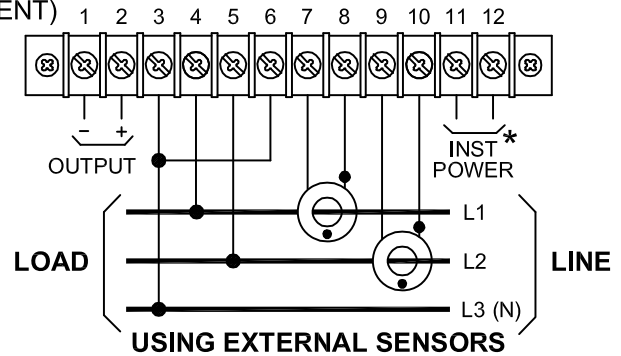
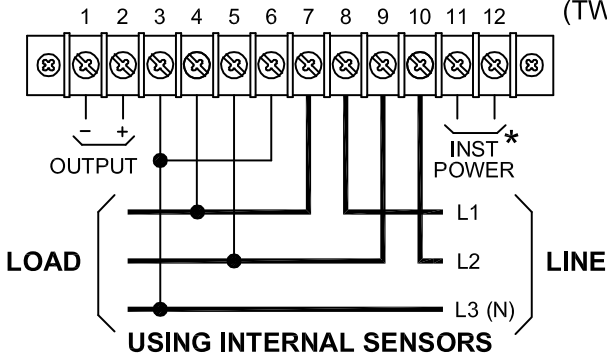
### SINGLE-PHASE, TWO-WIRE CONNECTIONS

(ONE ELEMENT)



### THREE-PHASE, THREE-WIRE CONNECTIONS

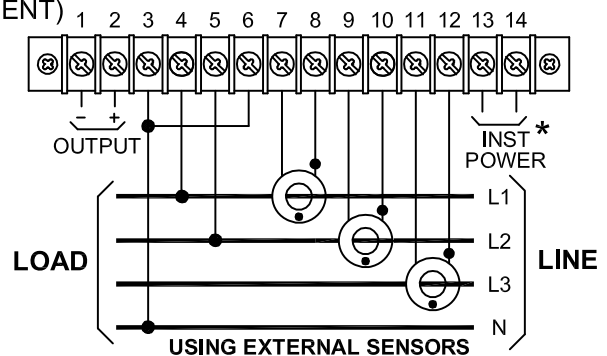
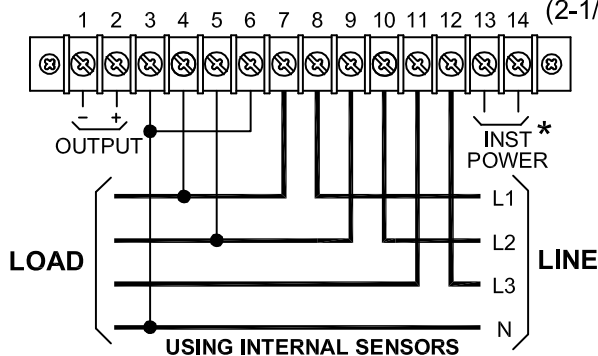
(TWO ELEMENT)



N IS NEUTRAL FOR 1PH-3W EDISON SYSTEM CONNECTIONS.

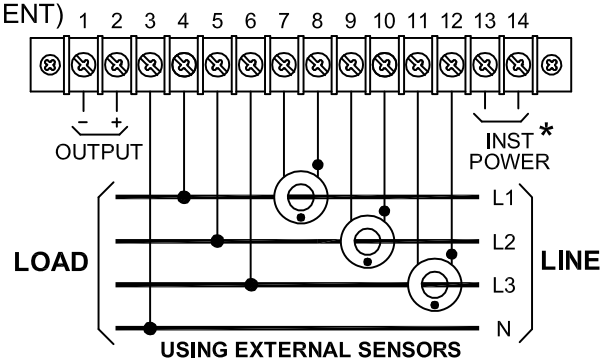
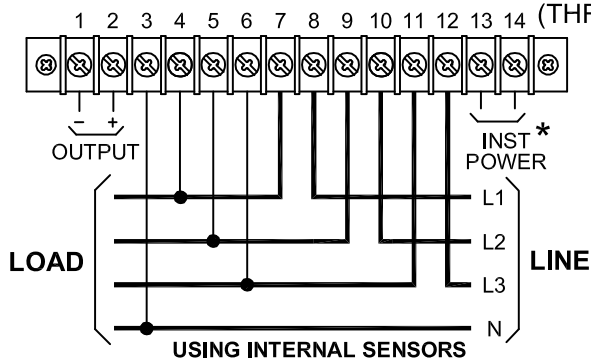
### THREE-PHASE, FOUR-WIRE CONNECTIONS

(2-1/2 ELEMENT)



### THREE-PHASE, FOUR-WIRE CONNECTIONS

(THREE ELEMENT)



\* 115Vac ON MODELS WITH B, D, E, EM OR X5 SUFFIX.

\* 230Vac ON MODELS WITH -22 SUFFIX.

\* NOT REQUIRED ON MODELS WITH A, C, E2 OR CX5 SUFFIX.

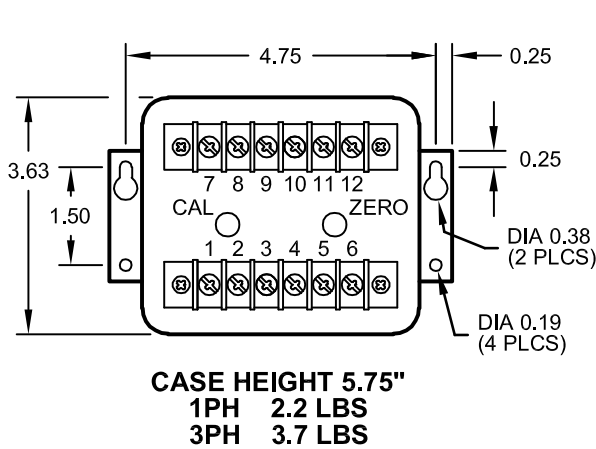
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# OHIO SEMITRONICS, INC.

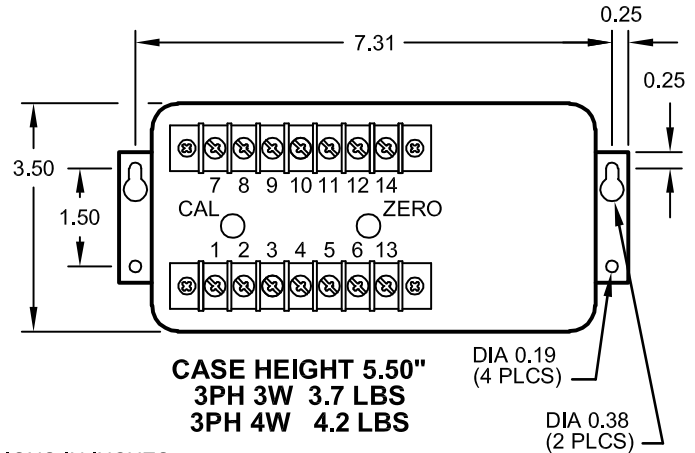
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### CASE DIMENSIONS

**SINGLE-PHASE & THREE-PHASE, THREE-WIRE**  
(EXCEPT THREE-PHASE, THREE-WIRE "E" MODELS)



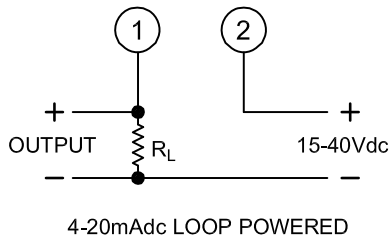
**THREE-PHASE, FOUR-WIRE**  
(ALSO USED ON THREE-PHASE, THREE-WIRE "E" MODELS)



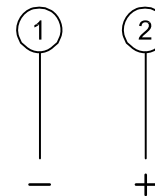
ALL DIMENSIONS IN INCHES.

### OUTPUT CONNECTIONS

**"E2" MODELS**

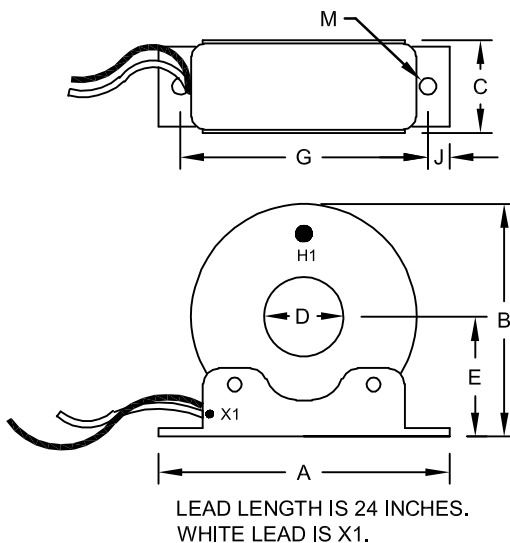


**ALL OTHER MODELS**



0-5Vdc, 0-10Vdc, 0-1mAac, 4-20mAac

### SENSOR DIMENSIONS



SENS. SIZE	SENSOR DIMENSIONS (in inches)								WT. LBS.
	A	B	C	D	E	G	J	M	
W	4.50	3.7	1.25	1.25	1.94	3.88	0.34	0.27 x 0.44	1.43
X	6.50	4.7	1.25	2.50	2.46	5.75	0.39	0.28	1.61
Y	6.50	4.7	1.25	3.00	2.46	5.75	0.39	0.28	1.10

Dwg# 0902-00871-B