

WATT/WATT HOUR TRANSDUCERS

AC WATT/WATT HOUR TRANSDUCER

MODEL W

SINGLE PHASE 50/60 HERTZ

FEATURES

- Accurate regardless of variations in voltage, current, power factor, or load.
- Standard Analog outputs for Watts, relay contact or 5V pulse for Watt Hours.
- **Factory calibrated**, traceable to NIST.

APPLICATIONS

- Measurement of power consumption.
- Can be easily integrated into building management systems.
- Pulse outputs interface with electronic or mechanical counters for accumulation of Watt Hours.



MODELS WITH INTEGRAL CURRENT SENSOR (ONE ELEMENT)

INPUTS		F.S. IN (WATTS)	STANDARD WATT OUTPUTS MODEL NUMBER W-							F.S. COUNT PER HR	WATT HR. OUTPUTS	
VOLTAGE	CURRENT		0-1mA*	0-1mA	0-10Vdc*	0-10Vdc	0-5Vdc*	0-5Vdc	4-20mA		CONTACT	5V PULSE
0 to 150	0 to 1.0	100	103A	103B	103C	103D	103CX5	103X5	103E	STANDARD OUTPUT FOR WATT HOURS N/O SPST RELAY CONTACT	TTL OUTPUT FOR WATT HOURS 5Vdc PULSE ADD SUFFIX "-T" TO PART NUMBER	
	0 to 2.5	250	106A	106B	106C	106D	106CX5	106X5	106E			
	0 to 5.0	500	001A	001B	001C	001D	001CX5	001X5	001E			
	0 to 10.0	1000	010A	010B	010C	010D	010CX5	010X5	010E			
	0 to 15.0	1500	019A	019B	019C	019D	019CX5	019X5	019E			
	0 to 20.0	2000	117A	117B	117C	117D	117CX5	117X5	117E			
0 to 300	0 to 1.0	200	104A	104B	104C	104D	104CX5	104X5	104E	200 500 1000 2000 3000 4000		
	0 to 2.5	500	107A	107B	107C	107D	107CX5	107X5	107E			
	0 to 5.0	1000	002A	002B	002C	002D	002CX5	002X5	002E			
	0 to 10.0	2000	011A	011B	011C	011D	011CX5	011X5	011E			
	0 to 15.0	3000	020A	020B	020C	020D	020CX5	020X5	020E			
	0 to 20.0	4000	110A	110B	110C	110D	110CX5	110X5	110E			
0 to 600	0 to 1.0	500	105A	105B	105C	105D	105CX5	105X5	105E	500 1000 2000 4000 6000 8000		
	0 to 2.5	1000	108A	108B	108C	108D	108CX5	108X5	108E			
	0 to 5.0	2000	003A	003B	003C	003D	003CX5	003X5	003E			
	0 to 10.0	4000	012A	012B	012C	012D	012CX5	012X5	012E			
	0 to 15.0	6000	021A	021B	021C	021D	021CX5	021X5	021E			
	0 to 20.0	8000	111A	111B	111C	111D	111CX5	111X5	111E			

Highlighted models, (5A), can be used with current transformers.

*Denotes self-powered unit, limiting input voltage ranges to:

103-135 for 150V models

215-280 for 300V models

395-550 for 600V models

All others require 103-135VAC instrument power, (50-400 Hz.).

Optional 220VAC instrument power-Add suffix "-22" to part number.

CUSTOM COUNT RATES, OPEN COLLECTOR WH OUTPUT AVAILABLE-CONSULT FACTORY

400 HERTZ MODELS- To order for use on 400 Hz. application, substitute "W4" in part number.

ORDERING INFORMATION

Example: Self-powered, single-phase, 120V, 5A input with 0-5Vdc output proportional to 0-500 Watts, TTL pulse output for Watt Hours, each pulse proportional to 0.1 Watt Hours.
W-001CX5-T

OPTION "V" - PROGRAMMABLE PULSES/HOURS

FULL SCALE OUTPUT USING CURRENT TRANSFORMERS/MODEL W WATT/WATT HOUR TRANSDUCERS						FULL SCALE OUTPUT USING CURRENT AND POTENTIAL TRANSFORMERS/MODEL W WATT/WATT HOUR TRANSDUCERS					
MODEL NO. (EXAMPLE) W	F.S. WATTS FROM ABOVE	CURRENT TRANSFORMER RATIO (EXAMPLE)	FULL SCALE WATTS	COUNTS PER HR FROM ABOVE	WH PER COUNT	F.S. WATTS FROM ABOVE	CURRENT TRANSFORMER RATIO (EXAMPLE)	POTENTIAL TRANSFORMER RATIO (EXAMPLE)	FULL SCALE WATTS	COUNTS PER HR FROM ABOVE	WH PER COUNT
-001	500	500/5 (100:1)	50,000	5000	10	500	500/5 (100:1)	2400/120 (20:1)	1,000,000	5000	200
-002	1000	500/5 (100:1)	100,000	1000	100						
-003	2000	500/5 (100:1)	200,000	2000	100						

CONNECTION DIAGRAMS AND DIMENSIONS SHOWN ON PAGE 105

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WATT / WATT HOUR TRANSDUCERS

WATT/WATT HOUR TRANSDUCERS

AC WATT/WATT HOUR TRANSDUCER

MODEL W

THREE PHASE-THREE WIRE 50/60 HERTZ



MODELS WITH INTEGRAL CURRENT SENSOR (TWO ELEMENT)

INPUTS		F.S. IN (WATTS)	STANDARD WATT OUTPUTS MODEL NUMBER W-							F.S. COUNT PER HR	WATT HR. OUTPUTS	
VOLTAGE	CURRENT		0-1mA*	0-1mA	0-10Vdc*	0-10Vdc	0-5Vdc*	0-5Vdc	4-20mA		CONTACT	5V PULSE
0 to 150	0 to 5	1K	004A	004B	004C	004D	004CX5	004X5	004E	1000	STANDARD OUTPUT FOR WATT HOURS N/O SPST RELAY CONTACT	TTL OUTPUT 5Vdc PULSE ADD SUFFIX "-T" TO PART NUMBER
	0 to 10	2K	013A	013B	013C	013D	013CX5	013X5	013E	2000		
	0 to 15	3K	022A	022B	022C	022D	022CX5	022X5	022E	3000		
	0 to 20	4K	112A	112B	112C	112D	112CX5	112X5	112E	4000		
0 to 300	0 to 5	2K	005A	005B	005C	005D	005CX5	005X5	005E	2000		
	0 to 10	4K	014A	014B	014C	014D	014CX5	014X5	014E	4000		
	0 to 15	6K	023A	023B	023C	023D	023CX5	023X5	023E	6000		
	0 to 20	8K	113A	113B	113C	113D	113CX5	113X5	113E	8000		
0 to 600	0 to 5	4K	006A	006B	006C	006D	006CX5	006X5	006E	4000		
	0 to 10	8K	015A	015B	015C	015D	015CX5	015X5	015E	8000		
	0 to 15	12K	024A	024B	024C	024D	024CX5	024X5	024E	12000		
	0 to 20	16K	114A	114B	114C	114D	114CX5	114X5	114E	16000		

Highlighted models, (5A), can be used with current transformers.

*Denotes self-powered unit, limiting input voltage ranges to:
103-135 for 150V models
215-280 for 300V models
395-550 for 600V models

150V models may be used with single-phase, three wire, 120V/240V Edison systems.

400 HERTZ MODELS-To order for use on 400 Hz. application, substitute "W4" in part number.

**CUSTOM COUNT RATES,
OPEN COLLECTOR WH OUTPUT AVAILABLE
CONSULT FACTORY
OPTION "V"- PROGRAMMABLE PULSES/HOUR**

FULL SCALE OUTPUT USING CURRENT TRANSFORMERS/MODEL W WATT/WATT HOUR TRANSDUCERS

MODEL NO. (EXAMPLE) W	F.S. WATTS FROM ABOVE	CURRENT TRANSFORMER RATIO (EXAMPLE)	FULL SCALE WATTS	COUNTS PER HR FROM ABOVE	WH PER COUNT
-004	1K	500/5 (100:1)	100K	1000	100
-005	2K	500/5 (100:1)	200K	2000	100
-006	4K	500/5 (100:1)	400K	4000	100

FULL SCALE OUTPUT USING CURRENT AND POTENTIAL TRANSFORMERS/MODEL W WATT/WATT HOUR TRANSDUCERS

F.S. WATTS FROM ABOVE	CURRENT TRANSFORMER RATIO (EXAMPLE)	POTENTIAL TRANSFORMER RATIO (EXAMPLE)	FULL SCALE WATTS	COUNTS PER HR FROM ABOVE	WH PER COUNT
1K	500/5 (100:1)	2400/120 (20:1)	2000K	1000	2000

MODEL W SPECIFICATIONS

INPUT

Voltage See tables
 Current See tables
 Frequency Range 48 to 70 Hz.
 Power Factor Any
 Response (Transient 90%)
 With integral sensors Less than 100 microSeconds
 Burden
 Voltage 1.25VA
 Current 1.25VA
 Output amplifier 2 Watts
 Current Overload
 2 times full scale (cont.)
 6 times full scale (10 Sec.)
 Dielectric Test....(Input/Output/Case) 1500VAC (RMS)
 Surge Withstands IEEE SWC test

OUTPUT

WH RELAY N/O SPST; 150VAC, 0.5A rated
 Contact closure period 200 milliSeconds
 Analog Output Ripple Less than 1% F.S.
 Output Loading (OHMS)
 0-1mA 0-10K
 0-10Vdc 2K min.
 0-5Vdc 2K min.
 4-20mA 500
 Response Time.....(90%) 250 milliSeconds
 Field Adjustable Cal. ± 10%
ACCURACY ± 0.5% F. S.
 Includes combined effects of power factor, linearity, repeatability, and current sensor.
 Temperature Effect (-10° to 60°C)
 ±1.0% of reading, ±0.1% F.S. output
 Instrument Power (Std.) ... 103-135VAC, 50-400 Hz., 10VA

CONNECTION DIAGRAMS AND DIMENSIONS SHOWN ON PAGE 105

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WATT / WATT HOUR TRANSDUCERS

WATT/WATT HOUR TRANSDUCERS

AC WATT/WATT HOUR TRANSDUCER

MODEL W

THREE PHASE-FOUR WIRE 50/60 HERTZ



MODELS WITH INTEGRAL CURRENT SENSOR (THREE ELEMENT)

INPUTS		F.S. IN (WATTS)	STANDARD WATT OUTPUTS MODEL NUMBER W-							F.S. COUNT PER HR	WATT HR. OUTPUTS	
VOLTAGE	CURRENT		0-1mA*	0-1mA	0-10Vdc*	0-10Vdc	0-5Vdc*	0-5Vdc	4-20mA		CONTACT	5VPULSE
0 to 150 Line	0 to 5	1500	007A	007B	007C	007D	007CX5	007X5	007E	1500	STANDARD OUTPUT N/O SPST RELAY CONTACT.	TTL OUTPUT ADD SUFFIX "-T"
To	0 to 10	3000	016A	016B	016C	016D	016CX5	016X5	016E	3000		
Neutral	0 to 15	4500	025A	025B	025C	025D	025CX5	025X5	025E	4500		
	0 to 20	6000	115A	115B	115C	115D	115CX5	115X5	115E	6000		
0 to 300 Line	0 to 5	3000	008A	008B	008C	008D	008CX5	008X5	008E	3000	3000 6000 9000 12000	
To	0 to 10	6000	017A	017B	017C	017D	017CX5	017X5	017E	6000		
Neutral	0 to 15	9000	026A	026B	026C	026D	026CX5	026X5	026E	9000		
	0 to 20	12000	116A	116B	116C	116D	116CX5	116X5	116E	12000		

Highlighted models, (5A), can be used with current transformers. All voltage specifications are **line-to-neutral voltage**.

*Denotes self-powered unit, limiting input voltage ranges to:
103-135 for 150V models
215-280 for 300V models
395-550 for 600V models

All others require 103-135VAC instrument power, (50-400 Hz.).
Optional 220VAC instrument power-Add suffix "-22" to part number.

**CUSTOM COUNT RATES,
OPEN COLLECTOR WH OUTPUT AVAILABLE
CONSULT FACTORY**

400 HERTZ MODELS-To order for use on 400 Hz. application, substitute "W4" in part number.

ORDERING INFORMATION

Example: Self-powered, three phase-four wire, 120V, 5A input with 0-5Vdc output proportional to 0-1500 Watts, TTL pulse output for Watt Hours, each pulse proportional to 1.0 Watt Hour.
W-007CX5-T

OPTION "V" - PROGRAMMABLE PULSES/HOUR

FULL SCALE OUTPUT USING CURRENT TRANSFORMERS/MODEL W WATT/WATT HOUR TRANSDUCERS

MODEL NO. (EXAMPLE) W	F.S. WATTS FROM ABOVE	CURRENT TRANSFORMER RATIO (EXAMPLE)	FULL SCALE WATTS	COUNTS PER HR FROM ABOVE	WH PER COUNT
-007	1500	500/5 (100:1)	150,000	1500	100
-008	3000	500/5 (100:1)	300,000	3000	100

FULL SCALE OUTPUT USING CURRENT AND POTENTIAL TRANSFORMERS/MODEL W WATT/WATT HOUR TRANSDUCERS

F.S. WATTS FROM ABOVE	CURRENT TRANSFORMER RATIO (EXAMPLE)	POTENTIAL TRANSFORMER RATIO (EXAMPLE)	FULL SCALE WATTS	COUNTS PER HR FROM ABOVE	WH PER COUNT
1500	500/5 (100:1)	2400/120 (20:1)	3,000,000	1500	2000

MODEL W SPECIFICATIONS

INPUT

Voltage See tables
Current See tables
Frequency Range 48 to 70 Hz.
Power Factor Any
Response (Transient 90%)
With integral sensors Less than 100 microSeconds
Burden
Voltage 1.25VA
Current 1.25VA
Output amplifier 2 Watts
Current Overload
..... 2 times full scale (cont.)
..... 6 times full scale (10 Sec.)
Dielectric Test....(Input/Output/Case) 1500VAC (RMS)
Surge Withstands IEEE SWC test

OUTPUT

WH RELAY N/O SPST; 150VAC, 0.5A rated
Contact closure period 200 milliSeconds
Analog Output Ripple Less than 1% F.S.
Output Loading (OHMS)
0-1mA 0-10K
0-10Vdc 2K min.
0-5Vdc 2K min.
4-20mA 500
Response Time.....(90%) 250 milliSeconds
Field Adjustable Cal. ± 10%
ACCURACY ± 0.5% F. S.
Includes combined effects of power factor, linearity, repeatability, and current sensor.
Temperature Effect (-10° to 60°C)
..... ±1.0% of reading, ±0.1% F.S. output
Instrument Power (Std.) 103-135VAC, 50-400 Hz.

CONNECTION DIAGRAMS AND DIMENSIONS SHOWN ON PAGE 105

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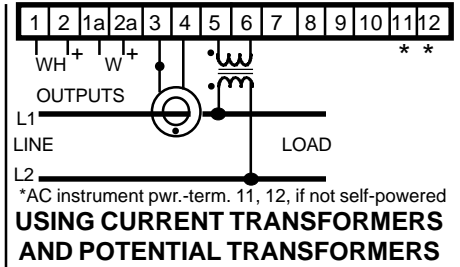
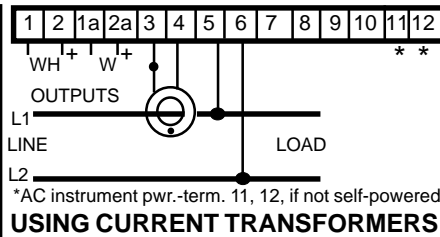
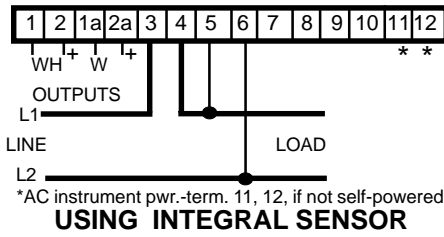
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WATT/WATT HOUR TRANSDUCERS

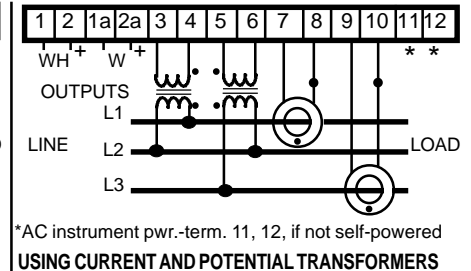
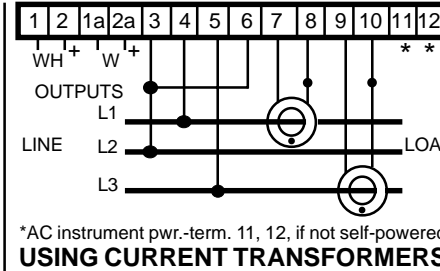
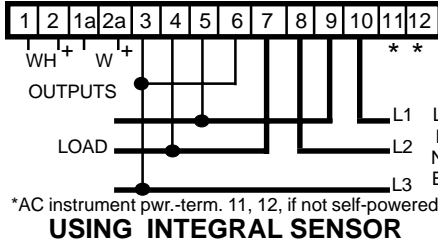
CONNECTION DIAGRAMS

MODEL W

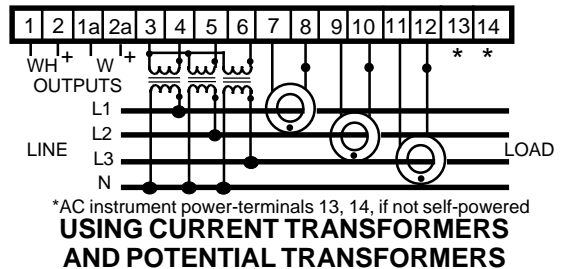
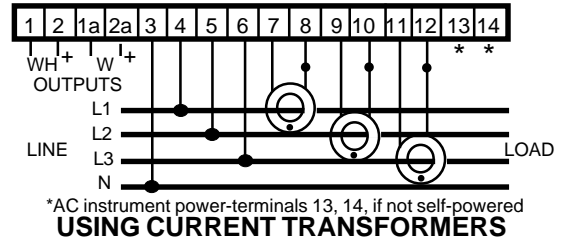
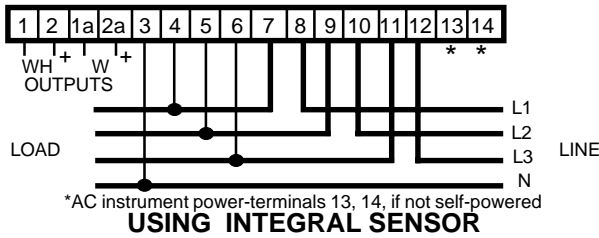
SINGLE PHASE CONNECTIONS



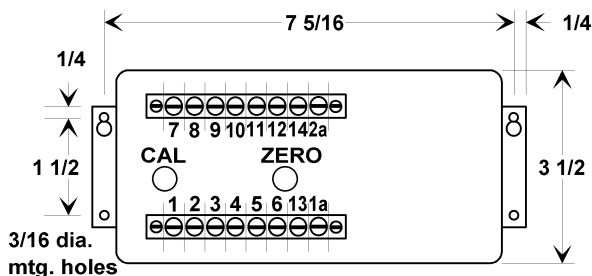
THREE PHASE THREE WIRE CONNECTIONS



THREE PHASE FOUR WIRE CONNECTIONS



CASE DIMENSIONS

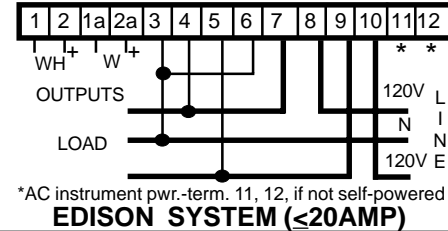


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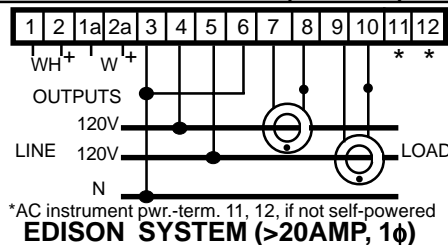
ALL DIMENSIONS IN INCHES

EDISON CIRCUIT 1 PHASE - 3 WIRE (120/240V)

- (W-004) 5A
- (W-013) 10A
- (W-022) 15A
- (W-112) 20A



(W-004 ONLY)



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