

ACCURATE TO 0.2% OF READING

DESCRIPTION

The GH-xxxx Watt/Watthour transducer provides an analog output proportional to time-averaged instantaneous true power (watts). Energy (watthours) consumption is indicated by a relay closure or TTL pulse output.

The VGH-xxxx VAR/VARhour transducer provides an analog output proportional to time-averaged instantaneous reactive power (VARs). Reactive energy (VARhours) is indicated by a relay closure or TTL pulse output.

Models are available in 1, 2, 2½, or 3 element configurations. Units with appropriate ratings may be directly connected to the monitored system. Voltage and current ranges may also be extended by using industry standard potential and/or current transformers.



5 YEAR WARRANTY

FEATURES

- Accurate for all variations of voltage, current and power factor
- Available in 1, 2, 2½ or 3 element configurations
- Bidirectional watt measurement (GH-xxxx)
- Leading/Lagging VAR measurement (VGH-xxxx)
- Calibration traceable to NIST

APPLICATIONS

- Process control
- Energy management systems
- Sub-metering
- Appliance testing (compliance with standards)
- Monitoring of generation / co-generation systems

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

INPUTS		F.S. WATTS or VARS	STANDARD GH- OR VGH-					RELAY OPTIONS (ADD SUFFIX) *				
AC VOLTS	AC AMPS		0-±1mAdc	0-±10Vdc	4-20mAdc	4-12-20mAdc	0-±5Vdc	Wh RELAY *	"-T"	"-R"	"-H"	"-K"
0 to 150	0 to 1	100	103B	103D	103E	103EM	103X5	1Wh/Cnt	Wh relay is replaced with a 5Vdc, TTL-compatible pulse.	A second Wh relay or pulse is provided to allow bidirectional (Forward/Reverse) energy measurement	Wh relay is replaced with a solid-state, Form C (SPDT) relay	Wh relay is replaced with a solid-state, Form C (SPDT) relay operating in "KYZ" format (50% duty cycle)
	0 to 2.5	250	106B	106D	106E	106EM	106X5	1Wh/Cnt				
	0 to 5	500	001B	001D	001E	001EM	001X5	1Wh/Cnt				
	0 to 10	1000	010B	010D	010E	010EM	010X5	1Wh/Cnt				
	0 to 20	2000	019B	019D	019E	019EM	019X5	1Wh/Cnt				
0 to 300	0 to 1	200	104B	104D	104E	104EM	104X5	1Wh/Cnt				
	0 to 2.5	500	107B	107D	107E	107EM	107X5	1Wh/Cnt				
	0 to 5	1000	002B	002D	002E	002EM	002X5	1Wh/Cnt				
	0 to 10	2000	011B	011D	011E	011EM	011X5	1Wh/Cnt				
	0 to 20	4000	020B	020D	020E	020EM	020X5	1Wh/Cnt				
0 to 600	0 to 1	400	105B	105D	105E	105EM	105X5	1Wh/Cnt				
	0 to 2.5	1000	108B	108D	108E	108EM	108X5	1Wh/Cnt				
	0 to 5	2000	003B	003D	003E	003EM	003X5	1Wh/Cnt				
	0 to 10	4000	012B	012D	012E	012EM	012X5	1Wh/Cnt				
	0 to 20	8000	021B	021D	021E	021EM	021X5	1Wh/Cnt				

Standard calibration is 60Hz. For 50Hz calibrationAdd suffix **"-50"**
 Standard instrument power is 115Vac. For 230Vac.....Add suffix **"-22"**
 Self-powered...Add suffix **"G"**

To calculate unit scaling when using Current and/or Potential Transformers (CTs or PTs), multiply the base unit scaling by the CT and/or PT ratio.

Example: GH-001D used with 100:5 CTs
 CT ratio = 100/5 = 20, so F.S. Watt input = 500W x 20 = 10,000W (0-10kW input = 0-10V output)
 Wh Relay scaling = 1Wh/Cnt x 20 = 20Wh/Cnt

*To specify a custom Wh count (pulse) rate, add a "r" suffix to the base model number followed by the desired F.S. counts (pulses) per hour. Range of Available Count (Pulse) Rates:

Min Count (Pulse) Rate All Models50/hr
 Max Count (Pulse) Rate Relay Models 12k Counts/hr
 Pulse Models 12M Pulses/hr

Count (Pulse) rates over 9k/hr will have the contact closure (pulse duration) adjusted for a 50% duty cycle at F.S. input. (maximum count rate).

Example: GH-002D-T/500K indicates a F.S. pulse rate of 500k pulses/hr. F.S. Watt input for this model is 1000W. The new Wh per pulse scaling is 0.002Wh/pulse (1000W/500k cts/hr) and pulse duration is 3.6ms ±10% (500k/3600)/2.

NOTE: On self-powered models (suffix **"G"**) input voltage ranges are limited to:
 0 - 150V models = 95 - 135V
 0 - 300V models = 200 - 280V
 0 - 600V models = 380 - 550V

ORDERING INFORMATION

Example:
 Single-Phase, 120V, 5A, 60Hz
 0-±500W Input = 0-±10Vdc Output
 TTL Pulse for Watthours -1Wh/pls

GH-001D-T

ORDERING INFORMATION

Example:
 Single-Phase, 120V, 5A, 60Hz
 0-500 Lag/Lead VARS = 0-±10Vdc Output
 Relay closure for Lagging VARhours -1VARh/cls
 Self-Powered

VGH-001DG

THREE-PHASE, THREE-WIRE MODELS WITH INTERNAL SENSOR (TWO-ELEMENT)

INPUTS		F.S. WATTS or VARS	STANDARD GH- OR VGH-					RELAY OPTIONS (ADD SUFFIX) *				
AC VOLTS	AC AMPS		0-±1mAcd	0-±10Vdc	4-20mAcd	4-12-20mAcd	0-±5Vdc	Wh RELAY *	"-T"	"-R"	"-H"	"-K"
0 to 150	0 to 1	200	120B	120D	120E	120EM	120X5	1Wh/Cnt	Wh relay is replaced with a 5Vdc, TTL-compatible pulse.	A second Wh relay or pulse is provided to allow bidirectional (Forward/Reverse) energy measurement	Wh relay is replaced with a solid-state, Form C (SPDT) relay	Wh relay is replaced with a solid-state, Form C (SPDT) relay operating in "KYZ" format (50% duty cycle)
	0 to 2.5	500	129B	129D	129E	129EM	129X5	1Wh/Cnt				
	0 to 5	1000	004B	004D	004E	004EM	004X5	1Wh/Cnt				
	0 to 10	2000	013B	013D	013E	013EM	013X5	1Wh/Cnt				
	0 to 20	4000	022B	022D	022E	022EM	022X5	1Wh/Cnt				
0 to 300	0 to 1	400	121B	121D	121E	121EM	121X5	1Wh/Cnt				
	0 to 2.5	1000	130B	130D	130E	130EM	130X5	1Wh/Cnt				
	0 to 5	2000	005B	005D	005E	005EM	005X5	1Wh/Cnt				
	0 to 10	4000	014B	014D	014E	014EM	014X5	1Wh/Cnt				
	0 to 20	8000	023B	023D	023E	023EM	023X5	1Wh/Cnt				
0 to 600	0 to 1	800	122B	122D	122E	122EM	122X5	1Wh/Cnt				
	0 to 2.5	2000	131B	131D	131E	131EM	131X5	1Wh/Cnt				
	0 to 5	4000	006B	006D	006E	006EM	006X5	1Wh/Cnt				
	0 to 10	8000	015B	015D	015E	015EM	015X5	1Wh/Cnt				
	0 to 20	16000	024B	024D	024E	024EM	024X5	10Wh/Cnt				

THREE-PHASE, FOUR-WIRE MODELS WITH INTERNAL SENSOR (THREE-ELEMENT)

INPUTS		F.S. WATTS or VARS	STANDARD GH- OR VGH-					RELAY OPTIONS (ADD SUFFIX) *				
AC VOLTS	AC AMPS		0-±1mAcd	0-±10Vdc	4-20mAcd	4-12-20mAcd	0-±5Vdc	Wh RELAY *	"-T"	"-R"	"-H"	"-K"
0 to 150 L-N	0 to 1	300	125B	125D	125E	125EM	125X5	1Wh/Cnt	Wh relay is replaced with a 5Vdc, TTL-compatible pulse.	A second Wh relay or pulse is provided to allow bidirectional (Forward/Reverse) energy measurement	Wh relay is replaced with a solid-state, Form C (SPDT) relay	Wh relay is replaced with a solid-state, Form C (SPDT) relay operating in "KYZ" format (50% duty cycle)
	0 to 2.5	750	132B	132D	132E	132EM	132X5	1Wh/Cnt				
	0 to 5	1500	007B	007D	007E	007EM	007X5	1Wh/Cnt				
	0 to 5	1500	7.5B	7.5D	7.5E	7.5EM	7.5X5	1Wh/Cnt				
	0 to 10	3000	016B	016D	016E	016EM	016X5	1Wh/Cnt				
	0 to 20	6000	025B	025D	025E	025EM	025X5	1Wh/Cnt				
0 to 300 L-N	0 to 1	600	126B	126D	126E	126EM	126X5	1Wh/Cnt				
	0 to 2.5	1500	133B	133D	133E	133EM	133X5	1Wh/Cnt				
	0 to 5	3000	008B	008D	008E	008EM	008X5	1Wh/Cnt				
	0 to 5	3000	8.5B	8.5D	8.5E	8.5EM	8.5X5	1Wh/Cnt				
	0 to 10	6000	017B	017D	017E	017EM	017X5	1Wh/Cnt				
	0 to 20	12000	026B	026D	026E	026EM	026X5	1Wh/Cnt				

PART NUMBERS 7.5 and 8.5 DENOTE 2 1/2-ELEMENT UNITS.

SPECIFICATIONS

INPUT

Voltage See Tables
 Current See Tables
 Frequency..Range GH-xxxx 58-62Hz
 with "-50" option 48-52Hz
 VGH-xxxx 60Hz
 with "-50" option 50Hz
 Power Factor Any
 Burden Voltage 0.1VA/element
 Current 0.28VA/element
 Overload
 Voltage ...continuous 150V/300V rated 1.17 x rated
 600V rated 600V
 Current ...continuous 1A/2.5A/5A/10A rated ...2 x rated
 20A rated 20A
 transient All 50A for 10s/hr
 All 250A for 1s/hr

DIELECTRIC TEST

Input/Output/Case 1800Vac
 Surge Withstands IEEE SWC test

INSTRUMENT POWER

Standard 115Vac ±15%, 50/60Hz, 7.5VA
 Option "-22" 230Vac ±15%, 50/60Hz, 7.5VA

TEMPERATURE and PHYSICAL

Temperature Operating Range -20°C to 60°C
 Effect ±0.005%/°C
 Humidity Operating 0-95% non-condensing

OUTPUT

VGH + = Lagging/ - = Leading
 Loading
 "B" models (0-1mAcd) 0-10kΩ
 "D", "X5" models (0-10Vdc, 0-5Vdc) ≥2kΩ
 "E", "EM" models (4-20mAcd) 0-500Ω
 Response Time ... (to 99%) ≤400ms
 Field Adjustable Cal. ±2% min.
 Wh Relay
 Standard Form A (SPST, N.O.) 120Vac, 0.5A
 Contact closure duration 200ms
 Option "-T" Pulse 5V, TTL-compatible pulse
 Pulse duration 200ms
 Option "-H" Solid-state, Form C (SPDT) .. 120Vac, 0.1A
 Contact closure duration 200ms
 Option "-K" Solid-state, Form C (KYZ) .. 120Vac, 0.1A
 Contact closure duration 50% duty cycle

- Notes: 1. For custom count rates, contact closure/pulse duration will be adjusted to maintain a duty cycle of approximately 50% at F.S. input.
 2. A lid mounted LED provides visual indication of contact closures/pulse outputs. One flash per closure/pulse.

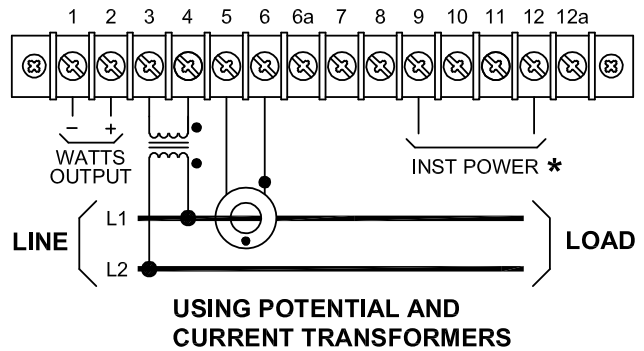
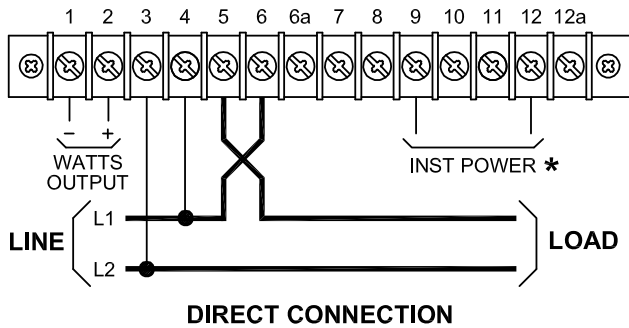
ACCURACY (setpoint, linearity, offset @ 25°C)

GH ±0.2% Rdg./PF, ±0.05% F.S.
 VGH ±0.2% Rdg./sinθ, ±0.05% F.S.
 Analog Output Ripple <0.5% F.S.

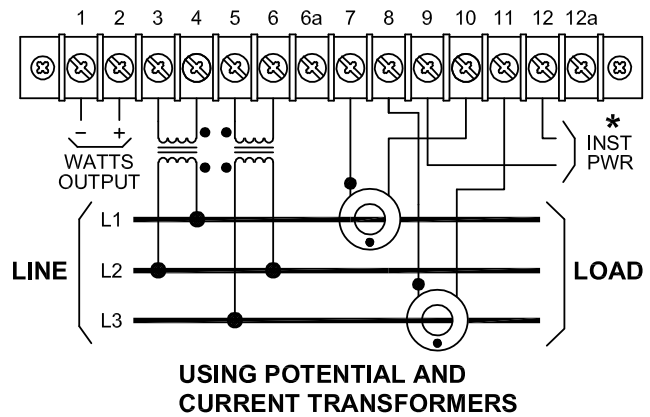
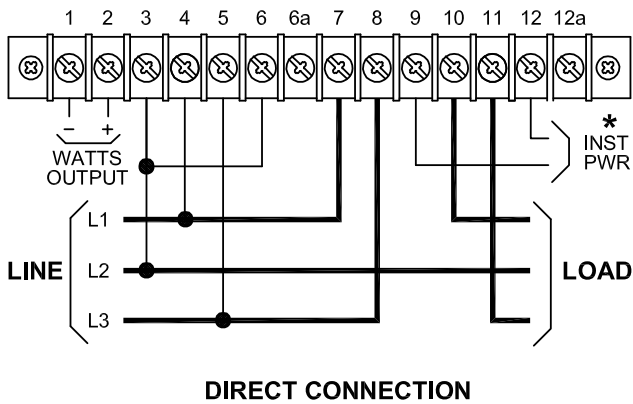
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 WWW.OHIOSEMITRONICS.COM * 1-800-537-6732

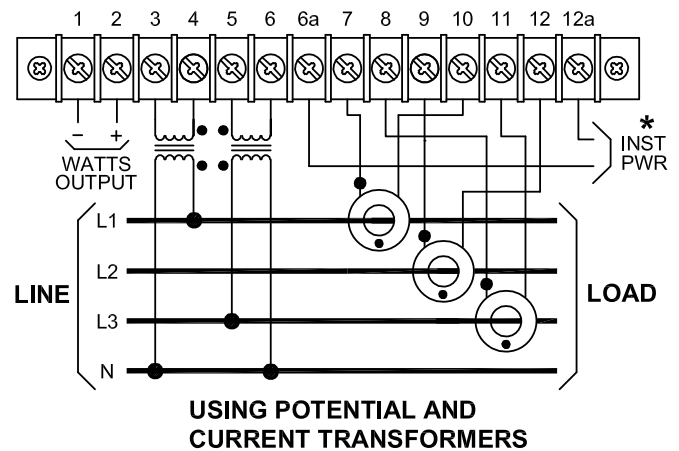
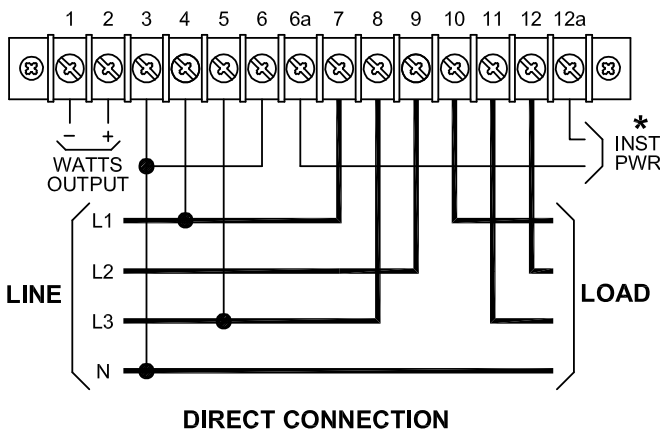
SINGLE-PHASE CONNECTIONS (ONE-ELEMENT)



THREE-PHASE, THREE-WIRE CONNECTIONS (TWO-ELEMENT)



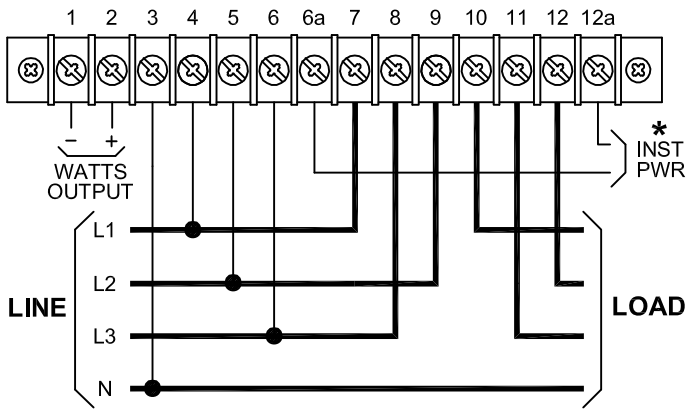
THREE-PHASE, FOUR-WIRE CONNECTIONS (2-1/2 ELEMENT)



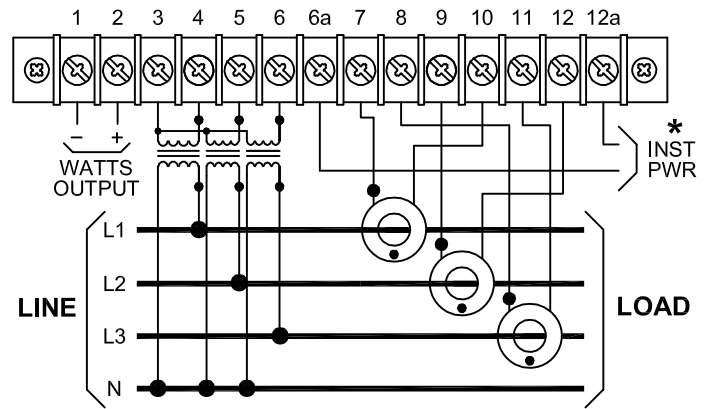
* 115Vac ON MODELS WITH B, D, E, EM OR X5 SUFFIX.
 * 230Vac ON MODELS WITH -22 SUFFIX.
 * NOT REQUIRED ON MODELS WITH G SUFFIX.

0902-00877-B

THREE-PHASE, FOUR-WIRE CONNECTIONS (THREE-ELEMENT)



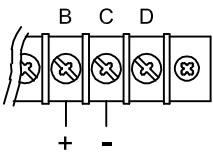
DIRECT CONNECTION



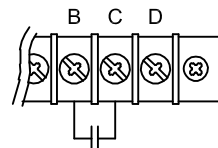
USING POTENTIAL AND CURRENT TRANSFORMERS

- * 115Vac ON MODELS WITH B, D, E, EM OR X5 SUFFIX.
- * 230Vac ON MODELS WITH -22 SUFFIX.
- * NOT REQUIRED ON MODELS WITH G SUFFIX.

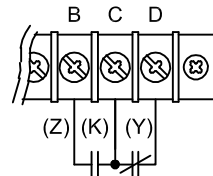
WATTHOUR OR VARHOUR OUTPUT CONNECTIONS



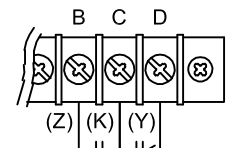
OPTION "-T" TTL OUTPUT



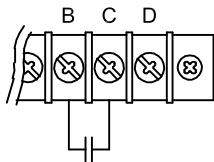
FORWARD (VGH = LAGGING)



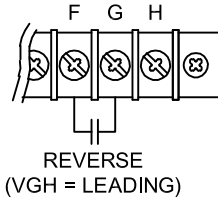
OPTION "H" OR "K" SPDT RELAY (VGH = LAGGING)



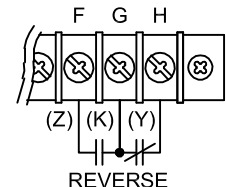
FORWARD (VGH = LAGGING)



STANDARD OUTPUT SPST RELAY (VGH = LAGGING)



REVERSE (VGH = LEADING)

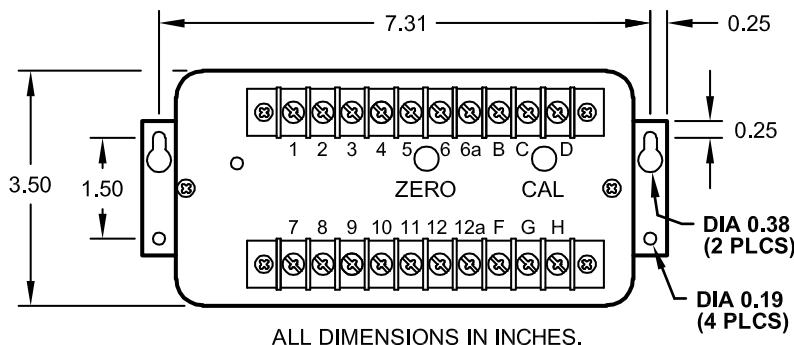


REVERSE (VGH = LEADING)

OPTION "R" BIDIRECTIONAL SPST RELAY

OPTION "RH" OR "RK"

CASE DIMENSIONS



ALL DIMENSIONS IN INCHES.

CASE HEIGHT 5.88"
1PH 2W 2.9 LBS
3PH 3W 3.3 LBS
3PH 4W 3.8 LBS

Dwg# 0902-00877-B Rev --