

WATT/WH or VAR/VARHR TRANSDUCERS

WATT/WATTHOUR OR VAR/VARHOUR TRANSDUCER *MODELS GH, VGH*

ACCURATE TO 0.2% OF READING

FEATURES

- Accurate regardless of variations in voltage, current, power factor, or load.
- Available with 1, 2, 2 1/2, or 3 element configurations. Bi-directional Watt and Watthour outputs available. (GH) Bi-directional Var and Varhour outputs available. (VGH)
- Accuracy maintained over wide temperature range, calibration traceable to NIST.

APPLICATIONS

- Integration into energy management systems, or a variety of sub-metering applications.
- Measurement using direct-connection, potential and/or current transformers.



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

INPUTS		F.S. WATTS or VARS	STANDARD OUTPUTS MODELS GH- OR VGH-					F.S. COUNTS/ HOUR	WH RELAY OPTIONS (ADD SUFFIX)			
AC VOLTS	AC AMPS		±1mAdc	±10Vdc	4-20mAdc	4-12-20mAdc	0-±5Vdc		"-T"	"-R"	"-H"	"-K"
0-150	0-1	100	103B	103D	103E	103EM	103X5	100	Relay is replaced with 5Vdc, TTL compatible pulse.	A second relay or pulse is provided to allow bi-directional measurement	Form C (SPDT) solid state relay 0.1A	Form C (SPDT) solid state relay operating in "KYZ" format (50% duty cycle) 0.1A
	0-5	500	001B	001D	001E	001EM	001X5	500				
	0-10	1000	010B	010D	010E	010EM	010X5	1000				
	0-20	2000	019B	019D	019E	019EM	019X5	2000				
0-300	0-1	200	104B	104D	104E	104EM	104X5	200				
	0-5	1000	002B	002D	002E	002EM	002X5	1000				
	0-10	2000	011B	011D	011E	011EM	011X5	2000				
	0-20	4000	020B	020D	020E	020EM	020X5	4000				
0-600	0-1	500	105B	105D	105E	105EM	105X5	500				
	0-5	2000	003B	003D	003E	003EM	003X5	2000				
	0-10	4000	012B	012D	012E	012EM	012X5	4000				
	0-20	8000	021B	021D	021E	021EM	021X5	8000				

Highlighted models, (5A), can be used with current transformers. To calculate unit scaling when using current or potential transformers, multiply the base unit scaling by the CT or PT ratio.

Example:

GH-001D used with 100:5 CTs.

CT ratio = 100/5 = 20

F.S. Watt input = 500W x 20 = 10,000W (10kW)

(0-10kW input = 0 - 10Vac output)

WH relay scaling = 1WH/Cnt x 20 = 20WH/cnt.

All std. units require 95-135Vac instrument power, (60Hz)

Optional self-powered models-Add suffix "-G"

Optional 230Vac instrument power - Add suffix "-22"

Input voltage ranges limited to:

95-135 for 150V models

200-280 for 300V models

380-550 for 600V models

50 HERTZ MODELS-ADD SUFFIX "-50" TO PART NUMBER.

Standard Relay is a Form A, SPST

ORDERING INFORMATION

Example: Single-Phase, 120V, 5A Input with
±10Vdc Output Proportional to ±500 Watts,
TTL Pulse Output for Watthours,
Each Pulse Proportional to 1.0 Watthour.

GH-001D-T

ORDERING INFORMATION

Example: Single-Phase, 120V, 5A Input with
±10Vdc Output Proportional to ±500 Vars,
Self-Powered, 1.0 Varhour per Relay Count.

VGH-001DG

CUSTOM WATTHOUR OR VARHOUR COUNT RATES
AVAILABLE - CONSULT FACTORY

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

INPUTS		F.S. WATTS or VARS	STANDARD OUTPUTS MODELS GH- OR VGH-					F.S. COUNTS/ HOUR	WH RELAY OPTIONS (ADD SUFFIX)			
AC VOLTS	AC AMPS		±1mAdc	±10Vdc	4-20mAdc	4-12-20mAdc	0-±5Vdc		"-T"	"-R"	"-H"	"-K"
0-150	0-1	200	120B	120D	120E	120EM	120X5	200	Relay is replaced with 5Vdc, TTL compatible pulse.	A second relay or pulse is provided to allow bi-directional measurement	Form C (SPDT) solid state relay 0.1A	Form C (SPDT) solid state relay operating in "KYZ" format (50% duty cycle) 0.1A
	0-5	1000	004B	004D	004E	004EM	004X5	1000				
	0-10	2000	013B	013D	013E	013EM	013X5	2000				
	0-20	4000	022B	022D	022E	022EM	022X5	4000				
0-300	0-1	400	121B	121D	121E	121EM	121X5	400				
	0-5	2000	005B	005D	005E	005EM	005X5	2000				
	0-10	4000	014B	014D	014E	014EM	014X5	4000				
	0-20	8000	023B	023D	023E	023EM	023X5	8000				
0-600	0-1	800	122B	122D	122E	122EM	122X5	800				
	0-5	4000	006B	006D	006E	006EM	006X5	4000				
	0-10	8000	015B	015D	015E	015EM	015X5	8000				
	0-20	16000	024B	024D	024E	024EM	024X5	1600				

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WATT/WH or VAR/VARHR TRANSDUCERS

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ACCURATE TO 0.2% OF READING



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

INPUTS		F.S. WATTS or VARS	STANDARD OUTPUTS MODEL GH- OR VGH-					F.S. COUNTS/ HOUR	WH RELAY OPTIONS (ADD SUFFIX)			
AC VOLTS	AC AMPS		±1mA _d c	±10V _d c	4-20mA _d c	4-12- 20mA _d c	0-±5V _d c		"-T"	"-R"	"-H"	"-K"
0-150 L-N	0-1	300	125B	125D	125E	125EM	125X5	300	Relay is replaced with 5V _d c, TTL compatible pulse.	A second relay or pulse is provided to allow bi-directional measurement	Form C (SPDT) solid state relay 0.1A	Form C (SPDT) solid state relay operating in "KYZ" format (50% duty cycle) 0.1A
	0-5	1500	007B	007D	007E	007EM	007X5	1500				
	0-5	1500	7.5B	7.5D	7.5E	7.5EM	7.5X5	1500				
	0-10	3000	016B	016D	016E	016EM	016X5	3000				
	0-20	6000	025B	025D	025E	025EM	025X5	6000				
0-300 L-N	0-1	600	126B	126D	126E	126EM	126X5	600				
	0-5	3000	008B	008D	008E	008EM	008X5	3000				
	0-5	3000	8.5B	8.5D	8.5E	8.5EM	8.5X5	3000				
	0-10	6000	017B	017D	017E	017EM	017X5	6000				
	0-20	12000	026B	026D	026E	026EM	026X5	12000				

Part Numbers 7.5 and 8.5 denote 2^{1/2} Element Units

Standard Relay is Form A, SPST

Highlighted models, (5A), can be used with current transformers.
To calculate unit scaling when using current or potential
transformers, multiply the base unit scaling by the CT or PT ratio.

Example:

GH-001D used with 100:5 CTs.

CT ratio = 100/5 = 20

F.S. Watt input = 500W x 20 = 10,000W (10kW)

(0-10kW input = 0 - 10V output)

WH relay scaling = 1WH/Cnt x 20 = 20WH/cnt.

All std. units require 95-135Vac instrument power, (60Hz)

Optional self-powered models-Add suffix "-G"

Optional 230Vac instrument power - Add suffix "-22"

Input voltage ranges limited to:

95-135 for 150V models

200-280 for 300V models

380-550 for 600V models

ORDERING INFORMATION

Example: Three-Phase, Four Wire 120V, 5A Input with
± 10V_dc Output Proportional to ± 1500 Vars,
TTL Pulse Output for Var Hours,
each Pulse Proportional to 1.0 Var Hour.
VGH-007D-T

50 HERTZ MODELS Add suffix "-50" to part number.

**CUSTOM WATT HOUR OR VAR HOUR COUNT RATES
AVAILABLE - CONSULT FACTORY**

SPECIFICATIONS

INPUT

Voltage..... See Tables

Current..... See Tables

Frequency Range GH 58-62Hz ... VGH 60Hz

Option "50"..... GH 48-52Hz ... VGH 50Hz

Power Factor..... Any

Burden

Voltage..... 0.1VA/phase

Current..... 0.28VA/phase

Overload

Voltage (cont.)..... 150V Range 175V

300V Range 350V

600V Range 600V

Current (cont.) 5A Range 2 X F.S.

10A Range 2 X F.S.

20A Range F.S.

Transient All Ranges

50A 10 sec./hr.

250A 1 sec./hr.

Dielectric Test....(Input/Output/Case)..... 1800Vac (RMS)

Surge Withstands IEEE SWC test

OUTPUT

VGH..... + = Lagging/ - = Leading

ACCURACY ± 0.2% R_dg ± 0.05% F.S.

Includes combined effects of voltage, current, load and power factor

Relay Form A (SPST, N.O.) 120Vac, 0.5A

Contact closure duration.....200ms

Option "T"..... Pulse 5V TTL Compatible Pulse

Pulse duration.....200ms

Option "H" Form C (SPDT)..... 120Vac, 0.1A

Contact closure duration.....200ms

Option "K" Form C (KYZ)..... 120Vac, 0.1A

Contact closure duration..... 50% duty cycle

Analog Output Ripple < 0.5% F.S.

Output Loading (Ω)

±1mA_dc..... 0-10K

±10V_dc..... 2K min.

4-20mA_dc..... 0-500

Response Time....(99%) <400ms

Field Adjustable Cal. ± 2% min.

Temperature Effect....(-20°C to +60°C) +0.005%/°C

Operating Humidity 0-95% non-condensing

Instrument Power (std.) 115Vac, ±15%, 50/60Hz, 7.5VA

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

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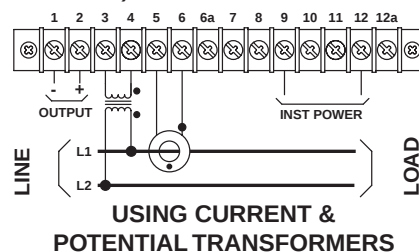
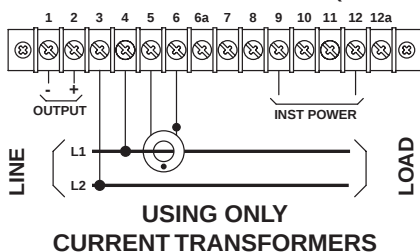
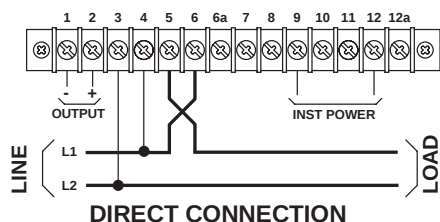
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WATT/WH or VAR/VARHR TRANSDUCERS

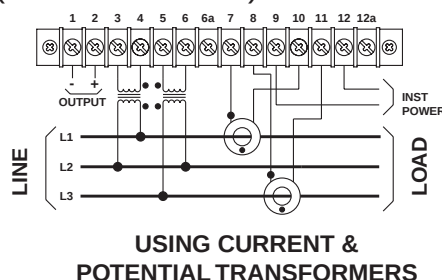
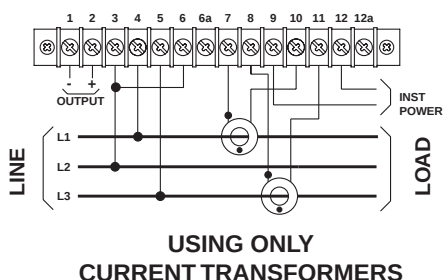
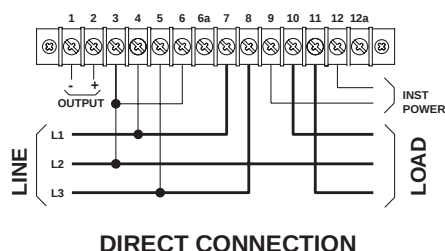
CONNECTION DIAGRAMS

MODELS GH, VGH

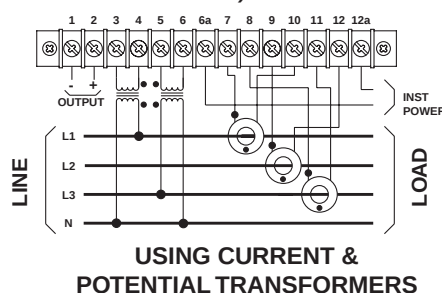
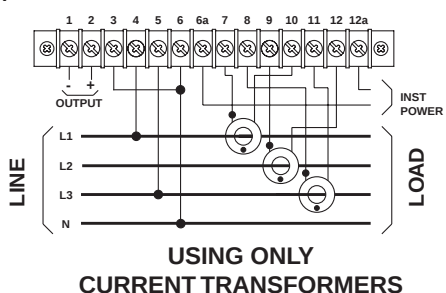
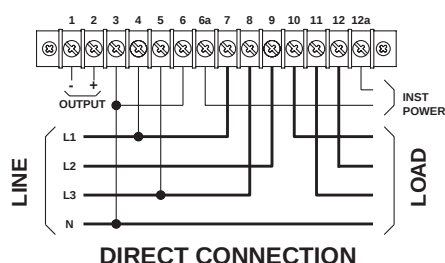
SINGLE PHASE CONNECTIONS (ONE ELEMENT)



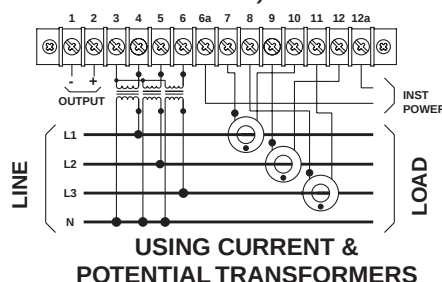
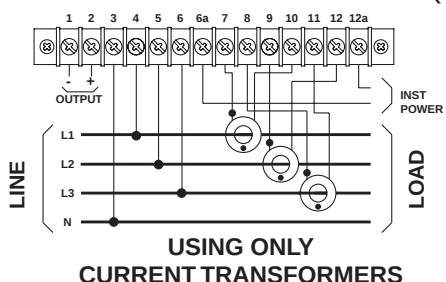
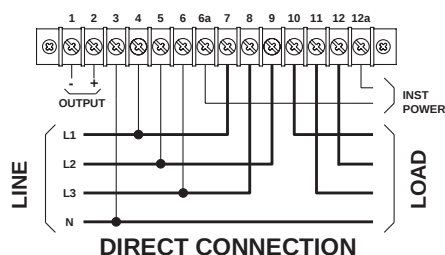
THREE-PHASE, THREE-WIRE CONNECTIONS (TWO ELEMENT)



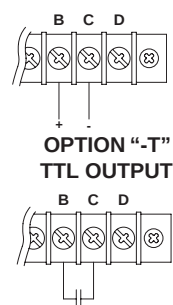
THREE-PHASE, FOUR-WIRE CONNECTIONS (2 1/2 ELEMENT)



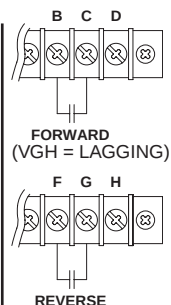
THREE-PHASE, FOUR-WIRE CONNECTIONS (THREE ELEMENT)



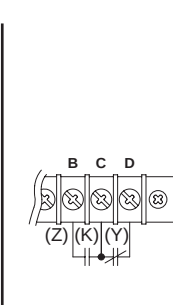
WATTHOUR OR VARHOUR OUTPUT CONNECTIONS



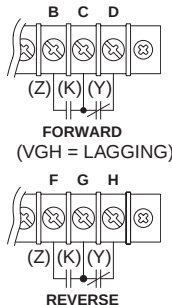
STANDARD OUTPUT SPST RELAY
(VGH = LAGGING)



REVERSE (VGH = LEADING) OPTION "R" BI-DIRECTIONAL SPST RELAY

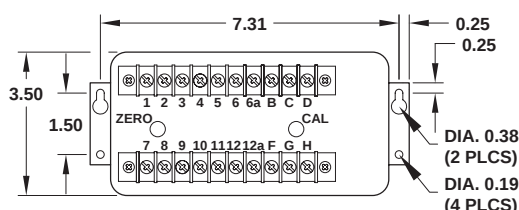


OPTION "RH" OR "RK" SPDT RELAY



REVERSE (VGH = LEADING) OPTION "RH" OR "RK" SPDT RELAY

CASE DIMENSIONS



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