

AC Watt&Watt-hr / Var&Var-hr TRANSDUCER

CWHW/CQHQ

FEATURES

- Measures both Watts and Watt-hrs or Vars and Var-hrs (Dual output)
- 1P2W, 1P3W, 3P3W, 3P4W systems
- 0.2% fs Accuracy and 4kV/1min dielectric strength
- Output range programmable by dip-switch
- Low output ripple
- High stability & low cost



SPECIFICATION

INPUT: Watt / Var

| Connection | AC Input | | Basic Ref. Value Watt or Var | Input Burden |
|------------|---|------------------------|---------------------------------|--------------------------------------|
| | Voltage | Current | | |
| 1P2W | 110V or 120V | 5A (1A) | $\pm 0.5 K (\pm 0.1K)$ | $\leq 0.10VA$ or $\leq 0.15VA$ |
| | 220V or 240V | | $\pm 1.0 K (\pm 0.2K)$ | |
| 1P3W | 220V-110V | | $\pm 1.0 K (\pm 0.2K)$ | |
| | 110V or 120V | | $\pm 2.0 K (\pm 0.4K)$ | |
| 3P3W | 220V or 240V | $\pm 3.0 K (\pm 0.6K)$ | | |
| | 380V or 416V | $\pm 1.5 K (\pm 0.3K)$ | | |
| 3P4W | 190V _{eff} -110V _{eff} or 208V _{eff} -120V _{eff} | $\pm 3.0 K (\pm 0.6K)$ | | |
| | 380V _{eff} -220V _{eff} or 416V _{eff} -240V _{eff} | | | |

* The maximum inputs are 450V and 10A. If the input over this level please connect with CT or VT to the transducer.
 * V_{eff} means Voltage of line to line; V_{eff} means Voltage of line to neutral.
 * Basic ref. value are secondary values of VT & CT converted to Watts/Vars

OUTPUT: Watt or Var O/P Programming by Dip Switch inside

| Output Range | Load Resistance | Output Resistance | Output Ripple |
|----------------------------|-----------------|-------------------|----------------------|
| 0 - 1 V / 0 - 0.5 - 1 V | ≥ 50 ohm | $\cong 0.001$ ohm | $\leq 0.2\%$ of F.S. |
| 0 - 5 V / 0 - 2.5 - 5 V | ≥ 250 ohm | | |
| 0 - 10 V / 0 - 5 - 10 V | ≥ 500 ohm | | |
| 1 - 5 V / 1 - 3 - 5 V | ≥ 250 ohm | | |
| -1 -0-+1 V | ≥ 75 ohm | $\cong 6M$ ohm | |
| -5-0-+5 V | ≥ 375 ohm | | |
| -10-0-+10 V | ≥ 750 ohm | $\cong 20M$ ohm | |
| 0 - 1 mA / 0 - 0.5 - 1 mA | 0 - 15K ohm | | |
| 0 - 5 mA | 0 - 3000 ohm | $\cong 6M$ ohm | |
| 0 - 10 mA / 0 - 5 - 10 mA | 0 - 1500 ohm | | |
| 0 - 20 mA / 0 - 10 - 20 mA | 0 - 750 ohm | $\cong 20M$ ohm | |
| 4 - 20 mA / 4 - 12 - 20 mA | 0 - 750 ohm | | |
| -1-0-+1 mA | 0 - 11K ohm | $\cong 6M$ ohm | |
| -5-0-+5 mA | 0 - 2200 ohm | | |
| -10-0-+10 mA | 0 - 1100 ohm | | |
| -20-0-+20 mA | 0 - 550 ohm | | |

OUTPUT: Watt-Hr or Var-Hr O/P Programming by Dip Switch inside

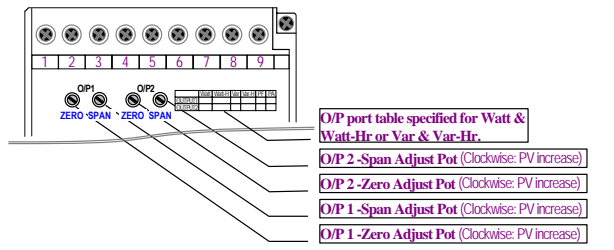
| Output Range | Output Mode | | | |
|----------------------------|---------------|---------------|--------------|------------------|
| | 1 count | Pulse Collect | Open Collect | Relay Contact |
| Per KWH or Per KVARH | 10 counts | DC 15V | DC 30V,100mA | AC 110,0.5A |
| | 100 counts | 10mA | (DC 60V) | DC 24V, 1A |
| | 1000 counts | | | Max. Freq.: 10Hz |
| | 10000 counts | | | |
| | 100000 counts | | | |

- Input frequency: 50 Hz ± 3 Hz, 60 Hz ± 3 Hz
 Response time: ≤ 250 msec.
 Span adjustment: $\leq \pm 5\%$ of F.S. (or $\pm 20\%$ of F.S. specify)
 Zero adjustment: $\leq \pm 2\%$ of F.S. (or $\pm 20\%$ of F.S. specify)
 Output load effect: Current output $\leq 0.1\%$ of F.S.
 Voltage output $\leq 0.05\%$ of F.S.
 Power supply: AC 115/230V $\pm 15\%$, 50/60 Hz
 AC 380 or 415V $\pm 15\%$, 50/60 Hz
 Option: DC 24V, 48V, 110V, 220V $\pm 10\%$
 Self Powered: Interior connection from input volt
 Working volt: $\pm 15\%$ rated of input voltage
 Power effect: $\leq 0.05\%$ of F.S.
 Power consumption: $\leq 4VA$

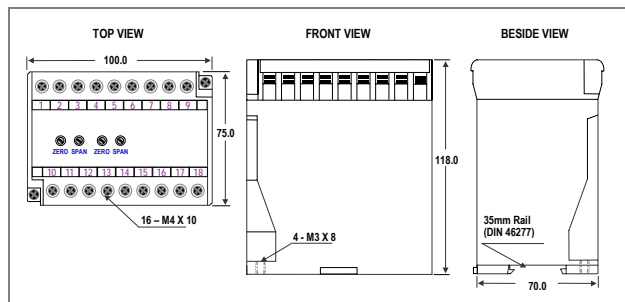
- Mutual interference effect: $\leq 0.1\%$ of F.S. between each element
 Magnetic field strength: 400ATM $\leq 0.2\%$ of F.S.
 Operating temperature: 0-60 °C
 Operating relative humidity: 20-95 %RH, non-condensing
 Temperature coefficient: ≤ 100 PPM/°C
 Storage temperature: -10-70 °C
 Dielectric Strength: IEC 414, IEC 688:1992, ANSI C37.90a
 Between Input / Output / Power / Case
 AC 4KV, 50/60Hz, 1 min.
 Surge test: IEC 255-4, ANSI C37.90a
 6KV, 1.2 x 50 μ sec.
 Common mode & differential mode
 Safety: IEC 414, BS 5458
 Enclosure: IEC 529 (IP50)
 Isolation: Input / Output / Power / Case
 $\geq 100M$ ohm, DC 500V
 Performance: Designed it comply with IEC 688
 Mounting: Wall or DIN rail (EN 50022)
 Weight: Under 650g

ADJUSTMENT

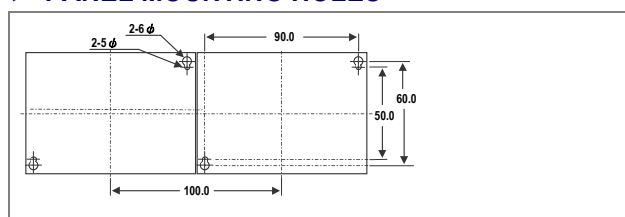
- Watt & Watt-Hr / Var & Var-Hr:



DIMENSIONS



PANEL MOUNTING HOLES



AC Watt & Watt-hr / Var & Var-hr TRANSDUCER

CWHW/CQHQ

OUTPUT RANGE PROGRAMMING

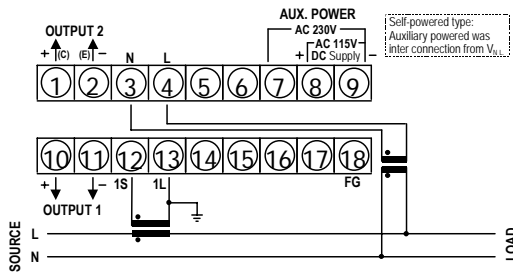
| OUTPUT | pcb no. WQHP2-2 | | | | | | | | | | JUMPER | |
|------------------|-----------------|----|----|----|----|----|----|----|----|----|--------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | CN10 | CN11 |
| 0 - 1 mA | | | | | on | | | | | on | | ■ |
| 0 - 5 mA | | | | | on | on | | | | on | | ■ |
| 0 - 10 mA | | | | | on | on | | | | | | ■ |
| 0 - 20 mA | | | | | on | on | on | | | | | ■ |
| 4 - 20 mA | on | | | | on | on | on | | | | | ■ |
| 0 - 0.5 - 1 mA | | | | | on | | | | on | on | | ■ |
| 0 - 5 - 10 mA | | | | | on | on | | | | on | | ■ |
| 0 - 10 - 20 mA | | | | | on | on | on | | | on | | ■ |
| 4 - 12 - 20 mA | on | | | | on | on | on | | | on | | ■ |
| -1 - 0 - +1 mA | | | | | on | | | | | | | ■ |
| -5 - 0 - +5 mA | | | | | on | on | | | | on | | ■ |
| -10 - 0 - +10 mA | | | | | on | on | | | | | | ■ |
| -20 - 0 - +20 mA | | | | | on | on | | | | | | ■ |
| 0 - 1 V | | on | on | on | | | | on | | | | ■ |
| 0 - 5 V | | | on | on | on | | | | | | | ■ |
| 0 - 10 V | | | | on | | | | on | | | | ■ |
| 1 - 5 V | | on | on | on | | | | on | | | | ■ |
| 2 - 10 V | on | | | on | on | on | | | | | | ■ |
| 0 - 0.5 - 1 V | | on | on | on | | | | on | on | on | | ■ |
| 0 - 2.5 - 5 V | | on | on | on | | | | on | on | on | | ■ |
| 0 - 5 - 10 V | | on | on | on | | | | on | on | on | | ■ |
| 1 - 3 - 5 V | on | | | on | on | on | | | on | on | | ■ |
| 2 - 6 - 10 V | on | | | on | on | on | | | on | on | | ■ |
| -1 - 0 - +1 V | | on | on | on | | | | on | | | | ■ |
| -5 - 0 - +5 V | | on | on | on | | | | on | | | | ■ |
| -10 - 0 - +10 V | | on | on | on | | | | on | | | | ■ |

* JUMPER: (1) * ■ closed by jumper; (2) blank field mean open.

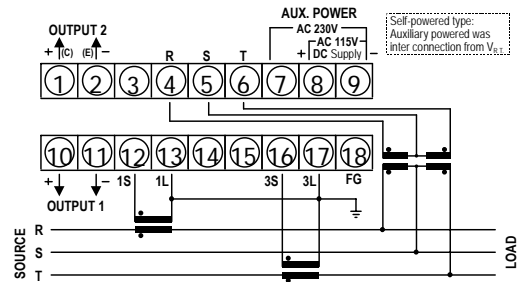
| OUTPUT | pcb no. WQHP2-2 | | | | | | | | | | pcb no. WQHP-HR2 | | | | | | | WQHP-HR1 |
|---------------------------------|-----------------|----|----|----|----|----|----|----|----|----|------------------|---|---|---|---|---|---|------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 p / KWh (1 p / KVARh) | on | | on | on | on | on | on | on | on | on | on | | | | | | | 4.6205K Hz |
| 10 p / KWh (10 p / KVARh) | on | on | on | on | on | on | on | on | on | on | on | | | | | | | 9.9556K Hz |
| 100 p / KWh (100 p / KVARh) | | on | on | on | on | on | on | on | on | on | on | | | | | | | 9.9556K Hz |
| 1000 p / KWh (1000 p / KVARh) | on | on | | | on | | | | | | | | | | | | | 9.9556K Hz |
| 10000 p / KWh (10000 p / KVARh) | on | on | on | | | | | | | | | | | | | | | 9.9556K Hz |

CONNECTION DIAGRAM

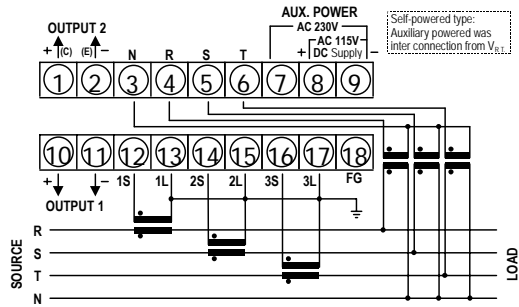
Watt & Watt-Hr / Var & Var-Hr - 1Φ2W (Unbalanced Load)



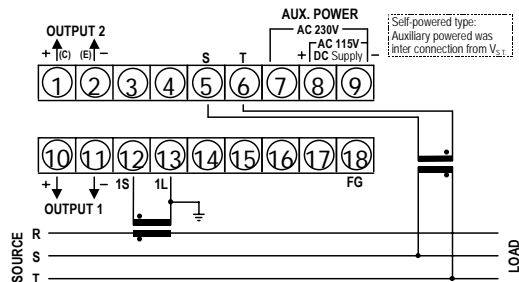
Watt & Watt -Hr / Var & Var-Hr - 3Φ3W (Unbalanced)



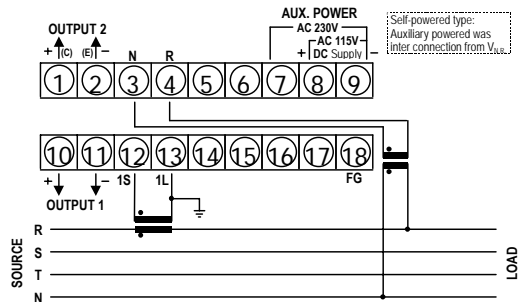
Watt & Watt-Hr / Var & Var-Hr - 3Φ4W (Unbalanced Load)



Watt & Watt-Hr / Var & Var-Hr - 3Φ3W (balanced Load)



Watt & Watt-Hr / Var & Var -Hr - 3Φ4W (balanced Load)



ORDER CODING

C Input Type — Connection — Input — Input Freq. — Watt (Var) Output — WH (VarH) Output — Aux. Power

| CODE | INPUT TYPE | CODE | INPUT RANGE | CODE | INPUT FREQ. | C | OUTPUT | C | OUTPUT | CODE | OUTPUT RANGE | CODE | AUX. POWER | | |
|------|----------------|------|--|--------------------------|-------------|----|------------|-----------|-------------|------------|-------------------------|------|--------------|------------|--|
| WHW | Watt & Watt-Hr | A1 | 0 - 1 A | 5 | 50Hz ±3Hz | A1 | 0-1 mA | V1 | 0-1 V | A | 1 P / KWH (KVARH) | A1 | AC 115/230 V | | |
| CQHQ | Var & Var-Hr | A5 | 0 - 5 A | 6 | 60Hz ±3Hz | A2 | 0-5 mA | V2 | 0-5 V | B | 10 P / KWH (KVARH) | A2 | AC 380 V | | |
| | | V1 | 110V or 120 V | F | Specify | A3 | 0-10 mA | V3 | 0-10 V | C | 100 P / KWH (KVARH) | A3 | AC 416 V | | |
| | | V2 | 220V or 240V | | | A4 | 0-20 mA | V4 | 1-5 V | D | 1000 P / KWH (KVARH) | D2 | DC 24 V | | |
| | | V3 | 380V or 416V | | | A5 | 4-20 mA | V5 | 0-0.5-1V | E | 10000 P / KWH (KVARH) | D4 | DC 48 V | | |
| | | V4 | 110V _{UL} -63.5V _{LN} or 120V _{UL} -69.3V _{LN} | | | A6 | 0-0.5-1mA | V6 | 0-2.5-5V | O | Specify (output counts) | D1 | DC 110 V | | |
| | | V5 | 190V _{UL} -110V _{LN} or 208V _{UL} -120V _{LN} | | | A7 | 0-5-10mA | V7 | 0-5-10V | P | 15V Pulse | D3 | DC 220 V | | |
| | | V6 | 380V _{UL} -220V _{LN} or 416V _{UL} -240V _{LN} | | | A8 | 0-10-20mA | V8 | 1-3-5V | C | Open Collect | AS | Self Powered | | |
| | | V7 | 220V-110V(1P3W) | | | A9 | 4-12-20mA | V9 | -1-0-+1V | R | Relay Contact | DO | Specify DC | | |
| | | AO | VO | Specify(A or V o/p) | | | AA | -1-0-+1mA | VA | -5-0-+5V | | | AO | Specify AC | |
| | | | | *V4, V5, V6 only in 3P4W | | | AB | -5-0-+5mA | VB | -10-0-+10V | | | | | |
| | | | | | | AC | -10-0-10mA | VO | Specify(V) | | | | | | |
| | | | | | | AD | -20-0-20mA | AO | Specify(mA) | | | | | | |

* Maximum frequency of Relay Contact is 10Hz. It means the relay will be trip 36000times/hour. And the life time of relay contact is 1,000,000 times