

W A T T A N D V A R T R A N S D U C E R

TWQ system Active + Reactive power (Watt + Var)

TW system Active power (Watt)

TQ system Reactive power (Var)

These transducers convert the active power or reactive power of a single-phase or three-phase system with balanced or unbalanced loads.

The output signals are isolated, load-independent DC current or DC voltage, representing the measured value of the active and reactive power.

FEATURES

- High accuracy $\pm 0.2\%$ RD $\pm 0.1\%$ RO
- Precision measurement even for distorted waves
- Uses time division multiplier for Watt and Var
- High immunity to external noise
- Wide selection of input and output range
- Quick and easy mounting

SPECIFICATION

Accuracy:	$\pm 0.2\%$ RD $\pm 0.1\%$ RO
Temp. coefficient:	100ppm at 23°C $\pm 3^\circ\text{C}$ (Option 60ppm at 23°C $\pm 3^\circ\text{C}$)
Temp. range:	-20 to 60 °C Operating 0~50°C
Humidity range:	Up to 95% RH
Isolation:	Input/output/power/case
Dielectric test:	DIN-IEC 688. 2K Vrms 50/60 Hz, 1 min. Between terminal to terminal. 2.8K Vrms/1min. Between terminal to case.
Surge test:	DIN-IEC 255-4, ANSI C37. 90a/1974. 5KV (1.2 x 50 μs)
Insulation resistance:	100M Ω or more, DC 500V
Housing material:	Steel sheet
Mounting:	Wall mounting
Power supply:	AC 115/230V $\pm 15\%$, 50/60 Hz, 3VA

INPUT

Frequency:	50Hz or 60Hz $\pm 3\text{Hz}$
Burden:	$\leq 0.1\text{VA}$ per voltage circuit $\leq 0.2\text{VA}$ per current circuit
Sensitivity:	$\leq 0.5\%$ of end range value
Overload capacity:	Voltage ... 600Vrms continuous 1.25 x rated continuous 2 x rated for 10 sec 4 x rated for 5 sec Current ... 3 x rated continuous 10 x rated for 10 sec 50 x rated for 1 sec 80 x rated for 0.5 sec



Operational range: Voltage ... 0~120%
Current... 0~120%

Circuit	Voltage	Current	W/Var
1 phase 2 wires	120V	1A	± 100
		5A	± 500
	240V	1A	± 200
		5A	± 1000
1 phase 3 wires	120V	1A	± 200
		5A	± 1000
	240V	1A	± 400
		5A	± 2000
3 phase 3 wires	120V	1A	± 200
		5A	± 1000
	240V	1A	± 400
		5A	± 2000
3 phase 4 wires	$120\text{V}/\sqrt{3} \cdot 120\text{V}$	1A	± 300
		5A	± 1500
	$240\text{V}/\sqrt{3} \cdot 240\text{V}$	1A	± 600
		5A	± 3000

- The 3 phase 4 wires $120\text{V}/\sqrt{3} \cdot 120\text{V}$, $240\text{V}/\sqrt{3} \cdot 240\text{V}$
120V or 240V ... phase voltage
 $\sqrt{3} \cdot 120\text{V}$ or $\sqrt{3} \cdot 240\text{V}$...line voltage
- To determine the primary measuring ranges
Measuring range end value = CT ratio x PT ratio x input (W)

Example:

CT: 200/5A PT: 3300/110V Input: 1000W
($X_A=40$) ($X_V=30$)
Measuring range end value = $40 \times 30 \times 1000\text{W} = 1200 \text{KW}$

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OUTPUT

Output variables: DC voltage or current
Ripple: <0.5% p-p max.
Response time: < 0.4 sec. or less
Zero adjustment: ±5% minimum
Span adjustment: ±10% minimum
DC current: 0~20mA (max.)

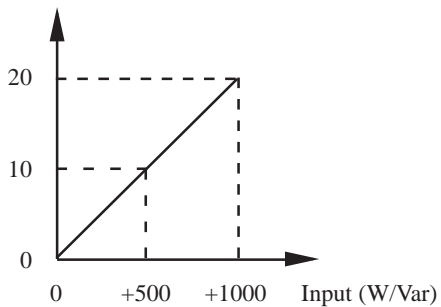
Output	Load resistance	Load voltage 12V $R = \frac{12V}{\text{Output current}}$ (R = load resistance)
4~20mA	≤ 600Ω	
0~20mA	≤ 600Ω	
0~10mA	≤ 1200Ω	
0~1mA	≤ 12KΩ	
-1~0~+1mA	≤ 12KΩ	
-10~0~+10mA	≤ 1200Ω	

DC voltage: 0~12V (max.)

Output	Load resistance	Load voltage 10mA $R = \frac{\text{Output voltage}}{10mA}$ (R = load resistance)
0~10V	≥ 1000Ω	
0~5V	≥ 500Ω	
1~5V	≥ 500Ω	
0~1V	≥ 100Ω	
-1~0~+1V	≥ 100Ω	
-10~0~+10V	≥ 1000Ω	

DC output characteristic

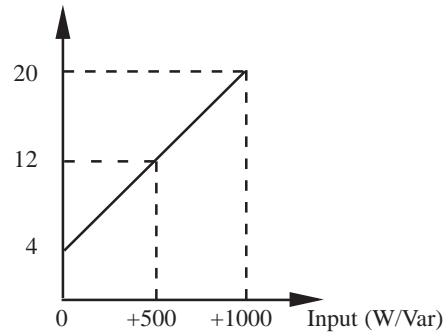
A: Output (mA)



Example:

Measuring range 0~1000W (Var)
 Output 0~20mA

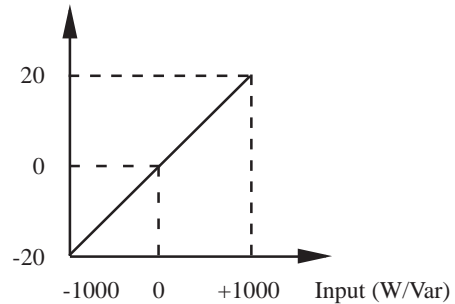
B: Output (mA)



Example:

Measuring range 0~1000W (Var)
 Output 4~20mA

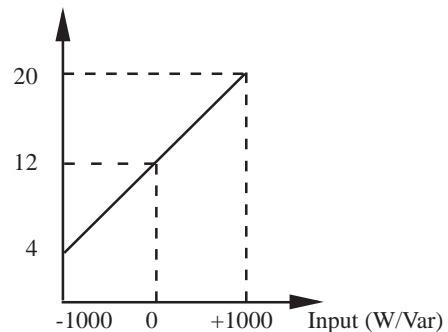
C: Output (mA)



Example:

Measuring range -1000~0~+1000W (Var)
 Output -20~0~+20mA

D: Output (mA)



Example:

Measuring range -1000~0~+1000W (Var)
 Output 4~12~20mA

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ORDERING INFORMATION

	TW	—	□	—	□	□	□	□
	TQ	—	□	—	□	□	□	□
	TWQ	—	□	—	□	□	□	□

MODEL _____

TW: Watt
TQ: Var
TWQ: Watt plus Var

CONNECTION _____

12: 1 phase 2 wires
 13: 1 phase 3 wires
 33: 3 phase 3 wires
 34: 3 phase 4 wires

INPUT _____

1: AC 120V, 5A
 2: AC 240V, 5A
 Y: Option (600V, 10A max.)

INPUT FREQUENCY _____

1: 50 Hz ±3 Hz
 2: 60 Hz ±3 Hz

DC OUTPUT _____

1: 4~20mA	A: 0~10V
2: 0~20mA	B: 0~5V
3: 0~10mA	C: 1~5V
4: 0~1mA	D: 0~1V
5: -10 ~ 0 ~ +10mA	E: -10 ~ 0 ~ +10V
6: -1 ~ 0 ~ +1mA	F: -1 ~ 0 ~ +1V

Y: Option (±20mA, ±12V max.)

POWER SUPPLY _____

1: AC 115/230V ±15%, 50/60 Hz
 Y: Option

CODE NUMBER

Model-Connection - Input/Frequency/Output/Power

Example: TW-33-2261

Connection: 3 phase 3 wires

Input: AC 240V, 5A

Frequency: 60Hz ±3Hz

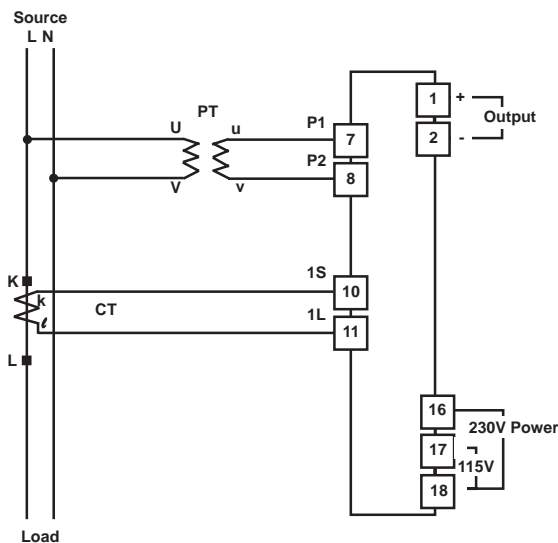
Output: -1 ~ 0 ~ +1 mA

Power: AC 115/230V

CONNECTION DIAGRAMS

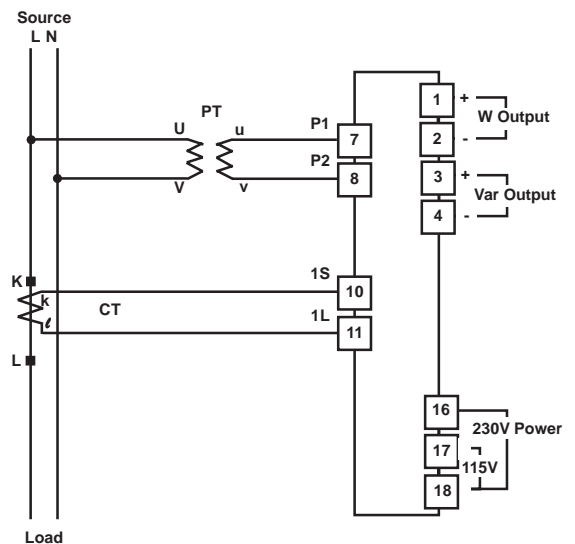
■ TW-12, TQ-12 (CASE B)

1 phase 2 wires



■ TWQ-12 (CASE B)

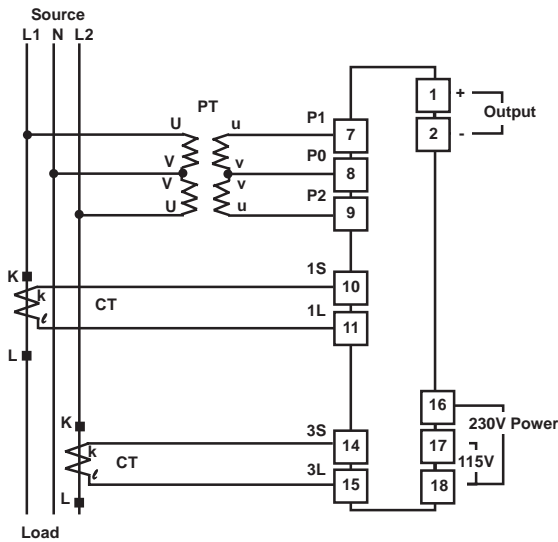
1 phase 2 wires



W A T T A N D V A R T R A N S D U C E R

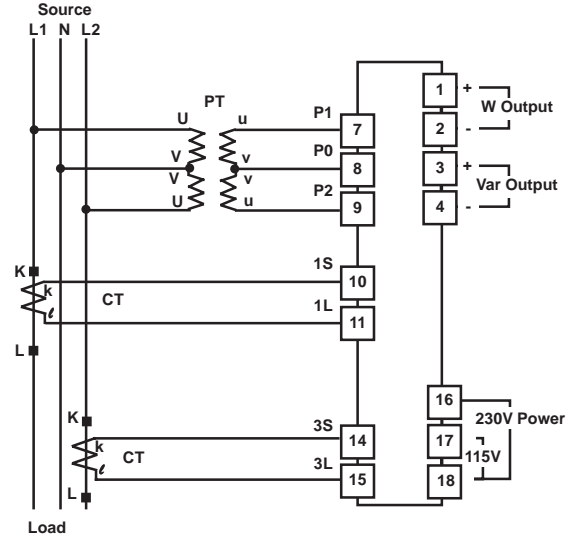
■ TW-13, TQ-13 (CASE B)

1 phase 3 wires



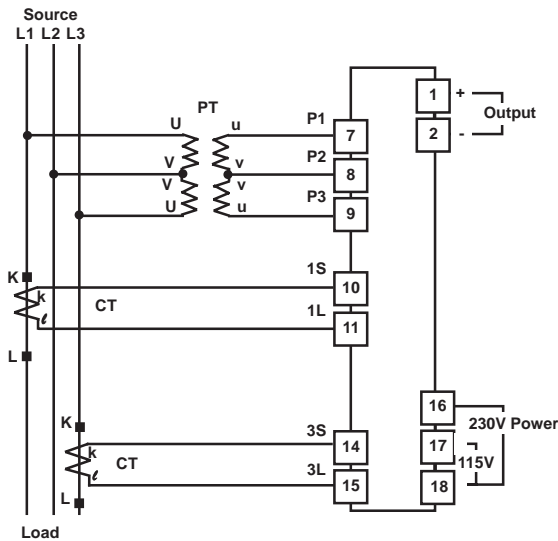
■ TWQ-13 (CASE B)

1 phase 3 wires



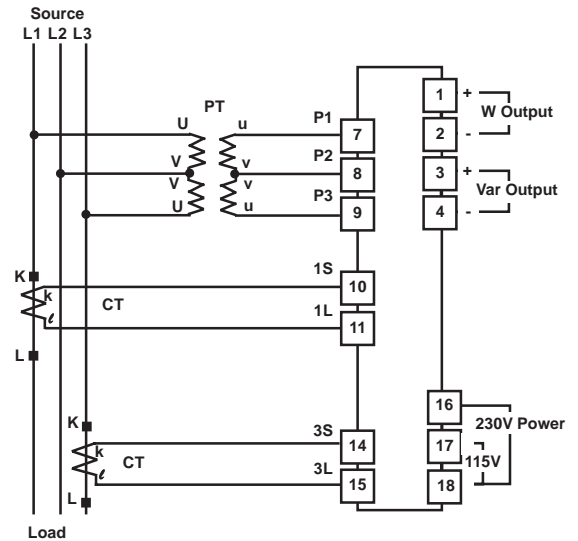
■ TW-33, TQ-33 (CASE B)

3 phase 3 wires



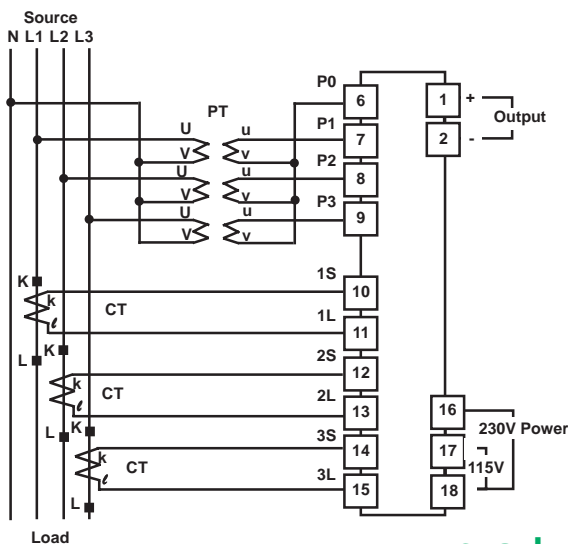
■ TWQ-33 (CASE B)

3 phase 3 wires



■ TW-34, TQ-34 (CASE B)

3 phase 4 wires



■ TWQ-34 (CASE B)

3 phase 4 wires

