

These time-division multiplication-type converters take in an AC voltage or AC current, and deliver a DC signal that is proportional to its power or reactive power. Their innovative circuit design has enabled us not only to downsize them to less than one-third the size of previous models, but also to adopt a plug-in design to enable mounting on or demounting from base sockets. Even when the voltage varies all the way to approximately 0% of the rating, these units ensure accurate measurement. They provide optimum outputs to computers, since their outputs are isolated from the input and power supply, contain little ripple, and have excellent linearity.

Features

- Offer outstanding space efficiency, and incorporate an easy-to-use plug-in design.
- Adopt the r.m.s. value measurement and time-division multiplication method for accurate measurement of distorted waves.
- Input, output and power supply terminals are isolated from each other, with a dielectric strength of 2,000 VAC.
- Accurate measurement, even if the voltage or current drops to 0% of the rating.

WATT TRANSDUCER

Model WAP - **W** - **□** - **□** - **□**

W Active power

	Phase line division (Frequency)	Accuracy
A	Single-phase 2-wire (Common for 50/60 Hz)	±0.5% fs
E	Three-phase 3-wire	±0.5% fs
L	(Common for 50/60 Hz)	±0.25% fs

	Rated Input
11	100 V·1 A
12	110 V·1 A
13	200 V·1 A
14	220 V·1 A
51	100 V·5 A
52	110 V·5 A
53	200 V·5 A
54	220 V·5 A
99	Other than the above (Please consult with us.)

	Power Supply
1	AC 100 V ± 10%, 50/60 Hz
2	AC 200 V ± 10%, 50/60 Hz
4	AC 110 V ± 10%, 50/60 Hz
5	AC 220 V ± 10%, 50/60 Hz

	Output Signal	Allowable Load Resistance
A	DC 4–20 mA	500 Ω or less
B	DC 1–5 mA	2 KΩ or less
C	DC 2–10 mA	1 KΩ or less
D	DC 0–1 mA	10 KΩ or less
E	DC 0–10 mA	1 KΩ or less
F	DC 0–16 mA	625 Ω or less
G	DC 0–20 mA	500 Ω or less
H	DC 1–5 V	2.5 KΩ or more
J	DC 0–10 mV	10 KΩ or more
K	DC 0–100 mV	100 KΩ or more
L	DC 0–1 V	500 Ω or more
N	DC 0–5 V	2.5 KΩ or more
P	DC 0–10 V	5 KΩ or more
R	DC ± 10 V	5 KΩ or more
S	Other than the above (Please consult with us.): Voltage output 10 V or less Current output 20 mA or less	

Ordering Procedure

- 1) Model · 2) Desired input range (WATT or Var)
3) PT rating and CT rating

When placing an order for products with non-standard output signals and supply voltages, please specify the required values.

Specification

Principle of operation:	Time-division multiplication system
Accuracy (at 23°C, with sine wave):	Active power: $\pm 0.25\% \cdot fs$ or $\pm 0.5\% \cdot fs$ Reactive power: $\pm 0.5\% \cdot fs$
Output ripple:	1% (p-p) $\cdot fs$ or less
Allowable load resistance:	For voltage output, use the transducer with a load current of 2 mA or less (1 μA or less for an output below 1 V $\cdot fs$). For current output, use the transducer with a voltage drop of 10 V or less between output terminals.
Response time:	0.5 sec (0–90%)
Effective measurement range:	0 to 120% of rating both for voltage and current
Allowable excessive input:	Voltage: 200% for 5 seconds Current: 1,000% for 5 seconds
Operating temperature and humidity:	-10 to +60°C, 90% RH or less (without condensation)
Influence of ambient temperature:	$\pm 0.2\% \cdot fs/10^\circ C$
Insulation resistance:	100 M Ω or more with a 500 VDC megger between the input/output terminal and power supply terminal, and between the input and output terminals
Dielectric strength:	2,000 VAC for 1 minute between the input and output terminals, between the input/output terminal and case, and between the input/output terminal and power supply terminal.
Power consumption:	Voltage side: Approx. 1 mA or less (each phase) Current side: Approx. 0.75 VA or less (each phase) Power supply side: Approx. 4 VA or less
Zero & span adjustment:	$\pm 10\% \cdot fs$ each (three-turn trimmer)

Manufacturing Range

<For direct connection>

Specify the desired input range from those listed below.

<With external PT and CT>

Perform the calculation indicated below to make sure that (P) is covered within the manufacturing ranges given in the table below, and specify the desired input range.

$$\text{Input signal to converter (P)} = \frac{\text{Desired input range}}{(\text{PT ratio}) \times (\text{CT ratio})}$$

Example 1: Desired input range: Single-phase, 5 kw, 440/110 V, 10/5 A

$$P = \frac{5 \text{ kw}}{(440 / 110) \times (10 / 5)} = \frac{5}{8} \text{ kw} = \underline{625 \text{ w}} \rightarrow \text{Manufacturable as quasi-standard product}$$

Example 2: Desired input range: Three-phase 3-wire, 40 kw, 660/110 V, 50/5 A

$$P = \frac{40 \text{ kw}}{(660 / 110) \times (50 / 5)} = \frac{40}{60} \text{ kw} = \underline{666 \text{ w}} \rightarrow \text{Manufacturable as special-order product}$$

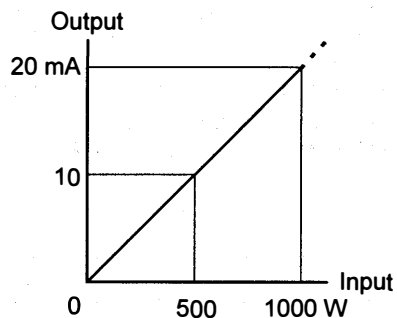
Note: For special-order products, please consult with us to confirm accuracy levels.

Power/Manufacturing Range					
Rating		Single-phase (W)		Three-phase (W)	
Voltage	Current	Standard	Quasi-Standard	Standard	Quasi-Standard
100 V	1 A	100	80-120	173	137-207
110 V	1 A	110	88-132	190	152-228
200 V	1 A	200	160-240	346	276-415
220 V	1 A	220	176-264	381	304-457
100 V	5 A	500	400-600	866	692-1,039
110 V	5 A	550	440-660	952	761-1,142
200 V	5 A	1,000	800-1,200	1,732	1,385-2,078
220 V	5 A	1,100	880-1,320	1,905	1,524-2,286

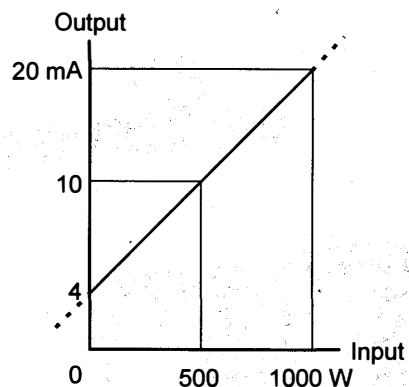
Reactive Power/Manufacturing Range					
Rating		Single-phase (W)		Three-phase (W)	
Voltage	Current	Standard	Quasi-Standard	Standard	Quasi-Standard
100 V	1 A	±100	±80-±120	±173	±137-±207
110 V	1 A	±110	±88-±132	±190	±152-±228
200 V	1 A	±200	±160-±240	±346	±276-±415
220 V	1 A	±220	±176-±264	±381	±304-±457
100 V	5 A	±500	±400-±600	±866	±692-±1,039
110 V	5 A	±550	±440-±660	±952	±761-±1,142
200 V	5 A	±1,000	±800-±1,200	±1,732	±1,385-±2,078
220 V	5 A	±1,100	±880-±1,320	±1,905	±1,524-±2,286

Relationships between Input and Output Signals (typical examples)

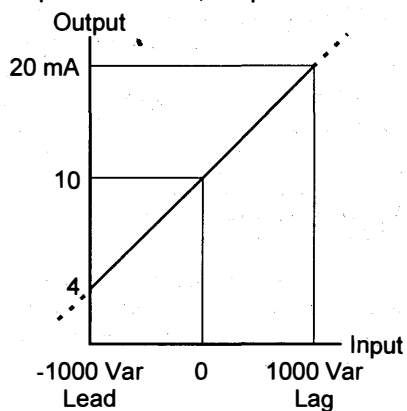
Input: 0–100 W, Output: 0–20 mA



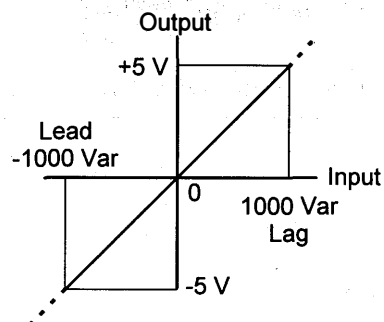
Input: ± 1000 var, Output: 4–20 mA



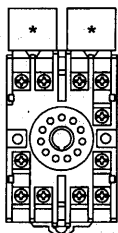
Input: 0–1000 W, Output: 4–20 mA



Input: ± 1000 var, Output: ± 5 V



Explanation of Terminals



* Protector
Installed only in
3-phase types.

	Single-Phase 2-Wire	Three-Phase 3-Wire
No.	Symbol	Symbol
1	+	+
2	-	-
3		P1
4		P3
5	P1	1S
6	P2	1L
7	1S	3S
8	1L	3L
9		P2
10	U	U
11	V	V