

§ BOX TRANSDUCER §
TYPE CODE DESIGNATION

■ **TYPE CODE DESIGNATION**

● SMALL SIZED AC TRANSDUCER

TT2-90A series ① TT2 ② A - ③

① Kind of input

Mark	Kind of input
A or AE	AC current
V or VE	AC voltage
W	AC power
WV	Reactive power
S	V-V phase angle
P	V-I phase angle
SP	Power factor
F	Frequency

② Kind of outer case and its dimensions

Mark	Material of outer case	Dimensions (mm)
		Length × Width × Height
91	Fire-retardant ABS resin	120×40×130
92	Fire-retardant ABS resin	120×56×130

③ Kind of circuit

Mark	Kind of circuit
12	Single phase 2 wire
13	Single phase 3 wire
33	3 phase 3 wire
34	3 phase 4 wire

● AC TRANSDUCER

TT2-80A series ① TT2 ② A ③ - ④

① Kind of input

Mark	Kind of input
AE	AC current
FAE	Power flow current
VE	AC voltage
W	AC power
FWV	Reactive power (power flow)
FSP	Power factor (power flow)
MDA	Maximum demand
MDV	Maximum indication voltage

Dielectric strength voltage

AC2,000V (50/60Hz) for 1 min, between input and output

③ For the use of cycle control

Mark	Kind
No mark	General circuit
C	Cycle control

② Kind of outer case and its dimensions

Mark	Material of outer case	Dimensions (mm)
		Length × Width × Height
82	Fire-retardant ABS resin	120× 56×130
83	Fire-retardant ABS resin	120×110×130

④ Kind of circuit

Mark	Kind of circuit
12	Single phase 2 wire
13	Single phase 3 wire
33	3 phase 3 wire
34	3 phase 4 wire

POWER FLOW POWER FACTOR TRANSDUCER FSPTT2-83A-33

POWER FLOW REACTIVE POWER TRANSDUCER FWVTT2-83A-33

POWER FLOW TRANSDUCER FAETT2-83A-33

Use

Recently, power shortage is becoming our concern along with rapid increase of power demand, deregulation of power-selling is taking place. Along with this trend, supply direction of electric power (power flow) occurs and measuring such as power amount is losing its accuracy.

This series can measure power amount accurately and recognize power flow direction regardless power flow. Choose product according to your usage.

Features

1. Double role power amount measuring of incoming/outgoing).
2. High quality/high performance design.
3. Simplification of installation wiring can be realized.
4. Compatible with TT2 series (transducer) installation.
5. Output type: 2-quadrant (same output for incoming/outgoing). 4-quadrant (different output for incoming/outgoing).

Specification and performance

Type		FSPTT2-83A-33	FWVTT2-83A-33	FAETT2-83A-33
Input	Rated input	LEAD 0-1-LAG 0 LEAD 0.5-1-LAG 0.5	LAG LEAD 500-1000var	5A, 1A
	Input voltage	AC 110V		
	Input current	AC 5A		
	Frequency	50Hz or 60Hz		
Output	Consumption VA	Voltage 0.5VA Current 1.0VA		
	Output method	Power factor 1 as 100%	-	
Output	Output	2-quadrant	4-quadrant	
		DC 4-20mA (500)	DC 4-12/12-20mA (500)	
		DC 0-1mA (10k)	DC 0-0.5/0.5-1mA (10k)	
		DC 1-5V (1k)	DC 1-3/3-5V (1k)	
		DC 0-10V (2k)	DC 0-5/5-10V (2k)	
Auxiliary supply		AC 110V±15%; DC 110V (90-140V)		
Auxiliary supply		AC power source 4VA; DC power source 5W		
Tolerance		± 3.0% * (±5.0%)	± 0.5% * (±1.0%)	± 0.5%
Response time		1 sec. at 0-99% response		
Influence of temperature		23 ± 20 tolerance %		
Influence of auxiliary supply		Rated voltage ±15% tolerance		
Influence of frequency		Rated frequency ±5% tolerance		
Strength of overvoltage		2 times of rated voltage (10 sec); 1.2 times of rated voltage, continuity		
Strength of over current		40 times of rated current (1 sec); 1.2 times of rated current, continuity		
Insulation resistance		Between input terminal/output terminal/auxiliary supply/outer case (earth): AC2, 000V (50/60Hz), 1min.		
Withstand voltage		AC2, 000V, 1min. between electric circuit and outer case input/auxiliary supply/output.		
Impulse withstand voltage		5kV 1.2/50µs positive/negative polarity 3 times each		
oscillation		Number of frequency 16.7Hz Plural width 4mm		
Impact		294m/s ² endurance		
Operating temperature/humidity range		-10- + 55 , 30-85%RH		
Storage temperature range		-40- + 70		

*Tolerance at the time of 4-quadrant is indicated in the parentheses ().



FSPTT2-83A-33
(120 × 110 × 130mm/1.0kg)

§ BOX TRANSDUCER §
AC SPECIAL TRANSDUCER

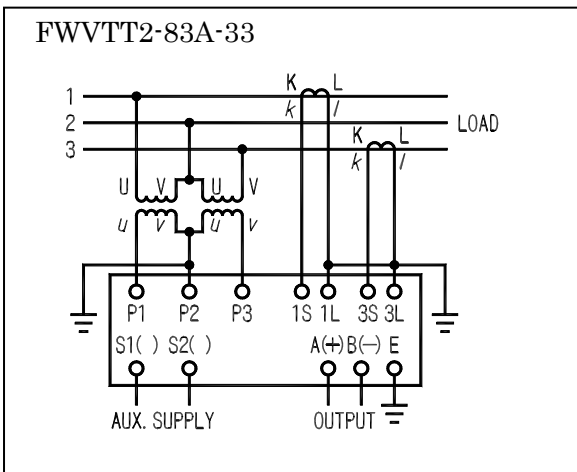
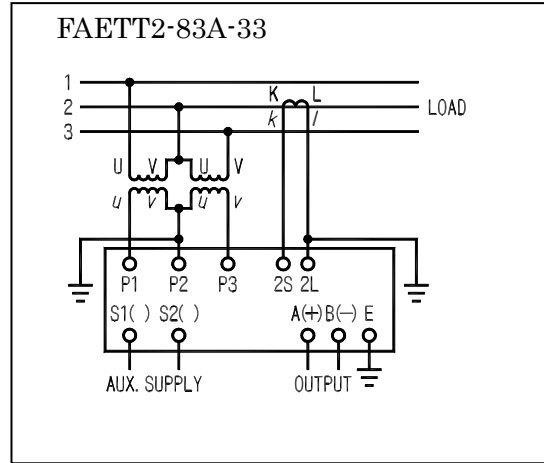
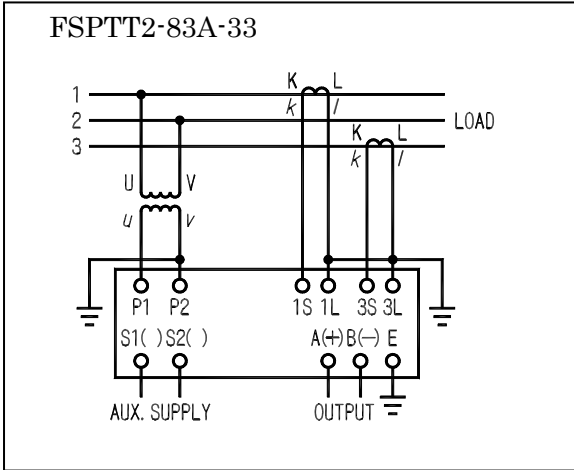
POWER FLOW TRANSDUCER

POWER FLOW POWER FACTOR TRANSDUCER FSPTT2-83A-33

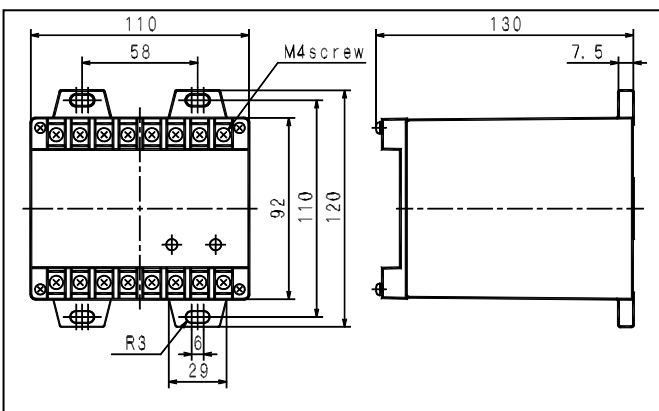
POWER FLOW REACTIVE POWER TRANSDUCER FWVTT2-83A-33

POWER FLOW TRANSDUCER FAETT2-83A-33

Connection diagram



Dimensions



Purchase specifications

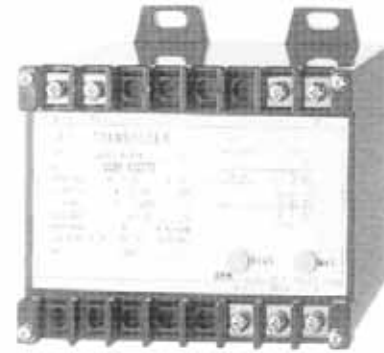
Type
 Input (Rated voltage/
 current/frequency)
 Output
 Auxiliary supply
 Quantity

§ BOX TRANSDUCER § AC SPECIAL TRANSDUCER

MAXIMUM DEMAND TRANSDUCER

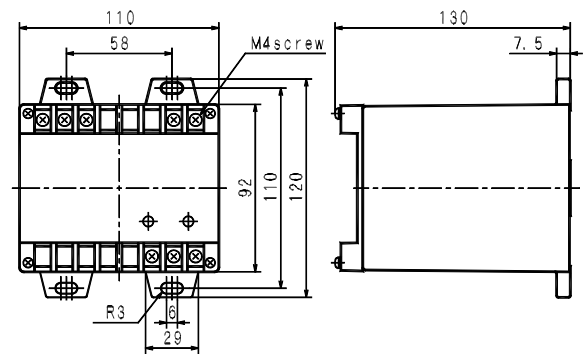
Standard specifications

Item	Specification
Type	MDATT2-83A
Standard	In conformity with JIS C1111-1989
Tolerance	± 1%
Input	1A, 5A (product range: 50-300A)
Output (load resistance)	5V 10V 1-5V 1mA 4-20mA (1k) (2k) (1k) (10k) (500)
Auxiliary supply	AC100/110V ± 15% (50/60Hz) 3VA AC 200/220V ± 15% (50/60Hz) 3VA DC 100/110V 6W
Period	Time it takes to reach 95% (±2%) of final steady value 1 min, 3 min, 5 min,
Warm-up time	Times equals period after the power was turned on.
Output ripple	1% P-P against output span
Influence of temperature	23 ± 20 ± 1%
Over current	Input 40 times 1 sec. 1.2 times continuity Auxiliary supply 1.5 times 10 sec. 1.2 times continuity
Insulation resistance	Between input terminal/output terminal/auxiliary supply/outer case (earth) 50M at DC500V
Withstand voltage	Between input terminal/output terminal/auxiliary supply/outer case (earth): AC2, 000V (50/60Hz) 1 min.
Impulse withstand voltage	Between electric circuit and outer case (earth) 5kV 1.2/50µs positive/negative polarity 3 times each
Appearance color	Black (munsell N1.5)
Operating temperature/humidity range	-10 + 55 , 30-85%RH
Storage temperature range	-40 + 70
Weight	Approx. 1.2kg



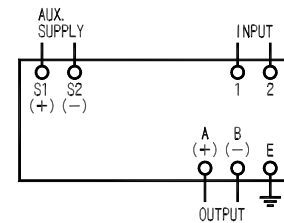
MDATT2-83A
(120 × 110 × 130mm/1.2kg)

Dimensions (mm)

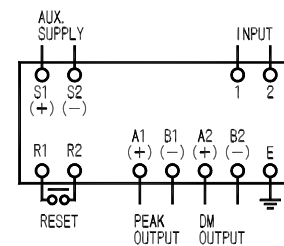


Connection diagram

- Demand output only



- W/ peak hold (option)



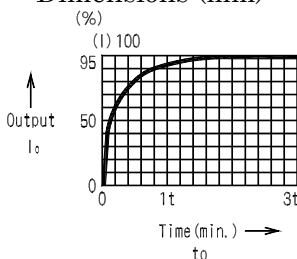
Option

With peak-hold output

Item	Specifications
Output (load resistance)	5V 10V 1-5V 1mA 4-20mA (1k) (2k) (1k) (10k) (500)
Power consumption (VA)	5VA
Reset method	External switch
Reset time	20ms

Non-insulation between demand output and peak output terminals. (Minus common)
Make sure to reset the device before use each time the power is turned on.

Dimensions (mm)



When applied continuously a constant input I, it operates according to exponential function and outputs I₀.
The device outputs the average value of input at 3t.

$$I_0 = I(1 - e^{-3t/t_0})$$

Purchase specifications

Type	Input
Output	Load resistance
Auxiliary supply	
Period	Quantity

§ BOX TRANSDUCER §

AC SPECIAL TRANSDUCER

MAXIMUM INDICATING VOLTAGE TRANSDUCER

Standard specifications

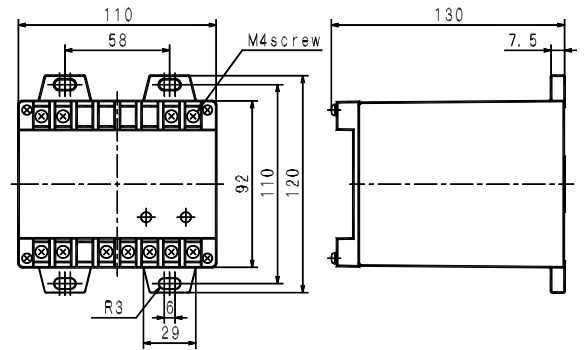
Item	Specification		
Type	MDVTT2-83A		
Standard	In conformity with JIS C1111-1989		
Tolerance	± 1%		
Input	150V, 259V, 300V (product range: 50-300V)		
Output (load resistance)	5V (1k) 10V (2k) 1-5V (1k) 1mA (10k) 4-20mA (500)		
Reset method	External switch (peak hold output)		
Reset time	20ms (peak hold output)		
Auxiliary supply	AC100/110V ± 15% (50/60Hz) 5VA AC 200/220V ± 15% (50/60Hz) 5VA DC 100/110V 8W		
Response time	0.2 sec. (time it takes to reach 90% of final steady value)		
Output ripple	1% P-P against output span		
Influence of temperature	23 ± 20 ± 1%		
Overvoltage	Input	2 times 10 sec. 1.2 times continuity	
	Auxiliary supply	1.5 times 10 sec. 1.2 times continuity	
Insulation resistance	Between electric circuit and outer case (earth)	DC500V megger	50MΩ
	Between input terminal and output/reset terminal		
	Between input/output/reset and auxiliary supply terminal		
	Between reset terminal and output		
Withstand voltage	Between electric circuit and outer case (earth)	AC2000V (50/60Hz) 1 min.	No abnormality
	Between input terminal and output/reset terminal		
	Between input/output/reset and auxiliary supply terminal		
	Between reset terminal and output	AC500V 1min.	
Impulse withstand voltage	Between electric circuit and outer case (earth)	5kV 1.2/50µs positive/negative polarity 3 times each	No abnormality
	Between input/ output/ reset and auxiliary supply terminal		
Appearance color	Black (munsell N1.5)		
Operating temperature/humidity range	-10- + 55 , 30-85%RH		
Storage temperature range	-40- + 70		
Weight	Approx. 1.2kg		



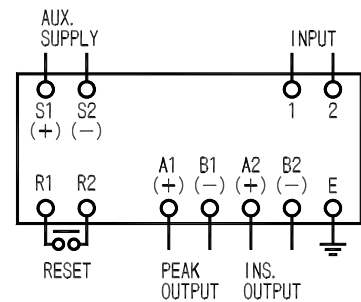
MDVTT2-83A

(120 × 110 × 130mm/1.2kg)

Dimensions (mm)



Connection diagram



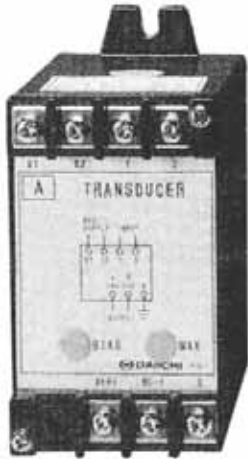
Non-insulation (minus common) between instantaneous output and peak output terminals.

Make sure to reset the device before use each time the power is turned on.

As a special response, 0.1s/99% (only available during start-up) is manufacturable.

Purchase specifications

Type	Input	Output	Load resistance
Auxiliary supply	Quantity		



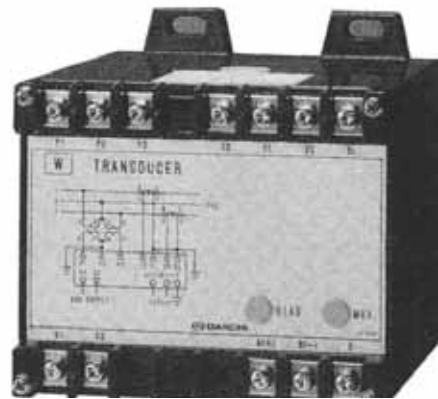
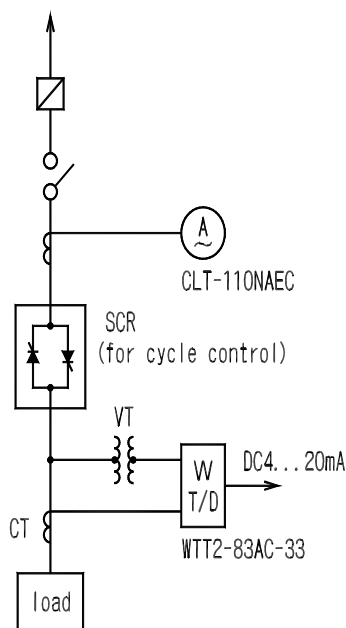
AETT2-82AC
(120 × 56 × 130mm/700g)

Use

When electric furnace is controlled by SCR (cyclic control), current/voltage and power fluctuate periodically and those can not be read by general indicating instrument or transducer.

This product can measure voltage/current and power in cycle control accurately and read them in stable condition. As those can be read by data logger, etc., this product can be used for cycle control measurement.

Operating connection diagram

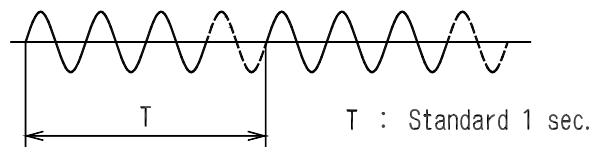


WTT2-83AC-33
(120 × 110 × 130mm/1.2kg)

Features

- High reliability design.
- Withstand voltage between input/ output/ auxiliary supply/ earth. 2000V AC 50/60Hz 1 min.. Complete insulation.
- With electrostatic shield between primary and secondary, equipment on output side can be protected from lightning surge, etc. on input side.
- With output line surge protection (2,000A, ± 8/20 μ s), can transmit an output directly to a distant place.
- Output operation is stable against cycle control input.

Cycle control waveform



Output comparison table against input continuity

Input	Output (%)	
	Current/voltage	Power
0.05 (5%)	22.4	5.0
0.25 (25%)	50.0	25.0
0.5 (50%)	70.7	50.0
0.75 (75%)	86.6	75.0
1 (100%)	100.0	100.0
Approximate formula	A (V) = input × 100%	P=VI= input × input × 100%

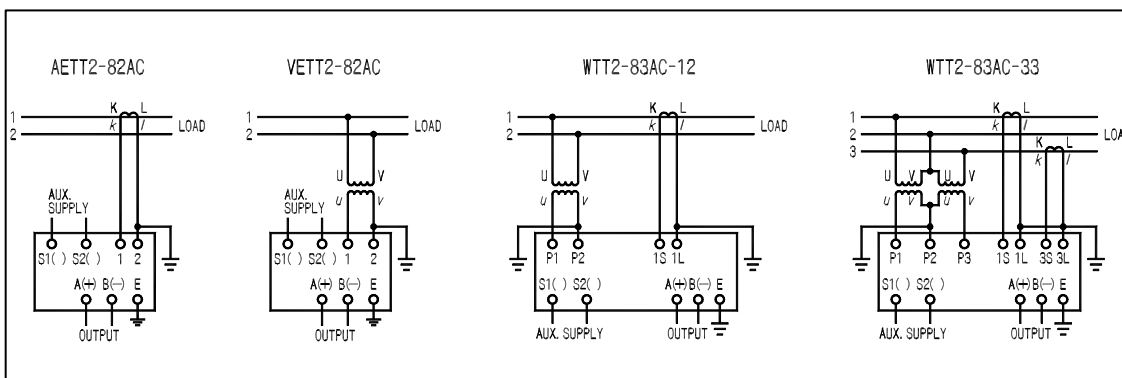
Specifications

Product	Operation method	Requirement of use				Type	Input	DC output (load resistance)	Tolerance	Ripple (p-p)	Response (second) ^{*3}	Approximate VA consumption			Weight
		Cycle wave form	Voltage side	Current side	Frequency							Voltage side	Current side	Auxiliary supply	
AC current	RMS value	Interval 1 sec.	-	-	50/60Hz	AETT2-82AC	5A	5V (1k) 10V (2k) 4-20mA (500)	*1 ±1.0%	1%	Rise: 5 sec Fall: 10 sec	1.0	0.5	2	700g
AC voltage	RMS value	Interval 1 sec.	-	-	50/60Hz	VETT2-82AC	150V or 300V	5V (1k) 10V (2k) 4-20mA (500)	*1 ±1.0%	1%	Rise: 5 sec Fall: 10 sec	1.0	-	2	700g
AC power	Single phase	Interval 1 sec.	-	-	50/60Hz	WTT2-83AC-12	100V, 5A 220V, 5A	500W 1kW	*2 ±1.0%	1%	Rise: 10 sec	0.5/phase	1/phase	1.5	1.0kg
	3-phase	Interval 1 sec.	unbalance	unbalance	50/60Hz	WTT2-83AC-33	110V, 5A 220V, 5A	1kW 2kW			Rise: 10 sec				1.2kg

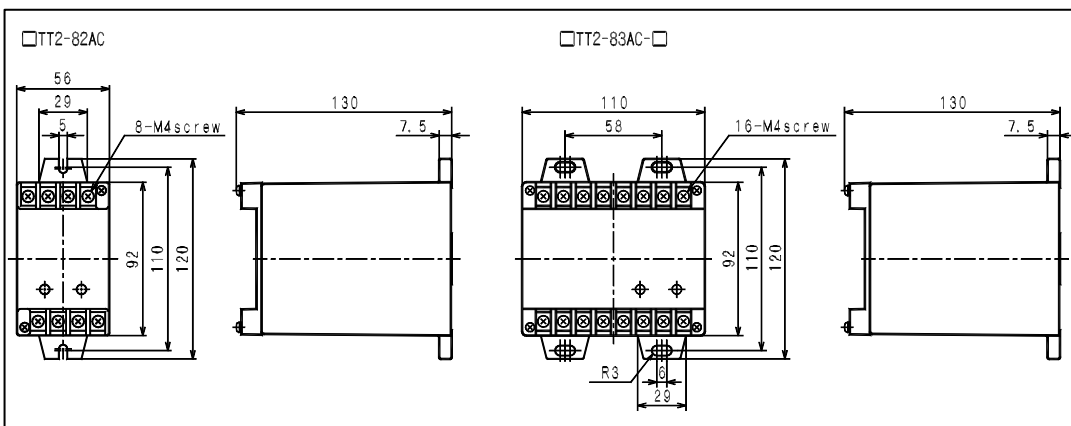
*1. In the case of less than 50% of rated output value, tolerance doubles. *2. In the case of less than 25% of rated output value, tolerance doubles.

*3. Time it takes to fall within 90% and 10% of final steady state value.

Connection diagram



Dimensions(mm) See above connection diagram for terminal arrangement.



Purchase specifications

Type	Input	Output
Auxiliary supply	Quantity	

INTEGRATING POWER TRANSDUCER

WHP-83A-

INTEGRATING REACTIVE POWER TRANSDUCER

WVHP-83A-



WHP-83A-33

Use

This product converts power/reactive power of single phase/ 3-phase and 3-phase 4-wire to proportional pulse output/ analog output.

Features

1. Power/reactive power can be measured accurately in distorted wave.
2. Integrating power can be measured in short period of time such as 20-30 seconds.
3. Variety of pulse output signal method can be selected.
4. Product with analog output (option) can be manufactured.
Analog output: with line surge (2,000A 8/20µs) protection and signal is outputted in remote place.
5. As output limiter circuit is equipped, output can be limited to approx. 1.5 times of rated value even at an excessive input.

Standard specifications

Item	Specifications
Tolerance	% against output span
Influence of temperature	23 ± 20 tolerance %
Influence of frequency	45-65Hz tolerance %
Characteristic	In conformity with JIS C1111-1989
Response time	Time to be within ±1% of constant output value when a stepped input of 90% output is applied.
Output ripple	P-P against rated output value 1% or less (analog output)
External adjustment to output	± 5% adjustment is possible.
Output limiter circuit	Limiting analog output (option) to approx. 1.5 times of rated value against an excessive input.
Auxiliary supply	AC100/110 or AC200/220V ±15% (50/60Hz); DC24V ±15% ; DC110V (88-143V)
Overvoltage	input 2 times of rated voltage (10 sec.), 1.2 times (continuity)
	Auxiliary supply 1.5 times of rated voltage (10 sec.), 1.2 times (continuity)
Over current	Rated current: 40 times (1 sec.), 20 times (4 sec.), 10 times (16 sec.), 1.2 times (continuity)
Insulation resistance	Between input/output/auxiliary supply and outer case (earth).
	Between pulse output terminal and analog output terminal (option) (Non-insulation between voltage output and analog output).
	DC500V 50MΩ or more.
Withstand voltage	Between input/output/auxiliary supply and outer case (earth).
	Between pulse output terminal and analog output terminal (option) (Non-insulation between voltage output and analog output).
	AC2, 000V (50/60Hz) 1min.
Impulse withstand voltage	Between electric circuit and outer case (earth).
	Between input/output/reset and auxiliary supply terminal. 5kV 1.2/50µS; positive and negative polarity 3 times each.
Appearance color	Black (munsell N1.5)
Operating temperature/ humidity range	-10- + 55 , 30-85%RH (no condensation)
Storage temperature range	-40- + 70

Specifications

Product	Operation method	Requirement of use				Type	Input		Output	Tolerance	Response (second) ^{*3}	Approximate consumption VA (W)			Weight (kg)
		Cycle wave form	Voltage side	Current side	Frequency (50/60Hz)		Rating	Second power				Pulse output	Analog output	Pulse output	
INTEGRATING POWER	Hall multiplying method				50/60	WHP-83A-12	110V/ 5A	500W	Voltage 10V \pm 10% (2k Ω or more) or Transistor open collector (DC48V/DC100mA MAX) or Photo MOS FET relay (DC48V DC100mA MAX)				1	0.5	1.1
							220V/ 5A	1kW							1.3
							110V/ 5A	1kW							1.3
							110V/ 5A	2kW							1.3
INTEGRATING REACTIVE POWER	Hall multiplying method			unbalance	50/60	WHP-83A-33	110V/ 5A	1kW	5V (1k Ω or more), 10V (2k Ω or more), 1.5V (1k Ω or more), 1mA (10k Ω or less), 5mA (2k Ω or less), 4-20mA (525 Ω or less)			100ms + 1/6 ^{*1}	1/phase	0.5/phase	1.4
							220V/ 5A	2kW							1.4
							110V/ 3V/ 5A	1kW							1.3
							220V/ 3V/ 5A	2kW							1.4
INTEGRATING REACTIVE POWER	Hall multiplying method			unbalance	50/60	WHP-83A-34	100V/ 5A	LAG 1kvar	DC48V (DC100mA MAX) or Photo MOS FET relay (DC48V DC100mA MAX)			1	0.5/phase	1.3	
							220V/ 5A	LAG 2kvar						1.4	
							110V/ 5A	LAG 1kvar						1.3	
							220V/ 5A	LAG 2kvar						1.4	

*1. fo: output frequency

*2. AC 4.5VA, DC 2.5W in the case of a product with analog output (option) .

Product range

Item		Rating			Pulse output	Analog output (option)
		Second power	voltage	current		
Integrating power	Single phase	225-600W (110V, 5A) 450-1,200W (220V, 5A)	AC50-240V	AC0.1-5V	45-65Hz	0.01667-277.8pps (60-1,000, 000pulse/h)
	Single phase 3-wire	0.25-1.2kW (110V, 5A)				
	3-phase	0.25-1.2kW (110V, 5A) 0.5-2.4kW (220V, 5A)				
	3-phase 4-wire	0.25-1.2kW (110/ 3V, 5A) 0.5-2.4kW (220/ 3V, 5A)				
Integrating reactive power	3-phase	LAG0.25-1.2kvar (110V, 5A)	AC50-240V			DC0.1-10V DC0.1-20mA Minus output is not manufacturable.
	3-phase 4-wire	LAG0.5-2.4kvar (220V, 5A)				

* Values in this table are Max. Values (except frequency).

Example: DC0.1-10V: From min. 0-0.1V to max. 0-10V can be manufactured.

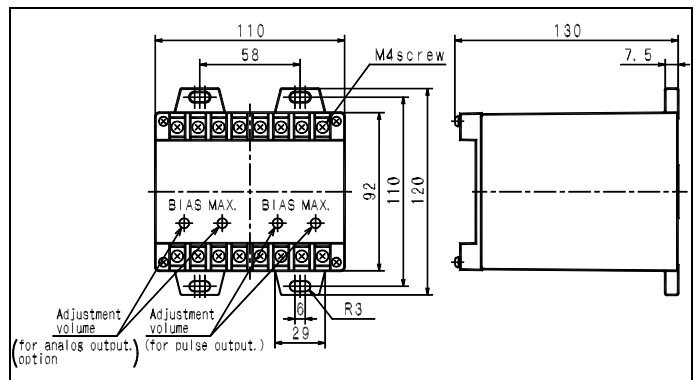
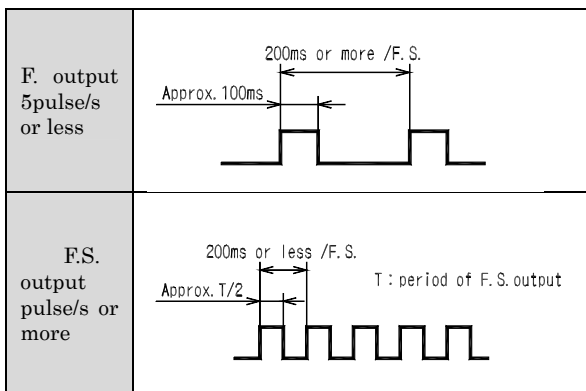
Pulse output ((Specify any one of the following))

<p>Voltage pulse output</p>	<p>Tr. open contactor output</p>	<p>Photo MOS/FET relay output</p>
<p>H.....10V±10% L..... 0.4V</p>	<p>ON OFF</p> <p>Load operates when internal transistor is ON. Do not apply reverse polarity voltage.</p>	<p>ON OFF</p> <p>Load operates when contact is ON. Connect an external assistant relay if it exceeds switching capacity.</p>

* When inductive load such as electromagnetic relay is connected to output contact, installation of diode around load is recommended.

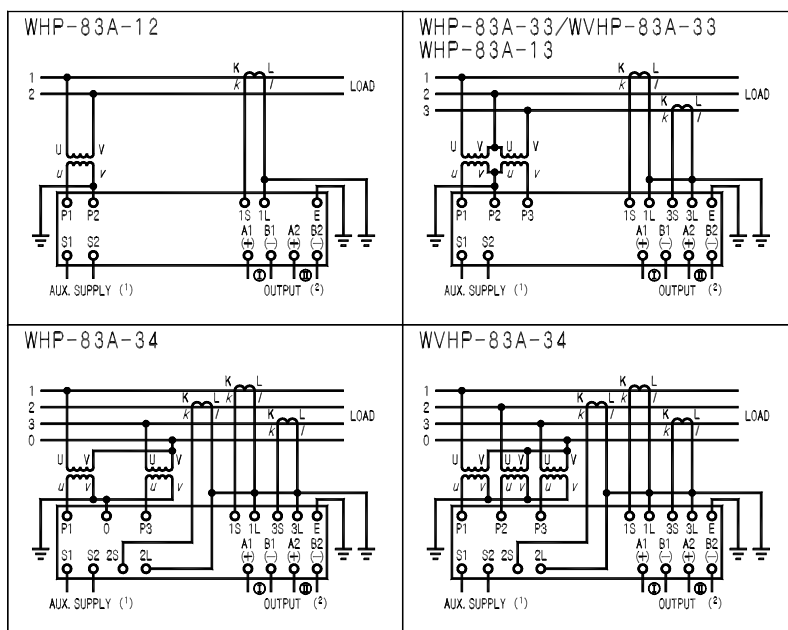
Pulse output width (standard: 100ms)

Dimensions(mm) See connection diagram for terminal arrangement.



Connection diagram

Purchase specifications



Type
Max. input power
Rating (voltage/current/VT
ratio/CT ratio/frequency)
Pulse constant
Pulse output signal method
Option (with analog output,
terminal cover)
auxiliary supply
no. of unit

(1) In the case of DC power source: S1 (+), S2 (-).

(2) OUTPUT is analog output (option), OUTPUT is pulse output. Output notation of standard product without analog output (option) is indicated as OUTPUT