■ 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

§ BOX TRANSDUCER §
TYPE CODE DESIGNATION

● SENSOR TRANSDUCER

TT-A series ① TT ② - ③ A

① Kind of input

Mark	Kind of input
H	Thermoelectric temperature
RH	Resistance temperature
R	Potentiometer
G	Revolution-speed (Frequency proportion)
GV	Revolution-speed (AC voltage proportion)

② Dielectric strength voltage

Mark	Dielectric strength voltage (50/60Hz)
No number	Non-insulated between input and output
2	AC2,000V for 1 min. between input and output

③ 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

● SIGNAL TRANSDUCER

T-A series ① ② - ③ A

① Kind of conversion

Mark	Kind of conversion
ADTT	Adding
SCTT	Scaling (option)
VF	Analog/Pulse
SE	Input switching

② Dielectric strength voltage

Mark	Dielectric strength voltage (50/60Hz)
No number	Non-insulated between input and output
2	AC2,000V for 1 min. between input and output

③ 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

■ COMMON STANDARD SPECIFICATIONS

● HIGH QUALITY / HIGH RELIABILITY

Highly reliable electronic parts are adopted. Aging test of each part as well as burn-in aging test of the product under a high temperature is implemented.

● OUTPUT LIMITER CIRCUIT

Even if an excessive input is applied, the product confines the output to about 1.5 times of rating and protects the output side equipments.

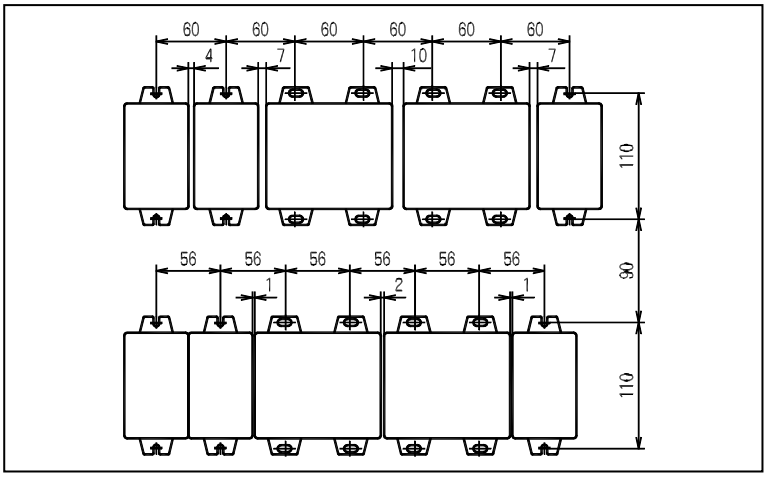
● PCB TREATMENT

In order to reinforce insulation resistance stability of PCB surfaces and prevent the surfaces from insulation deterioration, B side of the PCB was cleaned and coated with high humidity resistant varnish after parts installation.

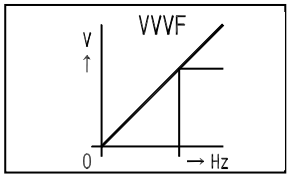
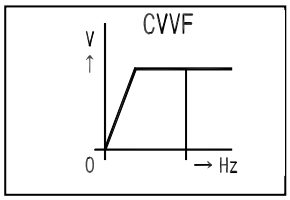
TT2-80A series STANDARD SPECIFICATION

Item	Specification
Tolerance	% against output span. See [Specifications]
Influence of temperature	23±20℃ tolerance %
Influence of frequency	No display: 1/2 of tolerance % at 45-65Hz Rated Hz display: 1/2 of tolerance at ±5% of rating
Characteristics	In conformity with the classifications of JIS C 1111-1989 in tolerance
Response time	Time it takes to fall within ±1% of the final steady-state value when applied a stepped input. ≦1 sec.
Output ripple	≦1% P-P against output span
External adjustment of output	±5% adjustable
Auxiliary supply	AC110V or AC220V ±15% (50/60Hz)
Over voltage	2 times of rated voltage (10 sec.), 1.2 times (Continuity) Auxiliary supply of isolator: 1.5 times 10sec.
Over current	40 times of rated current (1 sec.), 20 times (4 sec.) 10 times (16 sec.), 1, 2 times (Continuity), (Signal transducer: 10 times 5 sec.)
Insulation resistance	≧50MΩ at DC500V between input terminal, output terminal, (auxiliary supply terminal) and outer case (earth)
Withstand voltage	AC2,000V (50/60Hz) for 1 min. between input terminal, output terminal, (auxiliary supply terminal) and outer case (earth)
Impulse withstand voltage	Between electric circuit and outer case (earth) 5kV 1.2/50μs positive/negative polarity 3 times each
Appearance color	See [Kind of outer case] in [Type code designation] Black (N 1.5)
Operating temperature/humidity range	-10 - +55℃, 30 - 85%RH
Storage temperature range	-40 - +70℃

■ DIMENSIONAL EXAMPLE of MULTIPLE UNIT INSTALLATION



■ COMMON SPECIAL SPECIFICATION (TT2-80A series)

<table>
<tr><th>Item</th><th colspan="4">Specification</th></tr>
<tr><td>Frequency
► General frequency variation
 
</td><td colspan="4">1. Voltage/current transducer
(1) Frequency fixation (Fixed Hz ±10% Tolerance %)</td></tr>
<tr><td></td><td>Frequency</td><td>Tolerance</td><td>Response time (±1%)</td><td>Ripple (P-P)</td></tr>
<tr><td></td><td>25Hz-2kHz</td><td>±0.5%</td><td>40Hz-2kHz, ≦1 sec.
30Hz-39kHz, ≦1.5 sec.
25Hz-29kHz, ≦2 sec.</td><td rowspan="3">≦1%</td></tr>
<tr><td></td><td>2.1kHz-10kHz</td><td rowspan="2">±1%</td><td>≦1 sec.</td></tr>
<tr><td></td><td>20Hz-24Hz</td><td>≦2 sec.</td></tr>
<tr><td></td><td colspan="4">(2) Frequency variation (tolerance % within the range)</td></tr>
<tr><td>Rated Hz
50/60Hz</td><td>Frequency</td><td>Tolerance</td><td>Response time (±1%)</td><td>Ripple (P-P)</td></tr>
<tr><td></td><td>35Hz-80Hz</td><td>±0.5%</td><td>≦1.5 sec.</td><td rowspan="2">≦1%</td></tr>
<tr><td></td><td>25Hz-200Hz</td><td>±1%</td><td>≦2 sec.</td></tr>
<tr><td>► Special frequency variation
 
</td><td colspan="4">2. Electric power transducer (only WTT-83 is manufacturable)
(1) Frequency fixation (Fixed Hz ±10% Tolerance %)</td></tr>
<tr><td></td><td>Frequency</td><td>Tolerance</td><td>Response time (±1%)</td><td>Ripple (P-P)</td></tr>
<tr><td></td><td>30Hz-2kHz</td><td>±0.5%</td><td>40Hz-2kHz, ≦1 sec.
30Hz-39kHz, ≦1.5 sec.</td><td rowspan="3">≦1%</td></tr>
<tr><td></td><td>2.1kHz-10kHz</td><td rowspan="2">±1%</td><td>≦1 sec.</td></tr>
<tr><td></td><td>20Hz-29Hz</td><td>≦2 sec.</td></tr>
<tr><td>Rated Hz
50/60Hz</td><td colspan="4">(2) Frequency variation (tolerance % within the range)</td></tr>
<tr><td></td><td>Frequency</td><td>Tolerance</td><td>Response time (±1%)</td><td>Ripple (P-P)</td></tr>
<tr><td>Consult us for the case of CVVF.</td><td>25Hz-100Hz</td><td rowspan="5">±1%</td><td>≦2 sec.</td><td rowspan="5">≦1%</td></tr>
<tr><td></td><td>30Hz-90Hz</td><td>≦1.5 sec.</td></tr>
<tr><td></td><td>40Hz-120Hz</td><td rowspan="3">≦1 sec.</td></tr>
<tr><td></td><td>200Hz-600Hz</td></tr>
<tr><td></td><td>500Hz-1.5kHz</td></tr>
</table>

<table>
<tr><th>Item</th><th colspan="4">Specification</th></tr>
<tr><td rowspan="8">Response time</td><td colspan="4">Voltage/current/transducer</td></tr>
<tr><td>Response time (±1%)</td><td>Frequency</td><td>Ripple (P-P)</td><td>Tolerance</td></tr>
<tr><td>≦0.1 sec.</td><td rowspan="2">50/60Hz</td><td>≦5%</td><td rowspan="2">±0.5%</td></tr>
<tr><td>≦0.2 sec.</td><td>≦3%</td></tr>
<tr><td colspan="4">Electric power transducer (3 phase 3 wire type)</td></tr>
<tr><td>Response time (±1%)</td><td>Frequency</td><td>Ripple (P-P)</td><td>Tolerance</td></tr>
<tr><td>≦0.1 sec.</td><td>50/60Hz</td><td>≦1%
(Input sensitivity 120-80%)
≦2%
(Input sensitivity 79-60%)
≦5%
(Input sensitivity 59-50%)</td><td rowspan="2">±0.5%</td></tr>
<tr><td>≦0.2 sec.</td><td>50/60Hz</td><td>≦1%
(Input sensitivity 120-70%)
≦2%
(Input sensitivity 69-50%)</td></tr>
<tr><td>IEC standard conformity (Pub. 688-1)</td><td colspan="4">Have a consultation with us for rating plate indication items, tolerance and line impulse and so on.</td></tr>
<tr><td>ANSI (SWC) test</td><td colspan="4">Please specify if any test by ANSI C37.90a-1974 is necessary.</td></tr>
<tr><td>Terminal cover</td><td colspan="4">Polycarbonate</td></tr>
<tr><td>Other</td><td colspan="4">Subject to consultation</td></tr>
</table>

§ BOX TRANSDUCER §

SMALL SIZED AC TRANSDUCER CONSTANT VOLTAGE/CURRENT TYPE 90 SERIES

Small sized box transducer that supports both DIN rail mounting and wall mounting

■ FEATURES

●Heavy current oriented size reduction
●Withstand voltage AC2000V 50/60Hz for 1 min. between input, output, auxiliary supply and earth.
●Impulse withstand voltage between electric circuit and earth 5kV 1.2/50μs positive/negative polarity 3 times each.
●As a constant voltage/current output type, it is possible to transmit an output directly to a distant place.
●With a terminal cover as standard equipment.
●Auxiliary supply DC100/110V (88-143V) is also manufacturable.
●Supports both DIN rail mounting and wall mounting.

■ COMMON SPECIFICATIONS

Item	Specification	
Tolerance	% against output span	
Influence of temperature	23±10℃ tolerance %	
Influence of output load	1/2 of tolerance % based on the center value of rated output load	
Influence of frequency	No display: 1/2 of tolerance % at 45-65Hz Rated Hz display: 1/2 of tolerance % at rating ±5%	
Characteristics	In conformity with JIS C1111-1989	
Response time	Time it takes to fall within ±1% of the final steady-state value ≦1 sec.	
Output ripple	≦1%P-P against output span	
External adjustment of output	±5% adjustable	
Output limiter circuit	Confines output to about 1.5 times of rating and protects output side equipments when an excessive input is applied.	
Auxiliary supply	AC100/110V +10/-15% or AC200/220V +10/-15% (50/60Hz) DC24V±15% or DC48V or DC110V (88-143V)	
Overvoltage	Input	2 times of rated voltage for 10 sec., 1.2 times Continuity
	Auxiliary supply	1.5 times of rated voltage for 10 sec., 1.2 times Continuity
Overcurrent	40 times of rated current 1 sec, 20 times 4 sec, 10 times 16 sec, 1.2 times Continuity	
Insulation resistance	≧50MΩ at DC500V between input terminal, output terminal, auxiliary supply terminal and outer case (earth)	
Withstand voltage	AC2,000V (50/60Hz) for 1 min. between input terminal, output terminal, auxiliary supply terminal and outer case (earth)	
Impulse withstand voltage	Between electric circuit and outer case (earth) 5kV 1.2/50μs positive/negative polarity 3 times each	
Material of case	Terminal block: Fire-retardant ABS (V-O) Mixed glass fiber in by 15% Box: Fire-retardant ABS (V-O) Terminal cover: Polycarbonate	
Terminal screw	M4	
Appearance color	Black (Munsell 1.5)	
Operating temperature/humidity range	-10 - +55℃, 30 - 85%RH	
Storage temperature range	-40 - +70℃	

■ PRODUCT RANGE

<table>
<tr><th colspan="2">Measuring objective</th><th colspan="3">Rated AC input range</th><th>Frequency</th><th>Rated DC output range</th></tr>
<tr><td colspan="2">AC current</td><td colspan="3">0.1-10A</td><td>45Hz-65Hz</td><td rowspan="2">0.1-10V
0.1-20mA</td></tr>
<tr><td colspan="2">AC voltage</td><td colspan="3">50-300V</td><td>45Hz-65Hz</td></tr>
<tr><td rowspan="4">Active power</td><td rowspan="2">Single phase</td><td rowspan="2">50-240V</td><td rowspan="2">1A, 5A</td><td>(110V, 5A) 250-600W ±150-±600W</td><td rowspan="2">50/60Hz</td><td rowspan="6">±0.1-±10V or ±0.1--5mA
+20mA</td></tr>
<tr><td>(220V, 5A) 500-1, 200W ±300-±1, 200W</td></tr>
<tr><td rowspan="2">3 phase 3 wire or 3 phase 4 wire</td><td rowspan="2">50-240V</td><td rowspan="2">1A, 5A</td><td>(110V, 5A) 500-1, 200W ±300-±1, 200W</td><td rowspan="2">50/60Hz</td></tr>
<tr><td>(220V, 5A) 1, 000-2, 400W ±600-±2, 400W</td></tr>
<tr><td rowspan="2">Reactive power</td><td rowspan="2">3 phase 3 wire or 3 phase 4 wire</td><td rowspan="2">50-240V</td><td rowspan="2">1A, 5A</td><td>(110V, 5A) 500-1, 200W ±300-±1, 200W</td><td rowspan="2">50/60Hz</td></tr>
<tr><td>(220V, 5A) 1, 000-2, 400W ±600-±2, 400W</td></tr>
<tr><td colspan="2">V-V phase angle</td><td>50-240V</td><td>-</td><td>±30°-±150°</td><td>50 or 60Hz by specification</td><td></td></tr>
<tr><td colspan="2">Frequency</td><td>50-240V</td><td>-</td><td>45-65Hz (45Hz-1kHz by specification)</td><td>-</td><td>0.1-10V
0.1-20mA</td></tr>
</table>

Have a consultation with us for those not included in the table above. (Shall be dealt with by TT2-80A series)

ATT2-91A
(120×40×130mm/0.5kg)

WTT2-92A-33
(120×56×130mm/0.7kg)

■ SPECIFICATIONS

PRODUCT		OPERATION METHOD	CONDITION of USE				TYPE
			Waveform	Voltage side	Current side	Frequency (50/60Hz)	
AC current		With waveform compensation	3rd, 5%	-	-	-	ATT2-91A
		RMS value	3rd, 15%	-	-	-	AETT2-91A
AC voltage		With waveform compensation	3rd, 5%	-	-	-	VTT2-91A
		RMS value	3rd, 15%	-	-	-	VETT2-91A
AC power	Single phase	Time-sharing multiplication method	-	-	-	50/60	WTT2-92A-12
	Single phase 3 wire		-	-	-	50/60	WTT2-92A-13
	3 phase		-	Unbalanced	Unbalanced	50/60	WTT2-92A-33
	3 phase 4 wire		-	Balanced (phase Positive phase sequence	Unbalanced	50/60	WTT2-92A-34
AC reactive power	3 phase	Time-sharing multiplication method	-	Balanced Positive phase sequence	Unbalanced	50/60	WVTT2-92A-33
	3 phase 4 wire		-	Balanced (line) Positive phase sequence	Unbalanced	50/60	WVTT2-92A-34
V-V phase angle		Phase difference	Distortion 5%	-	-	Specification	STT2-92A
V-I phase angle	Single phase	Phase difference	Distortion	-	-	-	PTT2-92A-12
	3 phase		Distortion 5%	Balanced Positive phase sequence	Unbalanced	Specification	PTT2-92A-33
	3 phase 4 wire		Distortion 5%	Balanced (phase Positive phase sequence	Unbalanced	Specification	PTT2-92A-34
Power factor	Single phase	Phase difference trade-off method	Distortion 5%	-	-	-	SPTT2-92A-12
	3 phase		Distortion 5%	Balanced Positive phase sequence	Unbalanced	Specification	SPTT2-92A-33
	3 phase 4 wire		Distortion 5%	Balanced (phase Positive phase sequence	Unbalanced	Specification	SPTT2-92A-34
Frequency		Pulse charge method	3rd, 15%	-	-	-	FTT2-91A

Continued on the next page

§ BOX TRANSDUCER §

SMALL SIZED AC TRANSDUCER 90 SERIES

TYPE	INPUT		DC OUTPUT (load resistance)	TOLERANCE	RESPONSE (sec.)	APPROX. VA CONSUMPTION (W)			WEIGHT (kg)
						Voltage side	Current side	Aux. supply	
ATT2-91A	1A or 5A		DC0- (≧200Ω) DC0-1V (≧200Ω) DC0-5V (≧600Ω) DC0-10V (≧2kΩ) DC1-5V (≧600Ω) DC0-1mA (≦10kΩ)	± 0.5%	≦1 sec.	-	0.5	1.5 (2.5)	0.5
AETT2-91A								3.0 (3.0)	
VTT2-91A	150V or 300V		DC0-5mA (≦2kΩ) DC0- (≦1kΩ) DC0- (≦600Ω) DC1-5mA (≦2kΩ) DC4- (≦550Ω)	± 0.5%	≦1 sec.	1	-	1.5 (2.5)	0.5
VETT2-91A								3.0 (3.0)	
WTT2-92A-12	110V, 5A	500W	0-100mV, ±100mV (≧200Ω) 0-1V, ±1V (≧200Ω) 0-5V, ±5V (≧600Ω) 0-10V, ±10V (≧2kΩ) 1-5V (≧600Ω) 0-1mA, ±1mA (≦10kΩ) 0-5mA, ±5mA (≦2kΩ) 0-10mA (≦1kΩ) 0-16mA (≦600Ω) 1-5mA (≦2kΩ) 4-20mA (≦550Ω)	± 0.5%	≦1 sec.	0.5/each phase	0.5/each phase	3.0 (3.0)	0.7
	220V, 5A	1kW							
WTT2-92A-13	110V, 5A	1kW							
WTT2-92A-33	110V, 5A	1kW							
	220V, 5A	2kW							
WTT2-92A-34	110 √3V,	1kW							
	220 √3V, 5A	2kW							
WVTT2-92A-33	110V, 5A	LAG LEAD 1kvar		± 0.5%	≦1 sec.	0.5/each phase	0.5/each phase	3.0 (3.0)	0.7
	220V, 5A	LAG LEAD 2kvar							
WVTT2-92A-34	110V, 5A	LAG LEAD 1kvar							
	220V, 5A	LAG LEAD 2kvar							
STT2-92A	110V or 220V	LEAD LAG 45-0-45° or 30-0-30		± 1%	≦1 sec.	0.5	-	3.0 (3.0)	0.7
PTT2-92A-12	110V, 5A or 220V, 5A	LAG 90° LEAD or LAG 60° LEAD		± 3%	≦1 sec.	0.5	0.5/each phase	3.0 (3.0)	0.7
PTT2-92A-33									
PTT2-92A-34	110 √3V, or 220 √3V, 5A								
SPTT2-92A-12	110V, 5A or 220V, 5A	LEAD LAG 0-1-0 or LEAD LAG 0.5-1-0.5		± 3%	≦1 sec.	0.5	0.5/each phase	3.0 (3.0)	0.7
SPTT2-92A-33									
SPTT2-92A-34	110 √3V, 5A or 220 √3V, 5A								
FTT2-91A	110V or 220V	45-55Hz or 55-65Hz	5V (≧600Ω) or 10V (≧2kΩ) or 4-20mA (≦550Ω)	± 0.5%	≦1 sec.	1.0	-	3.0 (3.0)	0.5

●Standard of auxiliary supply: AC100/110V+10%-15%/AC200/220V+10%-15%/DC24V±15%/DC48V±15% or DC100/110V (88-143V)

●Power and reactive power transducer can measure normally from input voltage 0V because the product has an auxiliary supply. Power transducer can be used with SCR waveform.

●Output polarities of reactive power, phase angle and power factor transducer are LAG (+) and LEAD (-).

●Output of a V-V phase angle transducer shall be scaled out to minus side if input voltage of either BUS side or START side is 0V. (at the time of auxiliary supply)

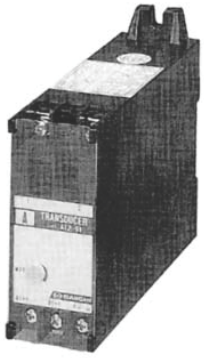
●Output of a V-I phase angle transducer or a power factor transducer becomes equivalent to power factor 1 at the time of an input voltage 0V or an input current 0A. (at the time of auxiliary supply)

●Output of a frequency transducer becomes as follows at the time of input voltage 0V.

●In the case of voltage output 0-5V: approx. -0.6V, in the case of current output 4-20mA: approx. 2mA (at the time of auxiliary supply).

§ BOX TRANSDUCER §

SMALL SIZED AC TRANSDUCER 90 SERIES



AT2-91
(120×40×130mm/0.3kg)

VT2-91
(120×40×130mm/0.3kg)

AUXILIARY POWER not REQUIRED, LOAD FIXED TYPE

■ FEATURES

- Heavy current oriented size reduction
- Withstand voltage AC2000V 50/60Hz for 1 min. between input, output and earth.
- Protects output side equipments from an input side lightning surge with an electrostatic shield between primary and secondary winding.
- Load resistance fixed type
- Auxiliary supply not required type
- Terminal cover as a standard equipment
- Supports both DIN rail and wall mounting.

■ COMMON SPECIFICATION

See COMMON SPECIFICATION above

■ SPECIFICATION

PRODUCT	OPERATION METHOD	CONDITION of USE		TYPE	INPUT	DC OUTPUT (load resistance)	TOLERANCE	RESPONSE (sec.)	APPROX. VA CONSUMPTION (W)		WEIGHT (kg)
		Wave form	Frequency (50/60Hz)						Voltage side	Current side	
AC current	With waveform compensation	3rd. 5%	50/60Hz	AT2-91	1A or 5A	*1 5V (fixed at 50kΩ or more)	± 0.5%	1	-	0.5	0.3
AC voltage				VT2-91	150V or 300V	or 1mA (fixed at 5kΩ or less)			1	-	

***1** Please specify the voltage output with a load resistance 50kΩ or more.
Please specify the current output with a load resistance 5kΩ or more.

■ APPLICATION

This device amplifies various kinds of DC signals and converts them into unified intersystem signals. Because input, output, power source and earth are reciprocally insulated by a withstand voltage 2,000V, the product offers full advantages in transmitting insulated signals between power measuring systems, cutoff of noise, protecting control circuit from a sneak current, and transmitting an output directly to a distant place.

Isolator TT2-91A
(120×40×130mm/0.5kg)

■ FEATURES

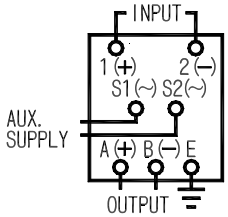
●Withstand voltage AC2000V 50/60Hz for 1 min. between input, output, auxiliary supply and earth.
●Impulse withstand voltage 5kV 1.2/50μs positive/negative polarity 3 times each between electric circuit and earth, auxiliary supply and input/output.
●Supports both DIN rail and wall mounting.

■ SPECIFICATION

Input (input resistance or voltage drop)				Output (load resistance)		Auxiliary Supply	Common Specification
A1 *1 : DC0—10mV	(approx.1MΩ)	C1 *1, 2 : DC0—10μA	(100mV)	1 : DC0—100mV	(≧200Ω)	1 : AC100/110V±10%, 50/60Hz	Tolerance: ±0.25%
A2 : DC0—50mV	(approx.1MΩ)	C2 *1 : DC0—100μA	(100mV)	2 : DC0—1V	(≧200Ω)	2 : AC200/220V±10%, 50/60Hz	Response time
A3 : DC0—60mV	(approx.1MΩ)	C3 : DC0—1mA	(approx. 100Ω)	3 : DC0—5V	(≧600Ω)	3 *5 : DC20—57V	≦0.2 sec./99%
A4 : DC0—100mV	(approx.1MΩ)	C4 : DC0—5mA	(approx. 100Ω)	4 : DC0—10V	(≧2kΩ)	4 : DC100/110V (88—143V)	VA consumption:
A5 : DC0—1V	(approx.1MΩ)	C5 : DC0—10mA	(approx. 100Ω)	5 : DC1—5V	(≧600Ω)	0 : other than those above	AC power source 3VA
A6 : DC0—5V	(approx.1MΩ)	C6 : DC0—16mA	(approx. 100Ω)	A : DC0—1mA	(≦10kΩ)		DC power source 3W
A7 : DC0—10V	(approx.1MΩ)	C7 : DC4—20mA	(approx. 100Ω)	B : DC0—5mA	(≦2kΩ)		
A8 : DC1—5V	(approx.1MΩ)	D1 *1, 2: DC±10μA	(±100mV)	C : DC0—10mA	(≦1kΩ)		
B1 * 1 : DC±10mV	(approx.1MΩ)	D2 * 1 : DC±10μA	(±100mV)	D : DC0—16mA	(≦600Ω)		
B2 : DC±50mV	(approx.1MΩ)	D3 : DC±500μA	(±100mV)	E : DC1—5mA	(≦2kΩ)		
B3 : DC±60mV	(approx.1MΩ)	D4 : DC± 1mA	(approx. 100Ω)	F : DC4—20mA	(≦550Ω)		
B4 : DC±100mV	(approx.1MΩ)	D5 : DC± 5mA	(approx. 100Ω)	0 *4 : other than those above			
B5 : DC± 1V	(approx.1MΩ)	D6 : DC±10mA	(approx. 100Ω)				
B6 : DC± 5V	(approx.1MΩ)	00 * 3 : other than those above					
B7 : DC±10V	(approx.1MΩ)						

*1 Tolerance becomes ±0.5% in the case of input voltage less than 50mV, input current less than 500μA.
*2 For input 10μA, circuit voltage is 15V or less.
*3 Input voltage ranging from 10mV to 600V, input current ranging from 10μA to 100mA are manufacturable.
*4 Consult with us for voltage output up to 10V, current output up to 20mA.
*5 Rated voltage of auxiliary supply DC20—57V is DC24V or DC48V.
► Open current output: The output terminal can be used with the current output terminal open at all times. Note that approx. 15V voltage will occur at the output terminal.

■ CONNECTION DIAGRAM



In the case of DC auxiliary supply, connect the wire with S1 as + and S2 as -.

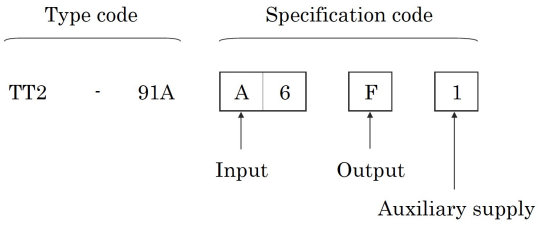
●Specifying special filter
When a ripple equal to a single-phase AC full rectification wave (50/60Hz) degree is included in input wave, it is necessary to specify a special filter to convert it into a DC output. A 50/60Hz full rectification wave filter is attached by specification.
Also, consult with us for special waveform such as inverter.

●Response time
Please specify it if a product of a very fast response time (60ms/99%) in control circuit is necessary.

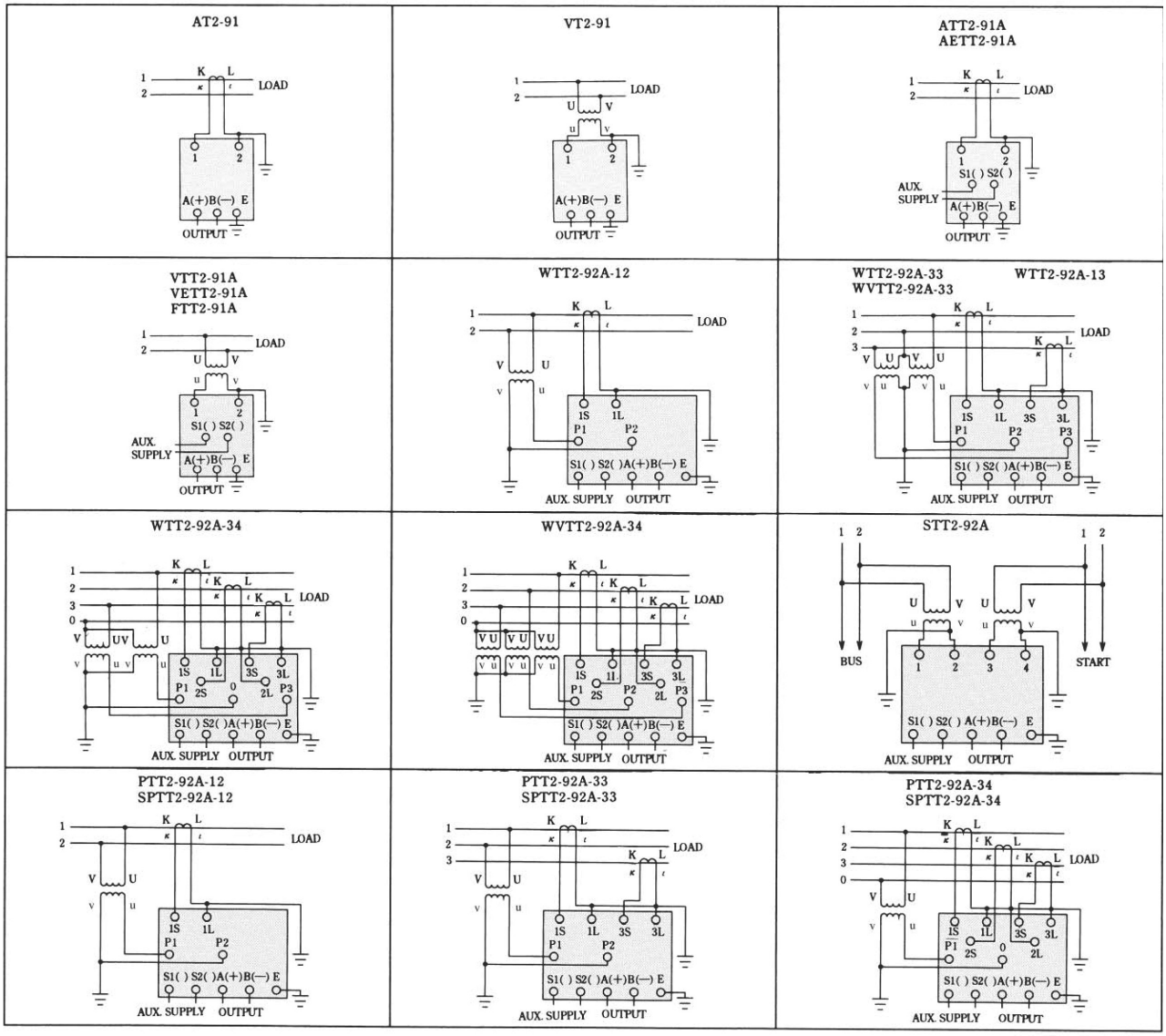
■ PURCHASE SPECIFICATION

● Specification

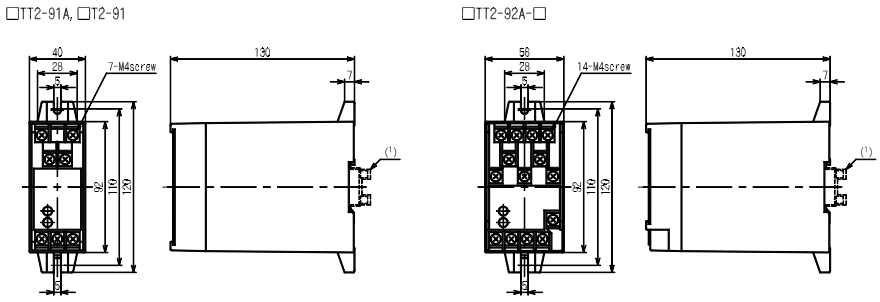
Please inform us of type code, specification and quantity.



■ **CONNECTION DIAGRAM** (in the case of DC auxiliary supply, connect SI as ＋, S2 as －)



■ **DIMENSIONS** (mm) See the connection diagram above for terminal arrangement



* Use DIN 35mm standard rail in the case of DIN rail mounting (height 15mm).

■ **PURCHASE SPECIFICATION**

1. Type;
2. Input (rated voltage / current / frequency);
3. Output (load resistance);
4. Auxiliary supply;
5. Quantity;

1. AC CURRENT TRANSDUCER

● How to specify

Type code: ATT2 - 91A　　Specification code: □ □ □

Input		Output (load resistance)			Auxiliary supply	
1	0–1A	1	DC0–100mV	(≧200Ω)	1 AC100/110V	+10%
2	0–5A	2	DC0–1V	(≧200Ω)	2 AC200/220V	+10%
3	0–6A	3	DC0–5V	(≧600Ω)	3 DC24V	±15%
4	0–10A	4	DC0–10V	(≧2kΩ)	5 DC100/110V (88–143V)	
Z	other than those above	5	DC1–5V	(≧600Ω)	Z other than those above	
		A	DC0–1mA	(≦10kΩ)		
		B	DC0–5mA	(≦2kΩ)		
		C	DC0–10mA	(≦1kΩ)		
		F	DC4–20mA	(≦550Ω)		
		Z	other than those above			

2. AC VOLTAGE TRANSDUCER

● How to specify

Type code: VTT2 - 91A　　Specification code: □ □ □

Input		Output (load resistance)			Auxiliary supply	
1	0–100V	1	DC0–100mV	(≧200Ω)	1 AC100/110V	+10% / -15%
2	0–110V	2	DC0–1V	(≧200Ω)	2 AC200/220V	+10% / -15%
3	0–150V	3	DC0–5V	(≧600Ω)	3 DC24V	±15%
4	0–200V	4	DC0–10V	(≧2kΩ)	5 DC100/110V (88–143V)	
5	0–259V	5	DC1–5V	(≧600Ω)	Z other than those above	
6	0–300V	A	DC0–1mA	(≦10kΩ)		
Z	other than those above	B	DC0–5mA	(≦2kΩ)		
		C	DC0–10mA	(≦1kΩ)		
		F	DC4–20mA	(≦550Ω)		
		Z	other than those above			

3. RMS VALUE AC CURRENT TRANSDUCER

● How to specify

Type code: AETT2 - 91A　　Specification code: □ □ □

Input		Output (load resistance)			Auxiliary supply	
1	0–1A	3	DC0–5V	(≧600Ω)	1 AC100/110V	+10% / -15%
2	0–5A	4	DC0–10V	(≧2kΩ)	2 AC200/220V	+10% / -15%
Z	other than those above	A	DC0–1mA	(≦10kΩ)	3 DC24V	±15%
		F	DC4–20mA	(≦550Ω)	5 DC100/110V (88–143V)	
		Z	other than those above		Z other than those above	

4. RMS VALUE TYPE AC VOLTAGE TRANSDUCER

● How to specify

Type code: VETT2 - 91A　　Specification code: □ □ □

Input		Output (load resistance)			Auxiliary supply	
1	0–100V	3	DC0–5V	(≧600Ω)	1 AC100/110V	+10% / -15%
2	0–110V	4	DC0–10V	(≧2kΩ)	2 AC200/220V	+10% / -15%
3	0–150V	A	DC0–1mA	(≦10kΩ)	3 DC24V	±15%
4	0–200V	F	DC4–20mA	(≦550Ω)	5 DC100/110V (88–143V)	
6	0–300V	Z	other than those above		Z other than those above	
Z	other than those above					

5.1 POWER TRANSDUCER 1φ2W

● How to specify

Type code: WTT2 - 92A - 12 | Specification code: □ □ □ □ □

Input	Rated voltage	Rated current	Output (load resistance)	Auxiliary supply
1 0–500W (0–100W)	1 AC100V	1 AC1A	1 DC0–100mV (≧200Ω)	1 AC100/110V +10% / -15%
A ±500W (±100W)	2 AC105V	2 AC5A	2 DC0–1V (≧200Ω)	2 AC200/220V +10% / -15%
Z other than those above	3 AC110V	Z other than those above	3 DC0–5V (≧600Ω)	3 DC24V ±15%
	4 AC115V		4 DC0–10V (≧2kΩ)	5 DC100/110V (88–143V)
The case of 1A is indicated in the parentheses.	Z other than those above		5 DC1–5V (≧600Ω)	Z other than those above
1 0–500W (0–100W)	5 AC200V		6 DC±5V (≧600Ω)	
2 0–750W (0–150W)	6 AC210V		7 DC±10V (≧2kΩ)	
3 0–833W (0–166.7W)	7 AC220V		A DC0–1mA (≦10kΩ)	
4 0–1kW (0–200W)	Z other than those above		B DC0–5mA (≦2kΩ)	
A ±500W (±100W)			C DC0–10mA (≦1kΩ)	
B ±750W (±150W)			F DC4–20mA (≦550Ω)	
C ±833W (±166.7W)			G DC±1mA (≦10kΩ)	
D ±1kW (±200W)			Z other than those above	
Z other than those above				
The case of 1A is indicated in the parentheses.				

5.2 POWER TRANSDUCER 1φ3W, 3φ3W, 3φ4W

● How to specify

Type code: WTT2 - 92A - 13 / 33 / 34 | Specification code: □ □ □ □ □

Input	Rated voltage	Rated current	Output (load resistance)	Auxiliary supply
1 0–500W (0–100W)	1 AC100V (AC100/√3V)	1 AC1A	1 DC0–100mV (≧200Ω)	1 AC100/110V +10% / -15%
2 0–750W (0–150W)	2 AC105V (AC105/√3V)	2 AC5A	2 DC0–1V (≧200Ω)	2 AC200/220V +10% / -15%
3 0–833W (0–166.7W)	3 AC110V (AC110/√3V)	Z other than those above	3 DC0–5V (≧600Ω)	3 DC24V ±15%
4 0–1kW (0–200W)	4 AC115V (AC115/√3V)		4 DC0–10V (≧2kΩ)	5 DC100/110V (88–143V)
A ±500W (±100W)	Z other than those above		5 DC1–5V (≧600Ω)	Z other than those above
B ±750W (±150W)			6 DC±5V (≧600Ω)	
C ±833W (±166.7W)			7 DC±10V (≧2kΩ)	
D ±1kW (±200W)	1φ3W: phase voltage between neutral point		A DC0–1mA (≦10kΩ)	
Z other than those above	The case of 3φ4W is indicated in the parentheses (phase voltage)		B DC0–5mA (≦2kΩ)	
The case of 1A is indicated in the parentheses.			C DC0–10mA (≦1kΩ)	
4 0–1kW (0–200W)			F DC4–20mA (≦550Ω)	
5 0–1.5kW (0–300W)	5 AC200V (AC200/√3V)		G DC±1mA (≦10kΩ)	
6 0–1.667kW (0–333.3W)	6 AC210V (AC210/√3V)		Z other than those above	
7 0–2kW (0–400W)	7 AC220V (AC220/√3V)			
D ±1kW (±200W)	Z other than those above			
E ±1.5kW (±300W)				
F ±1.667kW (±333.3W)	1φ3W: phase voltage between neutral point			
G ±2kW (±400W)	The case of 3φ4W is indicated in the parentheses (phase voltage)			
Z other than those above				
The case of 1A is indicated in the parentheses.				

6. REACTIVE POWER TRANSDUCER 3φ3W, 3φ4W

● How to specify

Type code: WVTT2 - 92A - 33 / 34 | Specification code: □ □ □ □ □

Input	Rated voltage	Rated current	Output (load resistance)	Auxiliary supply
1 LEAD 500–LAG 500var (LEAD 100–LAG 100var)	1 AC100V	1 AC1A	1 DC0–100mV (≧200Ω)	1 AC100/110V +10% / -15%
2 LEAD 750–LAG 750var (LEAD 150– LAG 150var)	2 AC105V	2 AC5A	2 DC0–1V (≧200Ω)	2 AC200/220V +10% / -15%
3 LEAD 833–LAG 833var (LEAD 166.7–LAG 166.7var)	3 AC110V	Z other than those above	3 DC0–5V (≧600Ω)	3 DC24V ±15%
4 LEAD 1–LAG 1kvar (LEAD 200–LAG 200var)	4 AC115V		4 DC0–10V (≧2kΩ)	5 DC100/110V (88–143V)
4 LEAD 1–LAG 1kvar (LEAD 200–LAG 200var)	5 AC200V		5 DC1–5V (≧600Ω)	Z other than those above
5 LEAD 1.5–LAG 1.5kvar (LEAD 300–LAG 300var)	6 AC210V		6 DC±5V (≧600Ω)	
6 LEAD 1.667–LAG 1.667kvar (LEAD 333.3–LAG 333.3var)	7 AC220V		7 DC±10V (≧2kΩ)	
7 LEAD 2–LAG 2kvar (LEAD 400–LAG 400var)	Z other than those above		A DC0–1mA (≦10kΩ)	
Z other than those above	Note: line voltage for 3φ4W, too.		B DC0–5mA (≦2kΩ)	
The case of 1A is indicated in the parentheses.			C DC0–10mA (≦1kΩ)	
			F DC4–20mA (≦550Ω)	
			G DC±1mA (≦10kΩ)	
			Z other than those above	

7. V-V PHASE ANGLE TRANSDUCER

● How to specify

Type code: STT2 - 92A

Specification code: [ ] [ ] [ ] [ ] [ ]

Input	Rated voltage	Rated frequency	Output (load resistance)	Auxiliary supply
1 LEAD30°– 0°– LAG30°	1 AC110V	1 50Hz	1 DC0–100mV (≧200Ω)	1 AC100/110V +10% / -15%
2 LEAD45°– 0° –LAG45°	2 AC110V/√3V	2 60Hz	2 DC0–1V (≧200Ω)	2 AC200/220V +10% / -15%
3 LEAD90°– 0° –LAG90° *	3 AC220V		3 DC0–5V (≧600Ω)	3 DC24V ±15%
Z other than those above	4 AC220V/√3V		4 DC0–10V (≧2kΩ)	5 DC100/110V (88–143V)
	Z other than those above		5 DC1–5V (≧600Ω)	Z other than those above
*: special rating			6 DC±5V (≧600Ω)	
			7 DC±10V (≧2kΩ)	
			A DC0–1mA (≦10kΩ)	
			B DC0–5mA (≦2kΩ)	
			C DC0–10mA (≦1kΩ)	
			F DC4–20mA (≦550Ω)	
			G DC±1mA (≦10kΩ)	
			Z other than those above	

8. V-I PHASE ANGLE TRANSDUCER

● How to specify

Type code: PTT2 - 92A - 12 / 33 / 34

Specification code: [ ] [ ] [ ] [ ] [ ] [ ]

Input	Rated voltage	Rated current	Rated frequency	Output (load resistance)	Auxiliary supply
1 LEAD60°– 0° –LAG60°	1 AC100V (AC100/√3V)	1 AC1A	1 50Hz	1 DC0–100mV (≧200Ω)	1 AC100/110V +10% / -15%
2 LEAD90° –0°– LAG90°	2 AC105V (AC105/√3V)	2 AC5A	2 60Hz	2 DC0–1V (≧200Ω)	2 AC200/220V +10% / -15%
Z other than those above	3 AC110V (AC110/√3V)	Z other than those above		3 DC0–5V (≧600Ω)	3 DC24V ±15%
	4 AC115V (AC115/√3V)			4 DC0–10V (≧2kΩ)	5 DC100/110V (88–143V)
	5 AC200V (AC200/√3V)			5 DC1–5V (≧600Ω)	Z other than those above
	6 AC210V (AC210/√3V)			6 DC±5V (≧600Ω)	
	7 AC220V (AC220/√3V)			7 DC±10V (≧2kΩ)	
	Z other than those above			A DC0–1mA (≦10kΩ)	
				B DC0–5mA (≦2kΩ)	
	The case of 3φ4W is indicated in the parentheses (phase voltage)			C DC0–10mA (≦1kΩ)	
				F DC4–20mA (≦550Ω)	
				G DC±1mA (≦10kΩ)	
				Z other than those above	

9. POWER FACTOR TRANSDUCER

● How to specify

Type code: SPTT2 - 92A - 12 / 33 / 34

Specification code: [ ] [ ] [ ] [ ] [ ] [ ]

Input	Rated voltage	Rated current	Rated frequency	Output (load resistance)	Auxiliary supply
1 LEAD0.5–1–LAG0.5	1 AC100V (AC100/√3V)	1 AC1A	1 50Hz	1 DC0–100m (≧200Ω)	1 AC100/110V +10% / -15%
2 LEAD0–1–LAG0	2 AC105V (AC105/√3V)	2 AC5A	2 60Hz	2 DC0–1V (≧200Ω)	2 AC200/220V +10% / -15%
Z other than those above	3 AC110V (AC110/√3V)	Z other than those above		3 DC0–5V (≧600Ω)	3 DC24V ±15%
	4 AC115V (AC115/√3V)			4 DC0–10V (≧2kΩ)	5 DC100/110V (88–143V)
	5 AC200V (AC200/√3V)			5 DC1–5V (≧600Ω)	Z other than those above
	6 AC210V (AC210/√3V)			6 DC±5V (≧600Ω)	
	7 AC220V (AC220/√3V)			7 DC±10V (≧2kΩ)	
	Z other than those above			A DC0–1mA (≦10kΩ)	
				B DC0–5mA (≦2kΩ)	
	The case of 3φ4W is indicated in the parentheses (phase voltage)			C DC0–10m/ (≦1kΩ)	
				F DC4–20m/ (≦550Ω)	
				G DC±1mA (≦10kΩ)	
				Z other than those above	

10. FREQUENCY TRANSDUCER

● How to specify

Type code: FTT2 - 91A　　Specification code: □ □ □ □

Input	Rated voltage	Output (load resistance)	Auxiliary supply
1 45–55Hz	1 AC100V	1 DC0–100mV (≧200Ω)	1 AC100/110V +10% / -15%
2 55–65Hz	2 AC105V	2 DC0–1V (≧200Ω)	2 AC200/220V +10% / -15%
3 45–65Hz	3 AC110V	3 DC0–5V (≧600Ω)	3 DC24V ±15%
Z other than those above	4 AC115V	4 DC0–10V (≧2kΩ)	5 DC100/110V (88–143V)
	5 AC200V	5 DC1–5V (≧600Ω)	Z other than those above
	6 AC210V	A DC0–1mA (≦10kΩ)	
	7 AC220V	B DC0–5mA (≦2kΩ)	
	Z other than those above	C DC0–10mA (≦1kΩ)	
		F DC4–20mA (≦550Ω)	
		Z other than those above	

11. LOAD FIXED TYPE AC CURRENT TRANSDUCER (power source-free type)

● How to specify

Type code: AT2 - 91　　Specification code: □ □ □

Input	Output (load resistance)	Load resistance
1 0–1A	3 DC0–5V	1 50kΩ
2 0–5A	Z other than those above (10mV–5V)	2 100kΩ
Z other than those above		3 200kΩ
		4 1MΩ
		5 2MΩ
		6 5MΩ
		7 10MΩ
		Z other than those above (Specify 50kΩ or more)
	A DC0–1mA	8 5kΩ
	(Note) Only 1mA available for current output	Z other than those above (Specify 5kΩ or less)

12. LOAD FIXED TYPE AC VOLTAGE TRANSDUCER (power source-free type)

● How to specify

Type code: VT2 - 91　　Specification code: □ □ □

Input	Output (load resistance)	Load resistance
3 0–150V	3 DC0–5V	1 50kΩ
6 0–300V	Z other than those above (10mV–5V)	2 100kΩ
Z other than those above		3 200kΩ
		4 1MΩ
		5 2MΩ
		6 5MΩ
		7 10MΩ
		Z other than those above (Specify 50kΩ or more)
	A DC0–1mA	8 5kΩ
	(Note) Only 1mA available for current output	Z other than those above (Specify 5kΩ or less)