Temperature and Humidity Control Specialists

SHIMADEN

Quality & Technology

To respond to all needs. As pioneer of industrial temperature and humidity cntrol instruments, Shimaden keeps rising to the challenge.

BRIEF PRODUCT GUIDE 2025

10th Edition

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Shimaden, Temperature and Humidity Control Specialists

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SHIMADEN

Series SRS1/3/4/5

DIGITAL CONTROLLER

CE approved

BASIC FEATURES

□ ***Multi-input and multi-range performance***

□ ***Small instrument depths (62 mm to 65 mm) save space, thus securing a larger installation area.***

□ ***Large 13.8 mm bright display (SRS1 & SRS4), 21.8 mm (SRS3) & 22mm (SRS5)***

□ ***1 Pattern, 10 step program function available (option)***

ORDERING INFORMATION

ITEM	CODE		SPECIFICATIONS
SERIES	SRS1 -		DIN 48x48 Digital Controller
	SRS3 -		DIN 96x96 Digital Controller
	SRS4 -		DIN 96x48 Digital Controller
	SRS5 -		DIN 48x96 Digital Controller
CONTROL OUTPUT		Y -	Contact: 1a, Contact capacity: 240 V AC 2A/resistive load Proportional cycle: 1 to 120 sec.
		I -	Current: 4 to 20 mA DC Load resistance: 600 Ω max. (OPTION)
		P -	SSR drive voltage: 12 V±1.5 V DC/20mA max. Proportional cycle: 1 to 120 sec.
		V -	Voltage: 0 to 10 V DC Load current: 2 mA max.
PROGRAM FUNCTION (OPTION)		N	None
		P	1 patterns, 10 steps
EVENT OUTPUT			1 Contact: 2 points x 1a, 240 V AC, 1 A: Resistive load (common)
REMARKS			0 Without
			6 Voltage input (V)
			9 With (Please consult before ordering.)

TERMINAL COVER

Model	Parts No.	Remarks
SRS1	QCR001	One touch mounting
SRS3	QCR006	One touch mounting
SRS4	QCR006	One touch mounting
SRS5	QCR006	One touch mounting

MEASURING RANGE CODES

Input Type			Code	Measuring range (°C)	Measuring range (°F)
Multi input	Thermocouple	B	01 *1	0 to 1800 °C	0 to 3300 °F
		R	02 *6	-50 to 1700 °C	0 to 3100 °F
		S	03 *6	0 to 1700 °C	0 to 3100 °F
		K	04 *2	-199.9 to 800.0 °C	-300 to 1500 °F
			05	0 to 1370 °C	0 to 2500 °F
		E	06	0 to 700 °C	0 to 1300 °F
		J	07 *2	-200 to 600 °C	-320 to 1100 °F
		T	08 *2	-270 to 400 °C	-450 to 750 °F
		N	09 *6	0 to 1300 °C	0 to 2300 °F
		PLII	10 *3	0 to 1300 °C	0 to 2300 °F
		C (WRe 5-26)	11	0 to 2300 °C	0 to 4200 °F
		U	12 *2	-199.9 to 400.0 °C	-300 to 750 °F
		L	13	0 to 600 °C	0 to 1100 °F
	Kelvin	K	14 *4	10.0 to 350.0 K	
		AuFe-Cr	15 *5	0.0 to 350.0 K	
	RTD	Pt100	33	-200 to 600 °C	-300 to 1100 °F
			34	-199.9 to 300.0 °C	-300 to 600 °F
	mV	-10 to 50 mV	72	Scaling range: -1999 to 9999	
Voltage	V	0 to 10 V	86	Span: 10 to 9999 digit	

Display accuracy TC : ± (0.3%FS + 1digit + 2 °C)
Pt : ± (0.3%FS +1 digit + 0.1 °C)
mV, V : ± (0.3%FS + 1digit)

*1 Thermocouple B: Accuracy guarantee is not applicable to 400 °C and 752 °F or below.
Accuracy of indicated values is 400 – 800°C (752 – 1472°F) is ± (0.5%FS + 1digit + 2°C)

*2 Thermocouple K (Celsius, Fahrenheit), E, J, T, U: Accuracy of indicated values below -100°C (-148°F) is ± (1.5%FS + 1digit + 2°C).

*3 Thermocouple PL ll, U: Accuracy of indicated values ± (1.5%FS + 1digit + 2°C).

*4 Thermocouple K (Kelvin) accuracy temperature range:
10–30K Accuracy ± (2.5%FS + 1digit + 2°C)
30–70K Accuracy ± (1.5%FS + 1digit + 2°C)
70–350K Accuracy ± (1.0%FS + 1digit + 2°C)

*5 Thermocouple AuFe, Cr: Accuracy of indicated values is ±(1.0%FS + 1digit + 2°C)

*6 Thermocouple N: Accuracy below 200°C (392°F) is ± (0.5%FS + 1digit + 2°C)

NOTE

TC: Temperatures below -273 °C (-459 °F) or R.T.D.: Temperatures below -240 °C (-400 °F) are subject to scaleover display.
Thermocouple: With or without a decimal point is selectable for TC and Pt.

Note: Unless otherwise designated, the factory default settings are as follows:

Input range	Code	Measuring range
Multi-input	05	K 0–1370 °C
Voltage input	86	0–10 V

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SHIMADEN

Series **SRS11A/12A/13A/14A**

DIGITAL CONTROLLER

CE approved

BASIC FEATURES

- □ ***Multi-input and multi-range performance***
- □ ***Small instrument depths (62mm to 65mm) save space, thus securing a larger installation area.***
- □ ***SV setting: 3 points***
- □ ***PID Value: 3 types***
- □ ***2-output heating and cooling control available (optional)***
- □ ***Total 32 steps Program available (optional) (1 to 4 pattern, 32 to 8 step)***
- □ ***RS-485 Interface available (optional) (Master/slave function, Modbus/Shimaden Protocol)***
- □ ***Heater break/heater loop alarm (optional)***
- □ ***A wide selection of additional functions (optional) is available to suit various needs.***
- □ ***Possible to switch off SV/PV value by key operation***
- □ ***Parameter mask (non-display) / lock (key lock) function***

SMALLER INSTRUMENT DEPTHS

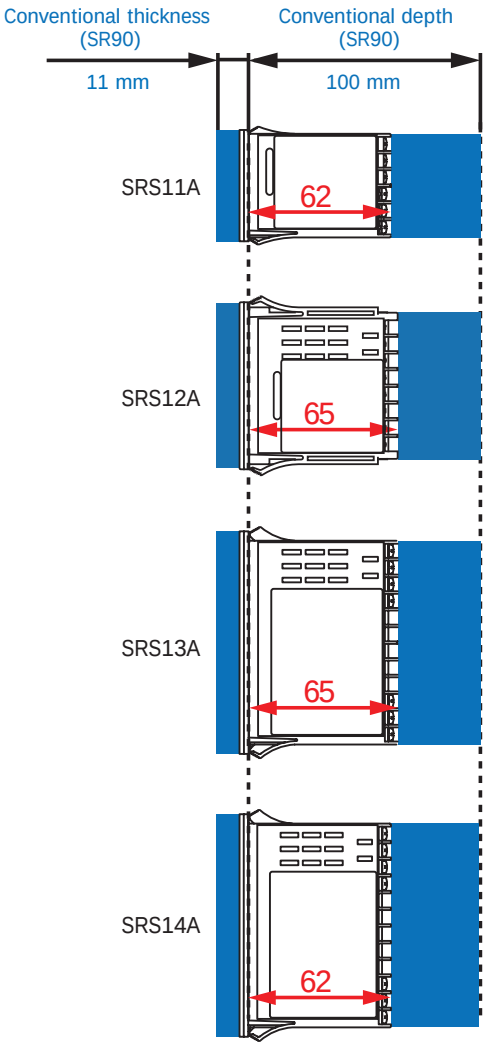
Smaller instrument depths save space and secure a larger and flexible installation area.

SRS11A Series
(48×48)

SRS12A Series
(72×72)

SRS13A Series
(96×96)

SRS14A Series
(48×96)



Blue part indicates the size of
the conventional instruments (SR90 Series).

NAMES AND FUNCTIONS

① Measured value (PV) display
Displays current PV value.

② Target set value (SV) display
Displays current SV value.

③ Action display
RUN/AT/MAN/OUT1/OUT2/EV1/EV2/EV3/COM

④ Operating keys

[ ]…Parameter key
Displays the next screen in various screen groups.

[▼]…Down key
Decrements setting values.

[▲]…Up key
Increments setting values.

[ENT]…Enter key
Enters setting values.

[RUN/RST]…RUN/RST key

ORDERING INFORMATION: SRS11A

ITEM	CODE	SPECIFICATIONS			
SERIES	SRS11A-	DIN 48×48 Digital Controller			
INPUT	8	Multi-input	Thermocouple:	B, R, S, K, E, J, T, N, PLII, C (WRe 5-26), U (DIN 43710), L (DIN 43710), AuFe-Cr	Scaling Possible (inverse scaling impossible) Range: -1999 to 9999 Span: 10 to 10000
			RTD:	Pt100/JPt100	
			Voltage (mV):	-10 to 10, 0 to 10, 0 to 20, 0 to 50, 0 to 100, 10 to 50mV DC	
	6	Voltage (V)	-1 to 1, 0 to 1, 0 to 2, 0 to 5, 1 to 5, 0 to 10V DC Input resistance: Min. 500kΩ		

CONTROL OUTPUT 1	Y	Contact: 1a, Contact capacity: 240V AC 2A/resistive load Proportional cycle: 1 to 120 sec.
	I	Current: 4 to 20mA DC Load resistance: 600Ω max.
	P	SSR drive voltage: 12V±1.5V DC/30mA max. Proportional cycle: 1 to 120 sec.
	V	Voltage: 0 to 10V DC Load current: 2mA max.

CONTROL OUTPUT 2	N-	None
	Y-	Contact: 1a, Contact capacity: 240V AC 2A/resistive load Proportional cycle: 1 to 120 sec.
	I-	Current: 4 to 20mA DC Load resistance: 600Ω max.
	P-	SSR drive voltage: 12V±1.5V DC/30mA max. Proportional cycle: 0.5 to 120 sec.
	V-	Voltage: 0 to 10V DC Load current: 2mA max.
Additional event output	E-	Additional event output 1 point (EV3)
Additional external control input signal (DI)	D-	Additional external control input 1 point (DI4)

POWER SUPPLY	90-	100 to 240V AC±10%, 50/60Hz
	08-	24V AC/DC±10%, 50/60Hz

PROGRAM FUNCTION	N	None
	P	Max. 4 patterns Total number of steps: 32

EVENT OUTPUT	0	None
	1	Event output 2 points (EV1, EV2)

ANALOG OUTPUT/ COMMUNICATION FUNCTION	0	None
	3	0 to 10mV DC Output resistance: 10Ω
	4	4 to 20mA DC Resistive load: 300Ω max.
	6	0 to 10V DC Load current: 2mA max.
	5	RS-485 (Shimaden standard protocol, MODBUS protocol)

EXTERNAL INPUT CONTROL SIGNAL (DI)/ CT INPUT/**Note: CT sold separately**	0	None	
	1	CT input 2 points	Note: Available only when control output 1 or 2 is Y or P.
	2	Control input 3 points (DI1, DI2, DI3)	

REMARKS	0	Without
	9	With

OPTIONAL ACCESSORIES

Name	Code	Remarks
CT	QCC01	CT for 30A
CT	QCC02	CT for 50A
Shunt resistor	QCS002	250Ω External receiving impedance for current input
Terminal cover	QCR001	For SRS11A

ORDERING INFORMATION: SRS12A, SRS13A, SRS14A

ITEM	CODE	SPECIFICATIONS
SERIES	SRS12A-	DIN 72×72 Digital Controller
	SRS13A-	DIN 96×96 Digital Controller
	SRS14A-	DIN 96×48 Digital Controller

INPUT	8	Multi-input	Thermocouple:	B, R, S, K, E, J, T, N, PLII, C (WRe 5-26), U (DIN 43710), L (DIN 43710), AuFe-Cr	Scaling Possible (inverse scaling impossible) Range: -1999 to 9999 Span: 10 to 10000
			RTD:	Pt100/JPt100	
			Voltage (mV):	-10 to 10, 0 to 10, 0 to 20, 0 to 50, 0 to 100, 10 to 50mV DC	
	6	Voltage (V)		-1 to 1, 0 to 1, 0 to 2, 0 to 5, 1 to 5, 0 to 10V DC Input resistance: Min. 500kΩ	

CONTROL OUTPUT 1	Y	Contact: 1a, Contact capacity: 240V AC 2A/resistive load Proportional cycle: 1 to 120 sec.
	I	Current: 4 to 20mA DC Load resistance: 600Ω max.
	P	SSR drive voltage: 12V±1.5V DC/30mA max. Proportional cycle: 1 to 120 sec.
	V	Voltage: 0 to 10V DC Load current: 2mA max.

CONTROL OUTPUT 2	N-	None
	Y-	Contact: 1a, Contact capacity: 240V AC 2A/resistive load Proportional cycle: 1 to 120 sec.
	I-	Current: 4 to 20mA DC Load resistance: 600Ω max.
	P-	SSR drive voltage: 12V±1.5V DC/30mA max. Proportional cycle: 1 to 120 sec.
	V-	Voltage: 0 to 10V DC Load current: 2mA max.
Additional event output	E-	Additional event output 1 point (EV3)
Additional external control input signal (DI)	D-	Additional external control input 1 point (DI4)

POWER SUPPLY	90-	100 to 240V AC±10%, 50/60Hz
PROGRAM FUNCTION	N	None
	P	Max. 4 patterns Total number of steps: 32
EVENT OUTPUT	0	None
	1	Event output 2 points (EV1, EV2)
ANALOG OUTPUT	0	None
	3	0 to 10mV DC Output resistance: 10Ω
	4	4 to 20mA DC Resistive load: 300Ω max.
	6	0 to 10V DC Load current: 2mA max.
CT INPUT/**Note: CT sold separately**	0	None
	1	CT input 2 points — Note: Available only when control output 1 or 2 is Y or P.
EXTERNAL INPUT CONTROL SIGNAL (DI)	0	None
	2	Control input 3 points (DI1, DI2, DI3)
COMMUNICATION FUNCTION	0	None
	5	RS-485 (Shimaden standard protocol, MODBUS protocol)
REMARKS	0	Without
	9	With

OPTIONAL ACCESSORIES

Name	Code	Remarks
CT	QCC01	CT for 30A
CT	QCC02	CT for 50A
Shunt resistor	QCS002	250Ω External receiving impedance for current input
Terminal cover	QCR002	For SRS12A (3 pcs./set)
	QCR007	For SRS13A, SRS14A (2 pcs./set)

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Series SR90

DIGITAL CONTROLLER

BASIC FEATURES

- □ ***Multi-input and multi-range performance***
- □ ***Large 20mm bright display (SR93)***
- □ ***Readable from a distance and in a low light area***
- □ ***2-output heating and cooling control available***
- □ ***RS-232C or RS-485 Interface (MODBUS / Shimaden) available***
- □ ***Dust and splash proof front panel equivalent to IP66***
- □ ***A wide selection of additional functions (optional) is available to suit various needs.***

ORDERING INFORMATION: SR91

ITEM	CODE	SPECIFICATIONS				
SERIES	SR91-	MPU-Based Auto-Tuning PID Digital Controller, DIN H48 × W48 × D110mm				
INPUT	8	Multi input	Thermocouple:	B, R, S, K, E, J, T, N, PLII, C (WRe 5-26), U (DIN 43710), L (DIN 43710) , AuFe-Cr		
			RTD:	Pt100Ω /JPt100Ω		
			Voltage:	-10 to 10, 0 to 10, 0 to 20, 0 to 50, 10 to 50, 0 to 100mV DC Input resistance: Min. 500kΩ	For voltage and current input: Scaling Possible Range: -1999 to 9999 Span: 10 to 5000 Note: Inverse scaling is not possible	
	4	Current (mA):	0 to 20, 4 to 20mA DC Receiving impedance: 250Ω			
	6	Voltage (V):	-1 to 1, 0 to 1, 0 to 2, 0 to 5, 1 to 5, 0 to 10V DC Input resistance: Min. 500kΩ			
CONTROL OUTPUT (1)	Y-	Contact: 1a, Contact capacity: 240V AC 2.5A/resistive load Proportional cycle: 1 to 120 sec.				
	I-	Current: 4 to 20mA DC Load resistance: 600Ω max.				
	P-	SSR drive voltage: 12V±1.5V DC/30mA max. Proportional cycle: 1 to 120 sec.				
	V-	Voltage: 0 to 10V DC Load current: 2mA max.				
POWER SUPPLY	90-	100 to 240V AC±10%, 50/60Hz				
	08-	24V AC/DC±10%, 50/60Hz				
EVENT OUTPUT	0	None				
	1	Contact output (2a) Ev1, Ev2: 240V AC 1A/resistive load				
OPTION	N	None				
	Y	Control output (2)	Contact: 1a, Contact capacity: 240V AC 2.5A/resistive load Proportional cycle: 1 to 120 sec.			
	I		Current: 4 to 20mA DC Load resistance: 600Ω max.			
	P		SSR drive voltage: 12±1.5V DC/30mA max. Proportional cycle: 1 to 120 sec.			
	V		Voltage: 0 to 10V DC Load current: 2mA max.			
	1	Heater break alarm	Current setting range: 0.1 to 30.0A (with CT 30A)	Note: Avaialble only when control output (1) is Y or P and when event output is selected.		
	2		Current setting range: 0.1 to 50.0A (with CT 50A)			
	3	Analog output	Voltage: 0 to 10mV DC, Output resistance: 10Ω			
	4		Current: 4 to 20mA DC, Load resistance: 300Ω max.			
	6		Voltage: 0 to 10V DC, Load current: 2mA max.			
	5	Communication	RS-485 (Shimaden standard protocol / MODBUS (RTU / ASCII))			
	8	SV Bias / DI	DI (set value bias, STBY, or ACT) 1 point, Non-voltage contact or Open collector input Open collector input rating: approx. 5V/1mA max.			
REMARKS	0	Without				
	9	With (Please consult before ordering.)				

Note:
When you purchase a two-output type controller and use it in a one output capacity, larger overshooting or undershooting may happen as a result of integral operation. Therefore, we recommend you to choose a one-output type.
The cause of the above-mentioned problem is that the positional relationship between the proportional band (PB) and the set value (SV) of a one-output type controller differs from that of a two-output type.

ORDERING INFORMATION: SR92

ITEM	CODE	SPECIFICATIONS				
SERIES	SR92-	MPU-Based Auto-Tuning PID Digital Controller, DIN H72 × W72 × D110mm				
INPUT	8	Multi input	Thermocouple	B, R, S, K, E, J, T, N, PLII, C (WRe 5-26), U (DIN 43710), L (DIN 43710), AuFe-Cr		
			R.T.D.	Pt100/JPt100		
			Voltage (mV)	-10 to 10, 0 to 10, 0 to 20, 0 to 50, 10 to 50, 0 to 100mV DC Input resistance: 500 kΩ min.	For voltage and current input: Scaling Possible Range: -1999 to 9999 Span: 10 to 5000 Note: reverse scaling possible.	
	4	Current (mA)	0 to 20, 4 to 20mA DC Receiving impedance: 250Ω			
	6	Voltage (V)	-1 to 1, 0 to 1, 0 to 2, 0 to 5, 1 to 5,0 to 10V DC Input resistance: 500kΩ min.			

CONTROL OUTPUT (1)	Y-	Contact	1a, Contact capacity: 240V AC 2A/resistive load Proportional cycle: 1 to 120 sec.
	I-	Current	4 to 20mA DC Load resistance: 600Ω max.
	P-	SSR drive voltage	12V±1.5V DC/30mA max. Proportional cycle: 1 to 120 sec.
	V-	Voltage	0 to 10V DC Load current: 2mA max.

CONTROL OUTPUT (2)	N-	None	
	Y-	Contact	1a, Contact capacity: 240V AC 2A/resistive load Proportional cycle: 1 to 120 sec.
	I-	Current	4 to 20mA DC Load resistance: 600Ω max.
	P-	SSR drive voltage	12V±1.5V DC/30mA max. Proportional cycle: 1 to 120 sec.
	V-	Voltage	0 to 10V DC Load current: 2mA max.

POWER SUPPLY	90-	100V to 240V AC±10%, 50/60Hz	
EVENT OUTPUT/HEATER BREAK ALARM	0	None	
	1	Event output (2a) Ev1, Ev2 Contact capacity: 240V AC 1A/resistive load	
	2	Event output (Ev1) + Heater break alarm (with CT30A)	Note: Available only when control output (1) is Y or P is selected.
	3	Event output (Ev1) + Heater break alarm (with CT50A)	

ANALOG OUTPUT	0	None
	3	Voltage: 0 to 10mV DC, Output resistance: 10Ω
	4	Current: 4 to 20mA DC, Load resistance: 300Ω max.
	6	Voltage: 0 to 10V DC, Load current: 2mA max.

COMMUNICATION or DI (Set value bias)	Communication	0	None
		5	RS-485 (Up to 31 connected units are possible)
		7	RS-232C
	DI (Set value bias)	8	1 point (setting range: -1999 to 5000), Non-voltage contact or Open collector input Open collector input rating: approx. 5V/1mA max.

REMARKS	0	Without
	9	With (Please consult before ordering.)

Note:

When you purchase a two-output type controller and use it in a one output capacity, larger overshooting or undershooting may happen as a result of integral operation. Therefore, we recommend you to choose a one-output type.

The cause of the above-mentioned problem is that the positional relationship between the proportional band (PB) and the set value (SV) of a one-output type controller differs from that of a two-output type.

ORDERING INFORMATION: SR93, SR94

ITEM	CODE	SPECIFICATIONS				
SERIES	SR93-	MPU-Based Auto-Tuning PID Digital Controller, DIN H96 × W96 × D110mm				
	SR94-	MPU-Based Auto-Tuning PID Digital Controller, DIN H96 × W48 × D110mm				
INPUT	8	Multi input	Thermocouple	B, R, S, K, E, J, T, N, PLII, C (WRe 5-26), U (DIN 43710), L (DIN 43710), AuFe-Cr		
			R.T.D.	Pt100/JPt100		
			Voltage (mV)	-10 to 10, 0 to 10, 0 to 20, 0 to 50, 10 to 50, 0 to 100mV DC Input resistance: 500 kΩ min.	For voltage and current input: Scaling Possible Range: -1999 to 9999 Span: 10 to 5000 Note: reverse scaling possible.	
	4	Current (mA)	0 to 20, 4 to 20mA DC Receiving impedance: 250Ω			
	6	Voltage (V)	-1 to 1, 0 to 1, 0 to 2, 0 to 5, 1 to 5,0 to 10V DC Input resistance: 500kΩ min.			
CONTROL OUTPUT (1)	Y–	Contact	1a, Contact capacity: 240V AC 2A/resistive load Proportional cycle: 1 to 120 sec.			
	I–	Current	4 to 20mA DC Load resistance: 600Ω max.			
	P–	SSR drive voltage	12V±1.5V DC/30mA max. Proportional cycle: 1 to 120 sec.			
	V–	Voltage	0 to 10V DC Load current: 2mA max.			
CONTROL OUTPUT (2)	N–	None				
	Y–	Contact	1a, Contact capacity: 240V AC 2A/resistive load Proportional cycle: 1 to 120 sec.			
	I–	Current	4 to 20mA DC Load resistance: 600Ω max.			
	P–	SSR drive voltage	12V±1.5V DC/30mA max. Proportional cycle: 1 to 120 sec.			
	V–	Voltage	0 to 10V DC Load current: 2mA max.			
POWER SUPPLY	90–	100V to 240V AC±10%, 50/60Hz				
EVENT OUTPUT/HEATER BREAK ALARM	0	None				
	1	Event output (2a) Ev1, Ev2 Contact capacity: 240V AC 1A/resistive load				
	2	Event output (Ev1) + Heater break alarm (with CT30A)	Note: Available only when control output (1) is Y or P is selected.			
	3	Event output (Ev1) + Heater break alarm (with CT50A)				
OPTION	00	None				
	ANALOG OUTPUT	30	Voltage: 0 to 10mV DC, Output resistance: 10Ω			
		40	Current: 4 to 20mA DC, Load resistance: 300Ω max.			
		60	Voltage: 0 to 10V DC, Load current: 2mA max.			
	DI (Set value bias)	08	1 point (setting range: -1999 to 5000), Non-voltage contact or Open collector input Open collector input rating: approx. 5V/1mA max.			
	ANALOG OUTPUT + DI (Set value bias)	38	Voltage: 0 to 10mV DC, Output resistance: 10Ω SV bias 1 point			
		48	Current: 4 to 20mA DC, Load resistance: 300Ω max. SV bias 1 point			
		68	Voltage: 0 to 10V DC, Load current: 2mA max. SV bias 1 point			
	Communication	05	RS-485 (Up to 31 connected units are possible)			
		07	RS-232C			
REMARKS	0	Without				
	9	With (Please consult before ordering.)				

Note:

When you purchase a two-output type controller and use it in a one output capacity, larger overshooting or undershooting may happen as a result of integral operation. Therefore, we recommend you to choose a one-output type.

The cause of the above-mentioned problem is that the positional relationship between the proportional band (PB) and the set value (SV) of a one-output type controller differs from that of a two-output type.

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SHIMADEN

Series SR80

DIGITAL CONTROLLER

BASIC FEATURES

□ ***High accuracy: ± (0.25% FS + 1 digit)***

□ ***Only SR83 (96 x 96) Large 20 mm bright display***
Make reading from long distance and low light location easier.

□ ***2-output heating and cooling control available for SR83 (96 x 96) and SR84 (48 x 96)***

□ ***Auto tuning function for both heating and cooling outputs in a high performance individual expert PID control***

□ ***Communication interface RS-232C/RS-485 available***

□ ***Dust and splash proof front panel Equivalent to IP66***

□ ***A wide selection of additional functions (optional) is available to suit various needs.***

ORDERING INFORMATION: SR82

ITEM	CODE			SPECIFICATIONS	
SERIES	SR82-	MPU-Based Auto-Tuning PID Digital Controller DIN H72 × W72 mm			
INPUT		1	Thermocouple	User-selectable inputs and ranges Input impedance : 500kΩ minimum Allowable external resistance range: 100Ω maximum	
		2	RTD	User-selectable ranges Amperage: About 0.25 mA Allowable range of lead wire resistance: 5Ω maximum / wire	
		3	DC Voltage	User-selectable 0 to 10, 10 to 50, -10 to 10, 0 to 20, 0 to 50, 0 to 100mV DC linear inputs Input resistance: Min. 500kΩ	
		4	DC Current	User-selectable 4 to 20, 0 to 20mA DC linear inputs Receiving impedance: 250Ω	
		6	DC Voltage	User-selectable 0 to 1, 1 to 5, -1 to 1, 0 to 2, 0 to 5, 0 to 10V DC linear inputs Input resistance: Min. 500kΩ	
CONTROL OUTPUT 1		Y-	Contact	PB Cycle: 1 to 120 seconds, Contact Capacity: 240V AC 2.5A / resistive load, 1A / inductive load	
		I-	Current	4 to 20mA DC Load resistance: 600Ω Max.	
		P-	SSR Voltage	PB Cycle 1 to 120 seconds, Output rating: 12V±1.5V DC 30mA Max.	
		V-	Voltage	0 to 10V DC Maximum load current: 2mA Max.	
CONTROL OUTPUT 2		N-	None		
POWER SUPPLY		90-	100 to 240V AC±10%, 50/60Hz		
EVENT OUTPUT (2 points)		0	None		
		1	Contact output, Contact capacity: 240V AC 1A / resistive load		
		2	Contact output + Heater break alarm (with 30A CT)		Selectable only for Y or P Control output
		3	Contact output + Heater break alarm (with 50A CT)		
REMOTE INPUT (Not selectable together with Heater break alarm function)		00	None		
		14	Current 4 to 20mA DC Receiving resistance: 250Ω		Non-Isolated input
		15	Voltage 1 to 5V DC Input resistance: 500kΩ Min.		
		16	Voltage 0 to 10V DC Input resistance: 500kΩ Min.		
ANALOG OUTPUT (Not selectable together with Interface function)		0	None		
		3	Voltage 0 to 10mV DC, Output resistance: 10Ω		
		4	Current 4 to 20mA DC, Load resistance: 300Ω Max.		
		6	Voltage 0 to 10V DC, Load current: 2mA Max.		
INTERFACE FUNCTION (Not selectable together with Analog output function)		0	None		
		5	RS-485		
		7	RS-232C		
EXTERNAL INPUT CONTROL SIGNAL / SET VALUE BIAS		0	None		
		1	Control input 2 points, Non-voltage contact, Open collector input (about 5V / 2mA impress)		
REMARKS		0	Without		
		9	With (Please consult before ordering.)		

ORDERING INFORMATION: SR83

ITEM	CODE	SPECIFICATIONS		
SERIES	SR83-	MPU-Based Auto-Tuning PID Digital Controller DIN H96 × W96 mm		
INPUT	1	Thermocouple	User-selectable inputs and ranges Input impedance: 500kΩ minimum Allowable external resistance range: 100Ω maximum	
	2	RTD	User-selectable ranges Amperage: About 0.25 mA Allowable range of lead wire resistance: 5Ω maximum / wire	
	3	DC Voltage	User-selectable 0 to 10, 10 to 50, -10 to 10, 0 to 20, 0 to 50, 0 to 100mV DC linear inputs Input resistance: Min. 500kΩ	
	4	DC Current	User-selectable 4 to 20, 0 to 20mA DC linear inputs Receiving impedance: 250Ω	
	6	DC Voltage	User-selectable 0 to 1, 1 to 5, -1 to 1, 0 to 2, 0 to 5, 0 to 10V DC linear inputs Input resistance: Min. 500kΩ	
CONTROL OUTPUT 1	Y-	Contact	PB Cycle: 1 to 120 seconds, Contact Capacity: 240V AC 2.5A / resistive load, 1A / inductive load	
	I-	Current	4 to 20mA DC Load resistance: 600Ω Max.	
	P-	SSR Voltage	PB Cycle: 1 to 120 seconds, Output rating: 12V±1.5V DC 30mA Max.	
	V-	Voltage	0 to 10V DC Maximum load current: 2mA Max.	
CONTROL OUTPUT 2	N-	None		
	Y-	Contact	PB Cycle: 1 to 120 seconds, Contact Capacity: 240V AC 2.5A / resistive load, 1A / inductive load	
	I-	Current	4 to 20mA DC Load resistance: 600Ω Max.	
	P-	SSR Voltage	PB Cycle: 1 to 120 seconds, Output rating: 12V±1.5V DC 30mA Max.	
	V-	Voltage	0 to 10V DC Maximum load current: 2mA Max.	
POWER SUPPLY	90-	100 to 240V AC±10%, 50/60Hz		
EVENT OUTPUT (3 points) (2 points when 2 output option is added)	0	None		
	1	Contact output, Contact capacity: 240V AC 1A / resistive load		
	2	Contact output + Heater break alarm (with 30A CT)		Selectable only for Y or P Control output
	3	Contact output + Heater break alarm (with 50A CT)		
REMOTE INPUT (Not selectable together with Heater break alarm function)	00	None		
	14	Current 4 to 20mA DC Receiving resistance: 250Ω		Non-Isolated input
	15	Voltage 1 to 5V DC Input resistance: 500kΩ Min.		
	16	Voltage 0 to 10V DC Input resistance: 500kΩ Min.		
ANALOG OUTPUT	0	None		
	3	Voltage 0 to 10mV DC, Output resistance: 10Ω		
	4	Current 4 to 20mA DC, Load resistance: 300Ω Max.		
	6	Voltage 0 to 10V DC, Load current: 2mA Max.		
INTERFACE FUNCTION	0	None		
	5	RS-485		
	7	RS-232C		
EXTERNAL INPUT CONTROL SIGNAL / SET VALUE BIAS	0	None		
	1	Control input 2 points, Non-voltage contact, Open collector input (about 5V / 2mA impress)		
REMARKS	0	Without		
	9	With (Please consult before ordering.)		

Note: Selection together with ANALOG OUTPUT and INTERFACE FUNCTION (RS485 or RS232C) is possible.

ORDERING INFORMATION: SR84

ITEM	CODE	SPECIFICATIONS			
SERIES	SR84-	MPU-Based Auto-Tuning PID Digital Controller DIN H96 × W48 mm			
INPUT	1	Thermocouple	User-selectable inputs and ranges Input impedance: 500kΩ minimum Allowable external resistance range: 100Ω maximum		
	2	RTD	User-selectable ranges Amperage: About 0.25 mA Allowable range of lead wire resistance: 5Ω maximum / wire		
	3	DC Voltage	User-selectable 0 to 10, 10 to 50, -10 to 10, 0 to 20, 0 to 50, 0 to 100mV DC linear inputs Input resistance: Min. 500kΩ		
	4	DC Current	User-selectable 4 to 20, 0 to 20mA DC linear inputs Receiving impedance: 250Ω		
	6	DC Voltage	User-selectable 0 to 1, 1 to 5, -1 to 1, 0 to 2, 0 to 5, 0 to 10V DC linear inputs Input resistance: Min. 500kΩ		
CONTROL OUTPUT 1	Y-	Contact	PB Cycle: 1 to 120 seconds, Contact Capacity: 240V AC 2.5A / resistive load, 1A / inductive load		
	I-	Current	4 to 20mA DC Load resistance: 600Ω Max.		
	P-	SSR Voltage	PB Cycle: 1 to 120 seconds, Output rating: 12V±1.5V DC 30mA Max.		
	V-	Voltage	0 to 10V DC Maximum load current: 2mA Max.		
CONTROL OUTPUT 2	N-	None			
	Y-	Contact	PB Cycle: 1 to 120 seconds, Contact Capacity: 240V AC 2.5A / resistive load, 1A / inductive load		
	I-	Current	4 to 20mA DC Load resistance: 600Ω Max.		
	P-	SSR Voltage	PB Cycle: 1 to 120 seconds, Output rating: 12V±1.5V DC 30mA Max.		
	V-	Voltage	0 to 10V DC Maximum load current: 2mA Max.		
POWER SUPPLY	90-	100 to 240V AC±10%, 50/60Hz			
EVENT OUTPUT (3 points) (2 points when 2 output option is added)	0	None			
	1	Contact output, Contact capacity: 240V AC 1A / resistive load			
	2	Contact output + Heater break alarm (with 30A CT)			Selectable only for Y or P Control output
	3	Contact output + Heater break alarm (with 50A CT)			
REMOTE INPUT (Not selectable together with Heater break alarm function)	00	None			
	14	Current 4 to 20mA DC	Receiving resistance: 250Ω		Non-Isolated input
	15	Voltage 1 to 5V DC	Input resistance: 500kΩ Min.		
	16	Voltage 0 to 10V DC	Input resistance: 500kΩ Min.		
ANALOG OUTPUT (Not selectable together with Interface function)	0	None			
	3	Voltage 0 to 10mV DC, Output resistance: 10Ω			
	4	Current 4 to 20mA DC, Load resistance: 300Ω Max.			
	6	Voltage 0 to 10V DC, Load current: 2mA Max.			
INTERFACE FUNCTION (Not selectable together with Analog output function)	0	None			
	5	RS-485			
	7	RS-232C			
EXTERNAL INPUT CONTROL SIGNAL / SET VALUE BIAS	0	None			
	1	Control input 2 points, Non-voltage contact, Open collector input (about 5V / 2mA impress)			
REMARKS	0	Without			
	9	With (Please consult before ordering.)			

°C
%RH
SHIMADEN

Series **SR23A**

DIGITAL CONTROLLER

CE approved

BASIC FEATURES

- □ *2-channel controller (Basic type: 1-channel controller)*
- □ *Independent 2-loop / Internal Cascade / 2-input operation control*
- □ *High accuracy ± (0.1% FS + 1 digit)*
- □ *High Sampling Cycle 0.1 sec.*
- □ *High resolution 1/ 1000ºC display achieved*
  **Only for RTD input (scale: 0.000 to 30.000ºC)*
- □ *Auto-Tuning PID / Expert PID / Self-Tuning PID*
- □ *Multi-Setting of 10 Set Values*
- □ *Independent Universal-Input*
- □ *User Friendly Operation (Menu Driven: 4 Lines LCD Display)*
- □ *Easy Setting & Maintenance via Infrared COM port on the front panel*
- □ *Interface RS-232C/RS-485 (MODBUS / Shimaden)*
- □ *The front dust/splash-proof IP66*
- □ *Universal Power Supply (100 to 240V AC ±10%)*
- □ *Sensor power supply*

1-input Specification

- **1-output control**
- **2-output control (Heat & Cool/Heat & Heat/Cool & Cool)**

ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS
SERIES	SR23A-	96 x 96 DIN size, high-performance digital controller EV 1 to 3 (3 points), DI 1 to 4 (4 points), DO 1 to 5 (5points)
BASIC FUNCTIONS	SS	Multi input, 1-input/1-output control
	SD	Multi input, 1-input/2-output control
CONTROL OUTPUT 1	Y	Contact 1c, contact rating: 240V AC 2.5A/resistive load, 1A/inductive load
	I	Current 4 to 20mA DC, Load resistance: max. 600Ω
	P	SSR drive voltage output 12V±1.5V DC, Load current: max. 30mA
	V	Voltage 0 to 10V DC, Load current: max. 2mA
CONTROL OUTPUT 2 (Select N- for basic function SS.)	N-	None
	Y-	Contact 1c, contact rating: 240V AC 2.5A/resistive load, 1A/inductive load
	I-	Current 4 to 20mA DC, Load resistance: max. 600Ω
	P-	SSR drive voltage output 12V±1.5V DC, Load current: max. 30mA
	V-	Voltage 0 to 10V DC, Load current: max. 2mA
REMOTE SETTING INPUT/HEATER BREAK ALARM (FOR SINGLE-PHASE) *1	04	REMOTE SETTING INPUT 4 to 20mA DC Input resistance: 250Ω — Non-insulated input
	05	REMOTE SETTING INPUT 1 to 5V DC Input resistance: approx. 600kΩ — Non-insulated input
	06	REMOTE SETTING INPUT 0 to 10V DC Input resistance: approx. 570kΩ — Non-insulated input
	14	REMOTE SETTING INPUT 4 to 20mA DC Input resistance: 250Ω — Insulated input
	15	REMOTE SETTING INPUT 1 to 5V DC Input resistance: approx. 600kΩ — Insulated input
	16	REMOTE SETTING INPUT 0 to 10V DC Input resistance: approx. 570kΩ — Insulated input
	31	Heater break alarm* (heater current 30A with CT) — Selectable only when Control Output 1 or 2 is Y or P
	32	Heater break alarm* (heater current 50A with CT) — Selectable only when Control Output 1 or 2 is Y or P
ANALOG OUTPUT 1	0	None
	3	0 to 10mV DC, Output resistance: 10Ω
	4	4 to 20mA DC, Load resistance: max. 300Ω
	6	0 to 10V DC, Load current: max. 2mA
ANALOG OUTPUT 2 or SENSOR POWER SUPPLY	0	None
	3	ANALOG OUTPUT 2 0 to 10mV DC, Output resistance: 10Ω
	4	ANALOG OUTPUT 2 4 to 20mA DC, Load resistance: max. 300Ω
	6	ANALOG OUTPUT 2 0 to 10V DC, Load current: max. 2mA
	8	Sensor power supply 24V DC 25mA
ADDITIONAL EXTERNAL OUTPUT CONTROL SIGNAL (DI/DO) *2	0	None
	1	DI 5 to 10 (6 points), DO 6 to 9 (4 points)
	2	DI 5 to 10 (6 points), DO 6 to 13 (8 points)
COMMUNICATION FUNCTION	0	None
	5	RS-485 — Shimaden standard protocol / MODBUS (RTU/ASCII) communication protocol
	7	RS-232C — Shimaden standard protocol / MODBUS (RTU/ASCII) communication protocol
REMARKS	0	Without
	9	With

*1 When switching the SV No. by DI, 10 points of DI (CODE 1 or 2) are required.

*2 10 DI points (code 1 or 2) are required for switching the SV No. by DI.

For the shunt resistors (optional accessories), please refer to the page 19.

2-input Specification

- **2-input/2-output control (independent 2-loop control)**
- **Internal cascade control *Output for control is output to Control Output 2.**
- **2-input operation/1-output control (1-loop control by max. value, min. value, average value, deviation value operation)**
- **2-input operation/2-output control (1-loop heat & cool/heat & heat/cool & cool control by max. value, min. value, average value, deviation value operation)**

ORDERING INFORMATION

ITEM	CORD	SPECIFICATIONS
SERIES	SR23A-	96 x 96 DIN size, high-performance digital controller EV 1 to 3 (3 points), DI 1 to 4 (4 points), DO 1 to 5 (5points)
BASIC FUNCTIONS *2, *3	DL	Multi input, independent 2-loop control
	DC	Multi input, internal cascade control
	DS	Multi input, 2-input operation/1-output control
	DD	Multi input, 2-input operation/2-output control
CONTROL OUTPUT 1 *1	Y	Contact 1c, contact rating: 240V AC 2.5A/resistive load, 1A/inductive load
	I	Current 4 to 20mA DC, Load resistance: max. 600Ω
	P	SSR drive voltage output 12V±1.5V DC, Load current: max. 30mA
	V	Voltage 0 to 10V DC, Load current: max. 2mA
CONTROL OUTPUT 2	Y-	Contact 1c, contact rating: 240V AC 2.5A/resistive load, 1A/inductive load
	I-	Current 4 to 20mA DC, Load resistance: max. 600Ω
	P-	SSR drive voltage output 12V±1.5V DC, Load current: max. 30mA
	V-	Voltage 0 to 10V DC, Load current: max. 2mA
REMOTE SETTING INPUT/ HEATER BREAK ALARM (FOR SINGLE-PHASE) *4	04	REMOTE SETTING INPUT 4 to 20mA DC Input resistance: 250Ω — Non-insulated input
	05	REMOTE SETTING INPUT 1 to 5V DC Input resistance: approx. 600kΩ — Non-insulated input
	06	REMOTE SETTING INPUT 0 to 10V DC Input resistance: approx. 570kΩ — Non-insulated input
	14	REMOTE SETTING INPUT 4 to 20mA DC Input resistance: 250Ω — Insulated input
	15	REMOTE SETTING INPUT 1 to 5V DC Input resistance:approx. 600kΩ — Insulated input
	16	REMOTE SETTING INPUT 0 to 10V DC Input resistance:approx. 570kΩ — Insulated input
	31	Heater break alarm (heater current 30A with CT) — Selectable only when Control Output 1 or 2 is Y or P
	32	Heater break alarm (heater current 50A with CT) — Selectable only when Control Output 1 or 2 is Y or P
ANALOG OUTPUT 1	0	None
	3	0 to 10mV DC, Output resistance: 10Ω
	4	4 to 20mA DC, Load resistance: max. 300Ω
	6	0 to 10V DC, Load current: max. 2mA
ANALOG OUTPUT 2/ SENSOR POWER SUPPLY	0	None
	3	ANALOG OUTPUT 2 0 to 10mV DC, Output resistance: 10Ω
	4	ANALOG OUTPUT 2 4 to 20mA DC, Load resistance: max. 300Ω
	6	ANALOG OUTPUT 2 0 to 10V DC, Load current: max. 2mA
	8	Sensor power supply24V DC 25mA
ADDITIONAL EXTERNAL OUTPUT CONTROL SIGNAL (DI/DO) *5	0	None
	1	DI 5 to 10 (6 points), DO 6 to 9 (4 points)
COMMUNICATION FUNCTION	0	None
	5	RS-485 — Shimaden standard protocol/ MODBUS (RTU/ASCII) communication protocol
	7	RS-232C — Shimaden standard protocol/ MODBUS (RTU/ASCII) communication protocol
REMARKS	0	Without
	9	With

*1 Independent 2-loop control, internal cascade control, 2-input operation/1-output control and 2-input operation/2-output control are all supported in the 2-input specification. This controller is shipped with the function selected at BASIC FUNCTION set.

*2 In an internal cascade control specification, slave output for control is output to Control Output 2. Select the same specification as Control Output 2 for Control Output 1.

*3 In a 2-input operation/1-output control specification, the output for control is output to Control Output 1. Select the same specification as Control Output 1 for Control Output 2.

*4 In a 2-output specification, the heater break alarm is used by either of Control Output 1 or 2.

For the shunt resistors (optional accessories), please refer to the page 19.

Servo output Specification

- **Control motor position proportional control**

ORDERING INFORMATION

ITEM	CORD	SPECIFICATIONS
SERIES	SR23A-	96 x 96 DIN size, high-performance digital controller EV 1 to 3 (3 points), DI 1 to 4 (4 points), DO 1 to 5 (5points)
BASIC FUNCTIONS	MS	Multi input, 1-input Servo output
CONTROL OUTPUT 1 *1	Y	Contact, rating: 240V AC 2A, CR absorber built-in
	R	Contact, rating: 240V AC 2A
CONTROL OUTPUT 2	N-	None
REMOTE SETTING INPUT	04	4 to 20mA DC Input resistance: 250Ω (Non-insulated input)
	05	1 to 5V DC Input resistance: approx. 600kΩ (Non-insulated input)
	06	0 to 10V DC Input resistance: approx. 570kΩ (Non-insulated input)
	14	4 to 20mA DC Input resistance: 250Ω (Insulated input)
	15	1 to 5V DC Input resistance: approx. 600kΩ (Insulated input)
	16	0 to 10V DC Input resistance: approx. 570kΩ (Insulated input)
ANALOG OUTPUT 1	0	None
	3	0 to 10mV DC Output resistance: 10Ω
	4	4 to 20mA DC Load resistance : max.300Ω
	6	0 to 10V DC Load current : max. 2mA
ANALOG OUTPUT 2/SENSOR POWER SUPPLY	0	None
	3	ANALOG OUTPUT 2 0 to 10mV DC Output resistance: 10Ω
	4	ANALOG OUTPUT 2 4 to 20mA DC Load resistance : max.300Ω
	6	ANALOG OUTPUT 2 0 to 10V DC Load current : max.2 mA .
	8	Sensor power supply 24 V DC 25mA
ADDITIONAL EXTERNAL OUTPUT CONTROL SIGNAL (DI/DO) *2	0	None
	1	DI 5 to 10 (6 points), DO 6 to 9 (4 points)
COMMUNICATION FUNCTION	0	None
	5	RS-485 (Shimaden standard protocol/ MODBUS (RTU/ASCII) communication protocol)
	7	RS-232C (Shimaden standard protocol/ MODBUS (RTU/ASCII) communication protocol)
REMARKS	0	Without
	9	With

*1 Y: This must be selected when directly controlling the motor.
R: This must be selected when controlling the motor through auxiliary relay, PLC or the like.
*2 When switching the SV No. by DI, 10 points of DI (CODE 1) are required.

OPTIONAL ACCESSORIES

Name	Model	Description
Shunt Resistor	QCS002	250Ω, external input resistance at current input 

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SHIMADEN

Series **SRP30**

HYBRID CONTROLLER

SRP33

SRP34

CE approved

BASIC FEATURES

- □ *Works as both a high-performance controller and a high-performance program controller*
- □ *Adopts a large LCD for SRP33 (display area: 77 (W) × 57 mm (H))*
- □ *Improved visibility and expressibility with a large 5-digit and 11-segment display*
- □ *Exclusive setup software enables an initial setting on the PC and the set data can be easily transferred to the instrument using the front panel USB port (communication is possible without the controller power source).*
- □ *Achieves high precision of 0.1%FS and high resolution of 0.0001*
- □ *The fastest sampling cycle is 50 ms (selectable from 50, 100, 200, and 500 ms).*
- □ *Multi SV value setting: SV value can be set up to 9 points.*
- □ *Multi PID: PID No. 1 to 9 (9 types)*
- □ *Program function: up to 9 patterns and 180 steps*
- □ *Dust and splash proof front panel equivalent to IP55*

ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS		
SERIES	SRP33-	96 x 96 DIN size Hybrid controller	TC, RTD, mV, V, mA Full multi input (mA is input by externally attached resistor) DI2 points, EV3 points, USB Communication standard equipment	
	SRP34-	48 x 96 DIN size Hybrid controller		
CONTROL OUTPUT 1	Y	Contact: 1a contact capacity 240 V AC 2.5 A/resistive load, 1 A/inductive load		
	I	Current: 4 to 20 mA DC, Load resistance: 600Ω or below		
	P	SSR drive voltage: 12 V ± 1.5 V DC, Load current: 20 mA or below		
	V	Voltage: 0 to 10 V DC, Load current: 2 mA or below		
CONTROL OUTPUT 2 (OPTION)	N-	Without		
	Y-	Contact: 1a contact capacity 240 V AC 2.5 A/resistive load, 1 A/inductive load		
	I-	Current: 4 to 20 mA DC, Load resistance: 600Ω or below		
	P-	SSR drive voltage: 12 V ± 1.5 V DC, Load current: 20 mA or below		
	V-	Voltage: 0 to 10 V DC, Load current: 2 mA or below		
	E-	EV4 Contact, 1a contact capacity, 240 V AC 2.5 A/resistive load, 1 A/inductive load		
EXTERNAL CONTROL INPUT (DI)	0	Without		
	1	5 points (DI3 to 7) *3		
ANALOG OUTPUT (AO)	0	Without		
	3	Voltage: 0 to 10 mV DC, Output resistance: 10Ω		
	4	Current: 4 to 20 mA DC, Load resistance: 300Ω or below		
	6	Voltage: 0 to 10 V DC, Load current: 2 mA or below		
EXTERNAL CONTROL OUTPUT (DO)	0	Without		
	1	3 points (DO1 to 3) Darlington open collector output: 24 V DC 50 mA		
ADDITIONAL DO/CT/REM	0	Without		
	1	Additional DO3 points (DO4 to 6) Darlington open collector output: 24 V DC 50 mA *1		
	2	CT input 2 points, amperage display 0.0 to 55.0 A *2		
	4	Remote setting input 4 to 20 mA DC/receiving impedance 250Ω (Uninsulated)		
	5	Remote setting input 1 to 5 V DC/input resistance approximately 500kΩ (Uninsulated)		
	6	Remote setting input 0 to 10 V DC/input resistance approximately 500kΩ (Uninsulated)		
CCMMUNICATION	0	Without		
	5	RS-485	Shimaden standard protocol/MODBUS communication protocol	
	7	RS-232C		
REMARKS	0	Without		
	9	With		

*1 Selectable only when adding DO1 to 3
*2 Selectable only when control output 1 or 2 is Y or P
*3 Necessary when selecting SV and patterns by DI

ITEMS SOLD SEPARATELY

Name of Item	Model	Description
Shunt Resistor	QCS002	250Ω External receiving impedance during current input 
CT	QCC01	CT for 30 A
CT	QCC02	CT for 50 A

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SHIMADEN

Series FP23A

PROGRAMMABLE CONTROLLER

CE approved

BASIC FEATURES

- □ *2-channel controller (Basic type: 1-channel controller)*
- □ *Independent 2-loop / 2-input operation control*
- □ *High accuracy ± (0.1% FS + 1 digit)*
- □ *High Sampling Cycle 0.1 sec.*
- □ *High resolution 1/ 1000 ºC display achieved*
  **Only for RTD input (scale: 0.000 to 30.000 ºC)*
- □ *Programmable Max. 400 steps (400 steps x 1 pattern to 20 steps x 20 patterns)*
- □ *Auto-Tuning PID / Expert PID*
- □ *Max. 10 Zone PID control available*
- □ *Independent Universal-Input*
- □ *User Friendly Operation (Menu Driven: 4 Lines LCD Display)*
- □ *Easy Setting & Maintenance via Infrared COM port on the front panel*
- □ *Interface RS-232C/RS-485 (MODBUS / Shimaden)*
- □ *The front dust/splash-proof IP66*
- □ *Universal Power Supply (100 to 240V AC ±10%)*
- □ *Sensor power supply*

1-input Specification

- **1-output control**
- **2-output control (Heat & Cool/Heat & Heat/Cool & Cool)**

ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS		
SERIES	FP23A-	96 x 96 DIN size, high-performance digital controller EV 1 to 3 (3 points), DI 1 to 4 (4 points), DO 1 to 5 (5points)		
BASIC FUNCTIONS	SS	Multi input, 1-input/1-output control		
	SD	Multi input, 1-input/2-output control		
CONTROL OUTPUT 1	Y	Contact 1c, contact rating: 240V AC 2.5A/resistive load, 1A/inductive load		
	I	Current 4 to 20mA DC, Load resistance: max. 600Ω		
	P	SSR drive voltage output 12V±1.5V DC, Load current: max. 30mA		
	V	Voltage 0 to 10V DC, Load current: max. 2mA		
CONTROL OUTPUT 2 (Select N- for basic function SS.)	N-	None		
	Y-	Contact 1c, contact rating: 240V AC 2.5A/resistive load, 1A/inductive load		
	I-	Current 4 to 20mA DC, Load resistance: max. 600Ω		
	P-	SSR drive voltage output 12V±1.5V DC, Load current: max. 30mA		
	V-	Voltage 0 to 10V DC, Load current: max. 2mA		
HEATER BREAK ALARM (FOR SINGLE-PHASE) *1	00	None		
	31	Heater break alarm* (heater current 30A with CT)	Selectable only when Control Output 1 or 2 is Y or P	
	32	Heater break alarm* (heater current 50A with CT)	Selectable only when Control Output 1 or 2 is Y or P	
ANALOG OUTPUT 1	0	None		
	3	0 to 10mV DC, Output resistance: 10Ω		
	4	4 to 20mA DC, Load resistance: max. 300Ω		
	6	0 to 10V DC, Load current: max. 2mA		
ANALOG OUTPUT 2 or SENSOR POWER SUPPLY	0	None		
	3	0 to 10mV DC, Output resistance: 10Ω		
	4	4 to 20mA DC, Load resistance: max. 300Ω		
	6	0 to 10V DC, Load current: max. 2mA		
	8	Sensor power supply 24V DC 25mA		
ADDITIONAL EXTERNAL OUTPUT CONTROL SIGNAL (DI/DO) *2	0	None		
	1	DI 5 to 10 (6 points), DO 6 to 9 (4 points)		
	2	DI 5 to 10 (6 points), DO 6 to 13 (8 points)		
COMMUNICATION FUNCTION	0	None		
	5	RS-485	Shimaden standard protocol / MODBUS (RTU/ASCII) communication protocol	
	7	RS-232C	Shimaden standard protocol / MODBUS (RTU/ASCII) communication protocol	
REMARKS	0	Without		
	9	With		

*1 When switching the SV No. by DI, 10 points of DI (CODE 1 or 2) are required.

*2 Ten DI points (code 1 or 2) are required for switching the SV No. by DI.

For the shunt resistors (optional accessories), please refer to the page 25.

2-input Specification

- **2-input/2-output control (independent 2-loop control)**
- **Internal cascade control *Output for control is output to Control Output 2.**
- **2-input operation/1-output control (1-loop control by max. value, min. value, average value, deviation value operation)**
- **2-input operation/2-output control (1-loop heat & cool/heat & heat/cool & cool control by max. value, min. value, average value, deviation value operation)**

ORDERING INFORMATION

ITEM	CORD	SPECIFICATIONS
SERIES	FP23A-	96 x 96 DIN size, high-performance digital controller EV 1 to 3 (3 points), DI 1 to 4 (4 points), DO 1 to 5 (5points)
BASIC FUNCTIONS *2, *3	DL	Multi input, independent 2-loop control
	DS	Multi input, 2-input operation/1-output control *2
	DD	Multi input, 2-input operation/2-output control
CONTROL OUTPUT 1 *1	Y	Contact 1c, contact rating: 240V AC 2.5A/resistive load, 1A/inductive load
	I	Current 4 to 20mA DC, Load resistance: max. 600Ω
	P	SSR drive voltage output 12V±1.5V DC, Load current: max. 30mA
	V	Voltage 0 to 10V DC, Load current: max. 2mA
CONTROL OUTPUT 2	Y-	Contact 1c, contact rating: 240V AC 2.5A/resistive load, 1A/inductive load
	I-	Current 4 to 20mA DC, Load resistance: max. 600Ω
	P-	SSR drive voltage output 12V±1.5V DC, Load current: max. 30mA
	V-	Voltage 0 to 10V DC, Load current: max. 2mA
HEATER BREAK ALARM (FOR SINGLE-PHASE) *4	00	None
	31	Heater break alarm (heater current 30A with CT) — Selectable only when Control Output 1 or 2 is Y or P
	32	Heater break alarm (heater current 50A with CT) — Selectable only when Control Output 1 or 2 is Y or P
ANALOG OUTPUT 1	0	None
	3	0 to 10mV DC, Output resistance: 10Ω
	4	4 to 20mA DC, Load resistance: max. 300Ω
	6	0 to 10V DC, Load current: max. 2mA
ANALOG OUTPUT 2/ SENSOR POWER SUPPLY	0	None
	3	0 to 10mV DC, Output resistance: 10Ω
	4	4 to 20mA DC, Load resistance: max. 300Ω
	6	0 to 10V DC, Load current: max. 2mA
	8	Sensor power supply 24V DC 25mA
ADDITIONAL EXTERNAL OUTPUT CONTROL SIGNAL (DI/DO) *5	0	None
	1	DI 5 to 10 (6 points), DO 6 to 9 (4 points)
COMMUNICATION FUNCTION	0	None
	5	RS-485 — Shimaden standard protocol/ MODBUS (RTU/ASCII) communication protocol
	7	RS-232C — Shimaden standard protocol/ MODBUS (RTU/ASCII) communication protocol
REMARKS	0	Without
	9	With

*1 Independent 2-loop control, internal cascade control, 2-input operation/1-output control and 2-input operation/2-output control are all supported in the 2-input specification. This controller is shipped with the function selected at BASIC FUNCTION set.

*2 In an internal cascade control specification, slave output for control is output to Control Output 2. Select the same specification as Control Output 2 for Control Output 1.

*3 In a 2-input operation/1-output control specification, the output for control is output to Control Output 1. Select the same specification as Control Output 1 for Control Output 2.

*4 In a 2-output specification, the heater break alarm is used by either of Control Output 1 or 2.

*5 When switching the SV No. by DI, 10 points of DI (CODE 1) are required.

For the shunt resistors (optional accessories), please refer to the page 25.

Servo output Specification

- **Control motor position proportional control**

ORDERING INFORMATION

ITEM	CORD	SPECIFICATIONS
SERIES	FP23A-	96 x 96 DIN size, high-performance digital controller EV 1 to 3 (3 points), DI 1 to 4 (4 points), DO 1 to 5 (5points)
BASIC FUNCTIONS	MS	Multi input, 1-input Servo output
CONTROL OUTPUT 1 *1	Y	Contact, rating: 240V AC 2A, CR absorber built-in
	R	Contact, rating: 240V AC 2A
CONTROL OUTPUT 2	N-	None
HEATER BREAK ALARM (FOR SINGLE-PHASE)	00	None
ANALOG OUTPUT 1	0	None
	3	0 to 10mV DC Output resistance: 10Ω
	4	4 to 20mA DC Load resistance : max.300Ω
	6	0 to 10V DC Load current : max. 2mA
ANALOG OUTPUT 2/SENSOR POWER SUPPLY	0	None
	3	0 to 10mV DC Output resistance: 10Ω
	4	4 to 20mA DC Load resistance : max.300Ω
	6	0 to 10V DC Load current : max.2 mA .
	8	Sensor power supply 24 V DC 25mA
ADDITIONAL EXTERNAL OUTPUT CONTROL SIGNAL (DI/DO) *2	0	None
	1	DI 5 to 10 (6 points), DO 6 to 9 (4 points)
COMMUNICATION FUNCTION	0	None
	5	RS-485 Shimaden standard protocol/ MODBUS (RTU/ASCII) communication protocol
	7	RS-232C
REMARKS	0	Without
	9	With

*1 Y : This must be selected when directly controlling the motor.
R : This must be selected when controlling the motor through auxiliary relay, PLC or the like.
*2 When switching the SV No. by DI, 10 points of DI (CODE 1) are required.

OPTIONAL ACCESSORIES

Name	Model	Description
Shunt Resistor	QCS002	250Ω, external input resistance at current input 

°C
%RH
SHIMADEN

Series FP93

PROGRAM CONTROLLER

CE approved

BASIC FEATURES

□ ***Full multi-input and multi-range performance***
User selectable Thermocouple, RTD, V, mV and Current inputs
A 250Ω resistor is required across the input terminal for 4 to 20mA DC.

□ ***Large 20mm bright display***

□ ***Readable from a distance and in a low light area***

□ ***64-step programs function***

□ ***RS-232C or RS-485 Interface available***

□ ***Dust and splash proof front panel equivalent to IP66***

ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS				
SERIES	FP93-	96 x 96 DIN size Program controller (External control input 4 points, event output 3 points - standard)				
INPUT	8	Multi	Thermocouple	B, R, S, K, E, J, T, N, PLII, C (WRe 5-26), U (DIN 43710), L (DIN 43710)		
			RTD	Pt100, JPt100		
			Voltage	mV: -10–10, 0–10, 0–20, 0–50, 10–50, 0–100mV DC	Scaling possible Range: -1999–9999 Span: 10–5000	
				V: -1 to 1, 0 to 1, 0 to 2, 0 to 5, 1 to 5, 0 to 10V DC		
	4	Current	4–20, 0–20mA DC (equipped with external 250 shunt resistor)			
CONTROL OUTPUT	Y-	Contact 1c Contact capacity: 240AC 2.5A/resistive load Proportional cycle: 1–120 seconds				
	I-	Current 4–20mA DC Load Resistance: 600 max.				
	P-	SSR drive voltage 12V ±1.5V DC 30mA max. Proportional cycle:1–120 seconds				
	V-	Voltage 0–10V DC Load current: 2mA max.				
POWER SUPPLY	90-	100–240V AC ±10% 50/60Hz				
STATUS OUTPUT (DO)	0	None				
	1	Open collector darlington output Rating: 24 V DC max. 20mA				
ANALOG OUTPUT	0	None				
	3	Voltage: 0–10mV DC Output resistance: 10				
	4	Current: 4–20mA DC Load resistance: 300 max.				
	6	Voltage: 0–10V DC Load current: 2mA max.				
COMMUNICATION FUNCTION	0	None				
	5	RS-485	Shimaden standard protocol/MODBUS communication protocol			
	7	RS-232C				
REMARKS	0	Without				
	9	With (Please consult before ordering.)				

MEASURING RANGE CODES

Type of input		Code	Scaling range (°C)	Scaling range (°F)
Thermocouple	B *1	01	0 to 1800	0 to 3300
	R	02	0 to 1700	0 to 3100
	S	03	0 to 1700	0 to 3100
	K	04 *2	-199.9 to 400.0	-300 to 750
		05	0.0 to 800.0	0 to 1500
		06	0 to 1200	0 to 2200
	E	07	0 to 700	0 to 1300
	J	08	0 to 600	0 to 1100
	T	09 *2	-199.9 to 200.0	-300 to 400
	N	10	0 to 1300	0 to 2300
	PLII *3	11	0 to 1300	0 to 2300
	C (WRe 5-26)	12	0 to 2300	0 to 4200
	U *4	13 *2	-199.9 to 200.0	-300 to 400
	L *4	14	0 to 600	0 to 1100
RTD	Pt100	31	-200 to 600	-300 to 1100
		32	-100.0 to 100.0	-150.0 to 200.0
		33	-50.0 to 50.0	-50.0 to 120.0
		34	0.0 to 200.0	0.0 to 400.0
	JPt100	35	-200 to 500	-300 to 1000
		36	-100.0 to 100.0	-150.0 to 200.0
		37	-50.0 to 50.0	-50.0 to 120.0
		38	0.0 to 200.0	0.0 to 400.0

Type of input		Code	Scaling range
Voltage (mV)	-10 to 10	71	Optional setting of Measuring range is possible by the scaling function as shown below. Scaling range: -1999 to 9999 digits Span: 10 to 5000 digits Higher limit value/Lower limit value Position of decimal point : None : Decimal point below digits, 1, 2, 3
	0 to 10	72	
	0 to 20	73	
	0 to 50	74	
	10 to 50	75	
	0 to 100	76	
Voltage (V)	-1 to 1	81	
	0 to 1	82	
	0 to 2	83	
	0 to 5	84	
	1 to 5	85	
	0 to 10	86	
Current (mV)	0 to 20	91	
	4 to 20	92	

Note:
*1 Thermocouple B: Accuracy guarantee not applicable temperature below 400 °C or 750 °F.
*2 Thermocouple K, T, U: Accuracy guarantee not applicable temperature below -100 °C. ±(0.7%FS+1digit)
*3 Thermocouple PLII: Platinel
*4 Thermocouple U, L: DIN 43710

Note: Unless otherwise specified, the measuring range will be set as isted below during the shipment from the factory.

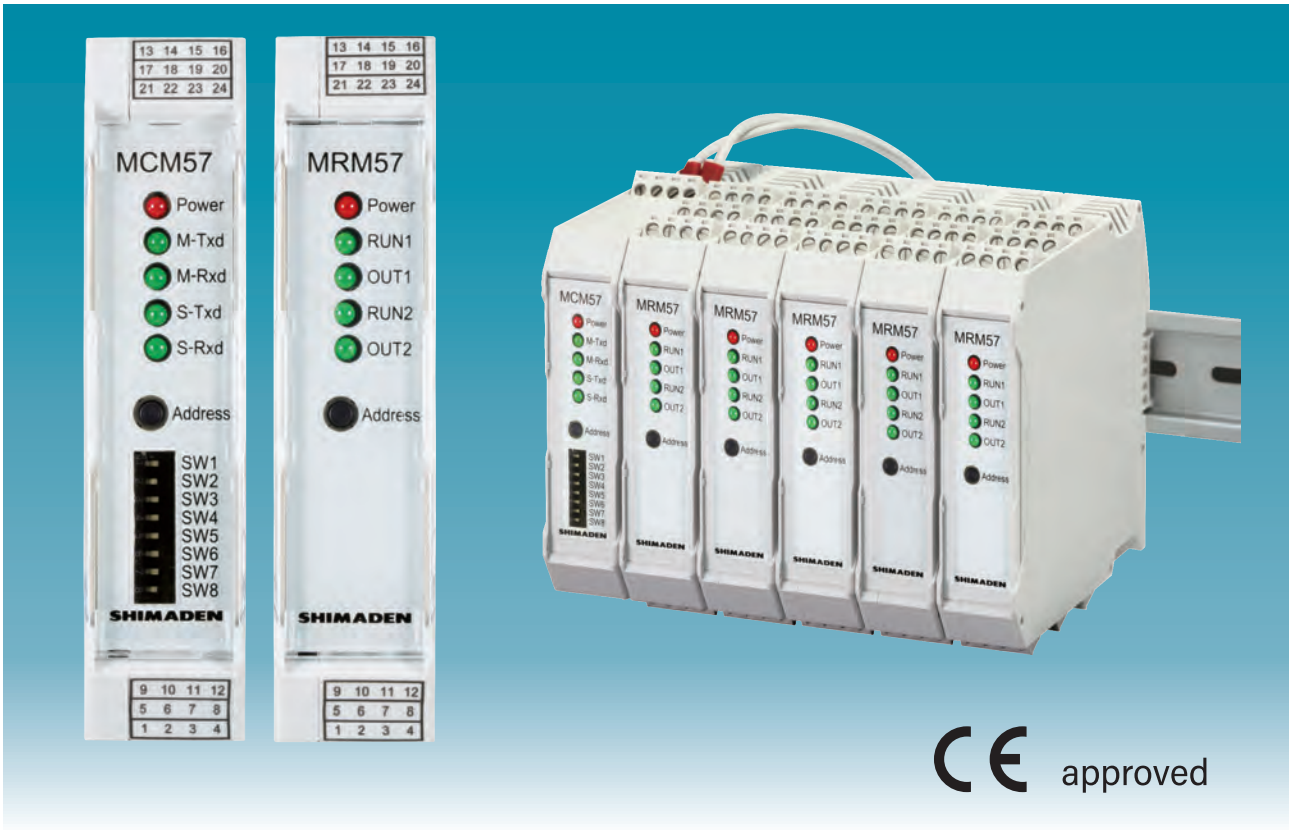
Input	Specification/Rating	Measuring range
Multi input	K thermocouple	0.0 to 800.0 °C
Current (mA)	4 to 20mA DC	0.0 to 100.0

TERMINAL COVER (AVAILABLE SEPARATELY)

Model	Mounting
QCR003	One-touch mount

°C
%RH
SHIMADEN

Series MCM 57 / MRM 57
Module TYPE TEMPERATURE CONTROLLER



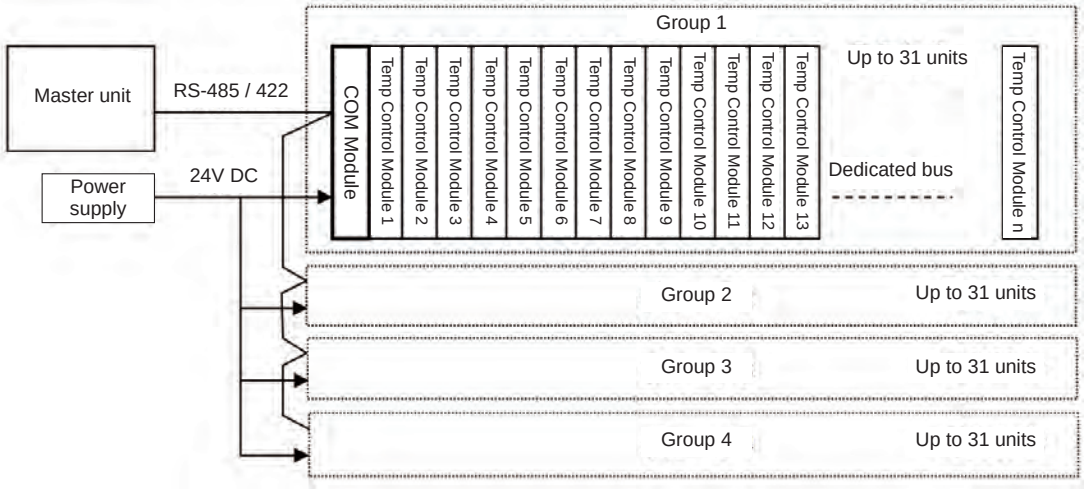
BASIC FEATURES

□ ***Temperature controller MCM 57 / MRM 57 series are multi-loop temperature controllers with a modular structure with 2 input channels and 2 output channels.***

□ ***Since this is filled with an insulator (magnesium oxide), compared to the general type, it has excellent resistance to tremors and collision impact. It is also characterized by a speedy response to temperature change.***

□ ***Configuration of this instrument***

Conceptual diagram of product configuration



ORDERING INFORMATION

■ COM Module

ITEM	CODE	SPECIFICATIONS	
Series	MCM57-	DIN rail mountable COM Module	
Master communication method	2	EIA RS-422, 4-wire half-duplex multi-drop (connectable to up to 31 units per group)	
	5	EIA RS-485, 2-wire half-duplex multi-drop (connectable to up to 31 units per group)	
Remarks	0	Without	
	9	With (Please consult before ordering)	

■ Temp Control Module

ITEM	CODE	SPECIFICATIONS	
Series	MRM57-	DIN rail mountable Temp Control Module with 2 event output points/CH (4 points in total)	
CH1 input	8	Multi (B, R, S, K, E, J, T, N, PL II, C (WRe5-26), U (DIN 43710) ,L (DIN 43710) , AuFe-Cr, Pt100, JPt100, ±10mV, 0 to 10mV, 0 to 20mV, 0 to 50mV, 10 to 50mV, 0 to 100mV)	
	6	Volt (±1V, 0 to 1V, 0 to 2V, 0 to 5V, 1 to 5V, 0 to 10V)	
CH2 input	8-	Multi (B, R, S, K, E, J, T, N, PL II, C (WRe5-26), U, L, Pt100, JPt100, ±10mV, 0 to 10mV, 0 to 20mV, 0 to 50mV, 10 to 50mV, 0 to 100mV)	
	6-	Volt (±1V, 0 to 1V, 0 to 2V, 0 to 5V, 1 to 5V, 0 to 10V)	
Control output (common to both CH1 and CH2)	C-	Transistor open collector/24 V DC, 100 mA	
	P-	SSR drive voltage/12 V DC, 30 mA	
	I-	Current/4 to 20 mA, max. load 500Ω	
	V-	Voltage/0 to 10 V, max. current 2 mA	
Program	N	None	
	P	4 patterns, 32 steps	
Option (common to both CH1 and CH2)	00	DI 3 points/CH (6 points in total), non-voltage contact input/5 V, 1 mA [standard] Note that 6 points are usable in the 1-input configuration.	
	03	Analog output 1 point/CH (2 points in total), 0 to 10 mV, output resistance 10Ω	
	04	Analog output 1 point/CH (2 points in total), 4 to 20 mA, max. load 300Ω	
	06	Analog output 1 point/CH (2 points in total), 0 to 10 V, max. current 2 mA	
Control mode	0	2-input 2-output (2ch independent two-loop)	
	1	1-input 2-output (1ch heating and cooling, 2 heating stages, 2 cooling stages)	
	2	2-input 1-output (1ch cascade)	
	3	2-input 2-output (1ch PV switchover control)	
Remarks	0	Without	
	9	With (Please consult before ordering)	

■ Sold separately

Name	Code	Summary
Shunt resistor	QCS003	250Ω External receiving resistance at current (mA) input

°C
%RH
SHIMADEN

Series SD17 & KR17

DIGITAL INDICATOR

BASIC FEATURES

- *DIN size 48 × 96 mm*
- *±0.3% high accuracy indication*
- *Large 20 mm bright display: Easy to read from long distances or dark and dim places*
- *Universal-input, multi-range*
- *Normal and inverse scaling for voltage and current inputs and analog outputs*
- *IP66 dust and splash-proof front panel*
- *Wide range of optional features: Alarms, analog outputs, 24V DC sensor power supply, and communication interface RS-485 or RS-232C (Shimaden standard protocol/MODBUS)*
- *Can be combined with six-point rotary selector switch KR17 Series*
- *Improved visibility with selectable red or white LED*
- *A six-point selector switch, (the KR17 series), is available for combined use.*

ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS		
SERIES	SD17-	Digital indicator (DIN size 48 × 96 mm)		
INPUT*1	8	Universal-input: - Thermocouple - RTD: Pt100/JPt100 - Voltage: 0 to 10 mV DC; 0 to 5, 1 to 5, and 0 to 10 V DC (input resistance 500kΩ or more)	For details on input type and measuring range, see Measuring Range Codes. Normal and inverse scaling can be used for voltage input.*2	
	4	Current: 4 to 20 mA DC (250Ω external receiving impedance attached)	Normal and inverse scaling*2	
POWER SUPPLY	90-	100 to 240 V±10%, AC 50/60 Hz		
*3	08-	24 V±10%, AC 50/60 Hz or DC		
ALARM	0	Without		
	1	Two-point individual setting and output (a-type contact) Contact capacity: 240 V AC, 1.5 A (resistive load)		
ANALOG OUTPUT OR SENSOR POWER SUPPLY	0	Without		
	3	Analog output: 0 to 10 mV DC, 10Ω output resistance	Normal and inverse scaling (within measuring range)	
	4	Analog output: 4 to 20 mA DC, 300Ω or less load resistance		
	6	Analog output: 0 to 10 V DC, 1 mA or less load current		
*3	8	Sensor power supply: 24 V DC, 25 mA or less		
COMMUNICATION	0	Without		
	5	RS-485 : Shimaden standard protocol/MODBUS		
	7	RS-232C: Shimaden standard protocol/MODBUS		
DISPLAY	0	11-segment red LED	Alarm action: display blinking	
	1	11-segment red and white LEDs	Alarm action: display color switching and/or display blinking	
REMARKS	0	Without		
	9	With		

*1 Although the SD17 is fully universal-input, we have two codes for input specifications as only the current input specification comes with an external receiving impedance (250Ω). If you do not need an external receiving impedance, select code 8.
*2 Scaling range: -1999 to 9999 digit; Scaling span: 10 to 10000 digit
*3 If you select code 08- (24 V AC/DC) for the "power supply," you cannot select code 8 (sensor power supply) for the "analog output or sensor power supply."

MEASURING RANGE CODES

INPUT		TYPE	CODE	MEASURING RANGE (°C)	MEASURING RANGE (°F)
Universal input*1	Thermocouple	B	01 *2	0 to 1800	0 to 3300
		R	02	0 to 1700	0 to 3100
		S	03	0 to 1700	0 to 3100
		K	04	-199.9 to 800.0	-300 to 1500
			05	0 to 1200	0 to 2200
		E	06	0 to 700	0 to 1300
		J	07	0 to 600	0 to 1100
		T	08 *3	-199.9 to 300.0	-300 to 600
		N	09	0 to 1300	0 to 2300
		U	10 *3	-199.9 to 300.0	-300 to 600
		L	11	0 to 600	0 to 1100
		C (WRe 5-26)	12	0 to 2300	0 to 4200
	RTD	Pt	31 *4	-199.9 to 600.0	-300 to 1100
			32	-100.0 to 100.0	-150.0 to 200.0
		JPt	33 *4	-199.9 to 500.0	-300 to 1000
			34	-100.0 to 100.0	-150.0 to 200.0
	Voltage	0 to 10 mV	71	Initial value: 0.0 to 100.0 Normal and inverse scaling: Scaling range: -1999 to 9999 digit Scaling span : 10 to 10000 digit	
		0 to 5 V	81		
		1 to 5 V	82		
		0 to 10 V	83		
Current		4 to 20 mA	95		

*1 The factory default setting is as follows:

Universal input	K	0 to 1200	°C
Current input	4 to 20 mA	0.0 to 100.0	No unit

*2 Accuracy is not guaranteed at 400°C (752°F) or less.
*3 Accuracy deteriorates to ±(0.5%FS + 1 digit) from -100°C to 0°C, and to ±(1%FS + 1 digit) at -100°C or less.
*4 Scaleover occurs at -240.0°C (-400°F).

Note: For thermocouple and RTD inputs with a measuring range having a decimal point, it is possible not to display the numbers below the decimal point.

°C
%RH
SHIMADEN

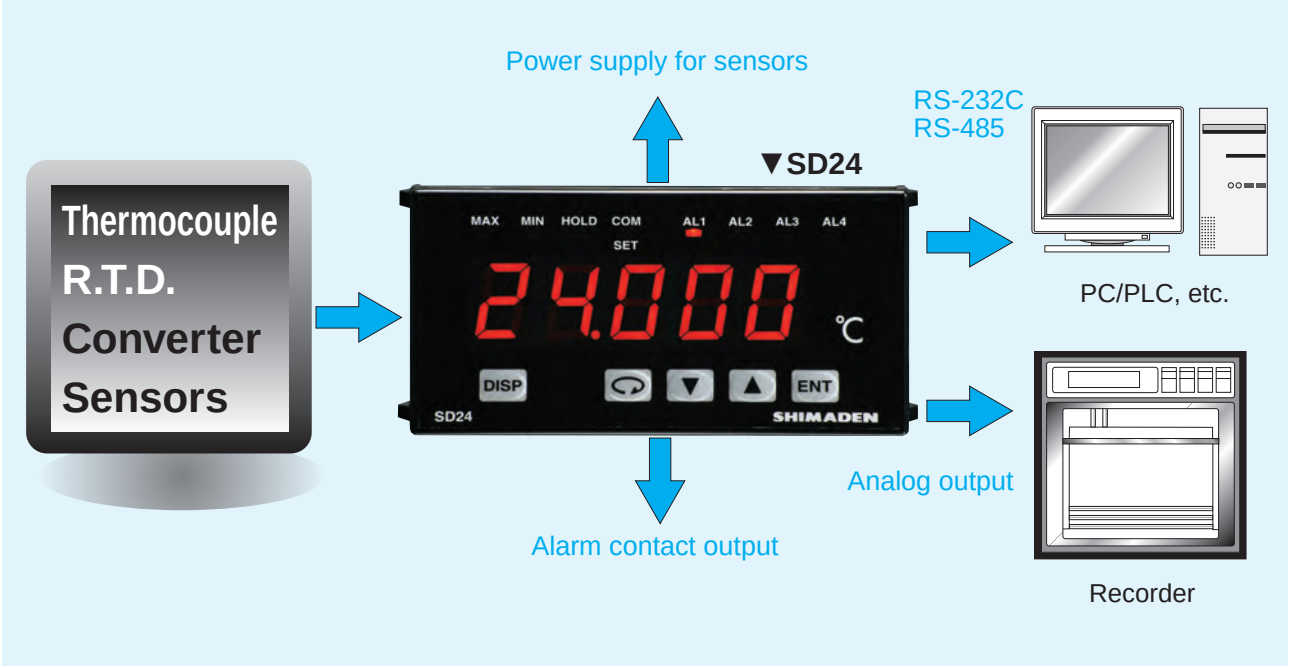
Series SD24 & KR17

DIGITAL INDICATOR

PRODUCT FEATURE

- □ *High Accuracy ±0.1% FS+1 digit*
- □ *1/1000 ºC Resolution Indication Possible (Pt input 0.000 to 30.000 ºC)*
- □ *3 Display Modes (Peak Hold, Bottom Hold, Display Hold)*
- □ *External Control Input (2 points) as a Standard Feature*
- □ *C contact (2 points) or a contact (4 points) can be selected for alarm output.*
- □ *Analog Output Hold Function (Hold Display Value Output)*
- □ *Communication Function RS-485/RS-232C*
  (Shimaden Standard Protcol/MODBUS)
- □ *Linear Approximation Operation Function (Voltage/Current Input only)*
- □ *Dust-proof and drip-proof structure: IP66 equivalent*

EXAMPLE OF USE



ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS		
SERIES	SD24-	DIN 48x96 Digital Indicator, DI 2 points		
INPUT	8	Universal-input Input resistance: 500kΩ minimum • Thermocouple • RTD : Pt100/JPt100 • Voltage (mV): -10 to 10, 0 to 10, 0 to 20, 0 to 50, 10 to 50, 0 to 100, -100 to 100mV DC		Refer to "Measuring Range Codes" for details of input type and measuring range.
	6	Voltage (V) Input resistance: 500kΩ minimum -1 to 1, 0 to 1, 0 to 2, 0 to 5, 1 to 5, 0 to 10, -10 to 10V DC		Voltage mV, V, Current mA range Scaling Possible (inverse scaling possible) Range: -9999 to 30000 digit Span: 10 to 39999 digit
	4	Current (mA) Receiving impedance: 250Ω 0 to 20, 4 to 20mA DC		
POWER SUPPLY	90-	100 to 240V AC±10%, (50/60 Hz)		
ALARM	0	None		
	1	Individually set/output 4 points (a contact)		
	2	Individually set/output 2 points (c contact)		
ANALOG OUTPUT/ COMMUNICATION FUNCTION	00	None		
	03	0 to 10mV DC Output resistance: 10Ω		Scaling Possible (inverse scaling possible) (within measuring range)
	04	4 to 20 mA DC Resistive load: 300Ω max.		
	06	0 to 10V DC Load current: 2 mA max.		
	50	RS-485		
	70	RS-232C		
SENSOR DC POWER SUPPLY	0	Without		
	1	With 24V DC 50 mA		
REMARKS	0	Without		
	9	With		

MEASURING RANGE CODES

		Input Type	Code		Measuring range			Measuring range (°F)		
Universal-input	Thermocouple	B	01	*1	0.0 – 1800.0	°C		0 – 3300	°F	
		R	02		0.0 – 1700.0	°C		0 – 3100	°F	
		S	03		0.0 – 1700.0	°C		0 – 3100	°F	
		K1	04		–100.0 – 400.0	°C		–150.0 – 750.0	°F	
		K2	05		0.0 – 400.0	°C		0.0 – 750.0	°F	
		K3	06		0.0 – 800.0	°C		0.0 – 1500.0	°F	
		K4	07		0.0 – 1370.0	°C		0.0 – 2500.0	°F	
		K5	08	*2	–200.0 – 200.0	°C		–300.0 – 400.0	°F	
		E	09		0.0 – 700.0	°C		0.0 – 1300.0	°F	
		J	10		0.0 – 600.0	°C		0.0 – 1100.0	°F	
		T	11	*2	–200.0 – 200.0	°C		–300.0 – 400.0	°F	
		N	12		0.0 – 1300.0	°C		0.0 – 2300.0	°F	
		PLII	13		0.0 – 1300.0	°C		0.0 – 2300.0	°F	
		PR40-20	14	*3	0.0 – 1800.0	°C		0 – 3300	°F	
		C (WRe 5-26)	15		0.0 – 2300.0	°C		0 – 4200	°F	
		U	16		–200.0 – 200.0	°C		–300.0 – 400.0	°F	
		L	17		0.0 – 600.0	°C		0.0 – 1100.0	°F	
		K	18	*4	10.0–350.0 (K)					
		AuFe-Cr	19	*5	0.0–350.0 (K)					
	RTD	Pt100	31	*6	–200.0 – 600.0	°C		–300.0 – 1100.0	°F	
			32		–100.00 – 100.00	°C		–150.0 – 200.0	°F	
			33		–100.0 – 300.0	°C		–150.0 – 600.0	°F	
			34		–60.00 – 40.00	°C		–80.00 – 100.00	°F	
			35		–50.00 – 50.00	°C		–60.00 – 120.00	°F	
			36		–40.00 – 60.00	°C		–40.00 – 140.00	°F	
			37		–20.00 – 80.00	°C		0.00 – 180.00	°F	
			38	*8	0.000 – 30.000	°C		0.00 – 80.00	°F	
			39		0.00 – 50.00	°C		0.00 – 120.00	°F	
			40		0.00 – 100.00	°C		0.00 – 200.00	°F	
			41		0.00 – 200.00	°C		0.0 – 400.0	°F	
			42	*9	0.00 – 300.00	°C		0.0 – 600.0	°F	
			43		0.0 – 300.0	°C		0.0 – 600.0	°F	
			44		0.0 – 500.0	°C		0.0 – 1000.0	°F	
		JPt100	45	*7	–200.0 – 500.0	°C		–300.0 – 900.0	°F	
			46		–100.00 – 100.00	°C		–150.0 – 200.0	°F	
			47		–100.0 – 300.0	°C		–150.0 – 600.0	°F	
			48		–60.00 – 40.00	°C		–80.00 – 100.0	°F	
			49		–50.00 – 50.00	°C		–60.00 – 120.00	°F	
			50		–40.00 – 60.00	°C		–40.00 – 140.00	°F	
			51		–20.00 – 80.00	°C		0.00 – 180.00	°F	
			52	*8	0.000 – 30.000	°C		0.00 – 80.00	°F	
			53		0.00 – 50.00	°C		0.00 – 120.00	°F	
			54		0.00 – 100.00	°C		0.00 – 200.00	°F	
			55		0.00 – 200.00	°C		0.0 – 400.0	°F	
			56	*9	0.00 – 300.00	°C		0.0 – 600.0	°F	
			57		0.0 – 300.0	°C		0.0 – 600.0	°F	
			58		0.0 – 500.0	°C		0.0 – 900.0	°F	
	Voltage (mV)	–10– 10 mV	71		Initial value: 0.00–100.00 Programmable Scaling Lower limit: -9999 Higher limit: 30000 (Span 10–39999 digit) (Inverse scaling possible) Scaleover is displayed for over 32000.					
		0– 10 mV	72							
		0– 20 mV	73							
		0– 50 mV	74							
		10– 50 mV	75							
		0–100 mV	76							
		–100–100 mV	77							
	Voltage (V)	–1– 1 V	81							
		0– 1 V	82							
		0– 2 V	83							
		0– 5 V	84							
		1– 5 V	85							
		0– 10 V	86							
		–10– 10 V	87							
	Current (mA)	0– 20 mA	94							
		4– 20 mA	95							

Thermocouple

*1. Accuracy guarantee not applicable to 400 °C or below

*2. -100 °C or below: Accuracy ±(0.5% FS+1 digit)

*3. Accuracy ±(0.3% FS+1 digit)

*4. Accuracy 10.0– 30.0K±(0.75%FS+1 digit)
30.0– 70.0K±(0.30%FS+1 digit)
70.0–350.0K±(0.25%FS+1 digit)

*5. Accuracy ±(0.25% FS+1 digit)

RTD

*6. Measured value display range: -240.0–680.0 °C

*7. Measured value display range: -240.0–570.0 °C

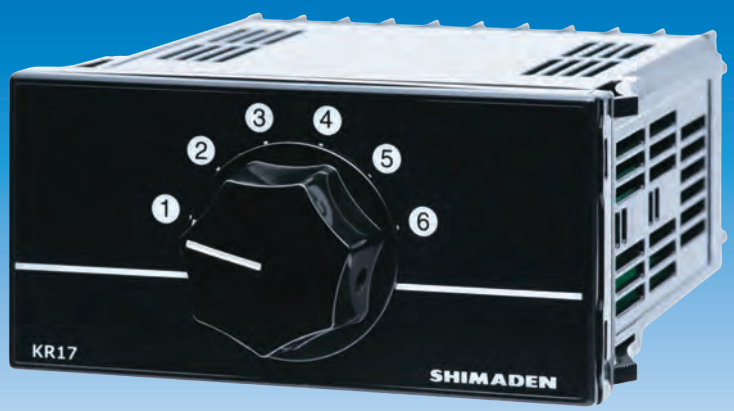
*8. Scaleover is displayed for over 32.000.

*9. Scaleover is displayed for over 320.00.

°C
%RH
SHIMADEN

SELECTOR SWITCH

Series KR17



6 - Point Rotary Switch

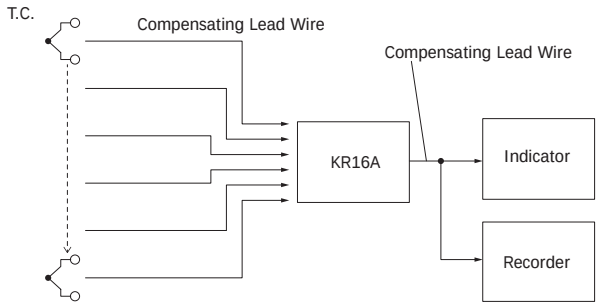
CE approved

ORDERING INFORMATION

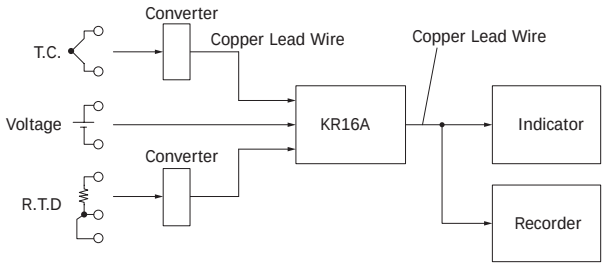
ITEM	CODE	SPECIFICATIONS	
SERIES	KR17-	6-point rotary switch	
REMARKS		0	Without
		9	With (Please consult before ordering.)

APPLICATION EXAMPLE

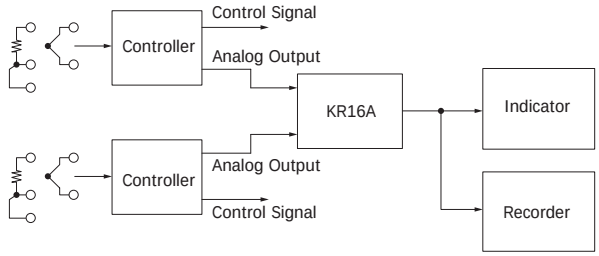
1. Selection of Thermocouple Switching



2. Selection of Voltage Switching



3. Selection of Analog Output (Voltage)



Installation Example with SD17

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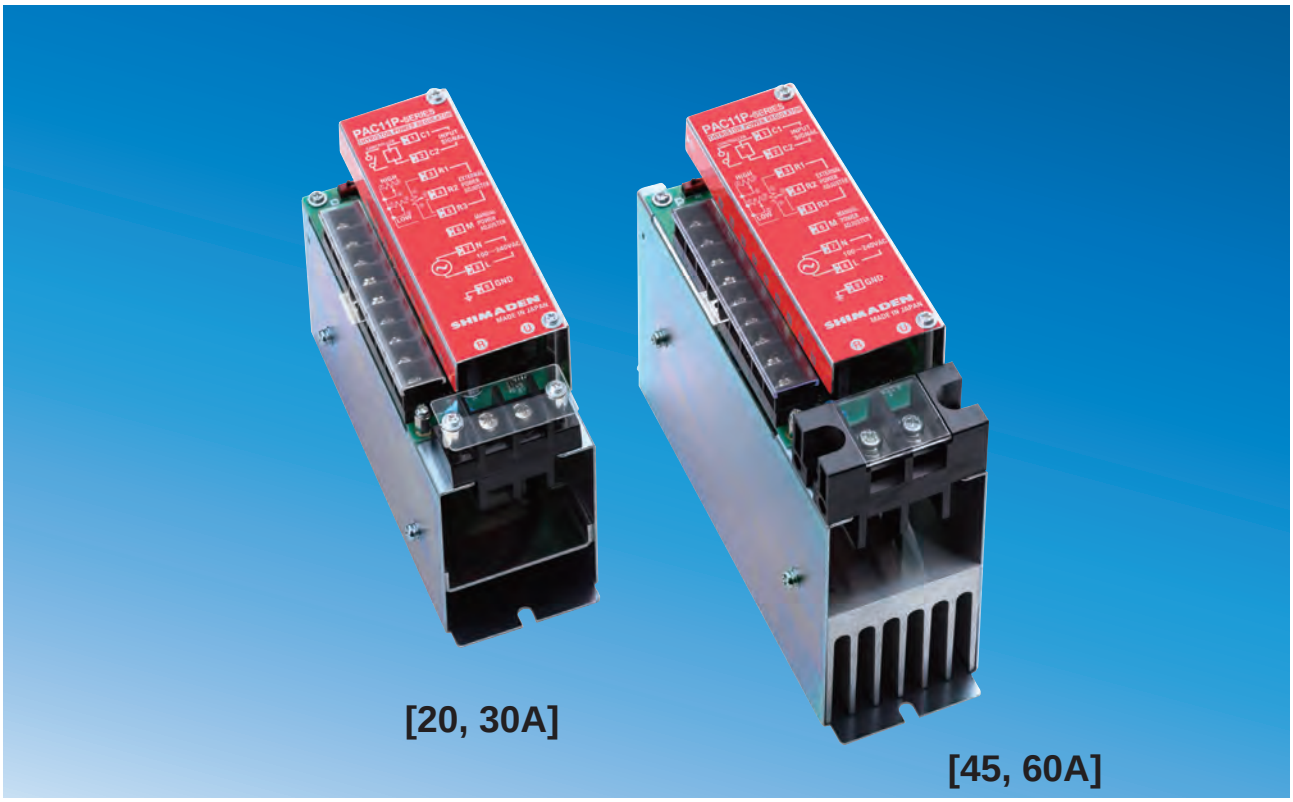
SHIMADEN

Series PAC11P
THYRISTOR SINGLE PHASE POWER REGULATOR



PRODUCT FEATURE

□ *Achieves a slim width with a compact integrated structure, and can increase the panel mounting density.*

□ *With frequency switching*

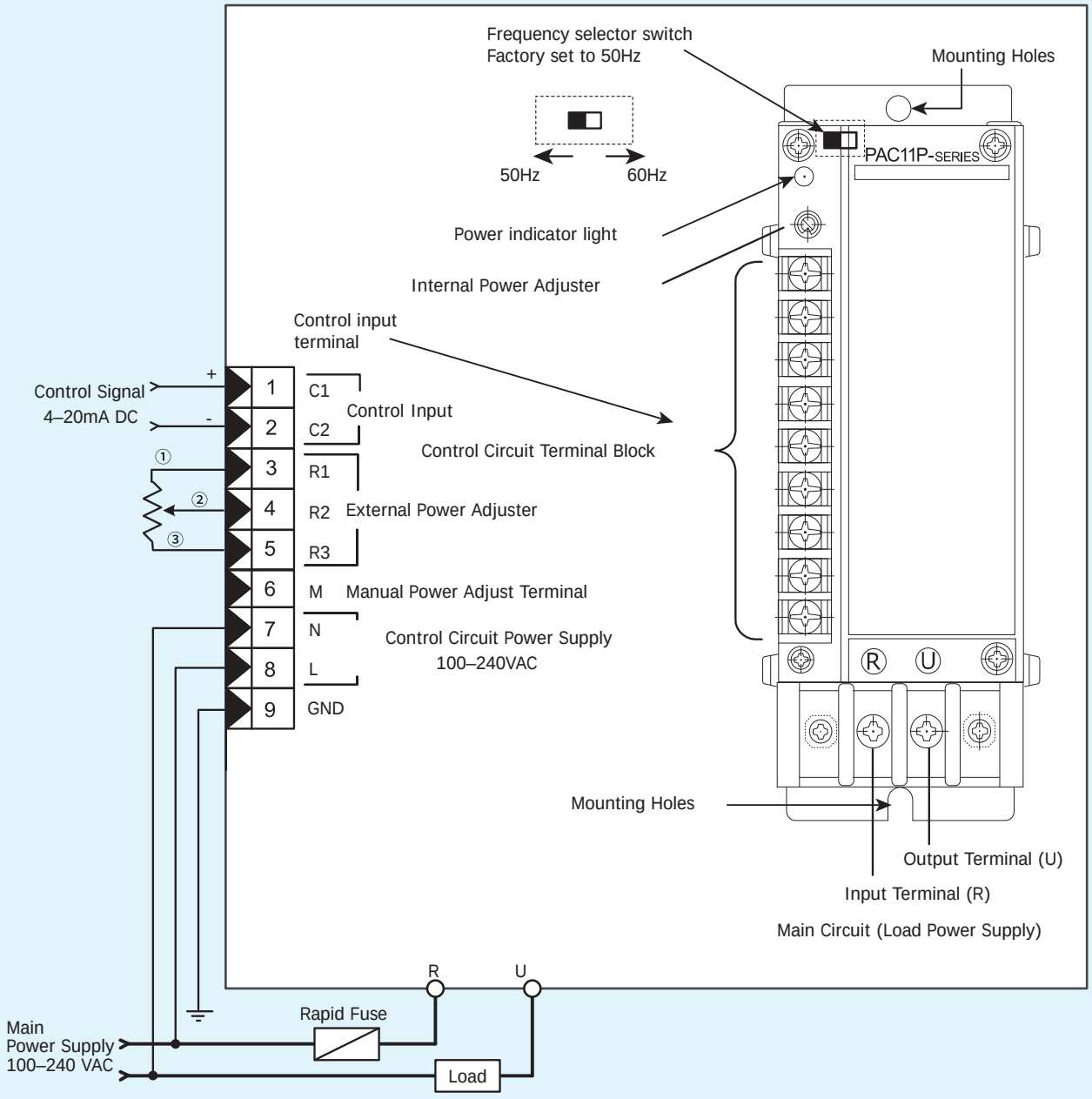
□ *Current Capacity: 20 to 60 Amperes*

□ *The power adjustment function can be used.*
[Current input type: internal (standard equipment), contact input type: external]

□ *RoHS directive supported*

Note: Successor model of the PAC15 series.

PANEL INFORMATION AND CONTROL TERMINALS



ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS			
SERIES	PAC11P	Phase Angle Single Phase Power Regulator (with soft start)			
CONTROL INPUT	0	4 to 20mA DC, Receiving impedance: 100Ω			
	2	Non-voltage contact			
CURRENT CAPACITY	020	20A			
	030	30A			
	045	45A			
	060	60A			
POWER SUPPLY	90-	100 to 240V AC ±10%, 50/60Hz			
EXTERNAL POWER ADJUSTER	Current Input	N	None (Internal installation as standard)		
		P	External power adjuster		
		M	Manual power adjuster		
		B	Base power adjuster		
		W	External power adjuster + manual power adjuster		
		Y	External power adjuster + base power adjuster		
	Contact Input	P	High power adjuster (standard)		
		B	High power adjuster (standard) + Low power adjuster		
REMARKS				0	Without
				9	With (Please consult before ordering.)

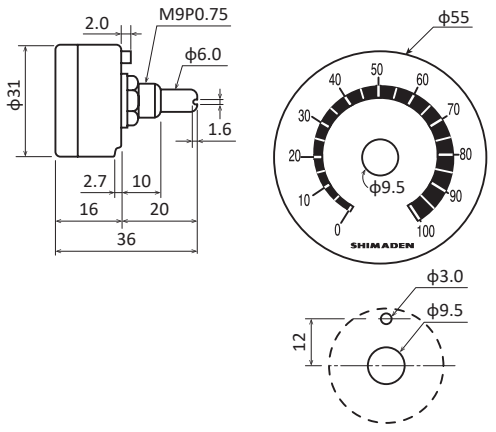
All external power adjusters are equipped with a B10kΩ (1W) scale plate, knob, and lead wire of 1m.

EXTERNAL ADJUSTER (SOLD SEPARATELY)

System / Input	Phase control	Lead wire	Spec.
Current input	QSV002	3 wires	□ Resistance value: B10kΩ □ Lead wire length: 1m, With crimping terminal for M4
Contact input	QSV001	2 wires	

□ 2 wires type when high/low power adjuster is selected

Note: The external power regulator is convenient to operate in a place away from the instrument, but when wiring, do not bundle it with the high-voltage circuit, but wire it apart.
If it is unavoidable to wire together, use a shielded wire and ground at one point.



Unit: mm

SPECIFICATIONS

■ **PAC11P**

● Control Mode	:	Phase angle (with soft start)
● Possible Loads	:	All resistance loads
● Current Capacity	:	20, 30, 45, 60 Amps.
● Power Supply	:	100 to 240V AC±10%
● Power Supply Cycle	:	50/60Hz (Switched by the internal switch: factory set: 50Hz)
● Power Lamp	:	Green LED lamp
● Control Input	:	Current = 4 to 20mA DC (Receiving impedance: 100 ohms) Contact = Zero voltage contact
● Output Voltage Control Range	:	0 to 95% min. 50/60Hz. of inut voltage
● Power Adjuster		
Current input	:	Internal installation as standard (External installation as option)
Contact input	:	External installation as standard
● Auto/Manual Power Adjuster	:	Only current input type is available - optional
● Thyristor Element Cooling	:	Natural air
● Over-Current Protection	:	None available (Use a fuse for semiconductor)
● Minimum Load	:	10% min. of current capacity (no operation at no load)
● Operating Ambient		
Temperature	:	-10 to 50°C
Humidity	:	90% RH (No dew condensation)
Elevation	:	2000 m above sea level or lower
Pollution class	:	2 (IEC 60664)
● Storage temperature	:	-20 to 65 °C
● Applicable standards	:	RoHS compliance
● Insulation Resistance	:	500V DC 20M ohms between power supply terminals and chassis 500V DC 20M ohms between power supply terminals and input terminals
● Dielectric Strength	:	1 min. at 2000V AC between power supply terminals and chassis
● Dimensions and Weight		
20A & 30A Types	:	H170 x W68 x D120 mm Weight: Approx. 1.1 kg
45A & 60A Types	:	H190 x W70 x D152 mm Weight: Approx. 1.9 kg

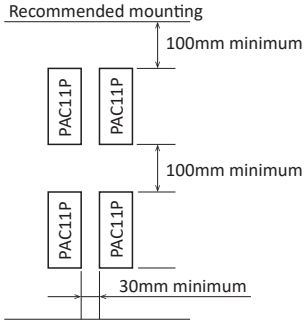
INTERNAL HEAT VALUE

Internal heat value for the PAC11P series with the rated current is as follows.
Voltage is produced between terminals by current flowing to the thyristor. Voltage between terminals multiplied by current (W) turns into Joule heat, resulting in rise in temperature of the thyristor element. Take heat dissipation and ventilation into account.

(Heat value conversion formula: 860 kcal = 1000 W)

Rated current (A)	20	30	45	60
Heat value (W)	24	36	48	60

*Care must be taken for air-ventilation.
*Vertical mounting is recommended.
When mounting horizontally, use at 70% of the current capacity.



°C
RH%
SHIMADEN

Series PAC18A

THYRISTOR SINGLE PHASE POWER REGULATOR

BASIC FEATURES

- □ ***Wide range of power supply voltage: 100V to 240V***
- □ ***Compact size lineup: 20A, 30A, 45A, 60A, 80A, 100A***
- □ ***50/60Hz automatic switching (Effective at 40–70Hz)***
- □ ***Stable operation against various power supply noises***
- □ ***Phase control method (4 modes switchable) or Cycle operation zero voltage switching method (single mode) are available according to the load characteristics.***
  - P0-: Phase control method/Phase angle proportional output
  - P1-: Phase control method/Voltage proportional output
  - P2-: Phase control method/Current feedback (option)
  - P3-: Phase control method/Voltage squared (power) proportional output
  - C1-: Cycle calculation zero voltage switching control method
- □ ***Precise operation of various settings with digital display and front keys***
  - ---Configurable from an external adjuster (up to 3, sold separately)
- □ ***Output current detection function supports overcurrent protection function, current limit function, and alarm output function (power supply failure, current failure, hardware failure, heater disconnection)***
- □ ***Operation switching (auto/manual)***
  - Contact input (two-position control ON/OFF) operation command (execute/stop)
  - HB alarm output switching (enabled/disabled)
- □ ***Mounting holes are common to the PAC15/18 series, easy to upgrade***
- □ ***CE marking compliant (complies with EMC standards by using the specified noise filter)***

ORDERING INFORMATION

Item	Code	Specifications		Pattern 1	Pattern 2
Series	PAC18A	Single-Phase Thyristor Power Regulator		○ Can be changed after purchase	
Control system	P0–	Phase control/phase angle proportional output			
	P1–	Phase control/voltage proportional output			
	P3–	Phase control/voltage square (electric power) proportional output			
	C1–	Cycle calculation zero voltage switching control			
	P2–	Phase control/current feedback *Output current detection/alarm output function (optional)		–	○
Control input	3	Voltage: 1–5V DC, input resistance: 200kΩ, contact: Common		○	○
	4	Current: 4–20mA DC, receiving impedance: 100kΩ, contact: Common			
	6	Voltage: 0–10V DC, input resistance: 200kΩ, contact: Common			
Current capacity	020–	20A		○	○
	030–	30A			
	045–	45A			
	060–	60A			
	080–	80A			
	100–	100A			
Current detection / Alarm output function * When P2- (Phase control / Current feedback) is selected,'Without'cannot be selected	0	Without		○	
	1	With	Overcurrent protection, current limit function, alarm output function (power failure / overcurrent / heater break / hardware error)		○
Additional functions	0	Without		–	–
Remarks	0	Without		○	○
	9	With			

Precautions concerning pattern 2
If the control type P2 (phase control/current feedback) is selected in the above item 2 (Control type) for PAC18A, the current detection/alarm output function for item 5 is automatically selected and, therefore, 1 ("With" the function) becomes the only selection.

Pattern 1: No current feedback
Pattern 2: Current feedback
○: Can be selected when purchasing
–: Cannot be selected when purchasing

Rapid fuse and fuse holder (sold separately)

Name	Current capacity	Remarks	Code
Rapid fuse	20A/30A		QSF006
	45A/60A		QSF007
	80A/100A		QSF008
Fuse holder	20A–60A		QSH002
	80A/100A		QSH003
Rapid fuse with fuse holder	20A/30A	QSF006+QSH002 1 pair	QSF01F
	45A/60A	QSF007+QSH002 1 pair	QSF01G
	80A/100A	QSF008+QSH003 1 pair	QSF01H

Noise filter (sold separately)

Current capacity	Type	Rated capacity
20A	NF2020C-SDG	20A
30A	NF2030C-SDG	30A
45A	NF2050C-SDG	50A
60A	NF2060C-SDG	60A
80A	NF2080C-SDG	80A
100A	NF2100C-SDG	100A

For details on the noise filter, see page 72 onwards.

External Adjuster Sold Separately

(B10k, knob, and scale plate lead (1m) are attached)

Type
QSV003

For details of specifi cations, please refer to the catalog or instruction manual.

°C
RH%
SHIMADEN

Series PAC26P

THYRISTOR SINGLE PHASE POWER REGULATOR

BASIC FEATURES

□ ***Wide application with variety of functions***

□ ***Suitable for air conditioning, electric, furnace, dryer, bio engineering, food industry, chemical industry, plastic formation and control of heat source applications.***

□ ***RoHS directive supported***

COMMON SPECIFICATIONS

Control input and Ratings

Contact signal	Non-volatage contact signal
Current input	4 to 20mA DC, Receiving impedance: 100Ω
Voltage input	1 to 5V DC, Input impedance: 200kΩ
	0 to 10V DC, Input impedance: 200kΩ

Power Voltage and Ratings

100V type	100 to 110V ±10% 50/60Hz or 110 to 120V ±10% 50/60Hz
200V type	200 to 220V ±10% 50/60Hz or 220 to 240V ±10% 50/60Hz
400V type	380 to 400V ±10% 50/60Hz or 400 to 440V ±10% 50/60Hz

Power Supply for 400V Type and External Power Ratings

20 to 100A	200 to 220V 20VA
150 to 450A	200 to 220V 50VA

Current Capacity and Cooling System

20, 30, 45, 60, 80 & 100A	Self-cooling system
150, 250, 350 & 450A	Forced air cooling system

Over-current Protection System

Electronic type (gate breaking system) standard	about 130% of rated current
Rapid fuse type (optional)	130 to 150% of rated current Reset
Electric type	Turn power OFF and reapply
Rapid fuse type	Replace fuse

For details of specifications, please refer to the catalog or instruction manual.

FUNCTION

Standard Function

Electronic over current protect function:	Protects thyristor element by shutting off the over current detected by a load current monitoring CT.
Constant voltage characteristics by means of voltage feedback:	Stable output provided by the voltage control function and easy operation achieved by the linear characteristics of control input and output voltage.
Soft start function:	Setting suitable soft start for the load.

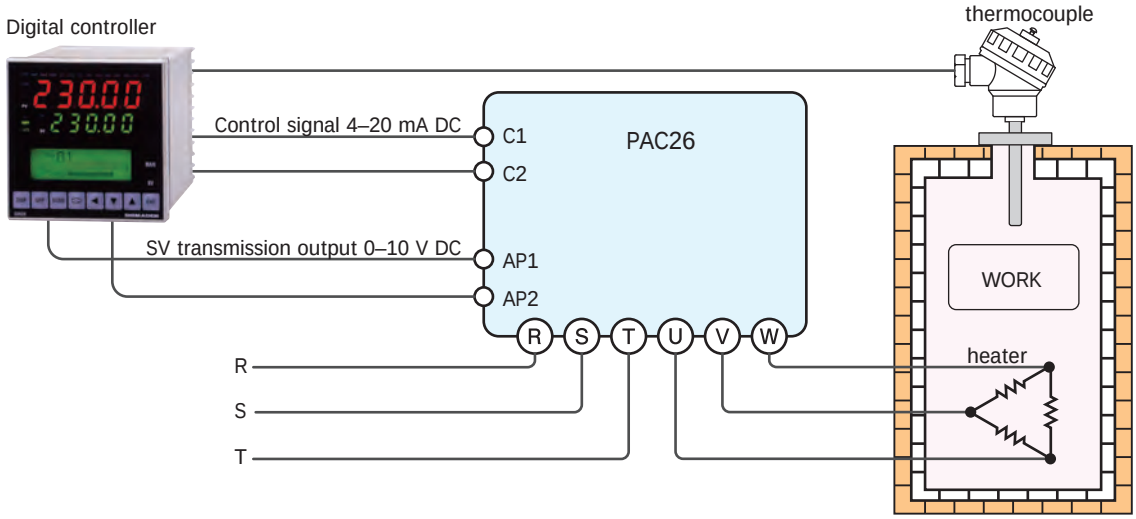
Additional Function (option)

Automatic power adjusting function:	The suitable power for the control temperature is continuously controlled by a signal from the programmable controller, computer and adjuster. Applicable for soft control of the low range.
Constant-current control (Current feedback):	Applicable to controlling the pure metallic heater and the Kanthal Super heater.
Constant-power control (Power feedback):	Applicable to controlling the SiC and the carbon heater,and applicable to high stability controlling.
Power linear control (Voltage square feedback):	Applicable to precise controlling for Nichrome heater load with power linear characteristics of the control input / output voltage.
Current limiting function:	Applicable to loads with rush current on starting and continuous usage over current condition such as pure metallic, Tungsten and Molybdenum heaters.
Start up output limiting function:	Applicable to the rush current reduction and load protection on turning on the power supply.
Heater break alarm:	Alarm display and output in case of detecting the low power condition of the broken heater and heater defect.
Rapid fuse:	Perfect protection for the thyristor device and the power line from the over current of the short circuit and the grounding.
Power adjustment function:	Addition of various manual equipment used for adjusting ramp, base (residual output), manual and high / low.

Monitor and Alarm Output on the Trouble Situation

Over-current protection:	[O.C] monitor lights and alarm output on
Fan stop (for models over 150A):	[FAN] monitor lights and alarm output on
Rapid fuse burnt out:	[FUSE] monitor lights and alarm output on
Heater break alarm:	[H / B] monitor lights and warning output on

EXAMPLE OF COMBINATION with CONTROLLER



When the SV transmission output (4 to 20 mA or 0 to 10 V) of the controller is input to the PAC26 auto power terminal (AP1, AP2), the maximum power (slope) is automatically set by the controller setting (SV). Is set to improve controllability.
Another effect is that when multiple thyristors are turned on at the same time, power peaks can be saved and no burden is placed on the power equipment.

ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS
SERIES	PAC26P	Phase Angle Control Single Phase Power Regulator
CONTROL INPUT	2	Contact
	3	1 to 5V DC Input Resistance: 200kΩ
	4	4 to 20mA DC Receiving Resistance: 100Ω
	6	0 to 10V DC Input Resistance: 200kΩ
	9	Others (Please consult before ordering.)
POWER SUPPLY	13-	100 to 110V AC
	14-	110 to 120V AC
	15-	200 to 220V AC
	16-	220 to 240V AC
	17-	380 to 400V AC
	18-	400 to 440V AC
		Note: 200V power supply is separetely required for electric source and power for fan.

CURRENT CAPACITY	100 to 240V AC		380 to 440V AC	
	021	20A	022	20A
	031	30A	032	30A
	041	45A	042	45A
	061	60A	062	60A
	081	80A	082	80A
	101	100A	102	100A
	151	150A	152	150A
	251	250A	252	250A
	351	350A	352	350A
	451	450A	452	450A

FEEDBACK FUNCTION	0	Constant voltage (standard feature)
	1	Constant current
	2	Constant power
	3	Voltage Square-root
OUTPUT CONTROL FUNCTION	0	None
	1	Startup time output control limiting (0 to 60%, 1 to 60 sec.)
	2	Current limiting
	3	Startup time output control + Current limiting
EXTERNAL POWER ADJUSTER	N	None (Internal installation as standard)
CONTACT INPUT	P	External power adjuster
	B	Base (low) power adjuster
	H	High / Low power adjuster
CURRENT/ VOLTAGE INPUT	P	External power adjuster
	M	Manual power adjuster
	B	Base power adjuster
	W	External power + Manual power
	Y	External power + Base power
HEATER BREAK ALARM	0	Without
	1	With (0 to 100% setting of rated current)
RAPID FUSE	0	Without
	1	With (See rapid fuse option.)
AUTO POWER ADJUSTMENT FUNCTIONS	0	Without
	4	4 to 20mA DC Receiving Impedance: 100Ω
	6	0 to 10V DC Input Impedance: 200kΩ
REMARKS	0	Without
	9	With (Please consult before ordering.)

Rapid Fuse Option

Current capacity	VOLTAGE	PARTS NO.
20A	100 to 240V	QSF023
	380 to 440V	QSF015
30A	100 to 240V	QSF009
	380 to 440V	QSF009
45A	100 to 440V	QSF016
60A	100 to 440V	QSF050
80A	100 to 440V	QSF010
100A	100 to 440V	QSF011
150A	100 to 440V	QSF019
250A	100 to 440V	QSF013
350A	100 to 440V	QSF033
450A	100 to 440V	QSF034

External Power Adjuster

CODE	SPECIFICATIONS
QSV002	with B10kΩ, knob, scale panel, lead wire 1m

PANEL INFORMATION AND CONTROL TERMINALS

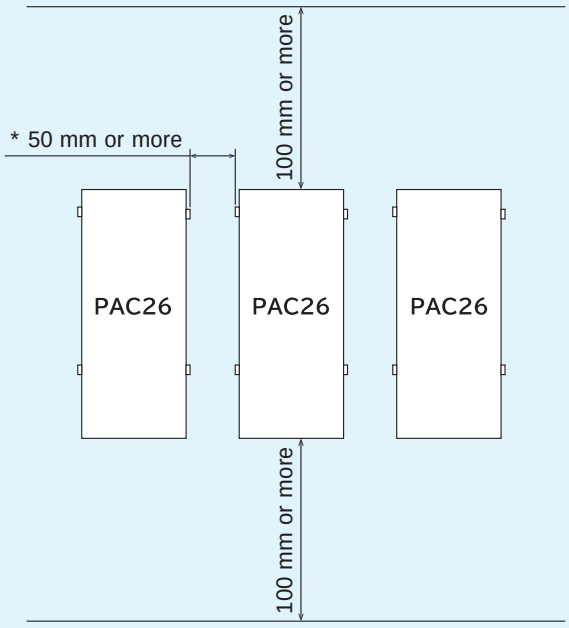
Terminal No. \ Code		Terminal Code	
		Voltage / Current	Contact
Upper terminal	1	C1	C1
	3	C2	C2
	5	R1	R1
	7	R2	R2
	9	R3	R3
	11	–	L2
	13	M	L3
	15	AL1	AL1
	17	AL2	AL2
Lower terminal	2	S1	
	4	S2	
	6	CL1	
	8	CL2	
	10	CL3	
	12	AP1	
	14	AP2	
	16	HB1	
	18	HB2	

Adjusters
- Power adjuster (standard)
- Soft start time adjuster (standard)
- Heater break alarm setting device (option)
- Automatic power adjuster (option)

Monitor Lamps
- P.L.: Power supply and output indication
- O.C: Over-current
- Fuse: Burning-out of rapid fuse (option)
- H / B: Heater break alarm (option)
- FAN: Stoppage of cooling fan (standard for 150A or above)

Terminal Codes and Functions
- C1–C2: Control input
- R1–R2–R3: External power (option)
- M: Manual / base adjustment (option)
- L2–L3: Low power and adjustment (option)
- AL1–AL2: Alarm output common to over-current, FAN,FUSE
- S1–S2: External sequence signal for limitting start power
- CL1–CL2–CL3: Current limiting adjuster
- AP1–AP2: Automatic Power signal input
- HB1–HB2: Heater break alarm output

INTERVALS REQUIRED for MOUNTING



- Wiring should be conducted for ease of maintenance and inspection at the opened door.
  (*Avoid adherent installation in order to open cover for wiring.)

°C
RH%
SHIMADEN

Series PAC27P

THYRISTOR SINGLE PHASE POWER REGULATOR

BASIC FEATURES

- □ *Phase Angle or Cycle Operation Zero Voltage Switching*
- □ *Current Capacity: 20, 30, 45, 60, 80, 100A*
- □ *Power Supply: 100 to 110, 110 to 120, 200 to 220, 220 to 240 V AC / 50/60Hz*
- □ *On the condition that the product is used with a noise filter as specified by SHIMADEN, the CE safety standard (EMC Directive) shall be satisfied.*
- □ *As we attach importance to safety aspects, the instrument has a number of alarm circuits including a built-in voltage feedback circuit as a standard function.*
- □ *If you select the current or the voltage control system, or the voltage square switching control system from the optional functions, control of special types of heaters and transformer loading is possible.*

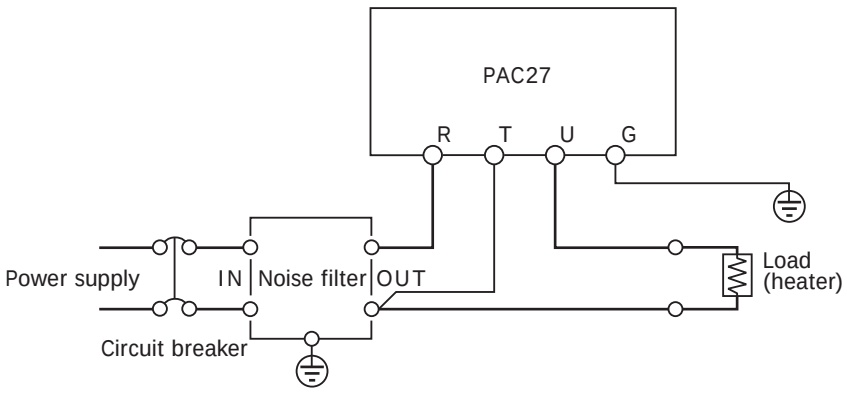
ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS
SERIES	PAC27P	Phase Angle Control Single Phase Power Regulator
CONTROL INPUT	2	Contact
	3	1 to 5V DC Input Resistance: 200kΩ min.
	4	4 to 20mA DC Receiving Resistance: 100Ω
	6	0 to 10V DC Input Resistance: 200kΩ min.
	9	Others (Please consult before ordering.)
POWER SUPPLY	13-	100 to 110V AC±10%, 50/60Hz
	14-	110 to 120V AC±10%, 50/60Hz
	15-	200 to 220V AC±10%, 50/60Hz
	16-	220 to 240V AC±10%, 50/60Hz
CURRENT CAPACITY	020	20A
	030	30A
	045	45A
	060	60A
	080	80A
	100	100A
FEEDBACK FUNCTION	0	Constant Voltage Control (standard feature)
	1	Constant Current Control
	2	Constant Power Control
	3	Power linear Control
CURRENT LIMIT FUNCTION	0	None
	1	With
EXTERNAL POWER ADJUSTER	N	None (Internal installation as standard)
CONTACT INPUT	P	External power adjuster
	B	Base (low) power adjuster
	H	High/Low power adjuster
CURRENT/VOLTAGE INPUT	P	External power adjuster
	M	Manual power adjuster
	W	External power + Manual power
HEATER BREAK ALARM	0	Without
	1	With
RAPID FUSE	0	Without
	1	With
REMARKS	0	Without
	9	With (Please consult before ordering.)

□ Noise Filter (Option)

Type	Current capacity
NF2020C-SDG	20A
NF2030C-SDG	30A
NF2050C-SDG	45A
NF2060C-SDG	60A
NF2080C-SDG	80A
NF2100C-SDG	100A

For details on the noise filter, see page 72 onwards.



□ On the condition that the product is used with a noise filter as specified by SHIMADEN, the CE safety standard (EMC Directive) shall be satisfied.

Series **PAC28**

THYRISTOR SINGLE PHASE POWER REGULATOR

CE

Rated current up to 100 A (main supply voltage: 100 V to 240 V)
Employs a noise filter to comply with EMC standards.

BASIC FEATURES

- □ *Source frequency 50/60 Hz automatically discernible*
- □ *Control circuit power supply can be 100 V to 240 V to support a wide supply voltage range.*
- □ *Two types of main power supply: 100 V to 240 V and 240 V to 480 V*
- □ *Analogue auxiliary input with insulation is optional; ramping can be set by remote signal.*
- □ *Standard heater break alarm as standard feature (not available for variable resistive loads)*
- □ *Operation control and output monitoring by communication function (optional)*
- □ *Output voltage range: 0 to 98% (not including thyristor forward voltage drop [1 to 2 V])*
- □ *CE marking compliant / rated current up to 100 A (main supply voltage: 100 V to 240 V)*
  Employs a noise filter to comply with EMC standards.

ORDERING INFORMATION

Item	code	specifications		
Series	PAC28	High-performance thyristor type power regulator Standard function: 1 Alarm output (AL1), 3 digital control inputs (DI)		
Control type	P1-	Phase control / constant voltage output		Equipped with feedback function
	P2-	Phase control / constant current output		
	P3-	Phase control / constant power output *1		
	P4-	Phase control / square voltage output		
	P0-	Phase control / angle proportional input		Not equipped with feedback function
	C1-	Cycle calculation zero voltage switching control		
Control input	6	Voltage: 0 to 10 V, 0 to 1 V, 1 to 5 V DC Input resistance: 200kΩ		
		Contact		
		voltage pulse Rated 12V DC ± 2V		
		potentiometer input Total resistance 100Ω to 10kΩ 3-wire system		
	4	Current: 4 to 20 mA, 0 to 20 mA DC Reception resistance: 100Ω		
Main power supply voltage	90-	100 to 240V AC		
	91-	240 to 480V AC (*2)		
Current capacity	020-	20A		
	030-	30A		
	050-	50A		
	075-	75A		
	100-	100A		
	150-	150A		
	200-	200A		
	300-	300A		
	450-	450A		
Analog auxiliary input (Output ramp function is available)	0	None		
	4	4 to 20mA DC reception resistance: 100Ω		
	5	1 to 5V DC input resistance: 500kΩ		
	6	0 to 10V DC input resistance: 500kΩ		
Alarm output 2 (With alarm output 1 / standard)	0	None		
	1	1 contact output		
Digital control output (DO)	0	None		
	1	2 open collector outputs		
Communication / analog output	0	None		
	5	Communication: RS-485 SHIMADEN standard protocol / MODBUS protocol		
	6	Analog output 0 to 10V DC Load current: 2mA (necessary when using the Operating Output Indicator)		
Rapid fuse	0	Without		
	1	With		
Remarks	0	Without		
	9	With		

Note) *1 Since the heating elements of the variable resistance types (especially silicon carbide) have a high temperature coefficient, the resistance value while heating will be significantly lower than in the room temperature range. Therefore, if you need to obtain appropriate power over the entire temperature range, determine the current capacity using the values below. The resistance ratio of silicon carbide heaters is approximately 1:3, so select a current capacity that is the square root of the resistance ratio $\sqrt{3} \fallingdotseq 1.73$ times. If the heater deteriorates, the resistance ratio may further increase, so we recommend selecting one with twice the resistance.

*2 If main power supply voltage is 240 – 480 V, a separate 100 to 240 V power supply must be provided for the control circuit.

ITEMS SOLD SEPARATELY

■Rapid fuse

Current capacity	code
20A	QSF009
30A	
50A	QSF010
75A	
100A	QSF011
150A	QSF012
200A	QSF013
300A	QSF014
450A	

■ Operating Output Indicator

Specifications	code
□60 mm Input: 0 to 10V Scale: 0 to 100%	QSM003
□80 mm Input: 0 to 10V Scale: 0 to 100%	QSM004

■Noise filter

Current capacity	code	Rated capacity
20A	NF2020C-SDG	20A
30A	NF2030C-SDG	30A
50A	NF2050C-SDG	50A
75A	NF2080C-SDG	80A
100A	NF2100C-SDG	100A

For details on the noise filter, see page 66 onwards.

■ External adjuster QSV003
(B10k, knob, and scale plate lead (1m) are attached)

code
QSV003

°C
%RH
SHIMADEN

SHIMADEN Series PAC46
THYRISTOR THREE-PHASE POWER REGULATOR

BASIC FEATURES

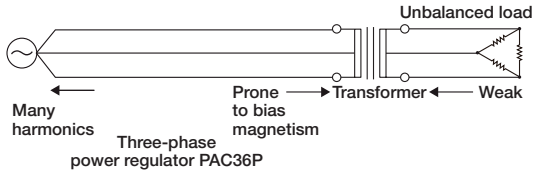
- □ *Reduced even harmonics with 6-arm control (thyristor pure inverse parallel)*
- □ *RoHS directive supported*
- □ *Approx. half the size and mass of the previous model (PAC36P)*
- □ *Separate European terminals facilitate wiring.*
- □ *Safety design prevents electric shock.*
- □ *Four types of high-precision feedback specifications*
- □ *Output limiting function*
- □ *Soft start function*
- □ *Automatic frequency determination*
- □ *Internal rapid fuse (optional)*
- □ *Output adjustment function*
- □ *Heater break alarm function (standard-equipped)*
- □ *Digital control input: 2 points*
- □ *Alarm output: 1 point*
- □ *Abnormal internal temperature alarm function*
- □ *Overcurrent protection function*
- □ *Indicator lamps for 4 types of errors*
- □ *Communication function (optional)*

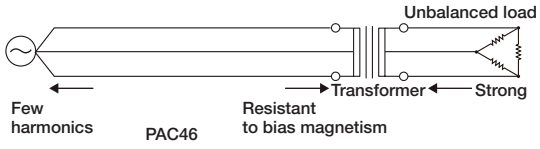
FUNCTION

***For detailed functions on PAC46, please refer to the single item catalogue.**

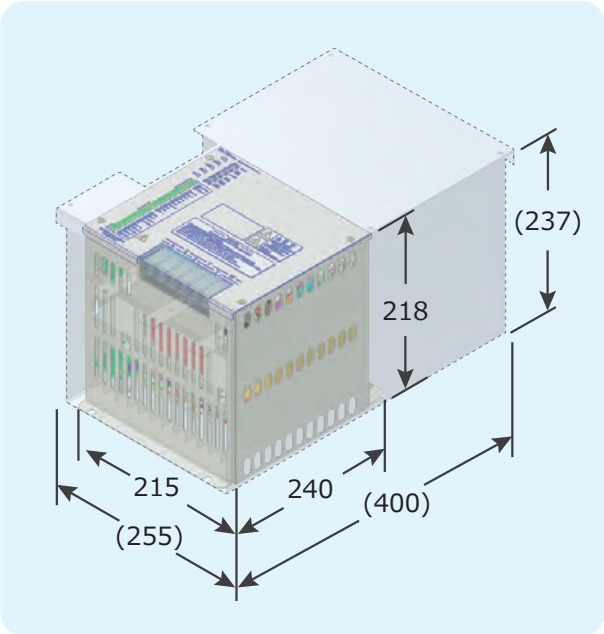
■ Six-arm control (thyristor pure inverse parallel) reduces even harmonics.

Voltage waveform is more symmetrical than the 3-arm system, so almost no even harmonics are generated. Bias magnetism is less likely to occur in the case of the transformer primary control, thereby enabling more compact transformers with enhanced efficiency.

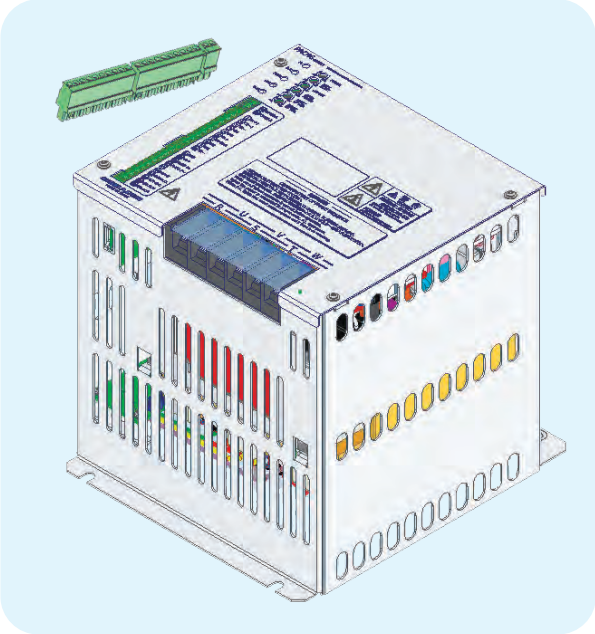




■ Size and mass of the main unit have been reduced to approximately half that of the previous model (PAC36P).
[Example: 100 A type]



■ Use of separate European terminals facilitates wiring.



■ The device is designed for safety; its structure is designed to prevent electric shock.

■ A variety of high-precision feedback specifications are available.

A wide selection of feedback specifications is available for the device.

You can choose from among four feedback specifications (voltage, current, power, and voltage square) according to load. Use of a stable three-phase power supply* enables high control accuracy (±3%FS). It also enhances temperature control, saves space, requires less wiring, and contributes to lower total cost. (* Stable three-phase power supply: Sine wave within 0.5% distortion factor and ±0.05% frequency stability)

Optional communication function also allows the feedback specifications to be changed.

Feedback control is a function that detects the output voltage and current of the power regulator and controls them to maintain output proportional to control input.

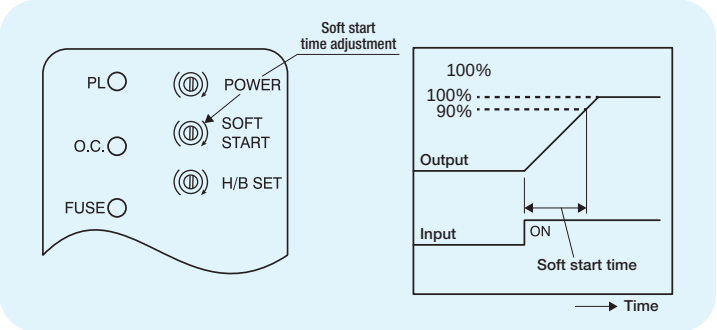
The function can maintain stable output even if the supply voltage or load resistance fluctuates.

■ Output limiting function

- Current limiting (optional): The current limiting function allows you to limit the output current.
- Start-up output limiting (optional): The start-up output limiting function allows you to limit the output at start-up. (Enables time setting)

If you are measuring output voltage or current of the device, correct value will not be indicated by a rectifier type meter.
Be sure to use an effective value meter.

■ Soft start function: Soft start time can be set to reduce rush current.



The characteristics such as those shown in the figure on the left can be realized for the change in the control signal and rise of output during power-up. The time it takes following the control signal to go from zero to 90% output can be adjusted in the range of approximately 1 to 30 seconds.

■ Automatic frequency determination: Automatic power frequency determination eliminates the need for 50/60 Hz switching.

■ Internal rapid fuse (optional)

■ Output adjustment function

- **Internal power adjustment**
- **External power adjustment (optional)**
- **Manual power adjustment (optional)**
- **Base-power adjustment (optional)**
- **External/manual power adjustment (optional)**
- **External power adjustment/base-power adjustment (optional)**
- **Soft start time**
- **Automatic power adjustment (optional)**

■ Heater break alarm function (standard-equipped)

The heater break alarm does not require an optional communication function, but it is required to detect heater resistance.
The approximate time for replacement is detected by heater resistance.
Under loads where resistance values fluctuate, detection accuracy may however be reduced.

■ Digital control input: 2 points

■ Alarm output: 1 point

■ The abnormal internal temperature alarm function shuts off output when abnormal temperature is detected.

■ The overcurrent protection function shuts off output when approximately 110% of the rated current is detected.

■ Four types of errors are indicated by indicator lamps.

- Rapid fuse break alarm (optional)

  If a rapid fuse breaks, output is shut off and the monitor lamp (FUSE) lights.
- Abnormal internal temperature alarm

  If an abnormal internal temperature is detected, output is shut off and the monitor lamp (O.H.) lights.
- Overcurrent protection alarm

  If excessive current is detected, output is shut off and the monitor lamp (O.C.) lights.
- Heater break alarm

  If a heater break fault is detected, the monitor lamp (H/B) lights. Output continues in this case.

Monitor lamp lights when error occurs. (For details, see the instruction manual.)

■ Communication (option)

- Up to 31 PAC46 devices can communicate with a single PC. (May differ according to connection conditions)
- RS-485 specifications: Insulated from the system
- Communication protocol: Modbus RTU
- Data communications up to 19200 bps (9600/19200 bps selection)
- Free application software is available for PCs. Please download from our website and install.
- Recommended operating environment

  Supported operating systems: Windows 10, Windows 7 (Japanese version)
  Hard disk free space: Min. 1 MB
  Memory capacity: Windows recommended

Notes:

1. For details on communication function, see the item “Communication (optional)” on page 8 (specifications page) or the Communication Interface Instruction Manual (separate).
2. Windows 10 and Windows 7 are registered trademarks of Microsoft Corporation in the United States and other countries.

ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS
1. Series	PAC46	Thyristor three-phase power regulator
2. Control input	3	1 to 5V DC Input resistance: Approx. 300kΩ or above or contact signal
	4	4 to 20mA DC Receiving impedance: 100Ω or contact signal
	6	0 to 10V DC Input resistance: Approx. 220kΩ or above or contact signal
3. Supply voltage (*1)	20 -	200V AC
	22 -	220V AC
	24 -	240V AC
	38 -	380V AC
	40 -	400V AC
	44 -	440V AC

4. Current capacity

	Supply voltage: 200 to 240 V			Supply voltage: 380 to 440 V		
	Code	Current capacity	Applicable load capacity	Code	Current capacity	Applicable load capacity
	021	20A	6.9 to 8.3 kVA	022	20A	13.2 to 15.2 kVA
	031	30A	10.4 to 12.5 kVA	032	30A	19.7 to 22.9 kVA
	051	50A	17.3 to 20.8 kVA	052	50A	32.9 to 38.1 kVA
	071	75A	26.0 to 31.2 kVA	072	75A	49.4 to 57.2 kVA
	101	100A	34.6 to 41.6 kVA	102	100A	65.8 to 76.2 kVA
	151	150A	52.0 to 62.4 kVA	152	150A	98.7 to 114.3 kVA
	201	200A	69.3 to 83.1 kVA	202	200A	131.6 to 152.4 kVA
	301	300A	103.9 to 124.7 kVA	302	300A	197.4 to 228.6 kVA
†1	501	500A	173.2 to 207.8 kVA	502	500A	329.1 to 381.0 kVA
†1	601	600A	207.8 to 249.4 kVA	602	600A	394.9 to 457.2 kVA

5. Control system (6-arm phase control)		P0	Phase control/voltage feedback
		P1	Phase control/current feedback
		P2	Phase control/power feedback (*2)
		P3	Phase control/voltage square feedback
	†2	CM	Communication function (The factory default setting is voltage feedback.) (*3)
6. Output limiting function		0	Without
		1	Start-up output limiting: Limiting to 0 to 60% output for 1 to 60 sec.
		2	Current limiting: Limiting to 50 to 100% of rated current (via external setter for VR3) w/ QSV006 × 1
		3	Start-up output limiting + current limiting (code 1 + code 2) w/ QSV006 × 1
7. Output adjustment function		N	Without (adjustment via standard-equipped internal power regulator)
	Selectable when used with voltage/current output type controller	P	External power adjustment w/ QSV005 × 1
		M	Manual power adjustment w/ QSV005 × 1
		B	Base (residual)-power adjustment w/ QSV005 × 1
		W	External power adjustment + manual power adjustment w/ QSV005 × 2
		Y	External power adjustment + base-power adjustment w/ QSV005 × 2
	Selectable when used with contact output type controller	C	External power adjustment w/ QSV005 × 1
		H	High/low power adjustment w/ QSV005 × 2
8. Rapid fuse		0	Without
		1	With Fuse break alarm output available
9. Automatic power adjustment function (non-insulated from the control input)		0	Without
		4	4 to 20 mA DC Receiving impedance: 100Ω
		6	0 to 10 V DC Input resistance: Approx. 220kΩ or above
10. Remarks		0	Without
		9	With

Notes:

*1 For use beyond the rated voltage, please make an inquiry.

*2 Variable resistance heating elements such as silicon carbide (SiC) heaters have a high negative temperature coefficient (their resistance greatly affected by temperature). During a temperature rise, their resistance falls far below that within the ordinary temperature range, leading to inadequate power. Maintaining output power within an appropriate range at every temperature requires the device's current capacity to be multiplied by a square root of the heating element's resistance ratio. To give an example, the approximate resistance ratio of SiC heaters is 1:3, a square root of which is √3, or approx. 1.73. The required current capacity when using those heaters is thus 1.73 times the original capacity. However, since heater deterioration may further widen the ratio, a current capacity even higher than the abovementioned must be selected. As for use of SiC heaters, we recommend about double the original capacity.

*3 See separate PAC46 Series Communication Interface Instruction Manual.

†1 Current capacity 500/600 A for 200 V system and 20–600 A for 400 V system are quasi-standard specifications. For delivery times, please inquire in advance.

†2 When selecting communication function, RS-485 communication allows the feedback system to be changed.

°C
%RH
SHIMADEN

Series PAC30Z
THREE-PHASE POWER REGULATOR

CIRCUIT PROTECTOR TYPE
with ELECTRICAL SHOCK PREVENTION COVER

RAPID FUSE TYPE

RAPID FUSE TYPE
with ELECTRICAL SHOCK PREVENTION COVER

BASIC FEATURES

- □ ***Easy Wiring With 2-Phase Control***
- □ ***Low-Noise Design***
- □ ***Compact and effective use of panel space***
- □ ***Wide Capacity Selection (18 to 450A)***
- □ ***Alarm Output Standard Feature***
- □ ***Thyristor protection is supported by Circuit protectors or Rapid fuses***
- □ ***Electrical Shock Prevention Cover (option)***
- □ ***RoHS directive supported***

ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS
SERIES	PAC30Z	Periodic zero voltage switching control three-phase power regulator
CONTROL INPUT	5	4 to 20 mA DC (Receiving resistance: 200 Ω) and contact signal
	9	Others (Please consult bofore ordering.)

CURRENT CAPACITY (kVA values represent the standard rated load capacity.)		CURRENT CAPACITY	200 to 220V	220 to 240V	* 380 to 400V	* 400 to 440V
	018	18A			11.8 to 12.5 kVA	12.5 to 13.7 kVA
	020	20A	6.9 to 7.6 kVA	7.6 to 8.3 kVA		
	030	30A	10.4 to 11.4 kVA	11.4 to 12.5 kVA	19.7 to 20.8 kVA	20.8 to 22.9 kVA
	045	45A	15.6 to 17.1 kVA	17.1 to 18.7 kVA	29.6 to 31.2 kVA	31.2 to 34.3 kVA
	060	60A	20.8 to 22.9 kVA	22.9 to 24.9 kVA	39.5 to 41.6 kVA	41.6 to 45.7 kVA
	090	90A	31.2 to 34.3 kVA	34.3 to 37.4 kVA	59.2 to 62.4 kVA	62.4 to 68.9 kVA
	135	135A	46.8 to 51.4 kVA	51.4 to 56.1 kVA	88.9 to 93.5 kVA	93.5 to 102.9kVA
	200	200A	69.3 to 76.2 kVA	76.2 to 83.1 kVA	131.6 to 138.6kVA	138.6 to 152.4kVA
*	300	300A	103.9 to 114.3kVA	114.3 to 124.7kVA	197.4 to 207.8kVA	207.8 to 228.6kVA
*	450	450A	155.9 to 171.5kVA	171.5 to 187.1 kVA	296.2 to 311.8 kVA	311.8 to 342.9kVA
	999	Others (Please consult bofore ordering.)				

POWER SUPPLY		
	15-	200 to 220V AC± 10% 50/60Hz
	16-	220 to 240V AC± 10% 50/60Hz
	17-	380 to 400V AC± 10% 50/60Hz
	18-	400 to 440V AC± 10% 50/60Hz
	99-	Others (Please consult bofore ordering.)

ELECTRICAL SHOCK PREVENTION COVER		
	0	With
	1	Without

EXTERNAL POWER ADJUSTER		
	0	None (Internal power adjuster as standard equipment)
	3	With (B10kΩ scale plate, knob and 1m lead wire included)
	9	Others (Please consult before ordering.)

OPERATION AMOUNT INDICATOR		
	0	Without
	1	With (QSM001: ◦60 mm)
	2	With (QSM002: ◦80 mm)

REMAKRS		
	0	Without
	9	With (Please consult before ordering.)

The 200V series / 300A, 450A and 400V series / 18-450A marked with * are treated as semi-standard products, so please contact us in advance for the delivery date.
Note: When selecting with the electric shock prevention cover, select 1: Yes for the code of [5. Electric shock prevention cover].

Rapid Fuse

Current capacity	Fuse Capacity	CODE
30A	40A	QSF038
45A	75A	QSF039
60A	100A	QSF040
90A	150A	QSF041
135A	200A	QSF042
200A	250A	QSF043
300A	450A	QSF044
450A	600A	QSF034

External Power Adjuster

CODE	SPECIFICATIONS
QSV002	Resistance Value: B10k ohms Lead Wire Length: 1m Terminal Shape: M4 terminal, 3-Wire Scale: 0–100%

Prevention of Electrical Shock Cover

CODE	SPECIFICATIONS	
QSK001	30A	400V Line
	45A	
	60A	200V Line/400V Line
	90A	
	135A	
QSK002	200A	
QSK003	300A	

Note: Prevention of electrical shock cover does not sell separately for model 20A, 30A, 45A/200-240V, 18A/380-440V, 450A/200-440V.

Operating Output Indicator

CODE	SPECIFICATIONS
QSM001	60x60m, Input: 0–1mA DC, Scale: 0–100%
QSM002	80x80m, Input: 0–1mA DC, Scale: 0–100%

INTERNAL HEAT GENERATED

Voltage (0.9to1.3V) is produced between terminals by current flowing to the thyristor. Voltage between terminals and accumulation of current (W) turn into Joule heat resulting in a rise in temperature of the thyristor elements. Take radiation and ventilation into account.

■ PAC30Z Rated current and heat value (Heat value conversion formula: 860kcal=1000W)

Rated current	18A	20A	30A	45A	60A	90A	135A	200A	300A	450A
Internal heat value	50W	55W	75W	100W	120W	220W	330W	480W	750W	1240W

PREVENTION COVER FOR ELECTRICAL SHOCK (OPTION)

CIRCUIT PROTECTOR TYPE

■ MODEL CODE WHEN ORDERING WITH ELECTRIC SHOCK PROTECTION COVER

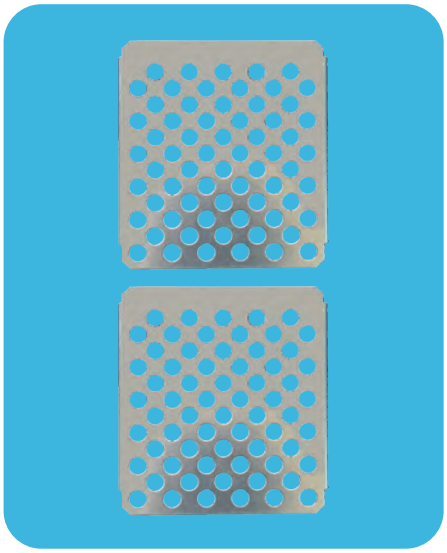
PAC30Z □ □□□ □□ - 1 □□ □

- 1 → PREVENTION COVER FOR ELECTRICAL SHOCK
- □□ → POWER SUPPLY
- □ → CURRENT CAPACITY { 20, 30, 45A / 200 ～ 240V ; 18A / 380 ～ 440 V

● An electric shock prevention cover for strong electric parts.

As for the component configuration... Photo bottom -1, Mounting status... Photo bottom -2

1. Component composition photo



2. Mounting photo

Note) The electric shock prevention cover is installed on the main unit when shipped.

● External dimensions and weight

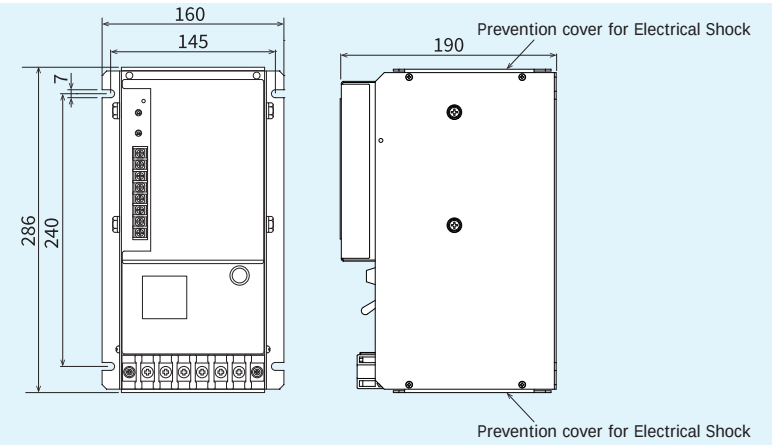
□ 20, 30, 45A/200-240V

□ 18A/380-440V

● Dimensions: H286×W160×D190 mm

● Mounting hole dimensions: H240×W145 mm

● Weight: about 5.3 kg



Unit: mm

PREVENTION COVER FOR ELECTRICAL SHOCK (OPTION)

RAPID FUSE TYPE

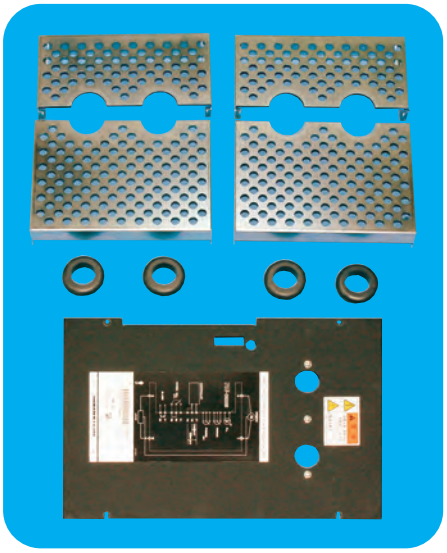
■ MODEL CODE WHEN ORDERING WITH ELECTRIC SHOCK PROTECTION COVER

PAC30Z □ □□□ □□ - 1 □□ □

- 1 □□ □ : PREVENTION COVER FOR ELECTRICAL SHOCK
- □□ : POWER SUPPLY
- □□□ : CURRENT CAPACITY { 60, 90, 135, 200, 300, 450 A / 200 ～ 240 V, 380 ～ 440 V / 30, 45 A / 380 ～ 440 V

● A cover to prevent electric shock for the power supply terminals (R, T), output terminals (U, W), control signal terminal block, and fuse peephole.
As for the component configuration... Photo below -1, Mounting status... Photo below -2

1. Component composition photo



2. Mounting photo

Note) If the electric shock prevention cover is mounted, the acrylic terminal protective cover (R, T, U, W terminals) cannot be attached.

● External dimensions and weight

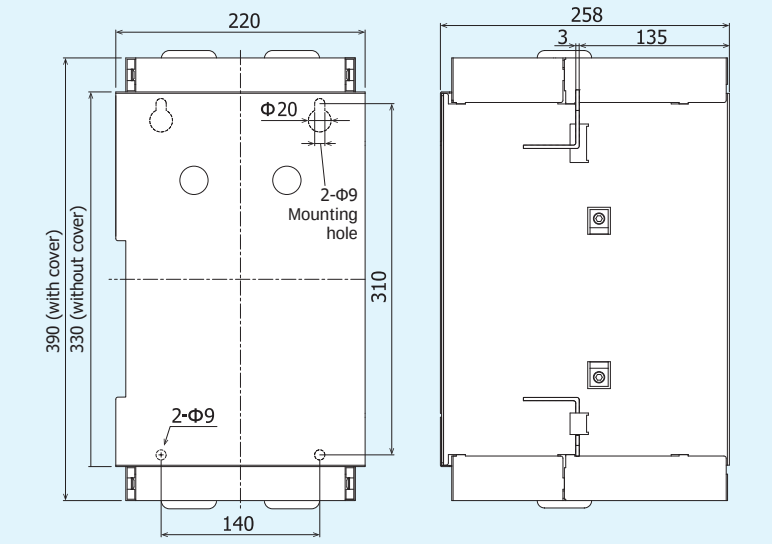
□ 60, 90, 135A / 200-240V, 380-440V

□ 30, 45A / 380-440V

● Dimensions: H390×W220×D258 mm

● Mounting hole dimensions: H310×W140 mm

● Weight: about 14.0 kg



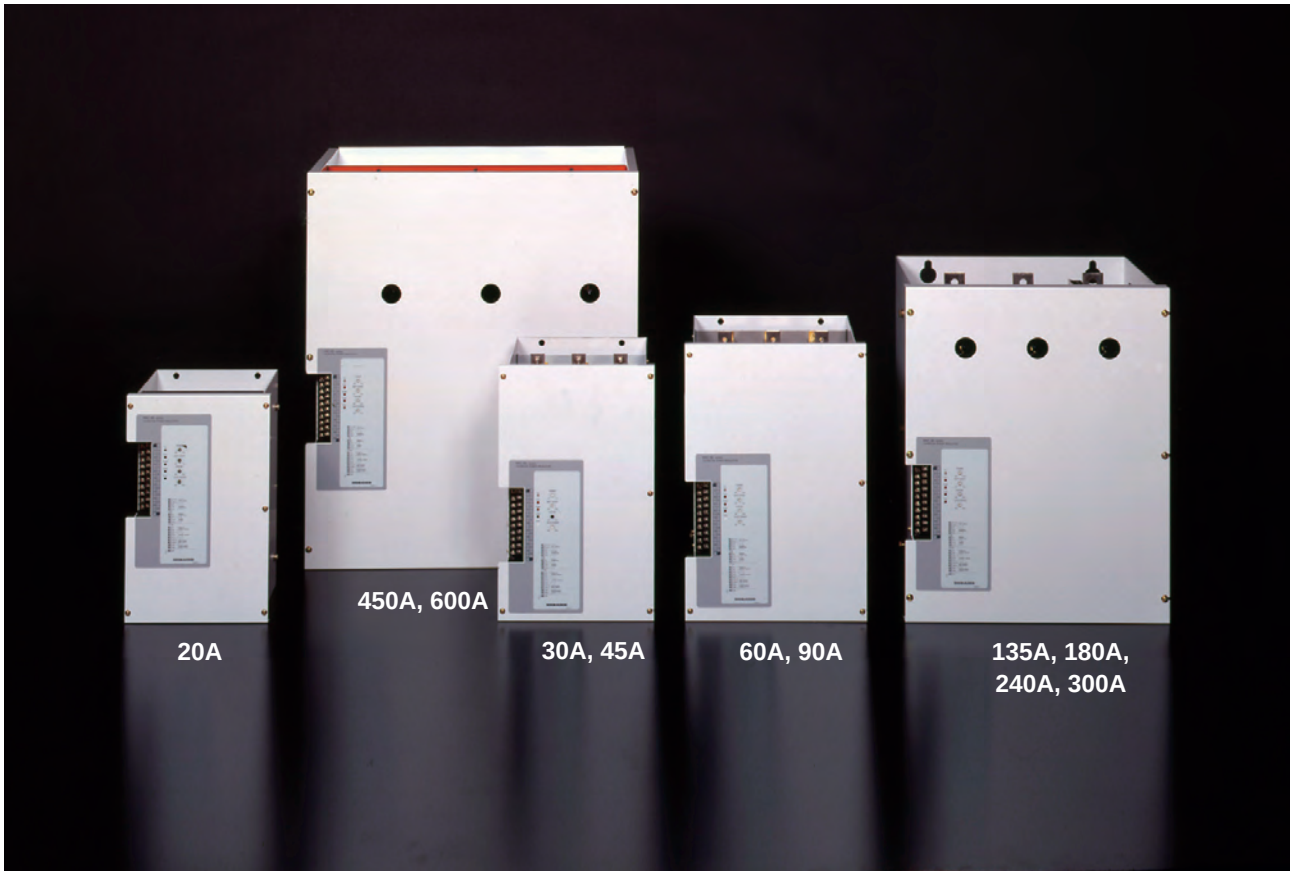
Unit: mm

* Mounting dimensions do not include grommets.

°C
%RH

Series PAC36P

THYRISTOR THREE PHASE POWER REGULATOR



BASIC FEATURES

□ ***Wide application with variety of functions***

□ ***Suitable for air conditioning, electric, furnace, dryer, bio engineering, food industry, chemical industry, plastic formation and control of heat source applications.***

□ ***Power Supply: 200 to 240V or 380 to 440V AC***

□ ***RoHS directive supported***

FUNCTION

Standard Function	
Electronic over current protect function:	Protects thyristor element by shutting off the over current detected by a load current monitoring CT.
Constant voltage characteristics by means of voltage feedback:	Stable output provided by the voltage control function and easy operation achieved by the linear characteristics of control input and output voltage.
Soft start function:	Setting suitable soft start time for the load.
Additional Function (option)	Stable output provided by the voltage control function and easy operation achieved
Automatic power adjusting function:	The suitable power for the control temperature is continuously controlled by a signal from the programmable controller, computer and adjuster. Applicable for soft control of the low range.
Constant-current control (Current feedback):	Applicable to controlling the pure metallic heater and the Kanthal Super heater.
Constant-power control (Power feedback):	Applicable to controlling the SiC and the carbon heater, and applicable to high stability controlling.
Power linear control (Voltage square feedback):	Applicable to precise controlling for Nichrome heater load with power linear characteristics of the control input / output voltage.
Current limiting function:	Applicable to loads with rush current on starting and continuous usage over current condition such as pure metallic, Tungsten and Molybdenum heaters.
Start up output limiting function:	Applicable to the rush current reduction and load protection on turning on the power supply.
Heater break alarm:	Alarm display and output in case of detecting the low power condition of the broken heater and heater defect.
Rapid fuse:	Perfect protection for the thyristor device and the power line from the over current of the short circuit and the grounding.
Power adjustment function:	Addition of various manual equipment used for adjusting ramp, base (residual output), manual and high / low.
Monitor and Alarm Output on the Trouble Situation	
Over-current protection:	[O.C] monitor lights and alarm output on
Fan stop (for models over 180A):	[FAN] monitor lights and alarm output on
Rapid fuse burnt out:	[FUSE] monitor lights and alarm output on
Heater break alarm:	[H / B] monitor lights and warning output on

INTERNAL HEAT GENERATED

Internal heat generated by series PAC36P at maximum current operation is as follows.The heat decreases is proportional to the current decrease. Ventilation should be considered for the system.

Rated current (A)	20	30	45	60	90	135	180	240	300	450	600
Internal heat generated (W)	82	121	151	196	274	442	620	731	1040	1567	2000

Approx. 10% more heat is generated in case of using rapid fuse.

SPECIFICATION

Control input and Rating:	Current input:	4 to 20mA / DC, Receiving impedance: 100Ω
	Voltage input:	1 to 5V / DC, Input impedance: 200kΩ min. 0 to 10V / DC, Input impedance: 200kΩ min.
	Contact signal:	Non-volatage contact signal
	Note:	Select external power (P) or (H) in the table of code Selection Item 7, (Output Adjusting Function)
Power Supply and Rating:	200V type:	200 to 220V AC ± 10% 50/60Hz
		220 to 240V AC ± 10% 50/60Hz
	400V type:	380 to 400V AC ± 10% 50/60Hz
		400 to 440V AC ± 10% 50/60Hz
Control Mode:	Phase angle control system	
	Soft start:	Adjustable approx. 1 to 10 sec. (time for reaching 90%)
	Applicable load:	Resistive load (additional function selected according to characteristics) Inductive load (transformer primary side control)
	Output voltage control range:	0 to 98% minimum of input voltage
	Output stability (95% or less of output voltage):	Input fluctuation ± 2% or less when input fluctuation is ± 10%.
	Control element configuration:	Mixed antiparallel configuration of SCRs and diodes
Over-current Protection System:	Electronic type (gate signal breaking system) standard:	approx. 130% of rated current
	Rapid fuse type (optional):	130 to 150% of rated current
	Reset Electronic type:	Turn power OFF and reapply
	Rapid fuse:	Replace fuse.
Current Capacity and Cooling System:	20A, 30A, 45A, 60A, 90A, 135A:	Self-cooling system
	180A, 240A, 300A, 450A, 600A:	Forced air cooling system
Alarm Monitors and Rating	Over-current:	[O.C] monitor lights. / AL1-AL2 conducting
	Fan stop:	[FAN] monitor lights. / AL1-AL2 conducting
	Fuse burnt out:	[FUSE] monitor lights./AL1-AL2 conducting
	Heater break:	[H / B] monitor lights. / HB1-HB2 conducting
	Output contact rating:	240V AC 1A / Resistive load
Power Lamp	Correct Phase sequence:	Green LED lights.
	Open / opposite phase sequence:	Red LED lights.
Operating Environment	Ambient temperature range:	-10 to 50˚C
	Ambient humidity:	90% RH max. with no condensation
Insulation Resistance	Power terminal and chassis:	500V DC 20MΩ min.
	Input terminal and power terminal:	500V DC 20MΩ min.
Dielectric Strength	Power terminals and chassis:	
	200 to 240V power supply:	2000V AC 1 minute
	380 to 440V power supply:	2500V AC 1 minute
Material / Finish	Ordinary steel plate / paint coating (equivalent to N8.5 Munsell number)	
External Dimensions and Weight:		See external demension drawings.
Terminal Cover:		Installed as standard equipment.
Additional functions (option)	**Power adjuster**	
	Connection to voltage / current output type controller	
	Internal Power (standard):	0 to 100%
	External Power:	0 to 100%
	Manual Power:	0 to 100%
	Base Power:	0 to 100%
	External power + Manual power:	0 to 100%
	External power + Base power:	0 to 100%
	Connection to contact output type controller	
	External Power:	0 to 100%
	High-low power, High power:	0 to 100%
	Low power:	High power × Low power
	Constant-current control (current feedback) Applicable loads:	Pure metallic heaters, Super kanthal, etc.
	Constant-power control (power feedback) Applicable loads:	SiC, Carbon heaters
	Power linear control (voltage feedback) Applicable loads:	Nichrome heater
	Output limiting function: Current limit:	50 to 100% of rated current
	Start up output limiting:	0 to 60% output for 1 to 60sec.
	Rapid fuse:	With alarm output function
	Heater break alarm:	Setting at 0 to 100% of rated current Automatic power adjusting
	function:	50 to 100%

ORDERING INFORMATION

Item	Code	Specification						
Series	PAC36P	Thyristor three- phase power regulator						
CONTROL INPUT		3	1 to 5V DC, Input Impedance: 200kΩ / contact signal					
		4	4 to 20mA DC, Receiving Impedance: 100Ω / contact signal					
		6	0 to 10V DC, Input Impedance: 200kΩ / contact signal					
		9	Others (Please consult before ordering.)					
POWER SUPPLY			15-	200 to 220V				
			16-	220 to 240V				
			17-	380 to 400V				
			18-	400 to 440V				
CURRENT CAPACITY (KVA is a guideline for rated load capacity)			Code		200V to 240V	Code		400V to 440V
			021	20A	6.9 to 8.3 kVA	022	20A	13.2 to 15.2 kVA
			031	30A	10.4 to 12.5 kVA	032	30A	19.7 to 22.9 kVA
			041	45A	15.6 to 18.7 kVA	042	45A	29.6 to 34.3 kVA
			061	60A	20.8 to 24.9 kVA	062	60A	39.5 to 45.7 kVA
			091	90A	31.2 to 37.4 kVA	092	90A	59.2 to 68.6 kVA
			131	135A	46.8 to 56.1 kVA	132	135A	88.9 to 102.9kVA
			181	180A	62.4 to 74.8 kVA	182	180A	118.5 to 137.2 kVA
			241	240A	83.1 to 99.8 kVA	242	240A	158.0 to 182.9kVA
			301	300A	103.9 to 124.7kVA	302	300A	197.4 to 228.6kVA
			*451	450A	155.9 to 187.1kVA	452	450A	296.2 to 342.9kVA
			*601	600A	207.8 to 249.4kVA	602	600A	394.9 to 457.2 kVA
FEEDBACK FUNCTION				0	Constant voltage (standard feature) / Nichrome			
				1	Constant current / Platinum, carbon, salt bath, tungsten			
				2	Constant power / SiC/Carbon (Note)			
				3	Voltage Square-root / Nichrome			
OUTPUT CONTROL FUNCTIONS				0	None			
				1	Startup time output control limiting (0 to 60%, 1 to 60 sec.)			
				2	Current limit (when saving continuously for more than 1 minute)	Not selectable when 1 or 2 is selected with the feedback function		
				3	Startup time output control + Current limiting			
EXTERNAL POWER ADJUSTER	When Used With Voltage and Current Output Controller			N	None (Internal installation as standard)			
				P	External power adjuster	1 set (knob/scale plate/lead)		
				M	Manual power adjuster			
				B	Base power adjuster			
				W	External power + Manual power	2 set (knob/scale plate/lead)		
				Y	External power + Base power			
	When Used with Contact Output			P	External power adjuster	1 set (knob/scale plate/lead)		
				H	High-Low power adjuster	2 set (knob/scale plate/lead)		
HEATER BREAK ALARM (constant resistance load)					0	Without		
					1	With (0 to 100% setting of rated current)		
RAPID FUSE					0	Without		
					1	With (See rapid fuse table.)		
AUTO POWER ADJUSTMENT FUNCTIONS					0	Without		
					4	4 to 20mA DC, Receiving Impedance: 100Ω		
					6	0 to 10V DC, Input Impedance: 200kΩ		
REMARKS					0	Without		
					9	With (Please consult before ordering.)		

- Please contact us when using other than the rated voltage.
- The 200V series/450A, 600A and 400V series/20 to 600A marked with * are treated as semi-standard products. Please contact us in advance for the delivery date.

(Note) For constant power output, the rated voltage x 1/2 of the rated current is 100% power value. That is, select a thyristor rating twice the load capacity.

■ External adjuster

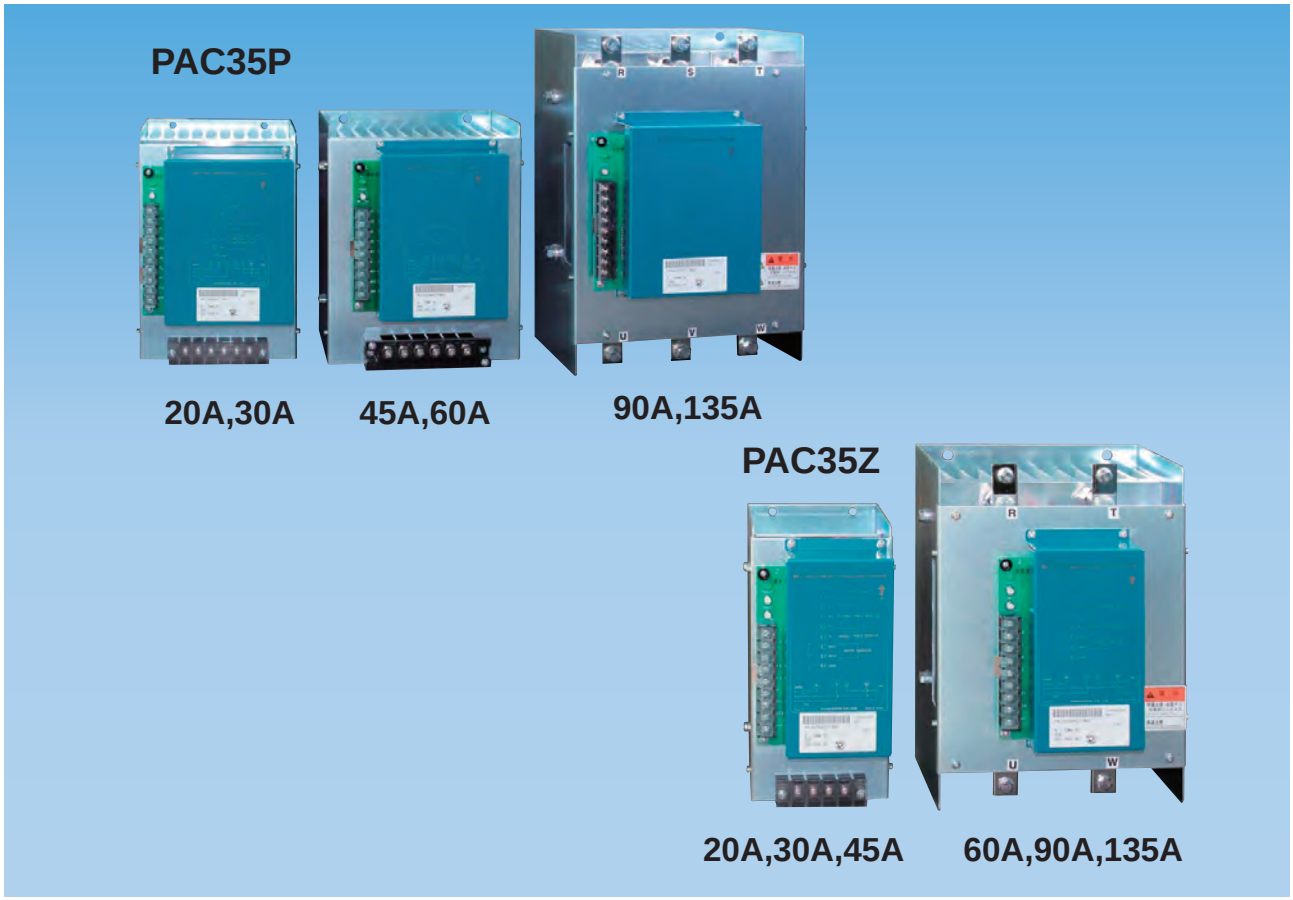
Code	Specification
QSV002	B10kΩ, knob, scale plate, 1m lead

■ RAPID FUSE (Option)

Current capacity	FUSE CAPACITY	PARTS NO.
20A	25A	QSF018
30A	40A	QSF009
45A	63A	QSF016
60A	80A	QSF050
90A	100A	QSF010
135A	200A	QSF042
180A	250A	QSF043
240A	350A	QSF047
300A	450A	QSF044
450A	630A	QSF020
600A	710A	QSF049

°C
%RH
SHIMADEN

Series PAC35
THREE-PHASE POWER REGULATOR



BASIC FEATURES

□ ***Current Capacity: 20, 30, 45, 60, 90, 135A***

□ ***Power Supply: 200 to 240 or 380 to 440V AC***

□ ***RoHS directive supported***

INTERNAL HEAT GENERATED

Voltage (0.9to1.3V) is produced between terminals by current flowing to the thyristor. Voltage between terminals and accumulation of current (W) turn into Joule heat resulting in a rise in temperature of the thyristor elements. Take radiation and ventilation into account.

■ PAC35 Rated current and heat value (Heat value conversion formula: 860kcal=1000W)

Rated current		20A	30A	45A	60A	90A	135A
Internal heat value (W)	PAC35P	69	105	141	172	270	445
	PAC35Z	45	69	93	125	175	300

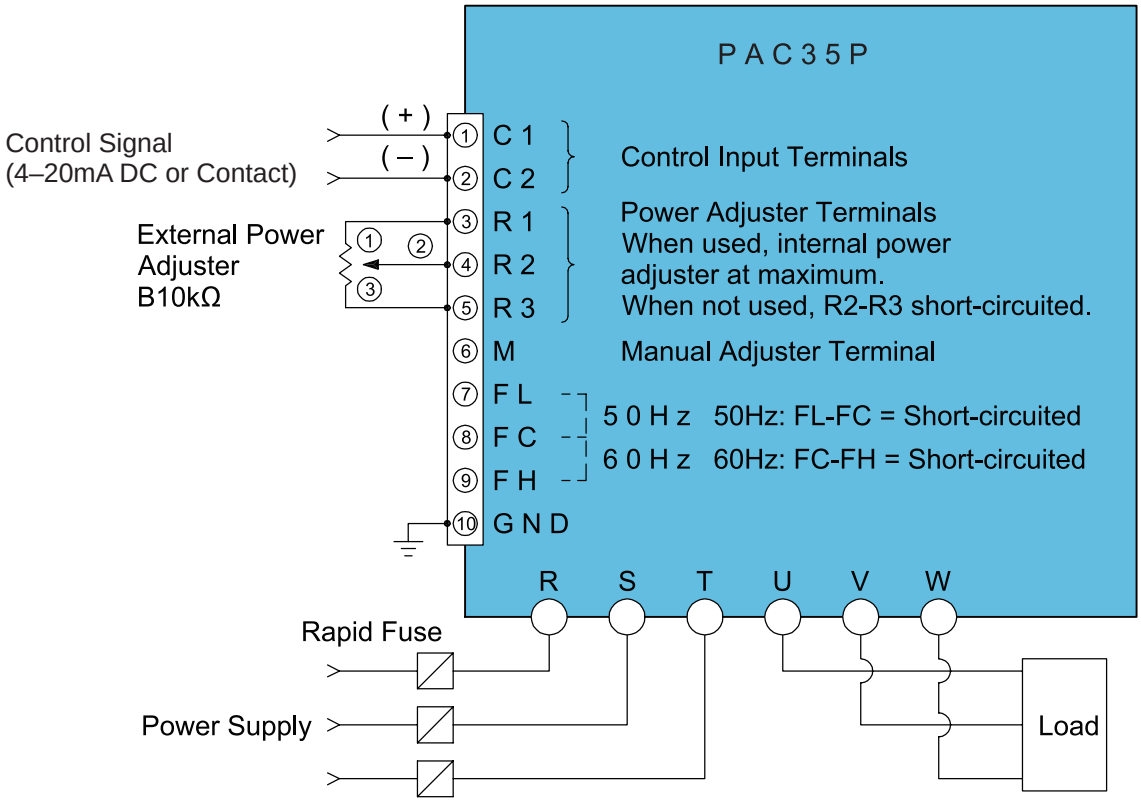
SERIES PAC35P (Phase Angle)

□ Ordering Information

ITEMS	CODE	SPECIFICATIONS			
SERIES	PAC35P	Phase Angle 3-phase Power Regulator With Soft-Start			
CONTROL INPUT	0	4 to 20mA DC/Receiving Resistance: 100Ω			
	2	Non-voltage contact			
	9	Others (Please consult before ordering.)			
CURRENT CAPACITY		CURRENT CAPACITY	CODE 37 / POWER SUPPLY: 200 to 240V Applicable load capacity	CODE 35 / POWER SUPPLY: 380 to 440V Applicable load capacity	
	020	20A	6.9 to 8.3 kVA	13.2 to 15.2 kVA	
	030	30A	10.4 to 12.5 kVA	19.7 to 22.9 kVA	
	045	45A	15.6 to 18.7 kVA	29.6 to 34.3 kVA	
	060	60A	20.8 to 24.9 kVA	39.5 to 45.7 kVA	
	090	90A	31.2 to 37.4 kVA	59.2 to 68.6 kVA	
	135	135A	46.8 to 56.1 kVA	88.9 to 102.9 kVA	
POWER SUPPLY	37-	200 to 240V AC ±10% 50/60Hz	50/60Hz (Switched by terminals)		
	35-	380 to 440V AC ±10% 50/60Hz			
	99-	Others (Please consult before ordering.)			
EXTERNAL POWER ADJUSTER	Current input	N	None (Internal standard)		
		P	External power adjuster		
		M	Manual power adjuster		
		B	Base power adjuster		
		W	External power adjuster + Manual power adjuster		
		Y	External power adjuster + Base power adjuster		
	Contact input	P	High power adjuster (standard)		
		B	High power adjuster (standard) + Low power adjuster		
		X	Others (Please consult before ordering.)		
REMARKS		0	Without		
		9	With (Please consult before ordering.)		

All external power adjusters are equipped with a B10kΩ (1W) scale plate, knob, and 1m lead wire.

□ TERMINAL ARRANGEMENT PAC35P (Phase Angle)



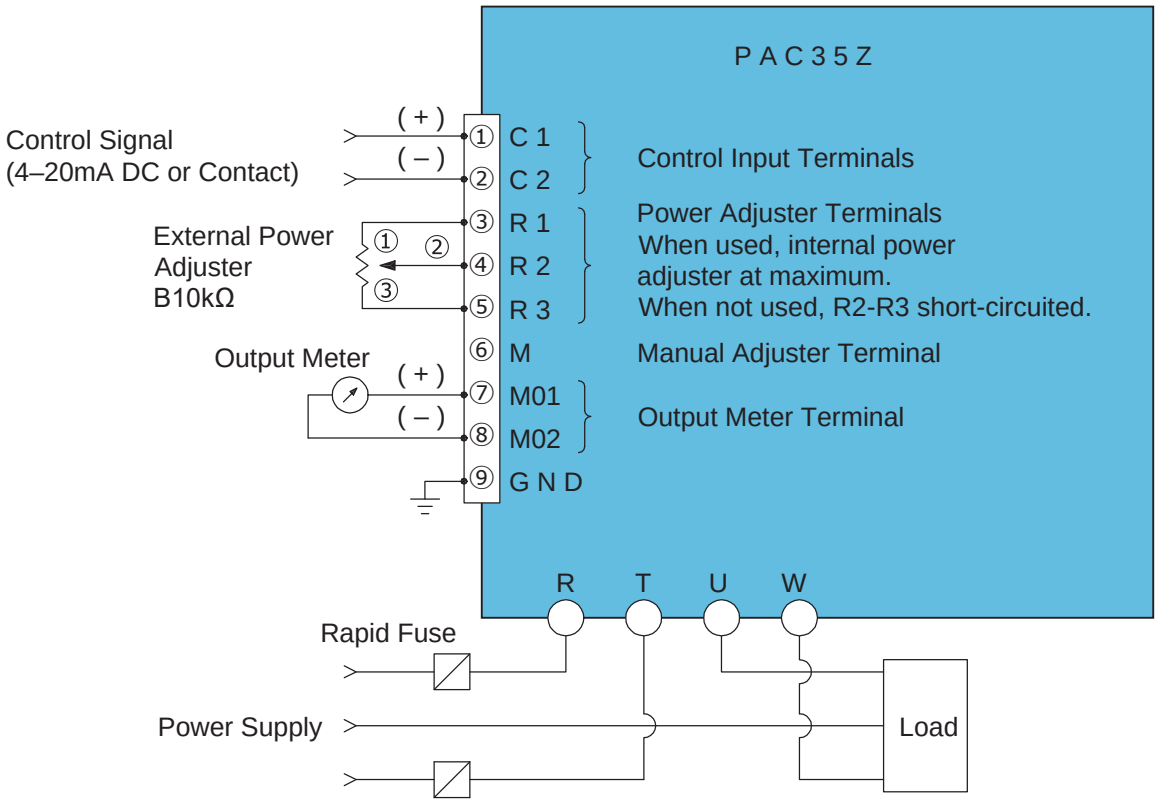
SERIES PAC35Z (Time Base Zero Voltage Switching)

□ Ordering Information

ITEMS	CODE	SPECIFICATIONS				
SERIES	PAC35Z	Time Base Zero Voltage Switching (3-Phase)				
CONTROL INPUT	0	4 to 20mA DC/Receiving Resistance: 100Ω				
	2	Non-voltage contact				
	9	Others (Please consult before ordering.)				
CURRENT CAPACITY		CURRENT CAPACITY	CODE 37 / POWER SUPPLY: 200 to 240V Applicable load capacity	CODE 35 / POWER SUPPLY: 380 to 440V Applicable load capacity		
	020	20A	6.9 to 8.3 kVA	13.2 to 15.2 kVA		
	030	30A	10.4 to 12.5 kVA	19.7 to 22.9 kVA		
	045	45A	15.6 to 18.7 kVA	29.6 to 34.3 kVA		
	060	60A	20.8 to 24.9 kVA	39.5 to 45.7 kVA		
	090	90A	31.2 to 37.4 kVA	59.2 to 68.6 kVA		
	135	135A	46.8 to 56.1 kVA	88.9 to 102.9 kVA		
POWER SUPPLY	37-	200 to 240V AC ±10% 50/60Hz				
	35-	380 to 440V AC ±10% 50/60Hz				
	99-	Others (Please consult before ordering.)				
EXTERNAL POWER ADJUSTER	Current input	N	None (Internal standard)			
		P	External power adjuster			
		M	Manual power adjuster			
		B	Base power adjuster			
		W	External power adjuster + Manual power adjuster			
		Y	External power adjuster + Base power adjuster			
	Current input	P	High power adjuster (standard)			
		B	High power adjuster (standard) + Low power adjuster			
		X	Others (Please consult before ordering.)			
MANIPULATED VARIABLE (POWER) OUTPUT AND/OR INDICATOR	0	None				
	1	Manipulated variable output				
	2	Manipulated variable + indicator, 60×60, 0 to 100% scale				
	3	Manipulated variable + indicator, 80×80, 0 to 100% scale				
REMARKS	0	Without				
	9	With (Please consult before ordering.)				

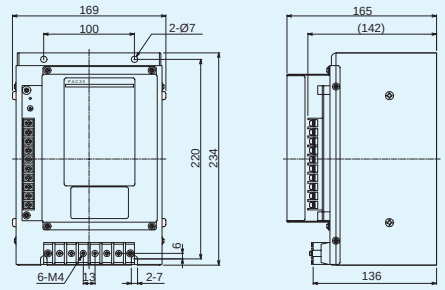
All external power adjusters are equipped with a B10kΩ (1W) scale plate, knob, and 1m lead wire.

□ TERMINAL ARRANGEMENT PAC35Z (Time Base Zero Voltage Switching)



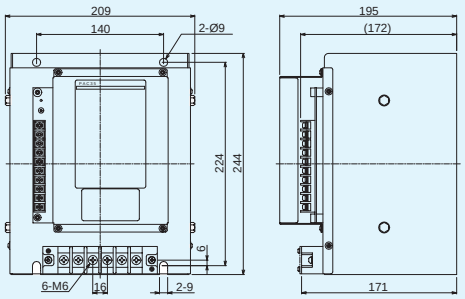
EXTERNAL DIMENSIONS & WEIGHT

PAC35P: 20A, 30A



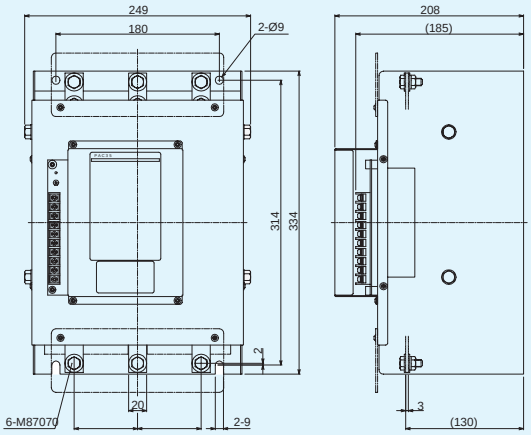
Weight: Approx. 3.0kg / 20A
Approx. 5.2kg / 30A

PAC35P: 45A, 60A



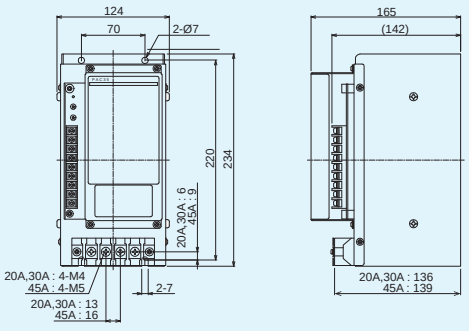
Weight: Approx. 7.6kg

PAC35P: 90A, 135A



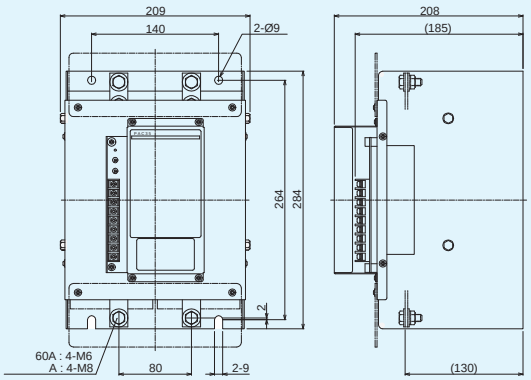
Weight: Approx. 12kg / 90A
Approx. 13kg / 135A

PAC35Z: 20A, 30A, 45A



Weight: Approx. 2.5kg / 20A
Approx. 3.8kg / 30A, 45A

PAC35Z: 60A, 90A, 135A



Weight: Approx. 8.4kg / 60A, 90A
Approx. 9.4kg / 135A

°C
%RH
SHIMADEN

Series NF2000C
Single Phase 2-Wire Type Noise Filter

BASIC FEATURES

- ***Reduction in size and weight realizes a 50% reduction compared to the past model***
- ***Excellent high attenuation characteristics***

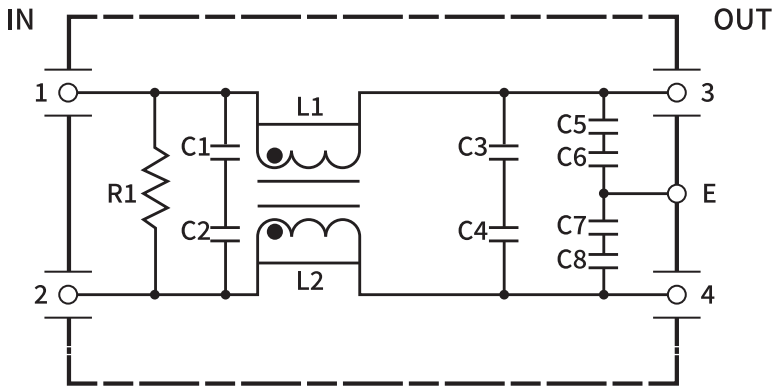
(corresponding to our thyristor power regulator PAC series)

- ***High rated voltage of AC 500V***
- ***Low leakage current 3mA***
- ***EN 55011 group 1 class A***
- ***RoHS directive supported***

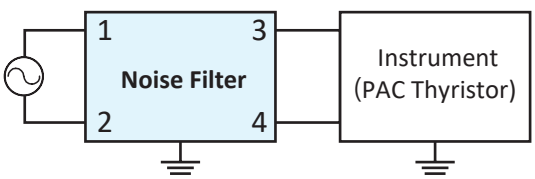
SPECIFICATIONS

- ■ Rated voltage : 500V AC (50/60Hz)
- ■ Rated current capacity : 20A, 30A, 50A, 60A, 80A, 100A, 150A, 200A
- ■ Dielectric strength : 2000 VDC / 1 min. Terminal-Case
- ■ Insulation resistance : 500 VDC / 1 min. later More than 100 MΩ Terminal-Case
- ■ Applicable standard : Complies with RoHS Directive
- ■ Leakage current : 3.0mA MAX 500 VAC 50Hz by UL1283
- ■ Overload current : Rated Current × 150%, 1 minute
  However, no change in characteristics and configuration case.
- ■ Operating Temperature Range : -20–50 °C
  Installation must be done on a metal plate (install the filter on wall)
- ■ External Dimensions : Refer to model code table

CIRCUIT DIAGRAM

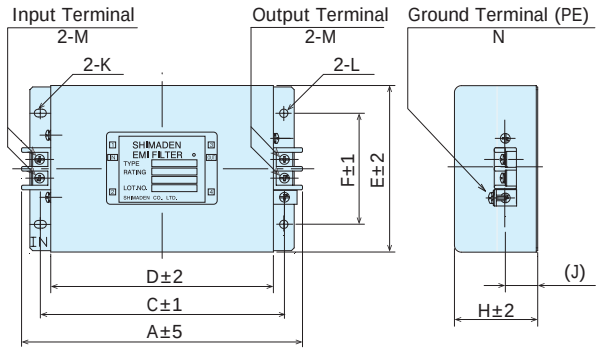


APPLICATION EXAMPLE



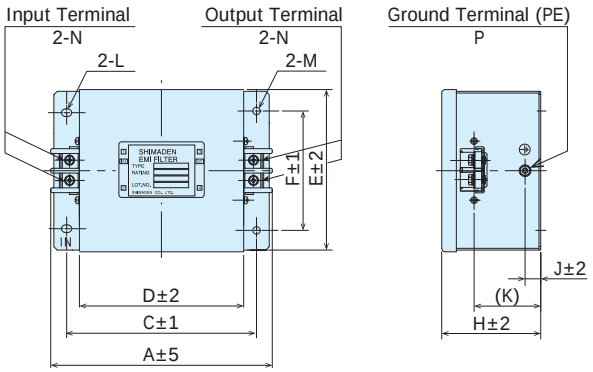
MODEL CODE & EXTERNAL DIMENSIONS

Model Code	Current Capacity	Dimentions (unit: mm)										Weight (Kg)	Case Mterial	
		A	D	E	F	H	J	K	L	M	N		Main Unit	Bottom Cover
NF2020C-SDG	20A	154	110	95	70	50	20	R2.25 Length 6	Φ4.5	M4	M4	0.8	SECC	
NF2030C-SDG	30A	154	110	95	70	50	20	R2.25 Length 6	Φ4.5	M4	M4	0.8		
NF2050C-SDG	50A	180	130	110	80	70	25	R2.75 Length 7	Φ5.5	M6	M4	1.5		
NF2060C-SDG	60A	180	130	110	80	70	25	R2.75 Length 7	Φ5.5	M6	M4	1.6		



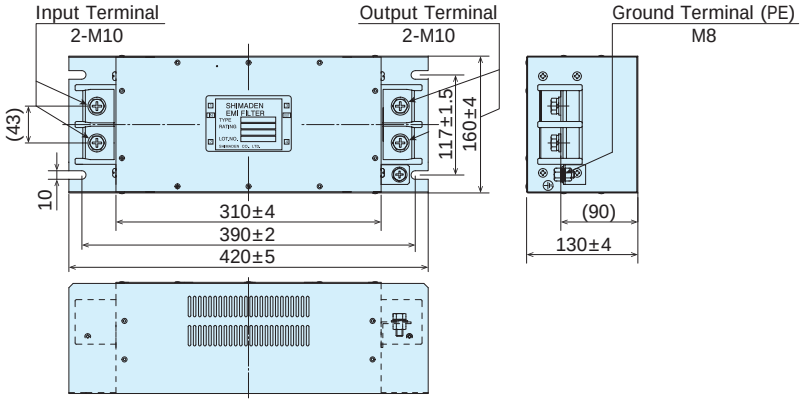
unit: mm

Model Code	Current Capacity	Dimentions (unit: mm)											Weight (Kg)	Case Mterial	
		A	D	E	F	H	J	K	L	M	N	P		Main Unit	Cover
NF2080C - SDG	80A	205	150	120	90	90	20	63	R2.75 Length 7	Φ5.5	M8	M6	2.4	SGCC or SECC	SUS304
NF2100C - SDG	100A	205	150	120	90	90	20	63	R2.75 Length 7	Φ5.5	M8	M6	2.6		
NF2150C - SDG	150A	255	200	170	140	130	20	103	R3.25 Length 8	Φ6.5	M8	M6	6.0		



unit: mm

Model Code	Current Capacity	Dimentions (unit: mm) B	D	E	F	H	K	N	P	Weight (Kg)	Case Mterial Main unit / Cover
NF2200C - SDG	200A	420	310	160	117	130	90	M10	M8	8.5	SGCC or SECC



unit: mm

°C
%RH
SHIMADEN

Series NF3000C
3-phase 3-Wire Type Noise Filter

BASIC FEATURES

- ***Reduction in size and weight realizes a 50% reduction compared to the past model***
- ***Excellent high attenuation characteristics***
  (corresponding to our thyristor power regulator PAC series)
- ***High rated voltage of AC 500V***
- ***Low leakage current 3mA***
- ***EN 55011 group 1 class A***
- ***RoHS directive supported***

SPECIFICATIONS

■ Rated voltage/Leakage Current :

	Rated voltage	Leakage Current
20A–300A	3-phase (3-wire) 500VAC (50/60Hz)	2.5mA Max 400V AC, 50Hz (1.5mA Max 200V AC 60Hz)
500A, 600A	3-phase (3-wire) 480VAC (50/60Hz)	10mA Max 400VAC, 50Hz (5mA Max 200V AC, 60Hz)

■ Rated current capacity : 20A, 40A, 50A, 60A, 100A, 150A, 200A, 300A, 500A, 600A

■ Dielectric strength : 2000V AC or 2828V DC between input/output terminal and ground terminal, 1 minute

■ Insulation resistance : 500V DC, 500MΩ min. between input/output terminal and case, 1 minute later

■ Applicable standard : Complies with RoHS Directive

■ Leakage current : 20A to 300A 2.5mA Max 400V AC 50Hz (1.5mA max 200V AC 60Hz)
500A, 600A 10mA Max 400VAC, 50Hz (5mA Max 200VAC, 60Hz)

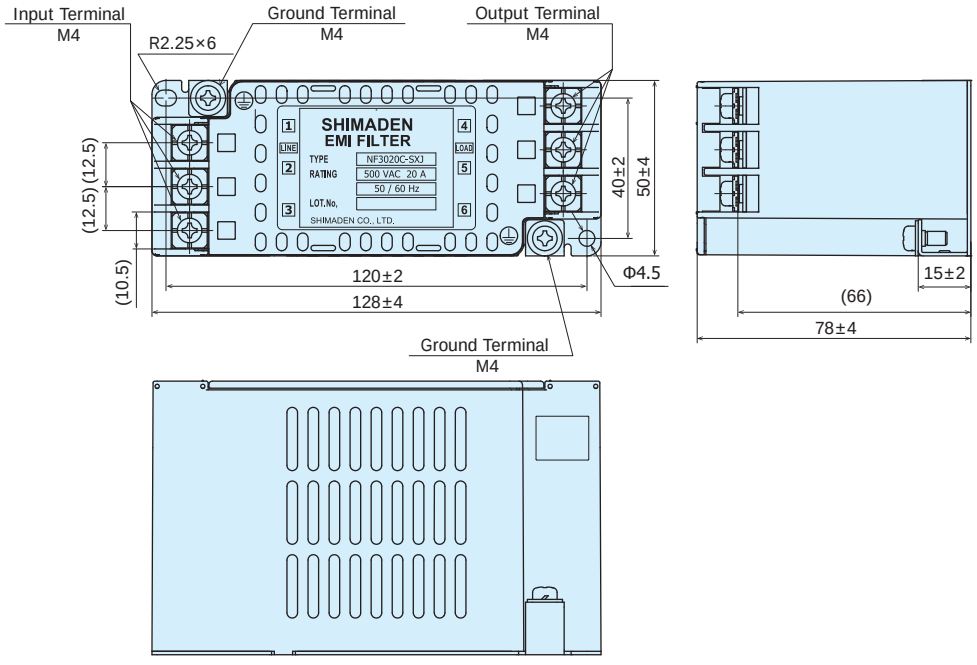
■ Overload current : Constant current × 150%, 1 minute
However, no change in characteristics, no case distortion and no deformation is required.

■ Operating Temperature Range : -20 to 50 °C
Installation must be done on a metal plate (install the filter on wall)

■ External Dimensions : Refer to model code table

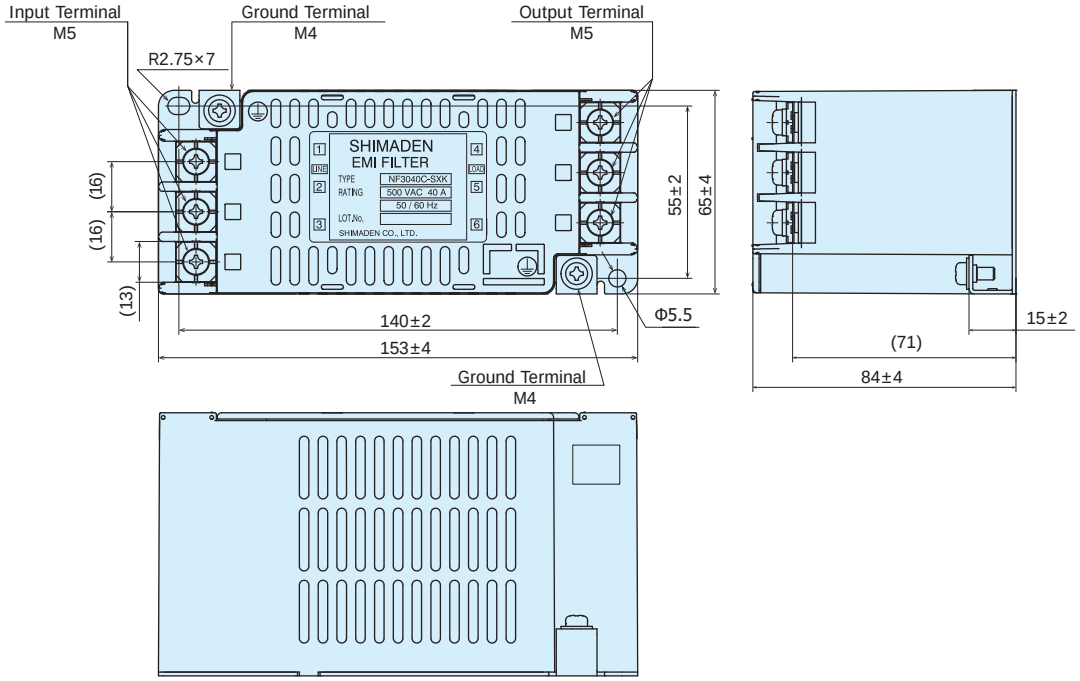
EXTERNAL DIMENSIONS

Model Code	Current Capacity	Input Terminal	Output Terminal	Ground Terminal	Weight (Kg)	Case Mterial
NF3020C-SXJ	20A	M4	M4	M4	0.7	PBT

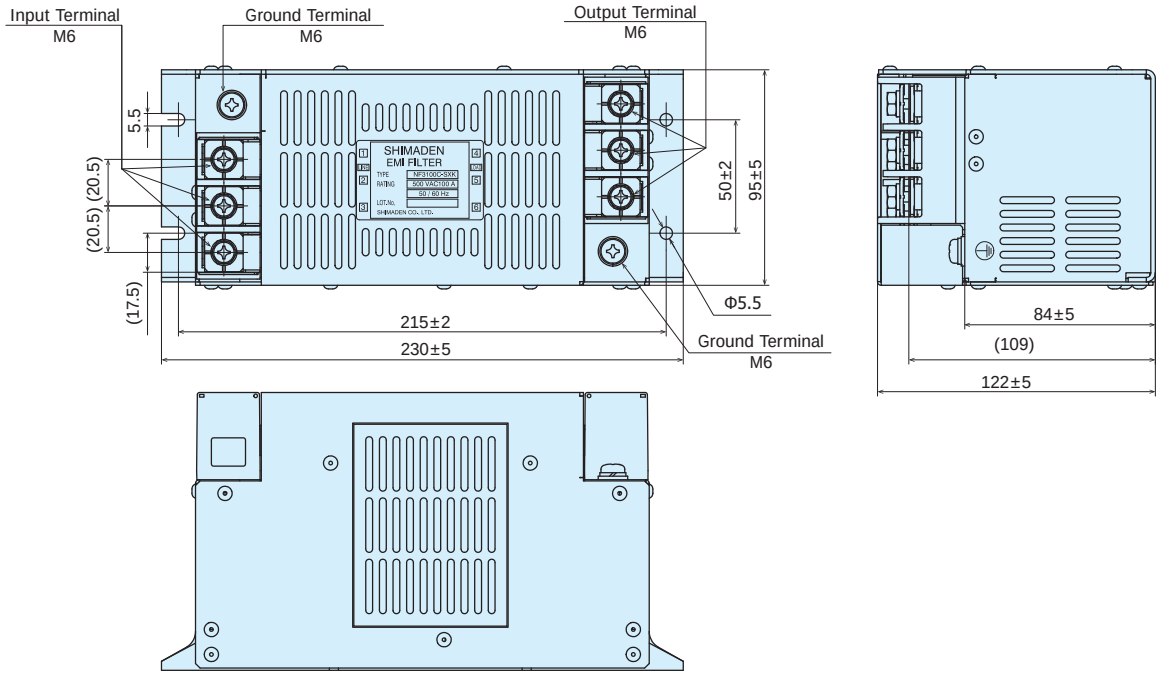


EXTERNAL DIMENSIONS

Model Code	Current Capacity	Input Terminal	Output Terminal	Ground Terminal	Weight (Kg)	Case Mterial
NF3040C-SXK	40A	M5	M5	M4	1.1	PBT
NF3050C-SXK	50A					
NF3060C-SXK	60A					

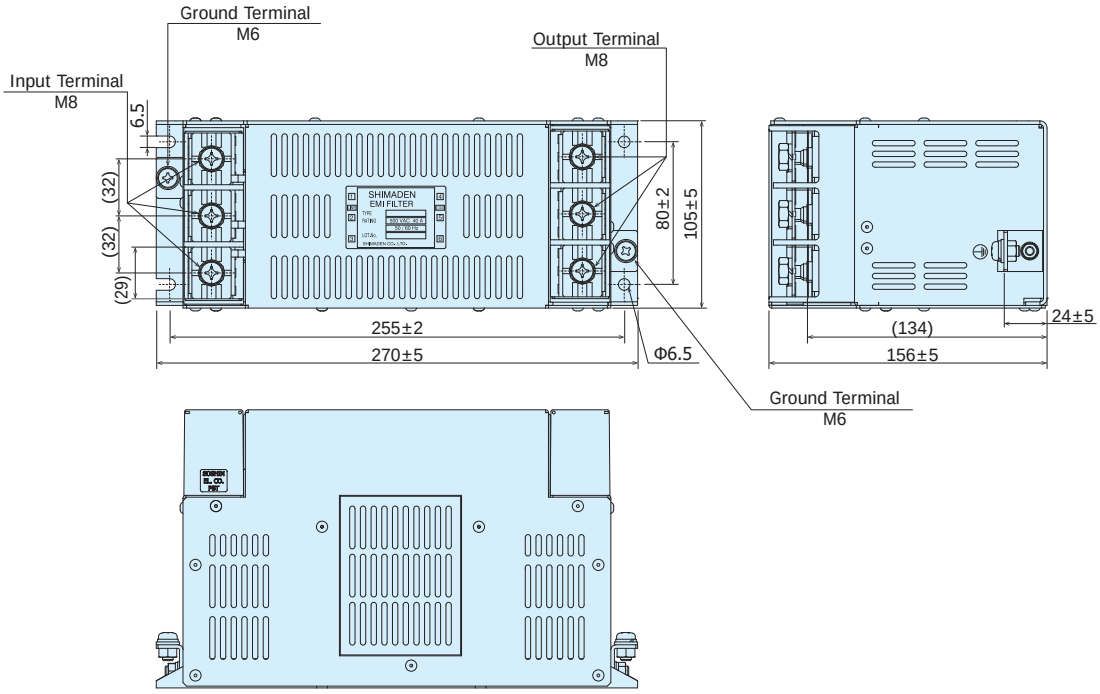


Model Code	Current Capacity	Input Terminal	Output Terminal	Ground Terminal	Weight (Kg)	Case Mterial
NF3100C-SXK	100A	M6	M6	M6	2.7	A5052

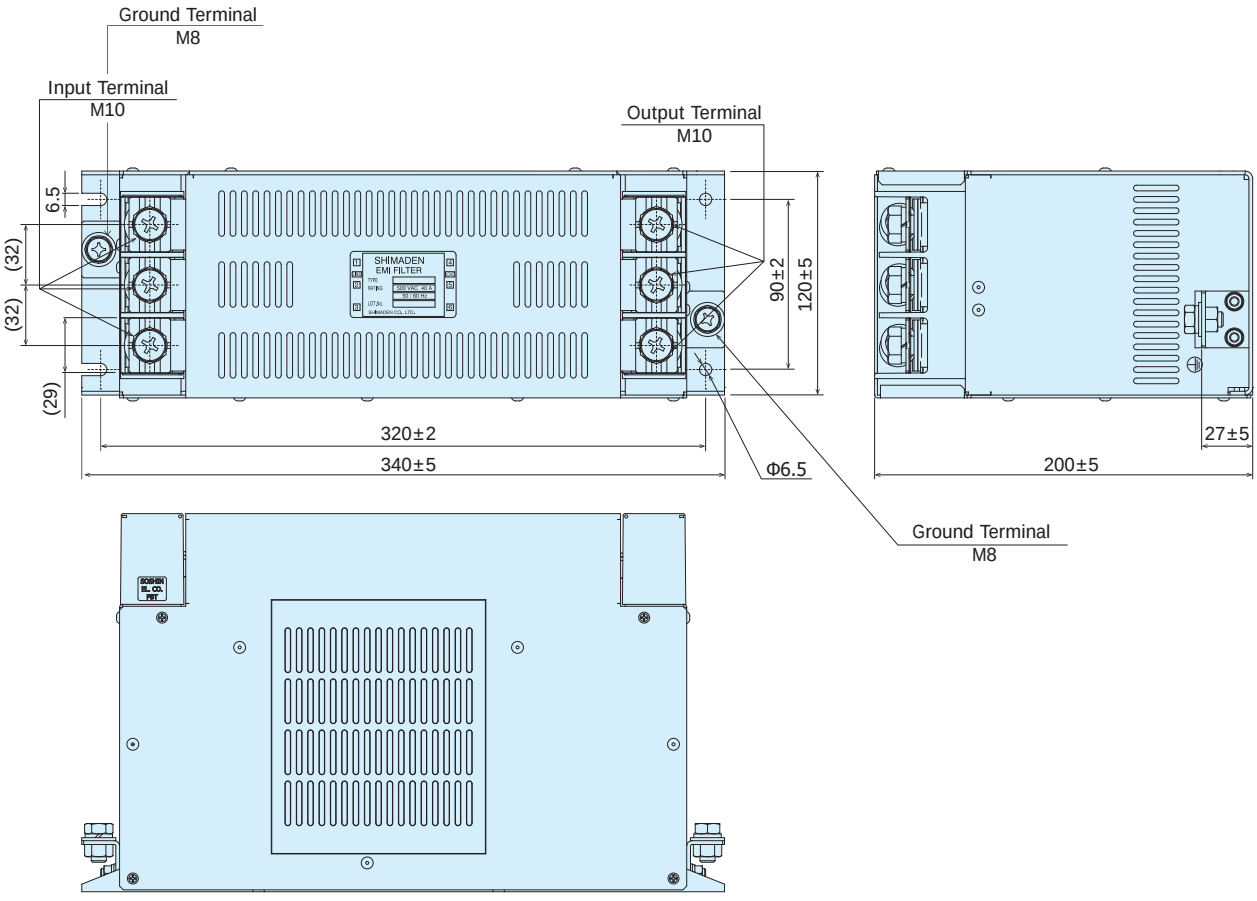


unit: mm

Model Code	Current Capacity	Input Terminal	Output Terminal	Ground Terminal	Weight (Kg)	Case Mterial
NF3150C-SXK	150A	M8	M8	M6	4.3kg	A5052



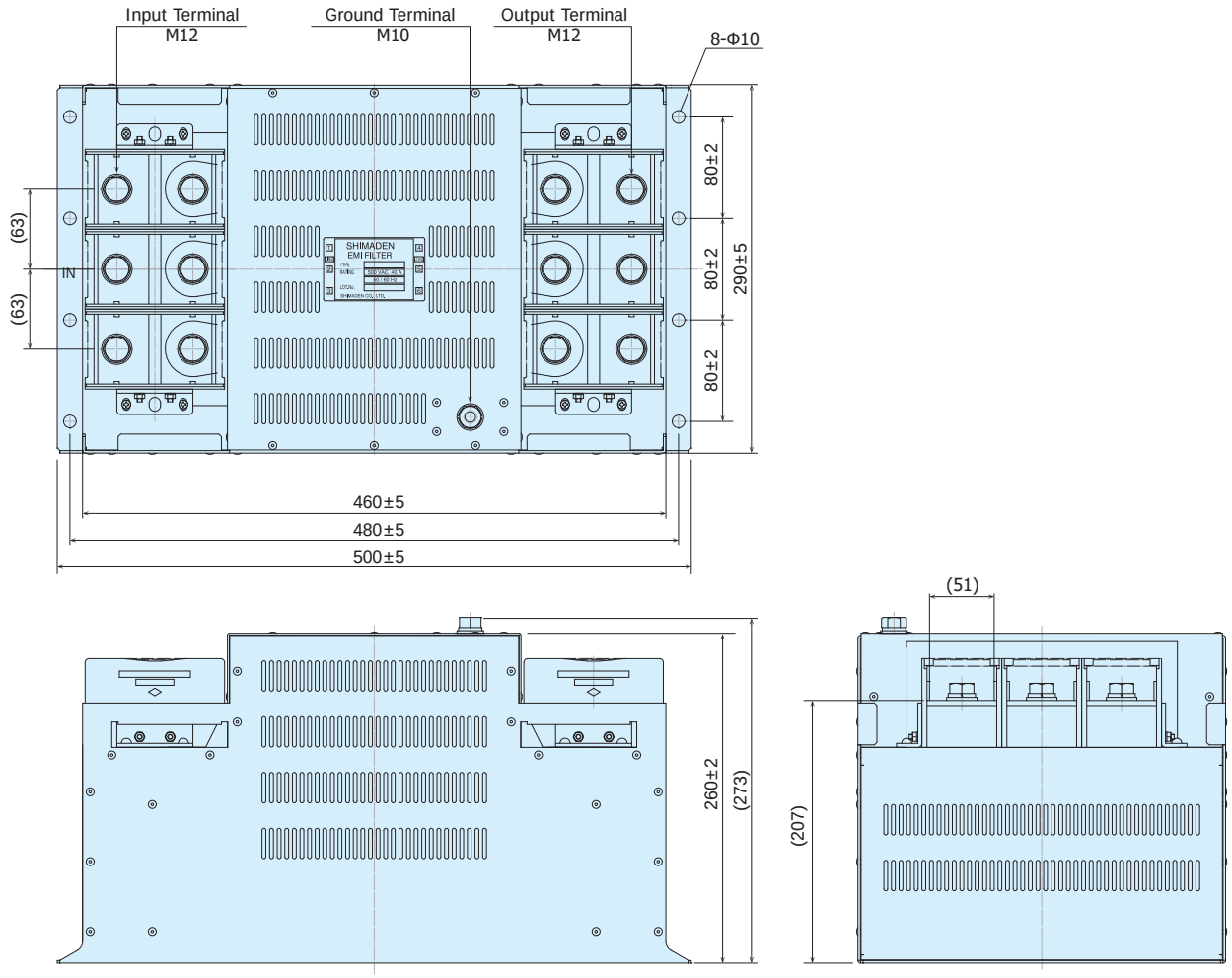
Model Code	Current Capacity	Input Terminal	Output Terminal	Ground Terminal	Weight (Kg)	Case Mterial
NF3200C-SXK	200A	M10	M10	M8	6.9 kg	A5052
NF3300C-SXK	300A				8.1 kg	



unit: mm

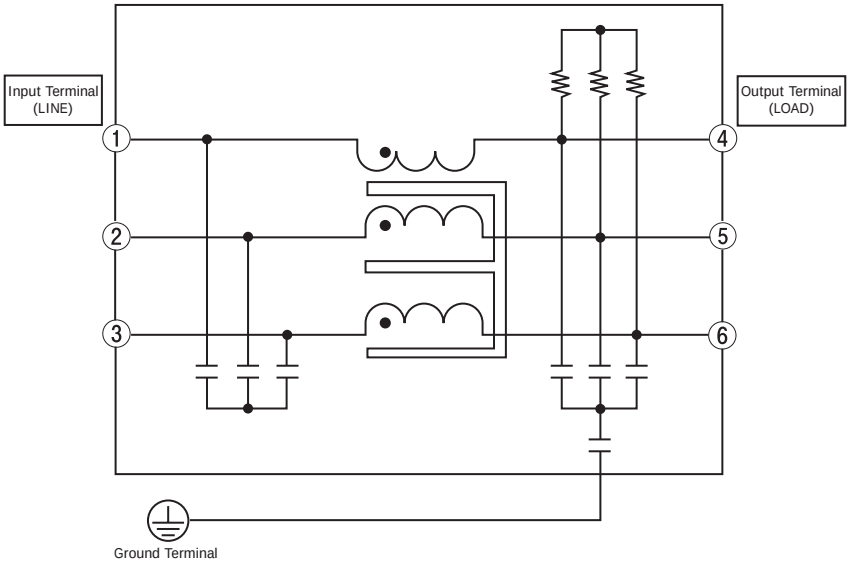
EXTERNAL DIMENSIONS

Model Code	Current Capacity	Input Terminal	Output Terminal	Ground Terminal	Weight (Kg)	Case Mterial
NF3500C-SXK	500A	M12	M12	M10	26 kg	A5052
NF3600C-SXK	600A					

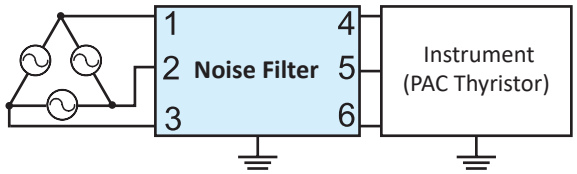
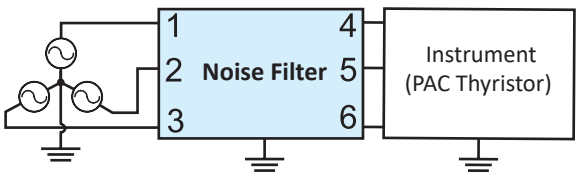


unit: mm

CIRCUIT DIAGRAM



APPLICATION EXAMPLE

One-phase ground power supply (delta connection)	Neutral point ground power supply (star connection)
	

°C
%RH
SHIMADEN

MICROPROCESSOR-BASED *Series EM70*

INTELLIGENT SERVO CONTROLLER

BASIC FEATURES

□ *High visibility of Control Motor opening display, which is shown in a bar graph (20 dots) and 7 segments.*

□ *Zero/Span adjustment of opening can be done automatically at the touch of a single button.*

□ *By means of the combination of SSR and relay, the drive unit can control directly large capacities (20 to 240V / 2A).*

□ *A wide selection of additional functions (optional) is available to suit various requirements.*

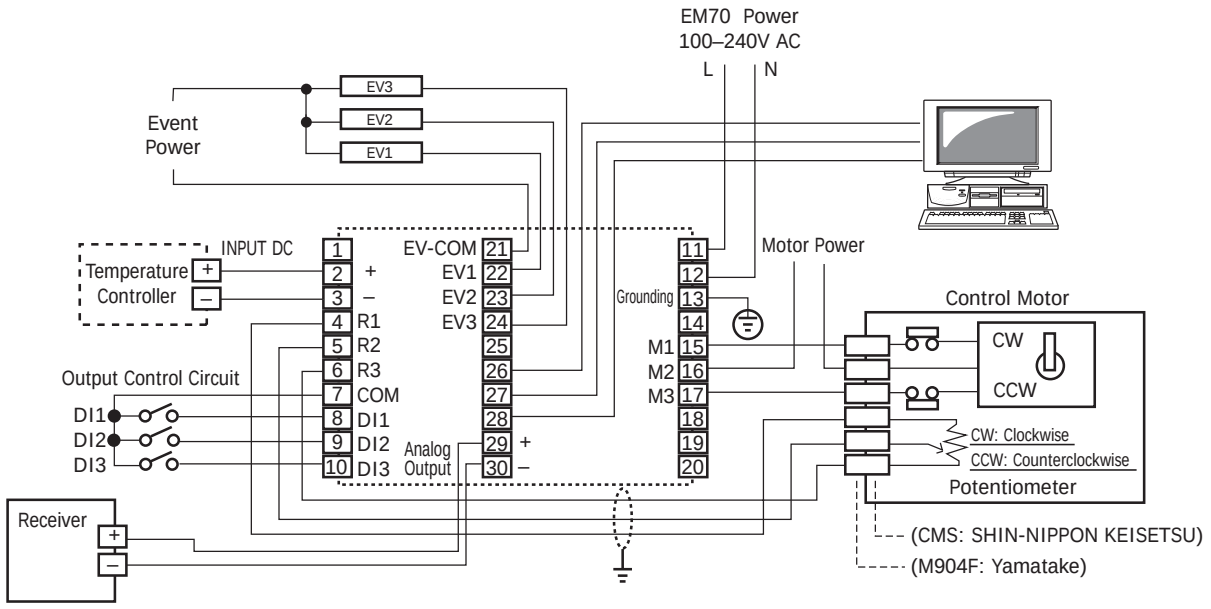
(Events, analog output, external operation, square root extraction, communication function)

□ *Dust and splash proof front panel equivalent to IP66*

ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS	
SERIES	EM70-	96×96 DIN size, Intelligent servo contoroller	
CONTROL INPUT	4	Current 4 to 20, 0 to 20mA DC	Receiving impedance: 100Ω
	6	Voltage 1 to 5, 0 to 5, 0 to 10 V DC	Input impedance: 1MΩ min.
CONTROL OUTPUT	Y-	Contact: 240V AC/2A With CR absorber (internally installed)	
	R-	Contact: 240V AC/2A Without CR absorber	
	S-	Combination of SSR and contact 240V AC 2A	
EVENT OUTPUT	0	Without	
	1	Contact output (1a) / 3 points	
ANALOG OUTPUT	0	Without	
	4	4 to 20mA DC Load resistance: 300Ω max.	
SQUARE ROOT EXTRACTION	0	Without	
	1	Output by square root extraction of control input signal	
COMMUNICATION	0	Without	
	5	RS-485	
	7	RS-232C	
REMARKS	0	Without	
	9	With (Please consult before ordering.)	

WIRING EXAMPLE



°C
%RH
SHIMADEN

Plug-In Type

Series EM52

SERVO CONTROLLER

Coming soon

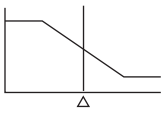
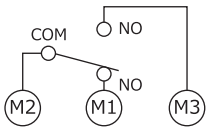
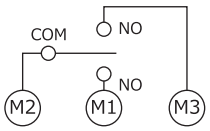
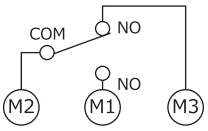
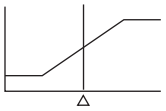
BASIC FEATURES

- □ *Adjusts the rotation angle of the control motor (with F.B.POT) in proportion to the control input signal*
- □ *Feedback resistance (with F.B.POT) is optional between 100Ω and 2kΩ*
- □ *Output selectable from relay contact or triac (SSR)*
- □ *Plug-in type, mounting type for both panel surface and DIN rail*
- □ *RoHS directive supported*

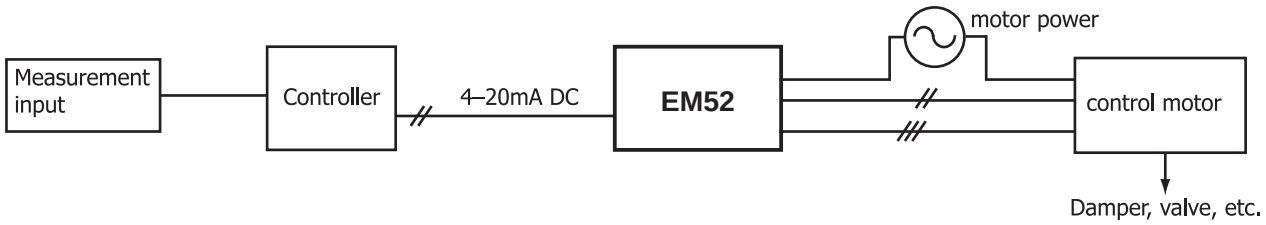
ORDERING INFORMATION

ITEM	CODE	SPECIFICATIONS
SERIES	EM52-	Plug-in Type Servo Controller
CONTROL INPUT	1	1 to 5mA DC, Receiving resistance: 250Ω
	2	4 to 20mA DC, Receiving resistance: 63Ω
	3	0 to 10V DC, Input resistance: 520kΩ
	5	Potentiometer 100Ω to 2kΩ 3-wire system
	9	Others (Please consult before ordering.)
OUTPUT	Y	Contact 240V AC, 1A (inductive load) With CR absorber
	R	Contact 240V AC, 1A (inductive load) without CR absorber
	S	Triac 20 to 120V AC, 1A (inductive load) (Motor Supply Voltage: 20 to 120V AC)
REMARKS	0	Without
	9	With (Please consult before ordering.)

RELAY ACTIONS

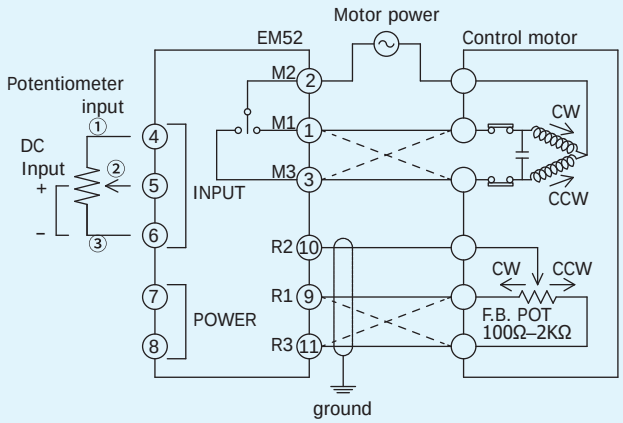
Characteristic		Run	Increased	Balanced	Decreased
RA		Heat	M2-M1: ON (Open)  LED Green lights	M2-M1, M3: OFF (Stop)  LED off	M2-M3: ON (Close)  LED Red lights.
DA		Cool			

WIRING EXAMPLE

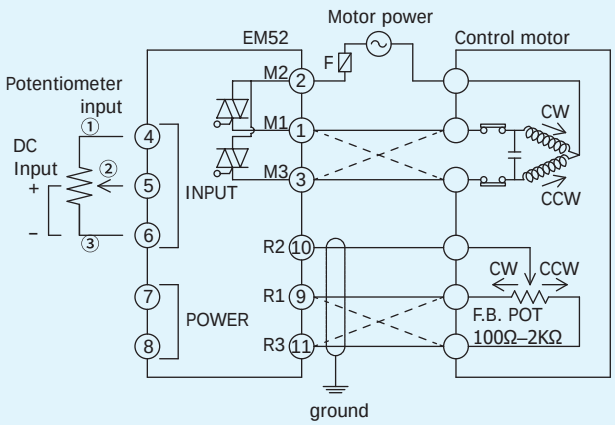


CONNECTION DIAGRAM

CONTACT



TRIAC (SSR)



□ For model with Triac (SSR), motor power supply voltage range must be 20 to 240V AC.
It is recommended that the fuse between terminal 2 and the power supply terminal be used to protect motor upon malfunction.
(Current rating for fuse must be approximately twice the size which is appropriate for the motor for which it is being used.)

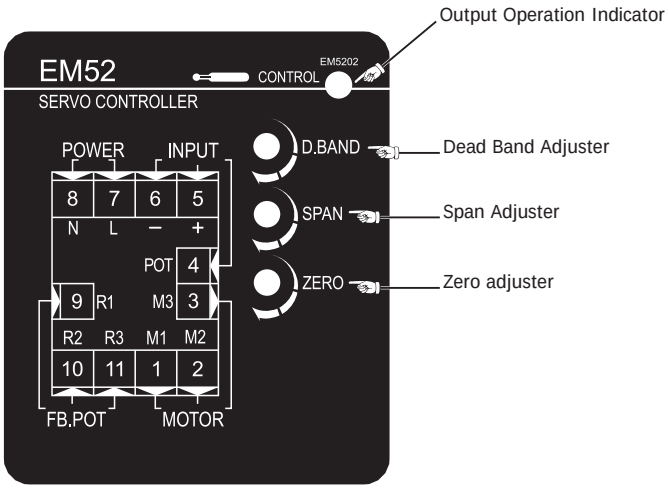
• Make sure the motor power supply matches the rating of the motor to be used.

• For inverting the operating direction of motor (to open with input at 0% and close with input at 100%), permute the wires for terminals ① and ③ as well as those for terminals ⑨ and ⑪ respectively.

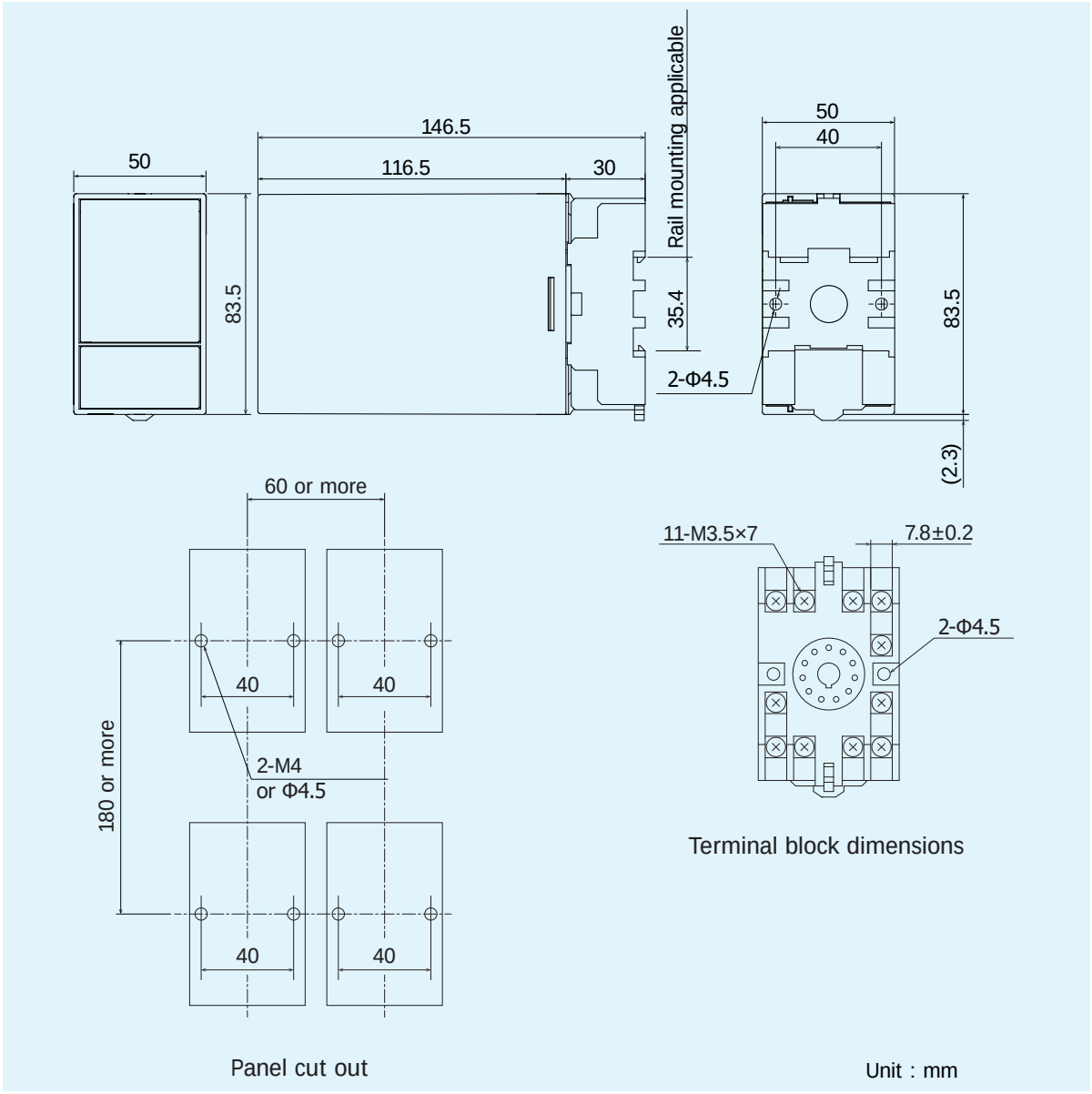
□ CW : Clockwise rotation (open)
CCW : Counterclockwise rotation (closed)

□ F : Fuse

TERMINAL ARRANGEMENT



EXTERNAL DIMENSIONS AND PANEL CUTOUT



°C
%RH
SHIMADEN

Series T71A/H71A/TH71A

Wall mounting type sensor (Temperature/Humidity)

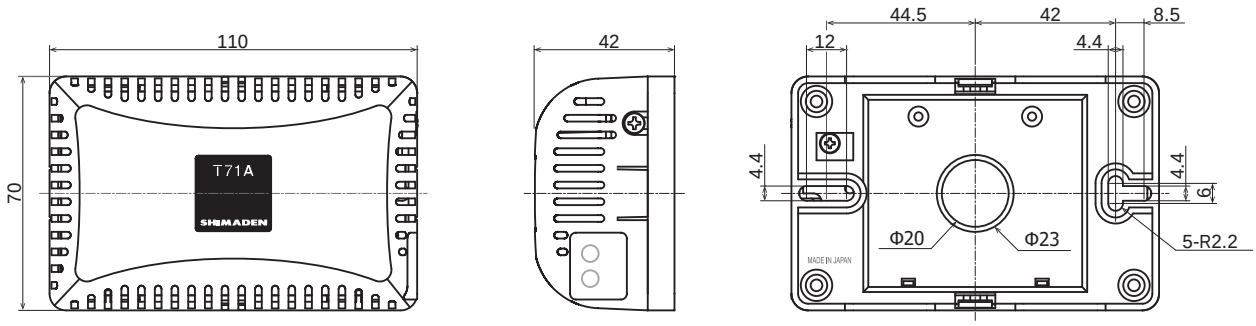
COMMON SPECIFICATIONS

- □ *Material (Case and Base): Resin based plastic*
- □ *External Dimensions: 70 (H) x 110 (W) x 42 (D) mm*
- □ *Mounting Method: Wall mounting*
- □ *Mounting Measurement: 86.5mm 2-φ4 (Mounting screw space)*
- □ *RoHS directive supported*

ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS		
SERIES	T71A-	Temperature Sensor		
NUMBER OF ELEMENT	1	1 (One element)		
	2	2 (Two element)		
STANDARD		F	Pt100 /DIN (New JIS)	
CLASS		S	Class B	
		Q	Class A	
		X	Others (Please consult before ordering.)	
MOUNTING DIRECTIONS (FACEPLATE DIRECTION ONLY)			1	Horizontal Direction
			2	Vertical Direction
REMARKS				0 Without
				9 With (Please consult before ordering.)

EXTERNAL DIMENSIONS & MOUNTING DRAWING



Unit: mm

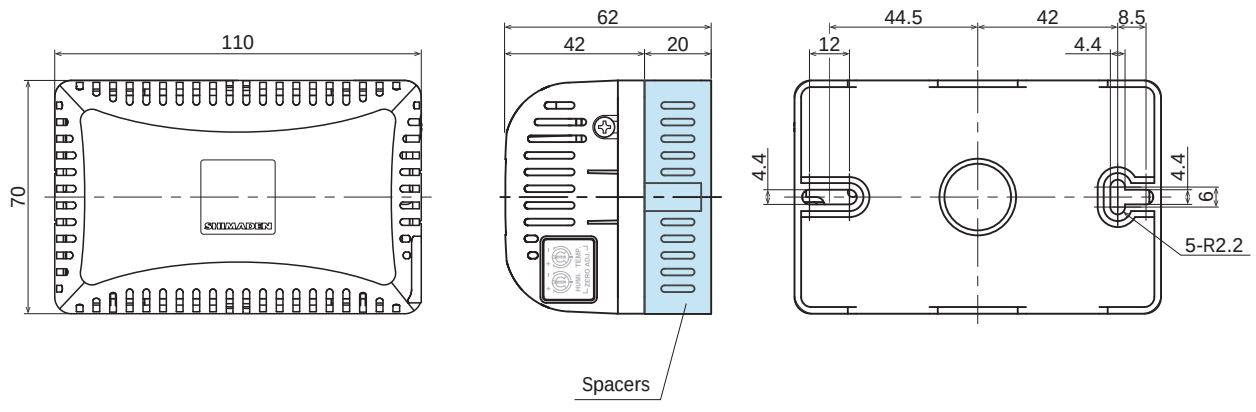
SPACERS (sold separately)

Product Outline

In the case the sensor is subject to the influence of humidity/temperature from the wall surface on which the sensor is mounted, the spacer lifts up the sensor by 20 mm from the wall surface, contributing to more precise measurements.

CODE	QTS001

External dimensions of the T71A/H71A/TH71A series sensors with spacers

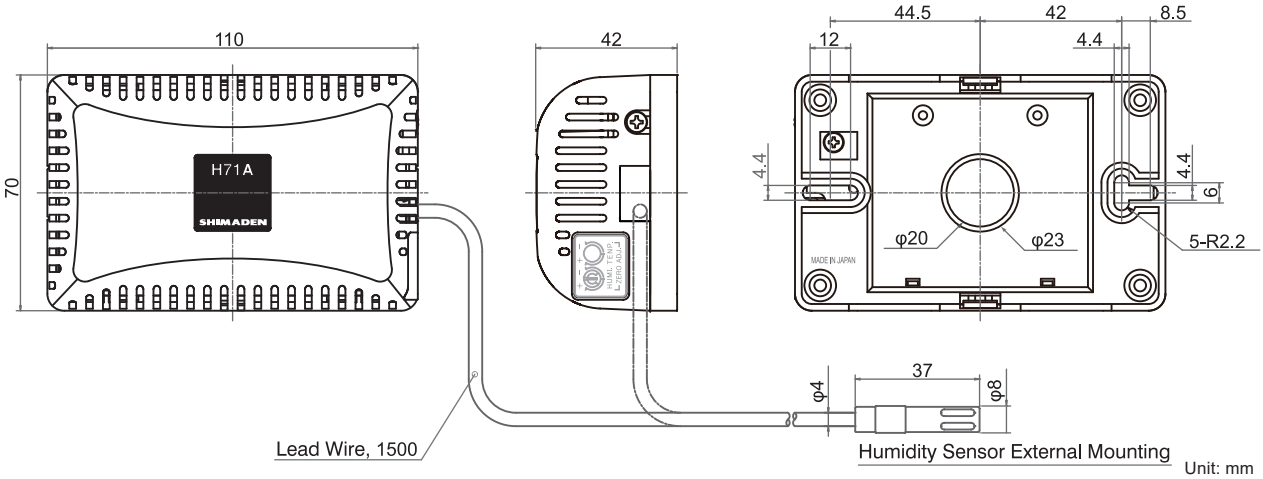


Unit: mm

ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS	
SERIES	H71A-	Humidity Sensor	
TYPE OF HUMIDITY SENSOR	1	Self-contained type	
	2	Probe type (with lead 1.5m)	
HUMIDITY OUTPUT SIGNAL	1	0 to 10mV DC/0 to 100%RH Output Resistance: 10Ω (linearized output)	
	2	0 to 100mV DC/0 to 100%RH Output Resistance: 100Ω (linearized output)	
	3	0 to 1V DC/0 to 100%RH Output Resistance: 1kΩ (linearized output)	
	6	4 to 20mA DC/0 to 100%RH Load Resistance: 600Ω max.	
	9	Others (Please consult before ordering.)	
MOUNTING DIRECTIONS (FACEPLATE DIRECTION ONLY)	1	Horizontal Direction	
	2	Vertical Direction	
REMARKS	0	Without	
	9	With (Please consult before ordering.)	

EXTERNAL DIMENSIONS & MOUNTING DRAWING



Unit: mm

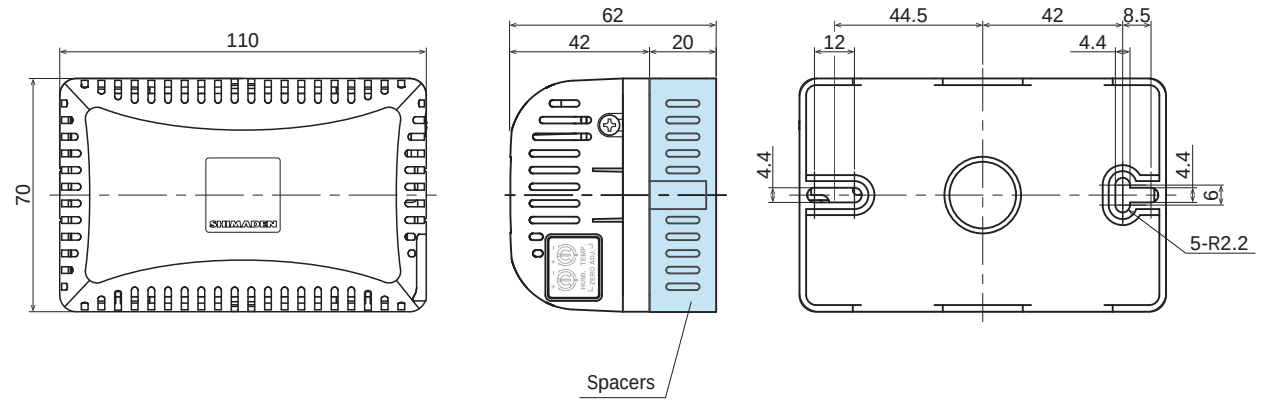
SPACERS (sold separately)

Product Outline

In the case the sensor is subject to the influence of humidity/temperature from the wall surface on which the sensor is mounted, the spacer lifts up the sensor by 20 mm from the wall surface, contributing to more precise measurements.

CODE	QTS001

External dimensions of the T71A/H71A/TH71A series sensors with spacers

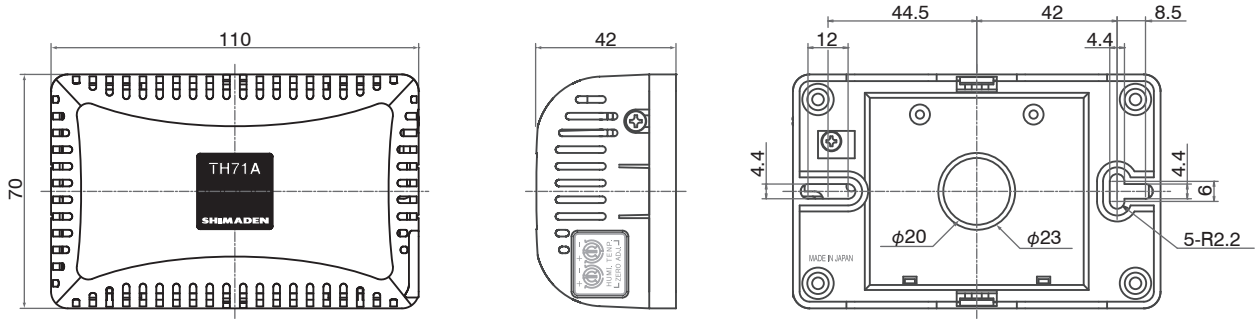


Unit: mm

ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS
SERIES	TH71A-	Temperature/Humidity Sensor (Sensing element self-contained type)
HUMIDITY OUTPUT SIGNAL	1	0 to 10mV DC/0 to 100%RH Output Resistance: 10Ω (linearized output)
	2	0 to 100mV DC/0 to 100%RH Output Resistance: 100Ω (linearized output)
	3	0 to 1V DC/0 to 100%RH Output Resistance: 1kΩ (linearized output)
	6	4 to 20mA DC/0 to 100%RH Load Resistance: 600Ω max. *Temperature output signal applies only to Pt100
	9	Others (Please consult before ordering.)
TEMPERATURE OUTPUT SIGNAL	1	0 to 5mV DC/0 to 50°C Output Resistance: 10Ω (linearized output)
	2	0 to 50mV DC/0 to 50°C Output Resistance: 100Ω (linearized output)
	3	0 to 0.5V DC/0 to 50°C Output Resistance: 1kΩ (linearized output)
	8	Pt100/DIN (three lead wire output) Class B Rated current: 1mA
	9	Others (Please consult before ordering.)
MOUNTING DIRECTIONS (FACEPLATE DIRECTION ONLY)	1	Horizontal Direction
	2	Vertical Direction
REMARKS	0	Without
	9	With (Please consult before ordering.)

EXTERNAL DIMENSIONS & MOUNTING DRAWING



Unit: mm

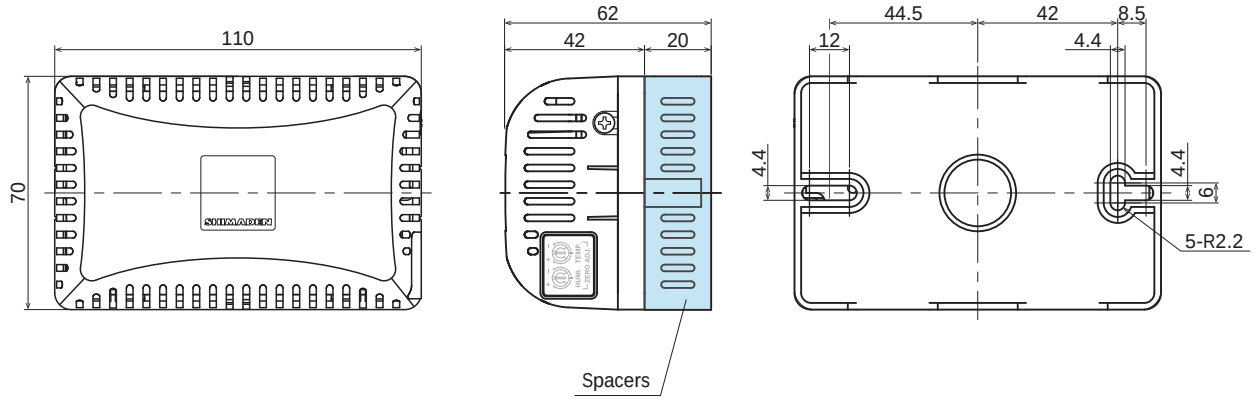
SPACERS (sold separately)

Product Outline

In the case the sensor is subject to the influence of humidity/temperature from the wall surface on which the sensor is mounted, the spacer lifts up the sensor by 20 mm from the wall surface, contributing to more precise measurements.

CODE	QTS001

External dimensions of the T71A/H71A/TH71A series sensors with spacers

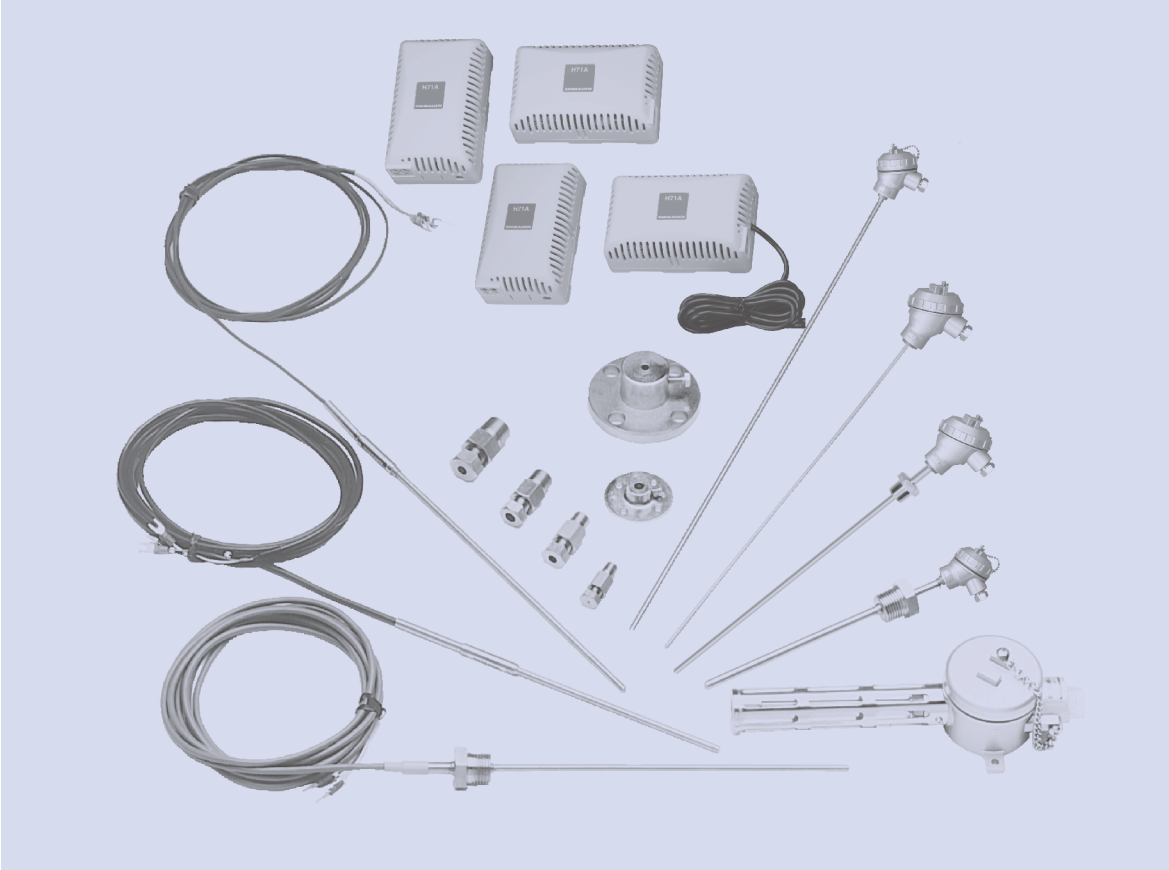


Unit: mm

°C
%RH
SHIMADEN

SENSOR

Series TD/RD/R/STD/SRD



BASIC FEATURES

Temperature sensor that can meet your needs

There are two types of Shimaden temperature detectors: standard type and special type.

Standard Type Temperature Sensor

Standard type is a list of commonly used shapes and specifications, and is available with short delivery times and low prices.

Thermocouple: The TD series is a standard type using class 2 thermocouples. There are two types of sheath thermocouples: TD-11S with direct lead attachment and TD-18S with terminal box. We will manufacture the metal sheath length and compensating lead length according to your order. Please contact your sales representative for pricing.

RTD: The RD series is a standard type that uses Class B RTD elements, and is available in general type, general type drip-proof specification, and sheath type. We will manufacture the protective tube, metal sheath length and lead wire length according to your order. Please contact your sales representative for pricing.

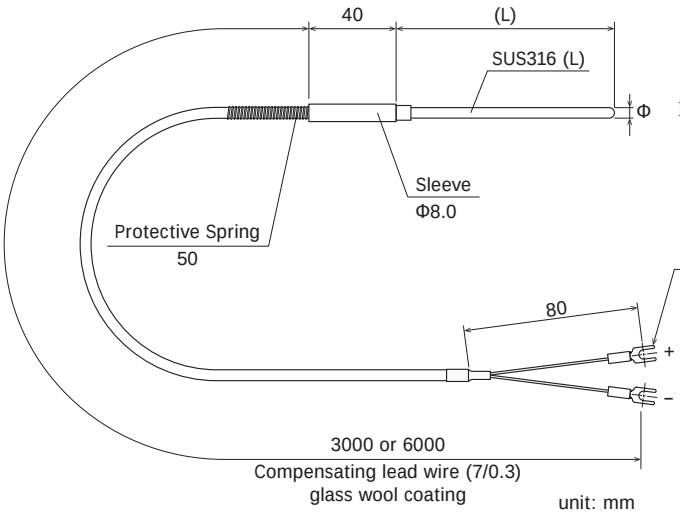
R-50M series: The R-50M series is a wall-mounted RTD for refrigeration, cold storage and low temperature areas.

Specially Ordered Temperature Sensor

Special ordered types are manufactured to customer specifications.

Series TD-11S Thermocouple Sensor

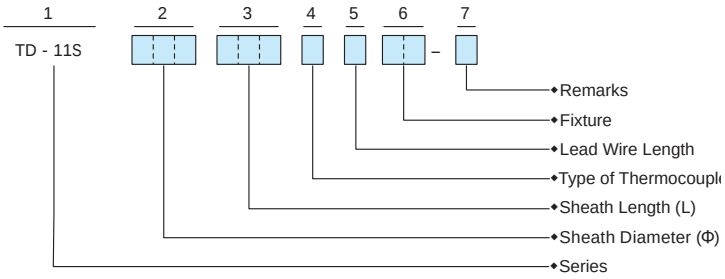
- External Dimensions -



unit: mm

Note 1: When installing a sensor, make sure to create an air cooling space by using mounting brackets, etc. so that the temperature of the sleeve portion does not exceed 80 °C.

Note 2: Do not soak the compensation lead wire.

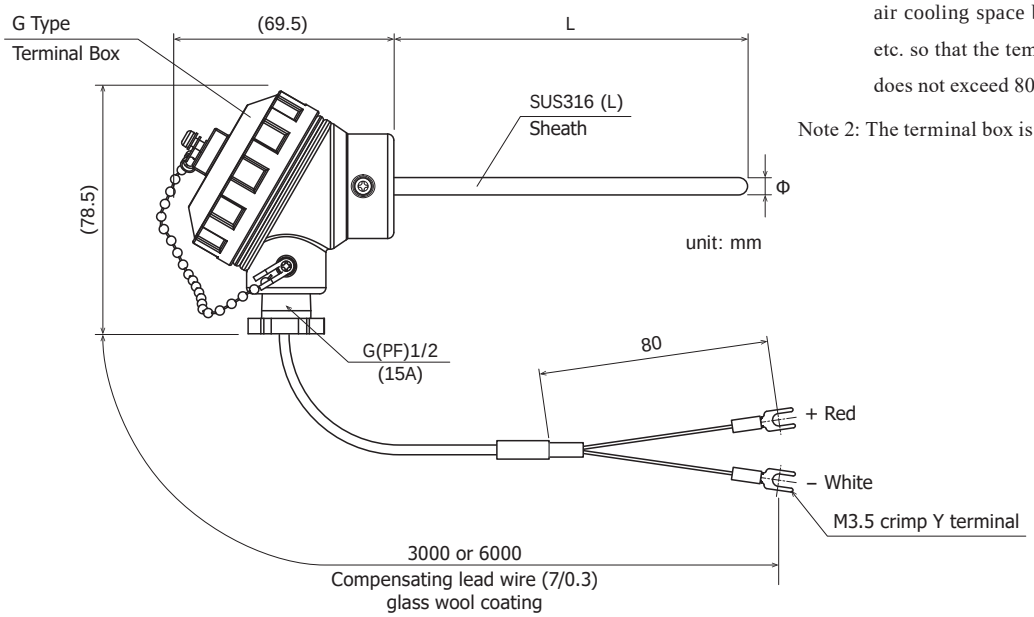


■ ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS			
1. Model	TD-11S-	SLEEVE TYPE THERMOCOUPLE Sheath SENSOR			
2. Sheath Diameter (Φ) & 3. Length (L)		016	150	Φ1.6	150 mm J/450 °C MAX, K/650 °C MAX
			250		250 mm J/450 °C MAX, K/650 °C MAX
			350		350 mm J/450 °C MAX, K/650 °C MAX
			500		500 mm J/450 °C MAX, K/650 °C MAX
			□□□		Others (Please consult before ordering.)
		032	150	Φ3.2	150 mm J/650 °C MAX, K/750 °C MAX
			250		250 mm J/650 °C MAX, K/750 °C MAX
			350		350 mm J/650 °C MAX, K/750 °C MAX
			500		500 mm J/650 °C MAX, K/750 °C MAX
			□□□		Others (Please consult before ordering.)
		048	150	Φ4.8	150 mm J/750 °C MAX, K/800 °C MAX
			250		250 mm J/750 °C MAX, K/800 °C MAX
			350		350 mm J/750 °C MAX, K/800 °C MAX
			500		500 mm J/750 °C MAX, K/800 °C MAX
			□□□		Others (Please consult before ordering.)
4. Element TYPE				J	JIS J 0.75 class 2
				K	JIS K 0.75 class 2
5. Lead Wire				C	3000 mm (3 merters) Diameter : 0.3 mm x 7, glass wool coating
				F	6000 mm (6 merters) Diameter : 0.3 mm x 7, glass wool coating
				X	Others (Please consult before ordering.)
6. Fixture					00- None
					45- With compression fitting PT1/8 Φ1.6, 3.2, 4.8
					46- With compression fitting PT1/4 Φ1.6, 3.2, 4.8
					47- With compression fitting PT3/8 Φ3.2, 4.8
					48- With compression fitting PT1/2 Φ3.2, 4.8
					49- With compression fitting PT3/4 Φ3.2, 4.8
					51- Sliding Flange Type (FA)
7. Remarks					0 Without
					9 With (Please consult before ordering.)

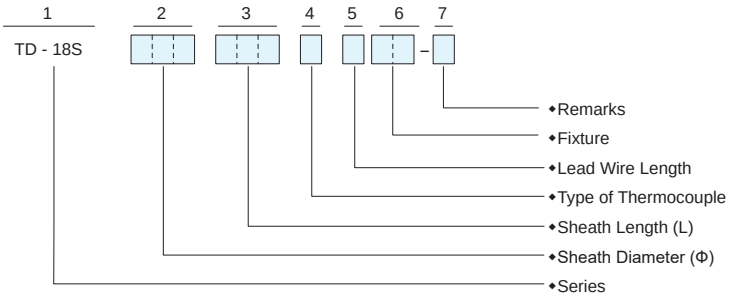
Series TD-18S Thermocouple Sensor

– External Dimensions –



Note 1: When installing a sensor, make sure to create an air cooling space by using mounting brackets, etc. so that the temperature of the Terminal Box does not exceed 80 °C.

Note 2: The terminal box is not water-proof/splash-proof.

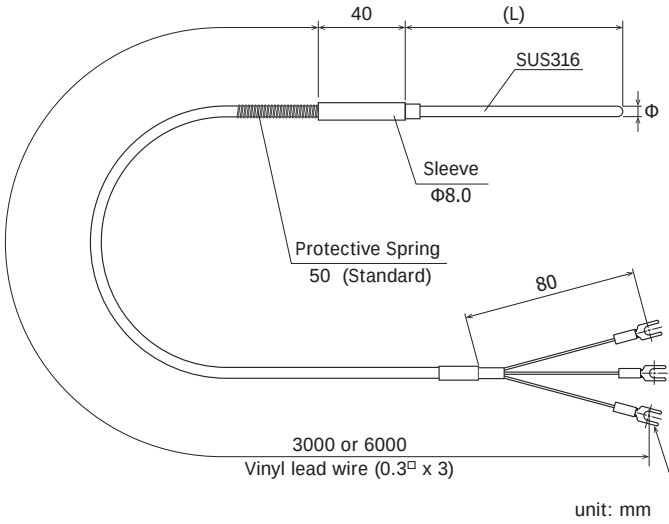


■ ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS			
1. Model	TD-18S-	G HEAD TYPE THERMOCOUPLE Sheath SENSOR			
2. Sheath Diameter (Φ) & 3. Length (L)		032	250	Φ3.2	250 mm J/650 °C MAX, K/750 °C MAX
			350		350 mm J/650 °C MAX, K/750 °C MAX
			500		500 mm J/650 °C MAX, K/750 °C MAX
			□□□		Others (Please consult before ordering.)
		048	250	Φ4.8	250 mm J/750 °C MAX, K/800 °C MAX
			350		350 mm J/750 °C MAX, K/800 °C MAX
			500		500 mm J/750 °C MAX, K/800 °C MAX
			□□□		Others (Please consult before ordering.)
		064	250	Φ6.4	250 mm J/750 °C MAX, K/800 °C MAX
			350		350 mm J/750 °C MAX, K/800 °C MAX
			500		500 mm J/750 °C MAX, K/800 °C MAX
			□□□		Others (Please consult before ordering.)
4. Element TYPE				J	JIS J 0.75 class 2
				K	JIS K 0.75 class 2
5. Lead Wire				N	None
				C	3000 mm (3 merters) Diameter : 0.3 mm x 7, glass wool coating
				F	6000 mm (6 merters) Diameter : 0.3 mm x 7, glass wool coating
				X	Others (Please consult before ordering.)
6.Fixture				00 -	None
				45 -	With compression fitting PT1/8 Φ3.2, 4.8
				46 -	With compression fitting PT1/4 Φ3.2, 4.8, 6.4
				47 -	With compression fitting PT3/8 Φ3.2, 4.8
				48 -	With compression fitting PT1/2 Φ3.2, 4.8
				49 -	With compression fitting PT3/4 Φ3.2, 4.8
				51 -	Sliding Flange Type (FA)
7.Remarks					0 Without
					9 With (Please consult before ordering.)

Series RD-11C RTD Sensor

- External Dimensions -

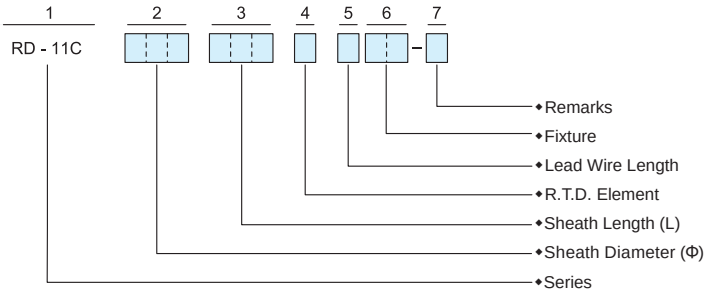


unit: mm

Temperature Range: 0–250 °C

Note 1: When installing a sensor, make sure to create an air cooling space by using mounting brackets, etc. so that the temperature of the sleeve portion does not exceed 80 °C.

Note 2 : Do not soak the lead wire.

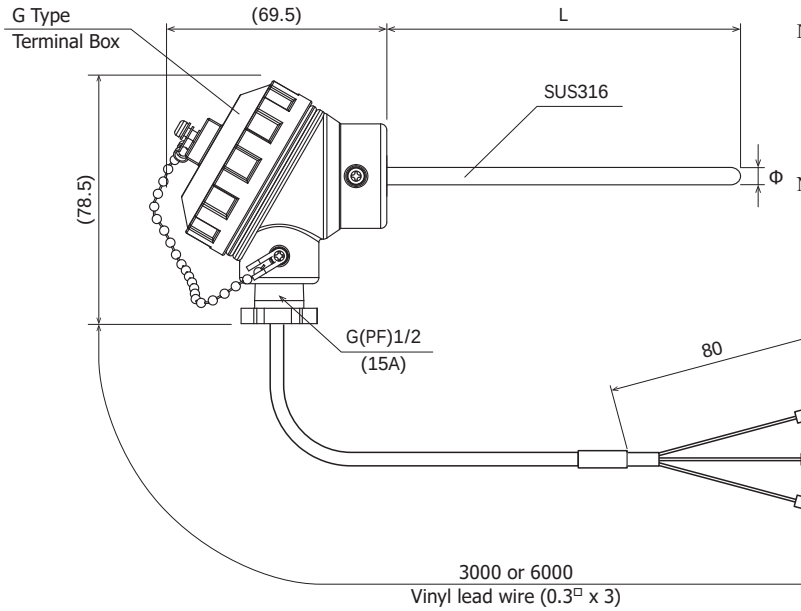


■ ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS			
1. Model	RD-11C-	SLEEVE TYPE RTD Pt100 JIS SENSOR			
2. Protecting tube Diameter (Φ) & 3. Length (L)		048	150	Φ4.8	150 mm
			250		250 mm
			350		350 mm
			500		500 mm
			□□□		Others (Please consult before ordering.)
		064	150	Φ6.4	150 mm
			250		250 mm
			350		350 mm
			500		500 mm
			□□□		Others (Please consult before ordering.)
4. RTD Element		F	JIS Pt100 class B		
5. Lead Wire		C	3000 mm (3 merters) Vinyl lead wire		
		F	6000 mm (6 merters) Vinyl lead wire		
		X	Others (Please consult before ordering.)		
6. Fixture		00 -	None		
		45 -	With compression fitting PT1/8 Φ4.8		
		46 -	With compression fitting PT1/4 Φ4.8, 6.4		
		47 -	With compression fitting PT3/8 Φ4.8, 6.4		
		48 -	With compression fitting PT1/2 Φ4.8, 6.4		
		49 -	With compression fitting PT3/4 Φ4.8, 6.4		
		51 -	Sliding Flange Type (FA)		
7. Remarks		0	Without		
		9	With (Please consult before ordering.)		

Series RD-18C RTD Sensor

– External Dimensions –

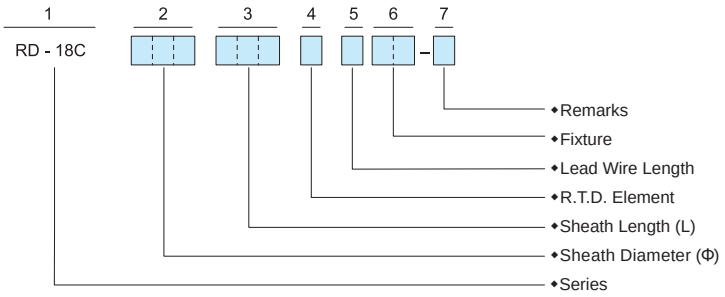


Unit: mm

Temperature Range: 0–250 °C

Note 1: When installing a sensor, make sure to create an air cooling space by using mounting brackets, etc. so that the temperature of the Terminal Box does not exceed 80 °C.

Note 2: The terminal box is not water-proof/splash-proof.

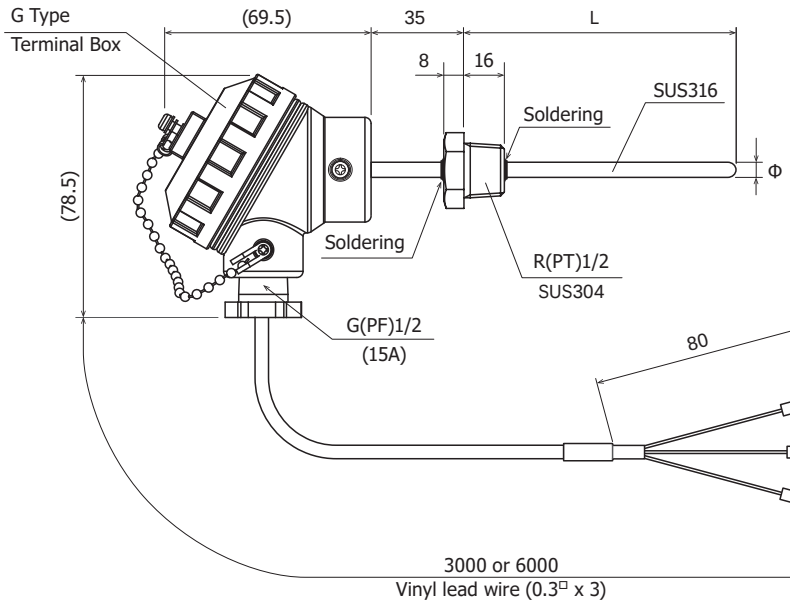


■ ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS			
1. Model	RD-18C-	G HEAD TYPE RTD Pt100 JIS SENSOR			
2. Protecting tube Diameter (Φ) & 3. Length (L)		048	150	Φ4.8	150 mm
			250		250 mm
			350		350 mm
			500		500 mm
			□□□		Others (Please consult before ordering.)
		064	150	Φ6.4	150 mm
			250		250 mm
			350		350 mm
			500		500 mm
			□□□		Others (Please consult before ordering.)
4. RTD Element				F	JIS Pt100 class B
5. Lead Wire					N None
					C 3000 mm (3 merters) Vinyl lead wire
					F 6000 mm (6 merters) Vinyl lead wire
					X Others (Please consult before ordering.)
6. Fixture					00 - None
					45 - With compression fitting PT1/8 Φ4.8
					46 - With compression fitting PT1/4 Φ4.8, 6.4
					47 - With compression fitting PT3/8 Φ4.8, 6.4
					48 - With compression fitting PT1/2 Φ4.8, 6.4
					49 - With compression fitting PT3/4 Φ4.8, 6.4
					51 - Sliding Flange Type (FA)
7. Remarks					0 Without
					9 With (Please consult before ordering.)

Series RD-22C RTD Sensor

– External Dimensions –

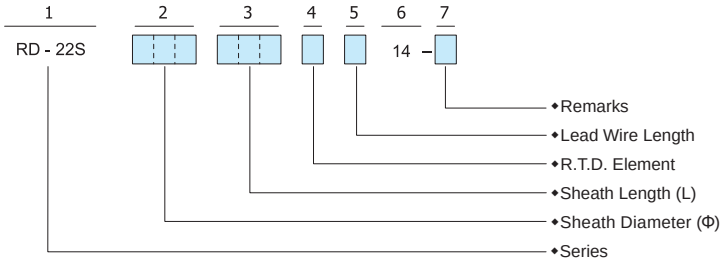


Unit: mm

Temperature Range: 0–250 °C

Note 1: When installing a sensor, make sure to create an air cooling space by using mounting brackets, etc. so that the temperature of the Terminal Box does not exceed 80 °C.

Note 2: The terminal box is not water-proof/splash-proof.

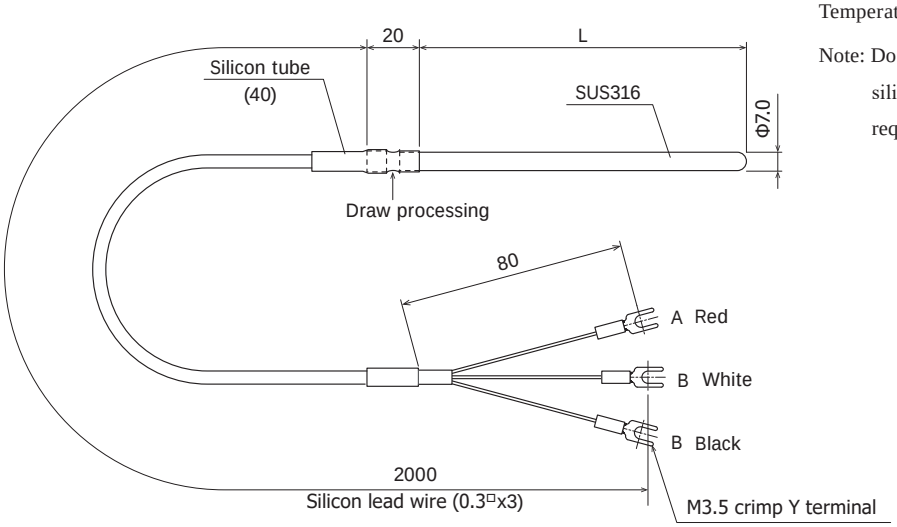


■ ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS			
1. Model	RD-22C-	G HEAD TYPE With Fitting Nipple RTD Pt100 JIS SENSOR			
2. Protecting tube Diameter (Φ) & 3. Length (L)		064	150	Φ6.4	150 mm
			200		200 mm
			250		250 mm
			300		300 mm
			□□□		Others (Please consult before ordering.)
		080	150	Φ8.0	150 mm
			200		200 mm
			250		250 mm
			300		300 mm
			□□□		Others (Please consult before ordering.)
4. RTD Element		F	JIS Pt100 class B		
5. Lead Wire		N	None		
		C	3000 mm (3 merters) Vinyl lead wire		
		F	6000 mm (6 merters) Vinyl lead wire		
		X	Others (Please consult before ordering.)		
6. Fixture		14 -	R (PT) 1/2 Fitting Nipple		
7. Remarks		0	Without		
		9	With (Please consult before ordering.)		

Series RD-10M RTD Sensor

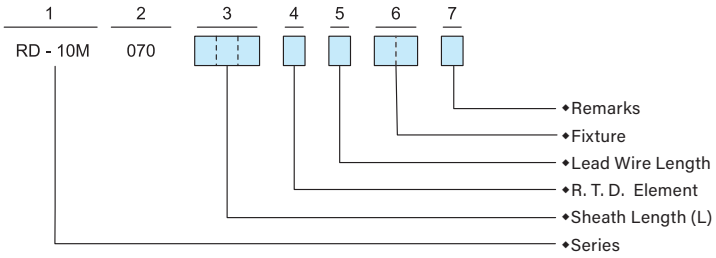
- External Dimensions -



Temperature Range: -50–100 °C

Note: Do not apply water pressure to the lead wires and silicone tubing. If high drip-proof specification is required, select the SRD series on page 101.

Unit:mm

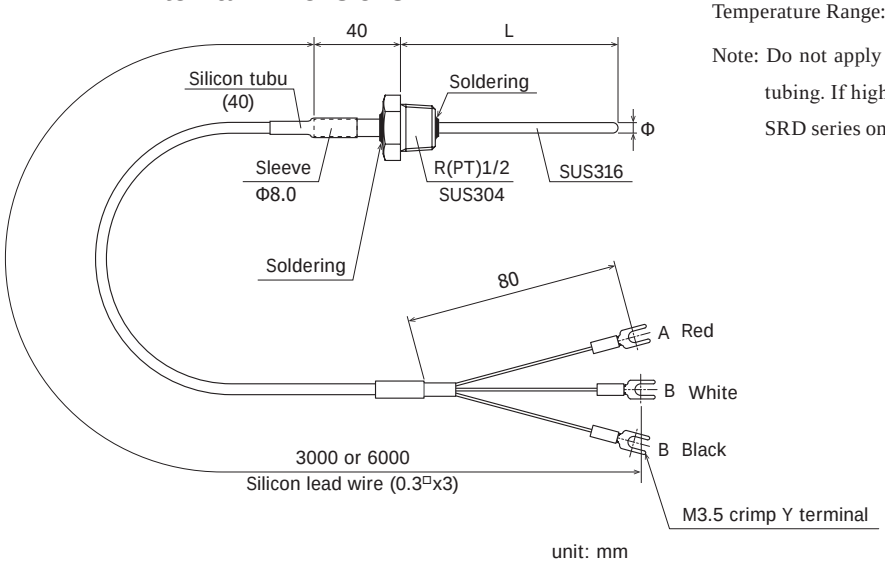


■ ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS			
1. Model	RD-10M-	DRIP PROOF TYPE RTD Pt100 JIS SENSOR			
2. Protecting tube Diameter (Φ) & 3. Length (L)	070	100	Φ7.0	100 mm	
		250		250 mm	
		□□□		Others (Please consult before ordering.)	
4. RTD Element			F	JIS Pt100 class B	
5. Lead Wire				B	2000 mm (2 merters) silicon lead wire
				X	Others (Please consult before ordering.)
6. Fixture (option)				00 -	None
				46 -	With compression fitting PT1/4 (non-standard feature)
				47 -	With compression fitting PT3/8
				48 -	With compression fitting PT1/2
				49 -	With compression fitting PT3/4
				51 -	Sliding Flange Type (FA)
7. Remarks				0	Without
				9	With (Please consult before ordering.)

Series RD-12M RTD Sensor

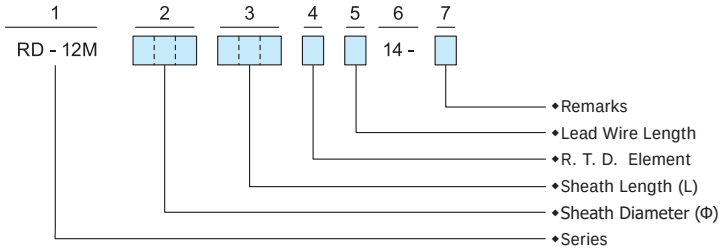
- External Dimensions -



unit: mm

Temperature Range: -50–100 °C

Note: Do not apply water pressure to the lead wires and silicone tubing. If high drip-proof specification is required, select the SRD series on page 101.

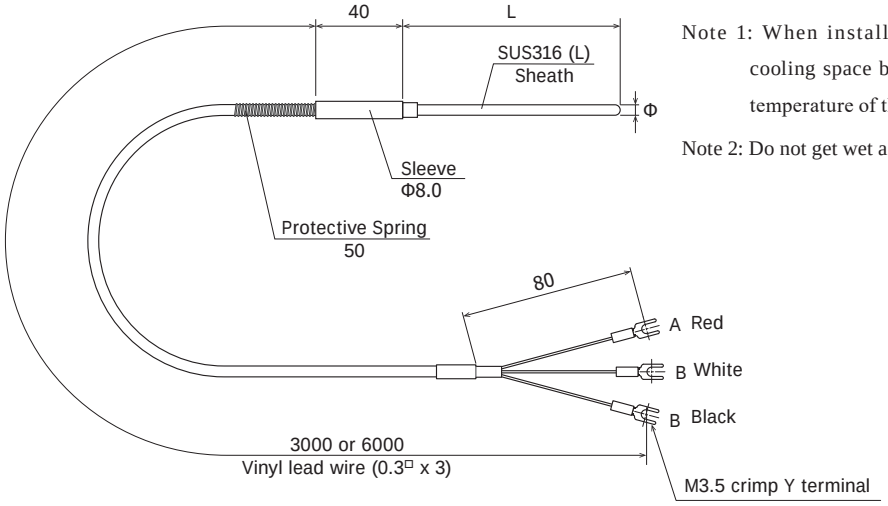


■ ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS			
1. Model	RD-12M-	DRIP PROOF TYPE RTD Pt100 JIS SENSOR			
2. Protecting tube Diameter (Φ) & 3. Length (L)		048	150	Φ4.8	150 mm
			200		200 mm
			250		250 mm
			300		300 mm
			□□□		Others (Please consult before ordering.)
		064	150	Φ6.4	150 mm
			200		200 mm
			250		250 mm
			300		300 mm
			□□□		Others (Please consult before ordering.)
		080	150	Φ8.0	150 mm
			200		200 mm
			250		250 mm
			300		300 mm
			□□□		Others (Please consult before ordering.)
4. RTD Element		F	JIS Pt100 class B 2mA		
5. Lead Wire		C	3000 mm (3 merters) silicon lead wire		
		F	6000 mm (6 merters) silicon lead wire		
		X	Others (Please consult before ordering.)		
6. Fixture		14 -	R (PT) 1/2 Fitting Nipple		
7. Remarks		0	Without		
		9	With (Please consult before ordering.)		

Series RD-11S RTD Sensor

- External Dimensions -

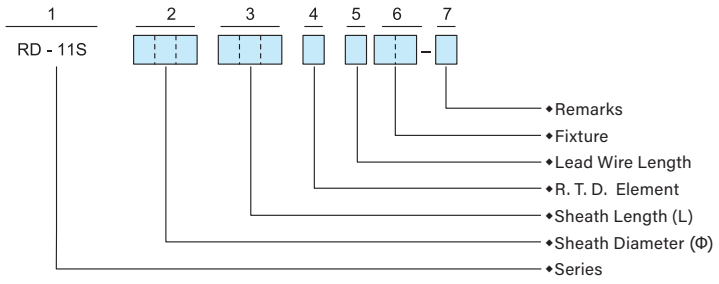


unit: mm

Temperature Range: -200–500 °C

Note 1: When installing a sensor, make sure to create an air cooling space by using mounting brackets, etc. so that the temperature of the sleeve portion does not exceed 80 °C.

Note 2: Do not get wet around the protective spring.

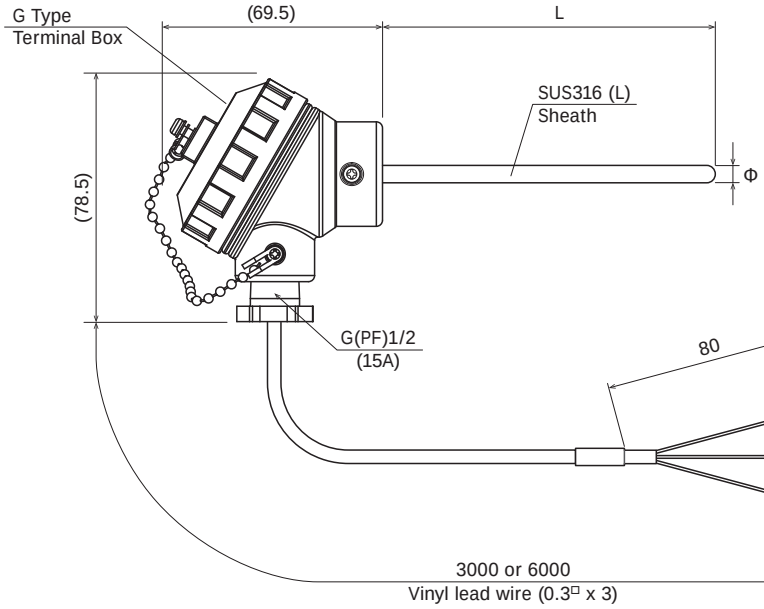


■ ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS			
1. Model	RD-11S-	SLEEVE TYPE RTD Pt100 JIS SENSOR			
2. Sheath Diameter (Φ) & 3. Length (L)		032	150	Φ3.2	150 mm
			250		250 mm
			350		350 mm
			500		500 mm
			□□□		Others (Please consult before ordering.)
		048	150	Φ4.8	150 mm
			250		250 mm
			350		350 mm
			500		500 mm
			□□□		Others (Please consult before ordering.)
		064	150	Φ6.4	150 mm
			250		250 mm
			350		350 mm
			500		500 mm
			□□□		Others (Please consult before ordering.)
4. RTD Element		F	JIS Pt100 class B		
5. Lead Wire		C	3000 mm (3 merters) Vinyl lead wire		
		F	6000 mm (6 merters) Vinyl lead wire		
		X	Others (Please consult before ordering.)		
6. Fixture		00 -	None		
		45 -	With compression fitting PT1/8 Φ3.2, 4.8		
		46 -	With compression fitting PT1/4 Φ3.2, 4.8, 6.4		
		47 -	With compression fitting PT3/8 Φ3.2, 4.8, 6.4		
		48 -	With compression fitting PT1/2 Φ3.2, 4.8, 6.4		
		49 -	With compression fitting PT3/4 Φ3.2, 4.8, 6.4		
		51 -	Sliding Flange Type (FA)		
7. Remarks		0	Without		
		9	With (Please consult before ordering.)		

Series RD-18S RTD Sensor

- External Dimensions -

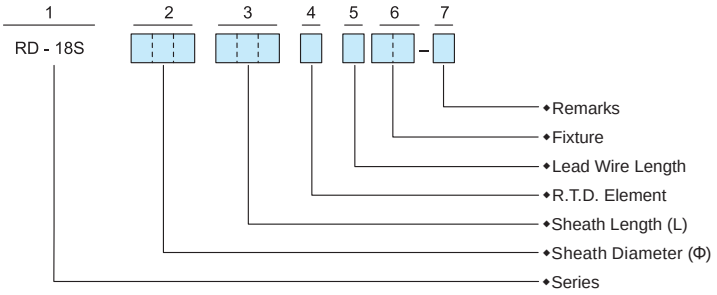


unit: mm

Temperature Range: -200–500 °C

Note 1: When installing a sensor, make sure to create an air cooling space by using mounting brackets, etc. so that the temperature of the Terminal Box does not exceed 80 °C.

Note 2: The terminal box is not water-proof/drip-proof.

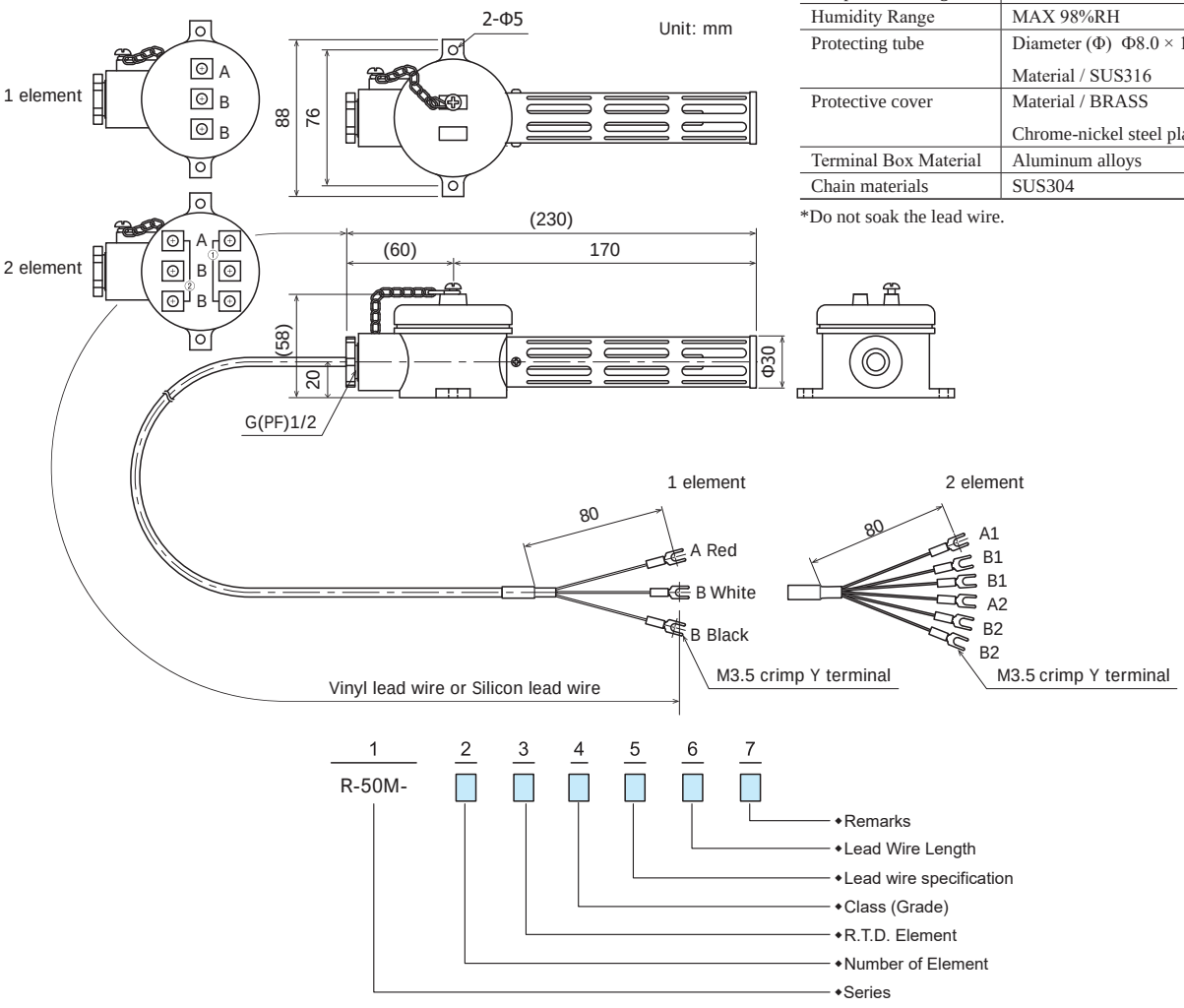


■ ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS			
1. Model	RD-18S-	G HEAD TYPE RTD Pt100 JIS SENSOR			
2. Sheath Diameter (Φ) & 3. Length (L)		032	150	Φ3.2	150 mm
			250		250 mm
			350		350 mm
			500		500 mm
			□□□		Others (Please consult before ordering.)
		048	150	Φ4.8	150 mm
			250		250 mm
			350		350 mm
			500		500 mm
			□□□		Others (Please consult before ordering.)
		064	150	Φ6.4	150 mm
			250		250 mm
			350		350 mm
			500		500 mm
			□□□		Others (Please consult before ordering.)
4. RTD Element		F	JIS Pt100 class B		
5. Lead Wire		C	3000 (3 merters) Vinyl lead wire		
		F	6000 (6 merters) Vinyl lead wire		
		X	Others (Please consult before ordering.)		
6. Fixture		00 -	None		
		45 -	With compression fitting PT1/8 Φ3.2, 4.8		
		46 -	With compression fitting PT1/4 Φ3.2, 4.8, 6.4		
		47 -	With compression fitting PT3/8 Φ3.2, 4.8, 6.4		
		48 -	With compression fitting PT1/2 Φ3.2, 4.8, 6.4		
		49 -	With compression fitting PT3/4 Φ3.2, 4.8, 6.4		
		51 -	Sliding Flange Type (FA)		
7.Remarks		0	Without		
		9	With (Please consult before ordering.)		

Series R-50M RTD Sensor

−Terminal Arrangement / External Dimensions −



■ SPECIFICATIONS

- Freeze/cool/low temperature/high humidity type
- Wall mounting type

Temperature Range	-50 to 60 °C
Humidity Range	MAX 98%RH
Protecting tube	Diameter (Φ) Φ8.0 × 100mm Material / SUS316
Protective cover	Material / BRASS Chrome-nickel steel plating
Terminal Box Material	Aluminum alloys
Chain materials	SUS304

*Do not soak the lead wire.

■ Data sheet for R-50M Sensor

ITEMS	CODE	SPECIFICATIONS	
1. Model	R-50M-	Freeze/cool/low temperature high humidity type sensor (Temperature)	
2 . Number of elements	1	1 element	
	2	2 element	
3. RTD Element	F	Pt100	
4 . Class (grade)	Q	Class A	
	S	Class B	
	X	Others (Please consult before ordering.)	
5. Lead wire specification	0N	None	
	1E	5 merters Vinyl lead wire (0.3□ × 3)	
	1J	10 merters Vinyl lead wire (0.3□ × 3)	
	3E	5 merters Vinyl lead wire (0.3□ × 6)	
	3J	10 merters Vinyl lead wire (0.3□ × 6)	
	5E	5 merters Silicon lead wire (0.3□ × 3)	
	5J	10 merters Silicon lead wire (0.3□ × 3)	
	7E	5 merters Silicon lead wire (0.3□ × 6)	
	7J	10 merters Silicon lead wire (0.3□ × 6)	
	9X	Others (Please consult before ordering.)	
6. Remarks	0	Without	
	9	With (Please consult before ordering.)	

STD Series Specially Ordered Thermocouple Model

(STD series is manufactured on special order basis when and if there is no specification found in the standard TD series suitable for your particular requirements.)

Ordering Information

Usable temperature limit: Limit of temperature that can be used continuously in air.
Note: 1. The terminal box is not water-proof and drip-proof.
2. When installing sensor, set terminal box and sleeve below.

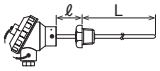
Items	Code	Specifications
1.Series	STD-	Special order type thermocouple
2. Type	□□	Select from the shape code selection table shown on page 102
3. Protecting tube type	C-	General type
	S-	Sheath type

4. Sheath & Protecting tube diameter

Sheath type										General type			
Code	Outer diameter (mm)	2 pairs	Working limits (°C) SUS316 T	J	E	K	N	Inconel K	Code	Outer diameter (mm)	2 pairs	Working limits (°C)
005	Φ0.5		300	400	600	600	600	600				Depends on the thermocouple wire diameter. Refer to "Tolerance of thermocouple and limit of overheating" (page 86).
010	Φ1.0		300	450	650	650	650	650				
016	Φ1.6		300	450	650	650	650	650				
023	Φ2.3		300	450	650	650	650	650				
032	Φ3.2	o	350	650	750	750	750	750				
048	Φ4.8	o	350	750	800	800	800	900	048	Φ4.8		
									050	Φ5.0		
									060	Φ6.0	o	
064	Φ6.4	o	350	750	800	800	800	1000	064	Φ6.4	o	
080	Φ8.0	o	350	750	800	900	900	1050	080	Φ8.0	o	
									100	Φ10	o	
									120	Φ12	o	
									130	Φ13	o	
									150	Φ15	o	
									160	Φ16	o	
									200	Φ20	o	
									220	Φ22	o	
999	Other								999	Other		

5. Material of the protecting tube

	Characteristics per material				
	Material	Working limits	Maximum resistible temperature limit	General characteristics	Available materials for sheath type
M	SUS316	850 °C	900 °C	Good corrosion and thermal resistances (superior to SUS304)	o
F	SUS304	850 °C	900 °C	Good corrosion and thermal resistances	
T	Titanium	400 °C	500 °C	Having chemical corrosion resistance	
N	Inconel	1000 °C	1100 °C	Having thermal and corrosion resistances	Lower than Φ8.0 are possible
Q	Quartz	1000 °C	1050 °C	Having strong acid resistance, but no good alkali resistance	
B	Porcelain PT1	1500 °C	1600 °C	Under good atmosphere such as in an electric furnace	
S	Porcelain PT0	1600 °C	1800 °C	Suitable for oxidation reduction atmosphere	
X	Other				

6. Length of air cooler (ℓ)	□□□	Record in mm unit	
7. Insertion length (L)	□□□	Record in mm unit. The values of 999 mm or higher will be recorded with a remark with 999.	

8. Temperature measuring junction	U	Non-grounded
	G	Grounded
	E	Tip open
9. Fixture	00-	None
	□□-	Select from the fixture code selection table shown on page 109
10. Thermocouple type	□	T: Thermocouple T, K: Thermocouple K, R: Thermocouple R, J: Thermocouple J, N: Thermocouple N, B: Thermocouple B, E: Thermocouple E, S: Thermocouple S, X: Other
11. Nomber of wires	1	1 Pair
	2	2 Pair
12. Class (grade)	D	Class 2 grade 0.25 (just for S and R)
	F	Class 1 grade 0.4 (precision type except S, R and B)
	G	Class 3 grade 0.5 (just for B)
	H	Class 2 grade 0.75 (generally used T, J, E, K and N)
	J	Class 3 grade 1.5 (just for temperature below 0 degree for T, E, K and N)
13. Compensating wire exterior specification (If you select 10, 11, 12, 13, 39 in [2. Type], please select other than "0: None".)	0	None
	1	Vinyl coating, 7/0.3, -20–90 °C
	2	Vinyl coating, 7/0.65, -20–90 °C
	3	Glass wool coating, 7/0.3, 0–150 °C
	4	Glass wool coating, 7/0.65, 0–150 °C
	5	Silicon coating, 20/0.18, -50–150 °C
	9	Other
14. Length of compensation wire (If you select 10, 11, 12, 13, 39 in [2. Shape], please select other than "000: None".) ([13. Compensating lead wire exterior specifications], if "0: None" is selected, it becomes "000: no compensation lead wire".)	000	None
	□□□	Record in cm unit. The values of 999 or higher will be recorded with remark(s)
15. Compensation wire end treatment (If you select 10, 11, 12, 13, 39 for [2. Shape], please select other than "0: None".) ([13. Compensating lead wire exterior specifications], if "0: None" is selected, it becomes "0: no compensation lead wire".)	0	No compensation wire
	U	M3.5 crimp Y terminal
	Y	M4 crimp Y terminal
	N	No terminal (disconnected)
	9	Other
16. Remarks	0	Without
	9	With

SRD Series Specially Ordered RTD Model

(SRD series is manufactured on special order basis when and if there is no specification found in the standard RD series suitable for your particular requirements.)

Ordering Information

Note: 1. The terminal box is not water-proof and drip-proof.
2. When installing sensor, set terminal box and sleeve below 80 °C
3. When placing an order, please let us know the temperature zone you actually use.
3: We will select materials according to the usage conditions and produce them.

Items	Code	Specifications
1. Series	SRD-	Special order type RTD
2. Type	□□	Select from the Shape code selection table shown on page 102
3. Protecting tube type	C-	General type
	M-	General purpose moisture-proof treatment
	S-	Sheath type
	Y-	Moisture-proof treatment of sheath type
	X-	Other

Shape code 10 can not be selected.

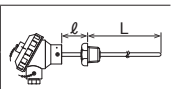
4. Sheath & Protecting tube diameter

* The stated value of each application temperature indicates the temperature range that can be produced. Specification at the time of ordering is required for applicable temperature range band.

	Diameter (mm)	2-element	C: General type * 1 element	C: General type * 2 element	M: General purpose moisture-proof treatment *	S: Sheath type *	Y: Moisture-proof treatment of sheath type *
010	Φ1.0		0–250 °C	—	-50–100 °C		
016	Φ1.6		0–250 °C	—	-50–100 °C	-30–300 °C	-30–200 °C
032	Φ3.2		0–250 °C	—	-50–100 °C	-200–500 °C	-200–200 °C
040	Φ4.0		0–250 °C	—	-50–100 °C		
048	Φ4.8	o	0–250 °C	0–250 °C	-50–100 °C	-200–500 °C	-200–200 °C
050	Φ5.0	o	0–250 °C	0–250 °C	-50–100 °C		
060	Φ6.0	o	0–250 °C	0–250 °C	-50–100 °C		
064	Φ6.4	o	0–400 °C	0–250 °C	-50–100 °C	-200–500 °C	-200–200 °C
070	Φ7.0	o	0–450 °C	0–250 °C	-50–100 °C		
080	Φ8.0	o	0–450 °C	0–250 °C	-50–100 °C	-200–500 °C	-200–200 °C
100	Φ10	o	0–500 °C	0–500 °C	-50–100 °C		
120	Φ12	o	0–500 °C	0–500 °C	-50–100 °C		
160	Φ16	o	0–500 °C	0–500 °C	-50–100 °C		
999	Other						

5. Material of the protecting tube	M	SUS316	Good corrosion and thermal resistances (superior to SUS304)
	F	SUS304	Good corrosion and thermal resistances
	T	Titanium	Having chemical corrosion resistance
	Q	Quartz	Having strong acid resistance, but no good alkali resistance
	X	Other	

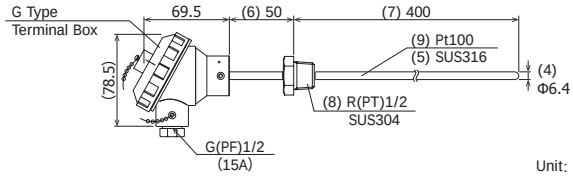
6. Length of air cooler (ℓ)	□□□	Record in mm unit
7. Insertion length (L)	□□□	Record in mm unit. The values of 999 mm or higher will be recorded with a remark with 999.



8. Fixture	00-	None
	□□-	Select from the fixture code selection table shown on page 109
9. RTD element	F	Pt100
	X	Other
10. Number of elements	1	1 element
	2	2 element
11. Class (grade)	P	Amperage specified for class A (Precision type): 1mA
	Q	Amperage specified for class A (Precision type): 2mA
	R	Amperage specified for class B (Ordinary type): 1mA
	S	Amperage specified for class B (Ordinary type): 2mA
	X	Other
12. Lead wire exterior specification (*2 This mark is for lead wire for 2 elements.) (If you select 10, 11, 12, 13, 39 for [2. Shape], please select other than "0: None".)	0	None
	1	3-core wire, vinyl coated 0.3□×3, 0.06Ω/m, 0–60 °C
	2	3-core wire, vinyl coated 0.75□×3, 0.03Ω/m, 0–60 °C
	3	6-core wire, vinyl coated *2 0.3□×6, 0.06Ω/m, 0–60 °C
	4	3-core wire, silicon 0.3□×3, 0.06Ω/m, -50–150 °C
	5	3-core wire, silicon 0.75□×3, 0.03Ω/m, -50–150 °C
	6	6-core wire, silicon *2 0.3□×6, 0.06Ω/m, -50–150 °C
	9	Other
13. Length of lead wire (If you select 10, 11, 12, 13, 39 for [2. Shape] , please select other than "000: none".) ([12. Lead wire exterior specifications], if "0: None" is selected, it becomes "000: without lead wire".)	000	None
	□□□	Record in cm unit. The values of 999 or higher will be recorded with remark(s).
14. Lead wire end treatment (If you select 10, 11, 12, 13, 39 as [2. Shape], please select other than "0: None".) (When "0: None" is selected in [12. Lead wire exterior specifications], it becomes "0: No lead wire".)	0	No lead wire
	U	M3.5 crimp Y terminal
	Y	M4 crimp Y terminal
	N	No terminal (disconnected)
	9	Other
15. Remarks	0	Without
	9	With

● Code selection example

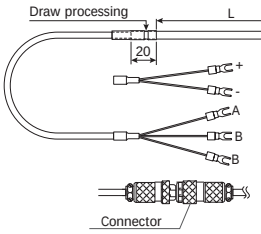
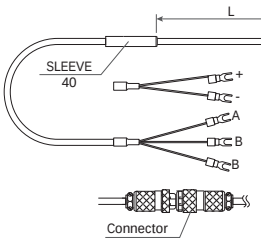
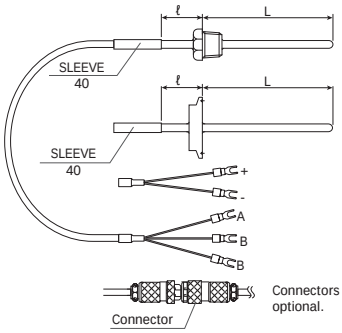
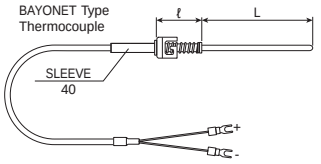
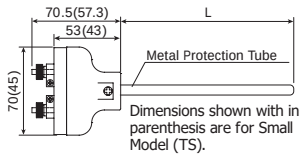
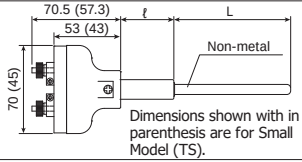
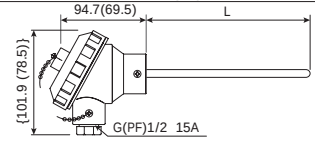
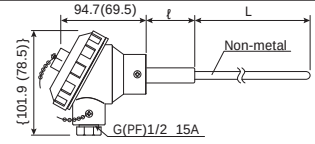
Code :	SRD	-	22	C	-	064	M	050	400	14	-	F	1	S	0	000	0	0
Items:	(1)		(2)	(3)		(4)	(5)	(6)	(7)	(8)		(9)	(10)	(11)	(12)	(13)	(14)	(15)

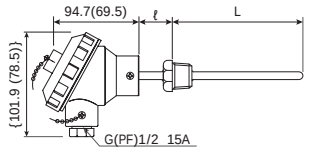
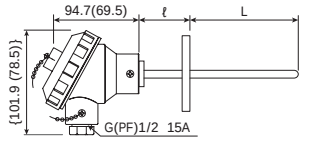
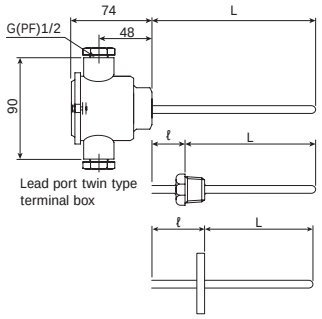
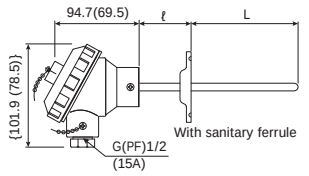
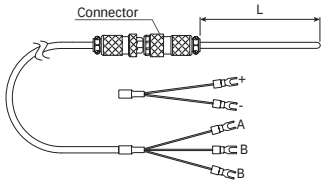
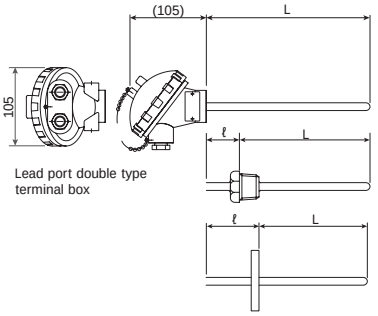
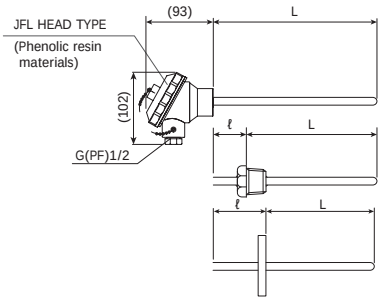


The above code shows the code when the RTD of shape code 22 (see the left figure) is selected.

Unit: mm

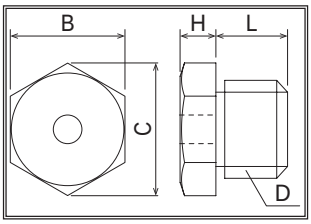
Shape code selection table TC / Thermocouple RTD / resistance temperature detector

Shape		Code	Applied element	Applied diameter (mm)
		10	TC	5.0 – 7.0
			RTD	7.0 – 8.0
		11	TC	0.5 – 6.4
			RTD	1.0 – 6.4
		12	TC	1.0 – 8.0
			RTD	3.2 – 8.0
		13	TC	3.2 – 4.8
	Small Model (TS)	14	TC	3.2 – 10
	Large Model (TL)	15		3.2 – 22
	Small Model (TS)	16	TC	6.0 – 10
	Large Model (TL)	17		13 – 20
	Small Model (G)	18	TC RTD	3.2 – 12
	Large Model (M)	19		3.2 – 22
	Small Model (G)	20	TC	6.0 – 10
	Large Model (M)	21		6.0 – 20

Shape		Code	Applied element	Applied diameter (mm)
	Small Model (G)	22	TC RTD	1.0 – 12
	Large Model (M)	23		3.2 – 22
	Small Model (G)	24	TC RTD	6.0 – 12
	Large Model (M)	25	TC RTD	3.2 – 22
		33	TC RTD	4.8 – 22
	Small Model (G)	37	TC RTD	3.2 – 12
	Large Model (M)	38		
		39	TC RTD	1.6 – 8.0
				3.2 – 22
		40	TC RTD	3.2 – 22
		41	TC RTD	3.2 – 22
Others		99		

■ Fitting Nipple

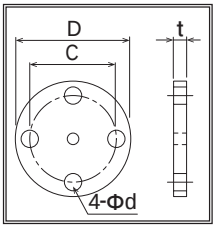
Category	Code	Screw standard	Dimension (unit:mm) / Material:SUS304 (*)				
			Nominal diameter D	B	C	L	H
G(PF) (Straight)	01	G(PF)1/8	1/8	14	16	10	5
	02	G(PF)1/4	1/4	17	19.6	12	7
	03	G(PF)3/8	3/8	21	24	13	7
	04	G(PF)1/2	1/2	26	30	16	8
	05	G(PF)3/4	3/4	32	37	20	10
R(PT) (Taper)	11	R(PT)1/8	1/8	14	16	10	5
	12	R(PT)1/4	1/4	17	19.6	12	7
	13	R(PT)3/8	3/8	21	24	13	7
	14	R(PT)1/2	1/2	26	30	16	8
	15	R(PT)3/4	3/4	32	37	20	10



* Standard material for Fitting Nipple is SUS304.
However, according your request, we may manufacture the nipple with any other material.

■ Pressure flange

Withstanding pressure	Nominal diameter (inch)	Code	Dimension (unit:mm) / Material:SUS304 (*)				Applicable pipe diameter
			D	C	d	t	
5K	10 (3/8)	23	75	55	12	9	17.3
	15 (1/2)	24	80	60	12		21.7
	20 (3/4)	25	85	65	12	10	27.2
	25 (1)	26	95	75	12		34.0
10K	10 (3/8)	33	90	65	15	12	17.3
	15 (1/2)	34	95	70	15		21.7
	20 (3/4)	35	100	75	15	14	27.2
	25 (1)	36	125	90	19		34.0



* Standard material for Pressure flange is SUS304.
However, according your request, we may manufacture the nipple with any other material.

■ Compression Fitting

Code	Screw standard	Applicable protecting tube diameter
45	R(PT)1/8	Φ1.6, 3.2, 4.8
46	R(PT)1/4	Φ1.6, 3.2, 4.8, 6.4, 8.0
47	R(PT)3/8	Φ3.2, 4.8, 6.4, 8.0
48	R(PT)1/2	Φ3.2, 4.8, 6.4, 8.0, 10
49	R(PT)3/4	Φ3.2, 4.8, 6.4, 8.0, 10

Refer to page 111 for dimensions.

Material: Body / SUS304, Cotter / Brass: C3713
We also accept Teflon, SUS, etc. as the material for the cotter.
Please contact your sales representative for details.

■ Sliding flange

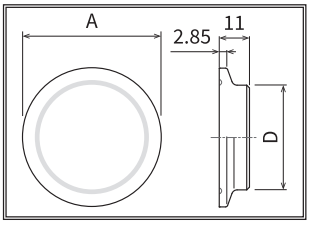
Pressure resistance / nominal diameter	Symbol	Code	Material, screw used
—	FA (Φ50)	51	Material : ZDC (Zinc alloy) Used screw SUS pan head 4 × 12
JIS5K20A	FB (Φ85)	52	Material : FC200 (Cast iron) Used screw M6×20

Refer to page 111 for dimensions.

■ Ferrule Cap

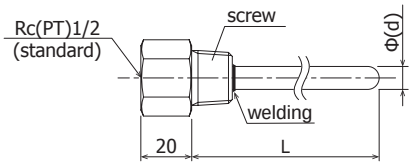
Nominal diameter	Code	Dimension (unit: mm)			Material
		D	B	A	
1S	65	38.1	43.5	50.5	SUS316L
1½S	66				
2S	67	50.8	56.5	64.0	
2½S	68	63.5	70.5	77.5	
3S	69	76.3	83.5	91.0	

* Standard material for Ferrule is SUS316L.
However, according your request, we may manufacture the Ferrule with any other material.



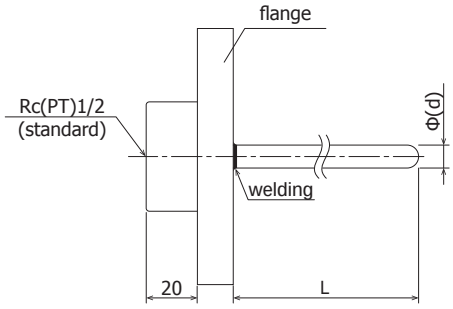
WP Series Type Welded

■ Nipple type



Unit: mm

■ Fange type



Unit: mm

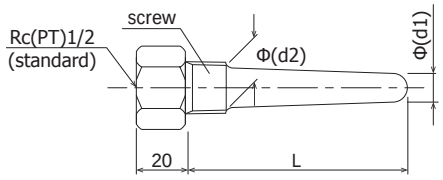
Ordering Information

Items	Code	Specifications
1.Series	WP-	Welded type
2. Type	N	Nipple type
	F	Fange type
3. Fixing bracket size	□□	For details, refer to Fixing bracket code selection table (page 109)
4. Protecting tube diameter (d)	080	Outer diameter size Φ8.0 (inner diameter Φ6.0)
	100	Outer diameter size Φ10.0 (inner diameter Φ7.0)
	120	Outer diameter size Φ12.0 (inner diameter Φ9.0)
	150	Outer diameter size Φ15.0 (inner diameter Φ11.0)
	□□□	Other than those above. Dimension code Φ□□.□. Processed with special instructions
5. Insertion length (L) (*)	□□□	Enter in mm. If 999 mm or more long length is required, specify 999 and inform your required length.
6. Material of the protecting tube	□	Refer to the code selection table (pages 106 to 107) for the protective tube material.
7. Remarks	0	Without
	9	With

* When calculating dimension L, make sure that the total length of the Double protection tube is 10.0 mm or more longer than the insertion length of the sensor used.

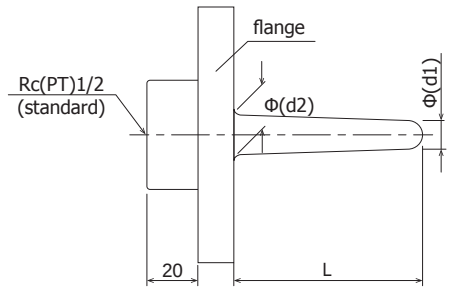
WB Series Type Drilled

■ Nipple type



Unit: mm

■ Fange type



Unit: mm

Ordering Information

Items	Code	Specifications
1.Series	WB-	Drilled type
2. Type	N	Nipple type
	F	Fange type
3. Fixing bracket size	□□	For details, refer to Fixing bracket code selection table (page 109)
4. Protecting tube diameter (d1)	□□□	Dimension code Φ□□.□
5. Protecting tube diameter (d2)	□□□	Dimension code Φ□□.□
6. Insertion length (L) (*)	□□□	Enter in mm. If 999 mm or more long length is required, specify 999 and inform your required length.
7. Material of the protecting tube	□	Refer to the code selection table (pages 106 to 107) for the protective tube material.
8. Protective tube inner diameter	□□□	Inner diameter dimension code Φ□□.□
9. Remarks	0	Without
	9	With

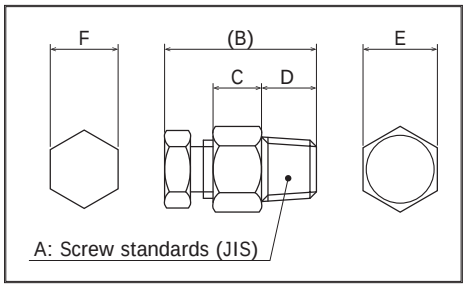
* When calculating dimension L, make sure that the total length of the Double protection tube is 10.0 mm or more longer than the insertion length of the sensor used.

QTC Series Compression Fitting

■ Dimension

Unit: mm

Symbol	A:Screw standards	(B)	C	D	E	F
Code: 45	R(PT)1/8	(30)	12	9	13	13
Code: 46	R(PT)1/4	(38)	14	12	17	17
Code: 47	R(PT)3/8	(40)	15	13	19	17
Code: 48	R(PT)1/2	(47)	15	17	23	21
Code: 49	R(PT)3/4	(61)	21	19.5	29	23



■ Material

Body : SUS304

Cotter: C3713 (Brass)

We also accept Teflon, SUS, etc. as the material for the cotter.

Please contact your sales representative for details.

note. There is no confidentiality.

■ Ordering Information

Items	Code	Specifications		
1.Series	QTC-	Compression Fitting		
2 . Screw standards / Applicable protecting tube diameter	45-(R1/8)	016	For Φ1.6	
		023	For Φ2.3	
		032	For Φ3.2	
		048	For Φ4.8	
	46-(R1/4)	016	For Φ1.6	
		023	For Φ2.3	
		032	For Φ3.2	
		048	For Φ4.8	
		064	For Φ6.4	
		080	For Φ8.0	
	47-(R3/8)	023	For Φ2.3	
		032	For Φ3.2	
		048	For Φ4.8	
		064	For Φ6.4	
		080	For Φ8.0	
	48-(R1/2)	032	For Φ3.2	
		048	For Φ4.8	
		064	For Φ6.4	
		080	For Φ8.0	
		100	For Φ10.0	
	49-(R3/4)	032	For Φ3.2	
		048	For Φ4.8	
		064	For Φ6.4	
		080	For Φ8.0	
		100	For Φ10.0	
3.Remarks		0	With	
		9	Without	

QTF Series Sliding Flange

■ Dimension

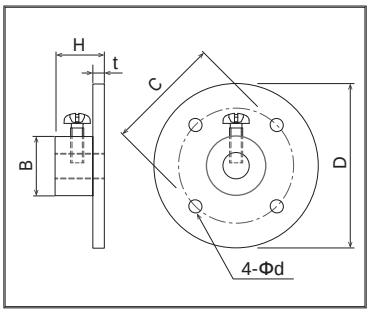
Unit: mm

Symbol	B	C	D	d	t	H	Used screw
Code: 51 (Type FA)	18	35	50	4.5	3.5	15	SUS Pan head 4 × 12
Code: 52 (Type FB)	35	65	85	12	10	40	M6 × 20

■ Material

Type FA: ZDC (Zinc alloy)

Type FB: FC200 (Cast iron)



■ Ordering Information

Items	Code	Specifications		
1. Series	QTF-	Sliding Flange		
2. Flange type / Applicable protective tube outer diameter	51-(type FA)	016	For Φ1.6	
		023	For Φ2.3	
		032	For Φ3.2	
		040	For Φ4.0	
		048	For Φ4.8	
		060	For Φ6.0	
		064	For Φ6.4	
		070	For Φ7.0	
		080	For Φ8.0	
		100	For Φ10.0	
		120	For Φ12.0	
	52-(type FB)	064	For Φ6.4	
		070	For Φ7.0	
		080	For Φ8.0	
		100	For Φ10.0	
		120	For Φ12.0	
		130	For Φ13.0	
		150	For Φ15.0	
		160	For Φ16.0	
		200	For Φ20.0	
		220	For Φ22.0	
3. Remarks		0	With	
		9	Without	

TERMINAL BOX

*1: Terminal Box does not exceed 80 °C.

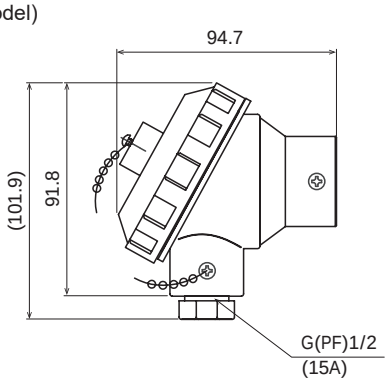
2: The terminal box is not water-proof/splash-proof.

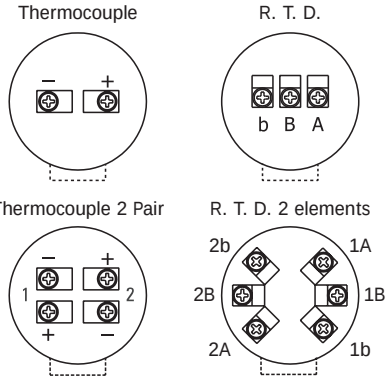
● SPECIFICATIONS

NAME \ ITEM		Material	GROUND	Chain Material / Appearance
Type M (Large Model)		Aluminum alloys (Both body and cap)	G(PF)1/2 (15A) Inner diameter Φ14.2	C3713 (Brass) / Chrome-nickel steel plating
Type G (Small Model)		Aluminum alloys (Both body and cap)		C3713 (Brass) / Chrome-nickel steel plating
Lead port double type terminal box (For 2 elements)		Aluminum alloys (Both body and cap)		C3713 (Brass) / Chrome-nickel steel plating
Phenolic resin terminal box		Phenolic resin		C3713 (Brass) / Chrome-nickel steel plating
Open type	Type TL (Large Model)	Body: Aluminum alloy Terminal board: Phenolic resin	M4 x 6	
	Type TS (Small Model)	Body: Aluminum alloy Terminal board: Phenolic resin	M3 x 6	
Lead port twin type terminal box (For 2 elements)		Aluminum alloy (Both body and cap)	G(PF)1/2	C3713 (Brass) / Chrome-nickel steel plating

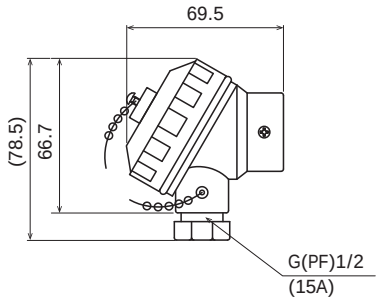
● OUTLINE DRAWING, TERMINAL INSIDE VIEW

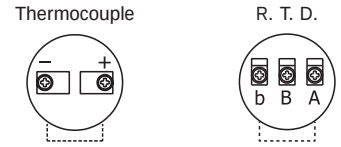
■ Type M (Large Model)



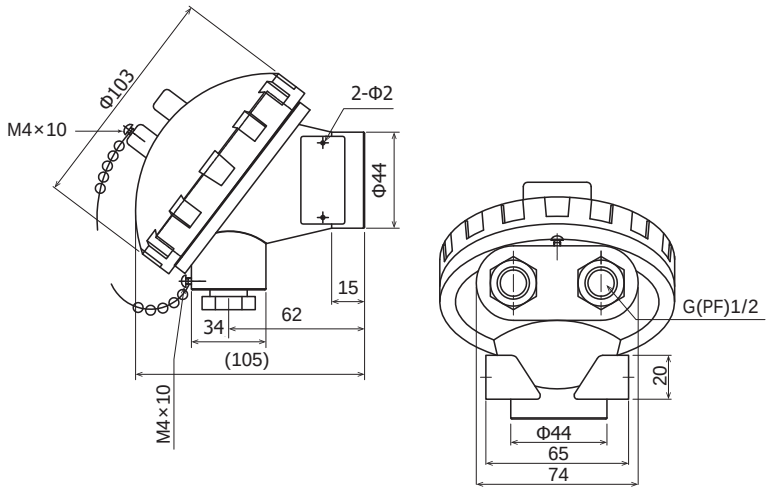


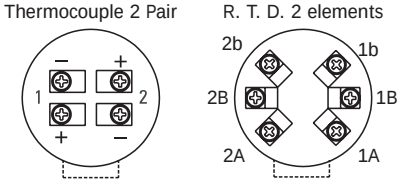
■ Type G (Small Model)





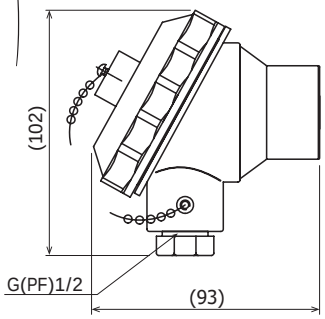
■ Lead port double type terminal box (For 2 elements)

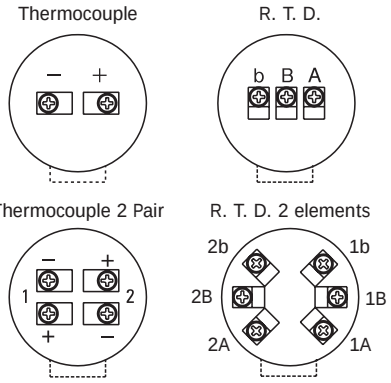




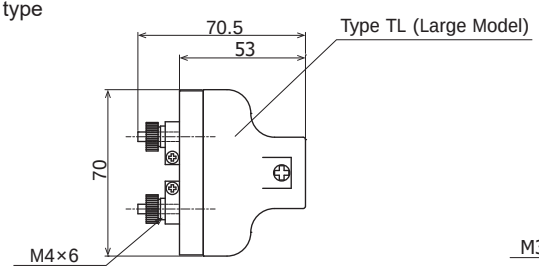
■ Phenolic resin (Type JFL) terminal box

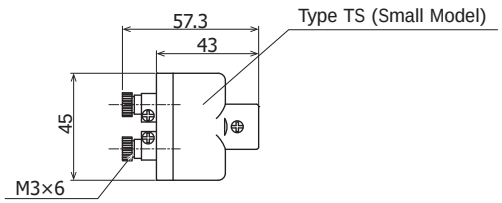
Characteristics of phenolic resin
· High oil resistance and chemical resistance
· Weak in alkali



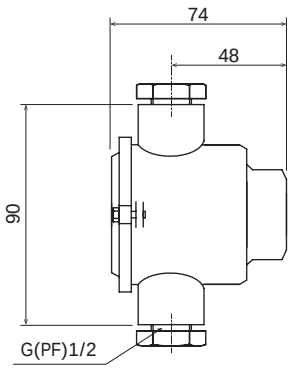


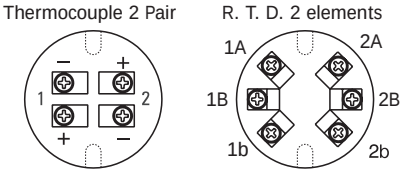
■ Open type





■ Lead port twin type terminal box (For 2 elements)

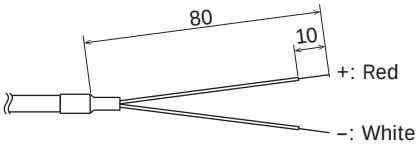




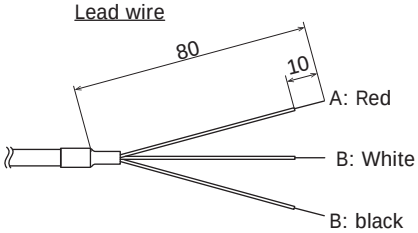
■ Additional items

- The specifications of the sleeves and protective springs used in the standard detectors RD and TD are as follows.
  Sleeve: Φ8.0 x 40 mm Material / SUS304 or SUS303
  Protection spring: 50 mm appearance / nickel plating
  Special orders such as the STD series and SRD series may differ. Please contact your sales representative for details.
- Compensating lead and lead wire length includes the exposed area (standard 80 mm / center of crimped Y terminal).
  The standard size of the crimping Y terminal of the TD / RD / R-50M series is M3.5, but it is possible to change to other sizes and shapes with the custom-made STD / SRD series.
  Please contact your sales representative for details.
- About joining of fixed nipple and pressure flange
  In the case of the general type: The protective tube outer diameter mm 3.2 mm or less is produced with silver solder, and the larger diameter is produced by argon welding.
  In the case of the sheath type: In principle, silver solder is used, but it may differ depending on the specifications and outer diameter. Please contact your sales representative for details.
- If the sensor with terminal box has an air-cooled part or support and the outer diameter of the protective tube or sheath tube is less than φ4.8 mm, the outer diameter of the air-cooled part or support is manufactured as standard φ8.For non-standard products, please contact your sales representative.
- In the STD series Compensating lead wire termination (No. 15 on page 106) and SRD series lead wire termination (No. 14 on page 107), "No terminal" is generated as follows.

Compensating wire



Lead wire



■ Tolerance and Working Limits for Thermocouple

JIS C 1602-1995

Types		Classification of tolerances (New standards)			Diameter of element wire (mm)	Working limit and Overheated working limit	
		Class 1	Class 2	Class 3		Working Limit Temperature (°C)	Overheated Working Limit Temperature (°C)
B	Tolerance for temperature range	--- ---	--- ---	600°C or higher and less than 800°C ±4°C	0.50	1500	1700
	Tolerance for temperature range	--- ---	600°C or higher and less than 1700°C ±0.0025 · | t |	800°C or higher and less than 1700°C ±0.005 · | t |			
	Grade (former standard)*	---	-	Grade 0.5			
R, S	Tolerance for temperature range	0°C or higher and less than 1100°C ±1°C	0°C or higher and less than +600°C ±1.5°C	--- ---	0.50	1400	1600
	Tolerance for temperature range	--- ---	600°C or higher and less than 1600°C ±0.0025 · | t |	--- ---			
	Grade (former standard)*	---	Grade 0.25	---			
N	Tolerance for temperature range	-40°C or higher and less than +375°C ±1.5°C	-40°C or higher and less than +333°C ±2.5°C	-167°C or higher and less than +40°C ±2.5°C	0.65 1.00	850 950	900 1000
	Tolerance for temperature range	375°C or higher and less than 1000°C ±0.004 · | t |	333°C or higher and less than 1200°C ±0.0075 · | t |	-200°C or higher and less than -167°C ±0.015 · | t |	1.60 2.30	1050 1100	1100 1150
	Grade (former standard)*	---	---	---	3.20	1200	1250
K	Tolerance for temperature range	-40°C or higher and less than +375°C ±1.5°C	-40°C or higher and less than +333°C ±2.5°C	-167°C or higher and less than +40°C ±2.5°C	0.65 1.00	650 750	850 950
	Tolerance for temperature range	375°C or higher and less than 1000°C ±0.004 · | t |	333°C or higher and less than 1200°C ±0.0075 · | t |	-200°C or higher and less than -167°C ±0.015 · | t |	1.60 2.30	850 900	1050 1100
	Grade (former standard)*	Grade 0.4	Grade 0.75	Grade 1.5	3.20	1000	1200
E	Tolerance for temperature range	-40°C or higher and less than +375°C ±1.5°C	-40°C or higher and less than +333°C ±2.5°C	-167°C or higher and less than +40°C ±2.5°C	0.65 1.00	450 500	500 550
	Tolerance for temperature range	375°C or higher and less than 800°C ±0.004 · | t |	333°C or higher and less than 900°C ±0.0075 · | t |	-200°C or higher and less than -167°C ±0.015 · | t |	1.60 2.30	550 600	600 750
	Grade (former standard)*	Grade 0.4	Grade 0.75	Grade 1.5	3.20	700	800
J	Tolerance for temperature range	-40°C or higher and less than +375°C ±1.5°C	-40°C or higher and less than +333°C ±2.5°C	--- ---	0.65 1.00	400 450	500 550
	Tolerance for temperature range	375°C or higher and less than 750°C ±0.004 · | t |	333°C or higher and less than 750°C ±0.0075 · | t |	--- ---	1.60 2.30	500 550	650 750
	Grade (former standard)*	Grade 0.4	Grade 0.75	---	3.20	600	750
T	Tolerance for temperature range	-40°C or higher and less than +125°C ±0.5°C	-40°C or higher and less than +133°C ±1°C	-67°C or higher and less than +40°C ±1°C	0.32 0.65	200 200	250 250
	Tolerance for temperature range	125°C or higher and less than 350°C ±0.004 · | t |	133°C or higher and less than 350°C ±0.0075 · | t |	-200°C or higher and less than -67°C ±0.015 · | t |	1.00 1.60	250 300	300 350
	Grade (former standard)*	Grade 0.4	Grade 0.75	Grade 1.5			

Note) ● The tolerance means the allowable maximum limits for the value obtained by subtracting the temperature at the temperature measuring junction from the temperature obtained by converting thermo-electromotive force based on reference table for thermoelectromotive force.

● Class 1 of the tolerance for thermocouple R/S will be applied to the standard thermocouples.

Remark 1. | t | is a modulus value of measured temperature (°C) regardless over or under the reezing point (+/-).

2. * is indicated for reference.

● Working Limits are the limits of temperature within which the thermocouple could be continuously used in the atmosphere.

● Overheated working limit is the temperature limit up to which the thermocouple may be used for short time period when inevitably required.

■ Insulation resistance and dielectric strength of the thermocouple (between terminal and protecting tube)

Item	Characteristics
Insulation resistance	500V DC 10MΩ or higher
Dielectric strength	500V AC for 1 minute or longer

Remark 1. Applied to thermocouples with protecting tube

2. For ground mode, or of any structure under which a protecting tube is to be used as a leg of wire for thermocouple, this test will not be conducted.

■ Tolerance and Working Limits for Sheath Thermocouples

JIS C 1602-1995

Types		Classification of tolerances		
		Class 1	Class 2	Class 3
SN	Tolerance for temperature range	-40°C or higher and less than +375°C ±1.5°C	-40°C or higher and less than +333°C ±2.5°C	-167°C or higher and less than +40°C ±2.5°C
	Tolerance for temperature range	375°C or higher and less than 1000°C ±0.004 · | t |	333°C or higher and less than 1200°C ±0.0075 · | t |	-200°C or higher and less than -167°C ±0.015 · | t |
	Grade (former standard)*	---	---	---
SK	Tolerance for temperature range	-40°C or higher and less than +375°C ±1.5°C	-40°C or higher and less than +333°C ±2.5°C	-167°C or higher and less than +40°C ±2.5°C
	Tolerance for temperature range	375°C or higher and less than 1000°C ±0.004 · | t |	333°C or higher and less than 1200°C ±0.0075 · | t |	-200°C or higher and less than -167°C ±0.015 · | t |
	Grade (former standard)*	---	Grade 0.75	Grade 1.5
SE	Tolerance for temperature range	-40°C or higher and less than +375°C ±1.5°C	-40°C or higher and less than +333°C ±2.5°C	-167°C or higher and less than +40°C ±2.5°C
	Tolerance for temperature range	375°C or higher and less than 800°C ±0.004 · | t |	333°C or higher and less than 900°C ±0.0075 · | t |	-200°C or higher and less than -167°C ±0.015 · | t |
	Grade (former standard)*	---	Grade 0.75	Grade 1.5
SJ	Tolerance for temperature range	-40°C or higher and less than +375°C ±1.5°C	-40°C or higher and less than +333°C ±2.5°C	---
	Tolerance for temperature range	375°C or higher and less than 750°C ±0.004 · | t |	333°C or higher and less than 750°C ±0.0075 · | t |	---
	Grade (former standard)*	---	Grade 0.75	---
ST	Tolerance for temperature range	-40°C or higher and less than +125°C ±0.5°C	-40°C or higher and less than +133°C ±1°C	-67°C or higher and less than +40°C ±1°C
	Tolerance for temperature range	125°C or higher and less than 350°C ±0.004 · | t |	133°C or higher and less than 350°C ±0.0075 · | t |	-200°C or higher and less than -67°C ±0.015 · | t |
	Grade (former standard)*	---	Grade 0.75	Grade 1.5

Note) The tolerance means the allowable maximum limits for the value obtained by subtracting the temperature at the temperature measuring junction from the temperature obtained by converting thermo-electromotive force based on reference table for thermo-electromotive force.

Remark 1. | t | is a modulus value of measured temperature (°C) regardless over or under the freezing point (+/-).

2. * is for reference.

OD of Metal Sheath (mm)	Metal Sheath (°C)	
	A	B
0.5	600	
1.0, 1.5 (, 1.6) , 2.0	650	
3.0 (,3.2)	750	
4.5 (,4.8)	800	900
6.0 (,6.4)	800	1000
8.0	900	1050
0.5	600	
1.0, 1.5 (, 1.6) , 2.0	650	
3.0 (,3.2)	750	
4.5 (,4.8)	800	900
6.0 (,6.4)	800	1000
8.0	900	1050
0.5	600	
1.0, 1.5 (, 1.6) , 2.0	650	
3.0 (,3.2)	750	
4.5 (,4.8)	800	900
6.0 (,6.4)	800	900
8.0	800	900
0.5	400	
1.0, 1.5 (, 1.6) , 2.0	450	
3.0 (,3.2)	650	
4.5 (,4.8)	750	
6.0 (,6.4)	750	
8.0	750	
0.5	300	
1.0, 1.5 (, 1.6) , 2.0	300	
3.0 (,3.2)	350	
4.5 (,4.8)	350	
6.0 (,6.4)	350	
8.0	350	

Remark 1. The series indicated within the parenthesis will be discontinued in future.

2. Material of metal sheath
   A: Austenitic stainless steel
   B: Corrosion and thermal resistant super alloy

■ Insulation resistance and withstand voltage of sheath thermocouple (between terminal and metal sheath)

ITEM	Outer diameter of metal sheath (mm)	Characteristic
Insulation resistance	0.5, 1.0, 1.5 ,(1.6), 2.0	100V DC 20 MΩ or more
	3.0, (3.2), 4.5, (4.8),6.0, (6.4), 8.0	500V DC 100 MΩ or more
Withstand voltage (Note)	1.0, 1.5, (1.6)	100V AC 1 minute
	3.0, (3.2), 4.5, (4.8), 6.0, (6.4), 8.0	500V AC 1 minute

(Note)The outer diameter 0.5 mm of the metal sheath does not apply.

Remarks 1. Not applicable to grounded type.

2. For compensation wire attachment, use the smaller of the insulation resistance value specified in JIS C 1610.

3. Series in ( ) will be abolished in the future.

Withstand voltage test is not conducted in our company.

°C
%RH
SHIMADEN

For Phase-Control Circuit *Series HB22*

Heater Breakdown Detector

Coming soon

PRODUCT FEATURE

□ ***Detects heater breaks in heating devices and outputs an alarm signal.***

□ ***RoHS directive supported***

SPECIFICATIONS

- Model : HB22
- Power supply : 100 to 240V AC ±10% 50/60Hz
- Rated control voltage (Heater voltage) : 100, 110, 120, 200, 220, 240 V AC (Either one to be selected.)
- Rated frequency : 50/60 Hz
- Operation current : 0.5 to 5A AC (Depends on the external CT when the operating current is more than 5A.)
- Setting range: 10 to 100% (0.5 to 5A: When input voltage is rated value)
- Sensitivity: Approx. 3% of the current setting value (When input voltage is rated value)
- Operation time: 0.5 sec. Max.(In case of the current changes from 150% to 0% of the operating value)
- Effect of fluctuation of input voltage : ±5% FS or less of the theoretical value on operating current value with the rated voltage (In a range from 20% to 110% of the input voltage)
- Alarm action output : Relay contact (1c/SPDT)
- Contact capacity : 240 V AC, 2A (Resisitive load)
- Alarm action display : Red LED lamp is on during alarm action.

- Operating environment conditions
  - Temperature : -10 to 50°C
  - Humidity : 90% RH max. (no dew condensation)
  - Elevation : 2000 m above sea level or lower
  - Overvoltage category : II
  - Pollution degree : 2 (IEC60664)
- Temperature when kept unused : -20 to 65 °C
- Insulation resistance : 500V DC 100MΩ Min. between each terminal of the power supply-heater voltage-heater current-alarm output.
- Dielectric strength : 1 min. at 1500V AC between each terminal of the power supply-heater voltage-heater current-alarm output.
- Material : ABS resin molding.
- External dimensions : H83.5×W50×D146.5mm (including socket terminal block)
- Mounting : 11P plug-in panel or DIN rail
- Weight : Main unit Approx. 190g
  Socket terminal block Approx. 75g

Note: This apparatus is designed for single-phase circuits, that is, unusable for 3-phase circuits.
In case if it is used for a heater of which the amperage exceeds 5A, a CT (current detector) should be installed externally.

ORDERING INFORMATION

ITEMS	CODE	SPECIFICATIONS		
1. SERIES	HB22-	Heater Break Alarm For ON-OFF control/phase control compatible 0.5 to 5A		
2. CONTROL VOLTAGE (Heater voltage)	19-	100V AC	±10% 50/60Hz	
	20-	110V AC		
	21-	120V AC		
	22-	200V AC		
	23-	220V AC		
	25-	240V AC		
	99-	Others		
3. REMARKS	0	Without		
	9	With		

WIRING EXAMPLE

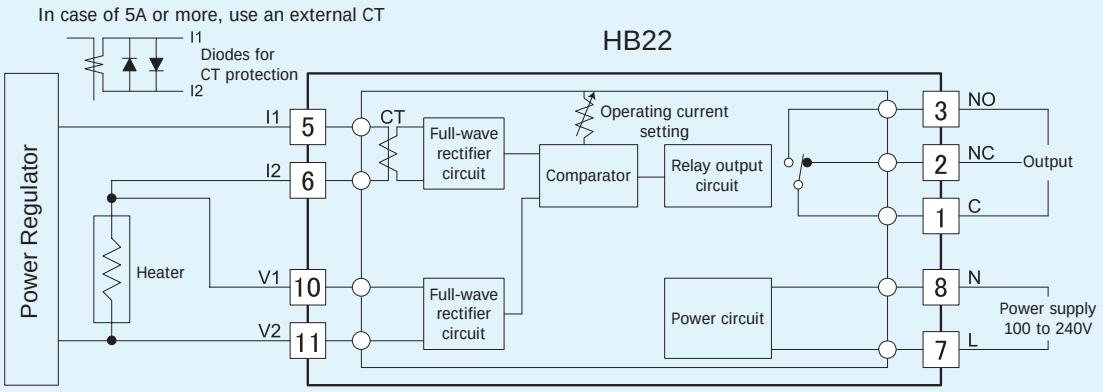
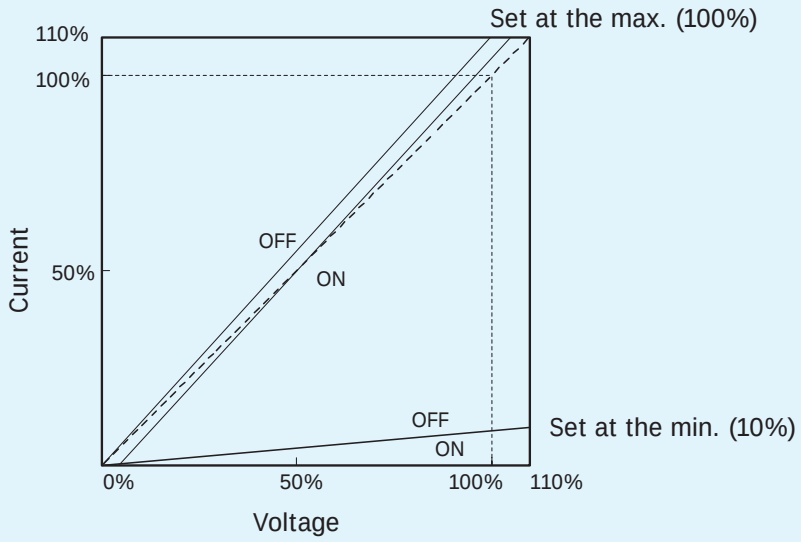
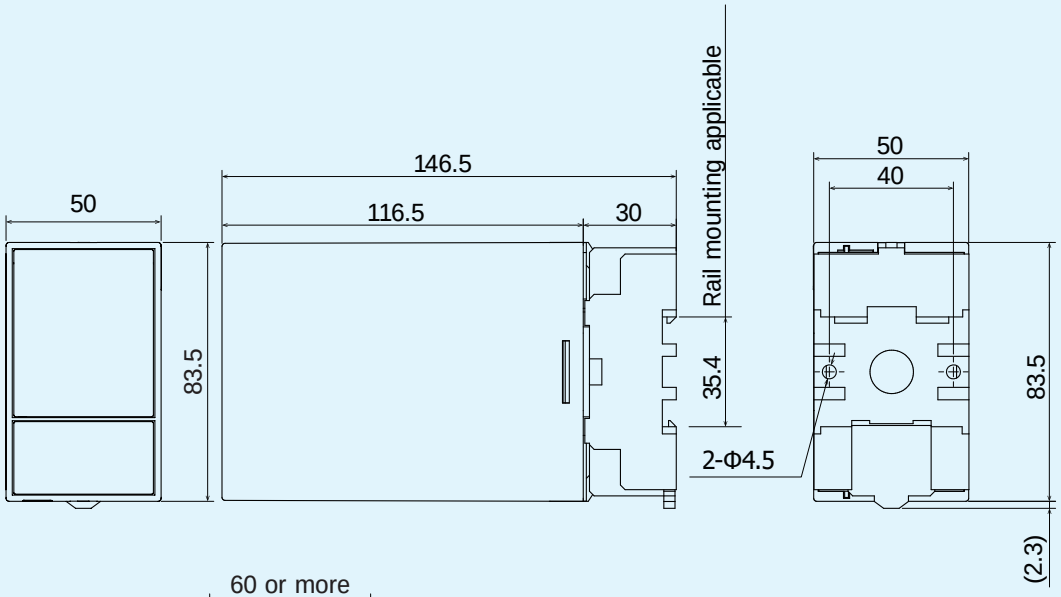
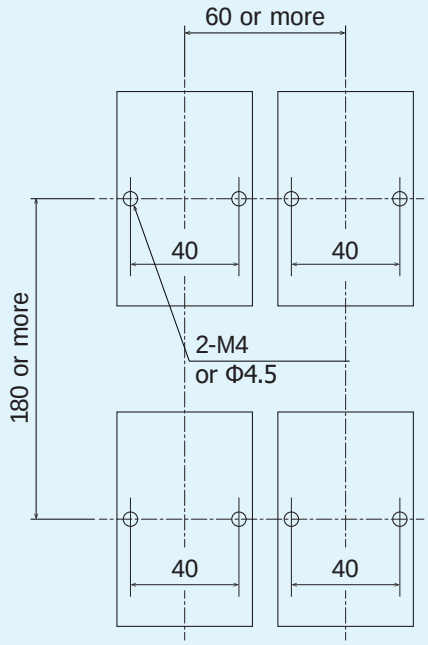


DIAGRAM of PERFORMANCE CHARACTERISTICS

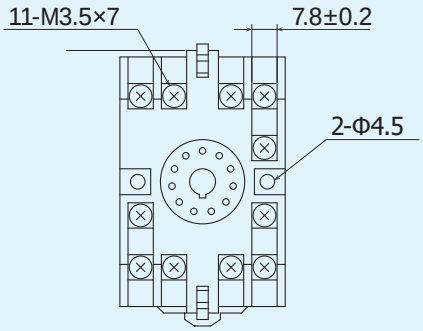


EXTERNAL DIMENSIONS AND PANEL CUTOUT





Panel cut out



Terminal block dimensions

Unit : mm

°C
%RH
SHIMADEN

Series CP3700

SIGNAL CONVERTERS

CE approved
Excluding some products

BASIC FEATURES

- □ *Slim-shaped plug-in converter with isolated single/dual-output*
- □ *DIN Rail mounting or Lateral mounting*
- □ *Power supply 100 to 240V AC or 24V DC*
- □ *Moisture-proof coating is applied as standard.*

CATEGORY CLASSIFICATION

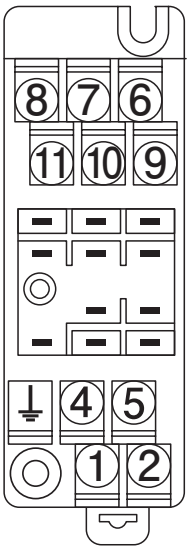
	Series:	Product	Obtained standards
Sensor Input	CP3701:	Thermocouple Temperature Converter	CE approved
	CP3702:	RTD Temperature Converter	CE approved
Signal Conversion	CP3703:	mV DC-DC Converter	CE approved
	CP3704:	V/mA DC-DC Converter	CE approved
	CP3708:	Frequency/DC Converter	RoHS directive supported
	CP3710:	Potentiometer Converter	CE approved
	CP3720:	CT Transmitter (Rms Calculation)	CE approved
	CP3721:	PT Transmitter (Rms Calculation)	CE approved
	CP3729:	DC-frequency (pulse) Converter	RoHS directive supported
	CP3759:	Relay Unit	RoHS directive supported
	CP3764:	Signal Isolator	RoHS directive supported
Setting Device	CP3705:	Alarm Setter (Dual Points)	CE approved
	CP3708:	Manual Setter	RoHS directive supported
Arithmetic Unit	CP3716:	Change-rate Limiting Converter	RoHS directive supported
	CP3725:	High / Low Selector	CE approved
	CP3761:	Adder	RoHS directive supported
	CP3762:	Subtractor	RoHS directive supported
	CP3765:	Multiplier (Arithmetic Operation Unit)	RoHS directive supported
Characteristic Conversion	CP3713:	Square-Root Extractor	RoHS directive supported
	CP3714:	Limiter	CE approved
	CP3739:	Ratio & Bias Setter	CE approved
	CP3740:	Signal Reverser	CE approved
	CP3766:	Analog hold Converter	RoHS directive supported
	CP3770:	Doubler-Inverter	RoHS directive supported
Signal Processing	CP3707:	Distributor (with Isolation)	CE approved
	CP3737:	Distributor (Non-Isolation between Input and Output)	CE approved

TERMINAL ARRANGEMENT DIAGRAM/SIGNAL ASSIGNMENT

■ TERMINAL ARRANGEMENT

■ SIGNAL ASSIGNMENT

Common to CP3700 series



SOCKET TOP VIEW

CP3701

1	P (+)	POWER
2	N (−)	
⏚	GND	
4	+	OUTPUT 1
5	−	OUTPUT 1
6	N. C.	
7	+	OUTPUT 2
8	−	OUTPUT 2
9	T. C.+	
10	T. C.−	
11	N. C.	

CP3702

1	P (+)	POWER
2	N (−)	
⏚	GND	
4	+	OUTPUT 1
5	−	OUTPUT 1
6	N. C.	
7	+	OUTPUT 2
8	−	OUTPUT 2
9	A RTD	
10	B RTD	
11	B' RTD	

CP3703/3704/3713/3714/3716/3729/3737/3739/3740/3770

1	P (+)	POWER
2	N (−)	
⏚	GND	
4	+	OUTPUT 1
5	−	OUTPUT 1
6	N. C.	
7	+	OUTPUT 2
8	−	OUTPUT 2
9	+	INPUT
10	−	INPUT
11	N. C.	

For Output 1, the pins of terminal nos. 7 & 8 are N.C.

CP3705

1	P (+)	POWER
2	N (−)	
⏚	GND	
4	NC	OUT 1
5	NO	OUT 1
6	COM	OUT 1
7	COM	OUT 2
8	NO	OUT 2
9	+	INPUT
10	−	INPUT
11	NC	OUT 2

CP3707

1	P (+)	POWER
2	N (−)	
⏚	GND	
4	+	OUTPUT 1
5	−	OUTPUT 1
6	N. C.	
7	+	OUTPUT 2
8	−	OUTPUT 2
9	+	INPUT
10	−	INPUT
11	COM	

CP3708

1	P (+)	POWER
2	N (−)	
⏚	GND	
4	+	OUTPUT 1
5	−	OUTPUT 1
6	N. C.	
7	+	OUTPUT 2
8	−	OUTPUT 2
9	+	INPUT
10	−	INPUT
11	EX	

For Output 1, the pins of terminal nos. 7 & 8 are N.C.

CP3710

1	P (+)	POWER
2	N (−)	
⏚	GND	
4	+	OUTPUT 1
5	−	OUTPUT 1
6	N. C.	
7	+	OUTPUT 2
8	−	OUTPUT 2
9	A POT	
10	B POT	
11	C POT	

CP3720

1	P (+)	POWER
2	N (−)	
⏚	GND	
4	+	OUTPUT 1
5	−	OUTPUT 1
6	(L)	INPUT
7	+	OUTPUT 2
8	−	OUTPUT 2
9	L	INPUT
10	N	INPUT
11	(N)	INPUT

CP3721

1	P (+)	POWER
2	N (−)	
⏚	GND	
4	+	OUTPUT 1
5	−	OUTPUT 1
6	N. C.	
7	+	OUTPUT 2
8	−	OUTPUT 2
9	N. C.	
10	L	INPUT
11	N	INPUT

CP3725/3761/3762/3765

1	P (+)	POWER
2	N (−)	
⏚	GND	
4	+	OUTPUT 1
5	−	OUTPUT 1
6	−	INPUT 2
7	+	OUTPUT 2
8	−	OUTPUT 2
9	+	INPUT 1
10	−	INPUT 1
11	+	INPUT 2

For Output 1, the pins of terminal nos. 7 & 8 are N.C.

CP3738

1	P(+)	POWER
2	N(−)	
⏚	GND	
4	+	OUTPUT 1
5	−	OUTPUT 1
6	N. C	
7	+	OUTPUT 2
8	−	OUTPUT 2
9	N. C	
10	N. C	
11	N. C	

CP3759

1	P(+)	POWER
2	N(−)	
⏚	GND	
4	NC OUT 1	
5	NO OUT 1	
6	COM OUT 1	
7	COM OUT 2	
8	NO OUT 2	
9	+ INPUT	
10	− INPUT	
11	NC OUT 2	

CP3764

1	N. C.	
2	N. C.	
⏚	N. C.	
4	+	OUTPUT Ch 1
5	−	OUTPUT Ch 1
6	−	INPUT Ch 2
7	+	OUTPUT Ch 2
8	−	OUTPUT Ch 2
9	+	INPUT Ch 1
10	−	INPUT Ch 1
11	+	INPUT Ch 2

CP3766

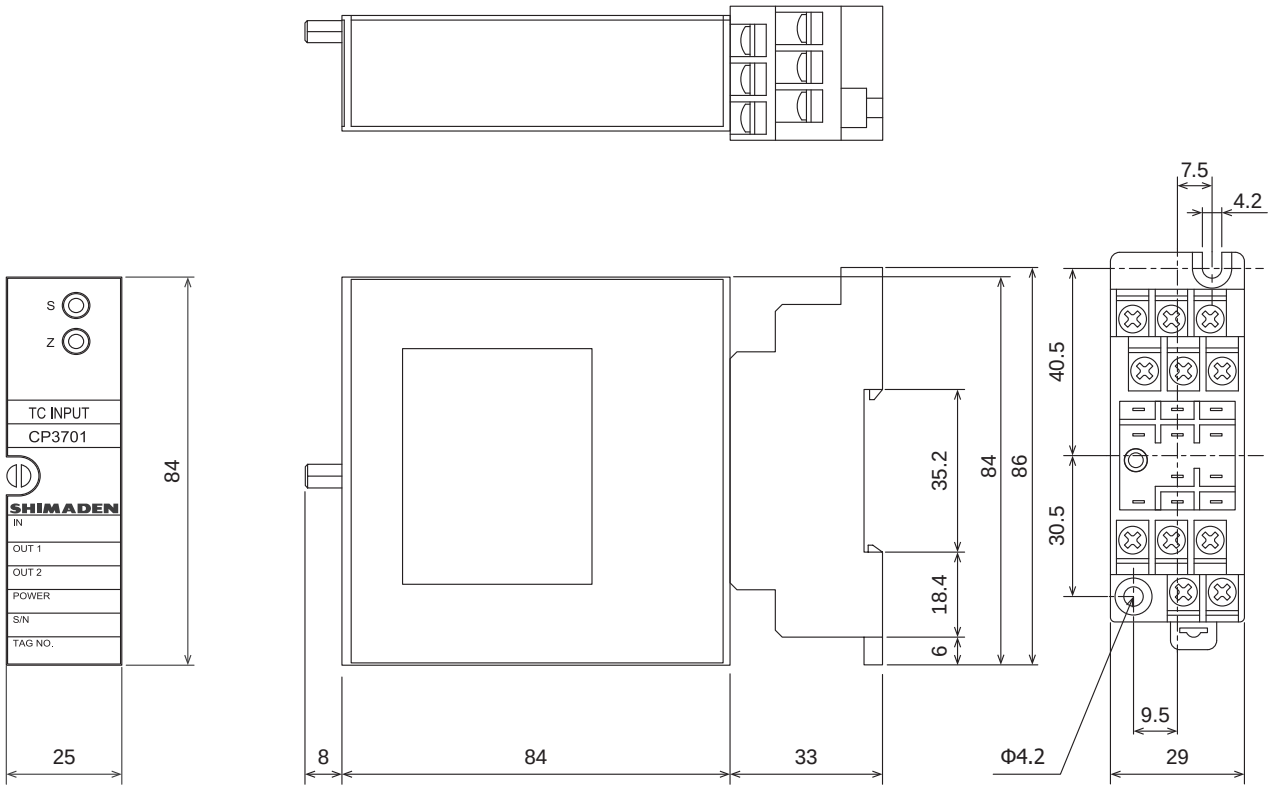
1	P (+)	POWER
2	N (−)	
⏚	GND	
4	+	OUTPUT 1
5	−	OUTPUT 1
6	N. C.	
7	+	HOLD
8	−	HOLD
9	+	INPUT
10	−	INPUT
11	N. C.	

COMMON SPECIFICATIONS

- Power supply : 100 to 240V AC ±10% or 24V DC±10%
- Voltage tolerance : 100 to 240V AC: 85 to 264V AC 47 to 63Hz
  24V DC: 24V DC±10%
- Operating ambient
  - Temperature : -5 to 55 °C
  - Humidity : 5 to 90%RH (No dew condensation)
- Stock temperature : -10 to 60 °C
- Installation : Wall / DIN rail mounting
  Wiring / M3.5 screw terminal connection (with a power terminal block cover & drop-proof screws)
  Screwing Torque / 0.8 to 1.0 [Nm] * Recommended
- Materials : Housing: ABS resin (UL94V-0)
  : Terminal block: PBT resin (UL94V-0)
  Terminal block cover: PC resin (UL94V-2)
  Din-rail stopper: PP resin (UL94-HB)
- External dimensions : H86×W29×D125 mm (including the mounting screw and socket terminal board)
  (Please see below for external dimensions and mounting dimensions.)
- Weight : Main body: 120g max.
  Terminal block: 80g max

■ **For individual specifications, please check the CP3700 series product catalog.**

EXTERNAL DIMENSIONS



Unit : mm

■ **The contents of this material are subject to change without notice.**

WARNING	* Be sure to follow the instruction manual when operating this device. * This device is designed for industrial use to control temperature, humidity and other physical values. Avoid using it for control of devices upon which human life is dependent. * If the possibility of loss or damage to your system or property as a result of failure of any parts of the process exists, proper safety measures must be made before the instrument is put into use so as to prevent the occurrence of trouble.

Head Office & Saitama Factory
ISO 9001/ISO14001 Certification Obtained

Temperature and Humidity Control Specialists

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