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SHIMADEN

Series **SR90**

SHIMADEN DIGITAL CONTROLLER



CE approved





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.*

■ Display

- Digital display : Measured value (PV)/7 segments red LED 4 digits
Target set value (SV)/7 segments green LED 4 digits
- Display accuracy : $\pm(0.3\%FS + 1 \text{ digit})$
Excluding reference contact temperature compensation accuracy of thermocouple input.
Accuracy of readings lower than -100°C of thermocouples K, T, U inputs is $\pm 0.7\%FS$. Accuracy guarantee not applicable to 400°C (752°F) and below of B thermocouple.
- Display accuracy maintaining range : $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ (18 to 28°C)
- Display resolution : Depends on measuring range (0.001, 0.01, 0.1 and 1)
- Measured value display range : -10% to 110% of measuring range
- Display updating cycle : 0.25 seconds
- Action display/color : 7 type, LED lamp display
Control output (OUT1, OUT2)/Green Event (EV1, EV2)/Orange Auto tuning/Green
Manual control output (MAN)/Green Set value bias, communication (SB/COM)/Green

■ Setting

- Setting method : By operating 4 keys (, ,  and ) on the front panel
- Target value setting range : Same as measuring range (within setting limiter)
- Setting limiter : Individual setting for higher and lower limits, any value is selectable within measuring range (Lower limit value < Higher limit value)

■ Input

- Type of input : Selectable from multiple (TC, Pt, mV), voltage (V) and current (mA)
- Thermocouple : B, R, S, K, E, J, T, N, PL II, C (Wre 5-26), {U, L (DIN 43710)}
- Input impedance : $500\text{k}\Omega$ minimum External resistance tolerance: 100Ω maximum
- Burnout function : Standard feature (up scale) Reference junction compensation accuracy:
 $\pm 1^{\circ}\text{C}$ (within the accuracy maintaining range ($23 \pm 5^{\circ}\text{C}$))
 $\pm 2^{\circ}\text{C}$ (between 5 and 45°C of ambient temperature)
- R.T.D. : Pt100/JPt100, 3-wire type
- Normal current : 0.25 mA
- Lead wire tolerance : 5Ω maximum/wire (3 lead wires should have the same resistance.)
- Voltage : mV: -10 to 10 , 0 to 10 , 0 to 20 , 0 to 50 , 10 to 50 , 0 to 100mV DC
V: -1 to 1 , 0 to 1 , 0 to 2 , 0 to 5 , 1 to 5 , 0 to 10V
- Input impedance : $500\text{k}\Omega$ minimum
- Current mA : 0 to 20 , 4 to 20mA DC Receiving impedance: 250Ω
- Input scaling function : Scaling possible for voltage (mV, V) or current (mA) input
- Scaling range : -1999 to 9999 digit
- Span : 10 to 5000 digit
- Position of decimal point : None, 1, 2 and 3 digits on the right of decimal point
- Sampling cycle : 0.25 seconds
- PV bias : -1999 to 2000 digit
- PV filter : 0 to 100 seconds
- Isolation : Control input not insulated from system, set value bias, and CT input but insulated from others

■ Control

● Control mode

- With 1 output : Expert PID control with auto tuning function
RA (reverse action characteristic): Heating action
DA (direct action characteristic): Cooling action

- With 2 outputs : Expert PID control with auto tuning function + PID control
PID (output 1) + PID (output 2)
RA (reverse action characteristic): Heating action
(OUT1) and cooling action (OUT2)
DA (direct characteristic): 2-stage heating action

● Type of control/rating

- : Contact/1a 240V AC 2A (resistive load)
1.2A (inductive load)
- (Common to Output 1 and 2) : SSR drive voltage/12V±1.5V DC (Maximum load current 30mA)
Current/4 to 20mA DC (Maximum load resistance 600Ω)
Voltage/0 to 10V DC (Maximum load current 2mA)

● Control output resolution

- : Control output 1: approx. 0.0125% (1/8000)
Control output 2: approx. 0.5% (1/200)

● Control output 1

- Proportional band (P) : OFF, 0.1 to 999.9% (ON-OFF action by OFF)
Integral time (I) : OFF, 1 to 6000 seconds (P or PD action by OFF)
Derivative time (D) : OFF, 1 to 3600 seconds (P or PI action by OFF)
Set value function : OFF, 0.01 to 1.00
ON-OFF hysteresis : 1 to 999 digit (Effective when P=OFF)
Manual reset : -50.0 to 50.0% (Effective when I=OFF)
Higher/lower limit output limiter : Lower limit 0.0 to 99.9%, higher limit 0.1 to 100.0% (Lower limit value < Higher limit value)
Proportional cycle : 1 to 120 seconds (for contact and SSR drive voltage output)

● Control output 2 (option)

- Proportional band (P) : OFF, 0.1 to 999.9% (ON-OFF action by OFF)
Integral time (I) : OFF, 1 to 6000 seconds (P or PD action by OFF)
Derivative time (D) : OFF, 1 to 3600 seconds (P or PI action by OFF)
Set value function : OFF, 0.01 to 1.00
ON-OFF hysteresis : 1 to 999 digit (Effective when P=OFF)
Dead band : -1999 to 5000 digit (Overlap with a negative value)
Higher/lower limit output limiter : Lower limit 0.0 to 99.9%, higher limit 0.1 to 100.0% (Lower limit value < Higher limit value)
Proportional cycle : 1 to 120 seconds (for contact and SSR drive voltage output)

● Manual control

- Output setting range : 0.0 to 100.0%
Setting resolution : 0.1%
Manual ↔ auto switching : Balanceless bumpless (within proportional range)

● Soft start

- : OFF, 1 to 100 seconds

● AT point

- : SV value in execution

● Control output characteristic

- : RA (reverse action characteristic)/DA (direct action characteristic) switching by front key or communication

With 2 outputs

- : RA (heating/cooling)/DA (2 stage heating)

● Isolation

- : Contact output isolated from all.
Analog output not insulated from SSR drive voltage, current and voltage but insulated from others.
(In case another output is also SSR drive voltage, current or voltage, two outputs are not insulated from each other.)

■ Event output (option)

- Number of event points : 2 points of EV1 and EV2
- Types : Selectable from the following 9 types for EV1 and EV2:
 - oFF No selection
 - Hd Higher limit deviation
 - Ld Lower limit deviation
 - od Outside higher/lower limit deviations
 - cd Within higher/lower limit deviations
 - HA Higher limit absolute value
 - LA Lower limit absolute value
 - So Scaleover
 - Hb Heater break/loop alarm
- Event setting range : Absolute values (both higher limit and lower limit): Within measuring range
Deviations (both higher limit and lower limit): -1999 to 2000 digit
Higher/lower limit deviations (within/outside): 0 to 2000 digit
- Event action : ON-OFF action
- Hysteresis : 1 to 999 digit
- Standby action : Selectable from the following 4 types
 - EV1 and EV2 : 1. Without standby action.
 - 2. Standby when power is applied.
 - 3. Standby when power is applied and when SV value in execution is changed.
 - 4. Control mode without standby action (No alarm is output at the time of abnormal input).
- Output type/rating : Contact (1a × 2 points common)/240V AC 1A (resistive load)
- Output updating cycle : 0.25 seconds

■ Heater break/heater loop alarm (option)

Heater break/loop detection only for OUT1 (Selectable when output type is contact or SSR drive voltage)

- Current capacity : 30A or 50A to be designated when CT is ordered.
- Alarm action : Heater current is detected by external CT provided as an accessory.
When heater break is detected while control output is ON=Alarm output ON
When heater loop alarm is detected while control output is OFF=Alarm output ON
- Current setting range : OFF, 0.1 to 50.0A (Alarm action is stopped by setting OFF)
- Setting resolution : 0.1A
- Current display range : 0.0 to 55.0A
- Display accuracy : ±2.0A (Sine wave at 50Hz)
- Minimum time to identify action : 0.25 seconds (every 0.5 seconds) common to ON and OFF
- Alarm retention mode : Selectable from lock (to retain) and real (not to retain).
- Standby action : Selectable from without (OFF) and with (ON).
- Sampling cycle : 0.5 seconds
- Isolation : CT input not insulated from system and other inputs but insulated from the others.

■ Set value bias/DI (option)

- Number of input points : 1 point
- Setting range : -1999 to 5000 digit
- Action input : Non-voltage contact or open collector (level action) about 5V DC, 1mA maximum
- Minimum level retention time : 0.15 seconds
- DI types : 1) None
2) SB; set value bias
3) STBY; standby
4) ACT; control action characteristics
- Isolation : Action input not insulated from system and other inputs but insulated from others

■ Communication function (option)

- Type of communication : RS-232C, RS-485
 - Communication system : RS-232C : 3-line type half duplex system
RS-485 : 2-line type half duplex system
(RS-485 is of half-duplex multi-drop (bus) system)
 - Communication distance : RS-232C : The longest: 15 m
RS-485 : The longest: 500 m (depending on conditions)
 - Number of connectable instruments : RS-232: 1, RS-485: up to 31
 - Synchronization system : Start-stop synchronization system
 - Communication speed : 1200, 2400, 4800, 9600, 19200 bps
 - Communication address : 1 to 255
 - Communication delay time : 1 to 100 (× 0.512 msec)
 - Communication memory mode : EEP/RAM/r_E
 - Communication protocol(1) : Shimaden standard protocol
 - Data format : 7E1, 7E2, 7N1, 7N2, 8E1, 8E2, 8N1, 8N2
 - Control code : STX_ETX_CR, @_ : CR
 - Communication BCC : Add, Add two's cmp, XOR, None
 - Communication code : ASCII code
 - Communication protocol(2) : MODBUS ASCII mode
 - Data format : 7E1, 7E2, 7N1, 7N2
 - Control code : CRLF
 - Error check : LRC check
 - Function code : 03H, 06H (Hex)
 - 1) 03H, read data
 - 2) 06H, write data
 - Communication protocol(3) : MODBUS RTU mode
 - Data format : 8E1, 8E2, 8N1, 8N2
 - Control code : None
 - Error check : CRC-16
 - Function code : 03H, 06H (Hex)
 - 1) 03H, read data
 - 2) 06H, write data
 - Isolation : Communication signals insulated from system, each input and each output.
- ### ■ Analog output (option)
- Number of output points : 1 point
 - Type of analog output : Selectable from measured value, target value (SV in execution), control output 1 and control output 2.
 - Output signal/rating : 4 to 20mA DC/Maximum load resistance 300Ω
0 to 10V DC/Maximum load current 2mA
0 to 10mV DC/Output resistance 10Ω
 - Output scaling : Measured value, target value: Within measuring range (inversed scaling possible)
Control output 1 and 2 0.0 to 100.0% (inversed scaling possible)
 - Output accuracy : ±0.3% FS (with respect to displayed value)
 - Output resolution : Approx. 0.01% (1/10000)
 - Output updating cycle : 0.25 seconds
 - Isolation : Analog output insulated from system and inputs but not insulated from control output except contact output.

■ General specifications

- Data storage : Non-volatile memory (EEPROM)
- Environmental conditions for instrument operation
 - Temperature : -10 to 50 °C
 - Humidity : 90% RH or less (no dew condensation)
 - Height : 2000m from the sea level or lower
 - Over voltage category : II
 - Pollution class : 2 (IEC 60664)
- Storage temperature : -20 to 65 °C
- Supply voltage : Either 100 to 240V AC \pm 10% 50/60Hz or 24V AC/DC \pm 10% to be designated.
- Power consumption : SR91: 100 to 240VAC 11VA maximum for AC; 6W for DC 24V; 7VA for AC 24V
SR92, SR93 and SR94: 100 to 240VAC 15VA maximum for AC; 8W for DC
- Input/noise removal ratio : 50 dB or higher in normal mode (50/60 Hz)
130 dB or higher in common mode (50/60 Hz)
- Applicable standards : Safety: IEC61010-1 and EN61010-1
EMC : EN61326-1
RoHS Compliance
- Insulation resistance : Input-output terminals and power terminal interval: 500 V DC 20M Ω min.
Power terminals and ground terminal interval: 500 V DC 20M Ω min.
- Dielectric strength : Input-output terminals and power terminal interval: 2300 V AC 1 minute
Power terminals and ground terminal interval: 1500 V AC 1 minute
- Protective structure : Front operating panel only is dust-proof and drip-proof. (equivalent to IP66, NEMA4X)
- Material of case : PPE resin molding (equivalent to UL94V-1)
- External dimensions : SR91: H48 \times W48 \times D111 (Panel depth: 100) mm
SR92: H72 \times W72 \times D111 (Panel depth: 100) mm
SR93: H96 \times W96 \times D111 (Panel depth: 100) mm
SR94: H96 \times W48 \times D111 (Panel depth: 100) mm
- Mounting : Push-in panel (one-touch mount)
- Panel thickness : 1.0 to 4.0 mm
- Panel cutout : SR91: H45 \times W45 mm
SR92: H68 \times W68 mm
SR93: H92 \times W92 mm
SR94: H92 \times W45 mm
- Weight : SR91: Approximately 170 g
SR92: Approximately 280 g
SR93: Approximately 330 g
SR94: Approximately 240 g

ORDERING INFORMATION

Series **SR91**

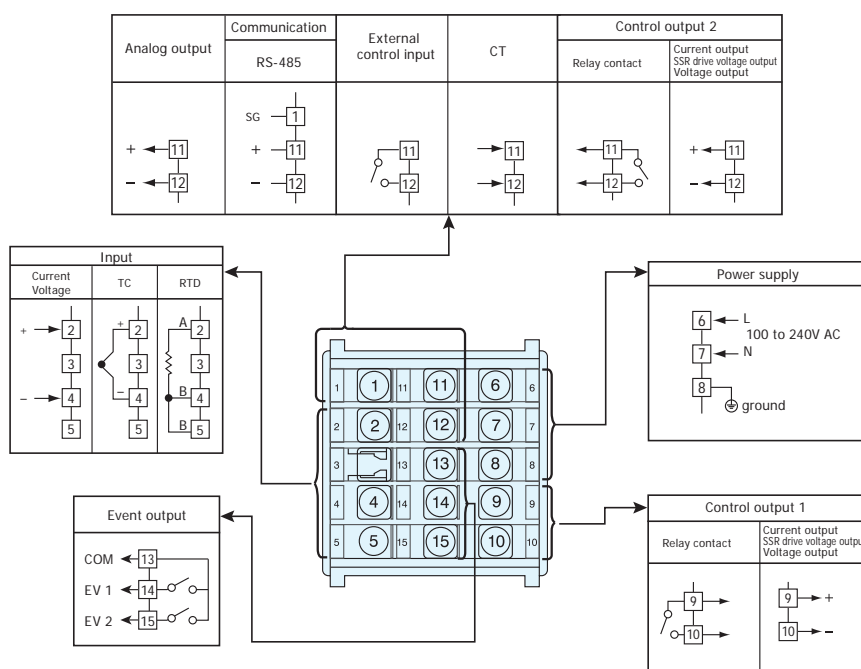
ITEMS	CODE	SPECIFICATIONS			
SERIES	SR91-	MPU-Based Auto-Tuning PID Digital Controller, DIN H48 × W48 × D110 mm			
INPUT	8	Multi input	Thermocouple	B, R, S, K, E, J, T, N, PLII, C (WRe 5-26), {U, L (DIN43710)}	
			R.T.D.	Pt100/JPt100	
			Voltage (mV)	-10 to 10, 0 to 10, 0 to 20, 0 to 50, 10 to 50 and 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 : Inverse scaling is not possible
	4	Current (mA)	0 to 20, 4 to 20 mA DC Receiving impedance: 250 Ω		
	6	Voltage (V)	-1 to 1, 0 to 1, 0 to 2, 0 to 5, 1 to 5, 0 to 10V DC Input resistance: 500 kΩ min.		
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 (OPTION)	0	None			
	1	Contact output (2a) Ev1, Ev2: 240V AC 1A/resistive load			
OPTION	Control output (2)	N	None		
		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	Voltage: 0 to 10V DC Load current: 2mA max.	
	Heater break alarm	1	Current setting range: 0.1 to 30.0A (with CT 30A)		Note: Availble 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)		
	Analog output	3	Voltage: 0 to 10mV DC, Output resistance: 10 Ω		
		4	Current: 4 to 20mA DC, Load resistance: 300 Ωmax.		
		6	Voltage: 0 to 10V DC, Load current: 2mA max.		
	Communication	5	RS-485 (Up to 31 connected units are possible)		
	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.

TERMINAL ARRANGEMENT



Crimp-type terminals fit M3.5 screws.

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, L (DIN43710)}		
			R.T.D.	Pt100/JPt100		
	4	Current (mA)	0 to 20, 4 to 20mA DC Receiving impedance: 250Ω		For voltage and current input: Scaling Possible Range: -1999 to 9999 Span: 10 to 5000 Note: Inverse scaling is not possible.	
			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.			
POWER SUPPLY	V-	Voltage	0 to 10V DC Load current: 2mA max.			
	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)	0	None				
	Communication	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.)				

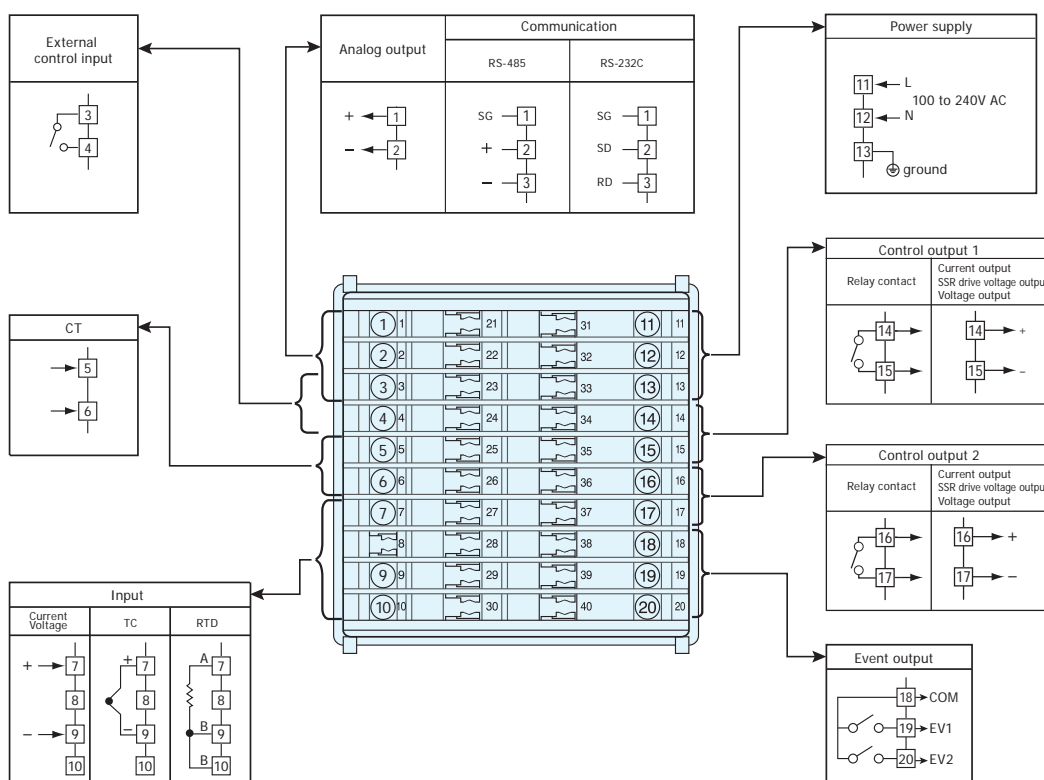
ITEM	CODE	SPECIFICATIONS			
SERIES	SR93-	MPU-Based Auto-Tuning PID Digital Controller, DIN H96 × W96 × D110mm			
	SR94-	MPU-Based Auto-Tuning PID Digital Controller, DIN H96 × W48 × D110mm			
INPUT	8	Multi input	Thermocouple	B, R, S, K, E, J, T, N, PLII, C (Wre 5-26), {U, L (DIN 43710)}	
			R.T.D.	Pt100/JPt100	
	4	Current (mA)	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: Inverse scaling is not possible.
			0 to 20, 4 to 20mA DC	Receiving impedance: 250Ω	
			-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)	6	Voltage (V)			
		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.
CONTROL OUTPUT (2)	V–	Voltage	0 to 10V DC	Load current: 2mA max.	
		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.
POWER SUPPLY	90–	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.
EVENT OUTPUT/HEATER BREAK ALARM	90–			100V to 240V AC±10%, 50/60Hz	
OPTION	ANALOG OUTPUT	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)		
	DI (Set value bias)	00	None		
		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.		
	ANALOG OUTPUT + 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.		
		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:

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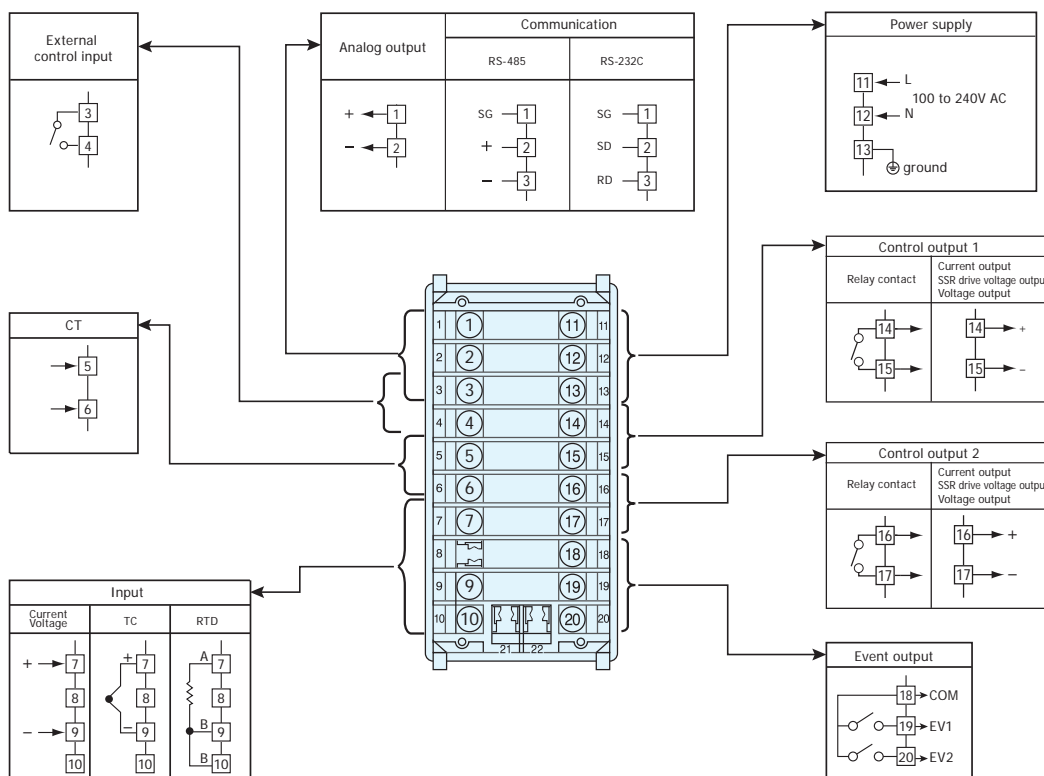
The cause of the above-mentioned problem is that the positional relationship between the proportional band (PB) and the set value (SV) of a one-output type controller differs from that of a two-output type.

●SR93



Crimp-type terminals fit M3.5 screws.

●SR94



Crimp-type terminals fit M3.5 screws.

Input Type			Code	Measuring range (°C)		Measuring range (°F)	
Multi-input	Thermocouple	B * 1	01	0	to 1800 °C	0	to 3300 °F
		R	02	0	to 1700 °C	0	to 3100 °F
		S	03	0	to 1700 °C	0	to 3100 °F
		K	04 * 2	-199.9	to 400.0 °C	-300	to 750 °F
			05	0.0	to 800.0 °C	0	to 1500 °F
			06	0	to 1200 °C	0	to 2200 °F
		E	07	0	to 700 °C	0	to 1300 °F
		J	08	0	to 600 °C	0	to 1100 °F
		T	09 * 2	-199.9	to 200.0 °C	-300	to 400 °F
		N	10	0	to 1300 °C	0	to 2300 °F
		PLII * 3	11	0	to 1300 °C	0	to 2300 °F
		C (WRe 5-26)	12	0	to 2300 °C	0	to 4200 °F
		U * 4	13 * 2	-199.9	to 200.0 °C	-300	to 400 °F
		L * 4	14	0	to 600 °C	0	to 1100 °F
	Kelvin	K	15 * 5	10.0	to 350.0 K	10.0	to 350.0 K
		AuFe-Cr	16 * 6	0.0	to 350.0 K	0.0	to 350.0 K
		K	17 * 5	10	to 350 K	10	to 350 K
		AuFe-Cr	18 * 6	0	to 350 K	0	to 350 K
	R.T.D.	Pt100	31	-200	to 600 °C	-300	to 1100 °F
			32	-100.0	to 100.0 °C	-150.0	to 200.0 °F
			33	-50.0	to 50.0 °C	-50.0	to 120.0 °F
			34	0.0	to 200.0 °C	0.0	to 400.0 °F
		JPt100	35	-200	to 500 °C	-300	to 1000 °F
			36	-100.0	to 100.0 °C	-150.0	to 200.0 °F
			37	-50.0	to 50.0 °C	-50.0	to 120.0 °F
			38	0.0	to 200.0 °C	0.0	to 400.0 °F
	Voltage (mV)	-10 to 10mV	71	Owing to scaling function, any measuring range can be set within the following range.			
		0 to 10mV	72				
		0 to 20mV	73				
		0 to 50mV	74				
		10 to 50mV	75				
		0 to 100mV	76				
Voltage (V)		-1 to 1V	81	Scaling range: -1999 to 9999 digit			
		0 to 1V	82				
		0 to 2V	83	Span: 10 to 5000 counts on condition of lower side < higher side			
		0 to 5V	84				
		1 to 5V	85				
		0 to 10V	86				
Current (mA)		0 to 20mA	91				
		4 to 20mA	92				

Thermocouple B, R, S, K, E, J, T, N : JIS/IEC

R.T.D. Pt100 : JIS/IEC JPt100

*1 Thermocouple: B: Accuracy guarantee not applicable to 400°C (752°F) and below.

*2 Thermocouple K, T, U: Accuracy of those whose readings are below -100°C is ±0.7% FS

*3 Thermocouple PLII: Platinel

*4 Thermocouple U, L: DIN 43710

*5. Thermocouple K (Kelvin) accuracy

Temperature range	
10.0 to 30.0K	±{2.0%FS + 40 °C+1 digit}
30.0 to 70.0K	±{1.0%FS + 14 °C+1 digit}
70.0 to 170.0K	±{0.7%FS + 6 °C+1 digit}
170.0 to 270.0K	±{0.5%FS + 3 °C+1 digit}
270.0 to 350.0K	±{0.3%FS + 2 °C+1 digit}

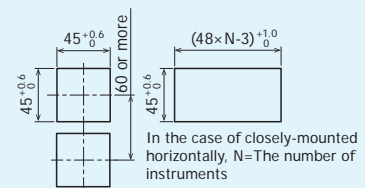
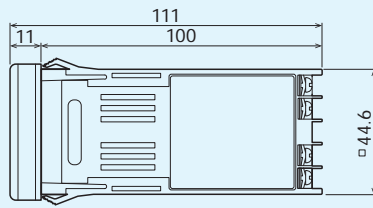
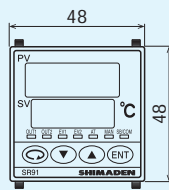
*6. Thermocouple Metal-chromel (AuFe-Cr) (Kelvin) accuracy

Temperature range	
0.0 to 30.0K	±{0.7%FS + 6 °C + 1 digit}
30.0 to 70.0K	±{0.5%FS + 3 °C + 1 digit}
70.0 to 170.0K	±{0.3%FS + 2.4 °C + 1 digit}
170.0 to 280.0K	±{0.3%FS + 2 °C + 1 digit}
280.0 to 350.0K	±{0.5%FS + 2 °C + 1 digit}

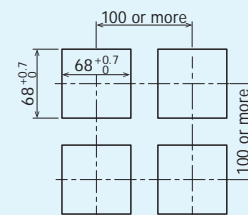
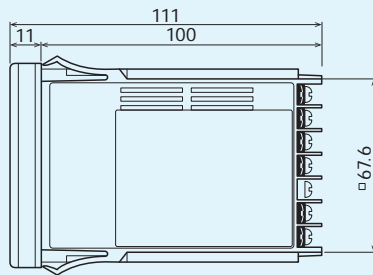
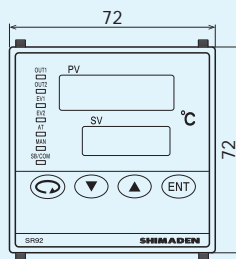
NOTE: Unless otherwise specified, the measuring range will be set as follows when shipped from the factory:

Input	Standard/rating	Measuring range
Multi-input	K thermocouple	0.0 to 800.0 °C
Voltage (V)	0 to 10V DC	0.0 to 100.0 no legend
Current (mA)	4 to 20mA DC	0.0 to 100.0 no legend

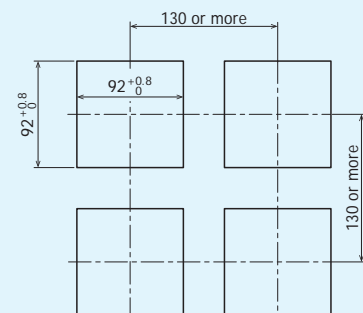
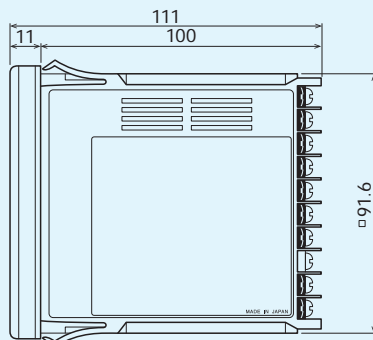
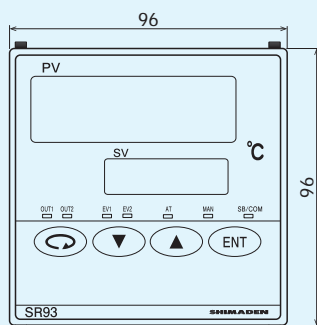
●SR91



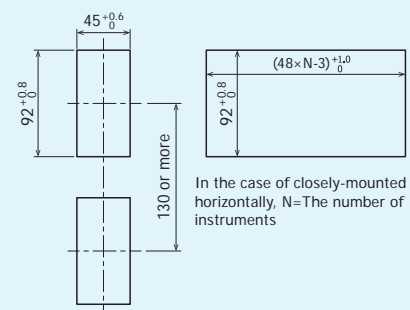
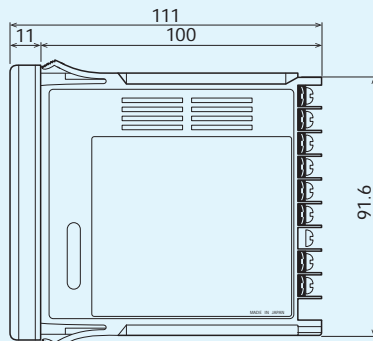
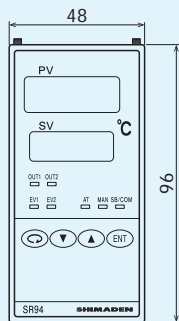
●SR92



●SR93

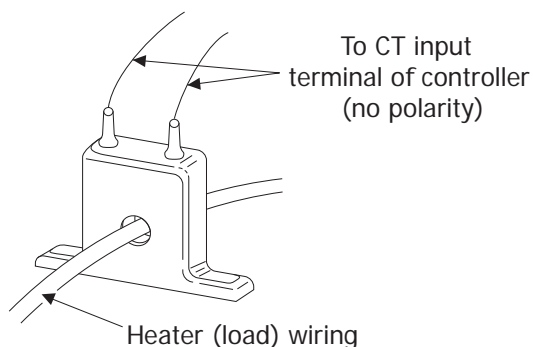


●SR94

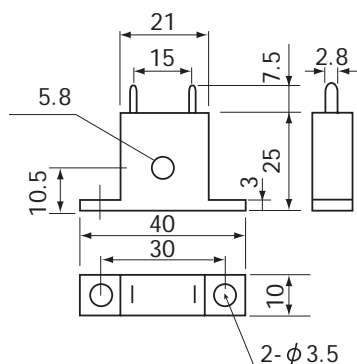


Name	Code	Remarks
CT	QCC01	CT for 30A (CTL-6-S)
CT	QCC02	CT for 50A (CTL-12-S36-8)
Terminal cover	QCR001	For SR91
	QCR002	For SR92 (3 pcs./set)
	QCR007	For SR93 (2 pcs./set)
	QCR004	For SR94 (Single mounting, Φ B Tight M2.3x6 2pcs.)
	QCR005	For SR94 (Close contact mounting, Φ B Tight M2.3x6 4pcs.)

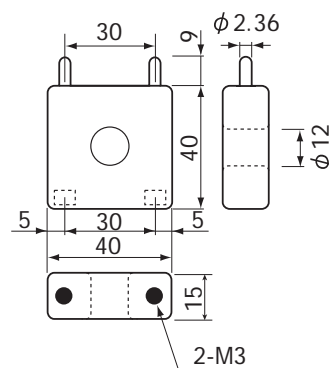
ACCESSORIES REQUIRED FOR CT INPUT



●CT FOR 30A (QCC01)



●CT FOR 50A (QCC02)



Unit: mm

⚠ Warning

- The SR90 series are designed for the control of temperature, humidity and other physical values of general industrial equipment. (They are not to be used for any purpose which regulates the prevention of serious effects on human life or safety.)

⚠ Caution

- If the possibility of loss or damage to your system or property as a result of failure of any part 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/ISO 14001 Certification Obtained

(The contents of this brochure are subject to change without notice.)

Temperature and Humidity Control Specialists