°C
%RH
SHIMADEN

Series **SR90**

SHIMADEN DIGITAL CONTROLLER

$_c$**ЯV**$_{US}$ $C\epsilon$ 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*

☐ *RS232C or RS485 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.*

SPECIFICATIONS

■ **Display**

● Digital display: Measured value (PV)/7 segments red LED
4 digits
Target set value (SV)/7 segments green
LED 4 digits

● Display accuracy: ±(0.3%FS + 1 digit)
Excluding reference contact temperature
compensation accuracy of thermocouple
input.
Accuracy of readings lower than −100°C of
thermocouples K, T, U inputs is ±0.7%FS.
Accuracy guarantee not applicable to
400°C (752°F) and below of B
thermocouple.

● Display accuracy maintaining range:
23°C ± 5°C (18~28°C)

● Display resolution: Depends on measuring range (0.001, 0.01,
0.1 and 1)

● Measured value display range: −10%~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 (ENT)) 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, Wre5-26 {U, L
(DIN 43710)}
Input impedance: 500kΩ minimum
External resistance tolerance: 100Ω maximum
Burnout function: Standard feature (up scale)
Reference junction compensation accuracy:
± 1°C (within the accuracy maintaining
range (23 ± 5°C))
± 2°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: −10~10, 0~10, 0~20, 0~50, 10~50,
0~100mv DC
V: −1~1, 0~1, 0~2, 0~5, 1~5, 0~10V
Input impedance: 500kΩ minimum

● Current mA: 0~20, 4~20mA DC
Receiving impedance: 250Ω

● Input scaling function: Scaling possible for voltage (mV, V) or
current (mA) input
Scaling range: −1999~9999 counts
Span: 10~5000 counts
Position of decimal point: None, 1, 2 and 3 digits on the right of
decimal point

● Sampling cycle: 0.25 seconds

● PV bias: −1999~2000 units

● PV filter: 0~100 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/4~20mA DC (Maximum load
resistance 600Ω)
Voltage/0~10V 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, 0.1~999.9% (ON-OFF action by OFF)
Integral time (I): OFF, 1~6000 seconds
(P or PD action by OFF)
Derivative time (D): OFF, 1~3600 seconds
(P or PI action by OFF)
Set value function: OFF, 0.01~1.00
ON-OFF hysteresis: 1~999 units (Effective when P=OFF)
Manual reset: −50.0~50.0% (Effective when I=OFF)
Higher/lower limit output limiter: Lower limit 0.0~99.9%, higher limit
0.1~100.0% (Lower limit value < Higher
limit value)
Proportional cycle: 1~120 seconds (for contact and SSR drive
voltage output)

● Control output 2 (option)
Proportional band (P): OFF, 0.1~999.9%
(ON-OFF action by OFF)
Integral time (I): OFF, 1~6000 seconds
(P or PD action by OFF)
Derivative time (D): OFF, 1~3600 seconds
(P or PI action by OFF)
Set value function: OFF, 0.01~1.00
ON-OFF hysteresis: 1~999 units (Effective when P=OFF)
Dead band: −1999~5000 units (Overlap with a negative
value)
Higher/lower limit output limiter: Lower limit 0.0~99.9%, higher limit
0.1~100.0% (Lower limit value < Higher
limit value)
Proportional cycle: 1~120 seconds (for contact and SSR drive
voltage output)

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

● Soft start: OFF, 1~100 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): −1999~2000 units
Higher/lower limit deviations

- Event action: (within/outside): 0~2000 units
  ON-OFF action
- Hysteresis: 1~999 units
- 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, 0.1~50.0A (Alarm action is stopped by setting OFF)
- Setting resolution: 0.1A
- Current display range: 0.0~55.0A
- 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: -1999–5000 units
- 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: 1~255
- Communication delay time: 1~100 (× 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: 4~20mA DC/Maximum load resistance 300Ω
  0~10V DC/Maximum load current 2mA
  0~10mV DC/Output resistance 10Ω
- Output scaling: Measured value, target value: Within measuring range (inversed scaling possible)
  Control output 1 and 2 0.0~100.0% (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: -10–50 °C
  Humidity: 90% RH or less (no dew condensation)
  Height: 2000m from the sea level or lower
  Category: II
  Degree of pollution: 2
- Storage temperature: -20–65 °C
- Supply voltage: Either 100-240V AC±10% 50/60Hz or 24V AC/DC±10% to be designated.
- Power consumption: SR91: 100-240VAC 11VA maximum for AC; 6W for DC 24V; 7VA for AC 24V
  SR92, SR93 and SR94: 100-240VAC 15VA maximum for AC; 8W for DC 24V; 9VA for AC 24V
- 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: IEC1010 and EN61010-1
  EMC: EN61326
  RoHS compliance: EN50581
- Insulation resistance: Between input/output terminals and power terminal 500V DC 20MΩ or above;
  Between input/output terminals and protective conductor terminal 500V DC 20MΩ or above
- Dielectric strength: Between input/output terminals and power terminal 2300V AC 1 minute; Between power terminal and protective conductor terminal 1500V AC 1 minute
- Protective structure: Only front panel has dust-proof and drip-proof structure equivalent to IP66.
- Material of case: PPO resin molding (equivalent to UL94V-1)
- External dimensions:
  SR91: H48 × W48 × D111 (Panel depth: 100) mm
  SR92: H72 × W72 × D111 (Panel depth: 100) mm
  SR93: H96 × W96 × D111 (Panel depth: 100) mm
  SR94: H96 × W48 × D111 (Panel depth: 100) mm
- Mounting: Push-in panel (one-touch mount)
- Panel thickness: 1.0–4.0 mm
- Panel cutout: SR91: H45 × W45 mm
  SR92: H68 × W68 mm
  SR93: H92 × W92 mm
  SR94: H92 × W45 mm
- Weight: SR91: Approximately 170 g
  SR92: Approximately 280 g
  SR93: Approximately 330 g
  SR94: Approximately 240 g

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, Wre5-26 {U, L (DIN 43710)} R.T.D.: Pt100Ω /JPt100Ω	
						Voltage: -10~10, 0~10, 0~20, 0~50, 10~50, 0~100mV DC	For voltage and current input: Scaling Possible
		4				Current (mA): 0~20, 4~20mA DC Receiving impedance: 250Ω	Range: -1999~9999 Span: 10~5000
		6				Voltage (V): -1~1, 0~1, 0~2, 0~5, 1~5, 0~10V DC	Note: Inverse scaling is not possible
CONTROL OUTPUT (1)			Y-			Contact: 1a, Contact capacity: 240V AC 2.5A/resistive load Proportional cycle: 1~120 sec.	
			I-			Current: 4~20mA DC Load resistance: 600Ω max.	
			P-			SSR drive voltage: 12V±1.5V DC/30mA max. Proportional cycle: 1~120 sec.	
			V-			Voltage: 0~10V DC Load current: 2mA max.	
POWER SUPPLY				90-		100~240V 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: 1~120 sec.	
					I	Current: 4~20mA DC Load resistance: 600Ω max.	
					P	SSR drive voltage: 12±1.5V DC/30mA max. Proportional cycle: 1~120 sec.	
					V	Voltage: 0~10V DC Load current: 2mA max.	
	Heater break alarm				1	Current setting range: 0.1~30.0A (with CT 30A)	Note: Avaialble only when control output (1) is Y or P and when event output is selected.
					2	Current setting range: 0.1~50.0A (with CT 50A)	
	Analog output				3	Voltage: 0~10mV DC, Output resistance: 10Ω	
					4	Current: 4~20mA DC, Load resistance: 300Ω max.	
					6	Voltage: 0~10V DC, Load current: 2mA max.	
	Communication				5	RS-485 (Shimaden standard protocol / MODBUS (RTU / ASCII))	
	SV Bias / DI				8	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.

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, Wre5-26 {U, L (DIN 43710)} R.T.D.: Pt100Ω /JPt100Ω Voltage (mV): -10~10, 0~10, 0~20, 0~50, 10~50, 0~100mV DC	For voltage and current input: Scaling Possible Range: -1999~9999 Span: 10~5000
		4						Current (mA): 0~20, 4~20mA DC Receiving impedance: 250Ω	Note: Inverse scaling is not possible.
		6						Voltage (V): -1~1, 0~1, 0~2, 0~5, 1~5, 0~10V DC Input resistance: 500kΩ min.	
CONTROL OUTPUT (1)			Y-					Contact: 1a, Contact capacity: 240V AC 2A/resistive load Proportional cycle: 1~120 sec.	
			I-					Current: 4~20mA DC Load resistance: 600Ω max.	
			P-					SSR drive voltage: 12V±1.5V DC/30mA max. Proportional cycle: 1~120 sec.	
			V-					Voltage: 0~10V DC Load current: 2mA max.	
CONTROL OUTPUT (2) (OPTION)				N-				None	
				Y-				Contact: 1a, Contact capacity: 240V AC 2A/resistive load Proportional cycle: 1~120 sec.	
				I-				Current: 4~20mA DC Load resistance: 600Ω max. (RA when shipped)	
				P-				SSR drive voltage: 12V±1.5V DC/30mA max. Proportional cycle: 1~120 sec.	
				V-				Voltage: 0~10V DC Load current: 2mA max.	
POWER SUPPLY					90-			100V~240V AC±10%, 50/60Hz	
					08-			24V AC/DC±10%, 50/60Hz	
EVENT OUTPUT/ HEATER BREAK ALARM (OPTION)						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 (OPTION)							0	None	
							3	Voltage: 0~10mV DC, Output resistance: 10Ω	
							4	Current: 4~20mA DC, Load resistance: 300Ω max.	
							6	Voltage: 0~10V DC, Load current: 2mA max.	
COMMUNICATION OR SV Bias/DI (OPTION)								0	None
								5	RS-485 (Shimaden standard protocol / MODBUS (RTU / ASCII))
								7	RS-232C (Shimaden standard protocol / MODBUS (RTU / ASCII))
								8	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.
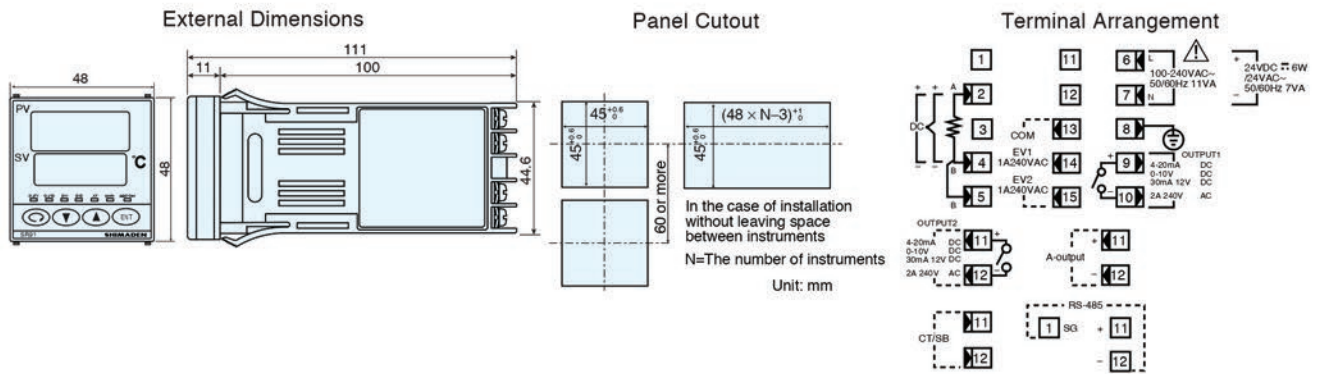
The cause of the above-mentioned problem is that the positional relationship between the proportional band (PB) and the set value (SV) of a one-output type controller differs from that of a two-output type.

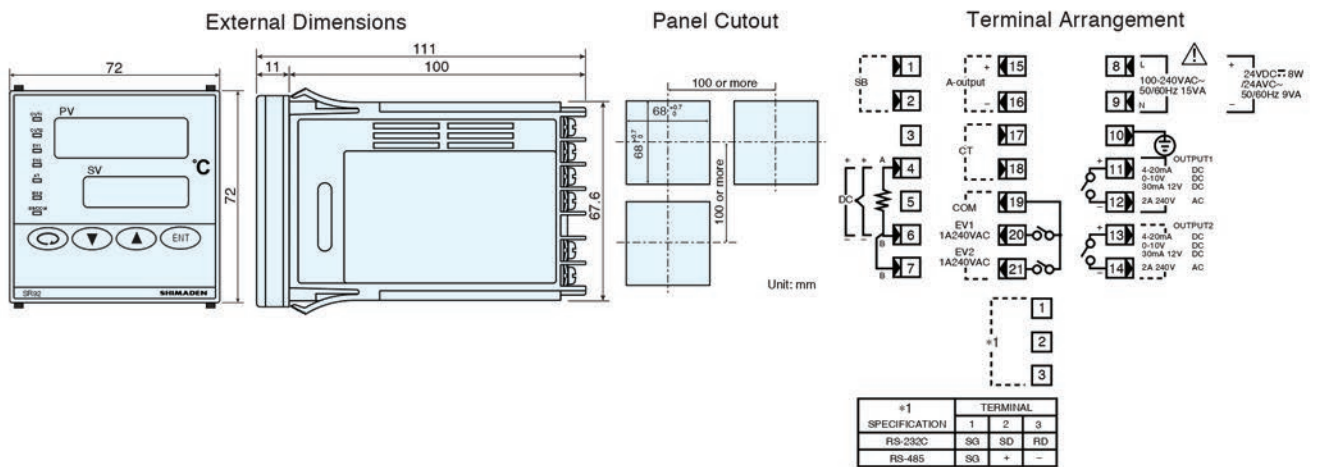| ITEM	CODE						SPECIFICATIONS	
SERIES	SR93-						MPU-Based Auto-Tuning PID Digital Controller, DIN H96 × W96 × D110mm	
	SR94-						MPU-Based Auto-Tuning PID Digital Controller, DIN H96 × W48 × D110mm	
INPUT	8	Multi input					Thermocouple: B, R, S, K, E, J, T, N, PLII, Wre5-26 {U, L (DIN 43710)} R.T.D.: Pt100Ω /JPt100Ω Voltage: -10~10, 0~10, 0~20, 0~50, 10~50, 0~100mV DC	For voltage and current input: Scaling Possible Range: -1999~9999 Span: 10~5000 Note: Inverse scaling is not possible
	4						Current (mA): 0~20, 4~20mA DC Receiving impedance: 250Ω	
	6						Voltage (V): -1~1, 0~1, 0~2, 0~5, 0~10V DC Load resistance: 600Ω max.	
CONTROL OUTPUT (1)		Y-					Contact: 1a, Contact capacity: 240V AC 2A/resistive load Proportional cycle: 1~120 sec.	
		I-					Current: 4~20mA DC Load resistance: 600Ω max.	
		P-					SSR drive voltage: 12V±1.5V DC/30mA max. Proportional cycle: 1~120 sec.	
		V-					Voltage: 0~10V DC Load current: 2mA max.	
CONTROL OUTPUT (2) (OPTION)			N-				None	
			Y-				Contact: 1a, Contact capacity: 240V AC 2A/resistive load Proportional cycle: 1~120 sec.	
			I-				Current: 4~20mA DC Load resistance: 600Ω max.	
			P-				SSR drive voltage: 12V±1.5V DC/30mA max. Proportional cycle: 1~120 sec.	
			V-				Voltage: 0~10V DC Load current: 2mA max.	
POWER SUPPLY				90-			100~240V AC±10%, 50/60Hz	
				08-			24V AC/DC±10%, 50/60Hz	
EVENT OUTPUT/ HEATER BREAK ALARM (OPTION)					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	Analog output					00	None	
						30	Voltage: 0~10mV DC, Output resistance: 10Ω	
						40	Current: 4~20mA DC, Load resistance: 300Ω max.	
						60	Voltage: 0~10V DC, Load current: 2mA max.	
	SV Bias / DI					08	DI (set value bias, STBY, or ACT) 1 point, Non-voltage contact or Open collector input Open collector input rating: approx. 5V/1mA max.	
	Analog output + SV Bias / DI					38	Voltage: 0~10mV DC, Output resistance: 10Ω DI (set value bias, STBY, or ACT) 1 point	
						48	Current: 4~20mA DC, Load resistance: 300Ω max. DI (set value bias, STBY, or ACT) 1 point	
						68	Voltage: 0~10V DC, Load current: 2mA max. DI (set value bias, STBY, or ACT) 1 point	
	Communication					05	RS-485 (Shimaden standard protocol / MODBUS (RTU / ASCII))	
						07	RS-232C (Shimaden standard protocol / MODBUS (RTU / ASCII))	
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.
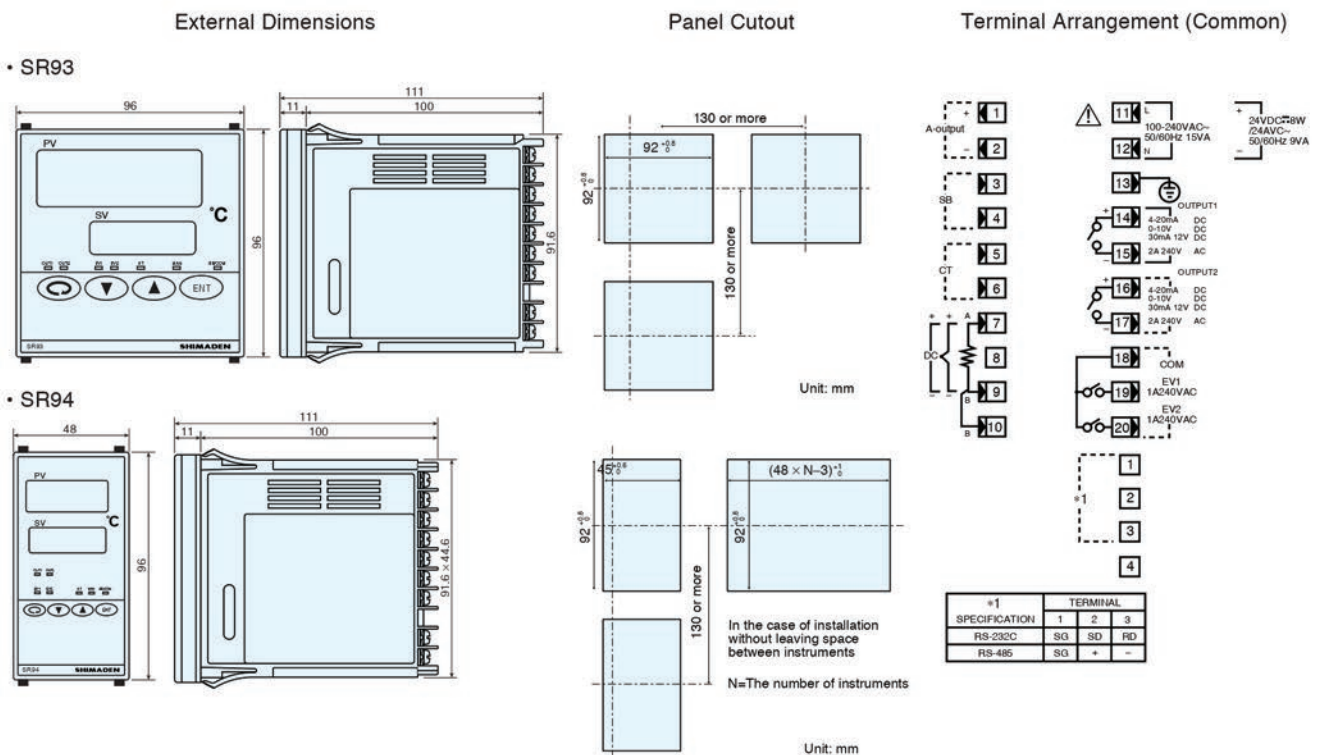
The cause of the above-mentioned problem is that the positional relationship between the proportional band (PB) and the set value (SV) of a one-output type controller differs from that of a two-output type.

SR91

External Dimensions

Panel Cutout

Terminal Arrangement

In the case of installation without leaving space between instruments

N=The number of instruments

Unit: mm

SR92

External Dimensions

Panel Cutout

Terminal Arrangement

100 or more

Unit: mm

*1 SPECIFICATION	TERMINAL		
	1	2	3
RS-232C	SG	SD	RD
RS-485	SG	+	−

SR93 AND SR94

External Dimensions

Panel Cutout

Terminal Arrangement (Common)

· SR93

130 or more

Unit: mm

· SR94

(48 × N−3)

In the case of installation without leaving space between instruments

N=The number of instruments

Unit: mm

*1 SPECIFICATION	TERMINAL		
	1	2	3
RS-232C	SG	SD	RD
RS-485	SG	+	−

Input Type			Code	Measuring range (°C)	Measuring range (°F)
Multi-input	Thermo-couple	B *1	01	0 ~ 1800 °C	0 ~ 3300 °F
		R	02	0 ~ 1700 °C	0 ~ 3100 °F
		S	03	0 ~ 1700 °C	0 ~ 3100 °F
		K	04 *2	-199.9 ~ 400.0 °C	-300 ~ 750 °F
		K	05	0.0 ~ 800.0 °C	0 ~ 1500 °F
		K	06	0 ~ 1200 °C	0 ~ 2200 °F
		E	07	0 ~ 700 °C	0 ~ 1300 °F
		J	08	0 ~ 600 °C	0 ~ 1100 °F
		T	09 *2	-199.9 ~ 200.0 °C	-300 ~ 400 °F
		N	10	0 ~ 1300 °C	0 ~ 2300 °F
		PLII *3	11	0 ~ 1300 °C	0 ~ 2300 °F
		WRe5-26 *4	12	0 ~ 2300 °C	0 ~ 4200 °F
		U *5	13 *2	-199.9 ~ 200.0 °C	-300 ~ 400 °F
		L *5	14	0 ~ 600 °C	0 ~ 1100 °F
		K *6	15	10.0 ~ 350.0 K	
		AuFe-Cr *7	16	0.0 ~ 350.0 K	
		K *6	17	10 ~ 350 K	
		AuFe-Cr *7	18	0 ~ 350 K	
	R.T.D.	Pt100	31	-200 ~ 600 °C	-300 ~ 1100 °F
			32	-100.0 ~ 100.0 °C	-150.0 ~ 200.0 °F
			33	-50.0 ~ 50.0 °C	-50.0 ~ 120.0 °F
			34	0.0 ~ 200.0 °C	0.0 ~ 400.0 °F
		JPt100	35	-200 ~ 500 °C	-300 ~ 1000 °F
			36	-100.0 ~ 100.0 °C	-150.0 ~ 200.0 °F
			37	-50.0 ~ 50.0 °C	-50.0 ~ 120.0 °F
			38	0.0 ~ 200.0 °C	0.0 ~ 400.0 °F
	Voltage (mV)	-10 ~ 10	71		
		0 ~ 10	72		
		0 ~ 20	73		
		0 ~ 50	74		
		10 ~ 50	75		
		0 ~ 100	76		
	Voltage (V)	-1 ~ 1	81		
		0 ~ 1	82		
		0 ~ 2	83		
		0 ~ 5	84		
		1 ~ 5	85		
		0 ~ 10	86		
	Current (mA)	0 ~ 20	91		
		4 ~ 20	92		

Voltage (mV) / Voltage (V) note:

Scaling possible

Owing to scaling function, any measuring range can be set within the following range.

Scaling range: -1999 to 9999 counts
Span: 10 to 5000 counts on condition of lower side < higher side

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

*2 Thermocouple
K, T, U: Accuracy guarantee not applicable to temperature below -100°C ±(0.7% FS + 1 digit)

*3 Thermocouple
PLII: Platinel

*4 Thermocouple
Wre5-26: A product of Hoskins

*5 Thermocouple
U, L: DIN 43710

*6. Thermocouple K (Kelvin) accuracy
Temperature range   External CJ   Internal CJ
$10.0 \sim 30.0$ K $\pm$(2.0%FS + [CJ error X 20] K + 1K)
$30.0 \sim 70.0$ K $\pm$(1.0%FS + [CJ error X 7] K + 1K)
$70.0 \sim 170.0$ K $\pm$(0.7%FS + [CJ error X 3] K + 1K)
$170.0 \sim 270.0$ K $\pm$(0.5%FS + [CJ error X 1.5] K + 1K)
$270.0 \sim 350.0$ K $\pm$(0.3%FS + [CJ error X 1] K + 1K)

*7. Thermocouple Metal-chromel (AuFe-Cr) (Kelvin) accuracy
Temperature range   External CJ   Internal CJ
$0.0 \sim 30.0$ K $\pm$(0.7%FS + [CJ error X 3] K + 1K)
$30.0 \sim 70.0$ K $\pm$(0.5%FS + [CJ error X 1.5] K + 1K)
$70.0 \sim 170.0$ K $\pm$(0.3%FS + [CJ error X 1.2] K + 1K)
$170.0 \sim 280.0$ K $\pm$(0.3%FS + [CJ error X 1] K + 1K)
$280.0 \sim 350.0$ K $\pm$(0.5%FS + [CJ error X 1] K + 1K)

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

Input	Specification/Rating	Measuring range
Multi-input	K thermocouple	0.0 ~ 800.0°C
Voltage (V)	0 ~ 10V DC	0.0 ~ 100.0
Current (mA)	4 ~ 20mA DC	0.0 ~ 100.0

TERMINAL COVER (AVAILABLE SEPARATELY)
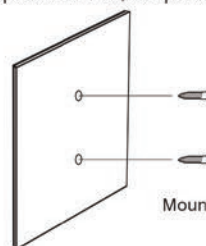
	Model	Mounting
SR91	QCR001	One-touch mount
SR92	QCR002	One-touch mount
SR93	QCR003	One-touch mount

Material/Appearance: PVC/transparent
Thickness: 1 mm
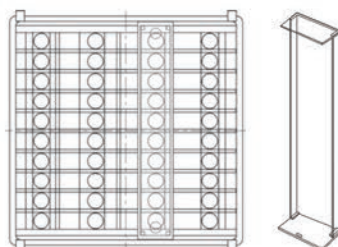
	Model	Mounting
SR94	QCR004 (Individual mounting)	Plus screw, B tight, M2.3 × 6 - 2 pcs.
	QCR005 (Tight-lock coupling)	Plus screw, B tight, M2.3 × 6 - 4 pcs.

Material/Appearance: PVC/transparent Thickness: 1 mm

Mounting: 2+B tight pan-head screws M2.3 ×6mm

⚠ Warning

• The SR90 series is designed for the control of temperature, humidity and other physical values of general industrial equipment. (It is 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.

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