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SHIMADEN

Series **SR90**

# SHIMADEN 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**
- 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.**

■ **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  $-100^{\circ}C$  of thermocouples K, T, U inputs is  $\pm 0.7\%FS$ .  
Accuracy guarantee not applicable to  $400^{\circ}C$  ( $752^{\circ}F$ ) and below of B thermocouple.

- Display accuracy maintaining range:  $23^{\circ}C \pm 5^{\circ}C$  ( $18\sim 28^{\circ}C$ )
- Display resolution: Depends on measuring range (0.001, 0.01, 0.1 and 1)
- Measured value display range:  $-10\%\sim 110\%$  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 ( , , ,  ) 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:  $500k\Omega$  minimum
- External resistance tolerance:  $100\Omega$  maximum
- Burnout function: Standard feature (up scale)
- Reference junction compensation accuracy:  $\pm 1^{\circ}C$  (within the accuracy maintaining range ( $23 \pm 5^{\circ}C$ ))  
 $\pm 2^{\circ}C$  (between  $5$  and  $45^{\circ}C$  of ambient temperature)
- R.T.D.: Pt100/JPt100, 3-wire type
- Normal current: 0.25 mA
- Lead wire tolerance:  $5\Omega$  maximum/wire (3 lead wires should have the same resistance.)
- Voltage mV:  $-10\sim 10, 0\sim 10, 0\sim 20, 0\sim 50, 10\sim 50, 0\sim 100\text{mV DC}$
- V:  $-1\sim 1, 0\sim 1, 0\sim 2, 0\sim 5, 1\sim 5, 0\sim 10V$
- Input impedance:  $500k\Omega$  minimum
- Current mA:  $0\sim 20, 4\sim 20\text{mA DC}$
- Receiving impedance:  $250\Omega$
- Input scaling function: Scaling possible for voltage (mV, V) or current (mA) input
- Scaling range:  $-1999\sim 9999$  counts
- Span:  $10\sim 5000$  counts
- Position of decimal point: None, 1, 2 and 3 digits on the right of decimal point
- Sampling cycle: 0.25 seconds
- PV bias:  $-1999\sim 2000$  units
- PV filter:  $0\sim 100$  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/ $12V \pm 1.5V$  DC (Maximum load current 30mA)  
Current/ $4\sim 20\text{mA DC}$  (Maximum load resistance  $600\Omega$ )  
Voltage/ $0\sim 10V$  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:  $-50.0\sim 50.0\%$  (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:  $-1999\sim 5000$  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  $\leftrightarrow$  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  
*Id*: 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):  $-1999\sim 2000$  units  
Higher/lower limit deviations

- Event action: (within/outside): 0~2000 units
- Hysteresis: ON-OFF action
- Standby action: 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 emp, 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
- Insulation resistance: RoHS compliance: EN50581  
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		
INPUT	4		Current (mA): 0~20, 4~20mA DC		
			Receiving impedance: 250Ω		
INPUT	6		Voltage (V): -1~1, 0~1, 0~2, 0~5, 1~5, 0~10V DC		
			For voltage and current input: Scaling Possible Range: -1999~9999 Span: 10~5000 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: Available 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	
			Current (mA): 0~20, 4~20mA DC Receiving impedance: 250Ω	
	4		Voltage (V): -1~1, 0~1, 0~2, 0~5, 1~5, 0~10V DC Input resistance: 500kΩ min.	
	6		For voltage and current input: Scaling Possible Range: -1999~9999 Span: 10~5000 Note: Inverse scaling is not possible.	
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.

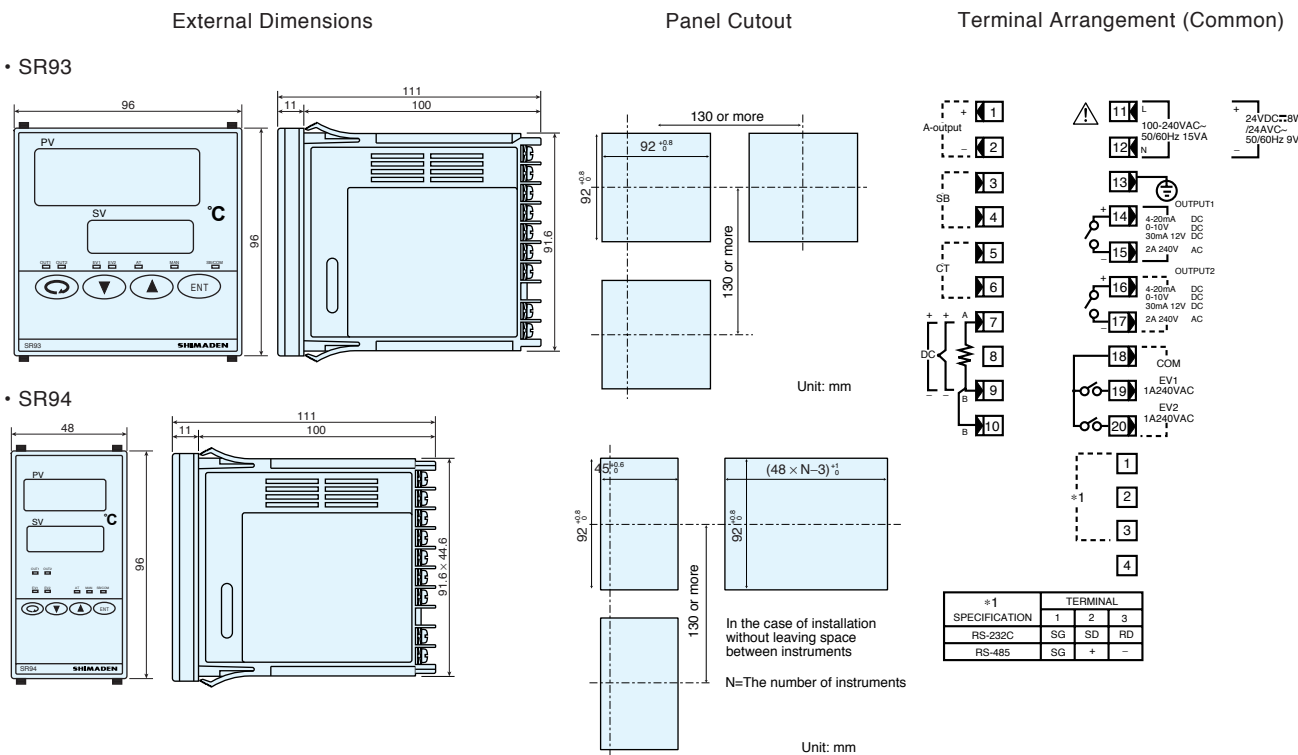
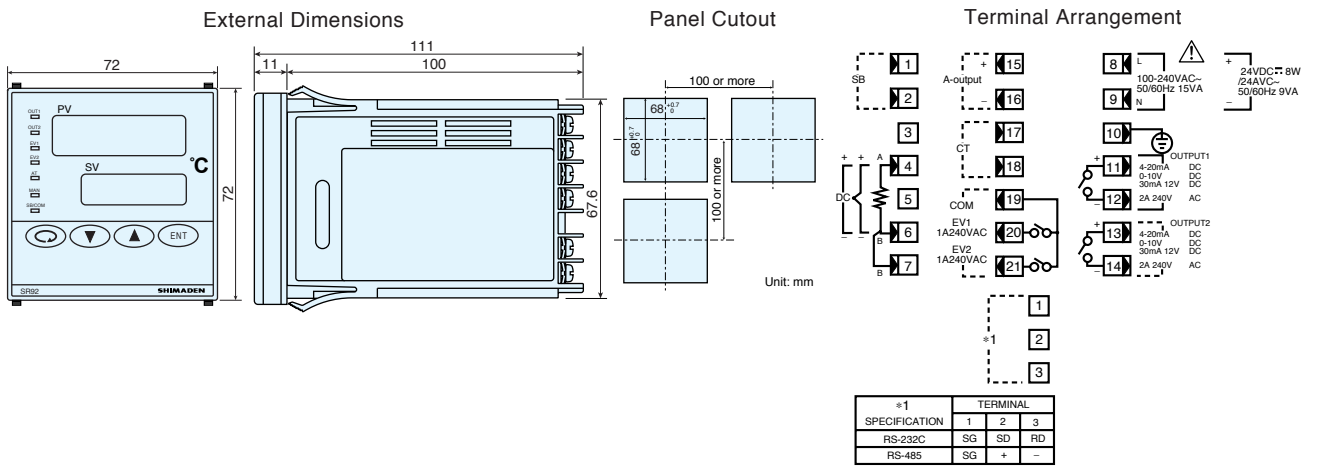
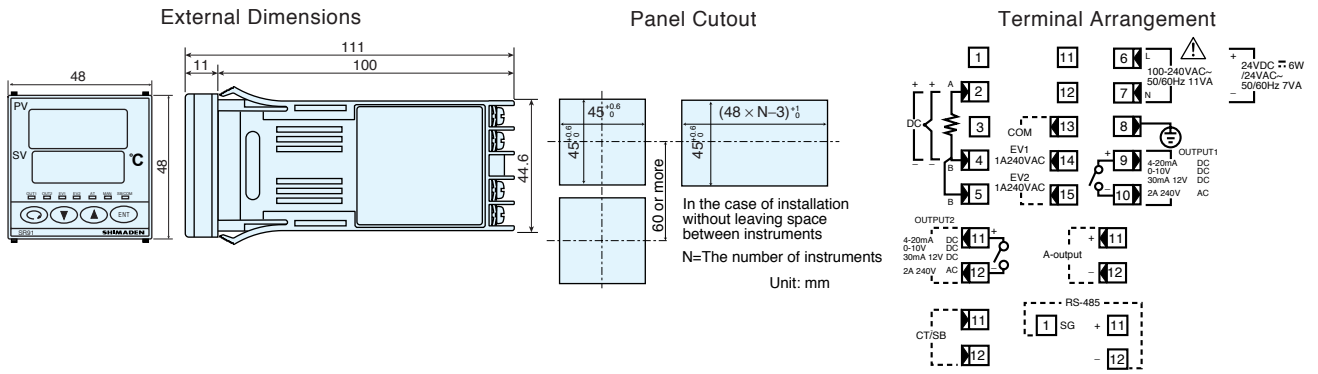
The cause of the above-mentioned problem is that the positional relationship between the proportional band (PB) and the set value (SV) of a one-output type controller differs from that of a two-output type.

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	
	4		Current (mA): 0~20, 4~20mA DC	For voltage and current input: Scaling Possible Range: -1999~9999 Span: 10~5000 Note: Inverse scaling is not possible
	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.	
		38	Voltage: 0~10mV DC, Output resistance: 10Ω DI (set value bias, STBY, or ACT) 1 point	
	Analog output + SV Bias / DI	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	
		05	RS-485 (Shimaden standard protocol / MODBUS (RTU / ASCII))	
	Communication	07	RS-232C (Shimaden standard protocol / MODBUS (RTU / ASCII))	
0		Without		
REMARKS	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.



Input Type	Code	Measuring range (°C)	Measuring range (°F)		
Multi-input	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	Scaling possible		
	0 ~ 10	72			
	0 ~ 20	73	Owing to scaling function, any measuring range can be set within the following range.		
	0 ~ 50	74			
	10 ~ 50	75			
Voltage (V)	0 ~ 100	76	Scaling range: -1999 to 9999 counts		
	0 ~ 1	81	Span: 10 to 5000 counts on condition of lower side < higher side		
	0 ~ 2	83			
	0 ~ 5	84			
	1 ~ 5	85			
	0 ~ 10	86			
	0 ~ 20	91			
Current (mA)	4 ~ 20	92			

- \*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: PlatineI
- \*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 ~ 30.0 K ±(2.0%FS + [CJ error X 20] K + 1K)  
30.0 ~ 70.0 K ±(1.0%FS + [CJ error X 7] K + 1K)  
70.0 ~ 170.0 K ±(0.7%FS + [CJ error X 3] K + 1K)  
170.0 ~ 270.0 K ±(0.5%FS + [CJ error X 1.5] K + 1K)  
270.0 ~ 350.0 K ±(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 ~ 30.0 K ±(0.7%FS + [CJ error X 3] K + 1K)  
30.0 ~ 70.0 K ±(0.5%FS + [CJ error X 1.5] K + 1K)  
70.0 ~ 170.0 K ±(0.3%FS + [CJ error X 1.2] K + 1K)  
170.0 ~ 280.0 K ±(0.3%FS + [CJ error X 1] K + 1K)  
280.0 ~ 350.0 K ±(0.5%FS + [CJ error X 1] K + 1K)

**NOTE:**

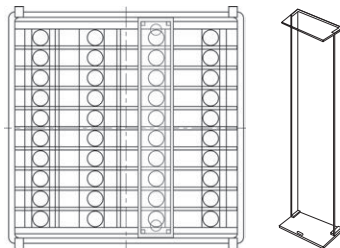
Unless otherwise specified, the measuring range will be set as listed below during the shipment from the factory.

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)

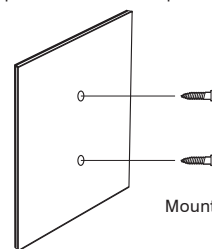
Model	Mounting
SR91	QCR001 One-touch mount
SR92	QCR002 One-touch mount
SR93	QCR003 One-touch mount

Material/Appearance: PVC/transparent  
Thickness: 1 mm



Model	Mounting
SR94	QCR004 (Individual mounting) Plus screw, B tight, M2.3 x 6 - 2 pcs.
	QCR005 (Tight-lock coupling) Plus screw, B tight, M2.3 x 6 - 4 pcs.

Material/Appearance: PVC/transparent Thickness: 1 mm



Mounting: 2+B tight pan-head screws M2.3 x6mm

**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.

ISO9001·ISO14001



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

Temperature and Humidity Control Specialists

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