Shimaden, Temperature and Humidity Control Specialists

°C
%RH
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	:	±(0.3%FS + 1 digit) Excluding reference contact temperature compensation accuracy of thermocouple input. Refer to "Table of Measuring Range Codes" for individual details.
● Display accuracy maintaining range	:	23˚C ± 5˚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 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, PLII, C (WRe 5-26), U (DIN 43710), L (DIN 43710), AuFe-Cr
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 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	:	500kΩ minimum
● Current	:	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 decimal places
● Maximum rated voltage	:	10V DC
● Maximum rated current	:	24mA DC
● Maximum rated transient overvoltage	:	1500V AC rms.
● Sampling cycle	:	0.25 seconds
● PV bias	:	-1999 to 2000 digit
● PV filter	:	0 to 100 seconds
● Cold junction compensation	:	Selectable between internal and external
● 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
● Output action mode	:	MAN (manual), AUTO (automation) / STBY (standby)
● Event at STBY	:	ON/OFF
● 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. 1/25000
		Control output 2: approx. 1/25000
● Hysteresis mode	:	Select from the following 3 types
		CENT mode, SVOF mode, SVON mode
● 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)
Target 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 transfer (within proportional range, however.)
● Soft start	:	OFF, 1 to 100 seconds
● AT point	:	SV value in execution
● Control output characteristic	:	RA (reverse characteristic)/DA (direct characteristic) switching
● 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 of SSR drive voltage, current or voltage, however, 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 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 or when standby is released.
  3. Standby when power is applied, when standby is released or 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 CT to be designated when ordering.
- 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 common to ON and OFF (every 0.5 seconds)
- 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 rest.

■ 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 mode types	: Select between COM1 and COM2
● Communication protocol (1)	: Shimaden standard protocol
Data format	: 7E1, 7E2, 7N1, 7N2, 8E1, 8E2, 8N1, 8N2
Control code	: STX_ETX_CR, STX_ETX_CRLF, @_:_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 (reverse 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. 1/25000
● 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
  - Degree of pollution : 2 (IEC 60664)
- Storage temperature : -20 to 65 °C
- Supply voltage : Either 100 to 240V AC±10% 50/60Hz or 24V AC/DC±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: EN IEC 61010-2-030
  EMC : EN61326-1
  RoHS directive supported
- Insulation resistance : Between I/O and power terminals: 500 V DC 20MΩ min.
  Between power and ground terminals: 500 V DC 20MΩ min.
- Dielectric strength : Between I/O and power terminals: 3000 V AC 1 minute
  Between power and ground terminals: 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)
- Mounting : Push-in panel (one-touch mount)
- External dimensions, Panel cutout, Weight, Panel thickness

	External dimensions	Panel cutout	Weight	Panel thickness
SR91	H48 × W48 × D111 (Panel depth: 100) mm	H45×W45 mm	Approximately 170 g	1.0 to 4.0 mm
SR92	H72 × W72 × D111 (Panel depth: 100) mm	H68×W68 mm	Approximately 280 g	
SR93	H96 × W96 × D111 (Panel depth: 100) mm	H92×W92 mm	Approximately 330 g	
SR94	H96 × W48 × D111 (Panel depth: 100) mm	H92×W45 mm	Approximately 240 g	

ORDERING INFORMATION

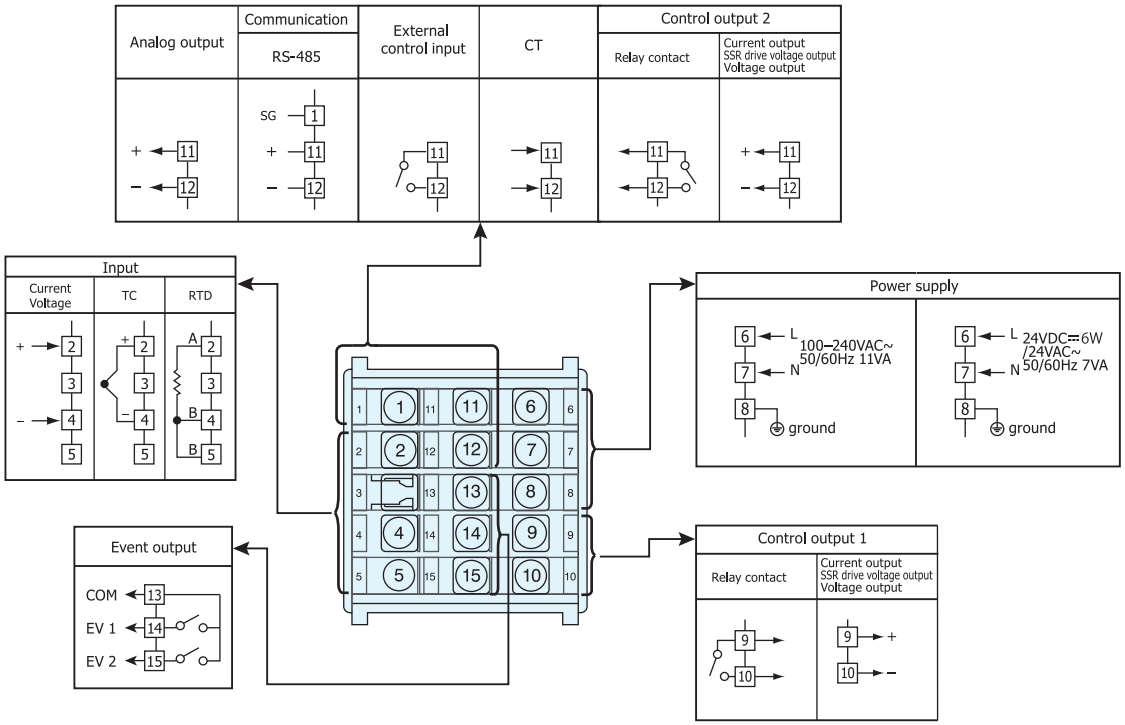
ITEMS	CODE	SPECIFICATIONS				
SERIES	SR91-	MPU-Based Auto-Tuning PID Digital Controller, DIN H48 × W48 × D110 mm				
INPUT	8	Multi input	Thermocouple	B, R, S, K, E, J, T, N, PLII, C (WRe 5-26), U (DIN 43710), L (DIN 43710), AuFe-Cr		
			R.T.D.	Pt100/JPt100		
			Voltage (mV)	-10 to 10, 0 to 10, 0 to 20, 0 to 50, 10 to 50 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 :reverse scaling 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	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	12V±1.5V DC/30mA max. Proportional cycle: 1 to 120 sec.		
	V		Voltage	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: 10 Ω			
	4		Current: 4 to 20mA DC, Load resistance: 300 Ωmax.			
	6		Voltage: 0 to 10V DC, Load current: 2mA max.			
	5	Communication	RS-485 (Up to 31 connected units are possible)			
	8	DI (Set value bias)	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.

ORDERING INFORMATION

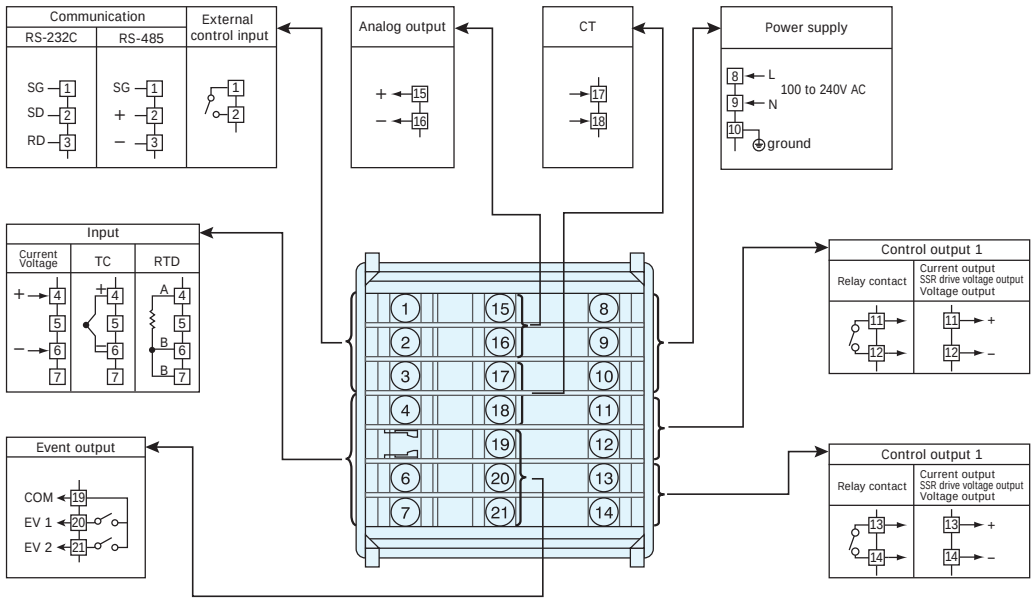
ITEM	CODE	SPECIFICATIONS				
SERIES	SR92-	MPU-Based Auto-Tuning PID Digital Controller, DIN H72 × W72 × D110mm				
INPUT	8	Multi input	Thermocouple	B, R, S, K, E, J, T, N, PLII, C (WRe 5-26), U (DIN 43710), L (DIN 43710), AuFe-Cr		
			R.T.D.	Pt100/JPt100		
			Voltage (mV)	-10 to 10, 0 to 10, 0 to 20, 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.

TERMINAL ARRANGEMENT



Crimp-type terminals fit M3.5 screws.

ORDERING INFORMATION

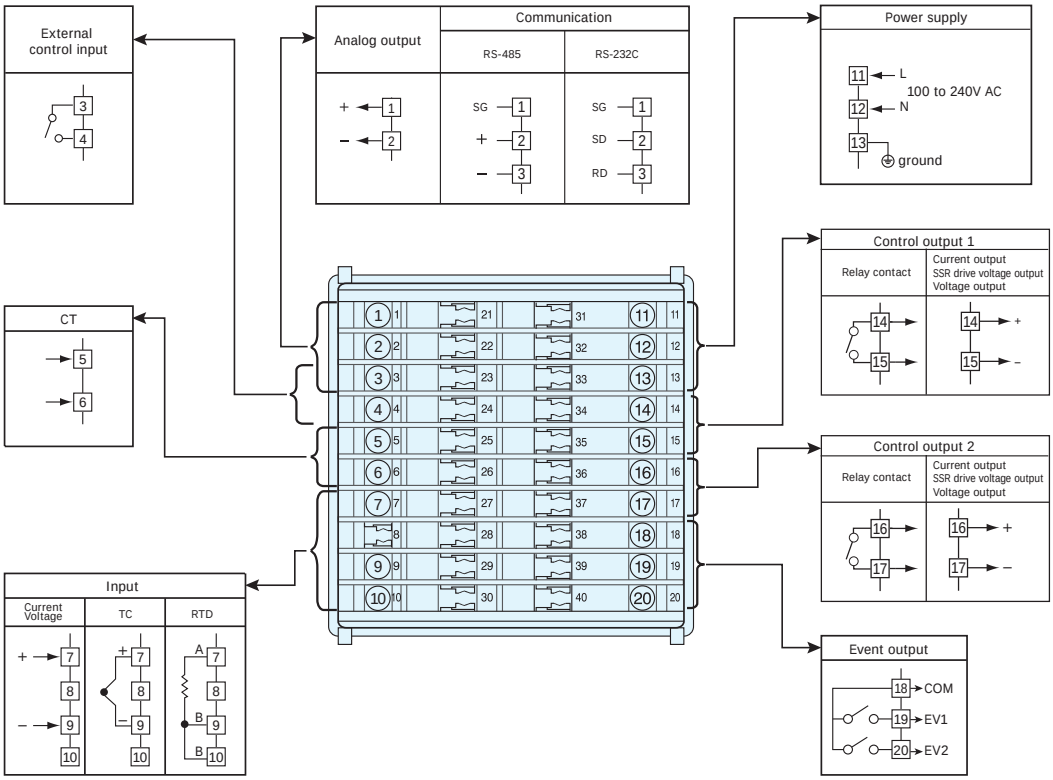
ITEM	CODE	SPECIFICATIONS				
SERIES	SR93-	MPU-Based Auto-Tuning PID Digital Controller, DIN H96 × W96 × D110mm				
	SR94-	MPU-Based Auto-Tuning PID Digital Controller, DIN H96 × W48 × D110mm				
INPUT	8	Multi input	Thermocouple	B, R, S, K, E, J, T, N, PLII, C (WRe 5-26), U (DIN 43710), L (DIN 43710), 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				
	30	ANALOG OUTPUT	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.			
	08	DI (Set value bias)	1 point (setting range: -1999 to 5000), Non-voltage contact or Open collector input Open collector input rating: approx. 5V/1mA max.			
	38	ANALOG OUTPUT + DI (Set value bias)	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			
	05	Communication	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.

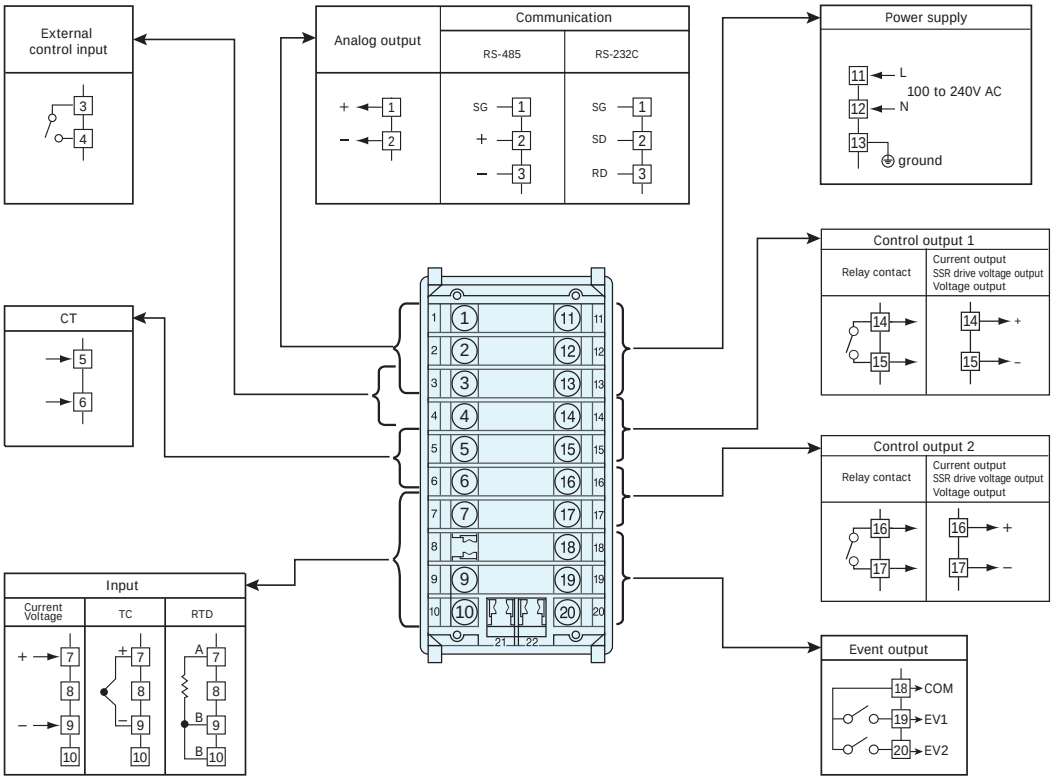
The cause of the above-mentioned problem is that the positional relationship between the proportional band (PB) and the set value (SV) of a one-output type controller differs from that of a two-output type.

●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. Scaling range: -1999 to 9999 digit Span: 10 to 5000 counts on condition of lower side < higher side	
		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		
		0 to 1V		82		
		0 to 2V		83		
		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)

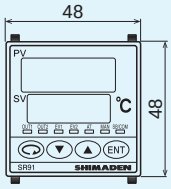
*6. Thermocouple Metal-chromel (AuFe-Cr) (Kelvin) accuracy

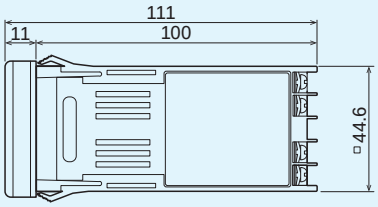
Temperature range	
0.0 to 30.0K	±(0.7%FS +6 °C +1 digit)
30.0 to 70.0K	±(0.5%FS +3 °C +1 digit)
70.0 to 170.0K	±(0.3%FS +2.4 °C +1 digit)
170.0 to 280.0K	±(0.3%FS +2 °C +1 digit)
280.0 to 350.0K	±(0.5%FS +2 °C +1 digit)

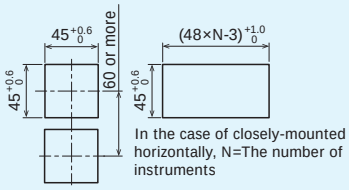
NOTE: Unless otherwise specified, the measuring range will be set as follows when shipped from the factory:

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

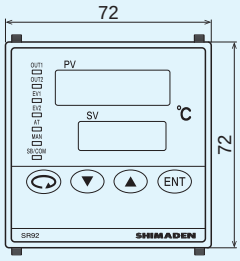
● SR91

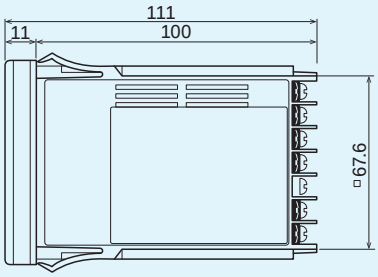


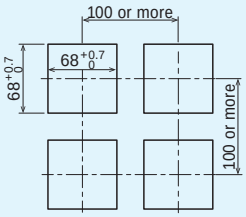




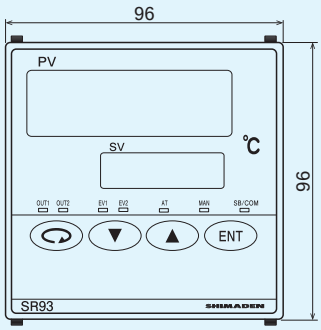
● SR92

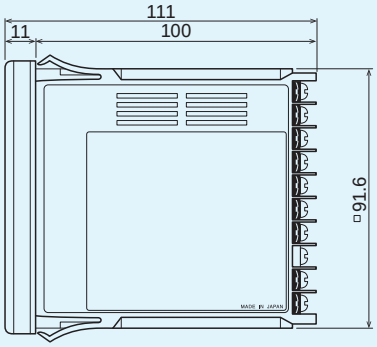


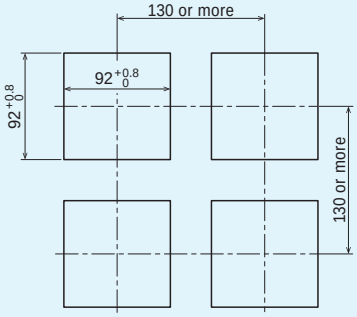




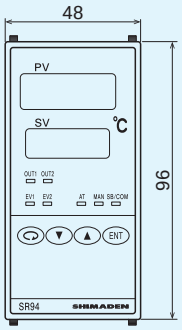
● SR93

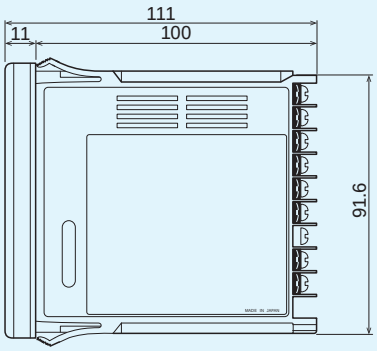


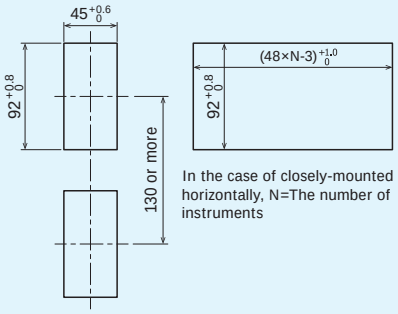




● SR94





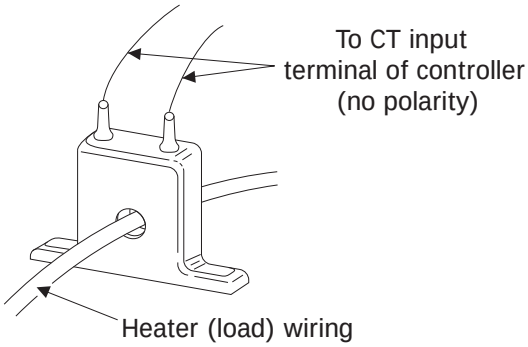


Unit: mm

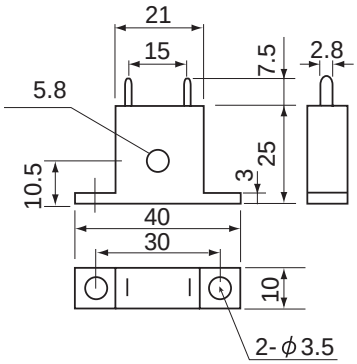
OPTIONAL ACCESSORIES

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

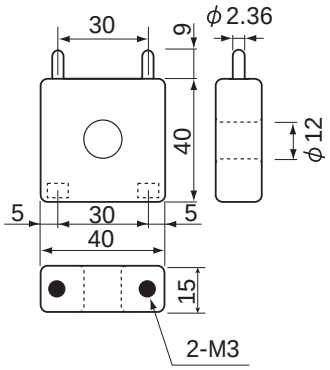
ACCESSORIES REQUIRED FOR CT INPUT



●CT FOR 30A (QCC01)



●CT FOR 50A (QCC02)



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

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