

SHIMADEN DIGITAL CONTROLLER



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Series SR90

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.

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	$\pm (0.3\%FS + 1 \text{ digit})$
	Excluding reference contact temperature compensation accuracy of thermocouple input.
	Accuracy of readings lower than -100°C of thermocouples K, T, U inputs is ±0.7%FS. Accuracy
	guarantee not applicable to 400° C (752°F) and below of B thermocouple.
• Display accuracy maintaining range	: $23^{\circ}C \pm 5^{\circ}C$ (18 to $28^{\circ}C$)
• 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 (\bigcirc , \checkmark , \bigstar and \textcircled{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="" td="" value)<=""></higher>
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	: $500k\Omega$ minimum External resistance tolerance: 100Ω maximum
Burnout function	: Standard feature (up scale) Reference junction compensation accuracy:
	\pm 1°C (within the accuracy maintaining range (23 \pm 5°C))
	$\pm 2^{\circ}C$ (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	: $500k\Omega$ 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 DV hiss	: 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

With 1 output Expert PID control with auto tuning function RA (reverse acion characteristic): Cooling action With 2 outputs Expert PID control with auto tuning function + PID control PID (output 1) + PID (output 2) RA (reverse acion characteristic): Leating action (OUT) and cooling action (OUT2) DA (direct action cooling action (OUT2) 0 (OUT) and cooling action (OUT2) DA (direct characteristic): 2-stage heating action 1 2A (inductive dod) (Cormon to Output 1 and 2) (Common to Output 1 and 2) ESR direc voltage[12V+1.5V DC (Maximum load current 30mA) (Cormon to Output 1 and 2) ESR direc voltage[12V+1.5V DC (Maximum load current 30mA) (Cormon to Output 1 and 2) ESR direc voltage[12V+1.5V DC (Maximum load current 30mA) (Cormon to Output 1 and 2) E Control output 1: approx. 0.0125% (1/8000 (Control output 2: approx. 0.5% (1/200) Control output 2: approx. 0.5% (1/200) • Control output 2: approx. 0.5% (1/200) Control output 2: approx. 0.5% (1/200) • Control output 2: approx. 0.5% (1/200) Control output 2: approx. 0.5% (1/200) • Control output 2: approx. 0.5% (1/200) Control output 2: approx. 0.5% (1/200) • Control output 2: approx. 0.5% (1/200) Control output 2: approx. 0.5% (1/200) • Control output 2: approx. 0.5% (1/200) Control output 2: approx. 0.5% (1/200) • Control output 2: approx. 0.5% (1/200) Control output 2	■ Control																																																																			
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RA (reverse action characteristic): Heating action (UTT) and cooling action (UTT) Da (direct characteristic): 2-stage heating action • Type of control/tating Contact/1a 240V AC 2A (resistive load) (Common to Output 1 and 2) SSR drive voltage/12V±1.5V DC (Maximum load current 30mA) (Common to Output 1 and 2) SSR drive voltage/12V±1.5V DC (Maximum load current 30mA) • Control output 1 exolution Control output 1: approx. 0.0125% (1/8000) • Control output 1: approx. 0.0125% (1/8000) Control output 2: approx. 0.5% (1/200) • Control output 2: opprox. 0.5% (1/200) Control output 2: approx. 0.5% (1/200) • Control output 2: opprox. 0.5% (1/200) Control output 2: opprox. 0.5% (1/200) • Control output 1: approx. 0.0125% (1/8000) Control output 2: opprox. 0.5% (1/200) • Control output 2: opprox. 0.5% (1/200) Control output 2: opprox. 0.5% (1/200) • Control output 2: opprox. 0.5% (0/200) Control output 2: opprox. 0.5% (1/200) • OFF, 0.1 to 9009 seconds (P or PD action by OFF) Control output 2: opprox. 0.5% (1/200) • OVOLOS (Maximum Ioad current 30mA) Control output 2: opprox. 0.5% (1/200) • OVE, 1 to 9009 seconds (P or PD action by OFF) Control output 1: opprox. 0.10% (Conver limit value < Higher limit value)	With 2 outputs	: Expert PID control with auto tuning function + PID control																																																																		
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• Type of control/rating : Contact/la 240V AC 2A (resistive load) I.2A (inductive load) (Common to Output 1 and 2) (Common to Output 1 and 2) • SSR drive voltage/I2V±1.5V DC (Maximum load current 30mA) Current/4 to 20mA DC (Maximum load current 2mA) • Voltage/ 0 10V DC (Maximum load current 2mA) • Control output 1: approx. 0.0125% (1/8000) • Control output 2: approx. 0.5% (1/200) • Control output 2: approx. 0.5% (1/200) • Control output 3 • Control output 2: approx. 0.5% (1/200) • Control output 2: approx. 0.5% (1/200) • Control output 3 • OFF, 0.1 to 999.9% (ON-OFF action by OFF) Integral time (1) : OFF, 0.1 to 999.9% (ON-OFF action by OFF) Integral time (1) : OFF, 0.1 to 1.00 ON-OFF bystersis : 1 to 999 digit (Effective when P-OFF) Manual reset : 1 - 10 99 digit (Effective when P-OFF) Higher/lower limit output limiter : Lower limit 0 to 99.9%, higher limit 0.1 to 100.0% (Lower limit value < Higher limit value) Proportional band (P) : OFF, 0.1 to 999.9% (ON-OFF action by OFF) Integral time (1) : OFF, 0.1 to 999.9% (ON-OFF action by OFF) Control output 2 option) • Control output 2 option) • Corff, 0.0 to 1.00 ON-OFF bystersis : 1 to 999.9% (ON-OFF action by OFF) Integral time (1) : OFF, 0.1 to 999.9% (ON-OFF action by OFF) Integral time (1) : OFF, 0.1 to 999.9% (ON-OFF action by OFF) Derivative time (D) : OFF, 0.1 to 999.9% (ON-OFF action by OFF) Derivative time (D) : OFF, 0.1 to 1.00 ON-OFF bysteresis : 1 to 999 digit (Effective when P=OFF) Derivative time (D) : OFF, 0.1 to 1.00 ON-OFF bysteresis : 1 to 120 seconds (for contact and SSR drive voltage output) • I to 10.00 ON-OFF bysteresis : 1 to 10.00 ON-OFF bysteresis : 2 to 10.00 Monula controt : : 10.00 secon		(OUT1) and cooling action (OUT2)																																																																		
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(Common to Output 1 and 2): SSR drive voltage/12V±1.5V DC (Maximum load current 30mA) Current/4 to 20mA DC (Maximum load current 20mA) Voltage/0 to 10V DC (Maximum load current 20mA)• Control output resolution: Control output 1: approx. 0.0125% (1/2000) Control output 1• Control output 1: OFF, 0.1 to 999.9% (ON-OFF action by OFF)• Control output 1: OFF, 0.1 to 999.9% (ON-OFF action by OFF)• Control output 1: OFF, 1 to 3000 seconds (P or Pl action by OFF)• Derivative time (D): OFF, 1 to 3000 seconds (P or Pl action by OFF)• St value function: OFF, 0.01 to 1.00• ON-OFF hystersis: 1 to 999 digit (Effective when P=OFF)• Manual reset: -50.0 to 50.9% (DN-OFF action by OFF)• Proportional band (P): OFF, 0.1 to 999.9% (ON-OFF action by OFF)• Control output 2 (option): 1 to 120 seconds (for contact and SSR drive voltage output)• Control output 2 (option): OFF, 0.1 to 999.9% (ON-OFF action by OFF)• Derivative time (D): OFF, 0.1 to 999.9% (ON-OFF action by OFF)• Derivative time (D): OFF, 0.1 to 999.9% (ON-OFF action by OFF)• Derivative time (D): OFF, 0.1 to 999.9% (ON-OFF action by OFF)• Derivative time (D): OFF, 0.1 to 100.0%• OFF, 1 to 3600 seconds (P or Pl action by OFF)• Derivative time (D): OFF, 0.01 to 1.00• ON-OFF hysteresis: 1 to 120 seconds (P or Pl action by OFF)• Derivative time (D): OFF, 0.01 to 1.00• OFF, 1 to 6000 seconds (P or Pl action by OFF)• Derivative time (D): OFF, 0.01 to 100.0%• OVF (D, 0.0% (D) <tr< td=""><td>• Type of control/rating</td><td>: Contact/1a 240V AC 2A (resistive load)</td></tr<>	• Type of control/rating	: Contact/1a 240V AC 2A (resistive load)																																																																		
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ON-OFF hysteresis: 1 to 999 digit (Effective when P=OFF)Manual reset: -50.0 to 50.0% (Effective when 1=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)																																																																				
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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:						
	□FF No selection						
	He Higher limit deviation						
	Lower limit deviation						
	Outside higher/lower limit deviations Uithin higher/lower limit deviations						
	Column 2 Within higher/lower limit deviations HR Higher limit absolute value						
	LR Lower limit absolute value						
	So Scaleover						
	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.						
	 Control mode without standby action (No alarm is output at the time of abnormal in 						
• Output type/rating	: Contact (1a × 2 points common)/240V AC 1A (resistive load)						
• Output updating cycle	: 0.25 seconds						
 Heater break/heater loop alarm (or 							
	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	-						
• Alarmaction	: 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	$\pm 2.0A \text{ (Sine wave at 50Hz)}$						
• 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						

SPECIFICATIONS

 Communication function (option) Transformation 	DR 222C DR 405						
• 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)	. Communication signals insulated nom system, each input and each output.						
Number of output points	: 1 point						
* *	 1 point : Selectable from measured value, target value (SV in execution), control output 1 and control output 2. 						
Type of analog output							
• 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	: $\pm 0.3\%$ 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.						

SPECIFICATIONS

General specifications	
• Data storage	: Non-volatile memory (EEPROM)
• Environmental conditions for inst	strument 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	: 11
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 × W48 × 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 × W45 mm
	SR92: H68 × W68 mm
	SR93: H92 × 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

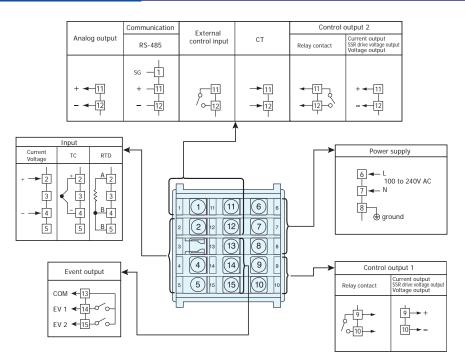
ITEMS	CODE	SPECIFICATIONS											
SERIES	SR91-	MP	MPU-Based Auto-Tuning PID Digital Controller, DIN H48 × W48 × D110 mm										
				Thermoc			ouple	ple B, R, S, K, E, J, T, N, PLII, C (WRe 5-26), {U, L (DIN43710)}					
					R.T.	D.		Pt100/JPt100					
		8	Multi	input				-10 to 10, 0 to	o 10, 0 to 20, 0 to 50, 10 to 50 and	For voltage and current input:			
					Volt	age (mV)	0 to 100mV E	DC	Scaling Possible			
INPUT								Input resistan	ce: 500 kΩ min.	Range: -1999 to 9999			
		4	Curre	nt (mA)	0 to	20, 4	4 to 20	mA DC Receiv	ving impedance: 250 Ω	Span : 10 to 5000			
		6	Voltag		-1 to	o 1, O) to 1, C) to 2, 0 to 5, 1	to 5, 0 to 10V DC				
		0	voltag	Je (V)	Inpu	ut res	istance	: 500 kΩ min.		Note : Inverse scaling is not possible			
			Y-	Contact					: 240V AC 2.5A/resistive load Proport	ional cycle: 1 to 120 sec			
CONTROL (`	I-	Current					resistance: 600Ω max.				
CONTROL	501101 (1)	P-			tage		<u> </u>	max. Proportional cycle: 1 to 120 se	C			
			V-	Voltage					urrent: 2mA max				
POWER SU	PPLY			90-				±10% 50/60Hz	Ζ				
				08-			C ±10% 50/60Hz						
EVENT OUT	IPUT (OPTI	ON)			0	Non	· · · · · · · · · · · · · · · · · · ·						
					1		tact output (2a) Ev1, Ev2: 240V AC 1A/resistive load						
				-		N	None						
						Y	Conta	ict	1a, Contact capacity: 240V AC 2.5A/	resistive load			
			C						Proportional cycle: 1 to 120 sec.				
		(Control	output (2	<u>'</u>)	P	Current 4 to 20mA DC Load resistance: 600Ω max.						
						P V		SSR drive voltage 12V±1.5V DC/30mA max. Proportional cycle: 1 to 120 sec.					
						V	voitaç	Voltage Voltage: 0 to 10V DC Load current: 2mA max.					
OPTION			1					nt setting range	e: 0.1 to 30.0A (with CT 30A)	Note: Avaialble only when control output (1) is Y or P and when event			
-		1	Heater break alarm 2					nt setting range	e: 0.1 to 50.0A (with CT 50A)	output is selected.			
						3	Voltage: 0 to 10mV DC, Output resistance: 10 Ω						
			Analo	g output		4	Current: 4 to 20mA DC, Load resistance: 300 Ωmax.						
						6	Voltage: 0 to 10V DC, Load current: 2mA max.						
-			Comm	unication		5	RS-48	35 (Up to 31 co	nnected units are possible)				
			NI (Sot	valuo bia	-)	8	1 poir	nt (setting rang	e: -1999 to 5000), Non-voltage contag	t or Open collector input Open collector			
DI (Set value bias) 8				0	input	input rating: approx. 5V/1mA max.							
REMARKS							0	Without					
							9	With (Please o	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



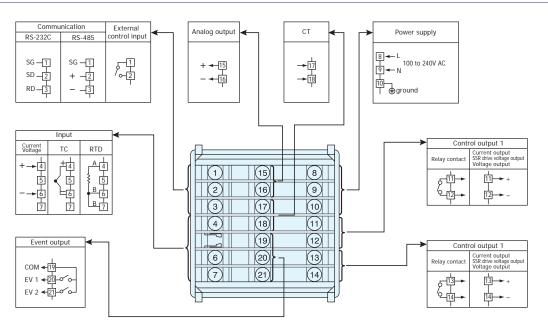
ITEM	CODE		SPECIFICATIONS									
SERIES	SR92-	MP	PU-Based Auto-Tuning PID Digital Controller, DIN H72 × W72 × D110mm									
					Thermocoupl	е	B, R	, S, K	, E, J, T, N, PLII, C (WRe 5-26), {U	, L (DIN43710)}		
					R.T.D.		Pt10	0/JPt	100			
		8	Multi inp	out			-10	to 10,	0 to 10, 0 to 20, 0 to 50,			
INPUT					Voltage (mV)		10 to	o 50,	0 to 100mV DC	For voltage and current input: Scaling Possible		
INPUT							Inpu	ıt resi	stance: 500 kΩ min.	Range: -1999 to 9999		
		4	Current	(mA)	,				ving impedance: 250Ω	- Span: 10 to 5000		
		6	Voltage	(Λ)		,			1 to 5,0 to 10V DC	Note: Inverse scaling is not possible.		
		Ŭ		(•)	Input resistar							
			Y-	Conta	ct				acity: 240V AC 2A/resistive load P	roportional cycle: 1 to 120 sec.		
CONTROL	. OUTPUT ((1)	I-	Currer				-	Load resistance: 600Ω max.			
		(-)	P-		rive voltage				OmA max. Proportional cycle: 1 to 1	20 sec.		
			V-	Voltag		0 to 1	10V D	C Lo	oad current: 2mA max.			
				N-	None							
		(2)		Y-	Contact				, , ,	pad Proportional cycle: 1 to 120 sec.		
CONTROL	. OUTPUT ((2)		- -	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. Voltage 0 to 10V DC Load current: 2mA max.							
POWER S	עוססו			V-	Voltage 90- 100V	to 24	0 to 100 DC Load current: 2mA max. 0V AC±10%, 50/60Hz					
POWER 5	UPPLY				90- 1000	0	Non		0, 50/60HZ			
						1		-	nut (2a) Ev1 Ev2 Contact canacit	v: 240V AC 14/resistive load		
						1 Event output (2a) Ev1, Ev2 Contact capacity: 240V AC 1A/resistive load Event output (Ev1) + Heater break alarm						
EVENT OL	JTPUT/HEA	ATER	BREAK A	LARM		2		n CT3		Note: Available only when control output		
							· ·		put (Ev1) + Heater break alarm	(1) is Y or P is selected.		
						3	(with CT50A)					
							0	Non	,			
							3	-	age: 0 to 10mV DC, Output resistar	nce: 10Ω		
ANALOG (DUTPUT						4 Current: 4 to 20mA DC, Load resistance: 300Ω max.					
							6					
								0	None			
								5	RS-485 (Up to 31 connected units	are possible)		
COMMUNICATION Communication or DI (Set value bias)				Communicati	on		7 RS-232C					
						1 point (setting range: -1999 to 5	000), Non-voltage contact or Open collector					
· · · · · · · · · · · · · · · · · · ·				DI (Set value b	oias)		8	input				
									Open collector input rating: appro	x. 5V/1mA max.		
DEMADYS									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.

TERMINAL ARRANGEMENT



ORDERING INFORMATION

Series SR93/SR94

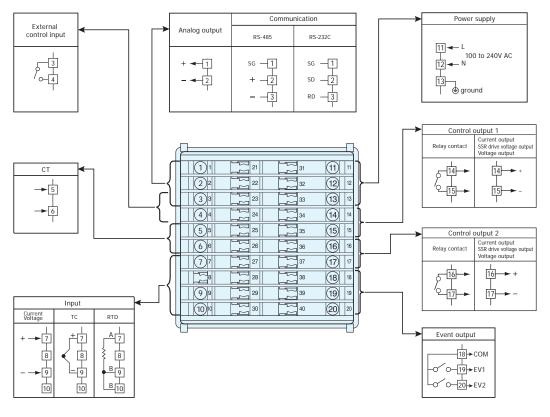
ITEM	CODE	SPECIFICATIONS											
	SR93-	MPU-Based Auto-Tuning PID Digital Controller, DIN H96 × W96 × D110mm											
SERIES	SR94-		MPU-Based Auto-Tuning PID Digital Controller, DIN H96 × W48 × D110mm										
					Thermocou		B, R, S, K, E, J, T, N, PLII, C (Wre 5-26), {U, L (DIN 43710)}						
					R. T. D.			Pt100/JPt100					
		8	Multi ir	put			-10 to	10,	0 to 10, 0 to 20, 0 to 50,				
INDUT					Voltage (m	V)) to 100mV DC	For voltage and current input: Scaling			
INPUT						,	Input	resis	tance: 500 kΩ min.	Possible			
		4	Curren	t (mA)	0 to 20, 4	to 20m/	DC F	Receiv	ving impedance: 250Ω	Range: -1999 to 9999 Span: 10 to 5000			
		6	Voltage		-1 to 1, 0 t	o 1, 0 t	o 2, 0 t	o 5, 3	1 to 5,0 to 10V DC	Note: Inverse scaling is not possible.			
		0	voltage	e (v)	Input resis	tance: 5	500kΩ n	nin.		Note. Inverse scaling is not possible.			
			Y –	Contac	t					ortional cycle: 1 to 120 sec.			
CONTROL		(1)	I –	Curren					ad resistance: 600Ω max.				
contritor	_ 0011 011	(1)	P-		0				A max. Proportional cycle: 1 to 120	sec.			
			V-	Voltage		0 to 10	IV DC	Load	current: 2mA max.				
				N-	None								
				Y –	Contact				t capacity: 240V AC 2A/resistive load	d Proportional cycle: 1 to 120 sec.			
CONTROL		(2)		I-	Current			20mA DC Load resistance: 600Ω max.					
				P-		SSR drive voltage 12V±1.5V DC/30mA max. Proportional cycle: 1 to 120 sec.							
				V-	Voltage	4001/		-	C Load current: 2mA max.				
POWER S	UPPLY				90-			ACE	±10%, 50/60Hz				
						0	None			v1, Ev2 Contact capacity: 240V AC 1A/resistive load			
						I			ut (2a) EV1, EV2 Contact capacity: ut (Ev1) + Heater break alarm	240V AC TA/resistive load			
EVENT O	UTPUT/HE/	ATER	BREAK A	LARM		2	(with CT30A)			Note: Available only when control output			
							`		ut (Ev1) + Heater break alarm	(1) is Y or P is selected.			
						3	(with		. ,	(1) IS Y OF P IS Selected.			
				-			00	Nor	/				
							30		tage: 0 to 10mV DC, Output resistan				
					G OUTPUT		40		rent: 4 to 20mA DC, Load resistance				
					0 0011 01		60		tage: 0 to 10V DC, Load current: 2m				
										Non-voltage contact or Open collector input			
				DI	(Set value bi	as)	08	Open collector input rating: approx. 5V/1mA max.					
OPTION									tage: 0 to 10mV DC, Output resistan				
-			ANALO	G OUTPUT		38		bias 1 point					
				+		48		rent: 4 to 20mA DC, Load resistance	e: 300Ω max. SV bias 1 point				
			DI	(Set value bi	as)	68	Voltage: 0 to 10V DC, Load current: 2mA max. SV bias 1 point						
						05		485 (Up to 31 connected units are p					
				Co	ommunicatio	n	07		232C				
DEMARKS								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.

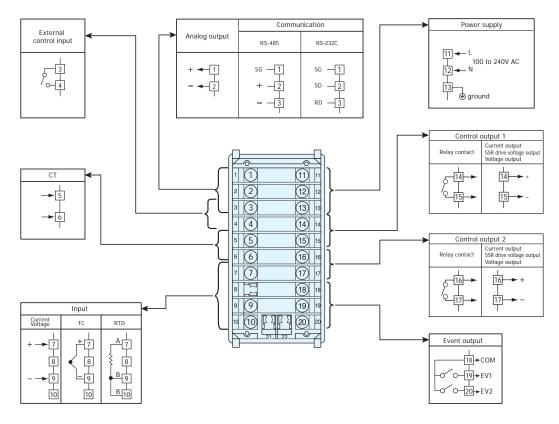
The cause of the above-mentioned problem is that the positional relationship between the proportional band (PB) and the set value (SV) of a one-output type controller differs from that of a two-output type.

•SR93



Crimp-type terminals fit M3.5 screws.

•SR94



Crimp-type terminals fit M3.5 screws.

	Input Ty		Co	de	Measuring range (°C) Measuring range (°F)			
		В		* 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
					04	* 2	-199.9	to 400.0	°C	-300 to 750	°F
		К			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
	Thermocouple	Т			09	* 2	-199.9	to 200.0	°C	-300 to 400	°F
	mernocoupie	N			10		0	to 1300	°C	0 to 2300	°F
		PLI		* 3	11		0	to 1300	°C	0 to 2300	°F
			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
			К		15	* 5		to 350.0	K	10.0 to 350.0	К
Multi-input		Kelvin	AuFe-Cr		16	* 6		to 350.0	К	0.0 to 350.0	К
man npar			К		17	* 5	10	to 350	K	10 to 350	К
			AuFe-Cr		18	* 6	0	to 350	K	0 to 350	K
					31 32		-200	to 600	°C	-300 to 1100	°F
			Pt100				-100.0	to 100.0	°C	-150.0 to 200.0	°F
							-50.0	to 50.0	°C	-50.0 to 120.0	°F
	R.T.D.						0.0		°C	0.0 to 400.0	°F
					35 36		-200	to 500	°C	-300 to 1000	°F
			JPt100				-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
		101. 10.11			38		0.0	to 200.0	°C	0.0 to 400.0	°F
			D to 10mV		71		-				
			0 to 10mV 0 to 20mV		72 73		-				
	Voltage (mV)		0 to 50mV		73		-				
) to 50mV		74		-		, any me	easuring range can be se	t within
			2 to 100mV		75		the following range.				
			1 to 1V		81		-				
) to 1V		82		Scaling range	: -1999 to 9	999 digit	t	
			0 to 2V		83		-				
Vo	oltage (V)) to 5V		84		Span: 10 to 5000 counts on condition of lower side < higher side				
			1 to 5V		85		-			-	
) to 10V		86		-				
) to 20mA		91		-				
Cu	rrent (mA)		4 to 20mA		91		-				
		·	+ to ZUINA		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 $^\circ\text{C}$ 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

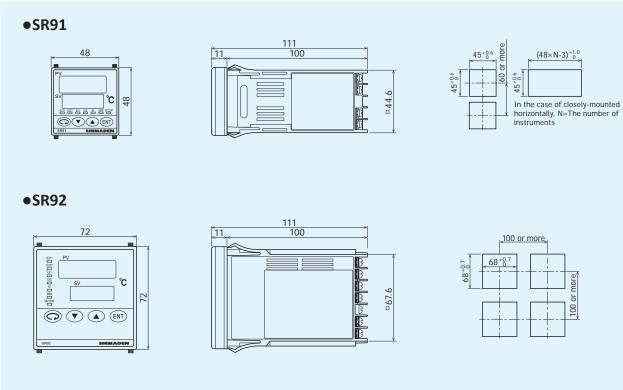
Temperature range	
0.0 to 30.0K	±{0.7%FS +6 °C +1 digit}
30.0 to 70.0K	±{0.5%FS +3 °C +1 digit}
70.0 to 170.0K	±{0.3%FS +2.4 °C +1 digit}
170.0 to 280.0K	±{0.3%FS +2 °C +1 digit}
280.0 to 350.0K	±{0.5%FS +2 °C +1 digit}

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

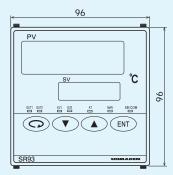
Input	Standard/rating	Measuring range
Multi-input	K thermocouple	0.0 to 800.0 °C
Voltage (V)	0 to 10V DC	0.0 to 100.0 no legend
Current (mA)	4 to 20mA DC	0.0 to 100.0 no legend

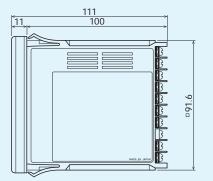
EXTERNAL DIMENSIONS/PANEL CUTOUT

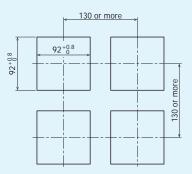
Series SR90



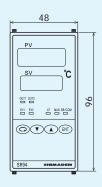
•SR93

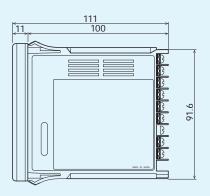


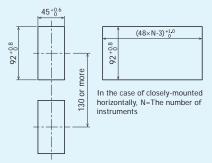




•SR94



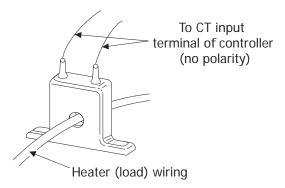




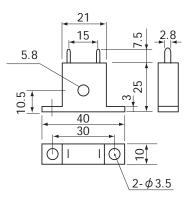
OPTIONAL ACCESSORIES

Name	Code	Remarks
СТ	QCC01	CT for 30A (CTL-6-S)
СТ	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, ●B Tight M2.3×6 2pcs.)
	QCR005	For SR94 (Close contact mounting, OB Tight M2.3x6 4pcs.)

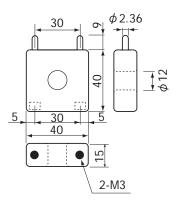
ACCESSORIES REQUIRED FOR CT INPUT



•CT FOR 30A (QCC01)



•CT FOR 50A (QCC02)



Unit: mm

\Lambda 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

