# SMA93/73/33 Series Digital Controller **Instruction Manual**

The contents of this manual are subject to change without notice.

#### 1.Safty rules

For matters regarding safety, potential damage to equipment and/or facilities, additional instru- ctions and notes are indicated by the following heading. A WARNING: Matters that could result in injury or death if instructions are not followed.						
▲ WARNING	4					
The SMA series digital controllers are designed to control temperature and other physical quantities of general industrial equipment.						
You should either take appropriate safety measures or avoid using for control that could have a serious effect on human life.						
The manufacturer shall not be liable for an accident that results if used without taking appropriate safety measures.						
■Safety caution						
You should be shocked if you touch charged parts.						

- The controller does not have a built-in fuse. Be sure to mount a fuse on the power circuit connected to the power terminal.Fuse rating:250VAC 0.5A Always consider the application conditions and use the output relays within their rated load and electrical
- life expectancy. Do not allow pieces of metal, w re clippings, or fine metallic shaving or filings from installatil to enter the
- product. Do not use the product where subject to flammable or explosive gas. Otherwise, minor injury from explosion may occasionally occur.

#### Never disassemble, modify or repair the product

Do not apply voltage/current other than rated input to the input terminal. Doing so could shorten product life and lead to equipment failure.

A malfunction in the temperature controller may occasionally make control operations impossible or prevent alarm outputs, resulting in property damage. To maintain safety in the event of malfunction of the controller, take appropriate safety measures, such as installing a monitoring device on a separate line.

#### CAUTION

- 1).Be sure to wire properly with correct polarity of terminals.
- Do not wire the terminals which are not used.
- 2). To avoid inductive noise, keep the wiring for the controller's terminal block away from power cables carry high voltages or large currents.Using shielded cables and using separate conduits or ducts is recommended. 3).Design system(control panel, etc) considering the 2 seconds of delay that the controller's output to be set after
- poweron

4). To allow heat to escape, do not block the area around the product.

- Do not block the ventilation holes on the product. 5).Do not use paint thinner or similar chemical to clean with. Use standard grade alcohol.
- 6). Always turn off the power supply before pulling out the interior of the product, and never touch nor apply shock to the terminals or electronic components. When inserting the interior of the product, do not allow the electronic components to touch the case. ). Use this product within the rated load and power supply.
- 8).Do not use this product in the following places
- \*Places subject to dust or corrosive gas.
- \*Places subject to icing and condensation
- \*Places subject to direct sunlight.
- \*Places subject to vibration and large shocks.
- \*Places subject to splashing liquid or oil atmosphere. \*Places directly subject to heat radiated from heating equipment.
- \*Places subject to intense temperature change.

## 2.Specifcations

Supply volta		:100-240V AC ±10% 50/60Hz					
Power consumption	า	: 6VA MAX					
Display accuracy		: ±0.2% FS+1 digit					
Sampling cycle		: 0.2 seconds					
Control characte	ristics	: Positive action (DA, cooling control)					
		Reaction (RA, heating control)					
Control output ad	ccuracy	: 0.0125% (1/8000)					
Output updating o	cycle	: 0.2 seconds					
Data storage		:Non-volatile memory(EEPROM)					
Use of environme	ntal cond	litions					
Temperature		: -10~50					
Humidity		:Max.90%RH(no dew condensation)					
Elevation		:Max.2000 m above sea level					
Category		:					
Pollution		: 2					
Storage temperatu	ure	: -20~65					
		Name Landa minimum 50 dD					
Input/noise remov	al ratio	INORMAI MODE MINIMUM SUDB					
Input/noise removes Insulation resist	al ratio	:Normal mode minimum 50dB :Between input//output terminals and power termi Min.500V DC,20M					
Input/noise remov Insulation resist	al ratio	:Normal mode minimum 50dB :Between input//output terminals and power term Min.500V DC,20M					
Input/noise remov Insulation resist Dielectric streng Between input/ou	/al ratio tance gth tout termi	:Normal mode minimum 50dB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC. 1 minute					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and	/al ratio tance gth tput termi d Y output	:Normal mode minimum 50dB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and Between input and	/al ratio tance gth tput termi d Y output d P,I,V ou	INFORMATI MODE minimum SUDB Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute utput :2300 V AC, 1 minute					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and Between input and Material of case	/al ratio tance gth tput termi d Y output d P,I,V ou	<pre>:Normal mode minimum 50dB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute utput :2300 V AC, 1 minute : ABS+PC</pre>					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and Between input and Material of case	val ratio tance gth tput termi d Y output d P,I,V ou	<pre>:Normal mode minimum 50dB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute utput :2300 V AC, 1 minute : ABS+PC</pre>					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and Between input and Material of case External dimensio	val ratio tance gth tput termi d Y output d P,I,V ou pns SMA33	<pre>:Normal mode minimum 50dB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute utput :2300 V AC, 1 minute : ABS+PC : 48 × 48mm</pre>					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and Between input and Material of case External dimensio	val ratio tance gth tput termi d Y output d P,I,V ou ons SMA33 SMA73	<pre>:Normal mode minimum 50dB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute utput :2300 V AC, 1 minute : ABS+PC : 48 × 48mm : 48 × 96mm</pre>					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and Between input and Material of case External dimensio	val ratio tance gth tput termi d Y output d P,I,V ou Dons SMA33 SMA33 SMA33	<pre>:Normal mode minimum 50dB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute utput :2300 V AC, 1 minute : ABS+PC : 48 × 48mm : 48 × 96mm : 96 × 96mm</pre>					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and Material of case External dimensio	val ratio tance gth tput termi d P,I,V ou Dns SMA33 SMA33 SMA93	<pre>:Normal mode minimum 50dB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute utput :2300 V AC, 1 minute : ABS+PC : 48 × 48mm : 48 × 96mm : 96 × 96mm</pre>					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and Material of case External dimension	val ratio tance gth tput termi d Y output d P,I,V ou DNS SMA33 SMA73 SMA93	<pre>:Normal mode minimum 50dB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute utput :2300 V AC, 1 minute :ABS+PC : 48 × 48mm : 48 × 96mm : 96 × 96mm</pre>					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and Material of case External dimension	val ratio tance gth tput termi d Y output d P,I,V ou DNS SMA33 SMA73 SMA93 SMA33 SMA33	<pre>:Normal mode minimum SudB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute utput :2300 V AC, 1 minute : ABS+PC : 48 × 48mm : 48 × 96mm : 96 × 96mm : Approx.100g : Approx.100g</pre>					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and Material of case External dimension	val ratio tance gth tput termi d Y output d P,I,V ou SMA33 SMA73 SMA93 SMA33 SMA73 SMA93	<pre>:Normal mode minimum 50dB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute utput :2300 V AC, 1 minute :ABS+PC : 48 × 48mm : 48 × 96mm : 96 × 96mm : Approx.100g : Approx.160g : Approx.220g</pre>					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and Material of case External dimension Weight	val ratio tance gth tput termi d Y output d P,I,V ou ons SMA33 SMA73 SMA93 SMA33 SMA93 ards	<pre>:Normal mode minimum SudB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute utput :2300 V AC, 1 minute : ABS+PC : 48 × 48mm : 48 × 96mm : 96 × 96mm : Approx.100g : Approx.160g : Approx.220g</pre>					
Input/noise remov Insulation resist Dielectric streng Between input/ou Between input and Material of case External dimension Weight Applicable stand Safety	val ratio tance gth tput termi d Y output d P,I,V ou DNS SMA33 SMA73 SMA93 SMA33 SMA73 SMA93 ards	<pre>:Normal mode minimum SudB :Between input//output terminals and power termi Min.500V DC,20M inals and power terminal :2300 V AC, 1 minute t :2300 V AC, 1 minute utput :2300 V AC, 1 minute : ABS+PC : 48 × 48mm : 48 × 96mm : 96 × 96mm : Approx.100g : Approx.100g : Approx.220g : IEC61010-1 and EN61010-1</pre>					

#### 3.Model code and accessories check

You should check the specification code and make sur	e you have all the accessories to make sure nothing is missing.
Compare the specification code on the case with "3. M	Model Selection table" to make sure it is the product you ordered.
Please verify the following attachments is complete :	
Digital Controller	1
Instruction Manual	1
<ul> <li>Fixed buckle</li> </ul>	2

# Iodel Selection table

Item	Model	Standard configuration: Control output 1										
	SMA93-	W 96 × H96 (mm)										
1.Model	SMA73-	<b>W</b> 4	W 48 $\times$ H 96 (mm)									
	SMA33-	$W48 \times H48 (mm)$										
		8	Thern	noco	ouple	:B, R,	S, K	, E, J	N, PLII, WRe5-26{U, L(DIN43710)} R.T.D: PT100			
2.Input t	ype	6	Voltag	ge:-	·1~1,	0~1,0	)~2, (	)~5,	0~10, 1~5V DC			
		Ŭ	Curre	nt:(4	4~20r	nA, 0 <sup>,</sup>	~20m	ıA)ŀ	landled by external receiving impedance 250 Ω			
			Y	Con	tact:	1a 24(	0VA	C 3 A	(inductive load)			
			1	Curi	rent: 4	4~20n	nAD	C(m	ax.load resistance 600 \Q			
3.Contro	l output 1		Р	SSR	driv	e volt	age:	12V	±1.5V DC(max.load current 30mA)			
			V	Volt	age:(	0~10	/ DC	(max	(.load current 2mA)			
			L	N -	Non	ie						
				Y -	Con	tact: 1	1a 24	0VA	AC 3A(inductive load)			
. ~ .				۱-	Curi	rent: 4	~20r	nAI	$DC(max.load resistance 600 \Omega)$			
4.Contro	ol output 2			Ρ-	SSR	driv	e vol	tage	$\pm 1.5$ V DC(max.load current 30mA)			
				٧-	Volt	age:0	$0 \sim 10^{10}$	VDC(max.load current 2mA)				
				M-	Sen	sor pc	ower:	24	DC 25mA			
5.Power	supply				A -	100	~ 240	0VAC ± 10% 50/60Hz				
					D-	2414	AC/DO	; ± 1	10% 50/60Hz			
6. Proc	edure					N	Non					
						Р	Pro	gram	n control (40 steps)			
7 Event	output						2	2point: EV1, EV2				
7.LVent	output						1	1point: EV1				
								0	None			
8.Analo	og output						ſ	4	Current(4~20mA), max. load resistance $300\Omega$			
(SMA33	NO CHOIC	ce)					Ī	6 Voltage(0~10V), max. load current 2mA				
								0	None			
9.Communication function							ľ	5	5 RS-485			
10. External input (DI)								0	None			
(SMA33 No choice)								1	1 point (RUN/SV2)			
11.Status output(DO)						0	None					
(SMA33 No choice)					Ī	1	2 points: DO1, DO2					
40. Crasial rates						0	None					
i∠. spe	cial note	38						1~ 9	Have			

## 5.Exteral dimensions and panel cutout



①Wire in accordance with the terminal layout on the controller. A fter wiring, check and make sure the wiring is correct.

<sup>2</sup>For thermocouple input, use a compensating conductor that matches the type of thermocouple.

(Input signal wires must not be accommodated with a strong electric circuit in the same conduit or duct.

Unit:mm

8.4. Proportion Initial va Short cvcl of the cvcl \* When 4-20mA 8.5.Control ou When P = OFI and the pos the position For example the "Y" rela .6. Control ou Accordina limit outpu Example: fo OUT1 limit 8.7. Slope con From stop t and runs acc the slope v \*Only valid window (4-8.8.Timing fun • When the me and the con • During the the time is • When the when the re .9.Manual set • On the mair automatic/ When manual output perc When equipp between Out1 \*In the stand .10. Run and s After setti The "RUN" Run / Stop Press the light is on, If the user the external 11.Return fur

#### <sup>5</sup>Using shielded wiring is effective for static induction noise. (For power supply, use wiring or cable with sectional area of at least 1mm that offers the same performances as 600V vinyl insulated wiring.

resistance.

				9.1. Program operation and constant value control switching
		0.5.0	25.0 <sup>PV</sup>	9.2. Use program to control preparameter settings
		25.0 PV	100 0 \$	1).Set up in window group 2(program parameter layer): number of curves, number of times of execution, time unit, ensure platform wait and power off protection, etc.
		100 0 sv		2).Set in window group 3(program setup layer): start SV value, end step number, PV start and curve step target value and time.
	AL1 AL2 OUT1 OUT2		AL2 011 0112 100.0 MV 25.0 PV MAN AT BIN COM	<b>9.3.</b> PV start function 1). If the PV value fits between the start SV value (SSV) and target step 1 SV value (SV1), the PV start function operates
	RUN COM		ALT 99 SET ENT AUX OUT1 OUT2 MAN AT COM	and time is shortened. $1 \cdot SSV \le PV \le SV1$ $2 \cdot SSV \ge PV \ge SV1$
	SEI (			
	SHIMADA	SMA93	SHIMADA SMA73 SHIMADA SMA33	SV1/SV2
	Symbol	Name	Function	
	SET	Parameter key	Select screen groups and Switch parameters screen	SSV SV1/SV2
Opeyation		Down key	Decrements setting values	. STEP1 STEP2 STEP1 STEP2 T1: Shortened time PV start. T2: Execution time
part		Shift key	Mobile data bit. When modifying parameters, this key first	2).If the PV value exists in a place that exceeds the step 1 SV value (SV1), the PV start function operates and step 1 is omitted.
	ENT	Enter key	Decrements setting values	1: SSV <sv1<pv 2:="" ssv="">SV1&gt;PV</sv1<pv>
		Measured valued(PV)/	1.Displays current PV value 2.Displays the name of narameters	PV SSV SSV
	PV	display	3.Displays type of abnormal measured input.	SV1/SV2
Display	sv	Target set value(SV)/	1.Displays target set values. 2.Displays setting values on each respective	SSV PV
part	0.	Set parameters display	parameter setting screen.	STEP1 STEP2 STEP1 STEP2
		Control output value	2.For two outputs, press the SET + ENT key,	9.4. Guarantee soak zone If PV is not in the specified guarantee soak zone when switching from an inclination step to a level step, it does not shift
	MV		the OUT2 light flashes, and MV is the output percentage of control output 2.	to the next control step. It is only effective when shifting from an inclination step to a level step, it does not shift
	-		SV rise	<ul> <li>(1).Guarantee soak zone OFF: After step 1 time elapses, it shifts to step 2 even if PV has not yet reached SV1.(Follow picture 1)</li> <li>(2) If guarantee soak zone is set:</li> </ul>
	-	Curve status display	SV flat	After step 1 time elapses, it shifts to step 2 if it has reached the Guarantee soak zone(Follow picture 2)
		-	SV drop	If the Guarantee zone has not yet been reached even though step 1 time has elapsed, guarantee soak is executed until it reaches the Guarantee zone. (Follow picture 3)
Action	AL1	Event output 1 LED		Guarante
arspray	AL2	Event output 2 LED		SV1/SV2 SV1/SV2 Sv1/SV2 Soak zone Soak zone
	0011	Control output 2 LED		
	MAN	Manual control LED		GUA
	AT	Auto turning LED		SSV STEP1 STEP2 STEP2 STEP2 STEP2 STEP2 STEP2 STEP2
	RUN	Action display LED		Picture 1 Picture 2 Picture 3
	COM	Communication mode		9.5. Power failure compensation
Desia	attin	~		up in a state preceding the power failure.
.Basic s	settin	9		9.6. Program execution forced jump: in the $(0,2)$ "STEP" window press the button for 3 seconds the program control and the current execution step
.1.Modify	parame	eter setting method ameter change in each	window press Key activation, press key	forcibly jumps to the next.
again or	press	the key to change t	he data, and finally press the ENT key to confirm.	9.7. Program execution pause: in the $(0,2)$ "STEP" window After the button is pressed for 3 seconds, the program pauses and then
.2. Input t	ype set	ting put the lower limit	and the higher limit of measuring range is displayed	press the button for 3 seconds to release the pause and the program continues to run.
and no ch	ange is	possible.		10.Auto turning(AT)
• During li	near in Io io un	put(mA,V), The higher	/lower limit value of scaling can be set.	1). Function
Note: A ch	ange of	a measuring range co	de will initialized all datas related to	This is the Function to automatically calculate and set P.I.D values, i.e., parameters of PID control. The time required for calculation depends on the details of control
the r	neasurir	ng range.		2). AT execution
Contro	l outpu	t characteristics can	be set independently for output.	Press the UP key on the "0-7 AT execution setting screen" changes oFF shown on the target set value(SV) display to ON and the decimal point on the rightmost digit blinks. Upon pressing the ENT key, the decimal point stops blinking and AT action
For he	ating, se	et to RA(reverse action	on) and for colling set to DA(direct action).	begins. The AT lamp flashes when auto turning being executed.
3.4. Propor	tional	cycling time	output: 20 cocordo	While AT is in execution, ON/OFF action of output is repeated several times in accordance with rise and fall of the measured value from the target value as the border and the PID values are saved in an internal saved in an internal memory.Immediately
• Short	cycle r	egulation changes fas	t, suitable for small inertia system, large inertia	when they are stored, control using these PID values begins and AT action ends. Then, the target set value display shows OFF and the AT lamp store flashing
of the * When 4	cycle c -20mA /	can be set longer. 0–10V is output, thi	s window is not displayed.	
3.5. Contro	ol outp	out ON-OFF control		3). AT cannot be executed
When P	= OFF,	the integral I and di	ifferential D parameters are automatically canceled,	SV AT cannot be executed under any of the following conditions.
and the the	e positi sition m	on sensitivity adjust otion width.	tment parameter dF [1–3] window appears for adjusting	J   1. Control output is in manual mode.     2. Reset mode
For exa	ample: d 'relav	during the reaction,	the set value is 500 , the dF sensitivity is 10 ,	3. The proportional band(P) of control output is oFF.
B.6. Contro	ol out	put limiter settin	g	4. Do not perform when PV measurement exceeds range
Accord	ing to	the needs of the site	, you can set the upper and lower	AI Start AT End Auto turning schemes
Exampl	e: for	0~10V output range,	OUT1 limit value is set to 20%,	4).Cancellation of AT
	imit va	lue is set to 80%, th	en the output range is 2~8V.	To cancel AT before it finishes, press the down key on the "0-7 AT execution setting screen" and select "OFF". When then appear here is pressed at the appealed The AT here there are finishes
8.7.Slope From st	contr op to r	Ol unning state, the rea	ulator starts from the current measured value PV	NOTE: If AT is cancelled before completion, PID values are not changed.
and run	is accor	ding to the set slope	e parameter. When the target set value SV changes or	
*Only v	alid wh	en setting control,(	with the program table screen blocked ), set the	11.Option function
window .8.Timino	(4-18)" funct	ramp", set the unit: ion	aegrees/minute	1).Analog output (AO)
· When t	he meas	ured value PV is equa	I to the set value SV, the timer will start,	The analog output is after the current measured value(PV) ,the preset target value (SV)or output value (OUT) is converted to voltage or current outputs.For recorders, cascade control. etc.
and th •Durino	e contr the ti	oner will stop when ming of the insulatio	the neat preservation platform ends. In platform, if the target set value changes.	Analog output type Analog output scaling lower limit value Analog output scaling higher limit value
the tin .When t	ne is re he pla	e-timed. tform is active the	platform signal light is ON ( This window is masked	PV         Lower limit value of measuring range         Higher limit value of measuring range
when t	he regu	lator has a program f	unction). Setting window (4-19).unit:hour/minute.	Sv         Lower limit value of measuring range         Higher limit value of measuring range           OUT         0.0%         100%
.9.Manual	setti main se	ng of control outpu creen. press the SFT+	It ENT key for 3 seconds to switch between	2).External control input DI
automa	tic/mar	nual status.	light is on proce the / key to get the sector	An external voltage- free contact input(simplifies the complexity of the button operation).
• when m output	percen	tage.	ngin is on, press the / key to set the control	Settings window         Code         External control input allocation type         Note           non         No selection         Initial value:non
•When eo between	quipped Out1 ar	with control output 2 nd Out 2, and the corr	2, CIICK the SEI+ENT key to switch the manual control responding selected control output signal light is on.	Image: Text of the second s
*In the	standby	state or at automat	ic turning(AT) state, the manual output is invalid	* SV2: double set SV value. (for davlight control in greenhouse, pre-heating or heat preservation of heating system)
After s	ana sto settina	բ the parameters. the ւ	user must set it to (RUN) in the (0–1) window to run.	3).Communication function
The "R	JN"lig	ght is on during the i	running state.	With the SMA series, RS-485 communications Using MODBUS RTU protocl and SHIMADA's standard protocol.
кun / S Press f	top Sho the a	and keys simultaned	ously on the basic screen for 3 seconds, the RUN	Tor details see SMA Series Digital Controller Communications Interface Instruction Manual.
light i If the	is on, a	and the meter enters f	the running state, otherwise it stops. h and selects "RUN" in the (4-20) window	NameCodeSetting rangeInitial valueSettings windowCommunication addressAddr1-2551[4-27]
the ext	ernal c	control input will tak	we precedence.	Communication data format dAtA E81 E82 N81 N82 E81 [4-28]
.11.Retur In anv	n func screen	tion except user laver. it	f there is no operation for 1 minute.	Communication speed         Dps         2400 4800 9600 19200 38400         9600         [4-29]           Communication memory mode         MEM         RAM.R_EP.EEP         EEP         [4-30]

9.Program control function

the screen will automatically return to 0-0 basic screen In any setting window, press the SET key for 2 seconds, the screen will return to the 0-0 basic screen

7.Names and functions of parts on front panel

8.Basic sett

rtu: MODBUS rtu protocol SMA: Shimada agreement 

AdrM

Communication protocol

-2-

RTU

[4-32]

Other explan	nation of func	etions	<u>14.Ca</u>	ause of Trouble and	d Troubleshooti	ng		
. PV bias and filer	time		Screen	Problem	Cause		Remedy	
• <b>PV blas:</b> Used for compensating input error of sensors,etc. The PV bias can be setted on "4-7 pv bias". When bias is applied, control is also executed according to the compensated value				Higher limit scaleover	1.Break in thermocouple 2.Input measured value exher limit of measuring	nput wiring ceeded hig- ange by 10%	1.Check thermocouple in break.If there is nothin	nput wiring for possible ng wrong with wiring,
<b>PV fliter time:</b> is superimposed. affect the measu the situation.	Used to alleviate The larger the set irement speed the s	the effect if input varies radically or noise value, the stronger the filtering effect, but pecific settings be adjusted according to			net mint of measuring f	ange by 1076	2.For voltage or current ment signal transmiss Check if set measuring input signal.	input, check the measure- ion unit. range code is correct for
Output Manual	Resel setting	Screen (Mr)	LLLL	Lower limit scaleover	Input measured value fell lower limit of measuring	bellow ange by 10%	Check for measurement in polarity or possible break	put wiring reverse
In PID action,an When OFF is set This method is c Wr setting windo	n offset is correc for I,output shou called manual rese ow [1-5], setting n	ted automatcally by I,I.e.,Integration. Id be increased or decreased manually. t range: -50 to 50%.	b	Break in R.T.D wiring	Break in R.T.D wiring		Check R.T.D. input wiring If there is nothing wrong v 1.Reduce ambient tempera	t for possible break. vith wiring, replace R.T.D. ture to the level provided
Output target A function which	value function s	setting screen(sp) rshoot and undershoot when the target value	СЈНН	Higher limit scaleover of cold junction of thermocouple input	Ambien temperature has exceeded 80°C       in the environment conditions.         2. If ambient temperature has not exceeded examine the controller.         1. Raise ambient temperature to the level relation of the l			itions. as not exceeded 80°C, re to the level provided
s reached. The effect is la Setting range:(	arge when 1.0 and 0.0~1.0, Initial	small when 0.0. value:0.4	CJLL	Lower limit scaleover of cold junction of thermocouple input	Ambien temperature has -20°C	fallen below	in the environment cond 2.If ambient temperature h examine the controller.	itions. as not fallen below -20°C,
Key lock functi t the completion	ion n of parameter adj atting the kovetr	ustment, in order to prevent misoperation	15.S	chedules		Table 2 Ever	nt type codes	
w the set parameter so etting window [4	eters. 4-1]	okes can be rocked, rocking rear can only		Input type         Display Code           K         K1	Measuring range -199. 9~+400. 0℃	code non no	Type of event	Remarks
etting range: : not locked	an look avaant tha			К К2 К К3	0.0~800.0°C 0~1200°C	Ha H La L	ligher limit absolute alarm ower limit absolute alarm	For the initial value
: Screen lock e	en lock except the except user layer	user Tayer run/stop	e e	R R J J	$\frac{0{\sim}1700^\circ\!\mathrm{C}}{0\sim600^\circ\!\mathrm{C}}$	Hd H Ld L	ligher limit deviation alarm ower limit deviation alarm	and setting range, see "Table 3:Event
Alarm	otopheral and t		mocoupl	E E S S	0~700 ℃ 0~1700℃	Id O	Outside higher/lower limit eviation alarm	initial value and setting range".
e SMA93 / 73/33 pe in the [4-9] n [0-5] [0-6] or	standard configur [4-12] window, an r Deviation	ation provides 2 relay alarm outputs. Set the alarm d set the actual alarm value of the alarm relay	Тherr	T T N N	-199. 9~+200. 0°C 0~1300°C	Od Ir	nside higher/lower limit eviation alarm	
Event select	tion alarm action	n diagrams		B B PLII PL	0~1800℃ 0~1300℃	So S Run R	caleover un Aonual contact	
∆:SV value	▲:Set value of a Diagrams	Iarm action point Explanation		WRED-20 WrES U U I	0~2300℃ -199.9~+200.0℃	AT A	T	
non	OFF	No event alarm		L L Pt100 Pt1	$0 \sim +600 \text{ C}$ -200~+600°C -100.0~+100.0°C	Table 3.Event	splay	Range
	ON		R.T.D.	Pt100 Pt2 Pt100 Pt3	-50. 0~+50. 0℃ 0. 0~200_0℃	Type C	Initial ValueCodeHaMeasuring range	Setting Kange
НА		Higher limit absolute alarm		Pt100         Pt5           -1~1V         -1	-100. 0∼350. 0°C	Multi	higher limit value Measuring range	Within measuring range
			tage	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Scaling possible. Setting range:	input	Lalower limit valueHd2000 unit	-1999~2000 unit
LA		Lower limit absolute alarm	Vol	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	-1999~ 9999 unit Span:10~10000 unit	Id	Ld -1999 unit d/Od 2000 unit	-1999~2000 unit 0~2000 unit
<b>ہ</b> ⊔		linkov linit destati i	ent	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		Voltage/	Ha 1000 unit La 0 unit	0~1000 unit 0~1000 unit
ПО		nigner limit deviation alarm	Curr	4~20mA 4_20		Current	Hd 2000 unit	-1999~2000 unit
Ld		Lower limit deviation alarm	NOTE 1.The: 2.Pt3: 3.The: is ±	: mocouple B:Accuracy guarantee not a Accuracy of this whose reading is $\pm 0$ . mocouple K, T, U:Accuracy of those whole 0.7%FS. reat input here the start start of the start of the start of the start start of the start start of the	pplicable to 400°C or below. 25%FS. hose readings are below -100°C	Table 4. E	d/Od 2000 unit Enter Type Factory Initia	0-2000 unit
Od		Outside higher/lower limit deviation alarm	4.Curi 5.The 6.Ifth initi 7.Unlo whe	rent input handled by external receiving input type can be changed during reset estiting is modified, all data related to ialized. ess otherwise specified, the measuring en shipped from the factory.	g impedance 250 M mode. measuring range will be rang will be set as follows	Inp Multi inj Voltaş Currer	Display code         M           put(M)         K2         0           ge(V)         0_10         0           nt(mA)         4_20         0	[easuring range] . 0∼800. 0°C . 0∼100. 0% . 0∼100. 0%
١d		Inside higher/lower limit deviation alarm	16.S	tatus output(DO) t	Event type	1	Note	
So	ON ON ON -10% PV 110%	Scaleover		non So Run Man	none Scaleover Run Manual control			
RUN	ON OFF	The program control/fixed value control triggers the alarm when it is running; when it stops, it cancels the alarm.		AT HA LA Prun	AT Higher limit absolu Lower limit absolut Program run	te e For pr	rogram control only	
MAN		When manual control is, an alarm is triggered; other states, the alarm is canceled.		Step Hold Guaz Ptn	Step signal Hold signal Wait zone Pattern signal	For pr For pr For pr For pr	rogram control only rogram control only rogram control only rogram control only	
AT		The alarm is triggered during auto-tuning; the auto-tuning ends and the alarm is canceled.	17.1	PEnd Ferminal Layout	Program end signal	For pr	rogram control only	
RST		When the fixed value control, the alarm will be issued when the insulation platform timing ends.	SN	MA93/73		SMA33	3	
STEP		An alarm is triggered at the end of the set program run.	10	$ \begin{array}{c} I  L \underbrace{\square} 1 \\ 0-240VAC^{\sim} \\ \underbrace{\square} \underbrace{\square} \underbrace{\square} 2 \\ \end{array} $	13]+ RS485 14];	100-240VAC~		Сом сом
. Alarm Hystere	esis				15	↓ <u>↓</u>	<u>"</u> ∎∠」 [8 -∎3]-++++ [8	
et alarm hystere	esis to avoid alarr	false operation and frequent alarms.			10 <sup>+</sup> AO	OUT1		
s shown below:	Is window · [1-10]	[4-13]			18	+ 1 1		
Sim rug setting	Hyster	sis		<u>сом</u> <b>7</b> сом	19 Сом !	κ5485 00T2		
	• • • • • • • • • • • • • • • • • • • •	ON		NO	DI 20≮ <u>□</u> ;		CE	
		Ť			21			
-	OFF 🕇	Alarm action point setting value			22 сом			
. Alarm power-	on suppression				<b>23</b> DO1			
ne measured value	e may be within an	event action area when applying power. May action			<b>24</b> DO2			
case on is set	for event standby d value is within a	, there is no event output upon applying power an event action area. Even is output when it				A		
aches the event arm suppression s	action area again setting window: [4	after it gets out of the event action area. -11] [4–14], initial value: OFF	Ma	nutacturer Company Name: Shimada Electronics (	(Changzhou) Co., Ltd.	Agent		
Positive and	negative action	of alarm relay:	No.	SHIMADA 18 Changwu Middle Road, Wujin Distri	<b>CO., LTD.</b> ict, Changzhou, Jiangsu, China			
		value n (Normally open)	III U	E-MALL. shimadavip@163.com UR	L:http://www.shimada.vip	L L		

		User laye	r basic		
	SET 3S	(0 screen	group)		(ENT) 3 seconds
ayer ic en group) 3 seconds (1	PID Layer ENT screen group) 3 seconds	Program Paramete (2 screen group) 3 secon	ds (3 screen group)	ENT 3 seconds Para (3 seconds)	↓ meter layer creen group)
9V 0-0 Basic screen PV:measured value SV:set value MV:control output value	PID initial screen	Pro⊑ SEL ©ET €NT+©ET	Creen 2-0 Curve 1 Curve	PERH SEE	C∩CE SEE Initial parameter setting
0-1 RUN/STOP 5 Setting range:RUN,RST Initial:STOP	Finitial value: 3.0(%)	(P) (%) (%) (%) (%) (%) (%) (%) (%	Screen ue control Strol SESB Setting ran	tting method is same as curve 1 / setting ue:0.0 ge:Within SV	4-1 window lock 4-1 window lock 0: not locked 1: set the screen lock except the user layer 2: Screen lock except user layer
0-2 Monitoring Program execuion step No Press 3s:Program jump Press 3s:Program pause	(F) (SET) (SET)	nit)	curves (SET) (ENT+SET) ves, 40 End 3-2 Final s group ves, 10 → 14	tep setting ue:40	ENT+SET -R∩L H2 Reference input type list
0-3 monitoring remaining time of program step	↓       ↓	(1) SET ENT+SET Steps per 2-3 Execution curr Initial value Setting range	group SET [ENT+SET] ve number ∶ 1 2 4 Setting rai	of pattern Iue:1 nge:1-9999	Image: Constraint of the sector     4-3     Celsius/Fahrenheit       C F     Setting unit: C/ F       Initial value: C
0-4 number of pattern executions monitoring screen	d     1-4 Output 1 derivative time       Initial value: 30       Setting range: 0-3600 €	e(D) (ET) (ENT + (SET) L	setting . setting . ute second BET Text PHSE Setting rational Setting ration	1 PV Start Iue:OFF nge:ON,OFF	ET ← ENT + SET 5C - L 0.0 C input lower limit setting (Reference input type list)
0-5 Alarm 1 set value	↓       1-5 Output 1 manual reset (         □.□       1-5 Output 1 manual reset (         Setting range : -50.0 ~ 50         Initial value: 0.0	MR) URL 2-5 Guarantee s URL 2-5 Guarantee s Setting Initial value: Setting range	soak zone OFF 1 - 1000 (SET) TevT + (SET) A-5 Pattern 3-5 Pattern Initial va Setting ra	1 Step 1 SV value lue:0.0 nge:Within SV	ENT+SET 5C-H BDD,D (Reference input type limit bC input upper limit setting (Performed input type light)
0-6 Alarm 2 set value	SP       1-6 Output 1 overshoot suppression coefficient( Initial value: 0.4 Setting range: 0.1-1.0	SP)	URE URE URE UNE UNE UNE UNE UNE UNE UNE UN	1 Step 1 time lue:00.00 nge:00.00-99.59	4-6DC input decimal point position Initial value:0.0
0-7 Al executions setting Initial value:OFF Setting range:ON,OFF	1-7 Output 1 output lower I Initial value: :0.0 Setting range: 0-99.9%,	imit (SET) Return to 2-0 window	ON,OFF €ET [ENT+SET] ☐ L - D I 3-7 Step 1 c Iower limit D. D D Setting ra	ontrols the output percentage limit nge:0-100%	РЫ-Ь Initial value:0
	Image: http://www.self       Image: http://wwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww	imit ,	SET TENT+SET OH-DI 100.0 Setting ra	ontrols the output percentage limit nge:1-100%	PB-F Initial value:0
: lifying the parameters, ress the trigger button tivate. The SV flashes, ress the button or	Image: Set properties     1-9 Output 1 proportional c       Image: Set properties     1-120 S       Image: Set properies<	ycle SSR:2	SET↓ ENT+SET OH-Y□ Step 40 cont I□□.□ upper limit	rols the output percentage limit	Setting range:0~9999 T ENT+SET RL: A Initial value:Hd
e the data. Then press button to confirm. stops flashing,that is ation success.	SET RCL Setting range : RA: heating	teristics ; DA: cooling	®ET↓ Return to 3-0 window		Refer to alarm type list Refer to alarm type list RENT+SET 4-10 Alarm 1 Hysteresis Setting range:1-1000,
: etting window, keep g the SET button for ds, and then return y to the Basic Screen	SET (ENT + SET) 1-11 Output 2 proportional Initial value: 3.0	band(P2)	4-22 Status output(DO1) action Initial value:non Refer to Status output(DO) ty T+(SET	rpe list	FILT Setting range: 0N/0FF,
ndow. : 3.4 window group, press button and the window	SET I-12 Output 2 hysteresis (d Initial value: 2.0 (uni DF2	9(%) F2) t)	4-23Status output(DO2) action Initial value:non Refer to Status output(DO) ty T+(SET)	rpe list	$\frac{1}{1} + \frac{1}{1} + \frac{1}$
ve backward in order. ress ENT button and ET button, the the vill move forward.	Setting range: 1-999 ( Displayed if P2 = 0.0 SET ENT+SET is set on 1-11 screen.		4-24 Analog output type setting setting range : PV/SV/OUT Initial value : PV T+(SET)		Refer to alarm type list Refer to alarm type list RL2d 4-13 Alarm 2 Hysteresis Setting range:1-1000,
: between window groups dow groups], to be done top window of each window / pressing the ENT button	Setting range:0~6000 S Setting range:0~6000 S Setting range:0~6000 S Setting range:0~6000 S Setting range:0~6000 S	ne(D2)	4-25 Analog output scaling low limit value setting T+(SET)	er se	Initial value:5       Image: Strain of the second seco
essing the shortcut tion key. 5:	SET Initial value: 30 Setting range: 0-3600 s SET 1-15 Output deadband settin	s RoSH BOD.C screen SET	4-26 Analog output scaling high limit value setting	ner se	Initial value : OFF       Image: Strain of the
windows that have been around	Setting range: -1999~50 2.0 SET ENT+SET 1-16 Output 2 overshoot		4-27 Communication address se setting range : 1-255 Initial value : 1		n_C: (Normally closed) Initial value:n_o Initial value:n_o Initial value:n_o Initial value:n_o Initial value:n_o
depending on the settings Display window after optional	Setting range: 0.1-1.0	(SP2)	4-28 Communication data format Setting range : E81.E82.N81. Initial value : E81 D+(SET)	settin L N82 SE	within measuring range SV_L <sv_h within measuring range SV_L<sv_h ENT+SET SU-H Higher limiter setting Higher limit value of measuring</sv_h </sv_h 
av characters R b	Imitial value: :0.0         Imitial value: :0.0         Setting range: 0-99.9%,         Imitial value: :0.0         Imitial value: :0.0         Imitial value: :0.0         Setting range: 0-99.9%,         Imitial value: :0.0         Imitial v	ыт ыт ыт ыт ыт ыт ыт ыт ыт ыт ыт ыт ыт ы	4-29 Communication speed setting Initial value : 9600 Setting range : 2400.4800.96 19200.38400 T+(SET)	ng L DO. Setting	range(800.0) T T T T T T T T T T T T T
rison table A B E F G H C J	Setting range : 0-100.0%	cycle	Setting range : EEP, RAM, R_ Initial value : EEP D+SET 	RP Setting	50RH Setting range : 0-99.59
n         n         p         q         r         g           m         n         n         n         p         q         r           M         N         O         P         Q         R	Setting range : 1-120 S ID Initial value: Relay: 1 (ET) (ENT)+(ET)	0, SSR:2	Setting range: 1-500 millise Initial value: 10 D+SET 14-32Communication protocol typ	e setting	unit:hour/minut unit:hour/minut □ □ □ ↓ ■ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
∪     H     ū     ¬     H     Ξ       U     V     W     X     Y     Z	▼       1-20 Output 1 output charac         □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□	teristics ; DA: cooling	SMA: Shimada agreement rtu: MODBUS RTU protocol Initial value:rtu T+SET 4-33 User parameter initializat	ion	Initial value: NON T↓ TeNT+GET SH2 4-21 SV2 set value Setting range: Within the SV
Ret	urn to 1-0 window	SET Return to 4	After setting to ON, press a the ENT key until the displa and implement user paramete initialization.	and hold ay OFF, r	(DI Set value is SV2 and valid when fixed value control) 4-22

\_\_\_\_\_