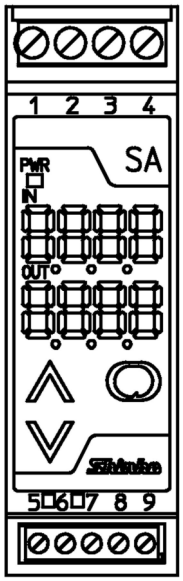
HIGH/LOW SELECTOR SAAS

INSTRUCTION MANUAL



Shinko

Preface

Thank you for purchasing the High/Low Selector SAAS.
This manual contains instructions for the mounting, functions, operations and notes when operating the SAAS. To prevent accidents arising from the misuse of this instrument, please ensure the operator receives this manual.

Notes

- This instrument should be used in accordance with the specifications described in the manual. If it is not used according to the specifications, it may malfunction or cause a fire.
- Be sure to follow the warnings, cautions and notices. If they are not observed, serious injury or malfunction may occur.
- Specifications of the SAAS and the contents of this instruction manual are subject to change without notice.
- Care has been taken to ensure that the contents of this instruction manual are correct, but if there are any doubts, mistakes or questions, please inform our sales department.
- This instrument is designed to be installed on a DIN rail. If it is not, measures must be taken to ensure that the operator does not touch power terminals or other high voltage sections.
- Any unauthorized transfer or copying of this document, in part or in whole, is prohibited.
- Shinko Technos CO., LTD. is not liable for any damage or secondary damage(s) incurred as a result of using this product, including any indirect damage.

SAFETY PRECAUTIONS (Be sure to read these precautions before using our products.)
The safety precautions are classified into categories: “Warning” and “Caution”.
Depending on circumstances, procedures indicated by ⚠ Caution may cause serious results, so be sure to follow the directions for usage.

⚠ Warning Procedures which may lead to dangerous conditions and cause death or serious injury, if not carried out properly.

⚠ Caution Procedures which may lead to dangerous conditions and cause superficial to medium injury or physical damage or may degrade or damage the product, if not carried out properly.

⚠ Warning

- To prevent an electric shock or fire, only Shinko or other qualified service personnel may handle the inner assembly.
- To prevent an electric shock, fire or damage to the instrument, parts replacement may only be undertaken by Shinko or other qualified service personnel.

⚠ Safety precautions

- To ensure safe and correct use, thoroughly read and understand this manual before using this instrument.
- This instrument is intended to be used for industrial machinery, machine tools and measuring equipment. Verify correct usage after consulting purpose of use with our agency or main office. (Never use this instrument for medical purposes with which human lives are involved.)
- External protection devices such as protection equipment against excessive temperature rise, etc. must be installed, as malfunction of this product could result in serious damage to the system or injury to personnel. Also proper periodic maintenance is required.
- This instrument must be used under the conditions and environment described in this manual. Shinko Technos Co., Ltd. does not accept liability for any injury, loss of life or damage occurring due to the instrument being used under conditions not otherwise stated in this manual.

Caution with respect to Export Trade Control Ordinance
To avoid this instrument from being used as a component in, or as being utilized in the manufacture of weapons of mass destruction (i.e. military applications, military equipment, etc.), please investigate the end users and the final use of this instrument.
In the case of resale, ensure that this instrument is not illegally exported.

1. Installation precautions

⚠ Caution

This instrument is intended to be used under the following environmental conditions (IEC61010-1): Overvoltage category Ⅱ, Pollution degree 2

Ensure the mounting location corresponds to the following conditions:

- A minimum of dust, and an absence of corrosive gases
- No flammable, explosive gases
- No mechanical vibrations or shocks
- No exposure to direct sunlight, an ambient temperature of -5 to 55℃ (23 to 131℉) that does not change rapidly, and no icing
- An ambient non-condensing humidity of 35 to 85%RH
- No large capacity electromagnetic switches or cables through which large current is flowing
- No water, oil or chemicals or where the vapors of these substances can come into direct contact with the unit
- When installing this unit within a control panel, take note that ambient temperature of this unit must not exceed 55℃ (131℉). Otherwise the life of electronic components (especially electrolytic capacitor) may be shortened.

Note: Avoid setting this instrument directly on or near flammable material even though the case of this instrument is made of flame-resistant resin.

2. Wiring precautions

⚠ Caution

- Do not leave bits of wire in the instrument, because they could cause a fire and malfunction.
- When wiring terminals, use ferrules with an insulation sleeve and crimping pliers made by Phoenix Contact GMBH & CO. applicable to terminals.
- Tighten the terminal screw using the specified torque.
  If excessive force is applied to the screw when tightening, the screw or case may be damaged.
- This instrument has no built-in power switch, circuit breaker or fuse. It is necessary to install them near the instrument.
  (Recommended fuse: Time-lag fuse, rated voltage 250V AC, rated current 2A)
- For wiring of AC power source, be sure to use exclusive terminals as described in this manual. If AC power source is connected to incorrect terminals, the unit will burn out.
- For a 24V DC power source, do not confuse polarity when wiring.
- For DC voltage and current input, do not confuse polarity when wiring.
- Keep the input wire, power line and output wire away from one another.

3. Operation and maintenance precautions

⚠ Caution

- Do not touch live terminals. This may cause electric shock or problems in operation.
- Turn the power supply to the instrument OFF when retightening the terminal and cleaning. Working or touching the terminal with the power switched ON may result in severe injury or death due to Electric Shock.
- Use a soft, dry cloth when cleaning the instrument.
  (Alcohol based substances may tarnish or deface the unit.)
- As the display section is vulnerable, do not strike or scratch it with a hard object or press hard on it.

Characters used in this manual

Indication	-1	0	1	2	3	4	5	6	7	8	9	℃	℉
Number, ℃/℉	-1	0	1	2	3	4	5	6	7	8	9	℃	℉
Indication	A	b	c	d	E	F	G	H	I	J	K	L	M
Alphabet	A	B	C	D	E	F	G	H	I	J	K	L	M
Indication	n	o	P	q	r	S	T	U	V	W	X	Y	Z
Alphabet	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

□ means that no character is indicated (unlit) on the display.

--- CONTENTS ---

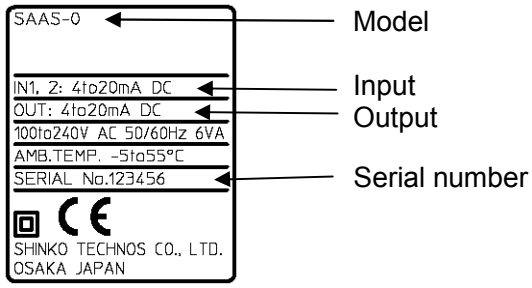
1. Model

1.1 Model

SA □□ – □			Series name: SA
Signal conditioner	AS		High/Low selector
Power supply		0	100 to 240V AC
		1	24V AC/DC

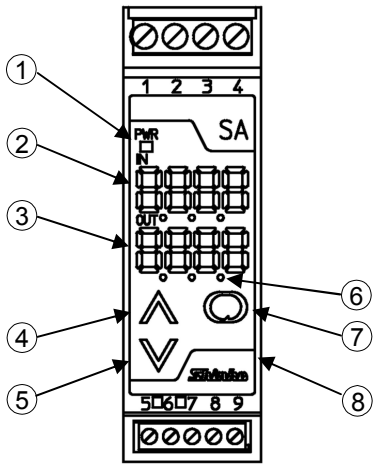
1.2 How to read the model label

The model label is attached to the left side of the case.



(Fig. 1.2-1)

2. Name and functions of sections



(Fig.2.1)

①**Power indicator** (Green)
Lights when the power to the instrument is turned on.

②**Input display** (Red)
Indicates the input value selected during Input High/Low selection, by comparing Input 1 with Input 2 value in the Run mode.

Indicates setting (or adjustment) characters in the Setup and Adjustment mode.

③**Output display** (Green)
Indicates the output value (%) corresponding to the input value selected during Input High/Low selection, by comparing Input 1 with Input 2 value in the Run mode.

Indicates the set (or adjusted) value in the Setup and Adjustment mode.

④**Up key** (∧)
Increases the numeric value, or switches the selection items.

⑤**Down key** (∨)
Decreases the numeric value, or switches the selection items.

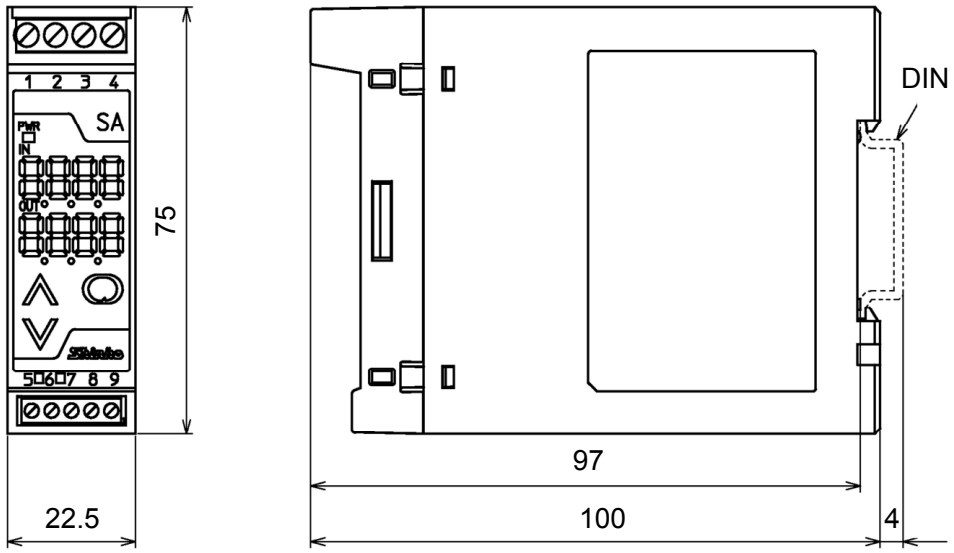
⑥**Input indicator**
Lights when Input 1 is indicated on the Input display.
Flashes when Input 2 is indicated on the Input display.

⑦**Mode key** (◯)
By holding down this key for approx. 3 seconds, the unit proceeds to the Adjustment mode.
Switches the setting mode, and registers the set (or selected) value.

⑧**Sub-mode key (Unmarked)**
If the Mode key is pressed while holding down this key, the unit proceeds to the Setup mode.

3. Mounting

3.1 External dimensions (Scale: mm)



(Fig. 3.1-1)

3.2 Mounting and removal to/from the DIN rail

⚠ Caution

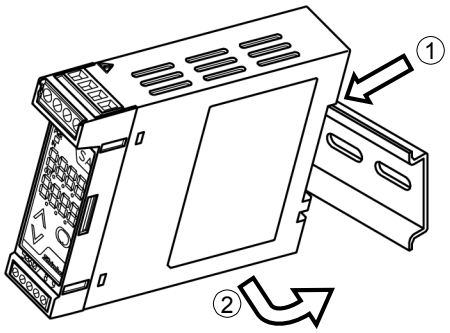
- **Mount the DIN rail horizontally.**
- **To remove this instrument, a flat blade screwdriver is required for pulling down the lever.**
  Never turn the screwdriver when inserting it into the release lever.
  If excessive power is applied to the lever, it may break.
- **Be sure to use commercially available fastening plates at both ends of the unit if it is in a position susceptible to vibration or shock.**

Recommended fastening plate

Manufacturer	Model
Omron Corporation	End plate PFP-M
IDEC Corporation	Fastening plate BNL6
Panasonic Electric Works Co., Ltd.	Fastening plate ATA4806

Mounting to the DIN rail (Fig. 3.2-1)

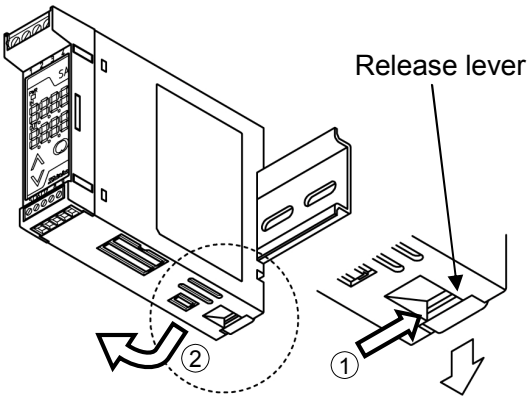
- Hook ① of the instrument on the upper side of the DIN rail.
- Making ① part of the instrument as a support, fit the lower part ② of the instrument to the DIN rail.
  The unit will be completely fixed to the DIN rail when a “Click” sound is heard.



(Fig. 3.2-1)

Removal from the DIN rail (Fig.3.2-2)

- Insert a flat blade screwdriver into the release lever (①).
- Remove the instrument from the DIN rail by pulling down the lever (②).



(Fig. 3.2-2)

4. Wiring

⚠ Warning

Turn the power supply to the instrument off before wiring.
Working or touching the terminal with the power switched on may result in severe injury or death due to Electric Shock.

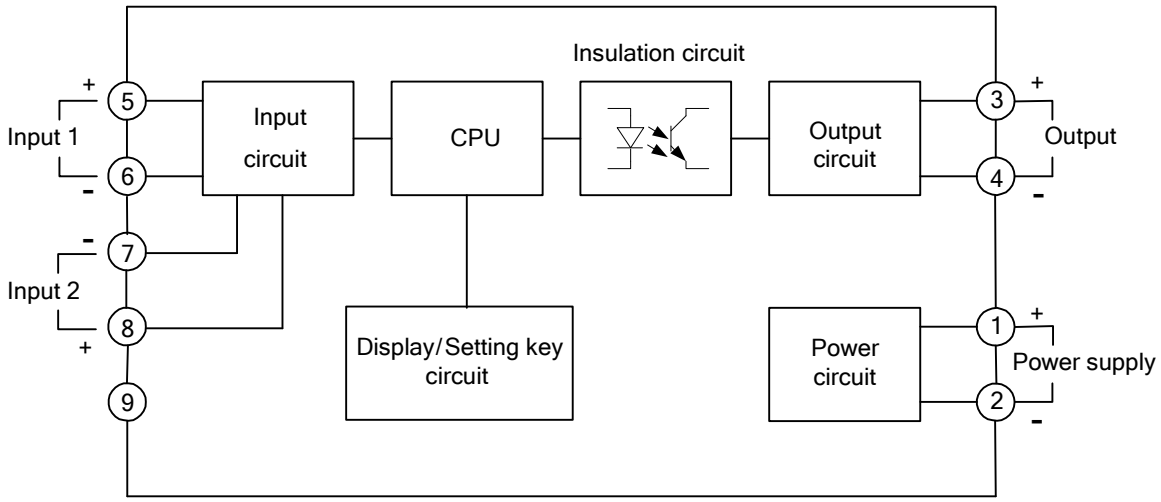
4.1 Recommended ferrules

When using ferrules, use the following recommended ferrules and crimping pliers made by Phoenix Contact GMBH &CO. See (Table 4.1-1).
Take note that screw size and tightening torque differ depending on the terminal number.

(Table 4.1-1)

Terminal number	Terminal screw	Ferrules with insulation sleeve	Conductor cross sections	Tightening torque	Crimping pliers
1 to 4	M2.6	AI 0.25-8 YE	0.2 to 0.25mm^2	0.5 to 0.6N•m	CRIMPFOX ZA 3 CRIMPFOX UD 6
		AI 0.34-8 TQ	0.25 to 0.34mm^2		
		AI 0.5-8 WH	0.34 to 0.5mm^2		
		AI 0.75-8 GY	0.5 to 0.75mm^2		
		AI 1.0-8 RD	0.75 to 1.0mm^2		
		AI 1.5-8 BK	1.0 to 1.5mm^2		
5 to 9	M2.0	AI 0.25-8 YE	0.2 to 0.25mm^2	0.22 to 0.25N•m	
		AI 0.34-8 TQ	0.25 to 0.34mm^2		
		AI 0.5-8 WH	0.34 to 0.5mm^2		

4.2 Terminal arrangement and circuit configuration



(Fig. 4.2-1)

4.3 Wiring of terminals

⚠ Caution

- **For 100 to 240V AC, if the AC power source is connected to incorrect terminals, this instrument will burn out.**
- **For a 24V DC power source, do not confuse polarity when wiring.**

4.3.1 Power source wiring

Use terminals ①(+) and ②(-) for the power supply to the instrument.

4.3.2 Output wiring

Use terminals ③(+) and ④(-) for the output wiring.

4.3.3 Input wiring

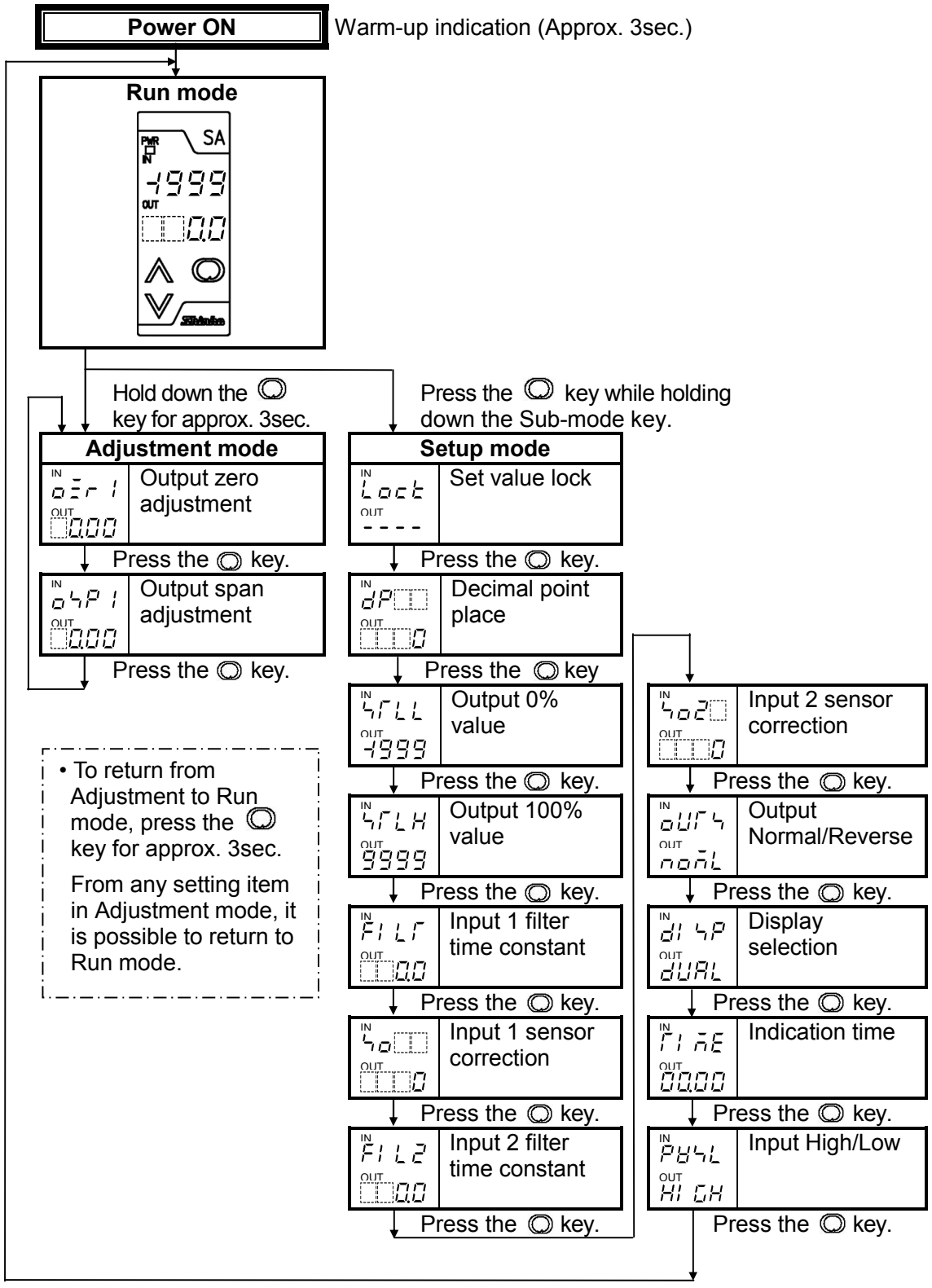
Use terminals ⑤(+), ⑥(-) for Input 1 wiring.
Use terminals ⑦(-), ⑧(+) for Input 2 wiring.

Connect shunt resistor (sold separately) between input terminals ⑤(+), ⑥(-) and between ⑦(-), ⑧(+).
See (Table 4.3.3-1).

(Table 4.3.3-1)

Input	Shunt resistor	
	Model	Specification
4 to 20mA DC	RES-S02-050	50Ω ±0.1%

5. Operation flowchart



6. Setup

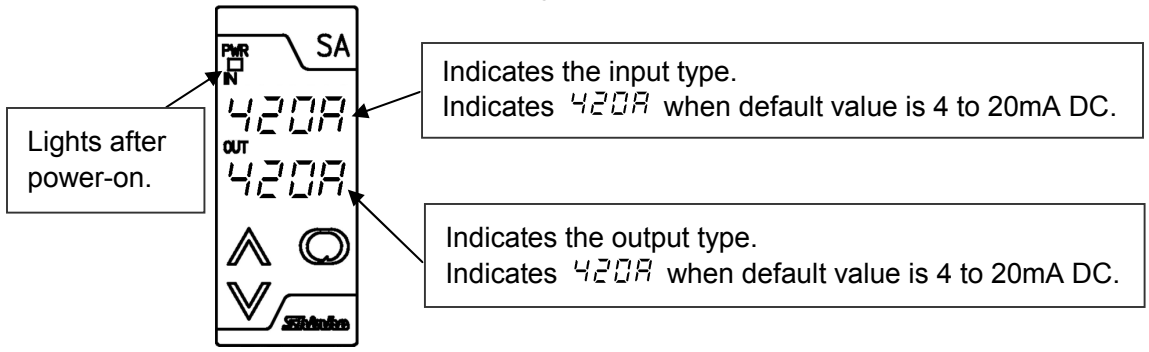
Setup should occur before using this unit, to set the Output 0% value, Output 100% value, Output Normal/Reverse, Input High/Low, etc. according to the users' conditions.
If the users' specifications are the same as the default value of the instrument, or if setup has already been completed, it is not necessary to set up the instrument. Proceed to Section "7. Adjustment".

(Table 6-1)

Setting item	Default value
Set value lock	Unlock
Decimal point place	No decimal point
Output 0% value	-1999
Output 100% value	9999
Input 1 filter time constant	0.0 seconds
Input 1 sensor correction	0
Input 2 filter time constant	0.0 seconds
Input 2 sensor correction	0
Output Normal/Reverse	Normal
Display selection	Input/Output indication
Indication time	00.00 (Continuous)
Input High/Low	Input High (High input signal)

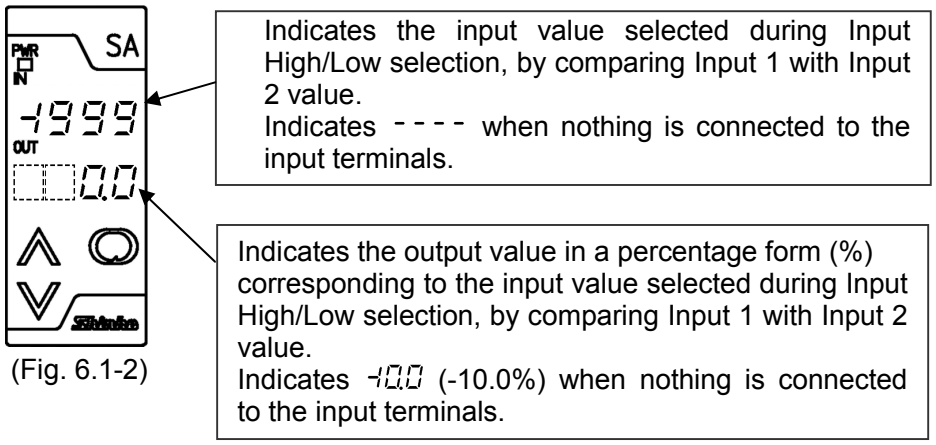
6.1 Indication after power-on

After power-on, warm-up status below (Fig. 6.1-1) is indicated for approx. 3sec.



(Fig. 6.1-1)

After that, the unit switches to the Run mode as shown below.



(Fig. 6.1-2)

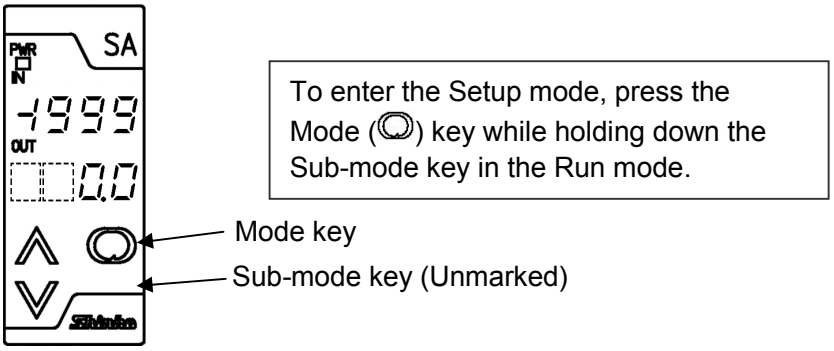
6.2 Basic operation of setup

Setup is conducted in the Setup mode.

To enter the Setup mode, press the ◎ key while holding down the Sub-mode key in the Run mode. (Fig. 6.2-1)

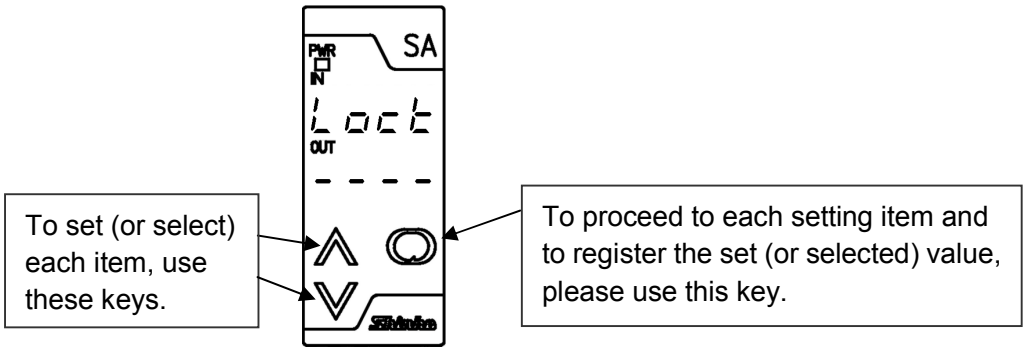
To set (select) each item, use the ∧ or ∨ key, and register the value with the ◎ key. (Fig. 6.2-2)

(1) Run mode



(Fig. 6.2-1)

(2) Setup mode



(Fig. 6.2-2)

6.3 Setup of the unit

The following shows all setup items. Set up the unit referring to the explanation of each item.

Display	Name, Function, Setting range	Default value
IN Lock OUT ----	**Set value lock**	Unlock
	Locks the set values to prevent setting errors. Selection item: ----: Unlock Lock: Lock (None of the set values and adjusted values can be changed.)	
IN dP□□ OUT □□□0	**Decimal point place**	No decimal point
	Selects the decimal point place. Selection item: □□□0: No decimal point □□0.0: 1 digit after decimal point □0.00: 2 digits after decimal point 0.000: 3 digits after decimal point	
IN SCLL OUT -1999	**Output 0% value**	-1999
	Sets the value (indicated on the Input display) at 0% output. Setting range: -1999 to Output 100% value (The placement of the decimal point follows the selection)	
IN SCLH OUT 9999	**Output 100% value**	9999
	Sets the value (indicated on the Input display) at 100% output. Setting range: Output 0% value to 9999 (The placement of the decimal point follows the selection)	
IN FILT OUT □□0.0	**Input 1 filter time constant**	0.0 seconds
	Sets Input 1 filter time constant. Reduces input fluctuation caused by noise. Setting range: 0.0 to 10.0 seconds	
IN So□□ OUT □□□0	**Input 1 sensor correction**	0
	Sets Input 1 sensor correction value. Input 1 value = Current Input 1 value + Input 1 sensor correction value Setting range: -1000 to 1000 (The placement of the decimal point follows the selection)	
IN FIL2 OUT □□0.0	**Input 2 filter time constant**	0.0 seconds
	Sets Input 2 filter time constant. Reduces input fluctuation caused by noise. Setting range: 0.0 to 10.0 seconds	
IN So2□ OUT □□□0	**Input 2 sensor correction**	0
	Sets Input 2 sensor correction value. Input 2 value = Current Input 2 value + Input 2 sensor correction value Setting range: -1000 to 1000 (The placement of the decimal point follows the selection)	
IN oUTS OUT norL	**Output Normal/Reverse**	Normal
	Selects either Normal mode (0.0 to 100.0%) or Reverse mode (100.0 to 0.0%) for output status. Selection item: norL: Normal rEVS: Reverse	

IN dI SP OUT dUAL	**Display selection**	Input/Output indication
	Selects an indication type on the display. Selection item: dUAL: Input/Output indication In□: Input indication oUT□: Output indication nonE: No indication (Only the power indicator is lit.)	
IN TIME OUT 00.00	**Indication time**	00.00 (Continuous)
	Sets the indication time of the display after the final key operation. Not available if No indication (Only the power indicator is lit) is selected during Display selection After the indication time has elapsed, the displays go off (Only the power indicator is lit.). If power is turned on again, or if any of the keys ∧, ∨, ◎ and the Sub-mode key is pressed while displays are unlit, the displays will light again. Setting range: 00.00: Continuous indication 00.01 (1 second) to 60.00 (60 minutes) [Minute.Second] With Input1 and 2, if input value is overscale or underscale, the Indication time setting function is disabled.	
IN PSHL OUT HI GH	**Input High/Low**	Input High
	Selects Input High or Low, by comparing Input 1 with Input 2 value. Selection range: HI GH: Input High (High input signal) LoW□: Input Low (Low input signal)	

6.3.1 When using this unit as a standard High/Low selector

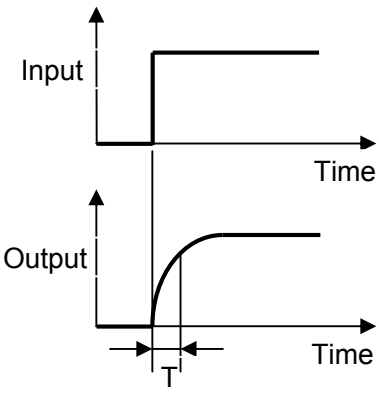
Set the filter time constant to 0.0 seconds, and
set the Output Normal/Reverse selection to “Normal”.

6.3.2 When using the Reverse function

This function reverses the output (100 to 0%)
that corresponds to the input (0 to 100%).
Set the Output Normal/Reverse selection to “Reverse”.

6.3.3 When using the first order lag filter function

The value is outputted by performing the first order lag computation using the filter time constant “T”. (Fig. 6.3.3-1)
Set the filter time constant to a random value (0.0 to 10.0 seconds).



(Fig. 6.3.3-1)

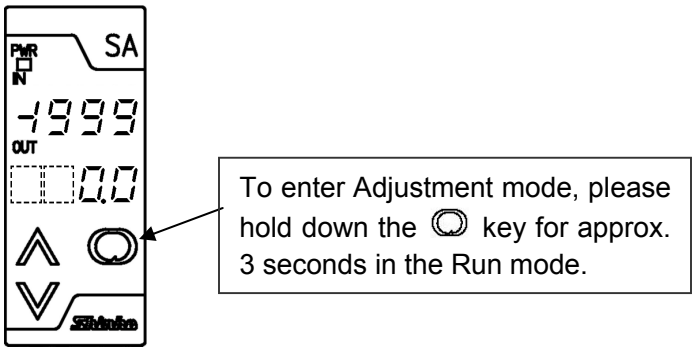
7. Adjustment

Performs the output zero and span adjustments.
Connect an mV generator to Input 1 terminals of this instrument.
Do not connect anything to Input 2 terminals.
Connect a digital multimeter to output terminals.
Select ”High (High input signal)” during the Input High/Low selection.

7.1 Basic operation of adjustment

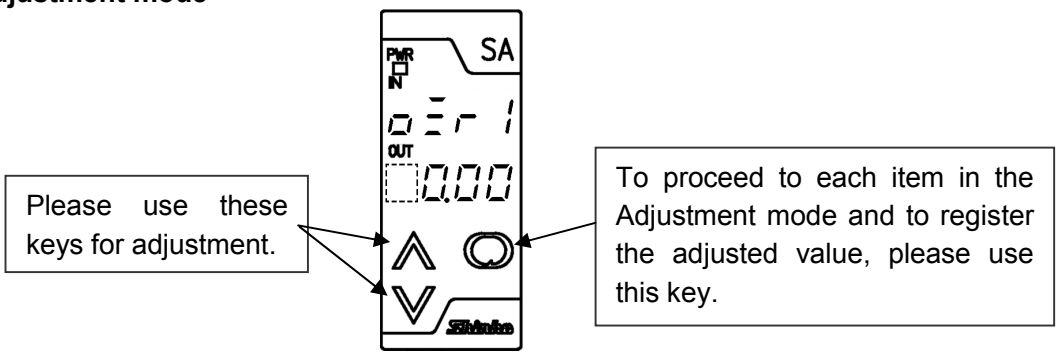
Adjustment can be conducted in the Adjustment mode.
To enter Adjustment mode, hold down the key for approx. 3 seconds in the Run mode. (Fig. 7.1-1)
For output adjustment, use the ∧ or ∨ key, and register the value with the key. (Fig. 7.1-2)
To revert to the Run mode, press the key again for approximately 3 seconds.

(1) Run mode



(Fig. 7.1-1)

(2) Adjustment mode



(Fig. 7.1-2)

7.2 Adjustment

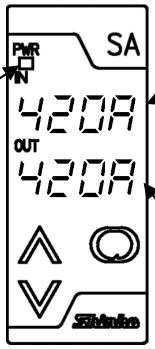
The following shows all adjustment items. Adjust values referring to explanation of each item below.

Display	Name, Function, Setting range	Default value
IN oEr 1 OUT 0.00	**Output zero adjustment**	0.00%
	Adjusts output zero. Input the value corresponding to 0% output, then adjust the value with the ∧ or ∨ key while viewing the output value (on the digital multimeter). Setting range: -5.00 to 5.00% Effective range of adjustment: -5 to 5%	
IN oSP 1 OUT 0.00	**Output span adjustment**	0.00%
	Adjusts output span. Input the value corresponding to 100% output, then adjust the value with the ∧ or ∨ key while viewing the output value (on the digital multimeter). Setting range: -5.00 to 5.00% Effective range of adjustment is 95 to 105%.	

8. Operation

8.1 Indication after power-on

After power-on, the following warm-up status is indicated for 3 seconds (Fig. 8.1-1).



Lights after power-on.

Indicates the input type.
Indicates 420A when default value is 4 to 20mA DC.

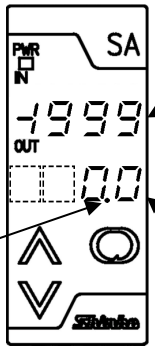
Indicates the output type.
Indicates 420A when default value is 4 to 20mA DC.

(Fig. 8.1-1)

8.2 Operation

The unit enters the Run mode as shown in (Fig. 8.2-1).
By comparing Input 1 with Input 2, the value selected during Input High/Low selection is indicated or outputted.

Input 1 is indicated on the Input display when the Input indicator is lit.
Input 2 is indicated on the Input display when the Input indicator is flashing.



Input indicator

Indicates the input value selected during Input High/Low selection, by comparing Input 1 with Input 2 value.
Indicates ---- when nothing is connected to the input terminals.

Output value corresponding to the input value selected during Input High/Low selection (Input 1 and Input 2 are compared) is indicated in a percentage form (%).
Indicates -10.0 (-10.0%) when nothing is connected to the input terminals.

(Fig. 8.2-1)

• **Indication when input value is -2000 or less**

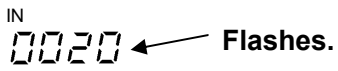
For the indication of -2000 or less (up to –10% output), the input value and the minus (-) sign are indicated alternately.

(e.g.) Indication of -2000

• **Indication when input value is 10000 or more**

For the indication of 10000 or more (up to 110% output), the lower 4 digits of input value are flashing.

(e.g.) Indication of 10020



• **Underrange, Overrange and Sensor burnout alarm indication**

Even if any selection is made during the Display selection, the following indications appear.

Underrange : "- - - -" flashes on the Input display.

Overrange : " " flashes on the Input display.

• **Indication time setting**

If indication time is set, the displays will go off after the indication time has elapsed. (Only the power indicator is lit.)

If power is turned on again, or if any of the keys ∧, ∨, ◎ and the Sub-mode key is pressed while displays are unlit, the displays will light again.

With Input1 and 2, if input value is overscale or underscale, the Indication time setting function is disabled.

9. Specifications

Input specifications

DC current	4 to 20mA DC (50Ω shunt resistor)

Output specifications

DC current	4 to 20mA DC (Allowable load resistance: 700Ω or less) Zero adjustment range: -5 to 5% Span adjustment range: 95 to 105%

Performance

Accuracy	Input: Within ±0.1% (Common to Input 1 and Input 2) Output: Within ±0.1%
Display accuracy	Within Input accuracy±1 digit
Response time	0.5 seconds (typical) (0 ⟶90%)
Temperature coefficient	±0.015**%/**℃
Insulation resistance	Input – Output – Power: 10MΩ or more, at 500V DC
Dielectric strength	Input – Output – Power: 2.0kV AC for 1 minute

General structure

Case	Flame-resistant resin, Color: Light gray
Front panel	Membrane sheet
Setting	Setting by the front keypad
Display, indicator	Input display : 7 segments Red LED display 4 digits Character size: 7.4 x 4.0mm (H x W) Output display : 7 segments Green LED display 4 digits Character size: 7.4 x 4.0mm (H x W) Power indicator: Green LED Input indicator : Green LED

Installation specifications

Power supply	100 to 240V AC 50/60Hz, 24V AC/DC 50/60Hz
Allowable voltage range	85 to 264V AC, 20 to 28V AC/DC
Power consumption	Approx. 6VA
Ambient temperature	-5 to 55℃ (23 to 131℉)
Ambient humidity	35 to 85%RH (Non-condensing)
Weight	Approx. 120g
Mounting	DIN rail mounting
External dimensions	W22.5 x H75 x D100mm

Attached function

- **Power failure countermeasure**:
  The setting data is backed up in the non-volatile IC memory.
- **Self-diagnosis**:
  The CPU is monitored by a watchdog timer, and if an abnormal status is found on the CPU, the unit is switched to warm-up status with all outputs off.

10. Troubleshooting

10.1 Indication

Problem	Presumed cause and solution
Input display is flashing "- - - -" or "- - - -".	• Check the input signal source.
The indication of the Input display is irregular or unstable.	• Check whether the sensor correcting value is suitable. Set it to a suitable value. • There may be equipment that interferes with or makes noise near the unit. Keep equipment that interferes with or makes noise away from the unit.

10.2 Key operation

Problem	Presumed cause and solution
Setting or adjustment is not possible.	• “Lock” has been selected during Set value lock selection. Select “Unlock”.

10.3 Operation

Problem	Presumed cause and solution
Input value does not change.	• Check whether input and output wires are securely connected to the Input/Output terminals of the instrument. Ensure that input and output wires are securely connected to the Input/Output terminals. • Check whether the wiring of input and output is correct.
No output	• Check whether Output 100% and Output 0% value have been set to suitable values. • Check whether Output type and Output Normal/Reverse have been selected correctly during Output type and Output Normal/Reverse selection. Check the selected value.

11. Character table

All setting items are indicated in the following tables.

Setup mode

Display	Setting item	Default value	Data
Lock	Set value lock	Unlock	
dP□	Decimal point place	No decimal point	
0%LL	Output 0% value	-1999	
0%LH	Output 100% value	9999	
FIL1	Input 1 filter time constant	0.0 seconds	
1o□□	Input 1 sensor correction	0	
FIL2	Input 2 filter time constant	0.0 seconds	
2o2□	Input 2 sensor correction	0	
oUT%	Output Normal/Reverse	Normal	
diSP	Display selection	Input/Output indication	
TIME	Indication time	00.00 (Continuous)	
PoSL	Input High/Low	Input High (High input signal)	

Adjustment mode

Display	Setting item	Default value	Data
oZr 1	Output zero adjustment	0.00%	
oSP 1	Output span adjustment	0.00%	

******* Inquiry *******

For any inquiry about this unit, please contact the vendor where you purchased the unit or our agency after checking the following.

(e.g.)

- Model .....……. SAAS-□
- Serial number …..... No. xxxxxx

In addition to the above, please let us know the details of malfunction, if any, and the operating conditions.

SHINKO TECHNOS CO.,LTD.
OVERSEAS DIVISION

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