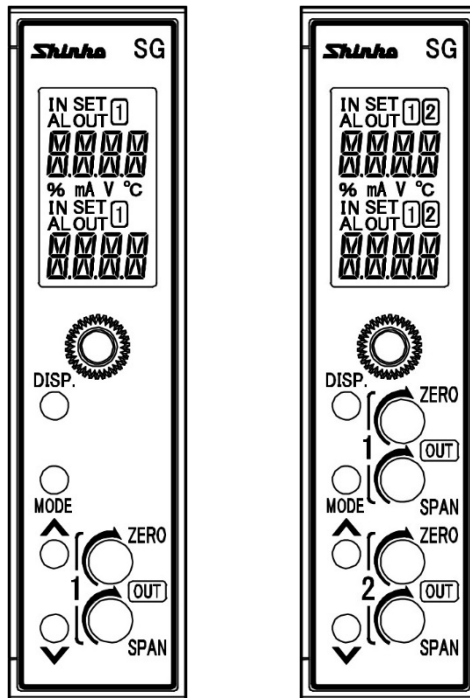# CURRENT LOOP SUPPLY

WITH RATIO FUNCTION

SGM
SGMW
SGML

INSTRUCTION MANUAL

Shinko

Preface

Thank you for purchasing our SGM, SGMW or SGML, Current Loop Supply with ratio function. This manual contains instructions for the mounting, functions, operations and notes when operating the SGM, SGMW or SGML. 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.
• 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 within a control panel. 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 result in serious consequences, 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 electrical shock or fire, only Shinko or qualified service personnel may handle the inner assembly.
• To prevent an electrical shock, fire, or damage to instrument, parts replacement may only be undertaken by Shinko or 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 purpose-of-use consultation with our agency or main office. (Never use this instrument for medical purposes with which human lives are involved.)
• External protection devices such as protective 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. Proper periodic maintenance is also 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.

■ 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 -10 to 55℃ (14 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 the vapors of these substances can come into direct contact with the unit.
- When installing this unit within a control panel, please note that ambient temperature of this unit – not the ambient temperature of the control panel – 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.

■ Wiring Precautions

⚠ Caution

- Do not leave bits of wire in the instrument, because they could cause a fire and malfunction.
- When wiring, use a crimping pliers and a solderless terminal with an insulation sleeve in which an M3 screw fits.
- 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 does not have a built-in power switch, circuit breaker and fuse. It is necessary to install a power switch, circuit breaker and fuse near the instrument. (Recommended fuse: Time-lag fuse, rated voltage 250 V AC, rated current 2 A)
- For wiring of the AC power source, be sure to use terminals as described in this manual. If the AC power source is connected to incorrect terminals, the unit will be burnt out.
- Do not apply a commercial power source to the sensor which is connected to the input terminal nor allow the power source to come into contact with the sensor.
- When using DC voltage and current input, do not confuse polarity when wiring.
- Keep the input/output wires and power line separate.

■ Operation and Maintenance Precautions

⚠ Caution

- Do not touch live terminals. This may cause an electrical shock or problems in operation.
- Turn the power supply to the instrument OFF when retightening the terminal or cleaning. Working on or touching the terminal with the power switched ON may result in severe injury or death due to electrical 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, be careful not to put pressure on, scratch or strike it with a hard object.

Characters used in this manual [: No character is indicated (unlit).]

Indication	ᴉ	₀	ᵢ	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

Contents

1. Model

1.1 Model

SGM

S G M - ▢ ▢ ▢ - ▢ - ▢

- Option
  - 0: No option needed
  - 1: Multi-rotation trimmer
  - 2: Moisture-proof treatment
  - 3: Multi-rotation trimmer+Moisture-proof treatment
- Power supply
  - 0: 100 to 240 V AC
  - 1: 24 V AC/DC
- Output [2]
- Input [1]
- Series name

SGMW

S G M W - ▢ ▢ ▢ ▢ - 0 - ▢

- Option
  - 0: No option needed
  - 1: Multi-rotation trimmer
  - 2: Moisture-proof treatment
  - 3: Multi-rotation trimmer + Moisture-proof treatment
- Power supply: 100 to 240 V AC
- Output 2 [2]
- Output 1 [2]
- Input [1]
- Series name

SGML

S G M L - ▢ ▢ ▢ - 0 - ▢

- Option
  - 0: No option needed
  - 1: Multi-rotation trimmer
  - 2: Moisture-proof treatment
  - 3: Multi-rotation trimmer+Moisture-proof treatment
- Power supply
  - 100 to 240 V AC
- Output [2]
- Input [1]
- Series name (with Serial communication)

*1: Input

Code		Input Type
A0	**Direct current**	4 to 20 mA (Built-in 50 Ω shunt resistor)

*2: Output, Output 1, Output 2

Code	Output Type		Code	Output Type	
1		4 to 20 mA	A		0 to 10 mV
2		0 to 20 mA	B		0 to 100 mV
3	**Current output**	0 to 16 mA	C		0 to 1 V
4		2 to 10 mA	D	**Voltage output**	0 to 5 V
5		0 to 10 mA	E		1 to 5 V
			F		0 to 10 V
			G		-5 to 5 V*

* Not available for the SGMW.

1.2　How to Read the Model Label

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

Terminal arrangement

Model (e.g. SGMW-A011-0-0)

Input

Output 1 (Enter a type selected in [Output 1 type].)

Output 2 (Enter a type selected in [Output 2 type].)

Serial number
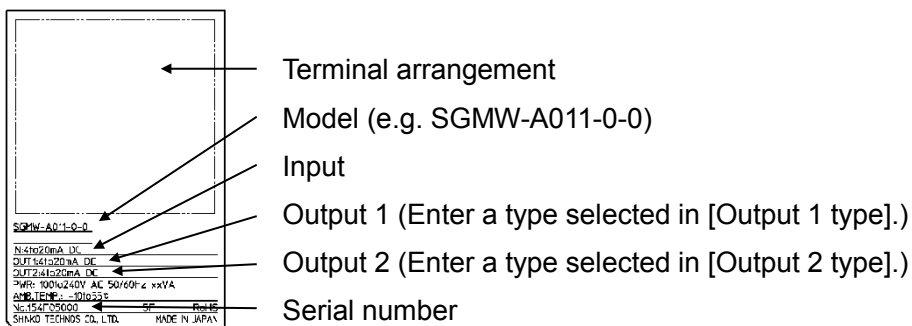
(Fig. 1.2-1)

2. Name and Functions

2.1 Front Panel

SGM, SGML

SGMW
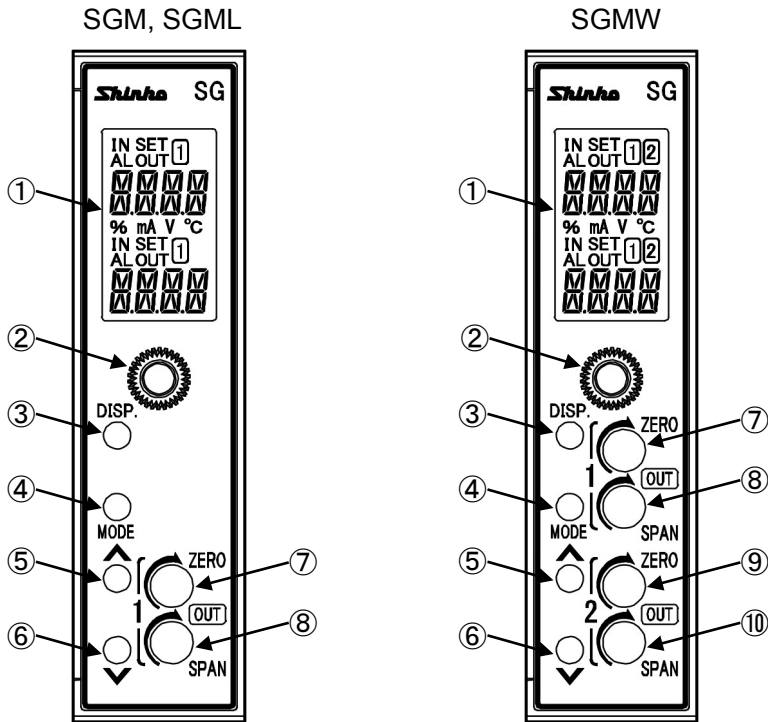
(Fig. 2.1-1)

①	Display section	Indicates setting contents, input value, output value, etc.
②	Mounting screw	Used for fixing the instrument to the socket or removal from it.
③	DISP key	Switches the displays, and moves to the next setting item. In Manual mode, Output 1 and Output 2 setting can be switched. Releases the lock status of the DISP key by pressing for 3 seconds.
④	MODE key	Selects either a setting mode or a display mode. Shifts the digit for the Custom Display. Enters the setting mode by pressing and holding for 5 seconds.
⑤	UP key	Increases the numerical value. Contents of Multi-Display A and B can be changed alternately when Default Display is RUN display mode 1, 2*, 3, 4*, 5 and 6*.
⑥	DOWN key	Decreases the numerical value. Enters Manual mode by pressing for 3 seconds.
⑦	Output 1 Zero	Adjusts the value of Output 1 Zero.
⑧	Output 1 Span	Adjusts the value of Output 1 Span.
⑨	Output 2 Zero*	Adjusts the value of Output 2 Zero.
⑩	Output 2 Span*	Adjusts the value of Output 2 Span.

* For SGMW only

2.2 Display Section

SGM, SGML   SGMW
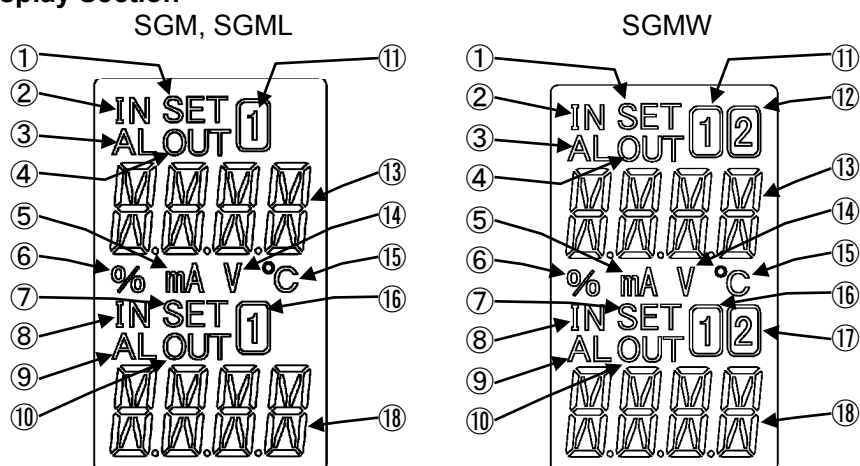
(Fig. 2.2-1)

|		
①	**Setting display indicator A**	Lights up in Manual mode.
②	**Input indicator A**	Lights up when Multi-Display A indicates an input value.
③	**Alarm indicator A**	Lights up if an input error or input disconnection occurs while Multi-Display A indicates an input value.
④	**Output indicator A**	Lights up when Multi-Display A indicates an output value.
⑤	**mA indicator**	Lights up when mA is selected in [Indication unit].
⑥	**% indicator**	Lights up when % is selected in [Indication unit].
⑦	**Setting display indicator B**	Lights up for the setting display. For the SGMW, lights up for the setting display or in Manual mode.
⑧	**Input indicator B**	Lights up when Multi-Display B indicates an input value.
⑨	**Alarm indicator B**	Lights up if an input error or input disconnection occurs while Multi-Display B indicates an input value.
⑩	**Output indicator B**	Lights up when Multi-Display B indicates an output value.
⑪	**1 indicator A**	Lights up when Multi-Display A indicates an input value, Output 1 output value, Input setting display or Output 1 setting display. Is turned OFF when Multi-Display A indicates custom characters.
⑫	**2 indicator A**	Lights up when Multi-Display A indicates Output 2 output value or Output 2 setting display. Is turned OFF when Multi-Display A indicates custom characters.
⑬	**Multi-Display A**	Indicates the following in accordance with the display indication: Input value, output value, custom characters, setting item
⑭	**V indicator**	Lights up when V is selected in [Indication unit].
⑮	**°C indicator**	Lights up when °C is selected in [Indication unit].
⑯	**1 indicator B**	Lights up when Multi-Display B indicates an input value, Output 1 output value, Input setting display or Output 1 setting display. Is turned OFF when Multi-Display B indicates custom characters.
⑰	**2 indicator B**	Lights up when Multi-Display B indicates Output 2 output value or Output 2 setting display. Is turned OFF when Multi-Display B indicates custom characters.
⑱	**Multi-Display B**	Indicates the following in accordance with the display indication: Input value, output value, custom characters, setting value

Output indicators A and B, Alarm indicators A and B: Red
Other indicators: White

3. Mounting

3.1   External Dimensions (Scale: mm)

8P socket (SGM, SGML)   **11P socket (SGMW)**
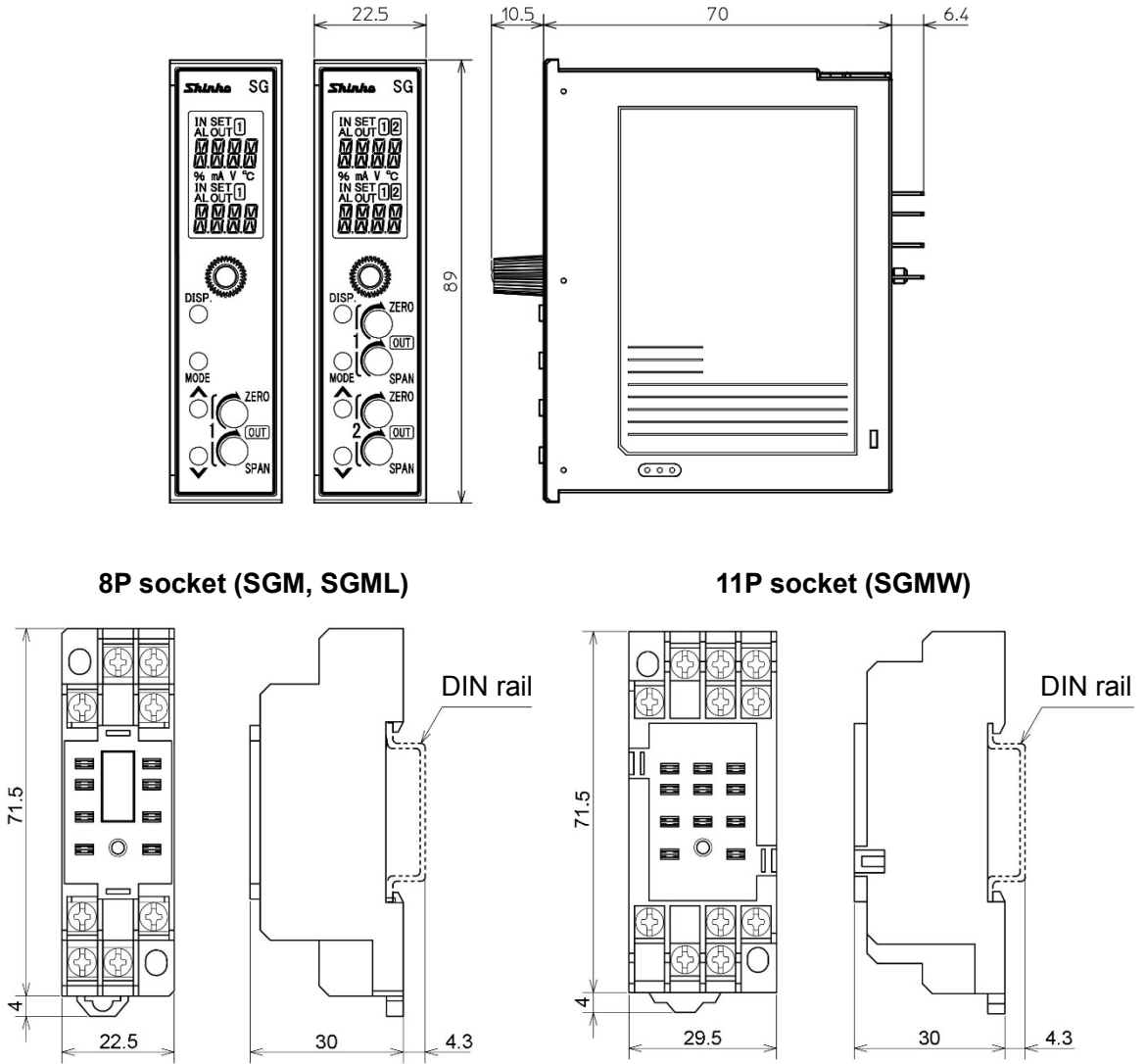
(Fig. 3.1-1)

3.2 Mounting to, and Removal from the DIN Rail

> # ⚠ Caution
>
> • Mount the DIN rail horizontally.
> • To remove the socket, a flat blade screwdriver is required.
>   Never turn the screwdriver when inserting it into the Lock lever. If excessive power
>   is applied to the lever, it may break.
> • If the instrument is mounted in a position susceptible to vibration or shock, mount
>   commercially available fastening plates at both ends of the instrument.
>
> **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)

① Separate the instrument from the socket by loosening the mounting screw on the
   front panel.
② Make sure the lock lever of the socket is located in the lower part of the socket.
   Hook the upper side of the socket onto the DIN rail, then fit the lower part of the
   socket onto the DIN rail (A clicking sound should be heard when done properly).

> # ⚠ Caution
>
> • Before inserting the instrument to the socket, make sure the cable is wired properly.
>   (Refer to "4. Wiring".)
> • When inserting or removing the socket, make sure the socket is oriented vertically.
>   If force is applied in any other direction than vertically, a malfunction may occur.
> • If the mounting screw is fastened too tightly, a malfunction may occur.

③ Insert the SGM into the socket.
④ Fasten the mounting screw by turning it clockwise, to secure the SGM onto the
   socket. Tighten the screw lightly.

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

① Turn the power to the instrument OFF.
② Separate the instrument from the socket by loosening the mounting screw on the
   front panel.
③ Insert a flat blade screwdriver into the Lock lever (lower part of the socket), and
   remove the socket from the DIN rail while pulling the lever down.

DIN rail

DIN rail
Lock lever
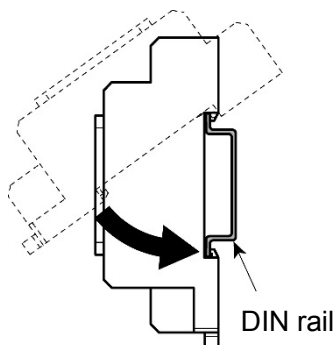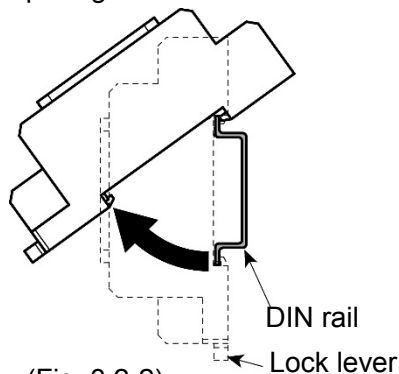
(Fig. 3.2-1)   (Fig. 3.2-2)

4. Wiring

> ## ⚠ Warning
>
> **Turn the power supply to the instrument off before wiring or checking.
> Working on or touching the terminal with the power switched on may result in
> severe injury or death due to electrical shock.**

4.1 Lead Wire Solderless Terminal

Use a solderless terminal with an insulation sleeve in which an M3 screw fits as shown
below. **The torque should be 0.63 N•m.**

Solderless Terminal	Manufacturer	Model
Y-type	Nichifu Terminal Industries Co., Ltd.	TMEV1.25Y-3
	Japan Solderless Terminal MFG Co., Ltd.	VD1.25-B3A
Ring-type	Nichifu Terminal Industries Co., Ltd.	TMEV1.25-3
	Japan Solderless Terminal MFG Co., Ltd.	V1.25-3

Y-type(Scale: mm)
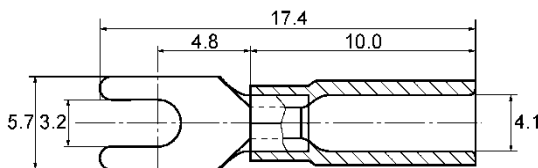
(Fig. 4.1-1)

Ring-type(Scale: mm)
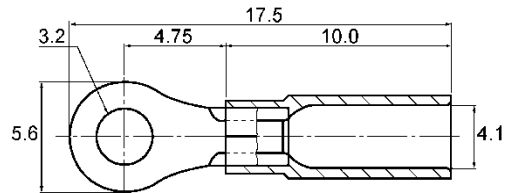
(Fig. 4.1-2)

4.2 Circuit Configuration

SGM, SGML
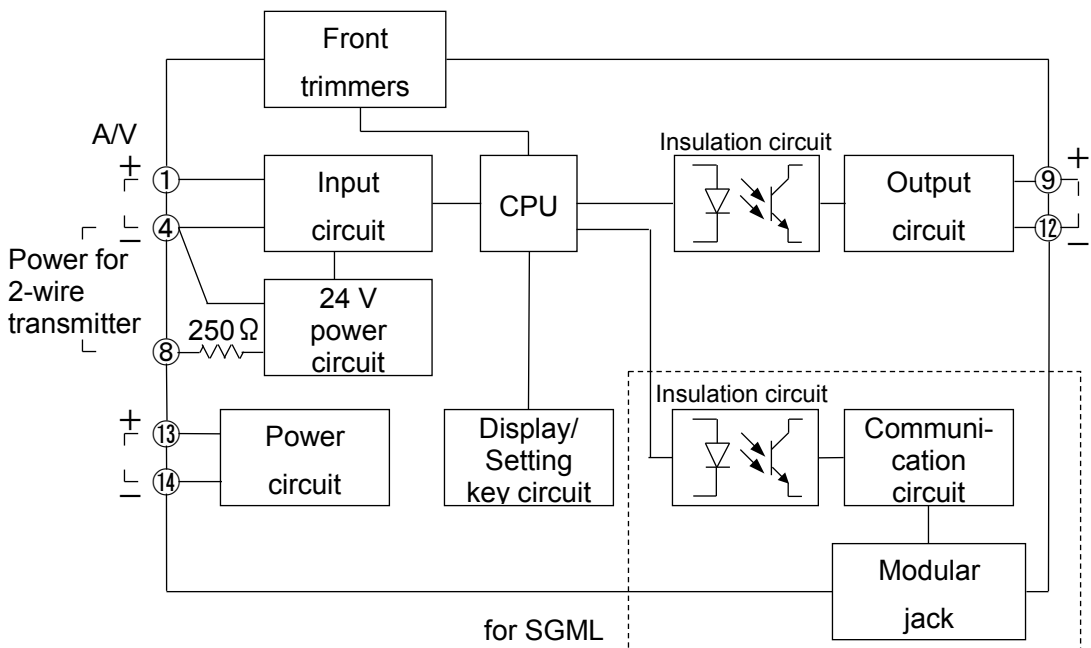
(Fig. 4.2-1)

- 11 -
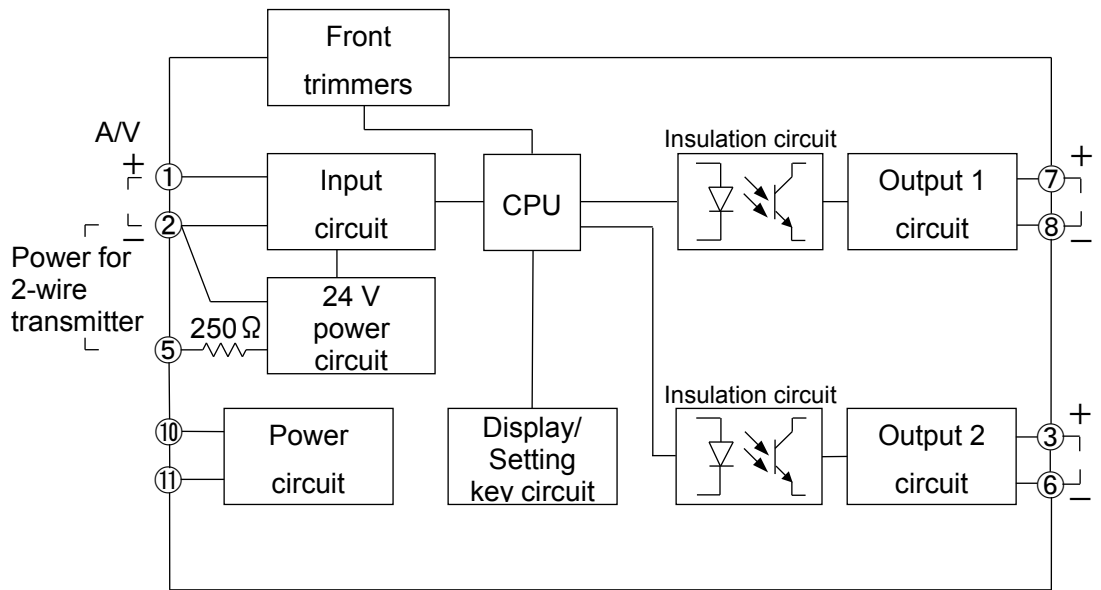
SGMW

(Fig. 4.2-2)

4.3 Terminal Arrangement

SGM
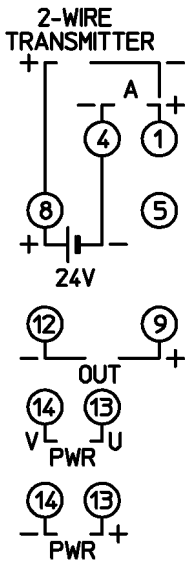
(Fig. 4.3-1)

SGML
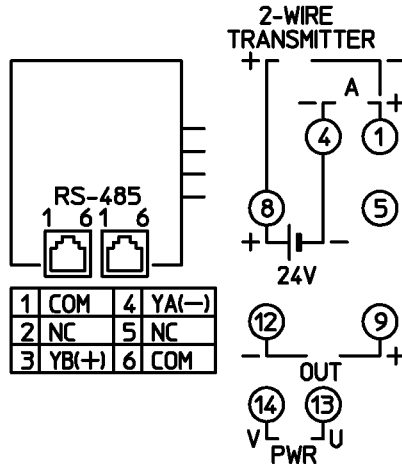
(Fig. 4.3-2)

SGMW
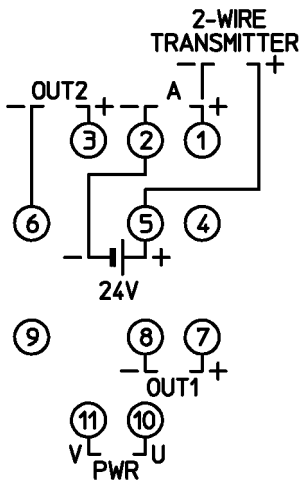
(Fig. 4.3-3)

PWR	Power supply 100 to 240 V AC or 24 V AC/DC (for SGM)
OUT (OUT1)	Output or Output 1 (for SGMW)
OUT2	Output 2 (for SGMW)
2-WIRE TRANSMITTER	2-wire transmitter input
A	Direct current input
RS-485	Serial communication (for SGML)

4.4   Wiring

⚠ **Warning**

• For 100 to 240 V AC, if the AC power source is connected to incorrect terminals, the instrument will be burnt out.

---

(1) Power Source Wiring

SGM: Use terminals ⑬, ⑭ for the power supply to the instrument.
                For 24 V DC, use terminals ⑬(+), ⑭(-) for the power supply to the instrument.
SGML: Use terminals ⑬, ⑭ for the power supply to the instrument.
SGMW: Use terminals ⑩, ⑪ for the power supply to the instrument.

(2) Output Wiring

SGM, SGML: Use terminals ⑨(+), ⑫(-) for the output wiring.
SGMW: Output 1: Use terminals ⑦(+), ⑧(-) for Output 1 wiring.
                Output 2: Use terminals ③(+), ⑥(-) for Output 2 wiring.

(3) Input Wiring

SGM, SGML: Use terminals ①, ④, ⑧ for the input wiring.
SGMW: Use terminals ①, ④, ⑤ for the input wiring.

SGM, SGML, SGMW: When using the instrument as a current loop supply or as an isolator, be sure to wire the unit as the following page.

As a current loop supply
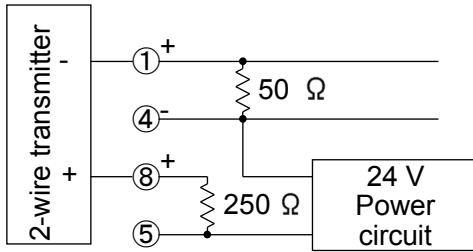
1-output (Input resistance: Approx. 300 Ω)
(Fig. 4.4-1)
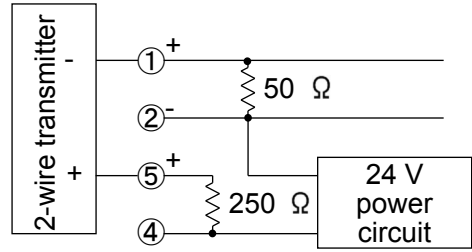
2-outputs (Input resistance: Approx. 300 Ω)
(Fig. 4.4-2)
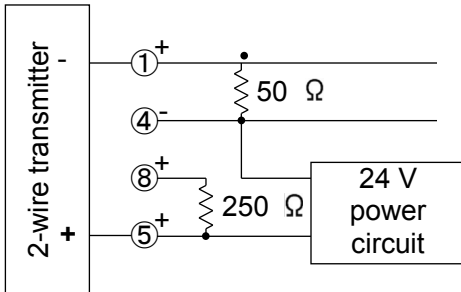
1-output (Input resistance: Approx. 50 Ω)

(Fig. 4.4-3)
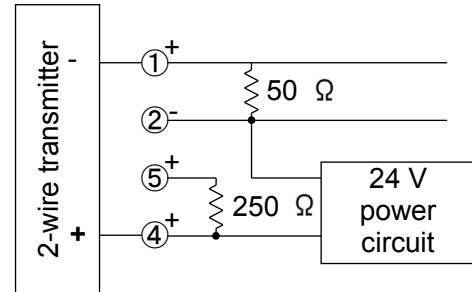
2-outputs (Input resistance: Approx. 50 Ω)

(Fig. 4.4-4)

As an isolator
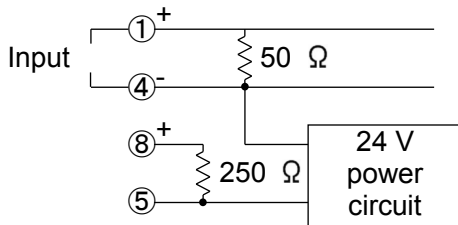
1-output
(Fig. 4.4-5)
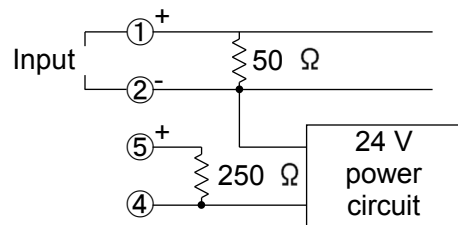
2-outputs
(Fig. 4.4-6)

(4) Communication Wiring

For the SGML, connect the SGML to SGML using the provided cable.

(Fig. 4.4-7)

1	COM
2	NC
3	YB(+)
4	YA(-)
5	NC
6	COM

RS-485
1　6 1　6

5. Display Mode

MODE key + DISP key for 3 sec → **RUN display mode 1**

MODE key + DISP key for 3 sec | DISP key → **RUN display mode 2**

MODE key + DISP key for 3 sec | DISP key → **RUN display mode 3**

MODE key + DISP key for 3 sec | DISP key → **RUN display mode 4**

MODE key + DISP key for 3 sec | DISP key → **RUN display mode 5**

MODE key + DISP key for 3 sec | DISP key → **RUN display mode 6**

MODE key + DISP key for 3 sec | DISP key → **Custom display mode 1**

DISP key

MODE key + DISP key for 3 sec → **Custom display mode 2**

MODE key + DISP key for 3 sec | DISP key → **Custom display mode 3**

MODE key + DISP key for 3 sec | DISP key → **Custom display mode 4**

MODE key + DISP key for 3 sec | DISP key → **Unlit display mode**

MODE key + DISP key for 3 sec | DISP key → **All unlit display mode**

MODE key + DISP key for 3 sec | DISP key → **Model display mode**

DISP key

Default Display

• ⌐‒‒‒‒¬ : Available only for the SGMW.

Default Display: If the MODE and DISP keys (in that order) are pressed together for approx. 3 seconds in any display mode, the display mode will become the Default Display.
Once the Default Display is set, the DISP key will be in lock status.
If the DISP key is pressed for approx. 3 seconds on the Default Display, the key lock status will be cancelled.
If the DISP key is pressed while the DISP key is in lock status, Multi-Display A indicates ⌷⌷⌷⌷.

RUN display mode 1: Multi-Display A indicates an input value, and Multi-Display B indicates Output 1 output value.

RUN display mode 2: Multi-Display A indicates an input value, and Multi-Display B indicates Output 2 output value.

RUN display mode 3: Multi-Display A indicates an input value, and Multi-Display B is unlit.

RUN display mode 4: Multi-Display A indicates Output 1 output value, and Multi-Display B indicates Output 2 output value.

RUN display mode 5: Multi-Display A is unlit, and Multi-Display B indicates Output 1 output value.

RUN display mode 6: Multi-Display A is unlit, and Multi-Display B indicates Output 2 output value.

Custom display mode 1: Multi-Display A indicates characters set in [Multi-Display A]. Multi-Display B indicates characters set in [Multi-Display B].

Custom display mode 2: Multi-Display A indicates an input value, and Multi-Display B indicates characters set in [Multi-Display B].

Custom display mode 3: Multi-Display A indicates an Output 1 output value, and Multi-Display B indicates characters set in [Multi-Display B].

Custom display mode 4: Multi-Display A indicates an Output 2 output value, and Multi-Display B indicates characters set in [Multi-Display B].

Unlit display mode: Multi-Display A and B are unlit, and the Input indicator A lights up.
Alarm indicator A and B light up if they are under the conditions of lighting.

All unlit display mode: All displays and indicators are unlit.
Alarm indicator A and B do not light up even if they are under the conditions of lighting.

Model display mode: Multi-Display A indicates a model name, and Multi-Display B indicates an input code and output code.

6. Setting Mode

6.1 Display Transition in Setting Mode

- ⌐⌐⌐⌐⌐⌐: Available only for the SGMW.
- ⌐⌐⌐⌐⌐⌐: Available only for the SGML.
- If the MODE key is pressed and held down for approx. 5 seconds in each setting mode, the unit will move to the Default Display.

| Default Display | → MODE key for 5 sec | Input setting mode (See pp.20, 21.) | → MODE key | Output 1 setting mode (See pp.22-24.) | → MODE key | Output 2 setting mode (See pp.25-27.) | → MODE key |

Default Display → DOWN key for 3 sec → **Manual mode (See p.32.)**

MODE key, or after Manual mode auto return time has elapsed.

Returns to the Default Display.

Input setting mode → DISP key for 3 sec →
- Decimal point place → DISP key
- Output 0% value → DISP key
- Output 100% value → DISP key
- Indication unit → DISP key
- Square root function → DISP key
- Low level cutoff → DISP key
- Save settings → DISP key

Returns to the Default Display.

Output 1 setting mode → DISP key for 3 sec →
- Output 1 type → DISP key
- Output 1 decimal point place → DISP key
- Indication value at output 0% → DISP key
- Indication value at output 100% → DISP key
- Output 1 low limit → DISP key
- Output 1 high limit → DISP key
- Output 1 Normal/Reverse → DISP key
- Output 1 ratio → DISP key
- Output 1 bias → DISP key
- Input point 1 → DISP key
- Output 1 output value 1 → DISP key
- Input point 2 → DISP key
- Output 1 output value 2 → DISP key
- Save settings → DISP key

Returns to the Default Display.

Output 2 setting mode → DISP key for 3 sec →
- Output 2 type → DISP key
- Output 2 decimal point place → DISP key
- Indication value at output 0% → DISP key
- Indication value at output 100% → DISP key
- Output 2 low limit → DISP key
- Output 2 high limit → DISP key
- Output 2 Normal/Reverse → DISP key
- Output 2 ratio → DISP key
- Output 2 bias → DISP key
- Input point 1 → DISP key
- Output 2 output value 1 → DISP key
- Input point 2 → DISP key
- Output 2 output value 2 → DISP key
- Save settings → DISP key

Returns to the Default Display.

```
┌─────────────────┐         ┌─────────────────┐         ┌─────────────────┐
│ Instrument      │ MODE    │ Communication   │ MODE    │ Custom display  │ MODE
│ setting mode    │──key──→ │ setting mode    │──key──→ │ setting mode    │──key──→  To Input setting mode
│ (See pp.28, 29.)│         │ (See pp.30, 31.)│         │ (See p.32.)     │
└─────────────────┘         └─────────────────┘         └─────────────────┘
        │ DISP                       │ DISP                       │ DISP
        │ key                        │ key                        │ key
        │ for 3 sec                  │ for 3 sec                  │ for 3 sec
        ▼                            ▼                            ▼
┌─────────────────┐         ┌─────────────────┐         ┌─────────────────┐
│ Filter time     │         │ Instrument      │         │ Multi-display A │
│ constant        │         │ number          │         │                 │
└─────────────────┘         └─────────────────┘         └─────────────────┘
        │ DISP                       │ DISP                       │ DISP
        │ key                        │ key                        │ key
        ▼                            ▼                            ▼
┌─────────────────┐         ┌─────────────────┐         ┌─────────────────┐
│ Sensor          │         │ Communication   │         │ Multi-display B │
│ correction      │         │ speed           │         │                 │
└─────────────────┘         └─────────────────┘         └─────────────────┘
        │ DISP                       │ DISP                       │ DISP
        │ key                        │ key                        │ key
        ▼                            ▼                            ▼
┌─────────────────┐         ┌─────────────────┐         ┌─────────────────┐
│ Indication time │         │ Data bit/Parity │         │ Save settings   │
└─────────────────┘         └─────────────────┘         └─────────────────┘
        │ DISP                       │ DISP                       │ DISP
        │ key                        │ key                        │ key
        ▼                            ▼                            ▼
┌─────────────────┐         ┌─────────────────┐         Returns to the
│ Auto/Manual     │         │ Stop bit        │         Default Display.
└─────────────────┘         └─────────────────┘
        │ DISP                       │ DISP
        │ key                        │ key
        ▼                            ▼
┌─────────────────┐         ┌─────────────────┐
│ Ratio setting   │         │ Response        │
│ method          │         │ delay time      │
└─────────────────┘         └─────────────────┘
        │ DISP                       │ DISP
        │ key                        │ key
        ▼                            ▼
┌─────────────────┐         ┌─────────────────┐
│ Manual mode     │         │ Save settings   │
│ auto return time│         └─────────────────┘
└─────────────────┘                 │ DISP
        │ DISP                       │ key
        │ key                        ▼
        ▼                    Returns to the
┌─────────────────┐         Default Display.
│ Save settings   │
└─────────────────┘
        │ DISP
        │ key
        ▼
Returns to the
Default Display.
```

6.2　Input Setting Mode

Decimal Point Place

Selects a decimal point place.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
No decimal point	dPxx	xxxⴹ	2 digits after decimal point
1 digit after decimal point		xxⴹⴹ	
2 digits after decimal point		xⴹⴹⴹ	dPxx
3 digits after decimal point		ⴹⴹⴹⴹ	xⴹⴹⴹ

Output 0% Value

Sets an input value (indicated on the display) at the time of output 0%.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Low limit value of each input type to Output 100% value	SELL	Set value	4.00 SELL x400

Output 100% Value

Sets an input value (indicated on the display) at the time of output 100%.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Output 0% value to High limit value of each input type	SELH	Set value	20.00 SELH 2000

Indication Unit

Selects the unit for indication.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
No unit	UNIt	NONE	No unit UNIt NONE
%		PERx	
mA		MAx	
V		VOLt	
°C		CELS	

Square root function

Enables/Disables the square root extraction function.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Enabled	ROOt	USEx	Disabled ROOt NONE
Disabled		NONE	

Low level cutoff

Sets the low level cutoff value. If input value is lower than the low level cutoff value, the input value will become 0.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
0.0 to 25.0%	ᴸᴼᵁᴸ	Set value	1.0% ᴸᴼᵁᴸ ⁿⁿⁿ10

Save Settings

Selects whether the settings are saved (registered) or not.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Save	SAVE	YESⁿ	Save SAVE YESⁿ
Not save		NOⁿⁿ	

6.3 Output 1 Setting Mode

Output 1 Type

Selects an output type.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
4 to 20 mA		420A	
0 to 20 mA		020A	
0 to 16 mA		016A	
2 to 10 mA		210A	
0 to 10 mA		010A	
0 to 10 mV	0t5n	010M	4 to 20 mA
0 to 100 mV		00mV	0t5n
0 to 1 V		01V	420A
0 to 5 V		05V	
1 to 5 V		15V	
0 to 10 V		010V	
-5 to 5 V *		-55V	

* Not available for the SGMW.

Output 1 Decimal Point Place

Selects a decimal point place for Output 1.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
No decimal point		XXXXO	2 digits after decimal point
1 digit after decimal point	dPXX	XX00	
2 digits after decimal point		X000	dPXX
3 digits after decimal point		0000	X000

Indication Value at Output 0%

Sets an indication value at the time of output 0%.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
-1999 to 9999	05Zn	Set value	4.00 05Zn X400

Indication Value at Output 100%

Sets an indication value at the time of output 100%.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
-1999 to 9999	055n	Set value	20.00 055n 2000

Output 1 Low Limit

Sets low limit of Output 1 output value.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
-10.0 to Output 1 high limit	⌷LLꓱ	Set value	-10.0% ⌷LLꓱ ꓱ-100

Output 1 High Limit

Sets high limit of Output 1 output value.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Output 1 low limit to 110.0	⌷LHꓱ	Set value	110.0% ⌷LHꓱ ꓱ1100

Output 1 Normal/Reverse

Selects either Normal mode or Reverse mode for Output 1 status.
Available when 'Ratio setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Normal	⌷RꓵN	NꓱMꓱ	Normal ⌷RꓵN NꓱMꓱ
Reverse		REꓦS	

Output 1 Ratio

Sets the ratio for Output 1 output value.
Available when 'Ratio setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
0.10 to 10.00 times	RAꓱꓵ	Set value	1.00 times RAꓱꓵ ꓱ100

Output 1 Bias

Sets the bias value for Output 1 output value.
Available when 'Ratio setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
-1000 to 1000%	ꓭꓵAꓱ	Set value	0% ꓭꓵAꓱ ꓱꓱꓱ0

Input Point 1

Set an input point for 'Output 1 output value 1'.

Available when 'Output value setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Output 0% value to Input point 2	ꞮΝΡꞀ	Set value	4.00 ꞮΝΡꞀ Ɬ4ꝏ

Output 1 Output Value 1

Sets a value to output using the input value set in [Input point 1].

Available when 'Output value setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Output 0% value to Output 1 output value 2	ꝶꞇꞒꞀ	Set value	4.00 ꝶꞇꞒꞀ Ɬ4ꝏ

Input Point 2

Set an input point for 'Output 1 output value 2'.

Available when 'Output value setting' is selected in [Ratio setting method] in Instrument setting mode.

° Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Input point 1 to Output 100% value	ꞮΝΡꞒ	Set value	20.00 ꞮΝΡꞒ Ɬꝏꝏ

Output 1 Output Value 2

Sets a value to output using the input value set in [Input point 2].

Available when 'Output value setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Output 1 output value 1 to Output 100% value	ꝶꞇꞒꞒ	Set value	20.00 ꝶꞇꞒꞒ Ɬꝏꝏ

Save Settings

Selects whether the settings are saved (registered) or not.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Save	ꞱꞀꝶꞒ	ꝳꞒꞱꞀ	Save ꞱꞀꝶꞒ ꝳꞒꞱꞀ
Not save		ΝꝸꞀꞀ	

6.4 Output 2 Setting Mode

Available only for the SGMW.

Output 2 Type

Selects an output type.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
4 to 20 mA		420A	
0 to 20 mA		020A	
0 to 16 mA		016A	
2 to 10 mA		210A	
0 to 10 mA		010A	4 to 20 mA
0 to 10 mV	0t52	01MV	0t52
0 to 100 mV		00NV	420A
0 to 1 V		0NNV	
0 to 5 V		0N5V	
1 to 5 V		1N5V	
0 to 10 V		010V	

Output 2 Decimal Point Place

Selects the decimal point place.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
No decimal point		NNN0	
1 digit after decimal point	dPNN	NN00	No decimal point
2 digits after decimal point		N000	dPNN
3 digits after decimal point		0000	N000

Indication Value at Output 0%

Sets an indication value at the time of output 0%.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
-1999 to 9999	05Z2	Set value	4.00 05Z2 N400

Indication Value at Output 100%

Sets an indication value at the time of output 100%.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
-1999 to 9999	0552	Set value	20.00 0552 2000

Output 2 Low Limit

Sets low limit of Output 2 output value.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
-10.0 to Output 2 high limit	ᗷᒪᒪ2	Set value	-10.0% ᗷᒪᒪ2 -10.0

Output 2 High Limit

Sets high limit of Output 2 output value.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Output 2 low limit to 110.0	ᗷᒪH2	Set value	110.0% ᗷᒪH2 110.0

Output 2 Normal/Reverse

Selects either Normal mode or Reverse mode for Output 2 status.
Available when 'Ratio setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Normal	ᗷᖇᑌ2	NᗷMᒪ	Normal ᗷᖇᑌ2 NᗷMᒪ
Reverse		ᖇEᐯᔆ	

Output 2 Ratio

Sets the ratio for Output 2 output value.

Available when 'Ratio setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
0.10 to 10.00 times	ᖇᗅᵗ2	Set value	1.00 times ᖇᗅᵗ2 1.00

Output 2 Bias

Sets the bias value for Output 2 output value.
Available when 'Ratio setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
-1000 to 1000%	ᗷIᗅ2	Set value	0% ᗷIᗅ2 0

Input Point 1

Sets an input point for 'Output 2 output value 1'.

Available when 'Output value setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	**Multi-Display B**	
Output 0% value to Input point 2	ꓘNꓒꓼ	Set value	4.00 ꓘNꓒꓼ ꓫ4ꓓꓓ

Output 2 Output Value 1

Sets a value to output using the input value set in [Input point 1].

Available when 'Output value setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	**Multi-Display B**	
Output 0% value to Output 2 output value 2	Sꓒꓛꓼ	Set value	4.00 Sꓒꓛꓼ ꓫ4ꓓꓓ

Input Point 2

Sets an input point for 'Output 2 output value 2'.

Available when 'Output value setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	**Multi-Display B**	
Input point 1 to Output 100% value	ꓘNꓒꓱ	Set value	20.00 ꓘNꓒꓱ ꓱꓓꓓꓓ

Output 2 Output Value 2

Sets a value to output using the input value set in [Input point 2].

Available when 'Output value setting' is selected in [Ratio setting method] in Instrument setting mode.

Setting Range	Indication		Factory Default
	Multi-Display A	**Multi-Display B**	
Output 2 output value 1 to Output 100% value	Sꓒꓛꓱ	Set value	20.00 Sꓒꓛꓱ ꓱꓓꓓꓓ

Save Settings

Selects whether the settings are saved (registered) or not.

Setting Range	Indication		Factory Default
	Multi-Display A	**Multi-Display B**	
Save	SꓮꓦE	ꓬESꓼ	Save SꓮꓦE ꓬESꓼ
Not save		Nꓛꓼꓼ	

6.5   Instrument Setting Mode

Filter Time Constant

Sets the input filter time constant.
Input fluctuation due to noise can be decreased.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
0.0 to 10.0 seconds	ꝛꝜꝠꝡ	Set value	0.0 sec ꝛꝜꝠꝡ ꝲꝲꝳꝳ

Sensor Correction

Sets sensor correction value.
Input value = Current input value + (Sensor correction value)

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
-1000 to 1000 *	ꝢꝢꝡꝢ	Set value	0 ꝢꝢꝡꝢ ꝲꝲꝲꝳ

* The placement of the decimal point follows the selection.

Indication Time

Sets duration from no operation until indication (of Multi-Display A, Multi-Display B,
and each action indicator) turns off.
When set to 00.00, they remain lit.
After indication time has elapsed, and if any key is pressed while they are unlit,
they will light up again.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
00 : 00 to 60 : 00 (Minutes : Seconds) 00 : 00 ....Continuous 00: 01 to 60 : 00 ...Indication time	ꝠꝡꝢꝣ	Set value	30 : 00 (Minutes : Seconds) ꝠꝡꝢꝣ ꝳꝳꝳꝳ

Auto/Manual

If AUTO is selected, the output value corresponding to the input value will be output.
When MANUAL is selected, the unit can enter Manual mode. The output value set in
Manual mode will be output.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Auto	ꝳꝳꝳꝳ	ꝠꝡꝢꝣ	Manual ꝳꝳꝳꝳ ꝳꝳꝳꝳ
Manual		ꝳꝳꝳꝳ	

Ratio Setting Method

Selects either 'Ratio setting' or 'Output value setting' for the ratio and bias settings.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Ratio setting	RbSt	RAtm	Ratio setting RbSt RAtm
Output value setting		bUtm	

Manual Mode Auto Return Time

Sets duration from manual mode until the unit automatically returns to the Default Display.
If set to 0 (zero), auto return will not occur.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
0 to 60 minutes	MbRt	Set value	30 minutes MbRt XX30

Save Settings

Selects whether the settings are saved (registered) or not.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Save	SAVE	YESX	Save SAVE YESX
Not save		NoXX	

6.6 Communication Setting Mode

Available only for the communication specifications.

Instrument Number

Sets the instrument number.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
1 to 247	CMN5	Set value	1 CMN5 XXXX1

Communication Speed

Selects the communication speed.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
9600 bps		XX96	38400 bps CMSP X384
19200 bps	CMSP	XX192	
38400 bps		X384	

Data bit/Parity

Selects data bit and parity.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
8 bits/No parity		8N8N	8 bits/Odd CMPt 8odd
8 bits/Even	CMPt	8EvN	
8 bits/Odd		8odd	

Stop Bit

Selects the stop bit.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
1 bit	CMSt	XXXX1	1 bit CMSt XXXX1
2 bits		XXXX2	

Response Delay Time

Response from the instrument can be delayed after receiving command from the host computer.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
0 to 1000 ms	CMdy	Set value	10 ms CMdy XXX10

Save Settings

Selects whether the settings are saved (registered) or not.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Save	SAVE	YES	Save
Not save		NO	SAVE
			YES

6.7 Custom Display Setting Mode

Customizes characters to be indicated on the Multi-Display A and B*.
Use alphanumeric characters and symbols.
   (e.g.) FLOW, TEMP, No.1, No.2
   * Number of characters which can be indicated differs depending on the display
      mode.
      Refer to Section '5. Display Mode' (pp.16, 17).
         • If Custom display mode 1 is selected:
               Up to 8 characters can be displayed in total for both Multi-Display A and B.
         • If any of Custom display mode 2 to 4 is selected:
               Up to 4 characters can be displayed on the Multi-Display B.

Can be set from the thousands digit of the display.
Digits can be selected with the MODE key.

Multi-Display A

Characters for the Multi-Display A can be customized.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
A to Z, 0 to 9, /, –, . , (Blank)	⌂5PA	Set value	AAAA ⌂5PA AAAA

Multi-Display B

Characters for the Multi-Display B can be customized.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
A to Z, 0 to 9, /, –, . , (Blank)	⌂5Pb	Set value	AAAA ⌂5Pb AAAA

Save Settings

Selects whether the set contents are saved (registered) or not.

Setting Range	Indication		Factory Default
	Multi-Display A	Multi-Display B	
Save	SAVE	YES	Save SAVE YES
Not save		No	

6.8 Manual Mode

If MANUAL is selected in [Auto/Manual] in Instrument setting mode, press the DOWN
key for 3 seconds on the Default Display. Then the unit will enter Manual mode.
At this time, Multi-Display A indicates Output 1 output value, and Multi-Display B
indicates Output 2 output value.
The output value can be set by the UP or DOWN key. The output value is lit while setting.
Pressing the DISP key switches the output to be set. The output to be set flashes.
By pressing the MODE key in Manual mode, or after Manual mode auto return time has
elapsed, the unit returns to the Default Display, and outputs the value corresponding to
the input value.

7. Adjustment

Performs the output zero and span adjustments.
For this instrument, the output adjustment trimmer has already been completed when shipped.
If the instrument is used with the ordered Input/Output spec, the adjustment is not required.
However, for calibration, or for the fine adjustment of the SGM to which any equipment is connected, perform the adjustment.

Connect an mV generator or Dial resistor to the input terminals of this instrument.
Connect a digital multimeter to the output terminals.

7.1 Basic Operation of Adjustment

Use the following trimmers on the front panel for adjustment.
Output 1 Zero: Adjusts the value of Output 1 Zero.
Output 1 Span: Adjusts the value of Output 1 Span.
Output 2 Zero: Adjusts the value of Output 2 Zero. (for SGMW only)
Output 2 Span: Adjusts the value of Output 2 Span. (for SGMW only)

7.2 Adjustment

All adjustment items are shown below.
Perform adjustment as follows.

7.2.1 Output 1 Adjustment

The following outlines the procedure for Output 1 adjustment.
① Enter the value corresponding to output 0%, and adjust the value using the 'Output 1 Zero' trimmer while viewing the output value (on the digital multimeter).
② Enter the value corresponding to output 100%, and adjust the value using the 'Output 1 Span' trimmer while viewing the output value (on the digital multimeter).
③ Enter the value corresponding to output 0% again, and confirm the output value (on the digital multimeter).
④ If the value corresponding to output 0% is not at 0%, repeat steps ① to ③ again

7.2.2 Output 2 Adjustment

The procedure for Output 2 adjustment is the same as that of Output 1 adjustment.
Use Output 2 Zero and Span trimmers for adjustment.

8. Operation

8.1 Indication after Power-on

After the power is turned on, the instrument is switched to warm-up status for 3 seconds. Multi-Display A indicates a model name, and Multi-Display B indicates the input code and output code.

(e.g.) SGM-A01-0-0

    Multi-Display A: ⸬SGM⸬

    Multi-Display B: ⸬A0⸬

A value corresponding to input 0% will be output for Output 1 and Output 2.

8.2 Operation

After warm-up status, the unit enters display mode.

The input signal will be converted to the output selected in [Output 1 type] and [Output 2 type].

8.2.1 Input Indication Range

The measured value is indicated within the following range:

    [Output 0% value – (Output 100% value – Output 0% value) ×10%] to
    [Output 100% value + (Output 100% value – Output 0% value) ×10%]

For a value lower than (and including) -2000, the input value and the minus (-) sign are indicated alternately. For a value higher than (and including) 10000, the lower 4 digits will flash. (The placement of the decimal point follows the selection.)

When the measured value exceeds the indication range, ⸬⸬⸬⸬ will flash.

When the measured value drops below the indication range, ⸬⸬⸬⸬ will flash.

8.2.2 Indication Range of Output 1 and Output 2

The output value is indicated within the following range:

    [Indication value at output 0% – (Indication value at output 100% – Indication value at output 0%)×10%] to
    [Indication value at output 100% + (Indication value at output 100% – Indication value at output 0%)×10%]

However, the high limit value is 9999, and the low limit value is -1999. (The placement of the decimal point follows the selection.)

8.2.3 Input Disconnection Status

If input is disconnected, the input status will be equal to 0 mA input.

8.2.4 Indication Time Setting

After preset indication time has elapsed, Multi-Display A, Multi-Display B and each action indicator are turned OFF.

They will light up again if any key is pressed.

They remain lit during setting mode, or in the event of an input error or input disconnection.

If the indication time is set to 00:00, they will remain lit.

8.2.5 Square Root Function

Selects Enabled/Disabled of the square root extraction function.
(Factory default: Disabled)

$$IN' = \sqrt{IN}$$

    IN' : Input after square root extraction

    IN : Input (0 to 100%)

8.2.6　Low Level Cutoff Function

When PV input is near 0 (zero), the result of the square root extraction changes considerably with only a very small change of input, which also affects the indication value. This function prevents this effect.

If PV input is lower than the low level cutoff value, the PV is forced to become 0 (zero).

The low level cutoff value is indicated in a percentage form (%) corresponding to the input range.

8.2.7　Ratio and Bias Settings

● **Ratio setting**

When 'Ratio setting' is selected in [Ratio setting method], the ratio and bias value for the output value corresponding to the input value can be set.

- **Output 1 ratio setting**

  Sets the ratio for Output 1 output value.

  The output will be produced by [(Input x Ratio) + Bias value] (for normal output) based on the slope set in [Output 0% value] and [Output 100% value].

- **Output 2 ratio setting**

  Sets the ratio for Output 2 output value.

  The output will be produced by [(Input x Ratio) + Bias value] (for normal output) based on the slope set in [Output 0% value] and [Output 100% value].

- **Output 1 bias setting**

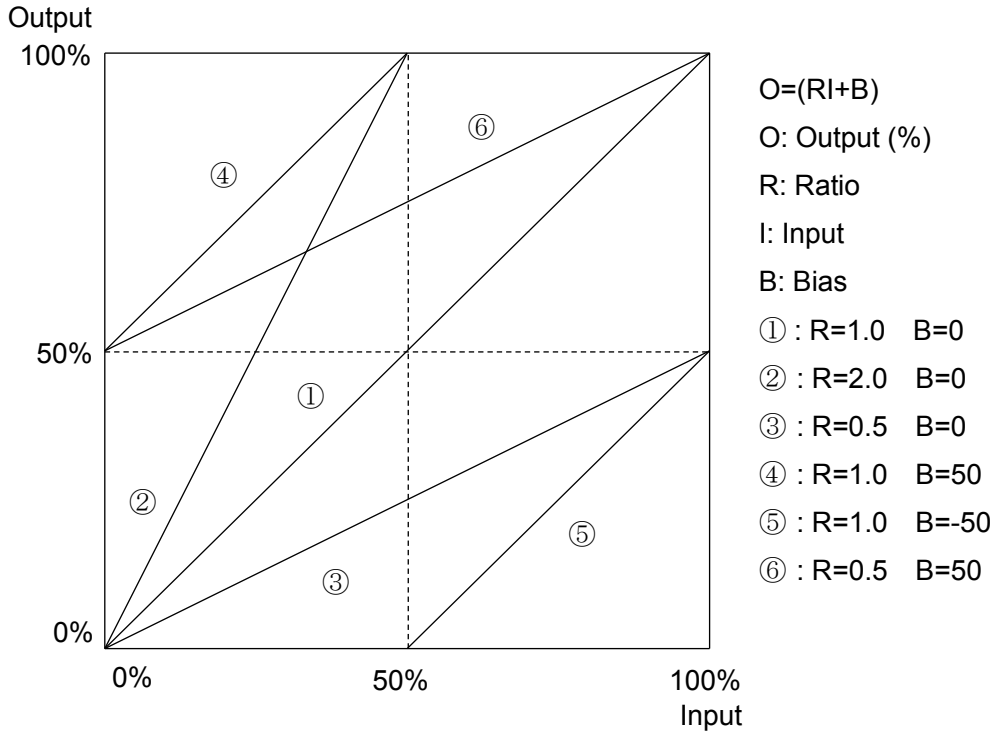 Sets the bias value for Output 1 output value.

  The bias value is added to [Input x Ratio] to produce the output based on the slope set in [Output 0% value] and [Output 100% value].

- **Output 2 bias setting**

  Sets the bias value for Output 2 output value.

  The bias value is added to [Input x Ratio] to produce the output based on the slope set in [Output 0% value] and [Output 100% value].

Normal output

Output

100%

O=(RI+B)

O: Output (%)

R: Ratio

I: Input

B: Bias

① : R=1.0   B=0

② : R=2.0   B=0

③ : R=0.5   B=0

④ : R=1.0   B=50

⑤ : R=1.0   B=-50

⑥ : R=0.5   B=50

50%

0%

0%   50%   100%

Input

(Fig. 8.2.7-1)

Reverse Output

Output

100%

O=S-(RI+B)

O: Output (%)

R: Ratio

I: Input

B: Bias

S: 100%

① : R=1.0   B=0

② : R=2.0   B=0

③ : R=0.5   B=0

④ : R=1.0   B=50

⑤ : R=1.0   B=-50

⑥ : R=0.5   B=50

50%

0%

0%   50%   100%

Input

(Fig. 8.2.7-2)

- 36 -
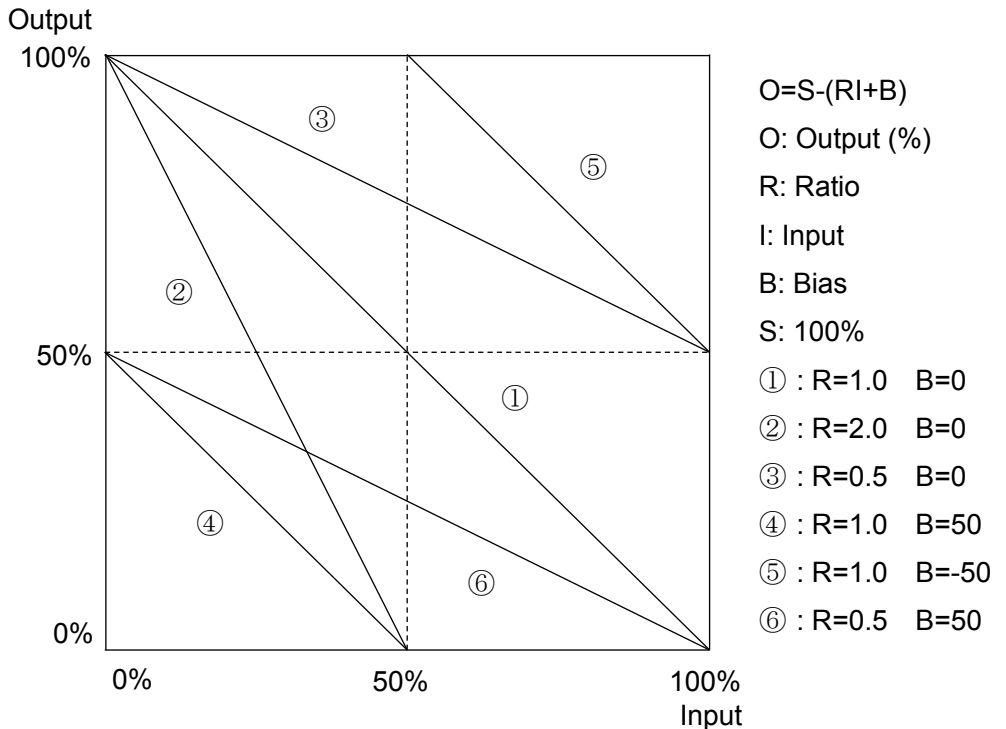
● **Output value setting**

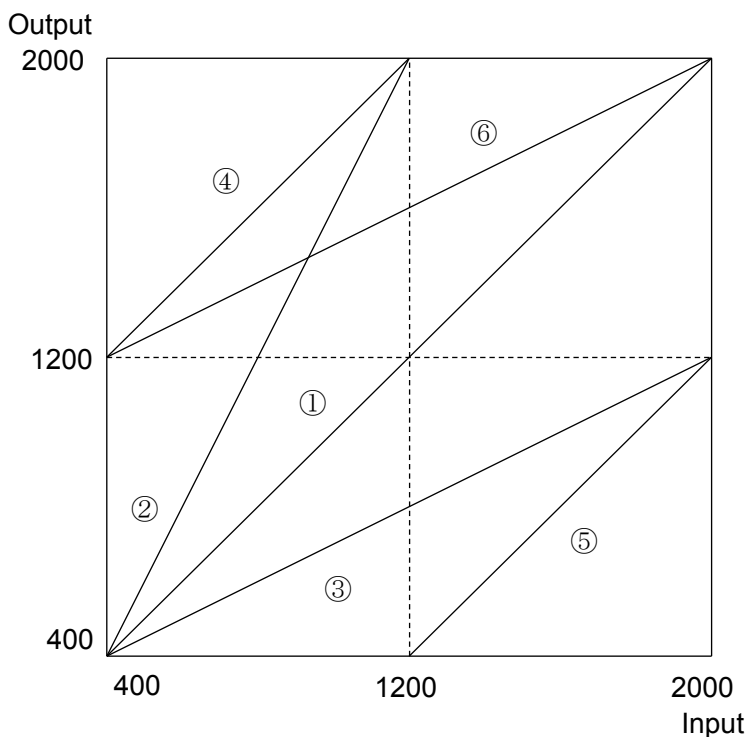If 'Output value setting' is selected in [Ratio setting method], the output value corresponding to the preset input point can be output.

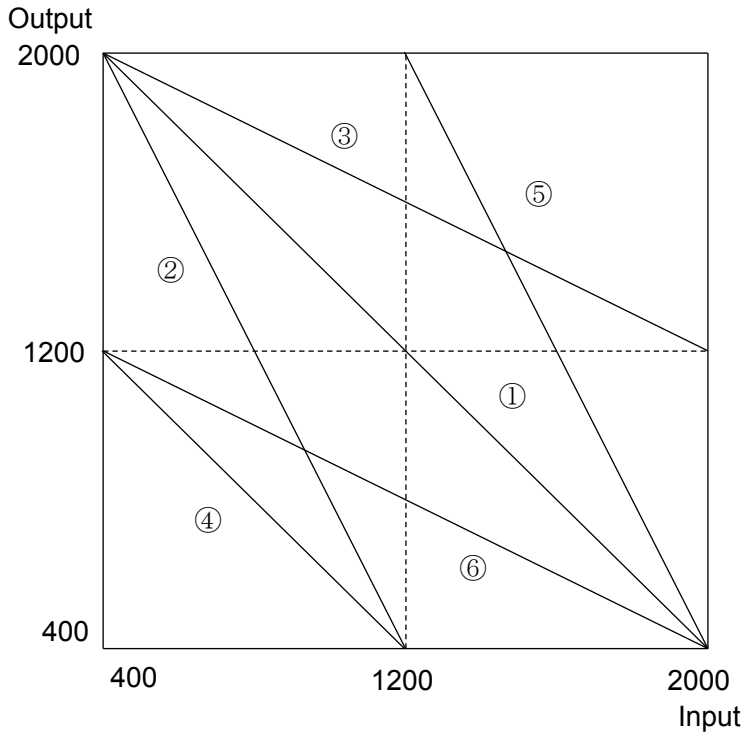**When 'Output 1 output value 1' is smaller than 'Output 1 output value 2**

(e.g.) Output 0% value: 400
Output 100% value: 2000
Indication value at output 0%: 400
Indication value at output 100%: 2000

①
| Input point 1 | 400 | Output 1 output value 1 | 400 |
| Input point 2 | 2000 | Output 1 output value 2 | 2000 |

②
| Input point 1 | 400 | Output 1 output value 1 | 400 |
| Input point 2 | 1200 | Output 1 output value 2 | 2000 |

③
| Input point 1 | 400 | Output 1 output value 1 | 400 |
| Input point 2 | 2000 | Output 1 output value 2 | 1200 |

④
| Input point 1 | 400 | Output 1 output value 1 | 1200 |
| Input point 2 | 1200 | Output 1 output value 2 | 2000 |

⑤
| Input point 1 | 1200 | Output 1 output value 1 | 400 |
| Input point 2 | 2000 | Output 1 output value 2 | 1200 |

⑥
| Input point 1 | 400 | Output 1 output value 1 | 1200 |
| Input point 2 | 2000 | Output 1 output value 2 | 2000 |

(Fig. 8.2.7-3)

When 'Output 1 output value 1' is larger than 'Output 1 output value 2

(e.g.) Output 0% value: 400
      Output 100% value: 2000
      Indication value at output 0%: 400
      Indication value at output 100%: 2000

①
| Input point 1 | 400 | Output 1 output value 1 | 2000 |
| Input point 2 | 2000 | Output 1 output value 2 | 400 |

②
| Input point 1 | 400 | Output 1 output value 1 | 2000 |
| Input point 2 | 1200 | Output 1 output value 2 | 400 |

③
| Input point 1 | 400 | Output 1 output value 1 | 2000 |
| Input point 2 | 2000 | Output 1 output value 2 | 1200 |

④
| Input point 1 | 400 | Output 1 output value 1 | 1200 |
| Input point 2 | 1200 | Output 1 output value 2 | 400 |

⑤
| Input point 1 | 1200 | Output 1 output value 1 | 2000 |
| Input point 2 | 2000 | Output 1 output value 2 | 400 |

⑥
| Input point 1 | 400 | Output 1 output value 1 | 1200 |
| Input point 2 | 2000 | Output 1 output value 2 | 400 |

(Fig. 8.2.7-4)

9. Specifications

Input Specifications

Direct current input			
	Input Range	**Shunt Resistor**	**Indication Resolution**
	4 to 20 mA DC	50 Ω *	1
	* Built-in shunt resistor		

Output 1 Specifications

Direct current				
	Output Range	**Allowable Load Resistance**	**Zero Adjustment Range**	**Span Adjustment Range**
	4 to 20 mA	750 Ω max.		
	0 to 20 mA *	750 Ω max.		
	0 to 16 mA *	900 Ω max.	-5 to 5%	95 to 105%
	2 to 10 mA	1500 Ω max.		
	0 to 10 mA *	1500 Ω max.		
	* 0 mA or less: Out of base accuracy			

DC voltage				
	Output Range	**Allowable Load Resistance**	**Zero Adjustment Range**	**Span Adjustment Range**
	0 to 10 mV *1	10 kΩ min.		
	0 to 100 mV *1	100 kΩ min.		
	0 to 1 V *1	1000 Ω min.		
	0 to 5 V *1	5000 Ω min.	-5 to 5%	95 to 105%
	1 to 5 V	5000 Ω min.		
	0 to 10 V *1	10 kΩ min.		
	-5 to 5 V *2	10 kΩ min.		
	*1: 0 V or less: Out of base accuracy			
	*2: Not available for the SGMW.			

Output 2 Specifications

Direct current				
	Output Range	**Allowable Load Resistance**	**Zero Adjustment Range**	**Span Adjustment Range**
	4 to 20 mA	750 Ω max.		
	0 to 20 mA *	750 Ω max.		
	0 to 16 mA *	900 Ω max.	-5 to 5%	95 to 105%
	2 to 10 mA	1500 Ω max.		
	0 to 10 mA *	1500 Ω max.		
	* 0 mA or less: Out of base accuracy			

DC voltage				
	Output Range	**Allowable Load Resistance**	**Zero Adjustment Range**	**Span Adjustment Range**
	0 to 10 mV *	10 kΩ min.		
	0 to 100 mV *	100 kΩ min.		
	0 to 1 V *	1000 Ω min.		
	0 to 5 V *	5000 Ω min.	-5 to 5%	95 to 105%
	1 to 5 V	5000 Ω min.		
	0 to 10 V *	10 kΩ min.		
	* 0 V or less: Output of base accuracy			

Performance

Base accuracy (at 25°C)	±0.1% of each input span
Cold junction compensation accuracy	±0.5°C (1.0°F) at 20±10°C
Temperature coefficient	±0.015 %/°C 0 to 10 mV output: 0.02 %/°C
Response time	500 ms max. (0→90%)
Indication update cycle	125 ms
Insulation resistance	100 MΩ minimum, at 500 V DC
Dielectric strength	2.0 kV AC for 1 minute

General Structure

Dimensions	22.5 x 89 x 70 mm (W x H x D)
Weight	Approx. 78 g
Mounting method	DIN rail
Case	Flame-resistant resin, Color: Black
Front panel	Polycarbonate

Installation Specifications

Power supply	100 to 240 V AC 50/60 Hz 24 V AC/DC 50/60 Hz
Allowable voltage range	100 to 240 V AC: 85 to 264 V AC 24 V AC/DC: 20 to 28 V AC/DC
Power consumption	100 to 240 V AC: Approx. 10 VA max. (SGML: Approx. 11 VA max.) 24 V AC: Approx. 7 VA max. 24 V DC: Approx. 4 W max.
Ambient temperature	-10 to 55°C (Non-condensing, no icing)
Ambient humidity	35 to 85 %RH (Non-condensing)

Serial Communication (for SGML)

Operation from an external computer	Reading and setting of various set values Reading of the input value and action status Function change
Communication line	EIA RS-485
Communication method	Half-duplex communication
Communication speed	9600, 19200, 38400 bps (Selectable by keypad) (Factory default: 38400 bps)
Synchronization method	Start-stop synchronization
Communication protocol	Modbus RTU
Start bit	1 bit
Data bit	8 bits
Parity	Even/Odd/No parity (Selectable by keypad) (Factory default: Odd)
Stop bit	1 bit or 2 bits (Selectable by keypad) (Factory default: 1 bit)
Response delay time	Response from the instrument can be delayed after receiving command from the host computer. 0 to 1000 ms (Factory default: 10 ms)

Standard 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 occurs, the instrument is switched to warm-up status, turning all outputs OFF.

10. Troubleshooting

10.1 Indication

Problem	Possible Cause	Solution
Multi-Display A or B flashes ▨▨▨▨ or ▨▨▨▨ wen it indicates an input value.	The sensor may be disconnected.	Replace with a new sensor.
	Check whether the sensor is securely mounted to the input terminals of this instrument.	Connect the sensor terminals to the instrument input terminals securely.
	Check the input signal source.	Ensure that the input signal source works normally.
Multi-Display A or B is irregular or unstable when it indicates an input value.	Sensor correction value is unsuitable.	Set it to a suitable value.
	AC leaks into the sensor circuit.	Use an ungrounded type sensor.
	There may be equipment that interferes with or makes noise near the instrument.	Keep the instrument clear of any potentially disruptive equipment.
Displays and indicators are unlit. If any key is pressed, they will light up.	The Indication Time (p.28) is set to any value other than 00 : 00. (Factory default is 30 : 00.)	To indicate continuously, set the Indication Time (p.28) to "00 : 00".

10.2 Key Operation

Problem	Possible Cause	Solution
If the DISP key is pressed, Multi-Display A shows ▨▨▨▨, and the display mode cannot be switched.	The DISP key is in locked status.	Press the DISP key for approx. 3 seconds to release the key lock.

10.3 Operation

Problem	Possible Cause	Solution
When Multi-Display A or B indicates an input value, the input value does not change.	The sensor may be out of order.	Replace with the new sensor.
	Check whether input and output wire are securely connected to the I/O terminals of the instrument.	Ensure that input and output wire are securely connected to the I/O terminals of the instrument.
	Check whether the wiring of input and output are correct.	Wire them correctly.
No output	Selections in [Output 1 type (p.22)], [Output 1 Normal/ Reverse (p.23)], [Output 2 type (p.25)] or [Output 2 Normal/Reverse (p.26)] may be incorrect.	Make a correct selection in [Output 1 type (p.22)], [Output 1 Normal/Reverse (p.23)], [Output 2 type (p.25)] or [Output 2 Normal/Reverse (p.26)].

11. Character Table

Please use the following factory default values for your reference.

Display mode

Setting Item	Multi-Display A	Multi-Display B	Data
Default display mode	Follows currently indicated display mode.		
RUN display mode 1	Input value	Output 1 output value	
RUN display mode 2 *	Input value	Output 2 output value	
RUN display mode 3	Input value	Unlit	
RUN display mode 4 *	Output 1 output value	Output 2 output value	
RUN display mode 5	Unlit	Output 1 output value	
RUN display mode 6 *	Unlit	Output 2 output value	
Custom display mode 1	⦿⦿⦿⦿	⦿⦿⦿⦿	
Custom display mode 2	Input value	⦿⦿⦿⦿	
Custom display mode 3	Output 1 output value	⦿⦿⦿⦿	
Custom display mode 4 *	Output 2 output value	⦿⦿⦿⦿	
Model display mode	Model	Input, Output codes	

 * Available only for the SGMW.

Setting mode

Setting Item	Multi-Display A	Multi-Display B	Data
Input setting mode	INXX	Unlit	
Output 1 setting mode	OUEX	Unlit	
Output 2 setting mode *	OUE2	Unlit	
Instrument setting mode	ANEX	Unlit	
Communication setting mode	COMM	Unlit	
Custom display setting mode	CUSE	Unlit	

 * Available only for the SGMW.

Input setting mode

Setting Item	Multi-Display A	Multi-Display B	Data
Decimal point place	dPXX	XXX0	
Output 0% value	SELL	X400	
Output 100% value	SELH	2000	
Indication unit	UNIE	NONE	
Square root function	RooE	NONE	
Low level cutoff	LCUE	XXX0	
Save settings	SAVE	YESX	

Output 1 setting mode

Setting Item	Multi-Display A	Multi-Display B	Data
Output 1 type	o t S 1	4 2 0 A	
Output 1 decimal point place	d P 1	0 0 0	
Indication value at output 0%	o S Z 1	4 0 0	
Indication value at output 100%	o S S 1	2 0 0 0	
Output 1 low limit	o L L 1	- 1 0 0	
Output 1 high limit	o L H 1	1 1 0 0	
Output 1 Normal/Reverse	o F U 1	N o M L	
Output 1 ratio	R A t 1	1 1 0 0	
Output 1 bias	b l A 1	0 0 0 0	
Input point 1	l N P 1	4 0 0	
Output 1 output value 1	S t o 1	4 0 0	
Input point 2	l N P 2	2 0 0 0	
Output 1 output value 2	S t o 2	2 0 0 0	
Save settings	S A V E	Y E S	

Output 2 setting mode

Setting Item	Multi-Display A	Multi-Display B	Data
Output 2 type	o t S 2	4 2 0 A	
Output 2 decimal point place	d P 2	0 0 0	
Indication value at output 0%	o S Z 2	4 0 0	
Indication value at output 100%	o S S 2	2 0 0 0	
Output 2 low limit	o L L 2	- 1 0 0	
Output 2 high limit	o L H 2	1 1 0 0	
Output 2 Normal/Reverse	o F U 2	N o M L	
Output 2 ratio	R A t 2	1 1 0 0	
Output 2 bias	b l A 2	0 0 0 0	
Input point 1	l N P 1	4 0 0	
Output 2 output value 1	S t o 1	4 0 0	
Input point 2	l N P 2	2 0 0 0	
Output 2 output value 2	S t o 2	2 0 0 0	
Save settings	S A V E	Y E S	

Instrument setting mode

Setting Item	Multi-Display A	Multi-Display B	Data
Filter time constant	A l t E	0 0 0 0	
Sensor correction	S o R S	0 0 0 0	
Indication time	t l M E	3 0 0 0	
Auto/Manual	M A R S	M A N U	
Ratio setting method	R b S t	R A t 1	
Manual mode auto return time	M o F t	0 0 3 0	
Save settings	S A V E	Y E S	

Communication setting mode (for SGML)

Setting Item	Multi-Display A	Multi-Display B	Data
Instrument number	CMNo	XXX1	
Communication speed	CMSP	X384	
Data bit/Parity	CMPE	8odd	
Stop bit	CMSt	XXX1	
Response delay time	CMdY	XX10	
Save settings	SAVE	YES	

Custom display setting mode

Setting Item	Multi-Display A	Multi-Display B	Data
Multi-Display A	dSPA	AAAA	
Multi-Display B	dSPb	AAAA	
Save settings	SAVE	YES	

***** Inquiries *****

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

[Example]

• Model ------------------------------ SGM-A01-0-0

• Serial number -------------------- 154F05000

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

SHINKO TECHNOS CO., LTD.
OVERSEAS DIVISION

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