
User's Manual

Thin/Plug-In Type Isolated Signal Conditioner

CP3700 series

Rev. 2.10

Thank you very much for employing SHIMADEN products.

Upon receipt of the product(s) please check the affixed label to make sure the specifications shown therein conform to your requirements. If you find any discrepancies and/or any damage on the product(s), please contact SHIMADEN or its local representatives.

You can be assured that all of the SHIMADEN products are manufactured according to the strict quality control standards.

WARRANTY PERIOD AND SCOPE

WARRANTY PERIOD

SHIMADEN's hardware products are warranted for one (1) year from the date of purchase.

WARRANTY SCOPE

- 1) SHIMADEN warrants that its hardware products are free from defects in materials and workmanship and conform to its product specifications.
- 2) SHIMADEN ships the products under its appropriate quality management system and quality control, but does not warrant, expressed or implied, that the operation, output, or indication of the hardware will be uninterrupted or error free. SHIMADEN shall not be liable and make no warranty for any damage to or any safety or performance trouble in the customer's or any other third party's equipment if the operation, output, or indication is interrupted or faulty.
- 3) If, during the warranty period, the product proves to be defective when used in accordance with the relevant user's manual, the product will be repaired or replaced.
- 4) This warranty does not apply to any malfunction or failure resulting from the following:
 - a Improper or incomplete maintenance or calibration,
 - b Any other cause, which does not relate with the delivered product,
 - c Modification or repair by any person other than SHIMADEN, and
 - d Natural disasters or other unavoidable accidents, for which SHIMADEN is not liable.


1. Introduction


For proper operation of the instrument(s), we recommend that you carefully read this manual prior to operation. The manual should be retained for future reference.

Prior to shipping the instrument(s), they are subjected to thorough inspections. Upon receipt of the product(s), conduct a visual check to make sure that they are not damaged. Also, check all the accessories similarly.


2. For Safe Operation


Be sure to observe the following safety clauses in your operation of the instrument(s). SHIMADEN cannot undertake any responsibility and guarantee for any damage and/or loss caused by improper operation contrary to or neglecting these clauses.

 WARNING	Disregard of this clause may cause fatal harm or serious bodily injury due to fire or electric shock.
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 CAUTION	Disregard of this clause may cause bodily harm or damages to nearby objects due to electric shock or other accidental happenings.
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The instrument(s) and manual provide the safety information using the following symbols:

 Devices protected by double or reinforced insulation

 Functional ground terminals (Do not use this as a protective earth terminal.)

 WARNING
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- All electrical connections must be made to the terminal block of the socket. All connections and disconnections must be made with no power applied to the instrument. Otherwise, electric shock may result.
- Do not disassemble or modify the instrument, and do not replace the power fuse. Otherwise, fire or electric shock could result.
- Should any foreign matter (metal chips, water, liquid, etc.) get inside the instrument, immediately unplug the power cable and contact SHIMADEN or its distributor.
- When the instrument is used for applications that require higher reliability and safety, such as transportation, communication, power generation control and medical equipment, special consideration should be taken in safety design to prevent such equipment from malfunctioning as a whole system.
- Do not operate the instrument in an explosive atmosphere containing flammable vapors, gases, or dusts. Otherwise, an explosion may result.
- Do not place any combustible materials close to or under the instrument.
- Because no power switch is provided on the instrument, the power supply of the instrument cannot be turned off on the instrument side. So, be sure to provide a power circuit breaker for the power source of the instrument. Note that the breaker should be installed in a location close to the instrument for the convenience of operation. And the breaker should be marked as a “disconnecting device” for the instrument.

 CAUTION
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- Use the instrument within the operating conditions described in the published product specification. Failure to do so may cause fire or damage to the instrument.
- Avoid operating the instrument(s) in locations where extreme temperature changes can cause condensation. Otherwise, the instrument may be damaged.
- Avoid operating or storing the instrument(s) in locations where corrosive gases are present or chemical solvents may splash.
- Hot-swapping may not cause immediate defects in the unit, but this should be avoided as far as possible.
- For the sake of safety, installation and wiring must be performed by qualified personnel with expertise in electronics, electricity, or instrumentation engineering.

3. Precautions

Be sure to observe the following precautions to ensure proper operation of the instrument(s). If these precautions are disregarded, the performance of the instrument(s) cannot be guaranteed.

For Handling:

- This is a precision instrument. Do not drop or throw the instrument.
- This product contains electronic parts. Do not splash water on the product and do not dip it in water. For installation, select a place where no condensation occurs.
- Avoid storing or installing the instrument(s) in locations subject to direct sunlight, high temperature, dust, high humidity, or vibration.

On Power Supply:

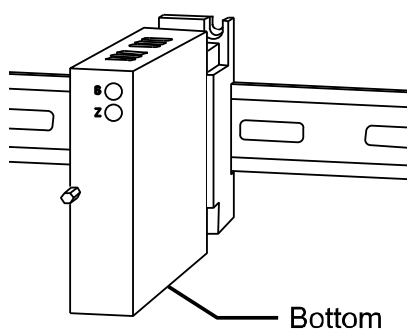
Check the power rating described in the specification label of the unit to ensure you use the correct power supply.

- Rating: 100 to 240V AC $\pm 10\%$, 50/60Hz
- Rating: 24V DC $\pm 10\%$

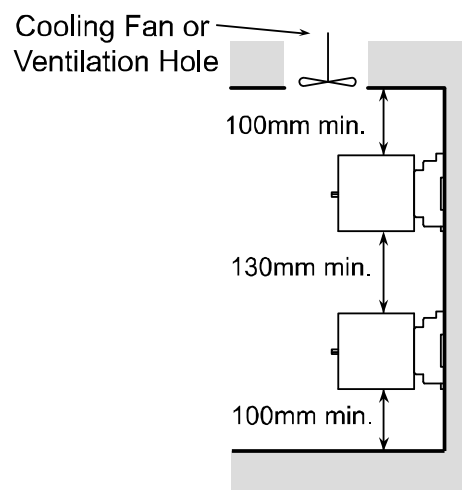
For Installation:

- The instrument is intended for indoor installation.
- Refer to section 7 "Mounting / Demounting" to install the instrument on a DIN rail or wall.
- Operating environmental conditions:
 - Temperature range: -5 to 55°C
 - Humidity: 5 to 90%RH
 - Altitude up to 2000 meters
- Do not block the vents in the instrument.
- Be careful not to ground the minus (-) terminal of the power supply.
- Use independent grounding or an alternative grounding which does not allow current to flow in.
- The instrument should be installed as shown in the sketch below, namely, in such a position that the label on the front panel is readable in the right direction.
- For effective heat dissipation, allow a space of at least 100 mm above and below the unit. When units are used in multiple stacks, they should be spaced at least 130 mm apart from each other. If the required minimum space is not available, take appropriate heat protection measures, e.g., by placing a partition between the units. Provide a ventilation hole or install a cooling fan to improve airflow. Keep adequate working space in front of and on both sides of the unit.

Installation Position



Typical Installation Example



On Wiring:

- Wiring connections should be made to the terminal block. For terminal assignments, refer to section 6-1. The recommended screwing torque is 0.8 to 1.0 Nm.
- For lead wires, use a highly flexible stranded conductor. The recommended nominal cross-section of the lead wire conductor is 0.5 to 2.0 mm².
- The connection of the lead wire to the terminal block should be made with the insulated crimp terminal attached on an end of the wire. Without the insulation, short circuit or electric shock may occur. The recommended crimp terminal thickness is 0.7 to 1.0 mm.

Note that only up to two (2) crimp terminals can be connected to one (1) terminal screw. In this case, the thickness of the crimp terminals should be not greater than 0.8 mm.

To Avoid Erroneous Measurements:

- In order to reduce the influence of noise, the input/output wire and power supply wire should not be used in a same bundle or same conduit. They should be installed separately with a minimum distance of 200 mm.
- Avoid wiring the signal lines in the vicinity of equipment generating magnetic fields or electromagnetic waves, such as electric motors and large-scale transmitters. If inevitable, anti-noise measures such as employment of shielded wires are indispensable.
- At least 30 minutes of warm-up is required prior to operation.
- Any sensor or equipment to be connected to the instrument(s) should be selected in consideration of the input/output impedance of the same. (For detailed specifications, refer to the product specification for each model.)

Special Notes for CE Marking:

- CE-marked models are designed and manufactured to conform to the following EMC Directive and Low Voltage Directives:
 - EMC Directive:
 - Standard conformity EN61326-1
 - Low Voltage Directive:
 - Standard conformity EN61010-1/IEC61010-1
 - Overvoltage Category II
 - Pollution Degree 2
- The instrument(s) should be installed in a control panel.
- The instrument maintains basic insulation between input and output, and between output and F.G. Prior to installation, check that the insulation class of the instrument satisfies system requirements.
- When the instrument is installed in a control panel, the measures to be taken for CE marking conformity may vary with the type of devices connected, wiring to the instrument(s) or structure of the control panel. Therefore, you should check that the control panel as an overall system conforms to the CE marking regulations.

4. About the Product

CP3700 series Signal Conditioners are miniature-sized (W29 × H86 × D125mm, including the socket and every projection); still they are highly reliable and accurate instruments to deliver isolated dual output.

Features

- Pin and socket contacts are gold-plated (0.2μm) to ensure high reliability and long-term stability.
- High dielectric strength of 2000VAC across Input - Output - Power input - Ground is secured.
- Input voltage range from 85 to 264V AC to meet varied power requirements
- Plug-in type for better maintainability
- Drop-proof terminal screws for easy and safe installation
- Fuse installed in the power line as standard attachment
- Conformal coating on PCB for improved environmental protection

User's Manual Thin/Plug-In Type Isolated Signal Conditioner CP3700 Series

Product Specifications

The following is just an excerpt of the specifications. Be sure to read the full specifications for each product.

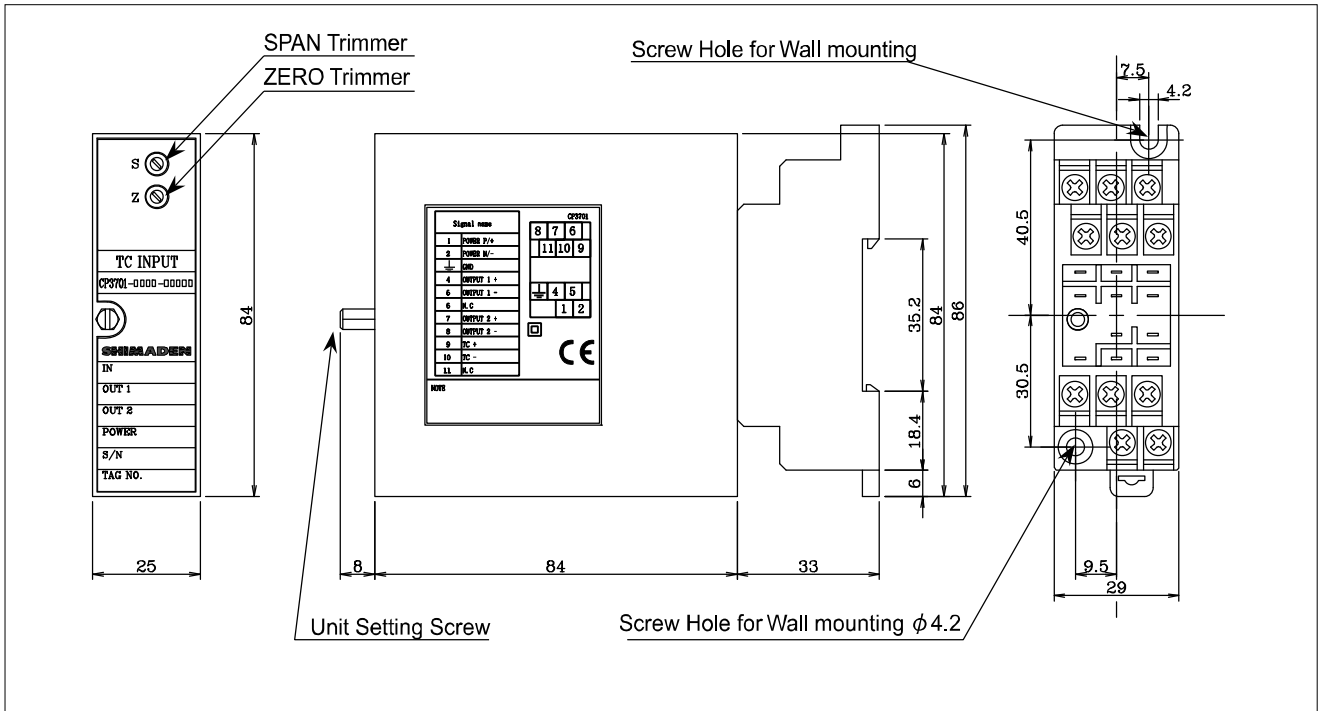
	Power Consumption		Input Resistance	Output Load	Accuracy Rating (25°C±5°C)	
	100-240 VAC	24VDC				
CP3701	7.0VA	1.8W	1MΩ (1MΩ without power)	Voltage output: 2mA max. Single current output: 750Ω max. (Out1) Dual current output: 550Ω max. (Out1) 350Ω max. (Out2)	Better than ± [0.1% of span + 0.5°C + Linearity error] *1	
CP3702	7.0VA	1.8W	–		Better than ±0.15% of span	
CP3703	5.0VA	1.6W	1MΩ (1MΩ without power)		Better than ±0.1% of span	
CP3704	5.0VA	1.6W	Voltage input: 1MΩ (1MΩ without power) Current input: 250Ω (4-20mA)	Rated load for contacts: 5A 125V AC, 5A 30V DC	Better than ±0.1% of span	
CP3705	6.5VA	2.0W	Voltage input: 1MΩ (10kΩ without power) Current input: 250Ω (4-20mA)		Setting accuracy: ±0.5% of span	
CP3707	7.5VA	2.4W	250Ω	Voltage output: 2mA max. Single current output: 750Ω max. (Out1) Dual current output: 550Ω max. (Out1) 350Ω max. (Out2)	Better than ±0.1% of span	
CP3708	9.0VA	3.0W	Voltage input: 1MΩ (30kΩ without power) Current input: 250Ω (4-20mA)		Better than ±0.3% of span	
CP3710	5.5VA	1.5W	–		Better than ±0.2% of span	
CP3713	6.0VA	2.0W	Voltage input: 1MΩ (1MΩ without power) Current input: 250Ω (4-20mA)		Better than ±0.2% of span (input 1-100%)	
CP3714	6.5VA	2.1W			Better than ±0.2% of span	
CP3716	6.0VA	1.8W			Better than ±0.1% of span	
CP3720	5.5VA	1.6W			5A AC input: 2mΩ (shunt resistor) 1A AC input: 10mΩ (shunt resistor)	Better than ±0.25% of span (with at least 10% input)
CP3721	5.5VA	1.6W	1MΩ (1MΩ without power)		Open collector: 30V, 100mA Photo MOS relay: 400V, 0.15A (peak AC)	Better than ±0.1% of span
CP3729	4.0VA	1.2W	Voltage input: 1MΩ (1MΩ without power) Current input: 250Ω (4-20mA)			Better than ±0.1% (accuracy of shunt resistor)
CP3737	5.0VA	1.5W	250Ω		Voltage output: 2mA max. Single current output: 750Ω max. (Out1) Dual current output: 550Ω max. (Out1) 350Ω max. (Out2)	Better than ±0.1% of span
CP3740	5.0VA	1.5W	Voltage input: 1MΩ (1MΩ without power) Current input: 250Ω (4-20mA)	Better than ±0.15% of span		
CP3761	5.5VA	1.7W		Better than ±0.15% of span		
CP3762	5.5VA	1.7W	Voltage output type: Approx. 250Ω Current output type: Approx. 230Ω + Load resistance	Voltage output: 50kΩ min. Current output: 50-350Ω	Better than ±0.15% of span	
CP3764	–	–	Voltage input: 1MΩ (1MΩ without power) Current input: 250Ω (4-20mA)		Voltage output: 2mA max. Single current output: 750Ω max. (Out1) Dual current output: 550Ω max. (Out1) 350Ω max. (Out2)	Addition, subtraction, multiplication: Better than ±0.4% of span Division: Better than ±2.0% of span
CP3765	6.5VA	2.1W	Voltage output: 2mA max. Current output: 750Ω max.	Better than ±0.2% of span		
CP3766	6.5VA	1.8W				

*1 Linearity Error

Input Span	Error (%)	Input Span	Error (%)
JIS K, 0-300°C	0.1	JIS K, 0-600°C	0.15
JIS J, 0-200°C	0.15	JIS E, 0-200°C	0.15
JIS E, 0-600°C	0.25	JIS R, 0-1600°C	0.5
JIS S, 0-1000°C	0.25	JIS T, 0-300°C	0.25

* Linearity errors vary with input spans.

5. Outer Dimensions



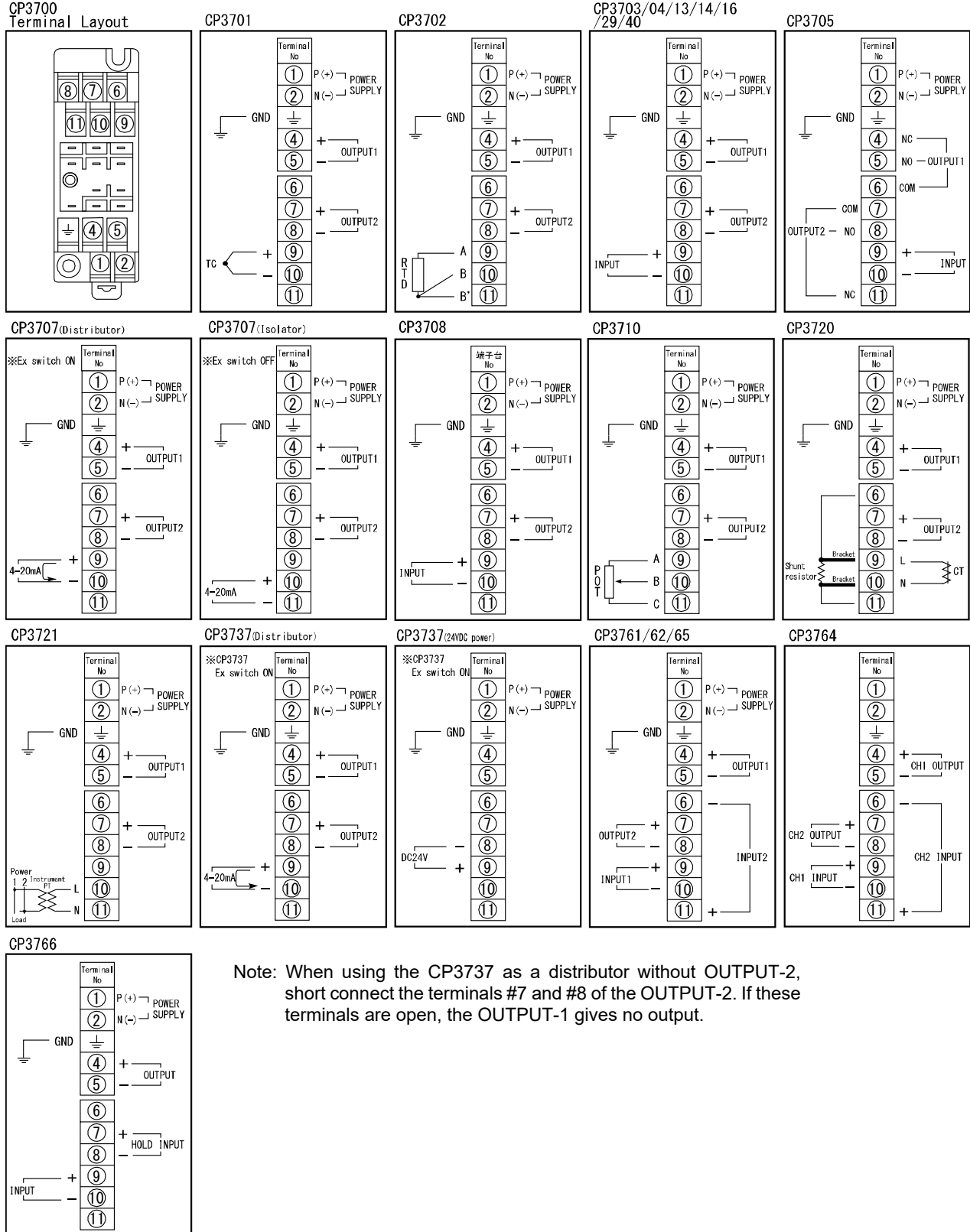
Note: For products with trimmers or switches other than ZERO/SPAN Trimmer, refer to section 8.
The figure above is the illustration of a CE-marked product (CP3701). Products not conforming to the CE legislation do not carry a CE-marked label.

6. Connections

6-1. Terminal Assignments

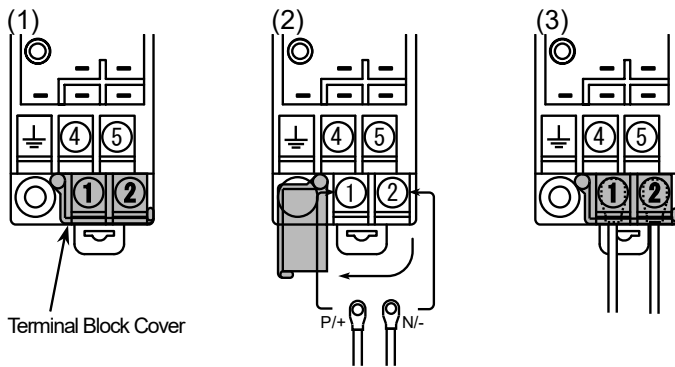
The connections of input, output and power lines to signal conditioners can be made at the screw terminals on the socket. The terminal assignments of each type of signal conditioner are as illustrated below.

Note: For single output type, "OUTPUT2" in the diagram should be interpreted as N.C.



Note: When using the CP3737 as a distributor without OUTPUT-2, short connect the terminals #7 and #8 of the OUTPUT-2. If these terminals are open, the OUTPUT-1 gives no output.

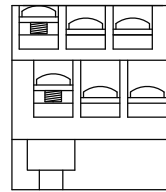
6-2. Power Line Connection



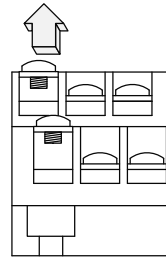
- (1) The terminals #1 and #2 for power connections are covered with a plastic plate for safety.
- (2) Open the cover plate and connect the power lines to the terminals.
- (3) Return the cover plate to its original position.

6-3. Connection to Terminals

The following steps should be taken prior to making connections to the terminals.



1. Loosen the terminal screw.



2. Insert the tip of a screwdriver bit beneath the washer and push it up to make ample room to receive a cable.

7. Mounting / Demounting

7-1. DIN-Rail Mounting / Demounting

Mounting the Socket	Demounting the Socket
<p>Hook the upper edge of the cavity on the rear of the socket at the upper blade of the rail (①), then push the lower part of the socket against the lower blade of the rail so as to make the slide clamp engaged firmly with the rail (②).</p>	<p>Push the slide clamp downward with a flat-head screwdriver bit or the like (①), and pull the lower part of the socket toward you (②).</p>

7-2. Main Unit Installation / Removal

Installation to the Socket	
<p>1. Identify the top and the bottom of the unit and insert the I/O pins straight (①) into the corresponding pin slots (receptacles) on the socket.</p>	<p>2. Tighten the set screw (②) to fix the unit firmly in position.</p>
Removal from the Socket	
<p>1. Loosen the set screw (①).</p>	<p>2. Pull out the unit carefully (②) not to bend the I/O pins.</p>

8. Various Settings for CP3700 Series

8-1. CP3705

8-1-1. CP3705 Front Panel

Setting Trip Points

Trip points can be set by the rotary switches, RY1-SET (OUT1) and RY2-SET (OUT2) on the front panel of the unit. Rotate the rotary switches with a screwdriver, etc. to set a trip point.

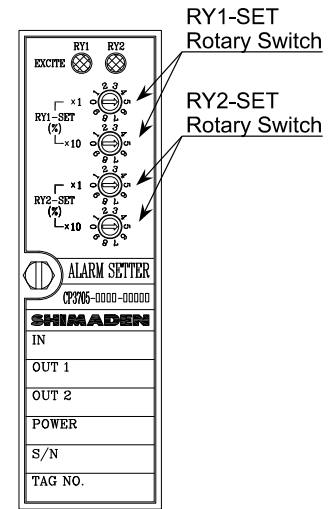
Setting range: 0 to 99% of input signal (1% step)

OUT1 settings:

RY1-SET rotary switch (upper): 1% step
RY1-SET rotary switch (lower): 10% step

OUT2 settings:

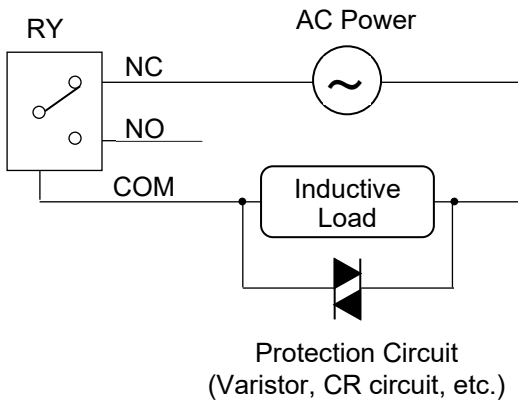
RY2-SET rotary switch (upper): 1% step
RY2-SET rotary switch (lower): 10% step



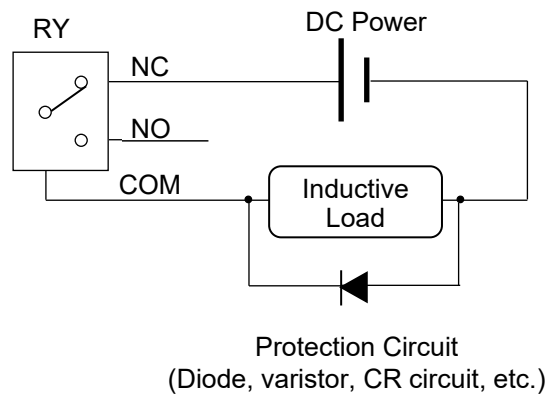
8-1-2. Output Connections

When any inductive load, such as an electric motor, is connected, be sure to connect a protection circuit for the relay contacts, as shown below.

Example of AC power connection



Example of DC power connection

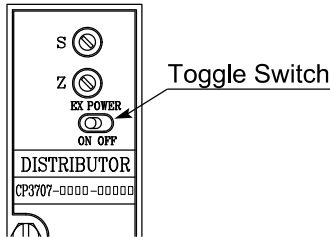




8-2. CP3707

The model CP3707 can be used as a 4-20mA input isolator by changing the setting and input connections. Set the toggle switch on the front panel of the unit, and connect the input terminals as per the following table.

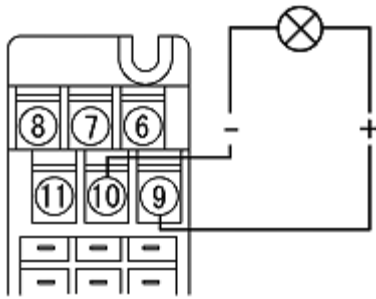
(1) Set the toggle switch on the front panel of the unit.

CP3707 Front Panel

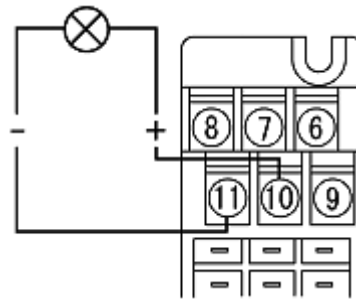


EX POWER  ON OFF	Toggle switch: ON (Transmitter power supply ON) - Used as a distributor.	Refer to Connection A.
EX POWER  ON OFF	Toggle switch: OFF (Transmitter power supply OFF) - Used as an isolator.	Refer to Connection B.

(2) Refer to the following connection diagrams to connect the terminals.



Connection A



Connection B



CAUTION

When using the CP3707 as an isolator, failure to observe the following precaution may cause injury or damage to property.

When the CP3707 is used as an isolator, be sure to turn off the power for the transmitter. If the power supply is left on, the following incidents may occur.

1. If terminal #9 is connected to terminal #10, the 24V DC power will be short-circuited to the ground through the internal input resistor (250Ω), resulting in a burnout of the resistor.
2. If terminal #9 is connected to terminal #11, the 24V DC power will be short-circuited directly to the ground, causing damage to the power circuit of the CP3707.

Note: In both of the above cases 1 and 2, a short-term faulty connection may not cause any problem. If the faulty connection is kept for more than one hour, the problem described will occur.

3. If terminal #9 is connected to the receiving instrument, 24V DC will be applied to the receiving instrument, causing damage to the instrument.

8-3. CP3714

8-3-1. Upper/Lower Limit Setting

(1) Upper limit setting

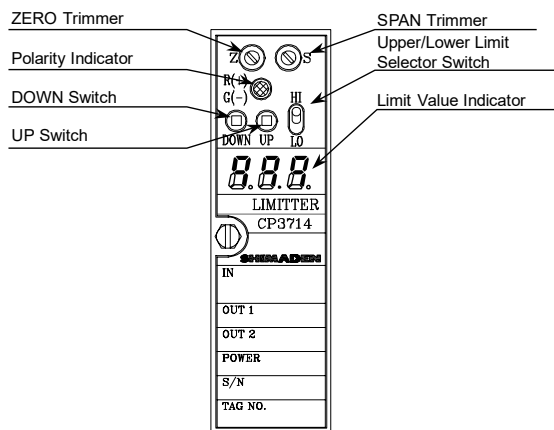
Set the Upper/Lower Limit Selector Switch to the "HI" position. The Limit Value Indicator will show the current upper limit. Press the UP or DOWN switch to change it to a desired value.

(2) Lower limit setting

Set the Upper/Lower Limit Selector Switch to the "LO" position. The Limit Value Indicator will show the current lower limit. Press the UP or DOWN switch to change it to a desired value.

Notes:

1. The Polarity Indicator LED lights red when the set value is positive, and green when it is negative.
2. Unless otherwise requested, the upper and lower limits will be set to the factory default settings indicated below:
Upper limit: 100%; Lower limit: 0%
3. The UP/DOWN switch is of a push button type. Pressing and holding the switch changes the value faster.
4. Limit setting range: -10 to 105%, in 0.1% steps (in 1% steps for the range over 100%) for both upper and lower limits
5. Limit setting requirements: Upper limit \geq Lower limit



8-3-2. LED Status Indicators

The CP3714 has LED indicators to indicate its status. The following table shows indicator patterns.

No	Event	Limit Value Indicator	Polarity Indicator	Output	Recovery Operation
1	Power ON or switch operation	Blinks 3 times (1s ON – 0.5s OFF cycle).	Green LED turns ON for 1 second, and then red LED turns ON for 0.5 second. This cycle is repeated 3 times.	Normal	–
2	Normal operation	OFF	Green LED is ON.	Normal	–
3	Value setting	Set value	Red LED is ON when the set value is positive; green LED in ON when it is negative.	Normal	–
4	DAC error	Error code: 1	Green LED blinks at 0.25 sec. intervals.	Typically 0%, but may vary.	None
5	CRC error of a set value	Error code: 2	Red LED blinks at 1 sec. intervals.	0%	Reconfiguration
6	CRC error of a compensated value	Error code: 4	Red LED blinks at 1 sec. intervals.	0%	None
7	System error	Not defined.	Red LED is ON; green LED is not defined.	Typically 0%, but may vary.	None

Notes:

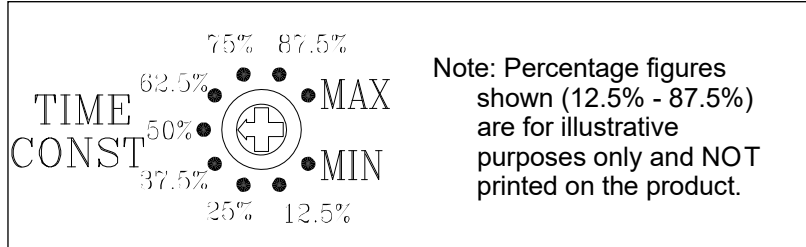
- #1: When the Limit Value Indicator is turned on, a 3-digit number "888" with dots is displayed.
- #7: The red LED may fail to light up.
- #4-7: Only the last digit is displayed in the event of an error.

8-4. CP3716

Time Constant Setting

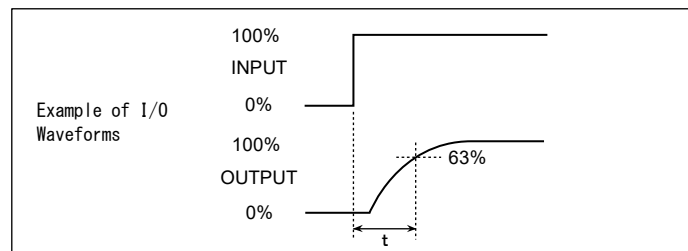
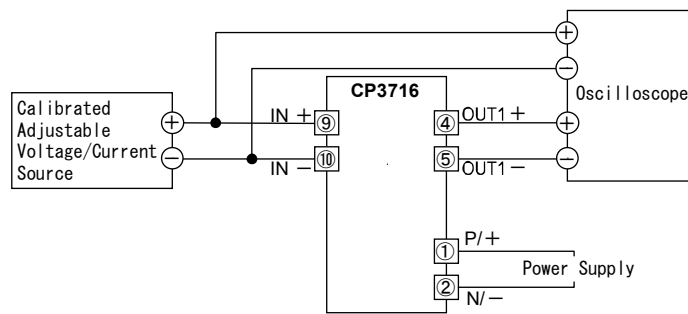
You can use the time constant setting trimmer on the front panel to set a time constant for first-order delay within the range of time constants you have specified when ordering.

- The trimmer has scales as shown. Use these scales as a guide to set the time constant.



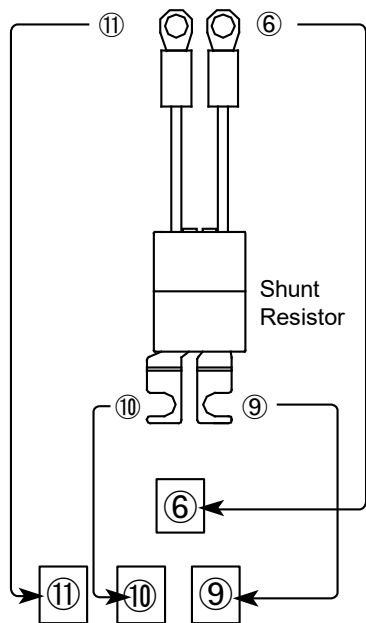
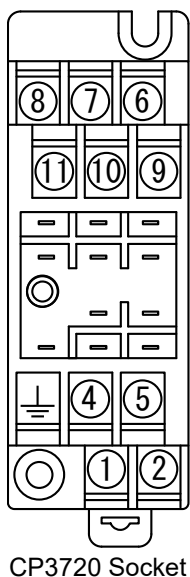
- After the setting, follow these steps to verify the time constant.

(1) Connect the unit as illustrated below. (Connections must be made with all devices powered off.)



- (2) Power on the devices and perform a warm-up for at least 30 minutes. Note that insufficient warm-up will lead to inaccurate measurements.
- (3) Apply a step input from 0% to 100% of the input range of the CP3716 unit and observe the input and output waveforms on the oscilloscope.
- (4) Read time t shown in the above example to determine the time constant.
- (5) Adjust the trimmer and repeat steps (3) and (4) until you get a desired time constant.

8-5. CP3720
Shunt Resistor Installation



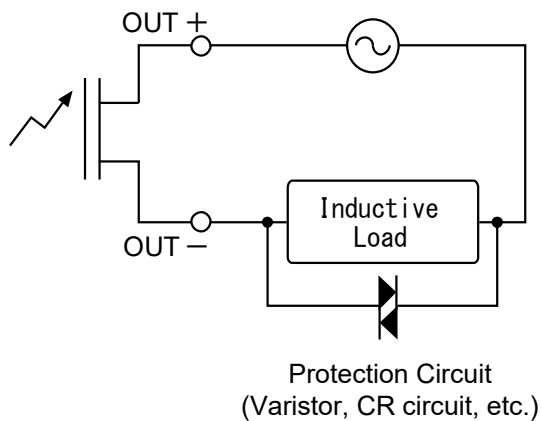
Install the shunt resistor in the right position (to screw terminals ⑥, ⑨, ⑩, and ⑪), as shown in the figure on the left.

CAUTION: The CP3720 should be used with the shunt resistor installed in the right position. Without this resistor, the secondary circuit of the CT would be opened, which may cause the CT to burn out. The overcurrent intensity of the unit conforms to JIS-C-1111.

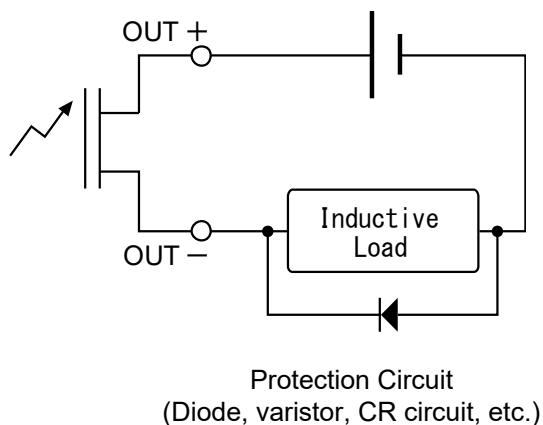
8-6. CP3729
Output connections

When any inductive load, such as an electric motor, is connected, be sure to connect a protection circuit for the relay contacts, as shown below.

Example of AC power connection



Example of DC power connection



8-7. CP3765

(1) Factor setting

Set the IN1/IN2 Selector Switch to the IN1 position, and the Factor Indicator will show the current set value for IN1 factor. You can use the UP or DOWN switch to change the value as desired. Setting the Selector Switch to the IN2 position displays the current set value for IN2 factor. You can change the value in the same manner.

Note: You cannot set the value for each factor if it is outside the defined range or does not meet the requirement.

(2) Equation setting

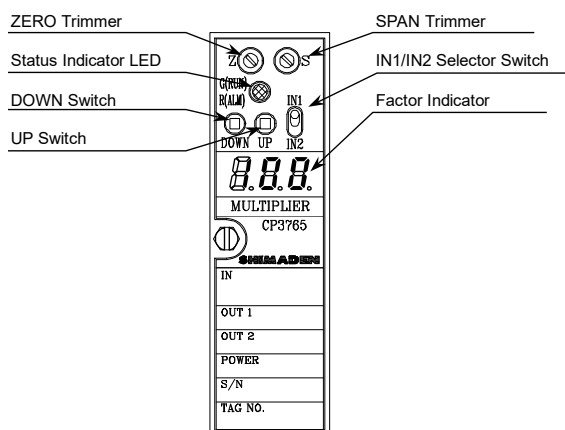
Turn on the power while pressing the DOWN switch. The Status Indicator LED will blink. Then, release the DOWN switch. The Factor Indicator will display any of the numbers 1 through 4 (1 = addition, 2 = subtraction, 3 = multiplication, 4 = division) in the middle digit. The number displayed represents the currently selected equation. Use the UP or DOWN switch to change the equation as desired, and then move the IN1/IN2 Selector Switch in the opposite direction. Upon power cycling, the unit will start its operation in accordance with the equation selected.

Notes:

1. Moving the IN1/IN2 Selector Switch in the opposite direction enables the setting to be saved in the unit.
2. Pressing and holding the UP/DOWN switch changes the value faster.
3. Unless otherwise requested, instruments will be delivered with the factory default settings indicated below:
Equation: Addition; K1: 1.00; K2: 1.00

< Equations and Factor Setting Range >

Equation		Factor Setting Range		
		K1: Input-1 factor	K2: Input-2 factor	Requirement
Addition	$Y = (IN1 \times K1) + (IN2 \times K2)$	0.10 to 2.00	0.10 to 2.00	$K1 + K2 \geq 0.40$
Subtraction	$Y = (IN1 \times K1) - (IN2 \times K2)$	0.40 to 2.00	0.10 to 2.00	
Multiplication	$Y = (IN1 \times K1) \times (IN2 \times K2)$	0.20 to 2.00	0.20 to 2.00	$0.4 \leq K1 \times K2 \leq 2.00$
Division	$Y = (IN1 \times K1) \div (IN2 \times K2)$	0.10 to 2.00	0.10 to 2.00	$0.4 \leq K1 \div K2 \leq 2.00$



<Status Indicator LED>

The CP3765 has two indicators on the front panel. Depending on the status of the instrument, the indicators behave as described in the table below.

No	Event	Factor Indicator	Status Indicator LED	Output	Recovery Operation
1	Power ON or switch operation	Blinks 3 times (1 s ON - 0.5 s OFF cycle), then displays an arithmetic operation code for 1 sec.	Green LED turns ON for 1 sec, and then red LED turns ON for 0.5 sec. This cycle is repeated 3 times.	Normal	–
2	Normal operation	OFF	Green LED is ON.	Normal	–
3	Factor setting	Set value	Green LED is ON.	Normal	–
4	DAC error	Error code: 01	Red LED blinks at 0.25 sec. intervals.	Typically 0%, but may vary.	None
5	ADC compensated value error	Error code: 02	Red LED blinks at 1 sec. intervals.	0%	None
6	Arithmetic operation mode setting error	Error code: 04	Red LED blinks at 1 sec. intervals.	0%	Reconfiguration
7	Input factor error	Error code: 08	Red LED blinks at 1 sec. intervals.	0%	Reconfiguration
8	System error	Not defined.	Red LED is ON; green LED is not defined.	Typically 0%, but may vary.	None

Notes:

- #1: When the Limit Value Indicator is turned on, a 3-digit number "888" with dots is displayed.
- #4-7: Only the last two digits are displayed in the event of an error.
- #8: The red LED may fail to light up.

8-8. CP3766

8-8-1. Status Indicator LED

The CP3766 has an LED hold status indicator on the front panel. It lights up either green or red depending on the status of the instrument. The table below shows the behavior of the indicator.

No	Event	Hold Status Indicator	Output	Recovery Operation
1	Power ON	Green LED turns ON for 1 second, and then red LED turns ON for 0.5 second. This cycle is repeated 3 times.	Normal	–
2	Normal operation	Green LED is ON.	Normal	–
3	Hold operation	Green LED blinks at 1 second intervals.	Held value	–
4	Held value recording error	Red LED blinks at 1 second intervals.	Held value: 0% or less	Cancel the Hold mode.
5	DAC error	Red LED blinks at 0.25 second intervals.	Typically 0% or less, but may vary.	None
6	System error	Red LED is ON; green LED is not defined.	Typically 0% or less, but may vary.	None

Note:

#6: The red LED may fail to light up.

9. Adjustment

Since the unit is precisely factory-adjusted before shipment, no further adjustment is needed at the user's side. Adjustment of signal conditioners requires expertise and fine craftsmanship. We recommend that you use adjustment service of SHIMADEN to save costs and ensure accuracy. Please contact SHIMADEN or its local representatives. Just for your reference, the adjustment procedure is described below.

9-1. Preparation

- For the terminal assignments, refer to section 6.
- The wiring work should be performed with no power applied to the instrument.
- Wiring should be connected to the terminal block.
- At least 30 minutes of warm-up is required before adjustment.

9-2. Adjustment Procedure

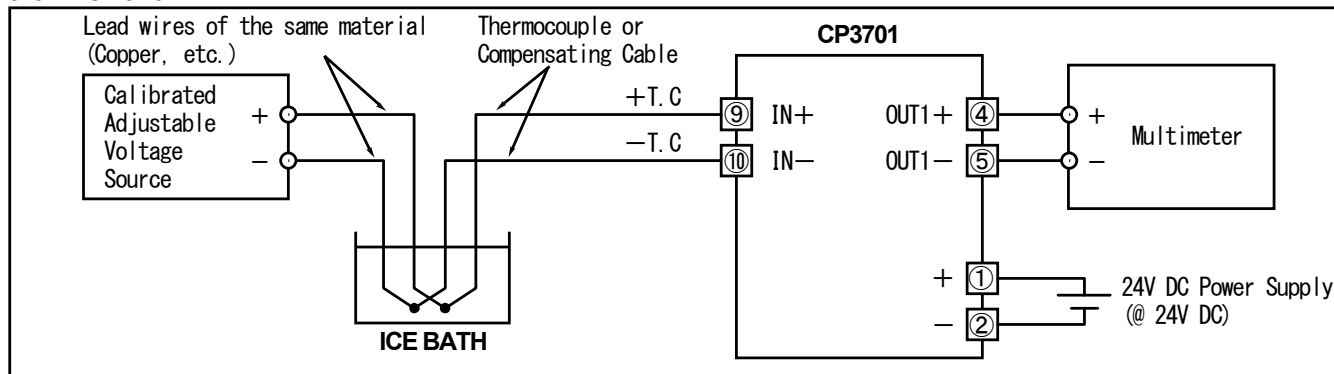
- (1) Connect the unit as illustrated below.
- (2) Check the input range printed in the front label, and apply Input Signal *1 to the unit.
- (3) Slowly turn the Zero Trimmer to obtain Output *2 while applying the Signal *1 as above.
- (4) Similarly check the input range, and apply Input Signal *3 to the unit.
- (5) Slowly turn the Span Trimmer to obtain Output *4 while applying the Signal *3 as above.
- (6) Repeat steps (2) through (5) until zero and span are precisely adjusted.
- (7) Apply 25%, 50% and 75% of the input signal range to the unit and record the values of output signals to confirm they are linearly proportional.

Notes:

1. For model-specific details about Input Signal *1, Output *2, Input Signal *3, and Output *4, refer to the connection diagrams below.
2. For the CP3714, following step (1), set the upper limit to 105% and the lower limit to -10%, then proceed to step (2).
3. For the CP3766, following step (1), cancel the HOLD operation mode, then proceed to step (2).

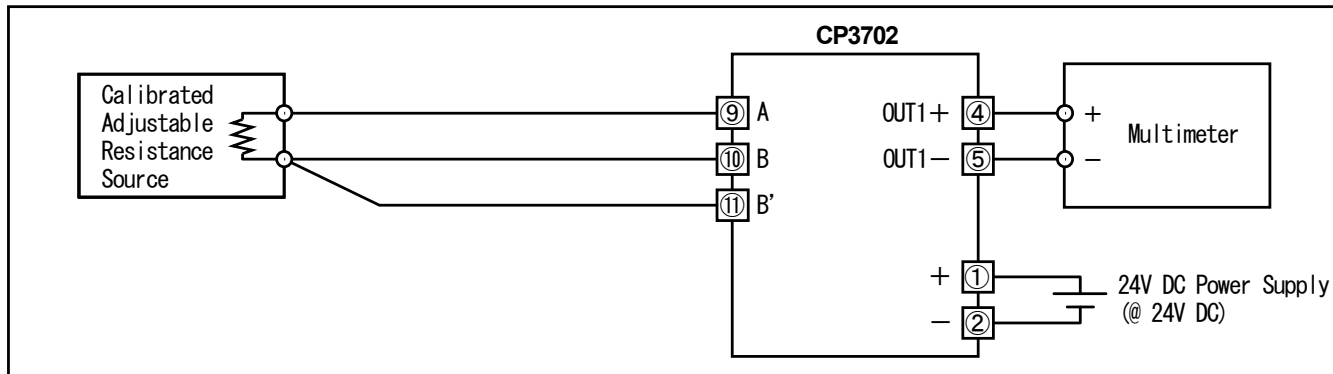
9-3. Connection Diagrams

9-3-1. CP3701



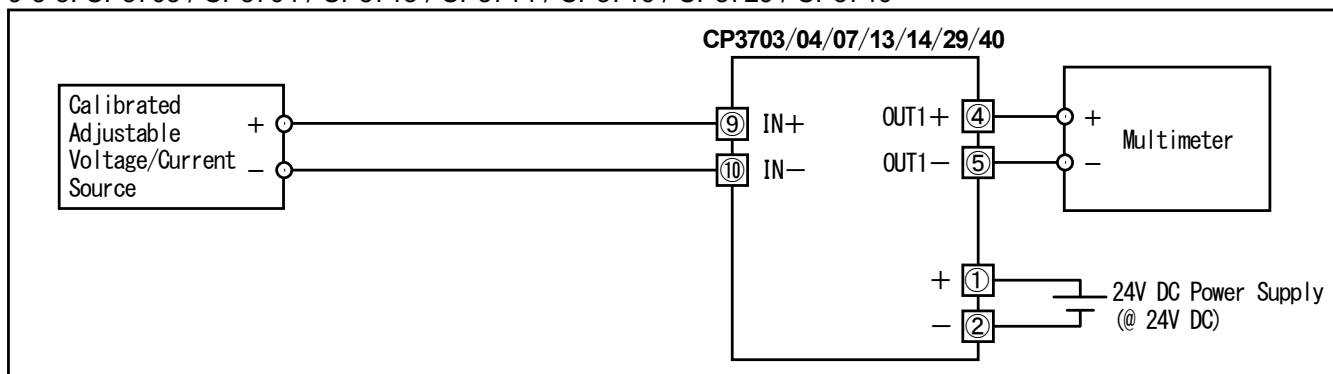
*1: 0% (0.5% for 0-20mA output), *2: 0% (0.5% for 0-20mA output), *3: Input 100%, *4: 100%

9-3-2. CP3702



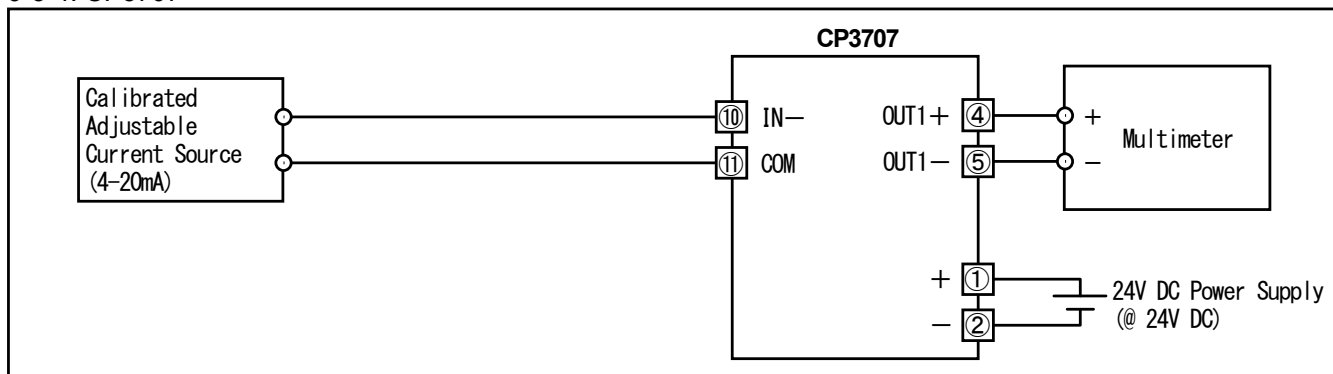
*1: 0% (0.5% for 0-20mA output), *2: 0% (0.5% for 0-20mA output), *3: Input 100%, *4: 100%

9-3-3. CP3703 / CP3704 / CP3713 / CP3714 / CP3716 / CP3729 / CP3740



CP3703: *1: 0% (0.5% for 0-20mA output), *2: 0% (0.5% for 0-20mA output), *3: Input 100%, *4: 100%
 CP3704: *1: 0% (0.5% for 0-20mA output), *2: 0% (0.5% for 0-20mA output), *3: Input 100%, *4: 100%
 CP3713: *1: 10%, *2: 10%, *3: Input 100%, *4: 100%
 CP3714: *1: 0% (0.5% for 0-20mA output), *2: 0% (0.5% for 0-20mA output), *3: Input 100%, *4: 100%
 CP3716: *1: 0% (0.5% for 0-20mA output), *2: 0% (0.5% for 0-20mA output), *3: Input 100%, *4: 100%
 CP3729: *1: 0.5%, *2: 0.5%, *3: Input 100%, *4: 100%
 CP3740: *1: Equivalent to 0%, *2: 100%, *3: Input 100% (99.5% for 20-0mA output), *4: 0% (0.5% for 20-0mA output)

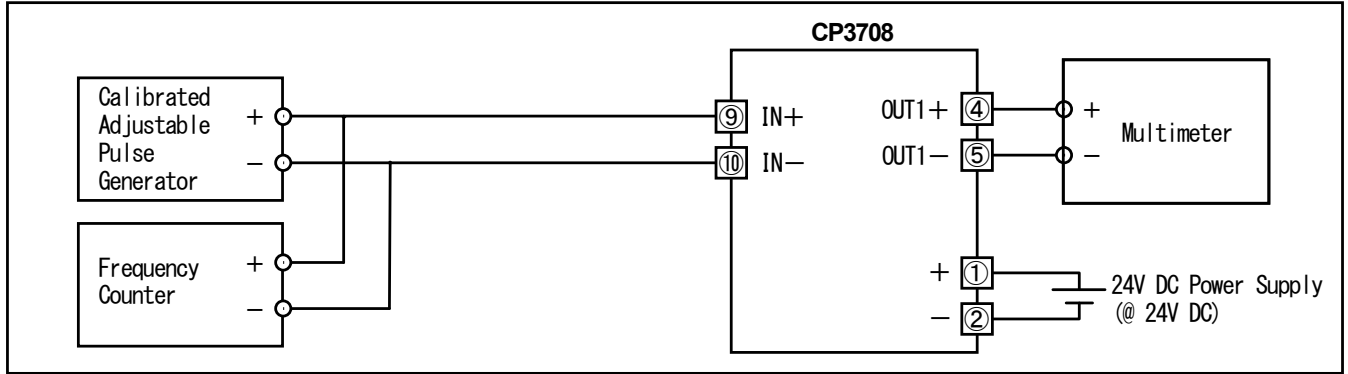
9-3-4. CP3707



Note: The CP3707 must be configured as an isolator when used for adjustment. For the configuration method, refer to section 8-2.

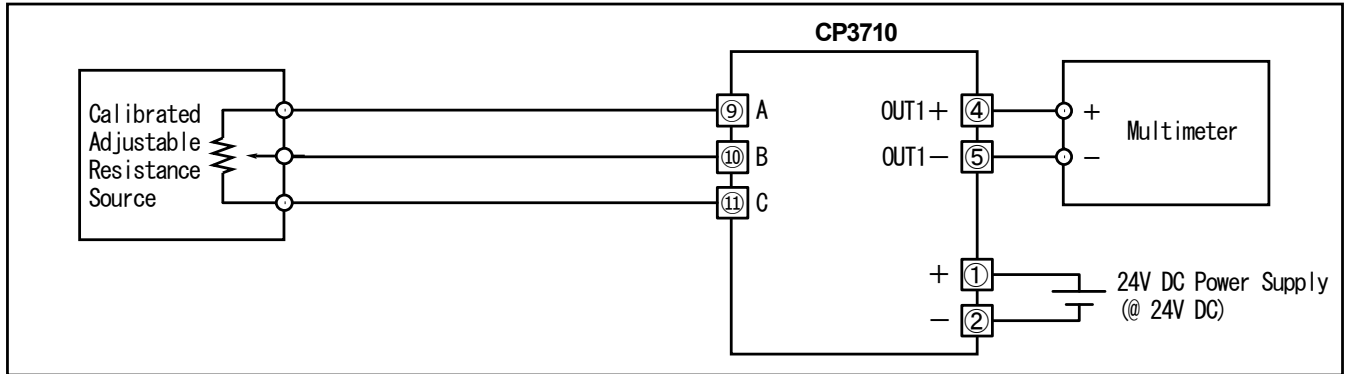
*1: 0% (0.5% for 0-20mA output), *2: 0% (0.5% for 0-20mA output), *3: Input 100%, *4: 100%

9-3-5. CP3708



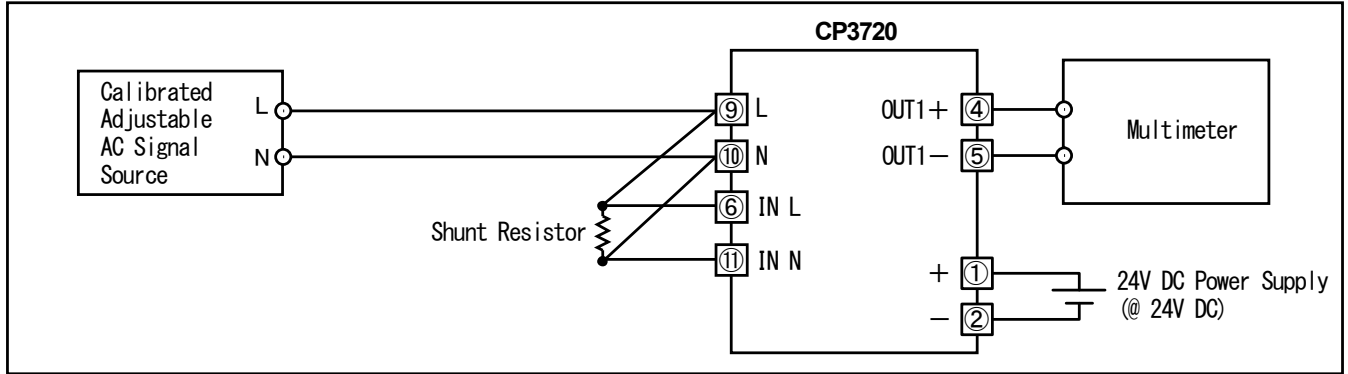
*1: 10%, *2: 10%, *3: Input 100%, *4: 100%

9-3-6. CP3710



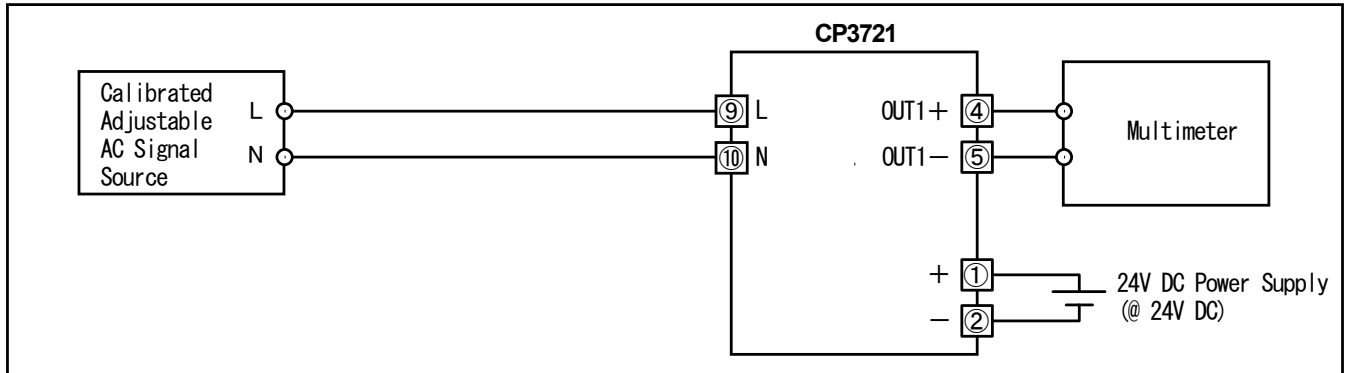
*1: 0% (0.5% for 0-20mA output), *2: 0% (0.5% for 0-20mA output), *3: Input 100%, *4: 100%

9-3-7. CP3720



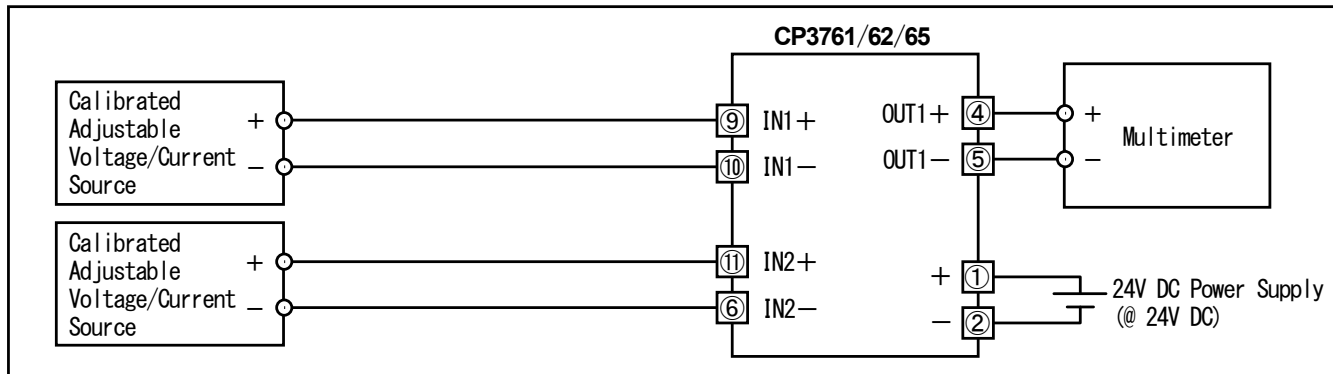
*1: 10%, *2: 10%, *3: Input 100%, *4: 100%

9-3-8. CP3721



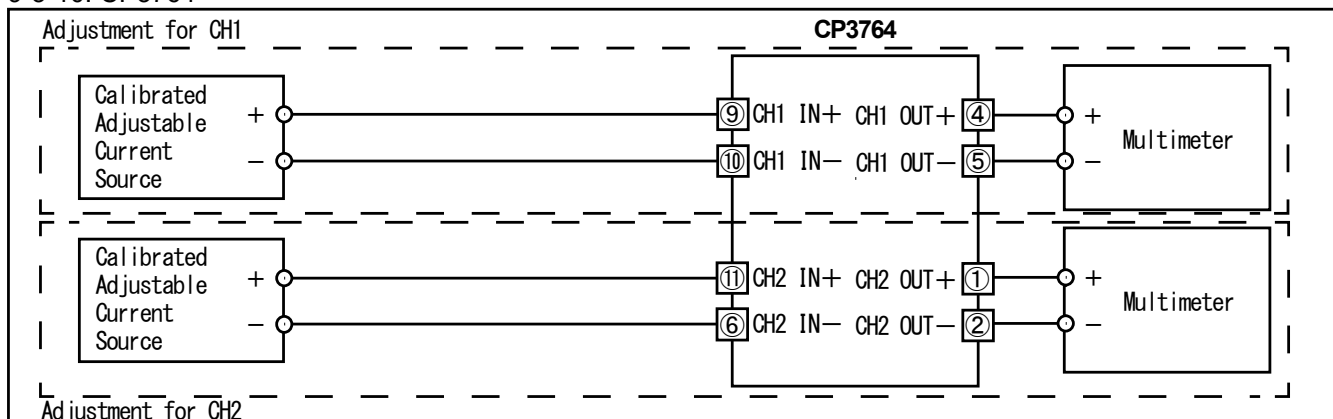
*1: 10%, *2: 10%, *3: Input 100%, *4: 100%

9-3-9. CP3761 / CP3762 / CP3765



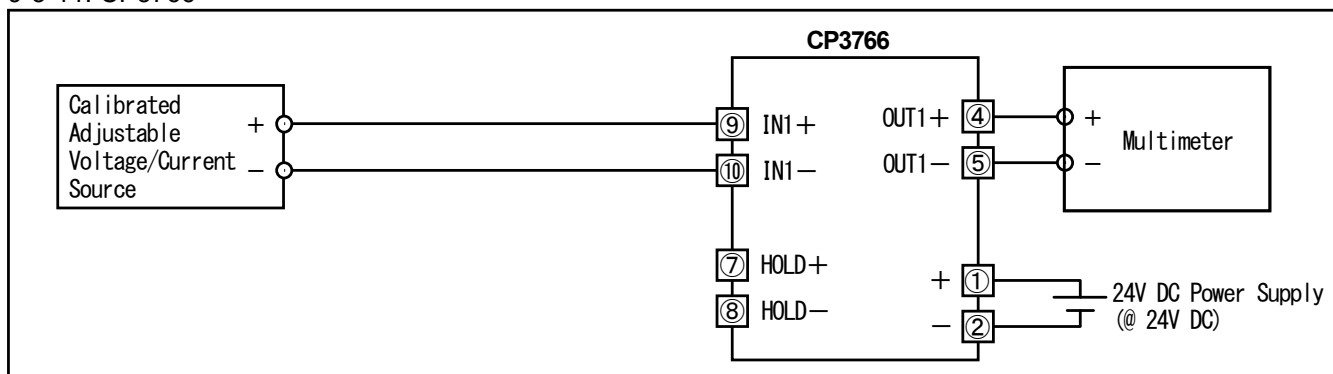
CP3761: *1: 0% (for 0-20mA output, signal determined by the equation to obtain 0.5% output), *2: 0% (0.5% for 0-20mA output), *3: 100% output signal determined by the equation, *4: 100%
 CP3762: *1: 0% (for 0-20mA output, signal determined by the equation to obtain 0.5% output), *2: 0% (0.5% for 0-20mA output), *3: 100% output signal determined by the equation, *4: 100%
 CP3765: *1: 0% for both IN1 and IN2 (IN1: 0.5%, IN2: 0% for 0-20mA output), *2: 0% (0.5% for 0-20mA output), *3: IN1: 100%, IN2: 0%, *4: 100%

9-3-10. CP3764



*1: 0%, *2: 0%, *3: Input 100%, *4: 100%

9-3-11. CP3766



*1: 0% (0.5% for 0-20mA output), *2: 0% (0.5% for 0-20mA output), *3: Input 100%, *4: 100%

10. Maintenance and Inspection

10-1. Cleaning

When cleaning, wipe the unit gently with a soft cloth, dampened with water. Do not use solvents such as alcohol or benzene.

10-2. Periodic Inspection

Check the unit for proper characteristics and settings about once every two years.

The contents of this Instruction Manual are subject change without notice.

Temperature and Humidity Control Specialists

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