

# Operating Instructions WSP-ABS

## ABSOLUTE-VALUE EXTRACTOR

We thank you for purchasing the product manufactured by Watanabe Electric Industry Co., Ltd. Please use the product in accordance with this manual after confirming that the contents on the rating label of the product conform to the specifications you required.

This instruction manual explains how to handle, connect, and adjust this product.

We are sure that you will be satisfied with this product because this product has been manufactured and inspected in accordance with the strict quality control standards. In case of trouble such as damage during transportation, please contact your dealer or us as soon as possible.

### ○Package Includes

- Arithmetic and logic unit 1 unit
- Socket 1 piece

## 1. Product Outline

This equipment is a converter of the plug-in-shaped which receives analog signal with a polarity and outputs a signal proportional to its absolute value. For example, it outputs an identical +10V signal in case of inputting +10V and inputting -10V.

## 2. Functions and Features

- It's possible to adjust zero and spans of output by UP or DOWN switch in the front.
- The output linearity of signal is an excellent.
- Realization of 5-year guarantee owing to long life design
- Universal power supply supported
- CE Marking compliance

## 3. Cautions

1) When this product is used as a CE Directive-compliant item:

- This product complies with Installation Category II, Pollution Degree 2, and Maximum Operating Voltage of 300 volts required by CE Directive. Basic insulation is provided for insulation capability between power supply terminal and input·output of signals. Make sure that the insulation class of this product meets the required specification before installation.
- Follow the definition that this product is designed to be installed in a control panel.
- This product shall be used at an altitude equal to or below 2000 meters.
- Appropriate space and creeping distance shall be provided. Inappropriate wiring may revoke compliance with CE Marking.

Compliance with EN standards:

EN61326-1

EMS:Industrial environments; EMI: Class A

The wiring length should be not more than 30 m.

EN61010-1

EN IEC 63000

\* Custom-made items other than a catalog standard specification are outside CE conformity.

### • Insulation resistance:

Among Input-primary output-secondary output-power supply terminal  
100 M ohms or more/500 V DC

### • Withstand voltage:

Among Input-primary output-secondary output-power supply terminal  
2000 V AC for 1 minute

### 2) Power supply

#### • Check the rating label.

- ① For rating: 100-240 V AC  
100-240 V AC $\pm$ 10% (50/60 Hz),  
approx. 5.5 VA
- ② For rating: 24 V DC  
24 V DC $\pm$ 10%, approx. 100 mA
- ③ For rating: 100-120 V DC  
100-120 V DC $\pm$ 10%, approx. 25 mA

### 3) When handling

- When this product is connected to or disconnected from the socket, be sure to turn off the power and stop the input signal for safety.
- **When a screw on this product is touched or the output control switch is operated, be sure to touch any metal object to release static electricity beforehand.**

### 4) Installation

- Be sure to use this product indoors.
- If this product is installed in a place with a lot of dust or metal particles, use a dust-proofing case with heat releasing measures to keep this product clean.
- Avoid vibration or shock to this product as much as possible. Failure to observe this may cause trouble.
- Install this product within the operating temperature range of -5 to 55 degrees C.
- Install this product with the operating humidity of 90% RH or less (no freezing, no condensation).
- Do not block the ventilation slot of this product.

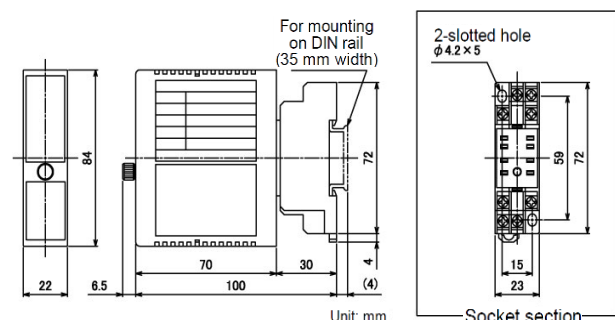
### 5) Wiring

- Keep the power supply line, input line, and output line away from the noise sources, relay drive line, and high frequency line.
- Avoid bundling the line of this product together with the line of superimposed noise and holding the line in the same duct in which the line of superimposed noise is held.

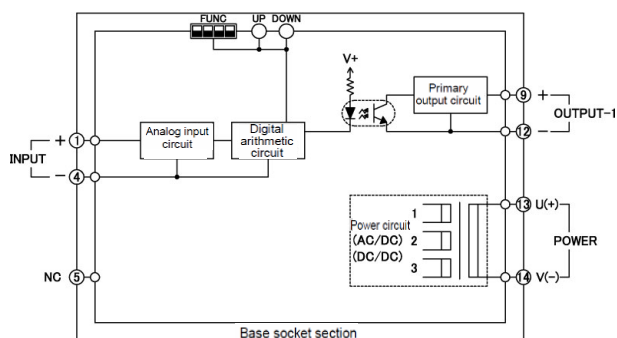
### 6) Caution other than the above

- It takes 30 minutes to assure full performance of this product even this product can be operated immediately after turning on the power.

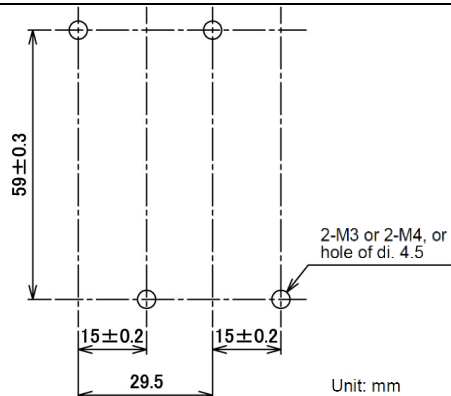
## 4. Dimensional Drawing



## 5. Circuit Configuration



## 6. How to Mount

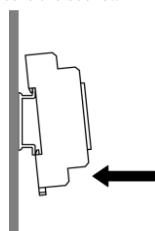


It's possible to install close adherence, but recommended so that 6.5 mm-more than 7 mm may be opened for thermal radiation.

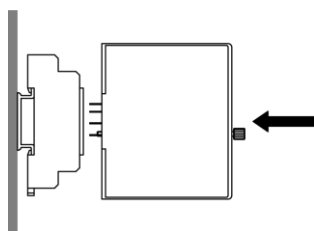
It will be 6.5mm between the case body by the 29.5mm space.

## 7. How to Connect to/Disconnect from DIN Rail

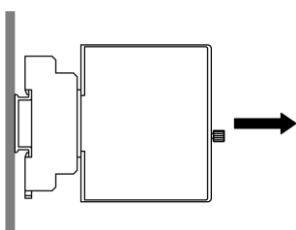
1) How to secure the socket  
Engage the hook on the rear upper side of the socket with the rail with the slider on the bottom side of the socket downward, and press the lower side of the socket in the arrow direction as shown in the drawing to secure the socket.



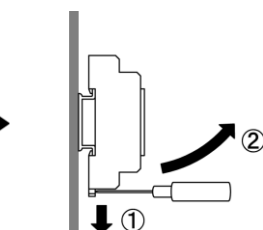
2) How to secure the main unit to the socket  
Position the main unit so that the characters in the front label can be read in the appropriate direction, press the main unit into the socket, and screw the main unit to secure it.



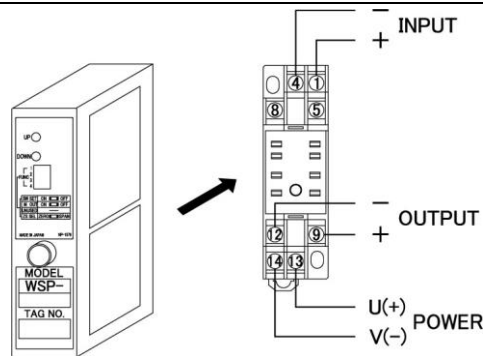
3) How to disconnect the main unit from the socket  
Loosen the screws that secure the main unit, and pull the unit out in a straight line.



4) How to disconnect the socket from the DIN rail  
Put a flat head screwdriver into the slider slot of the socket and pull the lower side of the socket in the arrow direction ② while pulling the screwdriver in the arrow direction ①.



## 8. How to Connect



Terminal No.	Sign	Description
1	INPUT	These terminals receive the specified input signals.
4		
5	NC	No connection
8	NC	No connection
9	OUTPUT1	Signals are provided in accordance with the input/output specifications.
12		
13	POWER	Connect the rated voltage power supply.
14		

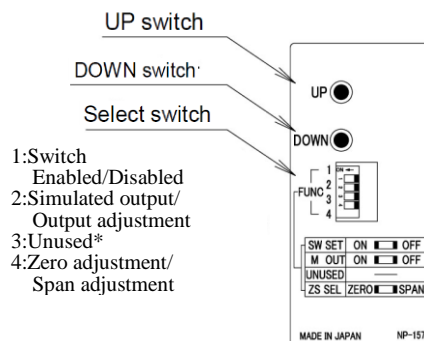
\* No line shall be connected to NC.

## 9. How to Adjust Output

We have already performed output adjustment in accordance with your requests at your order. Therefore, no output adjustment is required if you operate this product within your requested specifications. If matching with devices to be connected or regular calibration is required, follow the steps below.

For calibration, use signal sources (including a standard voltage/current generator) and measuring instruments (including a voltmeter and an ammeter) the tolerances of both of which are more than 10 times that of this product and wait for 30 minutes or more after turning on the power.

Output adjustment is performed with the setting switch on the front side of this product.



\* Please don't change a setting condition (right side) of the selection switch 3 after shipping.

○ How to adjust

① Set the selection switch 1 (SW SET) to ON.  
This action enables switch operation.

② Set the selection switch 2 (M OUT) to OFF.

③ Set the selection switch 4 (ZS SEL) to ZERO.

Use the UP or DOWN switch to adjust the output to 0% when a 0%-equivalent input is provided.

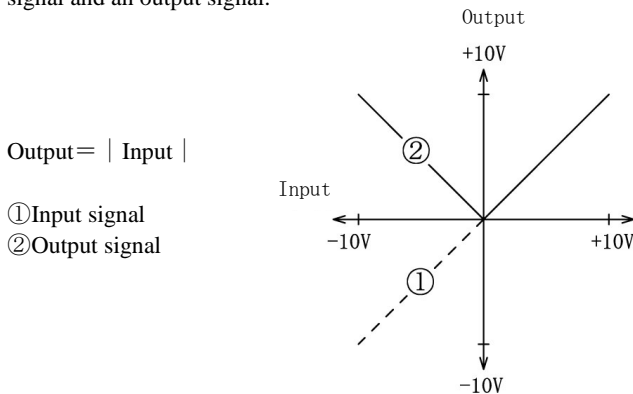
④ Set the selection switch 4 (ZS SEL) to SPAN.

Use the UP or DOWN switch to adjust the output to 100% when a 100%-equivalent input is provided.

- ⑤ Provide a 0%-equivalent input signal again to make sure that the output is 0%.  
If the output deviates, repeat the steps ③ and ④.
  - ⑥ Set the selection switch 1 to OFF after completion of adjustment.  
At this moment, the adjusted values are written into the internal memory and switch operation becomes disabled.
- \* The adjusted values are written into the internal memory and turning on or off the power does not clear the values. The write limit to the internal memory is 1,000 times at maximum.
  - \* If the power is turned off during adjustment, the adjusted values are not written into the internal memory.
  - \* approximately  $\pm 10\%$  fs.

## 10. Input-output characteristic

It's an arithmetic as follows as a relation between an input signal and an output signal.



## 11. Simulated Output Function

This product is equipped with the simulated output function to conduct tests including connection test.

The simulated output is performed with the setting switch on the front side of this product. (Refer to the drawing in Section 9 for the switch position.)

- Simulated output procedure
- ① Set the selection switch 1 (SW SET) to ON.  
This action enables switch operation.
- ② Set the selection switch 2 (M OUT) to ON.
- ③ The simulated output value is set with 3 steps that use of the UP and DOWN switches.  
(DOWN) 0%  $\Leftrightarrow$  50%  $\Leftrightarrow$  100% (UP)
- ④ Set the selection switch 1 to OFF after completion of adjustment.

## 12. Operation beyond Specifications

- 1) Excessive input  
If an input signal beyond the upper limit is provided, the output signal increases almost in proportion to the input until approximately 120% fs of scaling setting. But even if an excessive input signal is provided more, the output signal does not increase any more.
- 2) Insufficient input  
The output is described below when an input signal below the lower limit is provided.
  - (a) The output signal decreases almost in proportion to the input until approximately -20% fs of scaling setting. But even if an insufficient input signal is provided more, the output signal does not minus polarity.

## 3) Load beyond specifications

- (a) For current output, if the input exceeds the “range of allowable load resistance”, the output is provided almost in proportion to the input until the voltage between the output terminals becomes approximately 15 volts. But if the output becomes larger, the output is saturated resulting in larger error.
- (b) For voltage output, if the input falls below the “range of allowable load resistance”, the output is saturated resulting in larger error.

## 13. Guarantee

This product is guaranteed for 5 years after delivery. If a failure occurs under normal operation during the guaranteed period, contact your dealer or us as soon as possible.

We will collect the product and repair it free of charge, or replace the product with new one.

We shall not be liable for use of this product that was disassembled or modified or under abnormal conditions.