



ONOSOKKI

# RV-3150

MULTI-FUNCTIONAL REVERSIBLE COUNTER

Instruction Manual

ONO SOKKI CO., LTD.

## Warranty

1. This product is covered by a warranty for a period of one year from the date of purchase.
  2. This warranty covers free-of-charge repair for defects judged to be the responsibility of the manufacturer, i.e., defects occurred while the product is used under normal operating conditions according to descriptions in this manual and notices on the unit label.
  3. For free-of-charge repair, contact either your sales representative or our sales office nearby.
  4. The following failures will be handled on a fee basis even during the warranty period.
    - (a) Failures occurring through misuse, mis-operation, or modification
    - (b) Failures occurring through mishandling (dropping) or transportation
    - (c) Failures occurring through natural calamities (fires, earthquakes, flooding, and lightning), environmental disruption, or abnormal voltage.
- \* For repairs after the warranty period expired, contact your sales representative or our sales office nearby.

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2. The contents of this document are subject to change without notice.
3. This document has been produced based on a series of strict verifications and inspections. Should a failure occur nonetheless, please inform our sales representative or sales office.
4. Ono Sokki shall have no liability for any effect resulting from any operation, whether or not the effect is attributable to a defect in the documentation.

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# FOREWORDS

Thank you for your selection of the RV-3150 multi-functional reversible counter.

This manual describes the functions, specifications, and connections of and notes on the RV-3150 multi-functional reversible counter.

We recommend that you read this manual thoroughly before using the RV-3150 multi-functional reversible counter.

In particular, failure to follow some CAUTIONS in this manual may cause property damage.

Be sure to handle the product following the description in this manual. Ono Sokki, Ltd. bears no responsibility for any warranty regarding damages, failures, or injury resulting from failure to follow instructions given in this manual.

After reading this manual, please keep it in a safe place.

## NOTICE

1. **The RV-3150 multi-functional reversible counter has been tested under strict inspections for normal operation before shipment.**
2. **When unpacking the unit, make sure that none of the parts have been damaged during transportation and that the product operates normally referencing this manual.**
3. **If any part is damaged or the product does not operate as described in this manual, contact the retail store where you bought the product or Ono Sokki sales office nearby.**

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# For Your Safety

To ensure safe and proper use of the RV-3150 multi-functional reversible counter, please read this document and this chapter.



Ono Sokki, Ltd. bears no responsibility for any warranty regarding damages, failures, or injury resulting from failure to follow directions given within this document during operation.

Failure to follow Cautions may lead serious result depending on the situation. Be sure to observe them because each describes important contents.

## Meaning of Warnings, Cautions, and Symbols

### Warnings and Cautions

In this document precautions are classified into two categories: WARNING and CAUTION. This depends on the degree of danger or damage possible if the precaution is ignored and the product is used incorrectly.

 <b>WARNING</b>	This symbol is used to indicate precautions where there is a risk of death or serious personal injury to the operator if the product is handled incorrectly.
 <b>CAUTION</b>	This symbol is used to indicate precautions where there is a risk of some personal injury to the operator or only material damage to the product if the product is handled incorrectly.



## BEFORE USING



- \* Be sure to operate the product on the specified voltage and frequency (100 to 240VAC, 50/60Hz). Operation on other than the specified voltage may cause damage to the product. Before turning on the power, make sure that the power voltage is appropriate. Supply the power from a power line which is isolated from power equipment.
- \* Do not use the product on locations where the temperature exceeds the specified operating temperature range (0 to +40 C) as doing so may cause the product to catch on fire. Avoid using the product on locations with extremely high temperature or condensation. Using the product with condensation may cause short-circuit or heat development inside the unit, resulting in fire or electric shock.
- \* Never dismantle or disassemble the product. Do not remove the casing or take apart this product. Use of this product without its casing or while taken apart may cause failure, electric shock, or other accidents. When internal adjustment, inspection or repairs are required, please contact the retail store where you bought the product or Ono Sokki sales office nearby.
- \* Do not splash or spill water on the product as doing so may cause fire or electric shock because of short-circuit or heat development. If you get water inside the product, unplug the power cord immediately and call the retail store where you bought the product or Ono Sokki sales office nearby as soon as possible.



## PRECAUTIONS ON ELECTRIC SHOCK



- \* Never cut the internal or external ground wire of a product or disconnect the wire connected to the protective ground terminal of the product as doing so may cause electric shock or damage to the product.
- \* Before connecting the product to the device under measurement or external control circuit, make sure that protective grounding is securely made and that the power is OFF. Connecting to external equipment without protective grounding or while the power is still ON may cause electric shock.
- \* Before touching the voltage output section or circuits connected to the voltage output section, make sure that the power is OFF. Touching such a section or circuit without turning the power OFF may cause electric shock.
- \* Be sure to operate the product on the specified voltage and frequency requirements. Operation on other than the specified voltage may cause electric shock, fire, or damage to the product.



## IF A PROBLEM OCCURS



- \* If any metal, water, or foreign object should fall inside, unplug the product immediately. Using the product after metal, water, or foreign object has fallen inside may cause fire or electric shock. Unplug the product immediately, then contact the retail store where you bought the product or Ono Sokki sales office nearby as soon as possible.
- \* If you perceive smoke, noise, or abnormal odor coming from the product or if you accidentally drop or damage it, unplug the product immediately. Using the product under such conditions may cause fire or electric shock. Contact the retail store where you bought the product or Ono Sokki sales office nearby as soon as possible.



## ABOUT THE POWER CORD



- \* Only use the power cord and power plug supplied with the product or ones specified by Ono Sokki. Use the supplied AC power cord within the range of 100VAC+–10%. When operating the product on voltages exceeding 110VAC, use an optional AC power cord which suits the target voltage.
- \* If you do not use the product for a prolonged period, be sure to unplug the product. Failure to do so may cause electric shock or damage to the product.
- \* Do not use three-pronged power cords with extension cords which do not have a protective ground wire as doing so defeats protective grounding.



## ABOUT PROTECTIVE GROUNDING



- \* Be sure to ground the instrument for safety and noise elimination.  
Grounding with a three-pronged power plug.  
Plug the supplied three-pronged AC power cord into a three-pronged outlet.



## ABOUT INSTALLATION AND CONNECTIONS



- \* Do not place or drop large or heavy objects on top of the product. If an object on top of the product should drop or fall, it may cause injury or damage to the product.
- \* Do not use the product on locations subject to excessive vibration. Because this product is a precision instrument, using it on locations subject to excessive vibration may cause failure. Be careful not to apply vibration to the product during transportation and installation.



## ABOUT THE POWER CORD



- \* Be sure to hold onto the plug portion when plugging in or unplugging the power cord. Pulling on the cord may damage or break the cord possibly resulting in fire or electric shock.
- \* Do not plug in or unplug the power cord while your hands are wet as doing so may cause electric shock.
- \* Keep the power cord away from heaters or appliances which generate high temperature as the cord casing may melt resulting in fire or electric shock.
- \* To prevent electric shock due to deteriorated insulation or fire due to leakage, if the product will not be in use for a prolonged period, unplug the power cord from the outlet or set the breaker on the switchboard to OFF.



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# Contents

1. Overview . . . . .	1	3. Parameter Setup Function . . . . .	11
1.1 Overview . . . . .	1	3.1 Setting Comparator Conditions (COMPARATOR CONDITION SET) . . . . .	12
1.2 Features . . . . .	2	3.2 Setting Comparator Upper Limit (COMPARATOR UPPER LIMIT SET) . . . . .	12
1.3 Checking Accessories . . . . .	2	3.3 Setting Comparator Lower Limit (COMPARATOR LOWER LIMIT SET) . . . . .	13
1.4 RV-3150 Type . . . . .	3	3.4 Setting Offset Value (OFFSET DATA SET) . . . . .	13
1.5 Checking Power Supply . . . . .	4	3.5 Setting LCD Upper Line Display Item (DISPLAY LINE 1SET) . . . . .	14
1.6 Grounding . . . . .	4	3.6 Setting LCD Lower Line Display Item (DISPLAY LINE 2SET) . . . . .	14
2. Name and Function of Each Section . . . . .	5	3.7 Setting Ratio Operation Function to ON or OFF (RATIO FUNCTION ON/OFF SET) . . . . .	15
2.1 Front Panel . . . . .	5	3.8 Setting Ratio Value (RATIO DATA SET) . . . . .	15
2.2 Back Panel . . . . .	8	3.9 Setting Analog Output Full-Scale (ANALOG FULL SCALE SET) . . . . .	16
		3.10 Setting Calibration Signal Output (CALIBRATION SET) . . . . .	16
		3.11 Setting Sensor Input Channel (SENSOR CHANNEL SET) . . . . .	17
		3.12 Setting Sensor Type (SENSOR TYPE SET) . . . . .	17
		3.13 Setting Multiplier (PULSE MULTIPLIER SET) . . . . .	18
		3.14 Setting Counting Direction (SENSOR DIRECTION SET) . . . . .	18

---

3.15	Setting Divider (DIVISION SET) . . . . .	19		
3.16	Setting Decimal Point Position (DECIMAL POINT SET) . . . . .	19	6.	Count Value . . . . . 35
3.17	Setting BCD Output Logic (BCD-OUT DIRECTION SET) 20			
3.18	Setting RS-232C Baud Rate (RS-232C BAUDRATE SET) . . . . .	20	7.	Descriptions of BCD-OUT . . . . . 36
3.19	Setting LCD Back Light Condition (BACK LIGHT ON/OFFSET) . . . . .	21	7.1	Pin Assignment . . . . . 37
			7.2	Connectors . . . . . 38
			7.3	Descriptions of Each Signal . . . . . 38
			7.4	Recommended Interfaces . . . . . 40
4.	Measurement Setup . . . . .	22		
4.1	Measurement Procedure . . . . .	22		
4.2	Sensor Connection . . . . .	23	8.	External Command Input from Terminal Board 42
4.3	Flow of Equipment Setup . . . . .	25	8.1	Descriptions of External Command Signals . 42
5.	Equipment Setup . . . . .	26	8.2	Recommended Interfaces . . . . . 43
5.1	Initialization . . . . .	26	8.3	Connections of Terminal Boards T1, T2, and T3 44
5.2	Setting Operation and Display Functions . .	32		
5.3	Output Setup . . . . .	33	9.	RS-232C Setup . . . . . 45

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9.1	Overview . . . . .	45
9.2	Specifications . . . . .	46
9.3	External Appearance and Specifications of Connector . . . . .	46
9.4	Communication Procedure for Parameter Setup	47
9.5	Commands . . . . .	48
10.	Troubleshooting . . . . .	55
11.	Specifications . . . . .	57
11.1	Outside Dimensional Drawing . . . . .	63

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# 1. Overview

## 1.1 Overview

The RV-3150 multi-functional reversible counter is used to measure and display the straight line position, displacement, dimensions, etc. in combination with a rotary encoder from Ono Sokki.

The RV-3150, an easy-to-use reversible counter stored in a compact metal case of the DIN size, combines diverse operation functions and external output functions.

## 1.2 Features

\* **Legible large-sized LED display**

\* **Diverse operation functions**

Multiplier: x1, x2, x4 (with 2 signals)

Ratio function: Setup range from 0.000001 to 0.999999

Offset function: Setup range from 0 to  $\pm 999999$

Decimal point position: 0, 0.0, 0.00, or 0.000

\* **Diverse external output functions**

Comparator output: Setup range from 0 to  $\pm 999999$

Analog output: 12-bit D/A conversion, 0 to  $\pm 10$  V/F.S

BCD output: Positive/negative logic (selectable), 6 digits parallel

RS-232C communication: Used to read measurement data and parameters and to set up parameters

\* **DIN case (144mm x72mm)**

## 1.3 Checking Accessories

When unpacking the unit, make sure that you have all the parts and that none have been damaged during transportation.

If any parts is damaged or missing, contact your dealer or Ono Sokki sale office nearby.

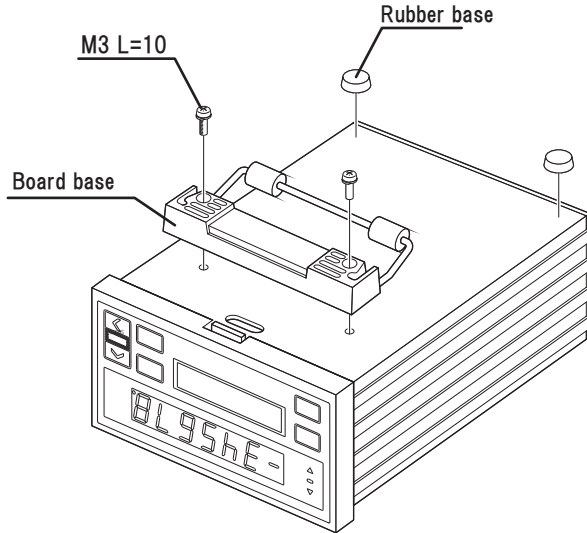
Name	Contents	Qty.
Power cord	3P-3P 1.9m (rated 125VAC)	x1
Panel-mount fitting		1 set
Board base		1 set
Rubber base		1 set
Terminal board socket	5 pins	x1
Terminal board socket	10 pins	x2
Operating manual	This manual	x1

## 1.4 RV-3150 Type

The RV-3150 can be used as the installed type or panel-mount type by selecting accessories to be used.

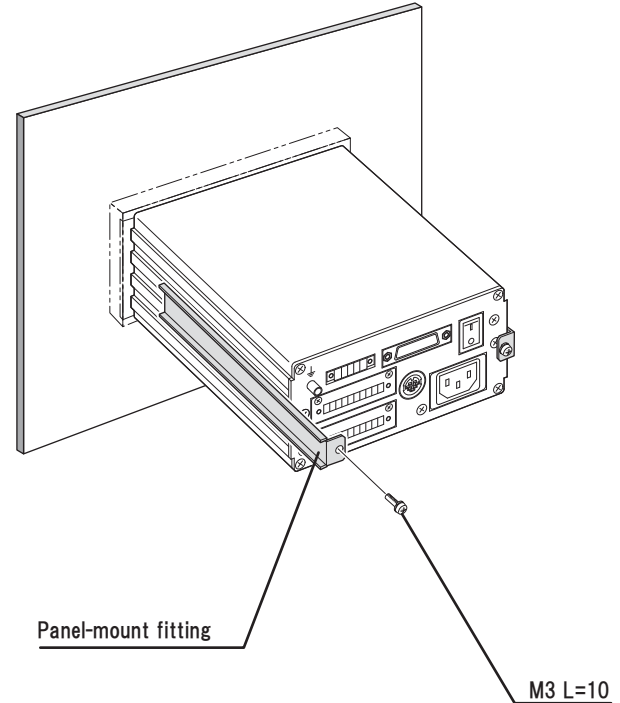
### ◆ Use as Installed Type

When you use the RV-3150 as the installed type, attach the stand base and rubber base as shown below.



### ◆ Use as Panel-Mount Type

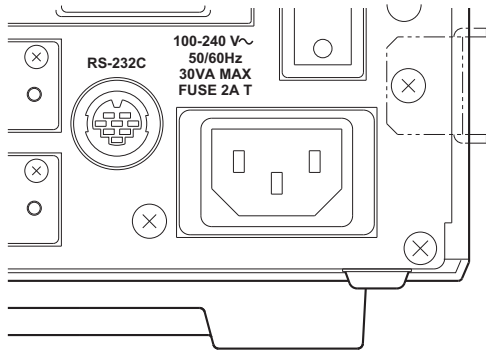
When you use the RV-3150 by attaching it to a rack or the panel of a large chassis, mount it firmly using the panel-mount fitting.



## 1.5 Checking Power Supply

The RV-3150 operates on 100 to 240VAC.

The power input section on the rear panel is marked as shown below.



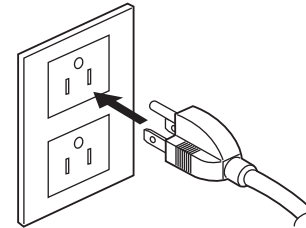
**Caution !** *The power cord supplied with the RV-3150 can be used for the 100VAC range. When using the RV-3150 with other voltage ranges, you need to use a power cord which is applicable to the voltage range used.*

## 1.6 Grounding

For safety and noise elimination, be sure to connect the DG-2310 to a good ground according to the grounding conditions of the measurement site.

### ◆ Grounding with the Three-pronged Power plug

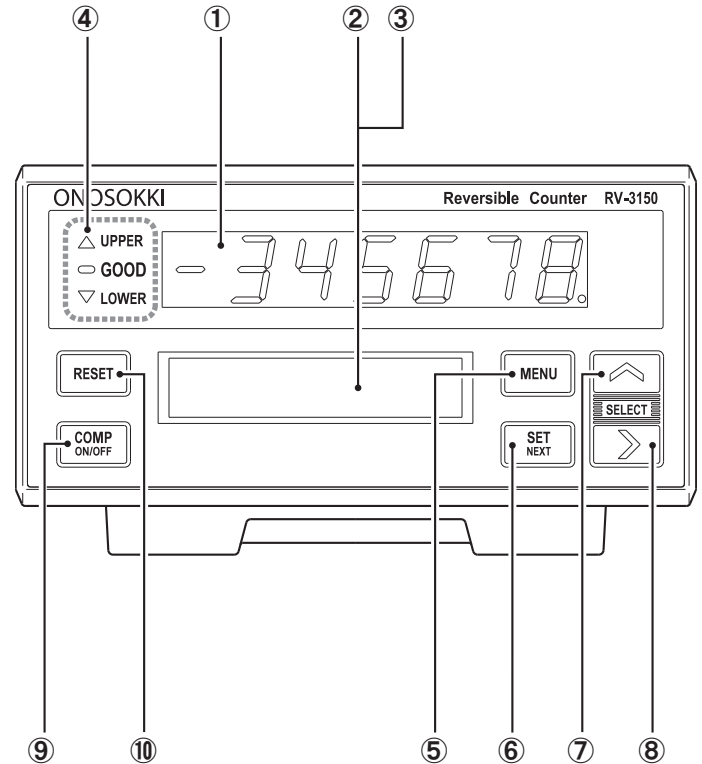
Plug the three-pronged power plug of the supplied power into a three-pronged outlet





## 2. Name and Function of Each Section

### 2.1 Front Panel



① Main Display (7-Segment LEDs)

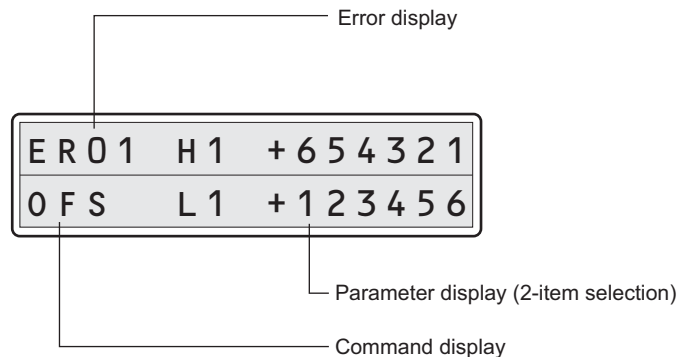
Displays calculated numerical values.

Display	Red LEDs Displays only a “-” as the 1-digit polarity and a 6-digit numerical value.
Display range	0 to ± 999999 (excluding the decimal point)

② Sub Display (LCD with Back Light)  
[Display items during measurement]

- \* Displays parameters and other numerical values of the specified two items.
- \* Displays the error number at the time of error occurrence. If two or more errors occur, displays the error number occurring first.  
“Contents of error display”  
ER01: Overspeed error of the sensor pulse signal  
ER1x: Count value overflow (x: Code number for maintenance)
- \* Displays the input condition when entering an external command.  
Displays the latest command input condition.  
However, when each command is set to ON at the same time, 1:OFS, 2:GON, and 3:RST are displayed with this priority.  
“Contents of command display”  
RST: RESET ON  
OFS: OFFSET ON  
GON: GATE ON

Sample LCD display



[Display items at the time of parameter setup]

The settings of each parameter are displayed.

③ Back Light

The back light condition can be changed in parameter setup.

When ON is set	Always ON
When OFF is set	Always OFF
When AUTO is set	Goes on for 5 seconds when any switch on the front panels is pressed.

**④ Comparator Display**

When the comparator function is turned ON, one of the following judgment condition LEDs goes ON.

UPPER	Red (comparator upper limit exceeded)
GOOD	Green (within comparator lower and upper limits)
LOWER	Red (comparator lower limit underrun)

**⑤ MENU Key**

This key is used to activate or deactivate the parameter setup mode. When this mode is entered, measurement is disabled. (The RV-3150 is disabled while the comparator function or key protection is active.)

**⑥ SET NEXT Key**

This key is used to establish the settings made by the arrow keys and then proceed with the next setup menu.

**⑦ SELECT[  $\wedge$  ] Key**

This key is used to select the digit value in the numerical setup menu. In other cases, it is used to select a setting.

**⑧ SELECT[>]Key**

This key is used to select a digit in the numerical setup menu.

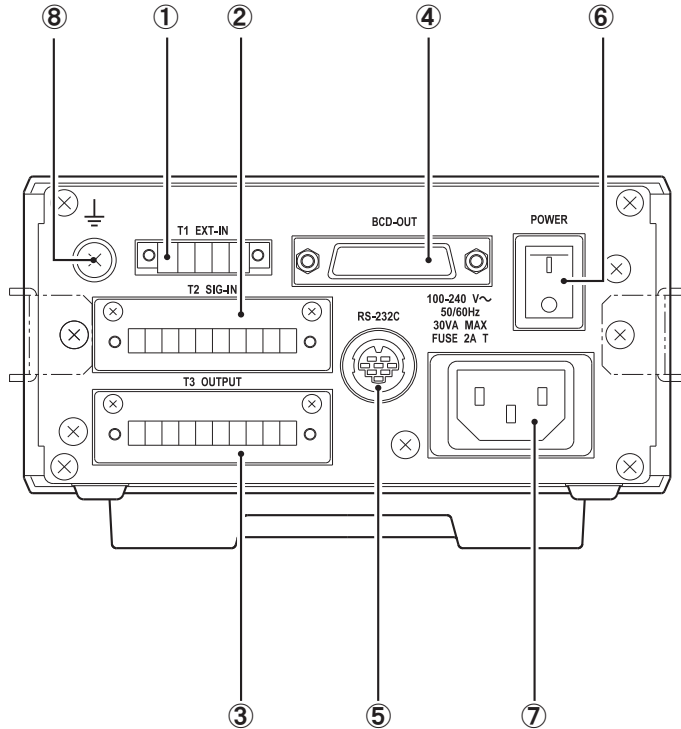
**⑨ COMP ON/OFF Key**

This key is used to activate or deactivate the comparator function. The parameter setup mode cannot be entered while the comparator function is active.

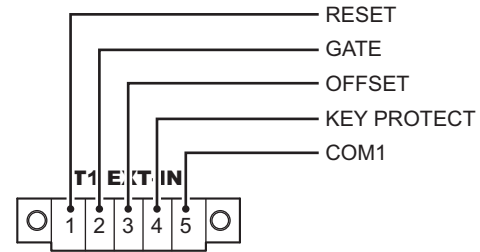
**⑩ RESET Key**

Resets the count value to zero, and recovers from the error condition at the time of error detection.

## 2.2 Back Panel

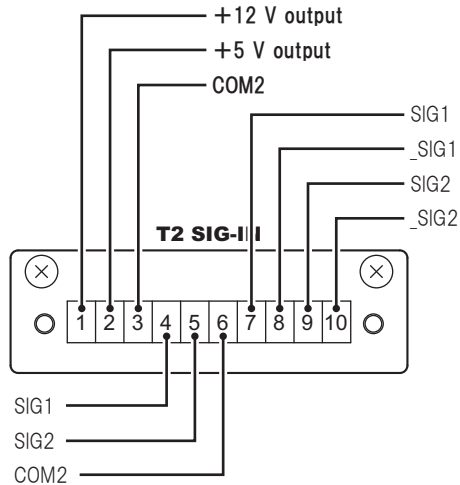


### ① T1 EXT-IN (Terminal Board for External Command Input)



RESET (pin No.1)	Resets the count value to zero. Recovers from the error condition at the time of error detection.
GATE (pin No.2)	Gates the pulse signal from the sensor to stop integrating.
OFFSET (pin No.3)	Resets the count value to zero and then adds the offset value to it.
KEY PROTECT (pin No.4)	Disables the MENU key to inhibit parameter setup change.
COM1 (pin No.5)	Common terminal for external command input

## ② T2 SIG-IN (Terminal Board for Sensor Signal Input)



+12V output (pin No.1)	Power output for sensors (120mA max.)
+5V output (pin No.2)	Power output for sensors (120mA max.) Either +12 V or +5V is selected. Both cannot be selected at the same time.
COM2 (pin No.3)	Common terminal for sensor signals

[Voltage pulse input terminal/P-IN]

SIG1 (pin No.4)	Pulse input for square wave (voltage) signals
SIG2 (pin No.5)	Pulse input for square wave (voltage) signals
COM2 (pin No.6)	Common terminal for sensor signals

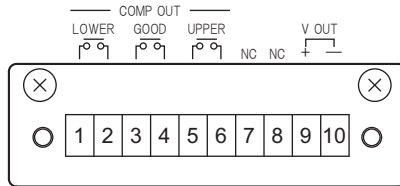
[Line receiver input (RS-422A) terminal/D-IN]

SIG1 (pin No.7)	Line receiver input (RS-422A) terminal
<u>SIG1</u> (pin No.8)	Line receiver input (RS-422A) terminal
SIG2 (pin No.9)	Line receiver input (RS-422A) terminal
<u>SIG2</u> (pin No.10)	Line receiver input (RS-422A) terminal

## Caution !

- \* P-IN and D-IN are effective only for the channel selected by parameter setup .
- \* COM1 and COM2 are isolated .
- \* For single phase input, SIG1 is the pulse input terminal and SIG2 (pin No.5) of P-IN is used as the control signal input terminal for UP/DOWN selection.  
When the sensor direction (DIR) is set to "+", the counter counts UP at the Lo level and counts DOWN at the Hi level .

③ T3 OUTPUT (Terminal Board for Output)



LOWER output (contact a) (pin No.1)	Comparator LOWER contact output
LOWER output (com) (pin No.2)	Comparator LOWER contact output
GOOD output (contact a) (pin No.3)	Comparator GOOD contact output
GOOD output (com) (pin No.4)	Comparator GOOD contact output
UPPER output (contact a) (pin No.5)	Comparator UPPER contact output
UPPER output (com) (pin No.6)	Comparator UPPER contact output

A semiconductor relay is used for each contact. Maximum contact capacity: 30VDC, 0.1A

NC (pin No.7)	This terminal is not used.
NC (pin No.8)	This terminal is not used.
Analog output (+) (pin No.9)	Analog voltage output (+) terminal
Analog output (-) (pin No.10)	Analog voltage output (-: common) terminal

④ BCD-OUT

Parallel BCD output

⑤ RS-232C

Connector for RS-232C communication

⑥ POWER

Power switch for the RV-3150

⑦ AC-LINE

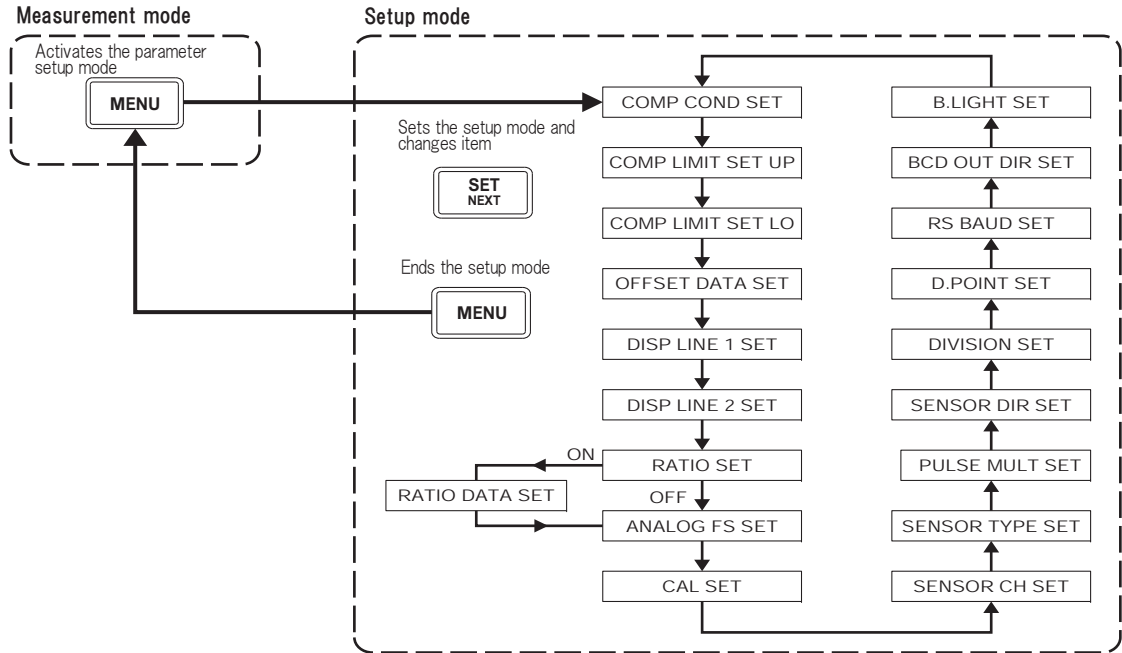
Connector for AC power input

⑧ Functional Grounding Terminal

Connects signal cables and other shielding wires to a good ground.

### 3. Parameter Setup Function

The parameter setup mode is entered when the MENU key is set to ON. When the parameter setup mode is entered, measurement is terminated. Each time you press the SET NEXT key in this mode, the setting changes as shown below.

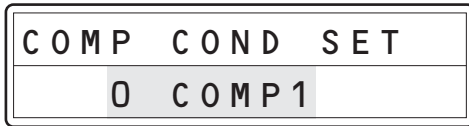


### 3.1 Setting Comparator Conditions (COMPARATOR CONDITION SET)

It is possible to save up to four settings as comparator conditions.

Here, select the condition number.

Press the SELECT ^ key to select an item and then press the SET NEXT key to establish the setting and proceed with the next setting. (Hereafter, items can be selected in the same manner.)



0	COMP1
1	COMP2
2	COMP3
3	COMP4

\* "0:COMP1" is set at the time of shipment.

### 3.2 Setting Comparator Upper Limit (COMPARATOR UPPER LIMIT SET)

Enter the comparator upper limit of the condition number selected with the previous setup menu.

Setup range: -999999 to +999999

When entering a numerical value, press the SELECT ^ key to increase the numerical value and the > key to change the digit. When you have set the numerical value, press the SET NEXT key to establish the setting and then proceed with the next setting. (Hereafter, numerical values can be entered in the same manner.)

Refer to "Specifications".



\* "+999999" is set at the time of shipment.



### 3.3 Setting Comparator Lower Limit (COMPARATOR LOWER LIMIT SET)

Enter the comparator lower limit of the condition number selected with the previous setup menu.

Setup range: -999999 to +999999

COMP LIMIT SET					
LOWER	→	-	1	2	3 4 5 6

\* "000000" is set at the time of shipment.

### 3.4 Setting Offset Value (OFFSET DATA SET)

Set the offset value.

Setup range: -999999 to +999999

OFFSET DATA SET					
SET	→	+	1	2 3 4 5 6	

\* "+100000" is set at the time of shipment.

### 3.5 Setting LCD Upper Line Display Item (DISPLAY LINE 1SET)

Select the display item for the LCD upper line at the time of measurement.



0	UPPER	Displays the comparator upper limit.
1	LOWER	Displays the comparator lower limit.
2	RATIO	Displays the ratio setting.
3	OFFSET	Displays the offset setting.
4	NORMAL	Displays the count value for the upper 6 digits of the internal counter (12 digits).

\* \* "0:UPPER" is set at the time of shipment.

- The ratio setting is displayed as six decimal places.
- This count value is the data after multiplication which is not yet calculated (with the ratio, offset, or other function).

### 3.6 Setting LCD Lower Line Display Item (DISPLAY LINE 2SET)

Select the display item for the LCD lower line at the time of measurement.



0	UPPER	Displays the comparator upper limit.
1	LOWER	Displays the comparator lower limit.
2	RATIO	Displays the ratio setting.
3	OFFSET	Displays the offset setting.
4	NORMAL	Displays the count value for the lower 6 digits of the internal counter (12 digits).

\* "1:LOWER" is set at the time of shipment.

- The ratio setting is displayed as six decimal places.
- This count value is the data after multiplication which is not calculated (ratio, offset, etc.)

### 3.7 Setting Ratio Operation Function to ON or OFF (RATIO FUNCTION ON/OFF SET)

Select the ON/OFF setting of the ratio operation function.

When you set the ratio function to ON, you can weight one input pulse count with the set ratio value.

When you set it to OFF, the ratio value is counted as 1.000000.

RATIO	SET
0 ON	

\* "1:OFF" is set at the time of shipment.

### 3.8 Setting Ratio Value (RATIO DATA SET)

Set the ratio value.

This setup is effective only when the ratio function is set to ON in the previous setup menu. When it is set to OFF, this setup menu is not displayed.

Setup range: 0.000001 to 0.999999 (When 0 is set up, 0.000001 is set up automatically.)

RATIO DATA SET
RATIO → 0 . 1 2 3 4 5 6

\* "0.100000" is set at the time of shipment.

### 3.9 Setting Analog Output Full-Scale (ANALOG FULL SCALE SET)

Set up the count value corresponding to the full-scale value (F.S. value: 10V) of the analog voltage output.

Setup range: 1 to 999999 (When 0 is set up, 1 is set up automatically.)

ANALOG FS SET					
FS	→	1	2	3	4
		5	6		

\* "999999" is set at the time of shipment.

### 3.10 Setting Calibration Signal Output (CALIBRATION SET)

Output the calibration signal for the analog voltage output.

CAL	SET
1	+FULL

0	ZERO	Outputs 0V.
1	+FULL	Outputs +10V.
2	-FULL	Outputs -10V.

\* "0:ZERO" is set at the time of shipment.

### 3.11 Setting Sensor Input Channel (SENSOR CHANNEL SET)

Select the signal input channel of the sensor.

With P-IN, the two-phase or single-phase square wave voltage signal (totem pole, collector output signal, etc.) is output.

With D-IN, the two-phase or single-phase line driver signal is output.

Note that the sensor connection terminal differs between P-IN and D-IN.

SENSOR CH SET		
0	P - IN	

0	P-IN	Square wave (voltage) signal output
1	D-IN	Line driver signal output

\* "0:P-IN" is set at the time of shipment.

### 3.12 Setting Sensor Type (SENSOR TYPE SET)

Select the two-phase or single-phase sensor signal.

When the single phase signal is selected, SIG2 of P-IN is used as the terminal for UP/DOWN control.

When the sensor direction (DIR) is set to "+", the counter counts UP at the Lo level and counts DOWN at the Hi level.

SENSOR TYPE SET		
0	DUAL	

0	DUAL	Two-phase square wave
1	SINGLE	Single-phase square wave

\* "0:DUAL" is set at the time of shipment.

### 3.13 Setting Multiplier (PULSE MULTIPLIER SET)

Select the multiplier.

PULSE	MULT	SET
1	* 2	

0	*1	No multiplication
1	*2	x2
2	*4	x4

\* “2:\*4” is set at the time of shipment.

### 3.14 Setting Counting Direction (SENSOR DIRECTION SET)

Select the relationship between the moving direction of the encoder and the counting direction of the counter (UP or DOWN).

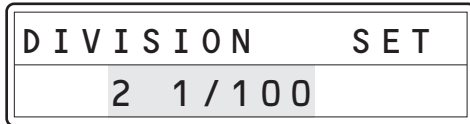
SENSOR	DIR	SET
0	( + )	

0	(+)	Counts UP when the phase of SIG1 of the two-phase signal leads SIG2.
1	(-)	Counts DOWN when the phase of SIG1 of the two-phase signal leads SIG2.

\* “0:(+)” is set at the time of shipment.

### 3.15 Setting Divider (DIVISION SET)

Select the divider for the count value.



0	1/1
1	1/10
2	1/100
3	1/1000

\* "0:1/1" is set at the time of shipment.

### 3.16 Setting Decimal Point Position (DECIMAL POINT SET)

Select the decimal point display position of the main display (LED).

This function only displays the decimal point leaving the count value unchanged.

Example: When the count value is 123456

When no decimal point is selected: Displays 123456.

When decimal point 0.00 is selected: Displays 1234.56.



0	OFF
1	0.0
2	0.00
3	0.000

\* "0:OFF" is set at the time of shipment.

### 3.17 Setting BCD Output Logic (BCD-OUT DIRECTION SET)

Select the logic of the parallel BCD output.

BCD - OUT DIR SET
0 (+)

0	(+)	Positive logic for "0" (transistor OFF)
1	(-)	Positive logic for "1" (transistor ON)

\* "0:(+)" is set at the time of shipment.

### 3.18 Setting RS-232C Baud Rate (RS-232C BAUDRATE SET)

Select the baud rate (bps) of the RS-232C.

RS BAUD SET
0 2400

0	2400
1	4800
2	9600

\* "2:9600" is set at the time of shipment.



### 3.19 Setting LCD Back Light Condition (BACK LIGHT ON/OFFSET)

Select the condition of the LCD back light.

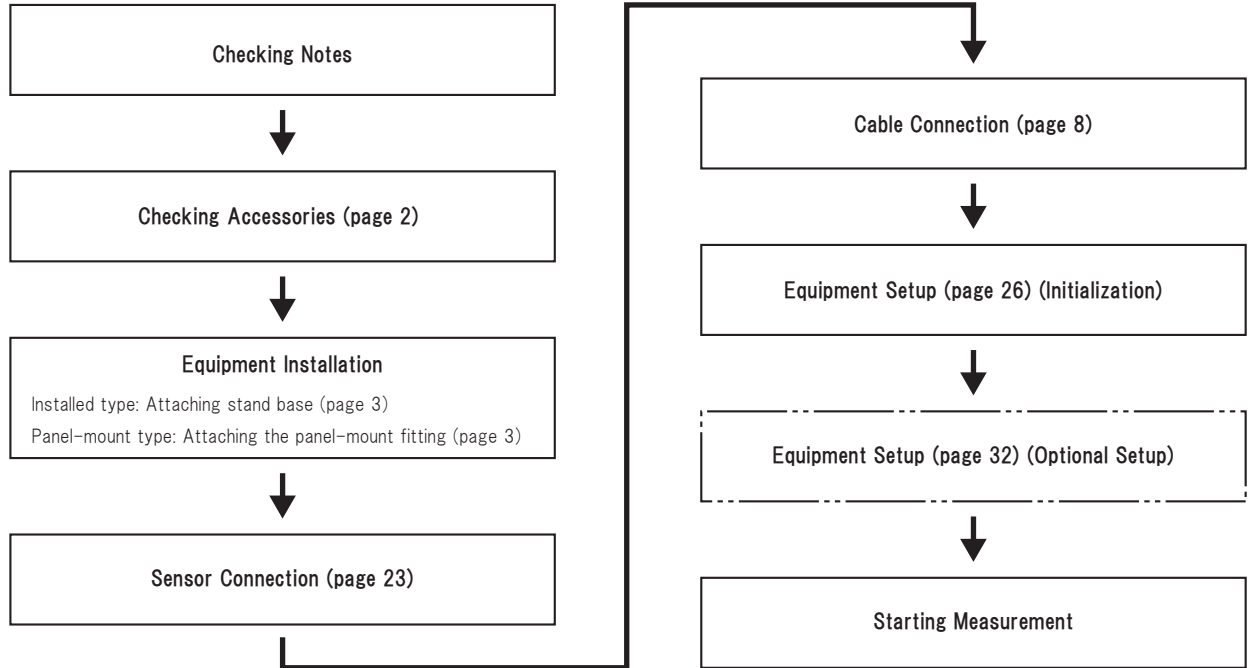
B . L I G H T	S E T
0	ON

0	ON	Always ON
1	OFF	Always OFF
2	AUTO	Goes on for about 5 seconds when any switch on the front panels is pressed.

\* It is set to "2:AUTO" at the time of factory shipments.

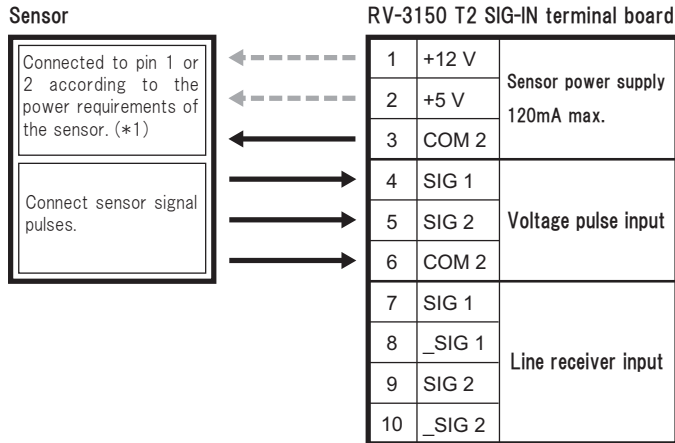
# 4. Measurement Setup

## 4.1 Measurement Procedure

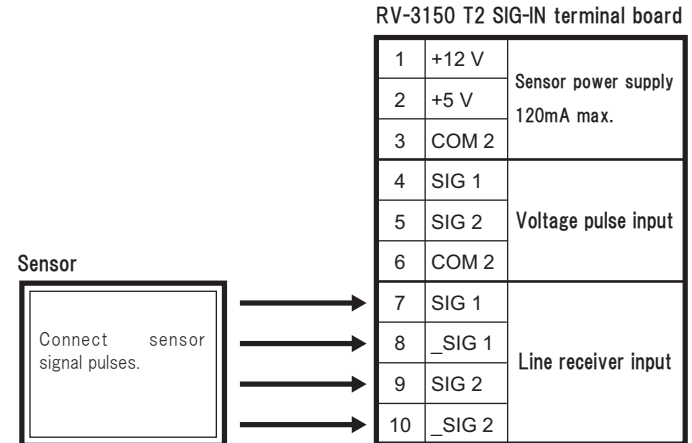


## 4.2 Sensor Connection

**Sensor Type: Two-Phase Voltage Output (Totem Pole, Collector Output Signal, etc.)**



**Sensor Type: Line Driver (RS-422A 422A) Output**



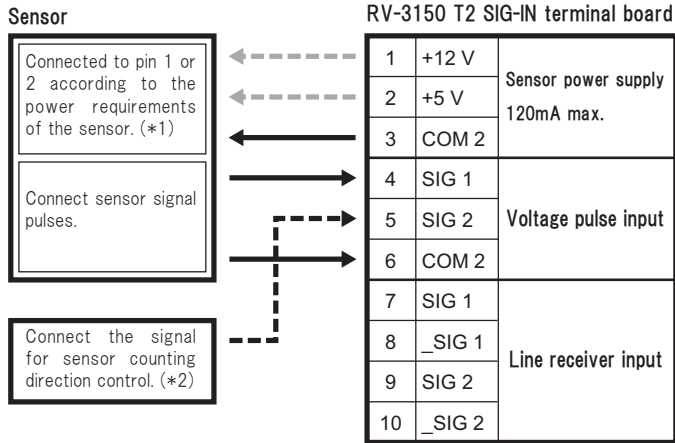
\*1 The +12V and +5V sensor power supplies cannot be used at the same time. Be sure to use either one.

Refer to Section, "Connection of Terminal Boards T1, T2, and T3".

\* Refer to Section, "Connection of Terminal Boards T1, T2, and T3".

**Sensor Type: Single Phase Voltage Output (Totem Pole, Collector Output Signal, etc.)**

**Caution !** Connect the shielding wire of the signal cable to the functional grounding terminal.



\*1 The +12V and +5V sensor power supplies cannot be used at the same time. Be sure to use either one.

\*2 If SIG2 is not connected (open), the input signal level becomes the Lo level, resulting in the UP count mode (when the sensor direction of the parameter setup mode is set to "+"). Refer to Section, "Connection of Terminal Boards T1, T2, and T3".

---

## 4.3 Flow of Equipment Setup

When you use the equipment for the first time, set up the equipment with the following procedure.

### 1. Initialization

NOTE: The following three settings need be established before use. If they are not established, the count display may be disabled. Be sure to check the settings before use.

- \* Sensor setup: Refer to page 26.
- \* Counting direction setup: Refer to page 28.
- \* Multiplier setup: Refer to page 30.

### 2. Setting Operation and Display Functions

Make and check the following setup only for the functions to be used.

- \* When the offset function is used: Refer to page 32.
- \* When the ratio function is used: Refer to page 33.
- \* When the divider setting is made: Refer to page 19.
- \* When the decimal point setting is made: Refer to page 19.

### 3. Setting Output

Make and check the following setup only for the functions to be used.

- \* When comparator function is used: Refer to page 33.

- \* When analog output is used
  - 1) Full-scale value setup: Refer to page 16.
  - 2) When calibration is performed: Refer to page 16.
- \* When LCD sub-data display is used
  - 1) Display item setup: Refer to page 14.
  - 2) LCD back light condition setup: Refer to page 21.
- \* When the BCD output is used: Refer to page 20.
- \* When the RS-232C communication function is used: Refer to page 20.

# 5. Equipment Setup

## 5.1 Initialization

### ◆ Sensor Setup

Set up parameters which best suit the connected sensor.

#### Setup by Output Signal Sensor Type

- ① **Sensor type: Voltage pulse output (totem pole, collector output signal, etc.)**

Connect the signal lines to pin 4 (SIG1), pin 5 (SIG2), and pin 6 (COM) of the T2 SIG-IN terminal board of the RV-3150 rear panel.

- a) Activate the parameter setup mode using the MENU key.

NOTE: Stop the comparator function.

- b) Press the SET NEXT key to call the sensor input channel setup screen.
- c) Select 0:P-IN (voltage pulse input) for SENSOR CH SET using the  $\wedge$  key.



- d) Terminate the parameter setup mode using the MENU key to return to the usual measurement mode.

**② Sensor type: Line driver output**

Connect the signal lines to pin 7 (SIG1), pin 8 (\_SIG1), pin 9 (SIG2), and pin 10 (\_SIG2) of the T2 SIG-IN terminal board of the RV-3150 rear panel.

a) Activate the parameter setup mode using the MENU key.

NOTE: Stop the comparator function.

b) Press the SET NEXT key to call the sensor input channel setup screen.

c) Select 1:D-IN (line receiver input) for SENSOR CH SET using the  $\wedge$  key.



d) Terminate the parameter setup mode using the MENU key to return to the usual measurement mode.

**Setup by Single-/Two-Phase Sensor Type****① Sensor type: Two-phase pulse output**

a) Activate the parameter setup mode using the MENU key.

NOTE: Stop the comparator function.

b) Press the SET NEXT key to call the screen of the sensor type setup.

c) Select 0:DUAL (two-phase pulse output) for SENSOR TYPE SET using the  $\wedge$  key.



d) Terminate the parameter setup mode using the MENU key to return to the usual measurement mode.

**② Sensor type: Single phase pulse output**

a) Activate the parameter setup mode using the MENU key.

NOTE: Stop the comparator function.

b) Press the SET NEXT key to call the screen of the sensor type setup.

c) Select 1:SINGLE (single phase pulse output) for SENSOR TYPE SET using the  $\wedge$  key.



d) Terminate the parameter setup mode using the MENU key to return to the usual measurement mode.

**Caution !** *With the single phase pulse input type, pin 5 of the T2 SIG-IN terminal board on the rear panel is used as the control signal input terminal for UP/DOWN selection.  
Refer to "Sensor type: Single phase pulse output".*

## ◆ Setting Counting Direction

### ① Sensor type: Two-phase pulse output

a) Activate the parameter setup mode using the MENU key.

NOTE: Stop the comparator function.

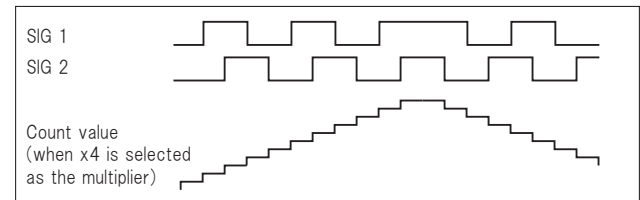
b) Press the SET NEXT key to call the counting direction setup screen.

c) Select 0:(+) (count UP) or 1:(-) (count DOWN) for SENSOR DIR SET using the  $\wedge$  key.

[When 0:(+) is selected]



When the phase of the pulse signal of SIG1 leads SIG2, the counter performs count UP. Conversely, when it lags behind SIG2, the counter performs count DOWN.

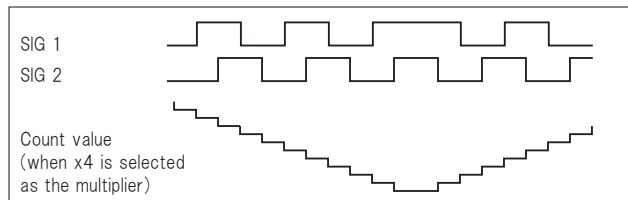




[When 1:(-) is selected]



When the phase of the pulse signal of SIG1 leads SIG2, the counter performs count DOWN. Conversely, when it lags behind SIG2, the counter performs count UP.



d) Terminate the parameter setup mode using the MENU key to return to the usual measurement mode.

## ② Sensor type: Single phase pulse output

a) Activate the parameter setup mode using the MENU key.

NOTE: Stop the comparator function.

b) Press the SET NEXT key to call the counting direction setup screen.

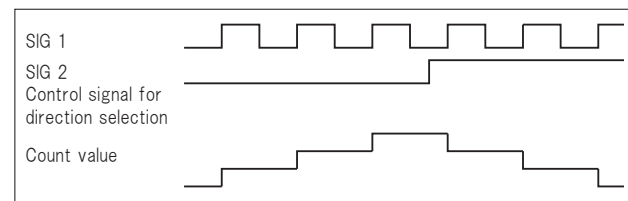
c) Select 0:(+) (count UP) or 1:(-) (count DOWN) for SENSOR DIR SET using the  $\wedge$  key.

[When 0:(+) is selected]



Pin 5 of the T2 SIG-IN terminal board is used as the control signal input terminal for UP/DOWN selection.

When pin 5 of T2 is set to the Lo level or not connected (open), the counter performs count UP. When it is set to the Hi level, the counter performs count DOWN.

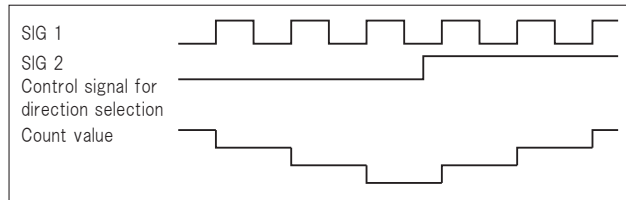


[When 1:(-) is selected]



Pin 5 of the T2 SIG-IN terminal board is used as the control signal input terminal for the UP/DOWN selection.

When pin 5 of T2 is set to the Lo level or not connected (open), the counter performs count DOWN. When it is set to the Hi level, the counter performs count UP.



d) Terminate the parameter setup mode using the MENU key to return to the usual measurement mode.

### ◆ Setting Multiplier

a) Activate the parameter setup mode using the MENU key.

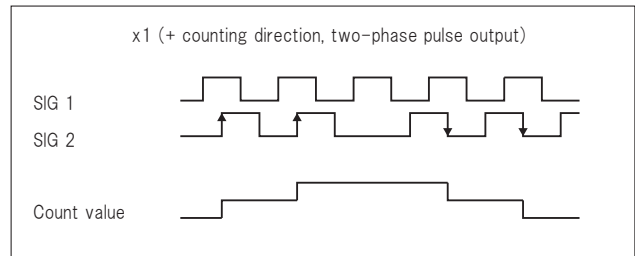
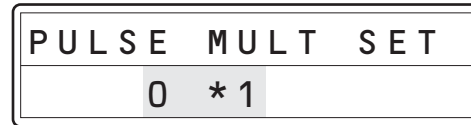
NOTE: Stop the comparator function.

b) Press the SET NEXT key to call the multiplier setup screen.

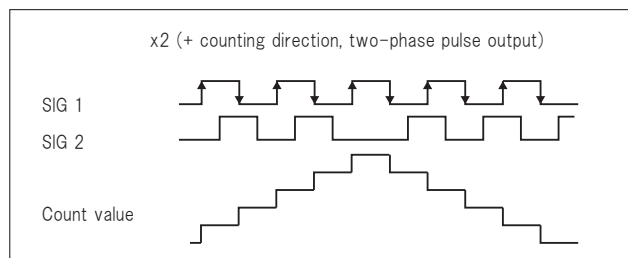
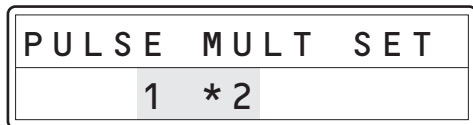
c) Select 0:\*1 (no multiplication), 1:\*2 (x2), or 2:\*4 (x4) for PULSE MULT SET using the  $\wedge$  key.

d) Terminate the parameter setup mode using the MENU key to return to the usual measurement mode.

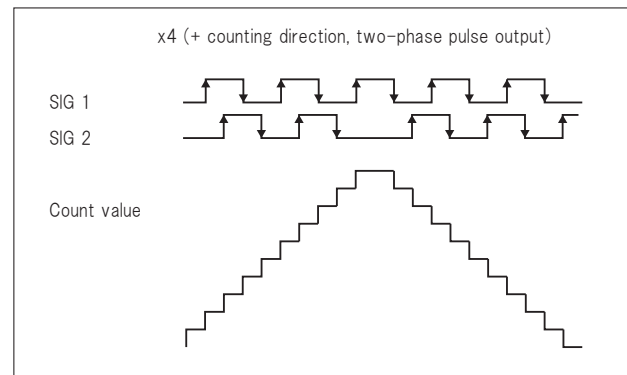
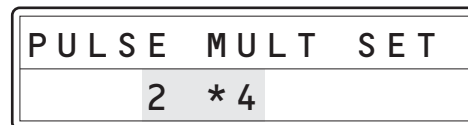
[When 0:\*1 is selected]



[When 1:\*2 is selected]



[When 2:\*4 is selected]



**Caution !** The multiplier setting is effective only when a sensor with two-phase pulse output signal is used. With single phase, x1 (no multiplication) is forcibly selected.

## 5.2 Setting Operation and Display Functions

Make and check the following setup only for the functions to be used.

### ◆ When Offset Function Is Used

a) Activate the parameter setup mode using the MENU key.

NOTE: Stop the comparator function.

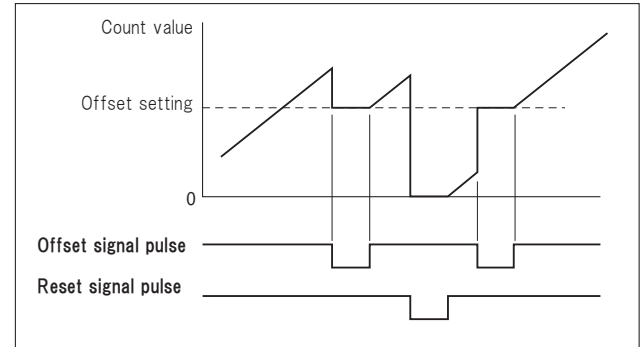
b) Press the SET NEXT key to call the offset value setup screen.

c) Select the polarity and numerical value using the  $\wedge$  key, then, while selecting a digit using the  $>$  key, set up the offset value sequentially.



d) Terminate the parameter setup mode using the MENU key to return to the usual measurement mode.

e) When the Lo level signal is input to pin 3 (OFFSET input) of the T1 EXT-IN terminal board on the rear panel, the count value is reset and then the specified offset value is set to the count value.



### ◆ When Ratio Function Is Used

a) Activate the parameter setup mode using the MENU key.

NOTE: Stop the comparator function.

b) Press the SET NEXT key to call the ratio value setup screen.

c) Select 0:ON using the  $\wedge$  key.

RATIO	SET
0 ON	

\* Only when ON is selected here, the ratio setup screen becomes effective.

d) Press the SET NEXT key to move to the next ratio setup screen.

e) Select the numerical value using the  $\wedge$  key, then, while selecting a digit using the  $>$  key, set up the ratio value sequentially.

RATIO DATA SET
RATIO → 0.123456

f) Terminate the parameter setup mode using the MENU key to return to the usual measurement mode.

## 5.3 Output Setup

Make and check the following setup only for the functions to be used.

### ◆ When Comparator Function Is Used

a) Activate the parameter setup mode using the MENU key.

NOTE: Stop the comparator function.

b) When the parameter setup mode is entered, the comparator condition setup screen appears. Select the condition number for comparator setting registration using the  $\wedge$  key.

CMP COND SET
0 COMP 1

\* Comparator condition allows you to register four different comparator settings (UPPER & LOWER).

c) Press the SET NEXT key to move to the next UPPER value setup screen.

d) Select the polarity and numerical value using the  $\wedge$  key, then, while selecting a digit using the  $>$  key, set up the UPPER comparator value sequentially (when changing the setting).

CMP LIMIT SET
UPPER → +123456

- e) Press the SET NEXT key to move to the next LOWER value setup screen.
- f) Select the polarity and numerical value using the  $\wedge$  key, then, while selecting a digit using the  $>$  key, set up the LOWER comparator value sequentially (when changing the setting).



- g) Terminate the parameter setup mode using the MENU key to return to the usual measurement mode.
- h) Turn ON the COMP ON/OFF key on the front panel to activate the comparator function.

## 6. Count Value

<b>Count value</b>	The count value is calculated by the following expression: [Count value] = [Input pulse] x [Multiplier] x [Ratio value] x [Divider value] + [Offset value]
<b>Multiplier</b>	Select from x1, x2, and x4 (when two-phase signal is used).
<b>Ratio value</b>	Select from 1 to 0.000001.
<b>Divider</b>	Select from 1/1, 1/10, 1/100, and 1/1000.
<b>Offset value</b>	Select from 0 to +-999999.

### CAUTION 1

If the count value exceeds the following range, an overflow error occurs.

| Count value | > 999999 (excluding the decimal point)

### CAUTION 2

The maximum count value of the internal counter of the RV-3150 is 999,999,999,999. Therefore, even if it exceeds the following range, an overflow error occurs.

| [Number of input pulses] x [Multiplier] | > 999,999,999,999 (excluding the decimal point)

Therefore, note that the count range is limited depending on the the ratio value and divider settings.

### Example

With an ratio value of 0.000001 and a divider of 1/1000, the count value is as follows:

[Count value] = | 999,999,999,999 | x 0.000001 x 1/1000 + [Offset value] = | 999 | + [Offset value] (excluding the decimal point)

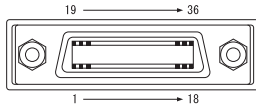
Therefore, the count value ranges 0 to | [Offset value]+-999 | (excluding the decimal point).

## 7. Descriptions of BCD- OUT



## 7.1 Pin Assignment

Connector model name: DX10-36S (Hirose Electric Co.,Ltd.)



Pin No.	Signal type	IN/OUT	Signal description	Pin No.	Signal type	IN/OUT	Signal description
1	Data	OUT	$1 \times 10^0$	19	Data	OUT	$4 \times 10^4$
2			$2 \times 10^0$	20			$8 \times 10^4$
3			$4 \times 10^0$	21			$1 \times 10^5$
4			$8 \times 10^0$	22			$2 \times 10^5$
5			$1 \times 10^1$	23			$4 \times 10^5$
6			$2 \times 10^1$	24			$8 \times 10^5$
7			$4 \times 10^1$	25			Polarity output(+)
8			$8 \times 10^1$	26			Polarity output(-)
9			$1 \times 10^2$	27	Judgment output	OUT	LOWER output
10			$2 \times 10^2$	28			GOOD output
11			$4 \times 10^2$	29			UPPER output
12			$8 \times 10^2$	30	Control output	OUT	ERROR output
13			$1 \times 10^3$	31	Control input	IN	HOLD output
14			$2 \times 10^3$	32			RESET output
15			$4 \times 10^3$	33			
16			$8 \times 10^3$	34			
17			$1 \times 10^4$	35	Control output	OUT	Print command output
18			$2 \times 10^4$	36	COM	—	COM

## 7.2 Connectors

<b>Receptacle</b>	DX10A-36S (RV-3150 side connector)
<b>Applicable plug</b>	DX40-36P (cable side, for soldering)
<b>Plug cover</b>	DX36-CV1 (cable side) All the above connectors from Hirose Electric Co.,Ltd.
<b>Recommended cable</b>	AA-8107 (option) 3m, one-side open processing
<b>Recommended cable</b>	when connection cable is made
	Conductor size: AWG#30
	Conductor configuration: 7/0.1
	Insulator outer diameter: $\phi$ 0.5
	Cable UL style: UL20276 and UL2789

## 7.3 Descriptions of Each Signal

### BCD output

Pins	1-24
Positive logic selection	6 digits, parallel output
Output form	Open collector output

### Polarity output

Pin 25	(+)
Pin 26	(-)
Output form	Open collector output
	When the BCD output logic is set to (-) (negative logic) with parameter setting, When the measured value is positive (+) Pin 25 (+): ON Pin 26 (-): OFF
	When the measured value is negative (-) Pin 25 (+): OFF Pin 26 (-): ON
	When reset to zero Pin 25 (+): ON Pin 26 (-): OFF

**Judgment output**

Set to ON at the time of judgement regardless of the BCD output logic setting.

Pin 27	LOWER output
Pin 28	GOOD output
Pin 29	UPPER output
Output form	Open collector output

**Error output**

Pin 30

Output form : Open collector output

Set to ON when an error is detected in RV-3150.

Error contents

**a) Overspeed error**

Occurs if the pulse signal frequency from the sensor largely exceeds the specified value.

**b) Overcount error**

Occurs if the count value exceeds the range from -999999 to +999999. However, note that the display value starts from zero continuously.

**Control input**

Pin 31: Hold input

Although the hold condition is retained while the signal is set to the Lo level, the display value is not held because the counting operation is being performed.

Only the BCD data is held by the voltage signal with the Lo level or when the external contact signal is closed.

Pin 32: Reset input

The count value is reset to zero by the voltage signal with the Lo level or when the external contact signal is closed.

While the signal is set to the Lo level, the reset condition is retained.

**Control output**

Pin 35: Print command output

Negative pulse print command is output for each time the BCD data is updated.

Output form: Open collector output

**Common**

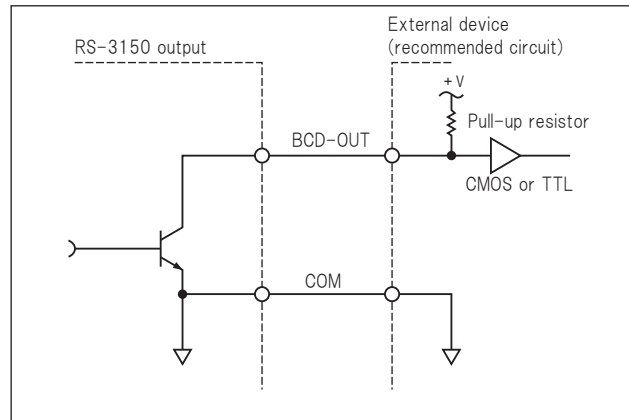
Pin 36: Common pin for signals

## 7.4 Recommended Interfaces

When connecting an external device to BCD-OUT, make sure that the following interface circuits are formed.

### Output signal interface

Output form	Open collector output
Output IC	74LS06 or equivalent
Withstand voltage	30V max. Operation on +24V or less is recommended to improve the reliability.
Maximum sink current	32mA max.
Residual voltage	0.5V max.



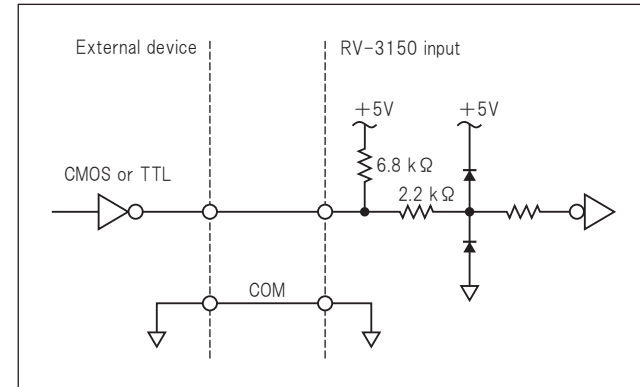
### Input signal interface (Hold, reset input)

Voltage signal

Input Lo level voltage	0 to 1V
Input Hi level voltage	4 to 5.25V

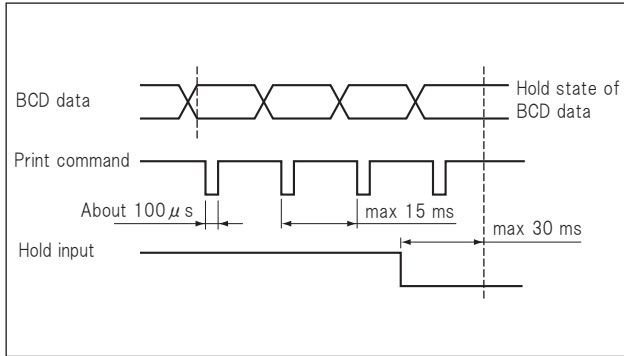
Non-voltage contact signal

Open voltage	5VDC max. $\pm$ 0.25V
Short-circuit current	1mA max.
Contact resistance	50ohms or less

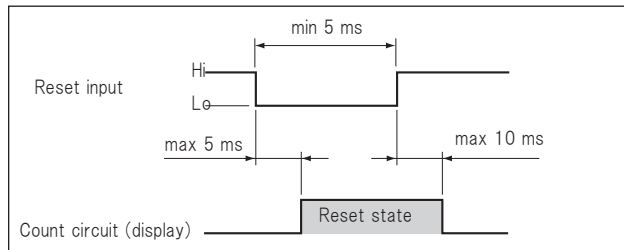


### Timing chart

Timing of BDC data, print command, and hold



Timing of reset input



## 8. External Command Input from Terminal Board

### 8.1 Descriptions of External Command Signals

- **Reset input**  
Resets the count value to zero and, if an error is detected, recovers the error.
- **Gate input**  
Gates the signal input from the sensor. The counter stops the counting operation while the gate signal is input.
- **Offset input**  
Resets the count value to zero and then adds the offset value.
- **Key protection**  
The MENU key on the front panel is disabled, inhibiting parameter setting.

## 8.2 Recommended Interfaces

When connecting an external device to the terminal board for external devices, make sure that the following interface circuits are formed.

- **Input signal interface**

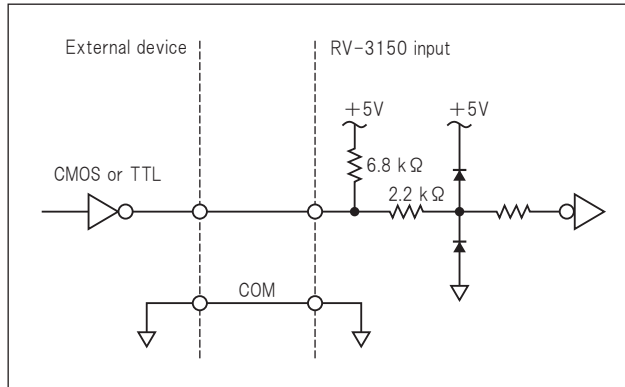
(Reset, gate, offset, key protection inputs)

Voltage signal

Input Lo level voltage	0 to 1V
Input Hi level voltage	4 to 5.25V

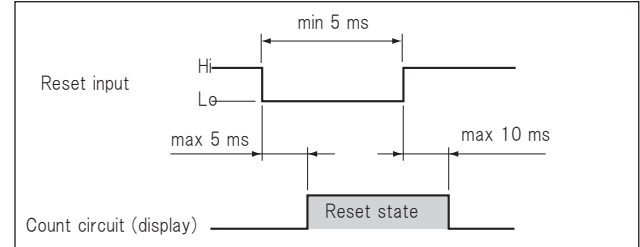
Non-voltage contact signal

Open voltage	5VDC max. $\pm$ 0.25V
Short-circuit current	1mA max.
Contact resistance	50ohms or less



- **Timing Chart**

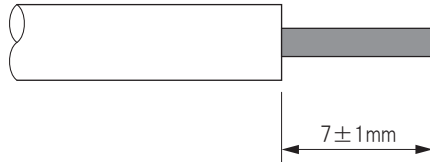
Timing of reset, gate, offset signals



## 8.3 Connections of Terminal Boards T1, T2, and T3

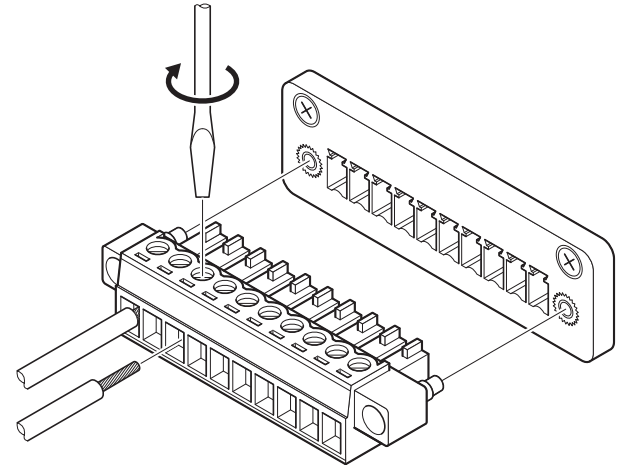
With terminal boards T1, T2, and T3 of the RV-3150, wires are connected directly with a fastening screw. Follow the instructions below for wire connection.

- Use a wire with the size of AWG 28-16 (0.14 to 1.5mm<sup>2</sup>).
- Strip the wire by  $7 \pm 1$ mm.



- Do not make pretinning at the tip of the wire.  
Pretinning may disturb correct connection.
- When fastening the terminal screw, use a screwdriver which suits the screw slotting size.  
If the screwdriver does not suit the screw, it cannot be fastened with the specified fastening torque, possibly damaging the screw.

- Fasten the terminal screw with a fastening torque of 0.25 N · m.  
This torque prevents the screw from loosening and the wire from dropping out.





## 9. RS-232C Setup

### 9.1 Overview

The RS-232C interface is a serial communication interface standardized by the EIA (Electronic Industries Association).

The RS-232C interface makes it possible to read measurement data and set and read parameters using an appropriate program of a minicomputer or personal computer.

## 9.2 Specifications

<b>Communication mode</b>	Asynchronous duplex mode
<b>Transmission rate</b>	2400/4800/9600
<b>Character length</b>	8 bits
<b>Parity check</b>	None
<b>Stop bit</b>	1 bit
<b>X parameter control</b>	Invalid
<b>Terminator</b>	CR+LF
<b>Character code</b>	ASCII

## 9.3 External Appearance and Specifications of Connector



Pin No.	Signal name	Function	I/O
1	FG(AA)	Signal ground	-
2	RxD(BB)	Receive data	Input
3	TxD(BA)	Transmit data	Output
4	CTS(CB)	Clear to send	Input
5	RTS(CA)	Request to send	Output
6	DTR(CD)	Data terminal ready	*
7	COM(AB)	Signal ground	-
8	DSR(CC)	Not connected	*

\* DTR and DSR are internally connected (short-circuited).

## 9.4 Communication Procedure for Parameter Setup

### Connecting the RS-232C cable

When connecting the cable, turn OFF the power of the personal computer and RV-3150.



### Setting the RS-232C baud rate

Set the baud rate with RV-3150 parameter setup as required.

After setting, be sure to exit the setup mode and enter the measurement mode.

NOTE: In the manual setup mode, commands are not accepted.



### Transmitting the RS-232C setup command

Transmit the "MON" (activate the parameter setup mode) command first.

When it is received normally, the corresponding message appears on the LCD display.

NOTE: When the comparator function is set to ON, the "MON" command is not accepted.



### Transmitting setup commands

Transmit required commands.

When the RV-3150 receives a command normally, it sends "G" or other response data.

Be sure to wait for reception of this response data before transmitting the next command.



### Terminating setup

Transmit the "MOF" command (deactivate the parameter setup mode) to terminate the setup mode.

## 9.5 Commands

### ◆ Limitations on Commands

- \* Parameter setup using RS-232C communication cannot be performed during manual setup.
- \* When the comparator function is set to ON (active), the menu setup function cannot be activated. Stop the comparator function first.
- \* Parameter setup commands are effective only when the menu function is activated by the "MON" command.
- \* When the menu function is activated by the "MON" command, the corresponding message appears on the LCD display.
- \* When the RV-3150 receives a command normally, it sends "G" or other response data. Wait for reception of this response data before transmitting the next command.

### ◆ Type 1

No numerical setting

Can be transmitted during measurement

Level type signal input, consisting of a pair of ON and OFF

Command	Function
CON	Activates the comparator function
COF	Deactivates the comparator function
MON	Activates the menu setup function
MOF	Deactivates the menu setup function
GON	GATE ON (equivalent to external command signal)
GOF	GATE OFF (equivalent to external command signal)

### ◆ Type 2

No numerical setting

Can be transmitted during measurement

Pulse type signal command

Command	Function
OFN	OFFSET ON (equivalent to external command signal)
RST	RESET ON (equivalent to external command signal)

### ◆ Type 3

Numerical setting (1)

Cannot be transmitted during measurement.

1-digit polarity and 6-digits numeric value

Command	Function
OFSx	Sets the OFFSET value.
LWSx	Sets the LOWER value.
UPSx	Sets the UPPER value.

x: Numerical setting from -999999 to +999999

### ◆ Type 4

Numerical setting (2)

Cannot be transmitted during measurement.

No polarity, 6-digits numeric value

Command	Function
RASx	Sets the RATIO value.
FSSx	Sets the ANALOG F.S.

x: Numerical setting from 1 to 999999

◆ **Type 5**

Numerical setting (3)

Cannot be transmitted during measurement.

No polarity, 1-digit numeric value

x: Numerical setting

Command	Function	0	1	2	3	4
CCSx	Selects condition number for the comparator.	COMP1	COMP2	COMP3	COMP4	
LISx	Selects the LCD display (upper line).	UPPER	LOWER	RATIO	OFFSET	NORMAL
L2Sx	Selects the LCD display (lower line).	UPPER	LOWER	RATIO	OFFSET	NORMAL
RFSx	Activates/deactivates the ratio function.	ON: Activation	OFF: Deactivation			
SCSx	Selects the sensor channel.	P-IN	D-in			
STSx	Selects the sensor signal type.	DUAL: Two-phase	SINGLE: Single phase			
PMSx	Selects the pulse multiplier.	x1	x2	x4		
SDSx	Selects the sensor direction.	(+)	(-)			
DDSx	Selects the divider.	1/1	1/10	1/100	1/1000	
DPSx	Selects the decimal point position.	OFF	0.0	0.00	0.000	
BDSx	Selects the BCD OUT output logic.	(+)	(-)			
BLSx	Selects the back light condition.	ON: Always on	OFF: Always off	AUTO		

x: Numerical setting from 1 to 4

◆ **Type 6**

Followed by receive data

1-digit polarity and 6-digit numeric value

Command	Function
CDR	Reads measurement data.

The decimal point is not included.

◆ **Type 7**

Followed by receive data

1-digit polarity and 6-digit numeric value

Command	Function
UPR	Reads the UPPER value.
LWR	Reads the LOWER value.
OFR	Reads the OFFSET value.

◆ **Type 8**

Followed by receive data

No polarity, 6-digit numerical value

Command	Function
RAR	Reads the RATIO value.
FSR	Reads the ANALOG F.S.

The RATIO value indicates the 6-digit decimal places.

◆ **Type 9**

x: Numerical setting

Command	Function	0	1	2	3	4
CJR	Reads the result of comparator judgement.	GOOD	UPPER	LOWER	UP & LO	NO COMP

UP & LO: UPPER and LOWER are set to ON at the same time.

NO COMP: The comparator function is deactivated.



◆ **Type 10**

Followed by receive data

No polarity, 1-digit numerical value

x: Receive data

Command	Function	0	1	2	3	4
CCR	Reads condition number for the comparator.	COMP1	COMP2	COMP3	COMP4	
L1R	Reads the LCD display (upper line).	UPPER	LOWER	RATIO	OFFSET	NORMAL
L2R	Reads the LCD display (lower line).	UPPER	LOWER	RATIO	OFFSET	NORMAL
RFR	Activates/deactivates the ratio function.	ON: Activation	OFF: Deactivation			
SCR	Reads the sensor channel.	P-IN	D-in			
STR	Reads the sensor signal type.	DUAL: Two-phase	SINGLE: Single phase			
PMR	Reads the pulse multiplier.	x1	x2	x4		
SDR	Reads the sensor direction.	(+)	(-)			
DDR	Reads the divider.	1/1	1/10	1/100	1/1000	
DPR	Reads the decimal point position.	OFF	0.0	0.00	0.000	
BDR	Reads the BCD OUT output logic.	(+)	(-)			
BLR	Reads the back light condition.	ON: Always on	OFF: Always off	AUTO		

◆ **Type 11**

Followed by receive data (fixed character string)

Command	Function	Communication data
IDR	Reads the product model number.	RV-3150
VER	Reads the software version number.	Vxxx

Command	Function
ER21	Communication trouble
ER22	Timeout error
ER23	Command receive buffer overflow
ER24	Invalid command
ER25	Out of the setup range
ER26	Invalid command reception, SET mode not activated

◆ **Type 12**

GOOD response command

Command	Function
G	Normal reception

◆ **Type 13**

Abnormal response command

Command	Function
ER01	Sensor overspeed
ER1 <sub>x</sub>	Count value exceeded

x: Maintenance code number

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# 10. Troubleshooting

If you suspect trouble, check the following points first.

If the counter does not operate normally, contact the retail store where you bought the product or Ono Sokki sales office nearby.

## ◆ Does Not Count after Sensor Connection

Check the following points sequentially from (A).

### (A) Check cable connections.

Connection between the RV-3150 and sensor depends on whether the signal output types of the sensor is voltage output (totem pole, collector output), line driver output, two-phase, or single phase.

Refer to "Sensor Connection".

### (B) Check sensor setup.

For sensor setup in the parameter setup mode, select the sensor channel and sensor type according to the sensor type.

Refer to "Sensor Setup".

### (C) Check the ratio and divider values.

If the weight for 1 count is small as for the ratio value and divider settings in the parameter setup mode, the count value is not displayed in the display unless the signal pulse corresponding to the settings is input.

For details, refer to "When Ratio Function Is Used", "Setting Divider", and "Count Value".

### (d) Check the gate signal.

When pin 2 (GATE) of the T1 EXT-IN terminal board on the rear panel is set to ON (Lo level), the gate counting operation is deactivated by the input pulse.

### ◆ The Parameter Setup Mode Is Not Activated

If the parameter setup mode is not activated after pressing the MENU key, check the following points.

Check the following points sequentially from (A).

#### (A) Check whether the comparator function is active.

Since parameter setup cannot be performed while the comparator function is active, once deactivate the comparator function using the COMP ON/OFF key.

#### (B) Check the key protection setting.

When pin 4 (key protection) of the T1 EXT-IN terminal board on the rear panel is set to ON (Lo level), the MENU key is disabled.

### ◆ The Comparator Function Is Not Activated

Check the following points sequentially from (A).

#### (A) Check the COMP ON/OFF key.

Even if the comparator value is set in the parameter setup mode, the comparator function is not activated unless the COMP ON/OFF key is set to ON.

#### (B) Check the parameter setup mode.

The COMP ON/OFF key on the front panel is disabled when the MENU key is set to ON and the parameter setup mode is entered.

Terminate the parameter setup mode using the MENU key to return to the usual measurement mode.

### ◆ The Counting Direction Is Not Correct

Check the following points sequentially from (A).

#### (A) Check the sensor type in parameter setup.

If single phase (1:SINGLE) is selected as the sensor type when the two-phase type sensor is connected, the counting direction may mismatch. Be sure to select the sensor type used.

Refer to "Sensor Type: Two-Phase Voltage Output" and "Sensor Type: Single-Phase Voltage Output".

#### (B) Check the counting direction in parameter setup.

Even if the phase of SIG1 and SIG2 of the two-phase signal is the same, the counting direction may be reversed depending on the counting direction setting (SENSOR DIR SET) "+" or "-".

Refer to "Setting Counting Direction".

# 11. Specifications

◆ **Count Signal Input Section**

Voltage pulse signal input (1CH)	Amplification mode	DC amplification
	Input impedance	30k ohms or more
	Inlet pressure level	Hi level +4 to +30V
Lo level 0 to +1V		
Line receiver input (1CH)	Conforms to RS-422A (26LS32 or equivalent)	
Input frequency	DC to 100kHz	
Input waveform	Square wave signal with 90-degree phase difference or single phase square wave signal	
Duty	50 ± 10%	
Counting range	0 to ± 999999	
Input connector	Connector terminal board (3.81 pitch, Phoenix)	

◆ External Control Signals

Input signal format	Voltage input	Hi level: +4 to +5.25V Lo level: 0 to +1V
	Non-voltage contact input	Open voltage: 5.25V or less Short-circuit current: 1mA or less
Input logic	Negative logic (Lo level or contact closing)	
Pulse width	5ms min. (reset, gate, offset)	
Signal type	Reset: Resets the count value to zero.	
	Gate: Deactivate the counting operation.	
	Offset: Adds the offset value to the zero point.	
	Key protection: Terminates parameter setup.(Disables the MENU key.)	

◆ Mode/Function Section

Multiplier selection	Multiplies (x1, x2, x4) the two-phase phase difference signal and counts the value.	
	Setting method	Set up with the soft key on the front panel.
Ratio function	Performs weighting for 1 count input with the following setup:	
	Setting range	0.000001 to 0.999999 (automatically set to 1.000000 when the ratio function is set to OFF)
	Setting method	Set up with the soft key on the front panel.
Offset function	Adds the offset value to the zero point.	
	Setting range	0 to ± 999999
	Setting method	Set up with the soft key on the front panel.

Comparator function	Performs comparison with respect to the display value.	
	Setting range	0 to $\pm 999999$
	Number of stages	2
	Setting method	Set up with the soft key on the front panel.
	Output item	LOWER/GOOD/UPPER
	Output ON condition	a) LOWER: LOWER setting $\geq$ Count value
		b) GOOD: LOWER setting $<$ Count value $<$ UPPER setting
		c) UPPER: UPPER setting $\leq$ Count value
	Output form	Semiconductor relay (one make contact for each)
	Output logic	Negative logic (contact ON)
	Output connector	Connector terminal board (3.81 pitch, Phoenix)
Maximum contact capacity	30VDC, 0.1A	
Contact ON resistance	50ohms or less	
Output refresh time	15ms or less	
Decimal point display position	The decimal point on the LCD goes on. Select from the following: Setting method: Set up with the soft key on the front panel.	
	a) 0 (no decimal point)	
	b) 0.0	
	c) 0.00	
	d) 0.000	
Counting direction selection	Selects the relationship between the movement direction of the encoder and the counting direction.	
	Selection method	a) When two-phase signal is selected: Set up with the soft key on the front panel. b) When single phase signal is selected: Selected by controlling SIG2 of Pulse-In.

◆ BCD Input/Output Section

Connector	DX10-36S (36-pin half-pitch, Hirose Electric Co.,Ltd.)	
Signal item	BCD output	Positive and negative logic (selectable), 6-digit parallel
	Polarity output	Positive and negative logic (selectable)
	Judgment output	Negative logic (LOWER/GOOD/UPPER)
	Error output	Negative logic
	Print command output	Negative logic
	Reset input	Negative logic
	Hold input	Negative logicNOTE: The negative logic indicates the ON state of the output transistor (O.C.).
Output form	Open collector (O.C.)	
	Output IC	74LS06 or equivalent
	Withstand voltage	30V max.
	Maximum sink current	32mA max.
Input form	Hi level	+4 to +5.25V
	Lo level	0 to +1V
Output refresh time	15ms or less	

◆ Analog Output

Conversion method	12-bit D/A conversion	
Output voltage range	0 to $\pm 10V$ /F.S. (F.S. is optional)	
Load resistance	More than 10k $\Omega$	
Linearity error	$\pm 0.3\%$ of F.S	
Temperature stability	Gain drift	$\pm 0.05\%$ of F.S./ $^{\circ}C$
	Zero drift	$\pm 0.05\%$ of F.S./ $^{\circ}C$
Setting error	FULL	$\pm 0.5\%$ of F.S./ $^{\circ}C$
	ZERO	$\pm 0.3\%$ of F.S./ $^{\circ}C$
Calibration function	ZERO/ $\pm$ FULL	
Output refresh time	15ms or less	
Output connector	Connector terminal board (3.81 pitch, Phoenix)	



## ◆ Display Section

Main display section (data display)	Display	7-segment LED
	Display range	0 to $\pm 999999$ (1-digit polarity (minus only) and 6-digit numerical value)
	Character height	14mm
Sub display section (parameter display)	Display	LCD module
	LCD type	STN character type
	Number of display characters	16 characters x two lines
	Display area	64.5x17.2mm
	Back light	LED (Color: Yellow-green)
Status display section	Display	$\phi 3$ round-shaped LED
	Display item	UPPER (red)
		GOOD (green)
LOWER (red)		

## ◆ RS-232C Communication

I/F function	Reads measurement data.	
	Sets up parameters.	
	Reads parameters.	
Protocol	Baud rate	2400/4800/9600 bps
	Character length	8 bits
	Parity check	None
	Stop bit	1 bit
	X parameter control	Invalid
	Terminator	CR+LF
	Character code	ASCII

## ◆ Power Supply for Sensor

Power supply with either voltage can be used.	5VDC $\pm$ 0.25V (120mA max.)
	12VDC $\pm$ 0.6V (120mA max.)

### ◆ General Specifications

Power source	100 to 240VAC (50/60Hz)
Current consumption	30VA or less
Operating temperature	0 to 40 °C
Storage temperature	-10 to 55 °C
Operating humidity	95% max. (without condensation)
Storage humidity	95% max. (without condensation)
Outside dimensions	144(W) x 72(H) x 180(D)
Weight	About 1.3kg
Withstand voltage	1500VAC (between power supply and GND for one minute)
Insulation resistance	More than 10MΩ (with a 500VDC megger)

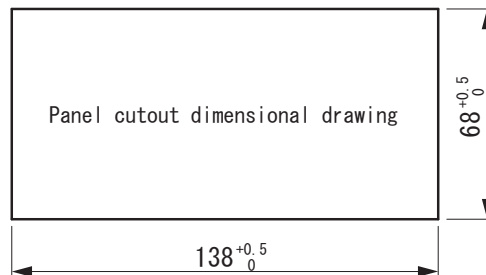
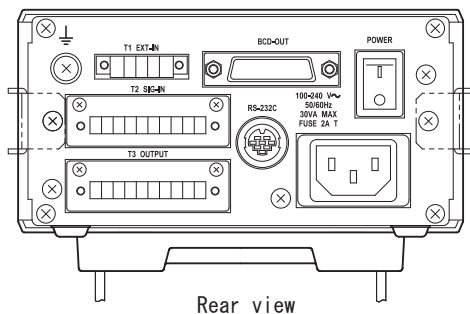
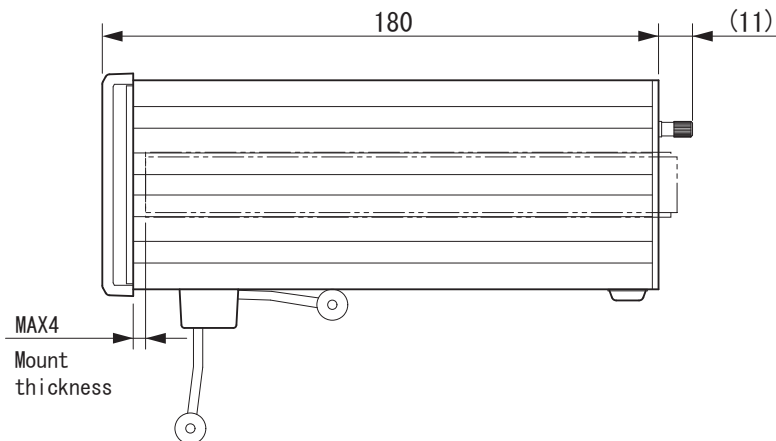
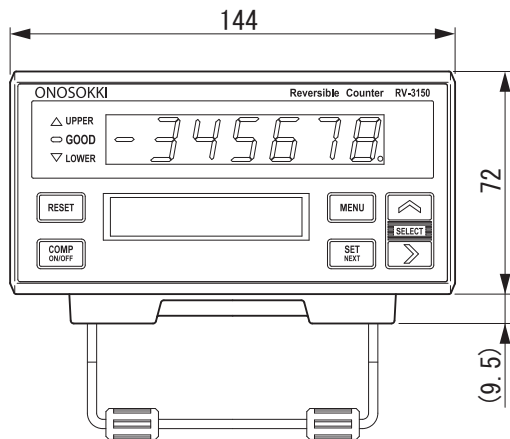
### ◆ Accessories

Power cord	x1 (3P-3P, 1.9 m, rated voltage of 125VAC)
Panel-mount fitting	1 set
Stand base	1 set
Rubber base	1 set
Terminal board socket	x1 (5 pins)
Terminal board socket	x2 (10 pins)
Operating manual	x1 (this manual)

### ◆ Options

BCD cable	AA-8107 (3m)
RS-232C cable	AA-5022 (2m)

## 11.1 Outside Dimensional Drawing





# ONOSOKKI

\*Outer appearance and specifications are subject to change without prior notice.

**HOME PAGE:** <http://www.onosokki.co.jp/English/english.htm>

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