

Read all instructions thoroughly

INSTRUCTIONS

Resistivity Meter

Type RNE



Preface

Thank you for your purchase of our resistivity meter.

You are requested to read this instruction manual carefully before starting the operation, and use this meter correctly.

After reading this manual, keep it within ready reach of an operator in charge without fail.

Cautions on safety Caution

- Turn off the power supply without fail before starting connections, otherwise an electric shock accident may result.
 - Don't mount this meter at a wet place or a place where it may be splashed with water or oil, otherwise a trouble or a fire may occur due to overheating.
 - Don't connect (inclusive of short-circuit, relaying, etc.) any wire to unoccupied terminals, otherwise a trouble may occur.
- Don't perform any insulation resistance test or dielectric strength test to unoccupied terminals, otherwise a trouble may occur.

Cautions on work Caution

Observe the following cautions so as not to cause any malfunction, breakage or other failures.

- This instrument is intended to be used under the following environmental conditions. (IEEC61010-1)

[OVERVOLTAGE CATEGORY II, POLLUTION DEGREE 2]

- Don't mount this meter at the following place.

- A place subjected to severe mechanical vibrations or impacts
- A dusty place
- A place where the ambient of the meter main body exceeds 0°C ~ 45°C
- A place near a unit which generates strong high-frequency noises

- Storage and transportation

- This meter is a precise instrument. Don't drop or shock it during storage or transportation.

- Power supply

- Connect the grounding terminal of the 24V DC power supply unit to the ground securely with due care. Poor grounding may cause a measuring failure.
- For an instrument with 24V power supply, supply power from a SELV circuit.

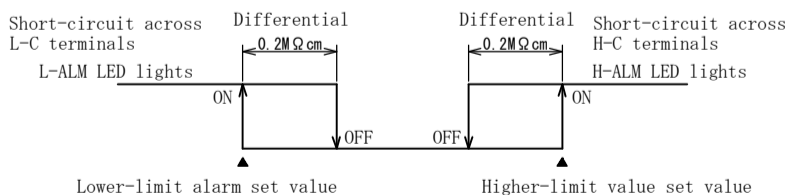
Specifications

Type	RNE-2N301 (Input-output insulated type)	Repeatability	±1% F.S. Note 1)
Power voltage	24VDC ±10%	Analog output	4~20mADC, 1 channel Note 2) (Corresponds to 0~20MΩ·cm)
Consumption current	Lower than 150mA (4~20mA inclusive of 1 channel)	Higher-limit alarm	Lower-limit alarm value < higher-limit alarm value ≤ 20.0MΩ·cm
Working ambient temperature	0~45°C	Lower-limit alarm	0.1MΩ·cm ≤ lower-limit alarm < higher-limit alarm value
Storage temperature range	-20~70°C	Alarm output delay timer	0~600 sec. (Initial value: 15sec)
Measuring range	0.05~20.00MΩ·cm	Differential	0.2MΩ·cm Note 3)
Measuring system	AC 2-electrode method	Contact output	2 circuits (No-voltage 1a output, higher/lower-limit alarm output common terminals)
Temperature compensation function	Provided	Contact output tolerance	Max. 30VDC 2.0A Resistive load Voltage current: Min. 10mVDC 10μA
Sensor (cell) System	ARK-※HBR-※※※		
Temperature correction range	0~95°C		
Reference temperature for temperature correction	25°C		

Note 1) Water temperature 25°C, Resistivity 18MΩ·cm, Ambient temperature of main body 25°C

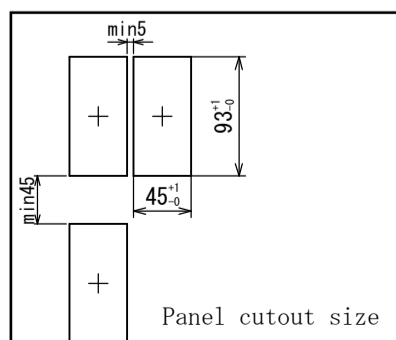
Note 2) Maximum load resistance 400Ω

Note 3) Differential (See the following figure)

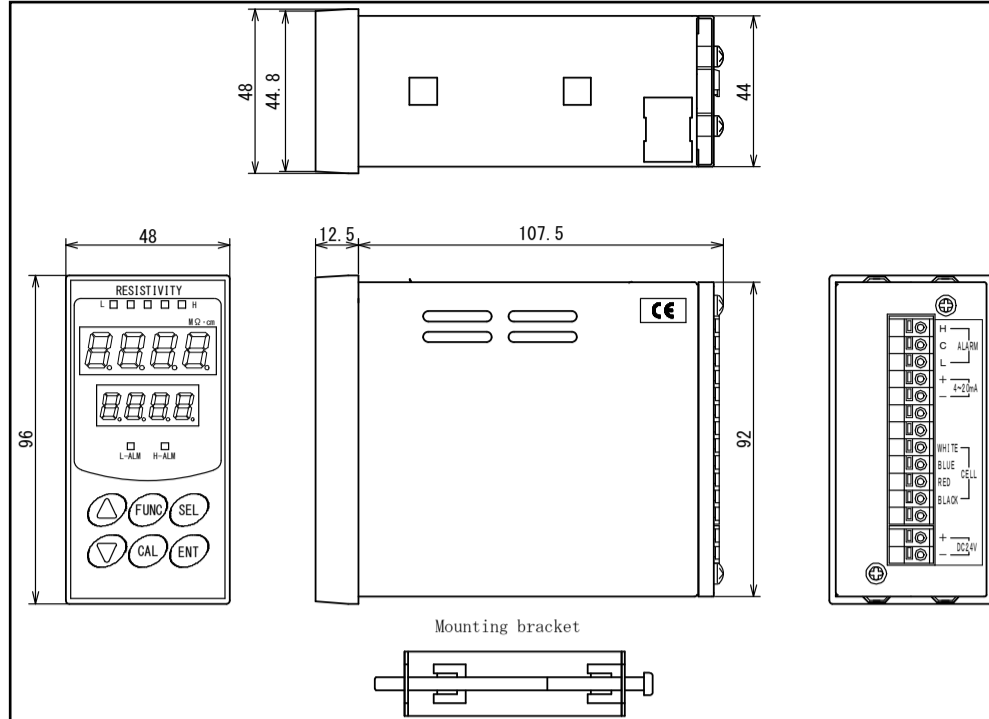


Mounting method

- Refer to the panel cutout size shown in the right figure. The minimum horizontal size is described.
- For mounting the meter, fix it at its upper and lower parts by using two attached brackets. (See the external dimensions)

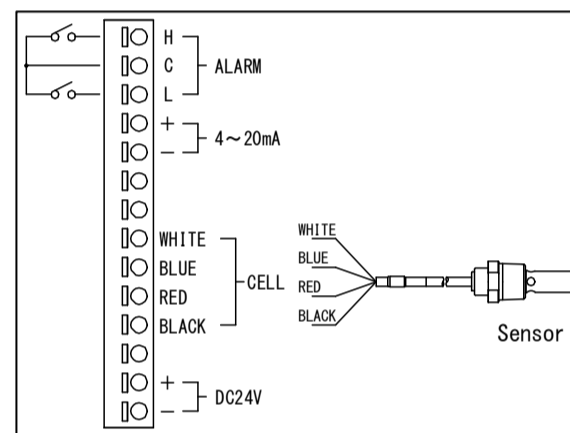


External dimensions



Connection method

- Connection to screw-less terminal board
- Applicable wires
 - Single wire: AWG26~16
 - Twisted wire: AWG22~16
- Wire exfoliation size: Min. 8mm (Recommended size 11mm)
- Applicable tool: A minus screwdriver (Blade tip width 2.6)



Caution

Don't push in any wire forcibly, otherwise the wire may be inserted up to the wire sheath to cause a continuity failure. Particularly be careful with connections.

- Be sure to provide an appropriate surge control circuit respectively for the following:

If input/output or signal lines within the building are longer than 30 meters. If input/output or signal lines leave the building, regardless the length.

Operation Check

Install and calibrate the product correctly and then check its operation to confirm correct function of the whole system when using.

Limit on Application

The product is not designed nor manufactured for an use in such equipment or system that is intended to be used under such circumstances that may affect human life.

For application requiring extreme high reliability, please contact the Company first.

Scope of warranty

Unless otherwise agreed by the parties, warranty period of the product shall be one year after date of delivery to Buyer.

In case of failure attribute to the Company within such period, the product shall be repaired or replaced without charge, provided that any one of followings are out of the warranty:

- ① Improper handling or application by user.
- ② Modification or repair by other than the Company.
- ③ Any failure to be caused by acts of God, fire, storm or the like, war riot or the like and other cases beyond the control of the Company.

Warranty described in this paragraph means the warranty for the product itself and does not include warranty for any consequential damage arising out of or occasioned by a defect or failure of the product.

Applicable Standards

- EMI: EN 50081-2
- EMS: EN 61000-6-2

Operation method

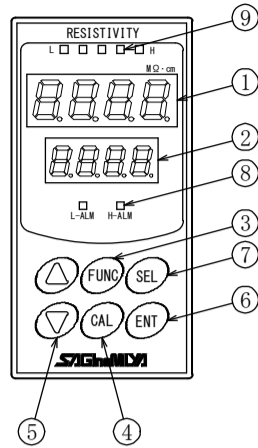
1. Indications and keying operation

1) Indications

- ①: Resistivity indication
(Data are indicated when constants are set)
- ②: Temperature indication
(Mode is indicated when constants are set)
- ⑧: Higher-limit/lower-limit alarm
- ⑨: Resistivity level indication

2) Key switches

- ③: FUNC (Selects various setting functions)
- ④: CAL (Selects various corrective functions)
- ⑤: UP/DOWN (Increases or decreases a numeric value)
- ⑥: ENT (Decides or inputs set values)
- ⑦: SEL (Inputs the cell constant and thermistor constant or changes the indication contents)



3) Data setting method

- ⑤: Data flicker when operating Up/Down key.
- ⑥: Input data by "ENT" key.

4) Temperature indication part change

- ⑦: Temperature indication returns to the resistivity indication when pressing "SEL" key during various setting. Indication contents in ② can be changed by "SEL" key during resistivity indication.

5) Resistivity level indication

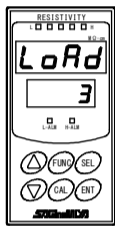
The level between the higher-limit alarm and the lower-limit alarm is divided into 5 sections to indicate the position to an alarm of measured values.

2. When tuning on the power supply

1) Memory check

When turning on the power supply, "LOAD" is indicated on the upper stage, while a count-down indication of "3→2→1→0" appears on the lower stage. Internal memory check and initial setting are executed during this time.

- ※ After the end of memory check, the meter transfers to the cell constant and thermistor constant input mode, or it transfers to the resistivity indication if both constants are already input.



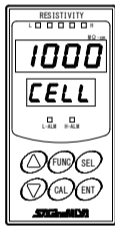
3. Initial setting after turning on the power supply

⚠ Caution

Input the cell constant and thermistor constant without fail when the power supply has been turned on first or when the built-in memory has been reset forcibly. The resistivity meter does not start operating until each constant is input.

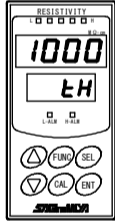
1) Cell constant input

- After the end of initial setting, the meter indicates flickering "1000".
- Input the cell input value being indicated at the end of sensor cable.
Assume that the cell input value is 1015, for example. Input "1015" and then, decide it by pressing "ENT" key.
- Transfer to the next item by pressing "SEL" key.



2) Thermistor constant input

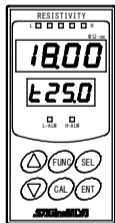
- The meter indicates flickering "1000" on the upper-stage indication part as shown in the right figure.
- Input the temperature input value being indicated at the end of sensor cable.
Assume that the temperature input value is 1010, for example. Input "1010" and then, decide it by pressing "ENT" key.
- Measurement is started by "SEL" key.



3) Resistivity indication

- ※ When "SEL" key is pressed after the cell constant and thermistor constant have been input, the meter transfers to the normal resistivity indication.

It takes about 30 seconds until the resistivity is stabilized.



⚠ Caution

When the sensor has been replaced, the cell constant and thermistor constant must be input again.

The meter transfers to the setting screen when pressing "FUNC" and "SEL" keys together for longer than 2 seconds. Input the constants again.

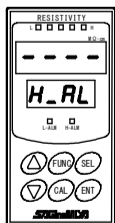
Be careful since correct resistivity is not indicated if these constants are not changed.

4. Various functions setting

- ※ By pressing "FUNC" key, indications are switched sequentially to be ready for the next setting.
- ※ By pressing "SEL" key, the indication returns to the resistivity indication.

1) Higher-limit alarm (H_AL)

- ※ "No alarm:[---]" is preset first in the initial stage.
- Setting range: Lower-limit alarm value < H_AL ≤ 20.0
- Set to "----" when no alarm is set.
- Setting to be out of the range: "Err" flickers.
Reset from the beginning.



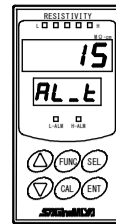
2) Lower-limit alarm (L_AL)

- ※ "No alarm:[---]" is preset first in the initial stage.
- Setting range: 0.1 ≤ L_AL < higher-limit alarm value
- Set to "----" when no alarm is set.
- Setting to be out of the range: "Err" flickers.
Reset from the beginning.



3) Alarm output delay timer (AL_t)

- ※ The timer is preset to 15sec. in the initial stage.
- ※ If the resistivity is restored within the delay time after it has becomes within the alarm range. The occurrence of an alarm due to an abnormal condition during a short time can be prevented.
- Setting range: 0 ~ 600 sec.



5. Various correction setting

- ※ By pressing "CAL" key, indications are switched sequentially to be ready for the next setting.
- ※ By pressing "SEL" key, the meter returns to the resistivity indication.

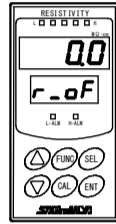
1) High temperature correction (Ht)

- ※ The meter is preset to "No correction: [---]" in the initial stage.
- ※ In order to eliminate a measuring error at a high temperature, correction at 1 point can be done.
- Setting range: 50.0~80.0°C
- Assume that the set value of the reference thermometer is 60.0°C, for example. Input this value to the resistivity meter. In this case, the resistivity meter applies an optimum correction to 60.0°C.
- "H**.*" (**.* shows temperature correction value Ht) and "t***" (**.* shows a measuring temperature) are alternately indicated during correction to show that the correction is in progress.
- For correction reset, set the correction to "----".



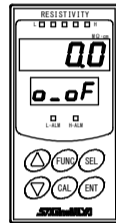
2) Resistivity indication offset (r_oF)

- ※ The resistivity meter is preset to "No offset: [0.0]" in the initial stage.
- Setting range: -3.0~3.0MΩ · cm
- Indication data becomes a value obtained by adding the offset value. The output current value remains unchanged.



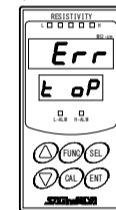
3) Output current offset (o_oF)

- ※ The resistivity meter is preset to "No offset: [0.0]" in the initial stage.
- Setting range: -3.0~3.0MΩ · cm
- When 4 ~ 20mA output is input to an external unit, an indicating error from the resistivity meter can be corrected.
- Output data only becomes a value obtained by adding the offset value. Indicating data remains unchanged.

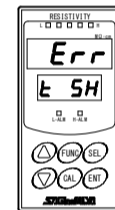


6. Error messages

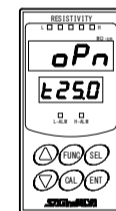
- ※ The resistivity meter indicates an abnormal condition by the following indications (error messages).



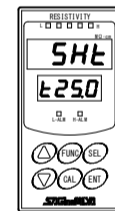
Under the temperature measuring range or breakage of temperature sensor



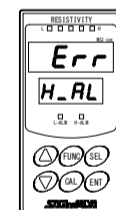
Temperature measuring range over or short-circuit of temperature sensor.



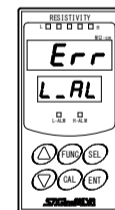
Resistivity measuring range over or breakage across resistivity sensor electrodes.



Under the resistivity measuring range or short-circuit across sensor electrodes.



A value lower than the lower-limit alarm set value has been input when setting the higher-limit alarm.



A value higher than the higher-limit alarm set value has been input when setting the lower-limit alarm.

7. Troubleshooting

Symptoms	Causes
No output current flows.	<ul style="list-style-type: none"> • Check if power is supplied. • Check if power is interrupted. • Check if connections to the terminal board are correct.
Neither indicating data nor output current is stable.	<ul style="list-style-type: none"> • Check if the power voltage is within a range of the rated value ±10%. • Check if the power lead wire or sensor lead wire is connected in parallel with a large current flowing wire by mistake. • Check if connections are done correctly. • Check if sensor lead wires are connected correctly. • Check if sensor electrodes are kept free of dirt or internal deposit of foreign substances. • Check if sensor electrodes are fully immersed into the liquid. • Check if sensor electrodes are kept free of air bubbles.

(※) For the specifications and structure of this product, alteration is reserved without notice for future improvement.

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