MODEL 356M

AC mΩ Tester with 20CH scanner

Instruction Manual

I-01980

TSURUGA ELECTRIC CORPORATION

Contents

1. Preface

We thank you for your purchase of our product. Please take care that this instruction manual is certainly delivered to the person in charge to operate the product. For proper use of the product, please carefully read this manual prior to the initial operation.

⚠ CAUTION

- **To avoid a break-down, malfunction or deterioration of life of the product, do not use it in such places where:**
  - **exposed to rain, water drops or direct sunlight.**
  - **high temperature or humidity, heavy dust or corrosive gas.**
  - **affected by external noise, radio waves or static electricity.**
  - **the vibration or shock is big or they are constantly applied.**
- **Do not use the product dismantling or modifying it.**

1.1 ●Preparations prior to use

1.1.1 Unpacking

When the tester is delivered, please check whether it conforms to the required specifications and has not been damaged in transit. If there is any damage on the tester or it does nor work in conformity with the specifications, please inform us of the model and product name.

1.1.2 Storage

In case of storing the tester for a long time, store it at the place of low humidity and where it is not exposed to the direct sunlight.

1.2 ●Confirmation prior to use

1.2.1 Power supply

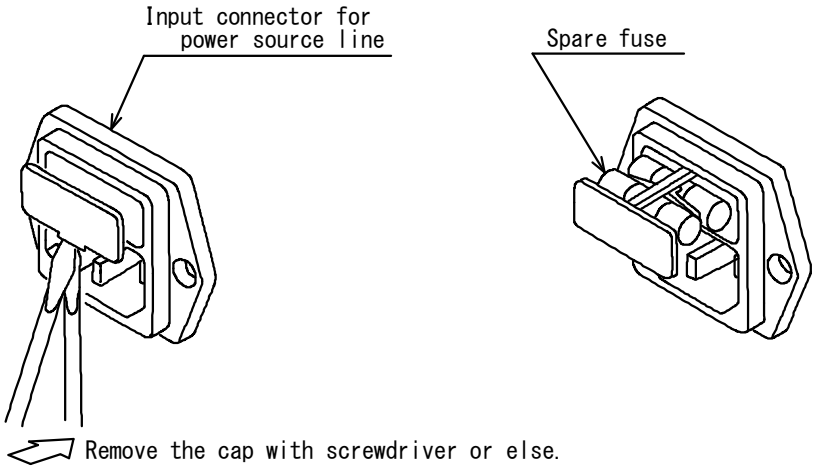
Use the tester with the power source voltage within 90~250VAC and the frequency 50/60Hz. When connecting the power supply cable, confirm that the power supply switch is turned OFF.

1.2.2 Power supply cable

The plug of power supply cable attached to the tester is for 100VAC use. When the tester is used with 200VAC, replace the plug with appropriate one for 200VAC use. Please connect the power supply cable to the power supply connector on the real panel of the tester. The plug of power supply cable has 3 pins and the round shape pin in the center is for grounding. When connecting the tester to the receptacle with an adapter attached to the plug, be sure to connect the earth wire of the adapter to the external earth line for grounding.

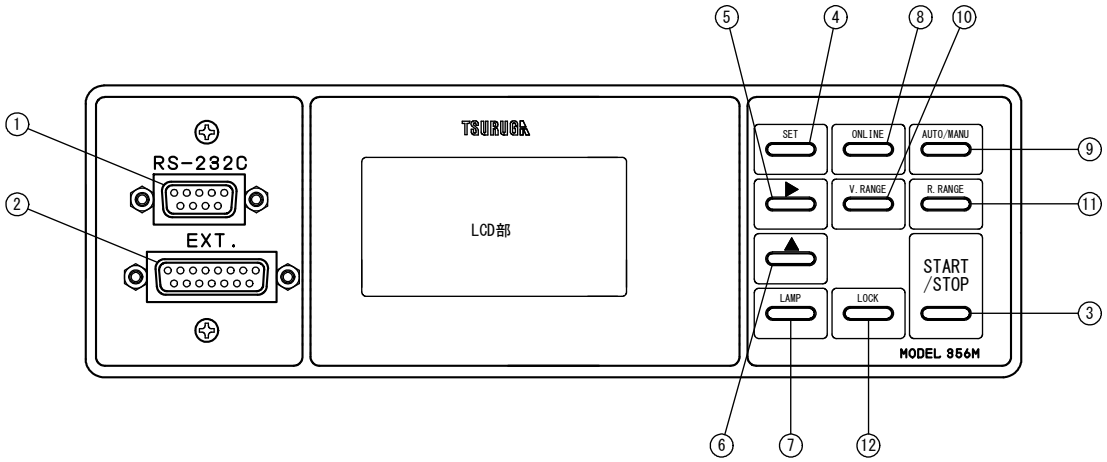
1.2.3 Replacement of fuse

A fuse of 250V/2A for the power source is mounted at the delivery from factory. A socket of the fuse is incorporated in the input connector of the power supply line. In advance to the connection of power supply cable, confirm the rate of the fuse, removing the cap of fuse holder and taking the fuse out. In total two fuses, including a spare one, are put inside the fuse cap. The fuse on this side (spare fuse) can be removed by pushing it toward right or left, and the fuse another side downward.



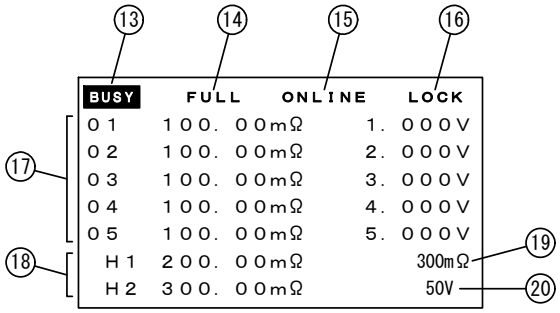
2. Name of parts

2.1 ●Front panel



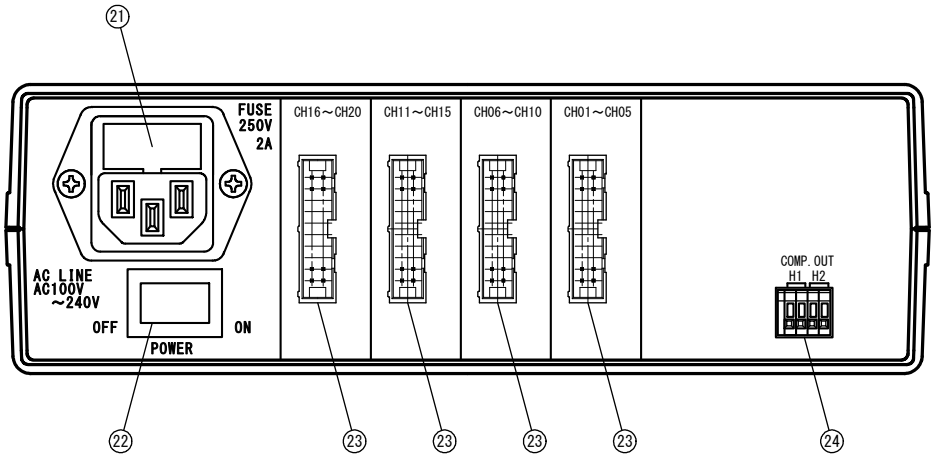
①RS-232C connector	D-sub connector is connected when the remote control is used.
②Connector for extension	Extension unit (5811-71) is connected by the dedicated cable.
③ START/STOP key	Used for start / stop of measurement.
④ SET key	Used to change-over the measurement mode / setting mode.
⑤ ▶ key	Used to select the item to set, in setting mode.
⑥ ▲ key	Used to change the setting item, in setting mode.
⑦ LAMP key	Used to ON / OFF of the backlight.
⑧ ONLINE key	Online key for the RS-232C.
⑨ AUTO/MANU key	Used to change-over the measurement mode.
⑩ V. RANGE key	Key to select the voltage measurement range 5V / 50V.
⑪ R. RANGE key	Key to select the resistance measurement range 30mΩ ~ 3Ω.
⑫ LOCK key	Key to prohibit the key operation of the front panel. A press for 3 seconds or more allows prohibition or its cancellation.

LCD section



⑬BUSY	Indicated during the measurement.
⑭Mode display	Indicating the measurement mode.
⑮ONLINE	Indicated when the remote control is active.
⑯LOCK	Indicated when the key lock is active.
⑰Measurement display	Measurement CH, measured resistance value and measured voltage value are displayed.
⑱Comparator display	Displays the set value of comparator.
⑲Resistance range display	Displays the current resistance measurement range.
⑳Voltage range display	Displays the current voltage measurement range.

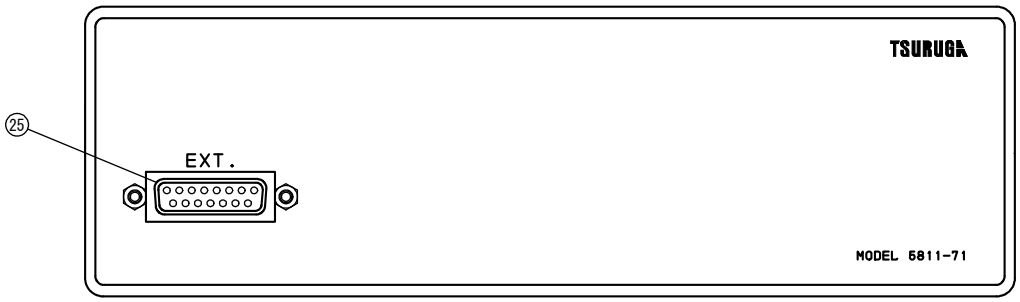
2.2 ●Rear panel



㉑㉑Power supply connector	The attached power supply cable is connected. Be sure to apply the source power voltage and frequency within the rated values. Use the fuse of 250V 2A.
㉒㉒Power switch	ON/OFF switch for the supplied power.
㉓㉓Measurement connector	The measurement connector is connected.
㉔㉔Output terminal blocks	Output terminals for comparator.

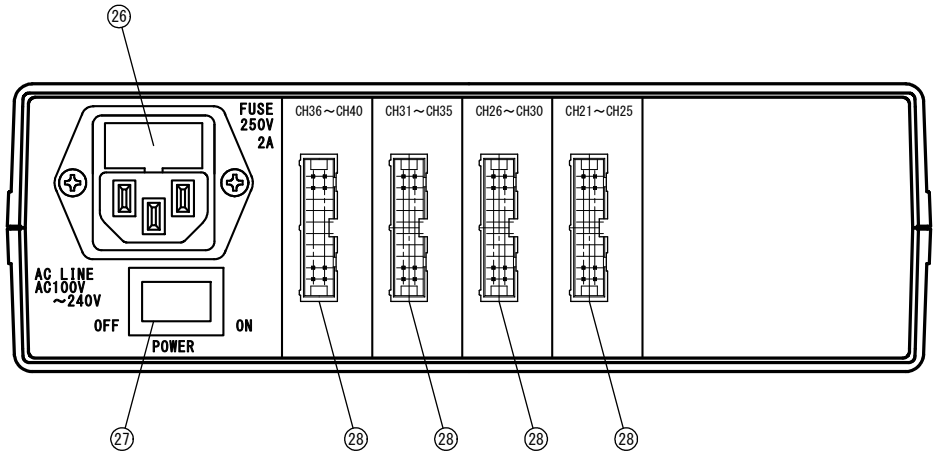
2.3 ●Extension unit (5811-71) (Option)

2.3.1 Front panel



㉕㉕Connector for extension　　Connected to the connector for extension on the front panel, by means of the dedicated cable.

2.3.2 Rear panel



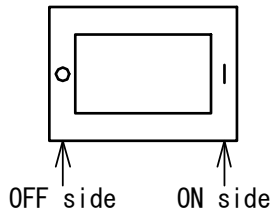
㉖㉖Power supply connector　　The attached power supply cable is connected.　Be sure to apply the source power voltage and frequency within the rated values.
Use the fuse of 250V 2A.

㉗㉗Power switch　　ON/OFF switch for the supplied power.

㉘㉘Measurement connector　　The measurement connector is connected.

3. Operation

3.1 ●Power supply



After confirming that the power source switch on the rear panel is in OFF position, connect the power supply plug into the receptacle and turn ON the power supply switch. The tester immediately becomes operable, but it is recommended to have a pre-heating time for 30 minutes or more.
The tester is provided with the function to retain the parameters, so it stores the status of the following parameters even if the power supply is turned OFF.

(1) Measurement mode and measuring range.
(2) Setting of measuring channel(s).
(3) Comparator values and buzzer setting.
(4) Key lock status.
(5) Various measurement setting.
(6) Communication setting.

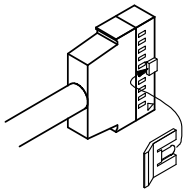
⚠ CAUTION

- **When the optional extension unit is connected, turn ON the power supply of the extension unit, prior to the tester main unit.**
  If the extension unit is turned ON after the tester main unit, the extension unit does not normally work.

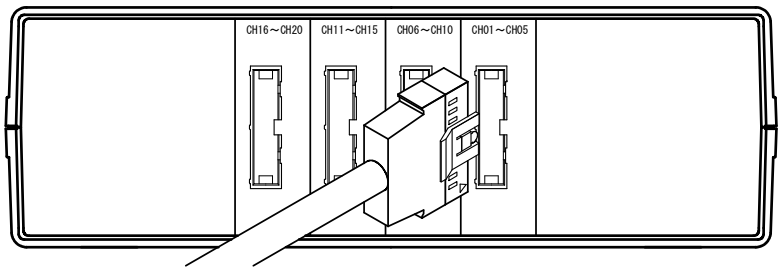
3.2 ●Connection of measuring cable

3.2.1 Connection of connector

Attach the projection of the attached lock lever to the socket on the measuring cable.

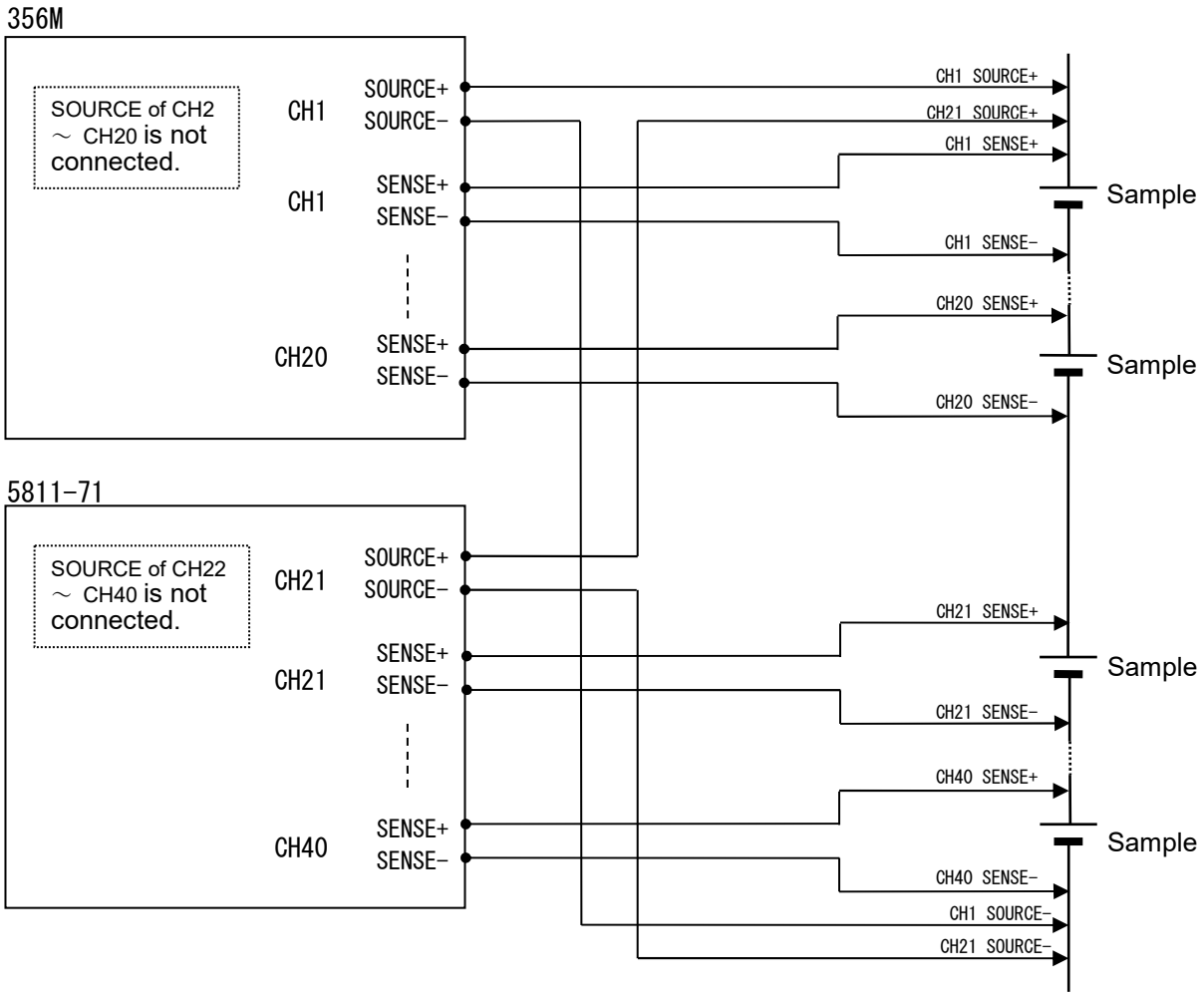


Connect the measuring cable (option) to the measurement connector on the rear panel.
The measuring cable is capable of 5 channels, so in order to measure the 20 channels, you need to connect all the 4 cables.



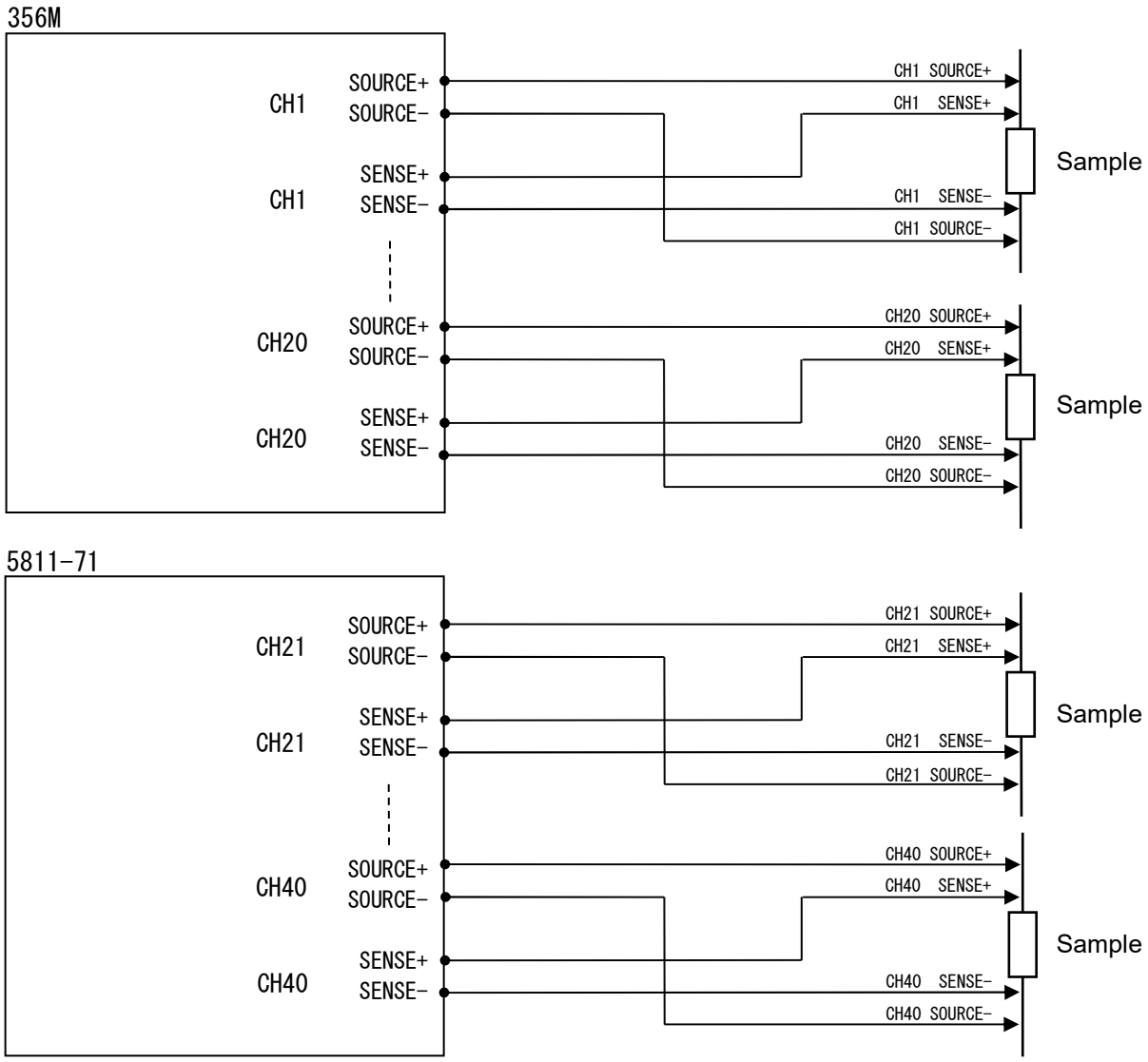
3.2.2 Connection to the sample to be tested (Fixed current output mode)

The fixed current output mode is used for the measurement of such sample as stack connected cells which are connected in series.
In the fixed current output mode, the 356M outputs the measuring current from CH1 and the extension unit (5811-71) from CH21.
The voltage measurement measures the voltage in between SOURCE- and SENSE+ to measure.



3.2.3 Connection to the sample to be tested (Individual current output mode)

The individual current output mode is used for the measurement of such single sample to be measured such as switch contact, contact resistance of connector pin and so on.
In the individual current output mode, the current is output, changing over to every measurement CH.
When connected to the sample, a four lines are connected per sample to be measure.



3.3 ●Cautions for measurement

3.3.1 Maximum apply voltage

The maximum apply voltage of each channel is 50V.
The maximum apply voltage between CH1 ~ maximum channels is 50V.

3.3.2 Cautions for the extension of lead wires

(1) Make the extension by 4 terminals system (2 wires for SENSE, 2 wires for SOURCE). If the wiring is made by 2 wires, the wiring or contact resistance is included in the measured value, having caused an incorrect measurement value.
(2) Make the wiring so that the forked section of the lead is as short as possible.
(3) Keep the measuring distant from the metallic part. If it is close to the metallic part, it may cause an inaccurate measurement due to the eddy current.
(4) When the lead wire is extended, take care that the lead wire resistance does not exceed the tolerable range specified in the following table.

Tolerable range of lead wire resistance of SENSE lead

Resistance range	Voltage limit	
	ON	OFF
30mΩ	600mΩ	1Ω
300mΩ	7Ω	7Ω
3Ω	50Ω	50Ω

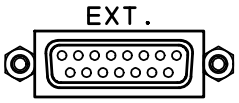
3.3.3 Others

A big error may occur if the samples having the inductance or capacitance is measured.
If the tester is used near the source of noise (high frequency furnace, high noise power line, inverter power source etc.), such noise may enter the input line and affect the measurement. Avoid the use in such a site or keep the sufficient distance from the noise source.

3.4 ●Connection of extension unit

3.4.1 Connector

The connector is female D-sub with 15 pins.



Set up the 356M main unit on the extension unit and connect the connector of each extension unit, using the dedicated cable.
If the use makes the cable, connect the 15 pins by one-to-one pin.

3.4.2 Cautions at connection

Connect the extension unit with the power supply turned OFF.
In case that the extension unit is connected, the 356M main unit must be of the specification of 20CH inputs (Model: 356M-20).

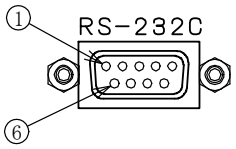
⚠ CAUTION

- **Use the 356M main unit and extension unit by one-to-one unit. The correct measurement can not be done if the extension unit is exchanged with one of the others.**
- **When only the extension unit is purchased, after the purchase of 356M main unit, an integral calibration of them is necessary. For that purpose the 356M main unit has to be returned to us before the delivery of extension unit.**

3.5 ●Connection of RS-232C

3.5.1 Connector and signals

The connector is D-Sub with 9 pins.

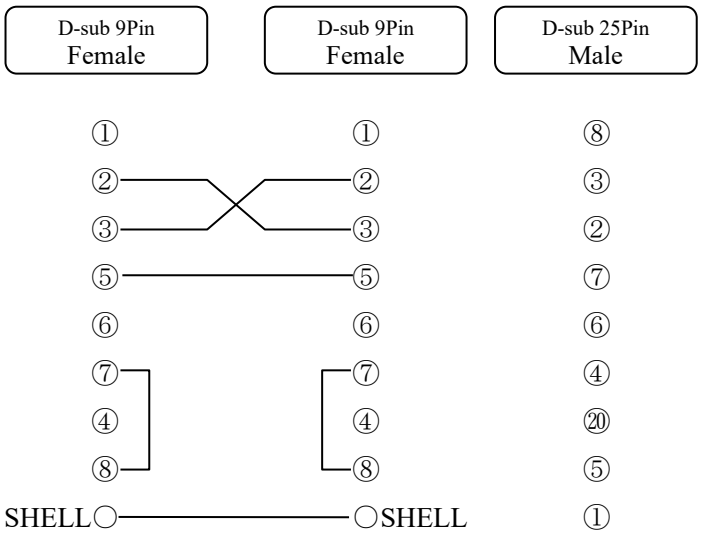


Pin No.	Signal JIS (RS-232C)	Direction	Name
①			Not in use
②	RD (RXD)	Input	Receiving data
③	SD (TXD)	Output	Transmission data
④			Not in use
⑤	SG (GND)		Ground for signal
⑥			Not in use
⑦			Not in use
⑧			Not in use
⑨			Not in use

3.5.2 Connection cable

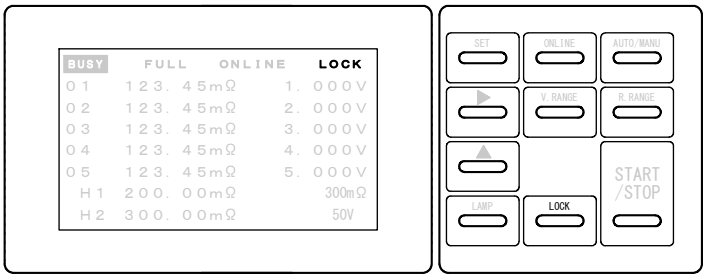
A cross cable (1.5m) is attached as standard to this tester.
If the user makes the communication cable, make the wiring as follows:

Hardware – no hand shake



3.6 ●Key lock

The key-lock function prohibits the key operation on the front panel so that the measuring condition can not be altered.
While the key lock is in operation, the LOCK mark is displayed above the LCD.
In order to operate the other keys, cancel the key lock first.
Only the LAMP and START/STOP keys are operable while the key lock is in operation.



How to key lock

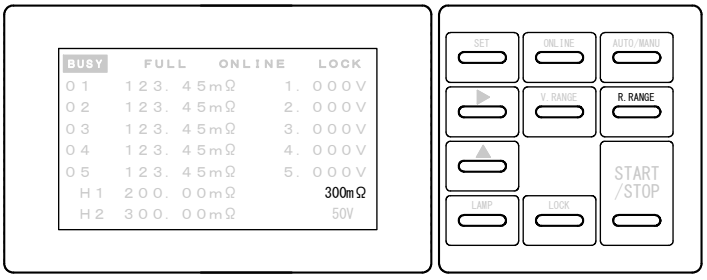
The key lock is obtained by pressing the LOCK key for 3 seconds or more.
During the key lock, LOCK mark is displayed above the LCD.

Reset of key lock

To cancel the key lock, press LOCK key again for 3 seconds or more.

3.7 ●Change-over of resistance measurement range

It is to select the measuring range of the resistance measurement.
It is not operable during the measurement and in the status of ONLINE and LOCK.

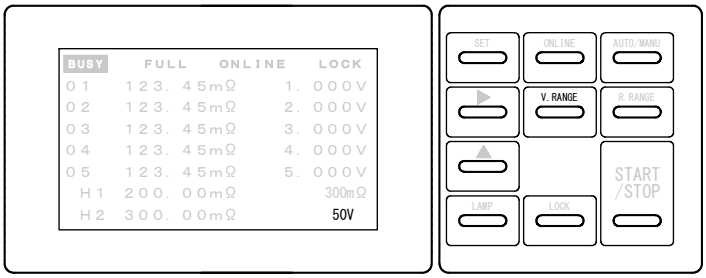


Change-over of resistance measurement range

Every time the R. RANGE key is pressed, the range mark (30mΩ~3Ω) at the right bottom on the LCD changes. Select the required range.

3.8 ●Change-over of voltage range

It is to select the measuring range of the voltage measurement.
It is not operable during the measurement and in the status of ONLINE and LOCK.

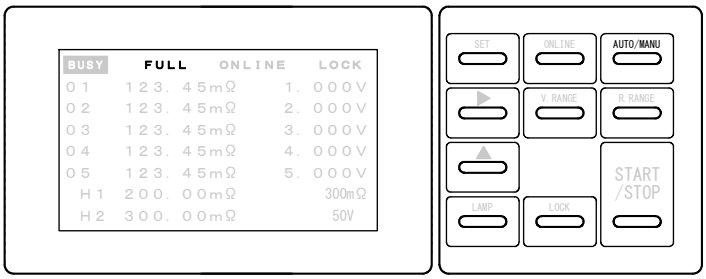


Change-over of voltage measurement range

Every time the V. RANGE key is pressed, the range mark (5V, 50V) at the right bottom on the LCD changes. Select the required range.

3.9 ●Change-over of measurement mode

It is to select the automatic measurement mode (AUTO, FULL) and manual measurement mode (MANU).
It is not operable during the measurement and in the status of ONLINE and LOCK.



(1) Automatic measurement mode (AUTO)
This mode measures resistance and voltage of CH1 up to the maximum measuring channel.
The scanned measurement values are internally memorized and on request by remote control, the measurement data of whole the channels are output.

(2) Automatic measurement model (FULL)
The measurement action is the same as Automatic measurement mode (AUTO).
In this mode, the data is output every time the measurement of each channel is made, without request by remote control.

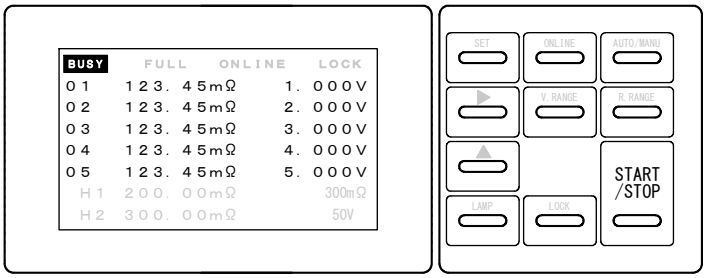
(3) Manual mode (MANU)
In this mode, the resistance and voltage value of the channel set to the manual measurement channel is measured.

Change-over of measurement mode

Every time the AUTO/MANU key is pressed, the mode display (AUTO/FULL/MANU) at the top on the LCD changes. Select the required mode.

3.10 ●Start/stop of measurement

It is to start the measurement by the selected measurement mode.
It is not operable in ONLINE status.



(1) Automatic measurement mode (AUTO, FULL)
After scanning the channels from CH1 up to the maximum measuring channel for one time, the tester becomes the status to wait for the measurement.
It is not allowed to change the order of measurement (scanning).

(2) Manual mode (MANU)
It starts the measurement of the channel set to the manual measurement channel.

Start of measurement

In the status waiting for the measurement, press START/STOP key, then BUSY is displayed at the top of LCD and the measurement is started.
During the measurement, the channel currently measured and the measured value are displayed.
Once the measurement is started, the previous measurement result is cleared.

Stop of measurement

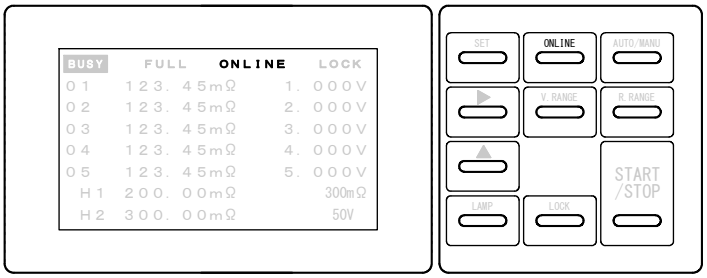
During the measurement, if the START/STOP key is pressed again, the measurement stops and the tester becomes the status to wait for the measurement.

Change-over of measurement display

The LCD can display the 5 channels at a time.
In the status waiting for the measurement, every time the ▶ key is pressed, the channels to be displayed on the LCD can be changed to “01~05”, “06~10”, “11~15”, “16~20”, (“21~25”, “26~30”, “31~35”, “36~40”).
(The figures in the brackets ( ) are when the extension unit is connected.)

3.11 ●Change-over of online

It is to change-over the online status of remote control.
It is not operable during the measurement and in the status of LOCK.



(1) Online
When the online is active, the setting of measurement conditions and start/stop of the measurement can be done by the remote control.
The key operation on the front panel is disabled (except the [ONLINE], [LAMP] keys).

(2) Cancellation of online
When the online is cancelled, the setting of measurement conditions or start/stop of the measurement can not be done by the remote control.

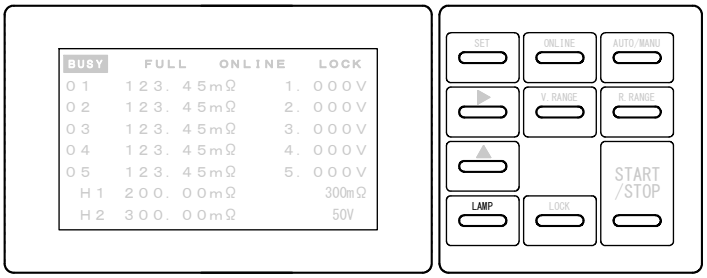
Regardless of online status, the output of measured data and the read out of the setting condition are possible.

[Change-over of online status]

Every time the [ONLINE] key is pressed, the ONLINE display at the top on the LCD changes. Select the required mode.

3.12 ●Backlight

It is to change-over the turn on or off the backlight.



[Change-over of backlight]

Every time the [LAMP] key is pressed, the backlight ON and OFF alternates.

3.13 ●Comparator action

The comparator has two output of resistance comparator which compares the resistance values. During the measurement, the tester compares the measured value with the respective high limit value, and displays and outputs the judgement result.
The output is retained even if the automatic measurement finished and the tester becomes the status waiting for the measurement.
Once the automatic measurement is started, the output is reset.
If either resistance value of the measured channel reaches or exceeds the H1 set value, the H1 relay contact output turns ON.
If either resistance value of the measured channel reaches or exceeds the H2 set value, the H2 relay contact output turns ON.
The judsgement is output by relay contact.

Note: The comparator does not work in the manual measurement mode (MANU).

3.13.1 Conditions of comparison

Display value ≧ H1 set value H1 output
Display value ≧ H2 set value H2 output

Note: The comparator compares the values, including the range.
Example:
In case that the high limit value is set to 100.00mΩ(300mΩ range), and when 0.1000Ω is displayed in the measuring range is 3Ω, the output turns ON.

3.13.2 Comparator output

- Contact output
  The relay contact output is output at the screw-less terminal blocks on the rear.
- Display
  H1 and H2 are displayed by reversing display.

3.14 ●Buzzer

When the comparator output is turned ON, it is announced by buzzer sounding.
The buzzer action can be selected.
The buzzer sound volume can be set in 10 steps.

Buzzer action

OFF	Buzzer OFF (buzzer does not sound).
H1	Buzzer sounds when H1 is output.
H2	Buzzer sounds when H2 is output.
H1 H2	Buzzer sounds when either H1 or H2 is output.

Stop of buzzer

The buzzer continues to sound even after the automatic measurement is finished.
In the status waiting for the measurement, the buzzer stops by pressing the ▲ key .
(The relay output is retained.)

4. Setting method

4.1 ●Contents to set

- In the status waiting for the measurement, press SET key for about 2 seconds, the tester enters the setting mode.
- It is not operable during the measurement and in the status of ONLINE and LOCK.
- If there is no key operation for about 5 minutes in the setting mode, the tester returns to the status to wait for the measurement. In this case, the values set immediately prior are not stored.

○ Setting of channel
  - Maximum measuring channel
  - Manual measurement channel

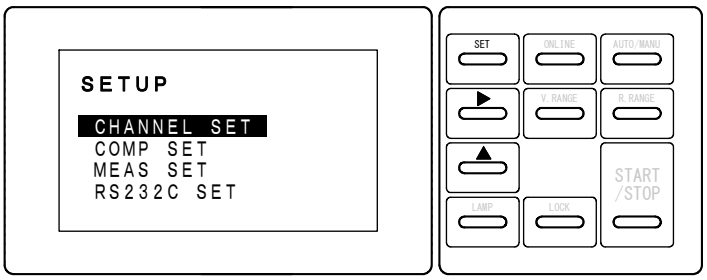
○ Setting of comparator
  - High limit value of comparator H1
  - High limit value of comparator H2
  - Comparator, range
  - Buzzer mode and buzzer sound volume

○ Setting of measurement
  - Channel, scanning time
  - Voltage limit function
  - Current mode

○ Setting of communication
  - Setting of RS-232C

4.2 ●Setting menu

Operating procedure



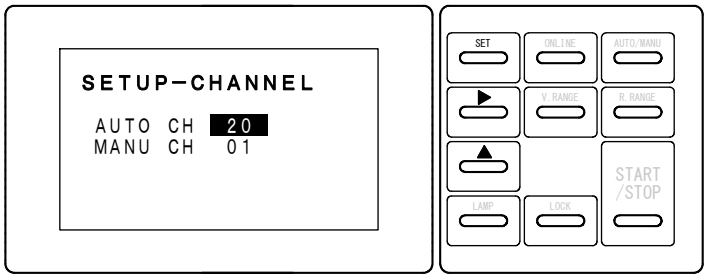
(1) Enter the setting menu, by pressing the SET key for about 2 seconds.
(2) With the ▶ key, select the item to set.
(3) With the ▲ key, move to the setting of the item selected.

Note: To exit from the setting menu, in the setting menu mode, press the SET key.

(4) If the SET key is pressed for about 2 seconds in the setting menu mode, the tester becomes that status to wait for the measurement. At this time, the each set value is memorized in the internal memory.

4.3 ●Setting of measurement channel

Operating procedure



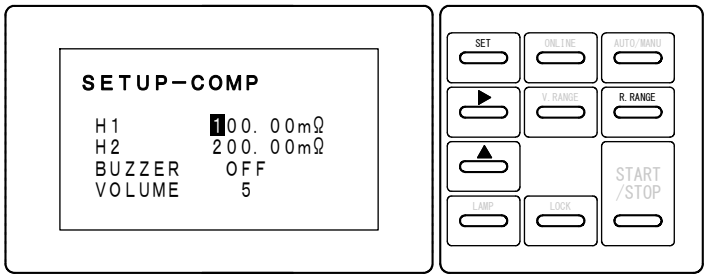
(1) By selecting CHANNEL SET in the setting menu, the tester moves to the setting of measurement channel.
(2) With the ▶ key, select the item to set.
(3) With the ▲ key, change the setting of the selected item.
(4) With the SET key, return to the setting menu.

AUTO CH	Set the maximum channel of automatic measurement (1~20) ※
MANU CH	Set the manual measurement channel (1~20) ※

※When the extension unit (5811-71) is connected, it is 0~40.

4.4 ●Setting of comparator

Operating procedure

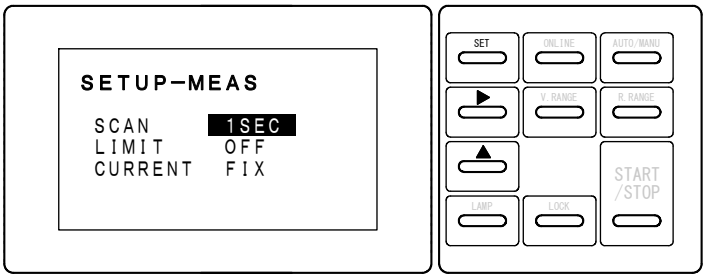


(1) By selecting COMP SET in the setting menu, the tester moves to the setting of comparator.
(2) With the ▶ key, select the item to set.
(3) With the ▲ key, change the setting of the selected item.
(4) When setting the H1, H2, select the comparator range with R.RANGE key.
(5) With the SET key, return to the setting menu.

H1	Set the high limit value of comparator H1. Adjustable range is 0~35000
H2	Set the high limit value of comparator H2. Adjustable range is 0~35000
BUZZER	Select the buzzer action: OFF Buzzer does not sound. H1 Buzzer sounds when the measured resistance value reaches or exceeds H1. H2 Buzzer sounds when the measured resistance value reaches or exceeds H2. H1H2 Buzzer sounds when the measured resistance value reaches or exceeds H1 or H2.
VOLUME	Set the buzzer sound volume. Adjustable range is 1~10.

4.5 ●Setting of measurement

Operating procedure



(1) By selecting MEAS SET in the setting menu, the tester moves to the setting of measurement.
(2) With the ▶ key, select the item to set.
(3) With the ▲ key, change the setting of the selected item.
(4) With the SET key, return to the setting menu.

SCAN	Setting of scanning time of automatic measurement channel.
1SEC	Performs the automatic measurement by 1 second / CH.
2SEC	Performs the automatic measurement by 2 second / CH.

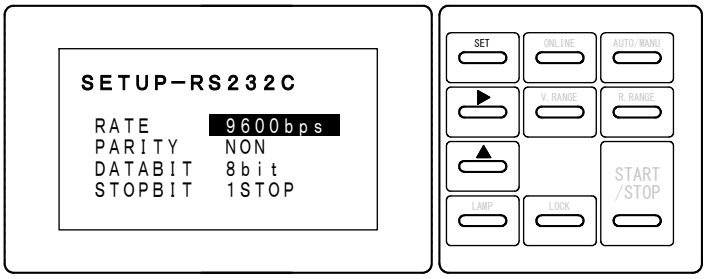
LIMIT	Setting of voltage limit.
OFF	Turns the voltage limit function OFF.
ON	Turns the voltage limit function ON: Limit the open voltage of SOURCE terminal to 20mV or less.

CURRENT	Setting of current output mode.
FIX	Fixed current output mode: The current output is always output from CH1 ※
EACH	Individual current output mode: The current output is output from the same channel as measurement channel.

※ When the extension unit (5811-71) is connected, the current output is as follows:
At the measurement of CH01~CH20: Current output from CH1.
At the measurement of CH21~CH40: Current output from CH21.

4.6 ●Setting of communication

Operating procedure



(1) By selecting RS232C SET in the setting menu, the tester moves to the setting of communication.
(2) With the ▶ key, select the item to set.
(3) With the ▲ key, change the setting of the selected item.
(4) With the SET key, return to the setting menu.

RATE	Setting of communication speed: Selected from 2400, 4800 or 9600bps
PARITY	Setting of parity: Selected from NON, ODD (odd number) or EVEN (even number)
DATABIT	Setting of data length: Selected from 7bit or 8bit.
STOPBIT	Stop bit: Fixed at 1STOPBIT.

When the utility software is used, make the setting as same as those in the article “6.3 Setting of communication”.

5. Calibration

5.1 ●Materials to prepare

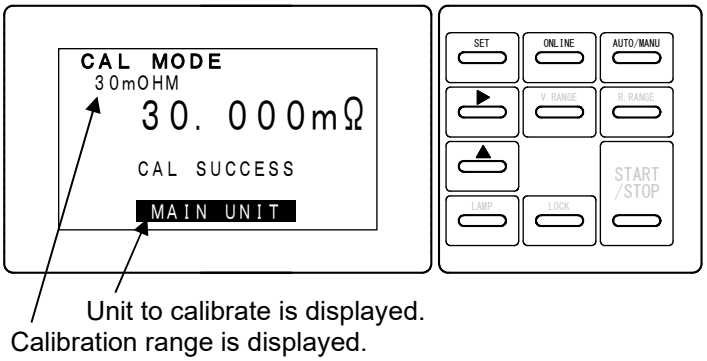
In case that this tester is calibrated, prepare the following device for calibration:

- Standard resistors for calibration of resistance measurement ranges:
  30mΩ,300mΩ, 3Ω.
- Standard voltage generator for calibration of voltage measurement ranges:
  5V, 50V

Note: Use the calibration device whose accuracy satisfies the accuracy of 356M.

5.2 ●Calibration method

5.2.1 Calibration of resistance measurement range

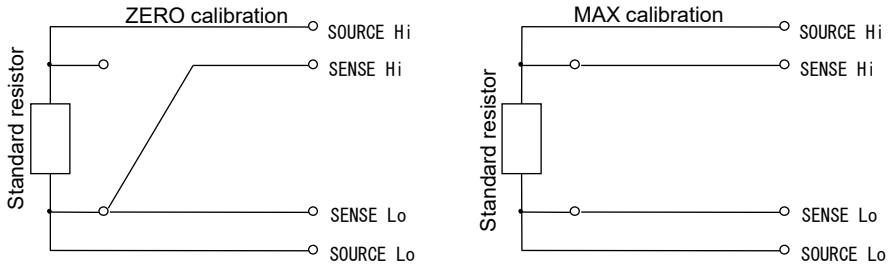


(1) Keep pressing the [ONLINE] and [AUTO/MANU] keys both together, turn the power supply switch ON.
(2) The tester enters the status of 30mΩ calibration.
(3) With the [▶] key, perform the ZERO calibration.
(4) With the [▲] key, perform the MAX calibration.
If the calibration is correctly done, “CAL SUCCESS” is displayed at the bottom of LCD.
When the “CAL ERROR” is displayed, it is out of calibration range.
Enter the correct resistance value.
(5) With the [SET] key, change the range.
(6) The standard resistance value for each range and the display value are as follows:

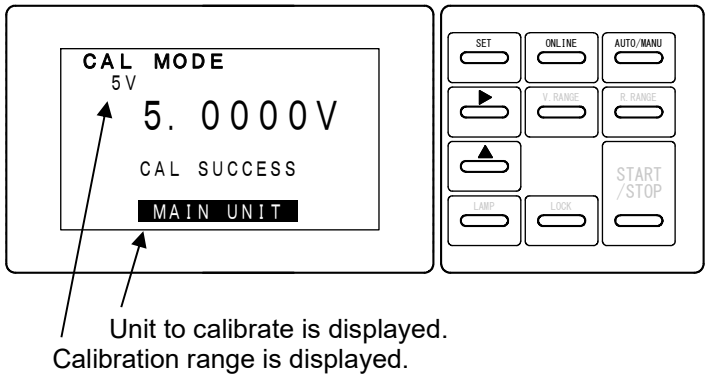
Range	Standard resistance value	ZERO display value	MAX display value
30mΩ	30mΩ	0.000 mΩ	30.000 mΩ
300mΩ	300mΩ	0.00 mΩ	300.00 mΩ
3Ω	3Ω	0.0000 Ω	3.0000 Ω

(7) When the calibration is finished, turn the power supply switch OFF and finish the calibration mode.
By turning ON again the unit, it returns to the measurement status.

○ Connection
Use the CH1 input terminal for the following connections.



5.2.2 Calibration of voltage measurement range

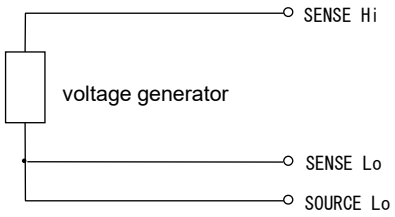


(1) Keep pressing the [ONLINE] and [AUTO/MANU] keys both together, turn the power supply switch ON.
(2) With the [SET] key, move to the 5V calibration.
(3) With the [▶] key, perform the ZERO calibration.
(4) With the [▲] key, perform the MAX calibration.
If the calibration is correctly done, "CAL SUCCESS" is displayed at the bottom of LCD.
When the "CAL ERROR" is displayed, it is out of calibration range.
Enter the correct voltage value.
(5) With the [SET] key, change the range.
(6) The standard voltage value for each range and the display value are as follows:

Range	Standard voltage value	ZERO display value	MAX display value
5V	5.0000V	0.0000V	5.0000V
50V	50.000V	0.000V	50.000V

(7) When the calibration is finished, turn the power supply switch OFF and finish the calibration mode.
By turning ON again the unit, it returns to the measurement status.

○ Connection
Use the CH1 input terminal for the following connections.



5.2.3 Calibration of extension unit

The extension unit needs to be calibrated apart from the main unit.

(1) Connect the main and extension unit and turn ON the extension unit.
(2) Keep pressing the [ONLINE] and [AUTO/MANU] keys both together, turn ON the power supply switch of main unit.
(3) With the [SET] key, move until the display changes to EXT UNIT
(4) Follow the same procedure as those described at the article 7.2.1 and 7.22.

Note: When calibrating the extension unit, use the input terminal of CH21.

6. Specifications

6.1 ●Model name

■Main unit

Model name	Specification
356M-05	Number of input 5CH
356M-10	Number of input 10CH
356M-15	Number of input 15CH
356M-20	Number of input 20CH

■Extension unit

Model name	Specification
5811-71-05	Number of input 5CH
5811-71-10	Number of input 10CH
5811-71-15	Number of input 15CH
5811-71-20	Number of input 20CH

6.2 ●Measuring range and accuracy

■Resistance measurement

Measuring range	30mΩ	300mΩ	3Ω
Resolution	1μΩ	10μΩ	100μΩ
Measuring current	7.4mA	1mA	100μA
Accuracy ※	±(0.5% of rdg. + 8digit)		
Temperature coefficient	±(0.05% of rdg. + 0.8digit)/°C		
Open terminal voltage	20mV peak or less (with ON/OFF function)		

■Voltage measurement

Measuring range	±5V	±50V
Resolution	100μV	1mV
Accuracy ※	±(0.05% of rdg. + 5digit)	
Temperature coefficient	±(0.005% of rdg. + 0.5digit)/°C	

※Accuracy: Defined at 23℃ ±5℃, 45～75% RH.
※ALL channels are common to the range setting.

6.3 ●General specifications

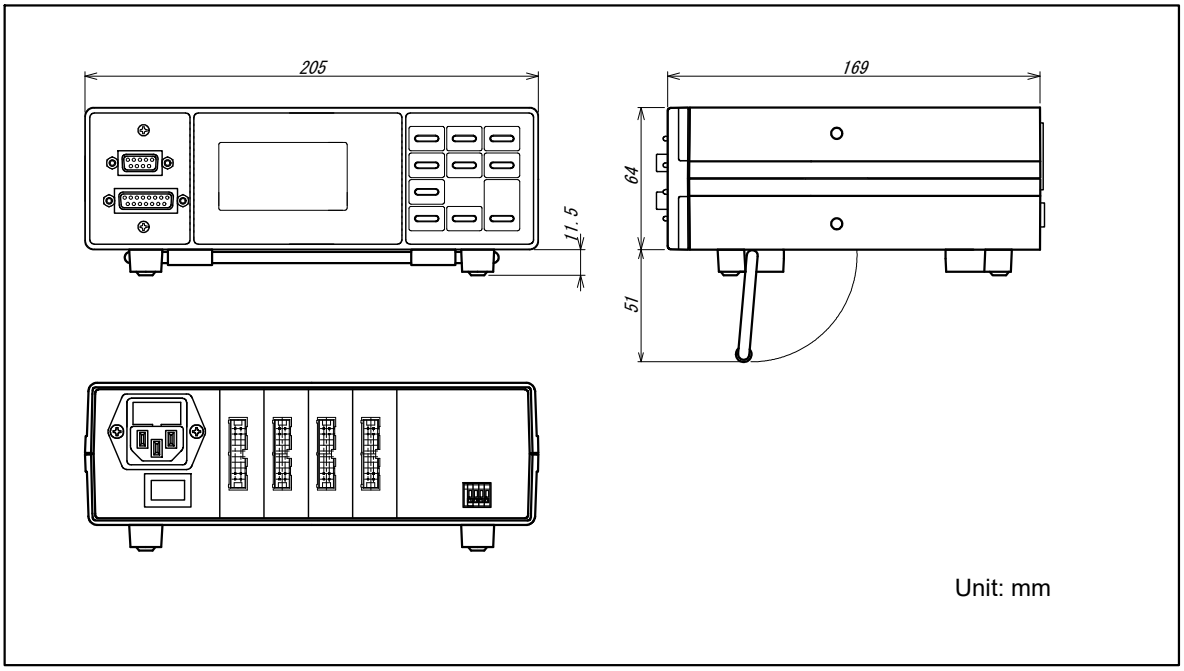
Measuring system	:	AC 4 terminal system
A/D conversion system	:	△－Σ system
Tolerable max. apply voltage	:	DC50V for all the range.
Measuring frequency	:	AC, 1kHz±20Hz
Display	:	LCD Resistance measurement : 35000 Voltage measurement : 50000 (with polarity indication) Provided with zero suppress function.
Over-range display	:	OVER
Display unit	:	mΩ, Ω, V
Sampling rate	:	10 times/sec.
Response speed	:	Approximately 667ms.
Insulation resistance	:	Terminal blocks / Case DC500V, 100MΩ or more
Withstanding voltage	:	Terminal blocks / Case AC1500V for 1 minute Power source terminals / Case AC1500V for 1 minute
Parameter retention	:	Range, values etc. set by the key are retained by EEPROM, even if the power is turned OFF.
Power supply voltage	:	AC100~240V 50/60Hz
Tolerable voltage range	:	AC90~250V
Power consumption	:	356M : Approx. 8VA at AC100V input Approx. 10VA at AC200V input 5811-71 : Approx. 6VA at AC100V input Approx. 7VA at AC200V input
Operating ambient temperature	:	0~50 °C
Storage temperature	:	-20~70 °C
Weight	:	356M : Approx. 1.2 kg 5811-71 : Approx. 1.2 kg
Accessories	:	356M : Power supply fuse: 1 pc. (Spare fuse: Fitted in the power supply connector) Power supply cord with 3P→2P converter 1 pc. Utility software 1 pc. RS-232C cable 1 pc. Instruction manual 1 copy 5811-71 : Power supply fuse: 1 pc. (Spare fuse: Fitted in the power supply connector) Power supply cord with 3P→2P converter 1 pc. Extension unit connection cable 1 pc.

6.4 ●General specifications (at the time of delivery from factory)

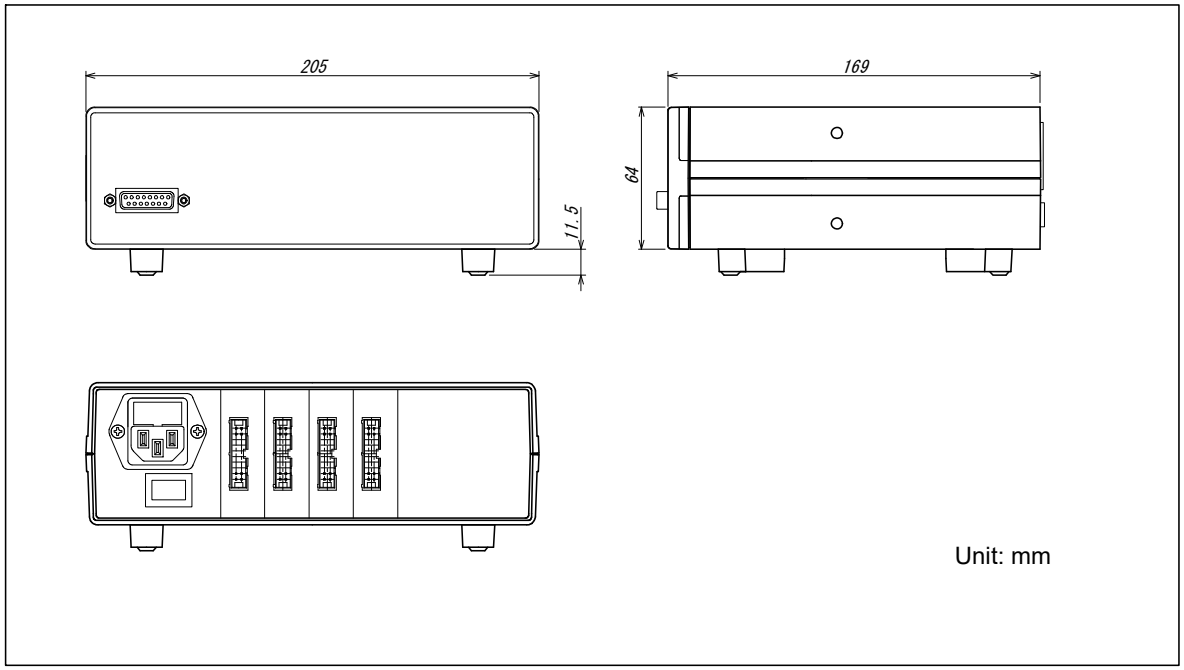
Measuring range	3Ω, 50V
Measurement mode	Automatic measurement mode (FULL)
Key lock	OFF
Max. channel of auto measurement	20
Manual measurement channel	01
Comparator	H1: 3.0000Ω, H2: 3.0000Ω
Buzzer	OFF, volume 5
Scanning time of auto measurement	1SEC
Voltage limit setting	OFF
Current mode setting	Fixed current mode
Communication setting	9600, 8, N, 1

6.5 ●External dimensions

■356M main unit



■Extension unit (5811-71)



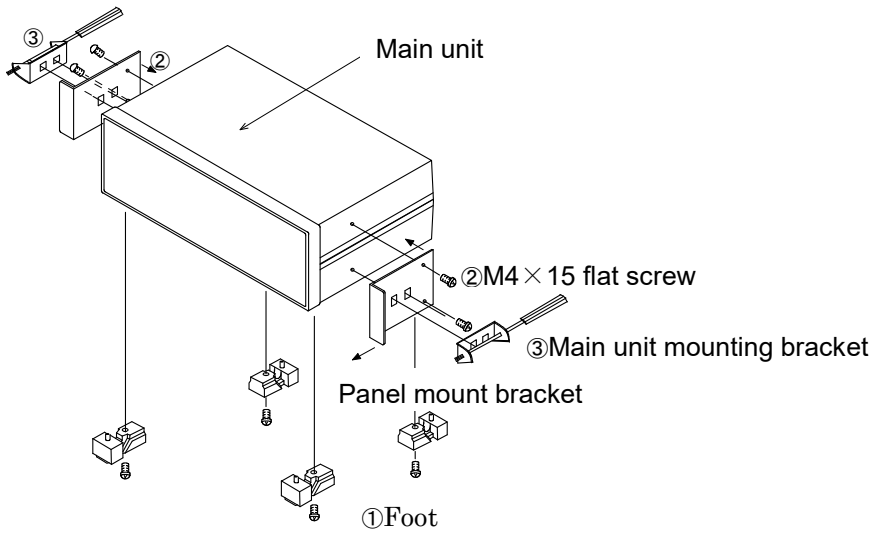
6.6 ●Option

Panel-mount bracket : 5811-31
Measuring cable : 5803-31- 1 (bare cable end)
1 : Cable length
-015 (1.5m), -030 (3.0m)
: 5803-32- 1 (with clip)
1 : Designation for the CH indication
-0105 (CH1~5), -0610 (CH6~10), -1115 (CH11~15), -1620 (CH16~20)
-2125 (CH21~25), -2630 (CH26~30), -3135 (CH31~35), -3640 (CH36~40)
-X (no indication)

7. Use by panel mount

7.1 ●Assembly drawing

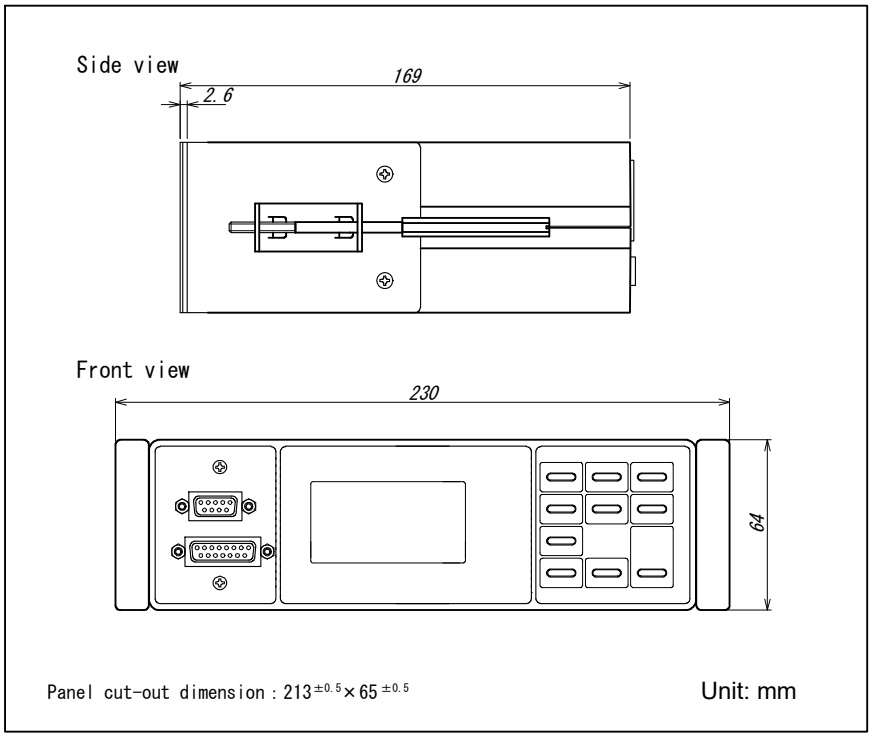
When the tester is mounted to the panel, use the optional mounting bracket.



①Take off the foot (4 pieces) at the base of tester.
②Fix the panel mount bracket at both sides of main unit (M4×15 flat screw)
③Insert the main unit from the panel front and fix it to the panel by the bracket.

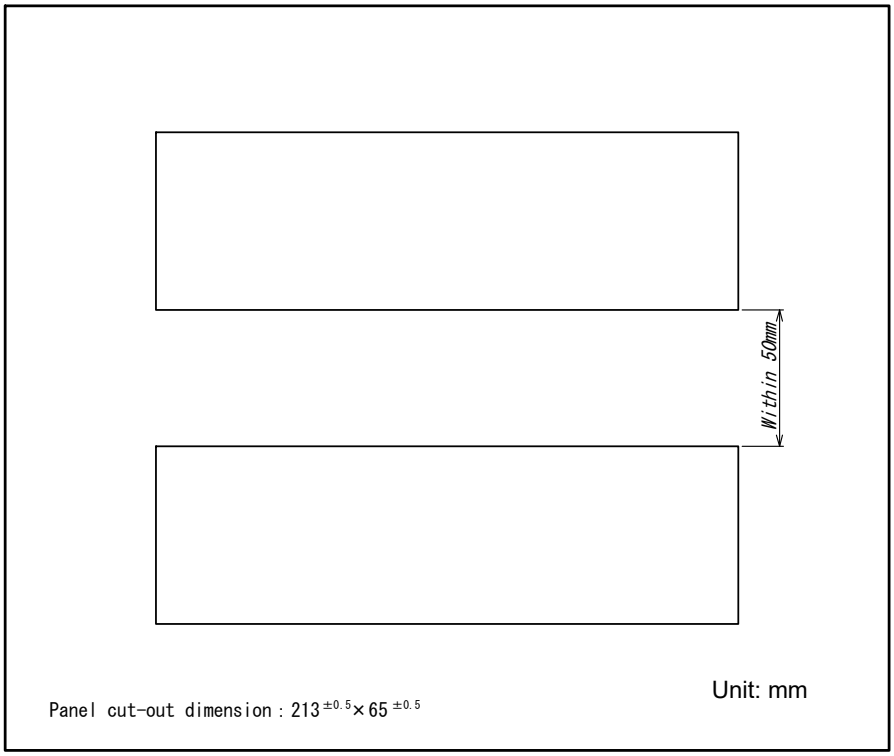
Note: In case that the tester is mounted to the chassis (frame), utilizing the threaded taps for the base feet, the length of screw is 6mm + chassis thickness.

7.2 ●Dimensional drawing when fitted with panel mount bracket



7.3 ●Assembly with extension unit

The attached cable for connection with the extension unit is of 150mm long.
Provide the clearance within 50mm between each cut-out hole.



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