

INSTRUCTION MANUAL
WITHSTANDING VOLTAGE TESTER

MODEL 863

KIKUSUI ELECTRONICS CORPORATION

79.9.21

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1. GENERAL

Model 363 Withstanding Voltage Tester provides an output test voltage of 3 kV maximum with current rating 10 mA. It has a high-sensitivity current detection range of 500 μ A. It also has an NG judgement circuit which drives an indicator lamp and buzzer when the leak current has exceeded the preset limit. It is incorporated with safety features. It is compact and light, and it is best suited for tests of electronic components and devices in production line, etc.

2. SPECIFICATIONS

Power requirements:

100 V \pm 10%, 50/60 Hz

Power consumption:

When no load (RESET state) Approx. 2 VA

When full load (3 kV, 10 mA) ... Approx. 45 VA

Insulation resistance: 500 V DC, 30 M Ω or over

Dimensions: 210 W \times 140 H \times 220 D mm

(8.27 W \times 5.51 H \times 8.66 D in.)

[Maximum Dimensions]: [215 W \times 165 H \times 270 D mm

(8.46 W \times 6.50 H \times 10.63 D in.)]

Weight: Approx. 4.7 kg (10.4 lb.)

Accessories: High voltage test leads (HTL-1.5W,
approx. 1.5 m (4.9 ft.))..... 1 set

Instruction manual 1 copy

Test voltage:

Applied voltage: 0 - 3 kV AC

Output: 30 VA (3 kV, 10 mA),
(with AC line voltage 100 V)

Waveform: AC line voltage boosted-up by
transformer

Voltage regulation: 15% or better at 3 kV output
(with AC line voltage 100 V)

Output voltmeter:

Scale: 3 kV FS, linear scale

Accuracy: \pm 5% FS

Indication: Mean-value response, rms-value
scale

Output cut-off by leak current detection:

Current detection ranges: 0.5/1/2/5/10 mA (5 ranges)

Accuracy: $\pm 5\%$

Detection method: Current is integrated and compared with reference value. Calibrated in rms value of sine wave.

Test method: Manual only

TEST: Output is delivered as TEST button is depressed.

RESET: Output is cut-off as RESET button is (HV OFF) depressed.

Test result judgement:

When a leak current larger than set value is detected, NG lamp lights and NG buzzer sounds (loudness adjustable).

Ambient conditions:

Normal operating ranges

Temperature 5°C - 35°C (41°F - 95°F)

Humidity 20% - 80% RH

Maximum operating ranges

Temperature 0°C - 40°C (32°F - 104°F)

Humidity 20% - 80% RH

3. OPERATION INSTRUCTIONS

3.1 Description of Front Panel

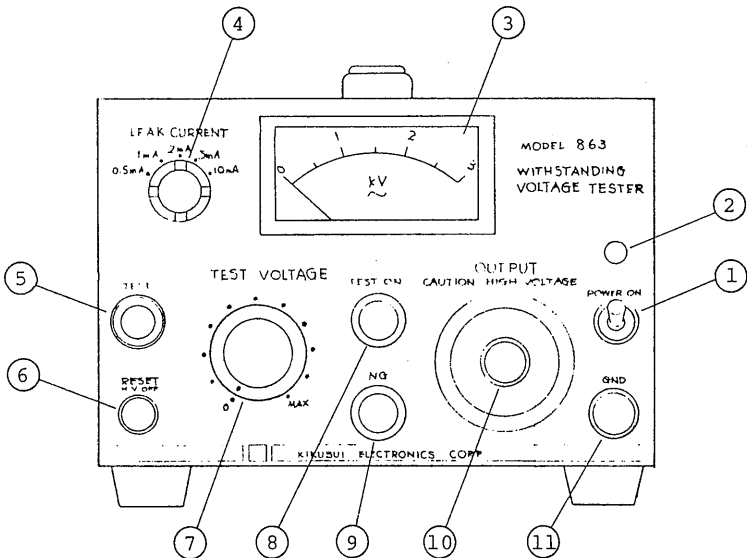


Figure 3.1

- ① POWER switch: Main power switch of instrument. Top position is ON. Before turning-ON this switch, be sure to read Section 9 "Precautions in Use."

- ② Power indicating lamp: Lights when the instrument power is turned-on.
- ③ Indicating meter: Indicates the output voltage of the instrument.
- ④ LEAK CURRENT dial: For setting the reference value (limit value) for leak current detection. The value can be set at 0.5, 1, 2, 5, or 10 mA. When a leak current larger than the reference value has flowed in the tested object, an NG judgement is done and the output is instantaneously cut off. The dial should be set at a value in conformity with the requirement of the tested object.
- ⑤ TEST button: As you press this button with the instrument set in the RESET state, ⑧ TEST ON lamp (red) lights and the voltage set by ⑦ TEST VOLTAGE dial is delivered to ⑩ OUTPUT terminal.
- ⑥ RESET button (HV OFF): To be pressed to reset the output voltage when test is over or when NG is indicated.
- ⑦ TEST VOLTAGE dial: For setting the test voltage. The "0" position is for the minimum output and the output increases as this dial is turned clockwise.
- ⑧ TEST ON lamp: This red lamp indicates that the test voltage is being delivered to ⑩ OUTPUT terminal.

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- ⑨ NG lamp: When a current in the tested object is larger than set by ④ LEAK CURRENT knob, the NG lamp lights and the buzzer sounds.
 - ⑩ OUTPUT terminal: The hot line of the test voltage.
 - ⑪ GND terminal: The ground line of the test voltage. Electrically connected to the instrument casing.

3.2 Description of Rear Panel

- ⑫ Cord take-up: To take-up the AC power cord when not in use.
- ⑬ GND terminal: For grounding the instrument to the earth potential.
- ⑭ NG buzzer: Sounds when NG state is detected (operates in parallel with the NG lamp). Loudness is adjustable by opening/closing the window.
- ⑮ FUSE: 1-ampere fuse in AC line power.
- ⑯ AC cord

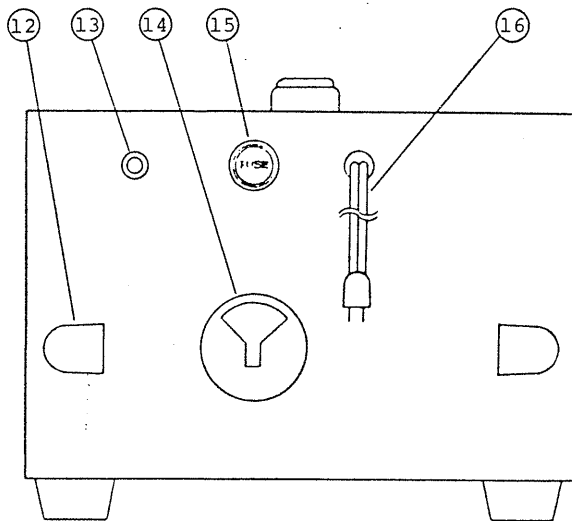


Figure 3.2

3.3 Precautions for Use

Model 863 Withstanding Voltage Tester has been designed with full attention to safety because this instrument uses a high voltage. Yet, as the instrument provides as high voltage as 3 kV to the external circuit, hazards are unavoidable unless the instrument is handled correctly. Be sure to observe the following instructions when operating the instrument.

- (1) Be sure to connect the GND terminal (13) of the rear panel when operating the instrument. If grounding is incomplete, when the output is short-circuited to the ground or power line, the instrument chassis is charged up to a high voltage which can cause hazards.

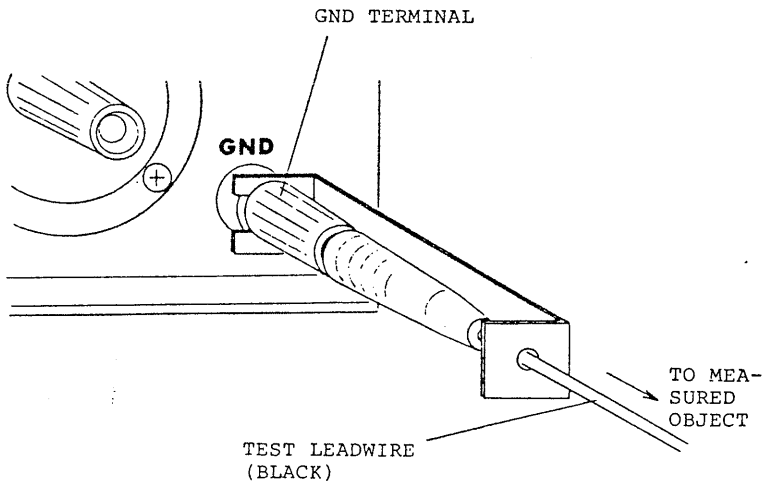


Figure 3.3

- (2) The connection method of the test leadwire of the GND side is shown in Figure 3.3. Be sure to check for that this leadwire is not open, each time the instrument is used. Also be sure to connect the GND terminal to the ground line of the measured object. If it is not securely connected, the measured object becomes a floated state and a dangerously high voltage may be built up in the measured object.
- (3) Be sure to wear rubber gloves whenever operating this instrument in order to guard against electric shock hazards. If gloves are unavailable, contact Kikusui's agent in your area.
- (4) Before turning-on the power switch, make sure that the TEST VOLTAGE dial is in the extremely counterclockwise position ("0" position).
- (5) Except when test is being done, turn the TEST VOLTAGE dial to the extremely counterclockwise position ("0" position). Also, press the RESET (HV OFF) button for the sake of safety. Be sure to turn-off the power switch each time the instrument is not used for a short period of time or when the operator leaves the instrument.
- (6) Never try to connect or disconnect the leadwires to or from the measured object, under the state that the test voltage is being applied. Never touch the tested object or leadwires when the test voltage is being delivered.

(7) Before touching the test leadwires or output terminal, be sure to check the following:

- (a) The voltmeter indication is zero.
- (b) The TEST ON lamp has gone off.

Also, short the output terminal to the GND terminal with the leadwire of the GND side.

- (8) Pay attention so that the output is not shorted to the ground or power line, lest the instrument chassis should be charged up to a hazardously highly voltage. When the instrument chassis is grounded to the earth, however, shorting of the high voltage terminal to the GND terminal does not cause any hazardous state.
- (9) In case of an emergency, immediately turn-off the power switch and disconnect the AC power cord from the AC line receptacle.
- (10) When the TEST ON lamp has become inoperative, immediately replace it or contact Kikusui's agent in your area.

To operate the instrument in good conditions for a long time, pay attention to the following:

- (1) When in the no-load state, the maximum output voltage of the instrument becomes higher than its rated voltage 3 kV. An output voltage higher than 3 kV may be produced also when the AC line voltage has surged up. Pay attention so that the output voltage does not become higher than 3 kV whenever avoidable.
- (2) This instrument operates normally with an AC an AC power line voltage range of 100 V $\pm 10\%$. If the AC line voltage is not within this range, the instrument operation becomes unstable and damage may be caused to the instrument. When the AC line voltage is not within this range, step it up or down into this range using an appropriate device.
- (3) Do not use or store the instrument in direct sunlight, in high temperature or humidity, or in dusty atmosphere.
- (4) Do not use the instrument as a power supply.

3.4 Operating Procedure and Instrument Operation

Observing the instructions of 3.3 "Precautions in Use" to protect yourself against hazards, operate the instrument as follows:

(1) Turning-on the power:

After making sure that the TEST VOLTAGE dial is set in the extremely counterclockwise position, turn-on the POWER switch.

(2) Setting the leak current:

With the LEAK CURRENT dial, set the leak current reference value as required by the tested object (one of the 5 ranges of 0.5 mA - 10 mA).

(3) Pressing the TEST button:

After making sure that everything is ready, press the TEST button. The test voltage is ready to be produced and the red TEST ON lamp lights.

(4) Raising the test voltage:

Gradually turn clockwise the TEST VOLTAGE dial until the required test voltage is obtained.

(5) Resetting the test voltage:

Press the RESET button so that the output is cut off. After making sure that the voltmeter indication is zero and the TEST ON lamp has gone off, connect the test lead-wires to the tested object. Press the TEST ON button again so that the test voltage set by step (4) is applied to the tested object.

(6) NG judgement:

If the leak current is larger than that set by the LEAK CURRENT dial, the NG lamp lights and the NG buzzer sounds. The output voltage is instantaneously cut off.

(7) Resetting the NG state:

Press the RESET button so that the NG state is reset, the NG lamp goes off and the buzzer is silenced.

(8) Applying again the test voltage:

To apply again the test voltage, press the TEST button.

(9) Ending the test:

When the test is over, cut off the output voltage by pressing the RESET button, turn the TEST VOLTAGE dial to the extremely counterclockwise position ("0" position) and then turn-off the power switch.

4. CALIBRATION

4.1 Sensitivity Calibration of Leak Current Detection Circuit

- (1) The upper one of the two semi-fixed resistors on the printed circuit board is for current sensitivity calibration.
- (2) Connect to the output terminals of this instrument in series a 3-M Ω resistor (withstanding voltage 3 kV or over, wattage 3 W or over) and a 1-mA milliammeter (Class 1 (JIS) or better).
- (3) Gradually raise the test voltage until the milliammeter reads 1 mA and, under this state, so adjust the above semi-fixed resistor that the NG judgement is done at this point.

4.2 Sensitivity Calibration of Voltmeter

- (1) The lower one of the two semi-fixed resistors on the printed circuit board is for sensitivity adjustment of the voltmeter.
- (2) Connect to the output terminals a voltmeter which is capable of measuring a voltage of 3 kV AC at an accuracy of $\pm 1\%$ or better. (An example is Kikusui Model 149-05A Voltmeter.)
- (3) Adjust the output voltage so that the external voltmeter reads 3 kV and, under this state, so adjust the above semi-fixed resistor that the voltmeter of the instrument also reads 3 kV.