

MODEL 875B
PUNCTURE TESTER
OPERATION MANUAL

印刷表紙使用のこと

KIKUSUI ELECTRONICS CORP.

The Model 875 B Puncture Tester is an equipment designed to test the dielectric strength of various electric and electronic components with voltage ratings up to 5 kilovolts AC or DC. Employing various safe guard provisions, and timer and relay, this equipment assures safe operation and presents accurate test results.

SPECIFICATION

Power Requirement	volts, 50 to 60 Hz, approx. 32 VA*
Size - Cabinet	520 W x 280 H x 305 D mm
Maximum	550 W x 300 H x 370 D mm
Weight	Approx. 32 Kgs
Items Supplied with Equipment	1 pair - Test Leads 1 Lid switch locknut 1 Operation Manual 1 ... 1 ...
Range Switch	Provided inside of the cabinet. To operate these switches, the lid on the upperside of the cabinet is opened. While this lid is opened, power line is cut off.
Test Voltage AC	Two ranges. 0 to 1.5 and 0 to 5 kilovolts, at power line frequency. Short circuit current at full output and 50 cps is approximately 25 mA.
Test Voltage DC	Two ranges. 0 to 1.5 and 0 to 5 kilovolts, at power line frequency.

* AC 5kV, no load, timer operating

	Short circuit current at full output and 50 Hz is approximately 25 mA.
Test Voltage DC	Two ranges. 0 to 1.5 and 0 to 5 kilovolts. Positive side is connected to HV terminal. Ripple at 5 kilovolts and no load less than 2% p-p.
Testing Period.	Manual and automatic. In automatic operation, testing period can be varied from 0 to 5 minutes. When failure is not detected, a lamp "OK" lights on.
Short Circuit Cutoff Relay	Operates when current exceeds a predetermined level between 1 and 10 mA. When failure is detected, a lamp "NG" lights on.
	* AC 5KV, no load, timer operating
Voltmeter	Two ranges. To 1.5 kilovolts and to 5 kilovolts AC or DC. AC range calibrated in R.S. Accuracy as compared with static voltmeter within 5%.
Test Result	Indicated by lamps. Either "OK" or "NG" lights on. Also can be obtained by reading voltage drop on the voltmeter
Insulation	Insulation between power line and chassis to withstand at 500 volts AC for 1 minutes, and more than

20 megohms at 1000 volts DC

WARNING

While the equipment is operating, a high voltage of up to 5 kilovolts may be exposed on the panel. Despite of its provisions for safe operation, careless operation might injure the operator vitally. The operators are required to read over this manual, and exercise every care to avoid the accident.

OPERATING PRECAUTIONS

Followings are precautions at least required for safe operation. The operators are requested to confirm each step in the order given.

1. Function switch should be always turned to RESET HV OFF position except when the equipment is performing the test.

Function switch provided below the timer is to turn high voltage circuit, and can be set to three positions as follows:

RESET HV OFF	When switch is placed in this position, high voltage is cut off. The operator should be accustomed to turn the switch to this position as soon as the test is finished.
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MANUAL	When switch is placed in this position, high voltage is exposed at the HV terminal unless short circuit cut off relay operates.
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AUTOMATIC

When switch is placed in this position, high voltage is exposed for a period set by timer unless short circuit cutoff relay operates.

While high voltage is exposed, the HV terminal is illuminated to indicate hazardous condition.

2. Test voltage control, TEST VOLTS, should be always turned to 0 volt position except when the equipment is performing the test. This knob is to turn a slide-tap auto-transformer to adjust high voltage output. As this knob is turned clockwise, voltage supplied to primary winding of high voltage transformer increases and at the same time, the brightness of illumination increases. The operator should be accustomed to turn this knob to zero position as soon as the test is finished.

3. Equipment should be securely grounded.

When equipment is poorly grounded, the equipment may be charged at a high potential, and causes shock as touching the cabinet. Therefore, the equipment should be securely grounded.

4. Check Test Leads

Test leads should be checked for frayed or broken insulation before using. These test leads also should be firmly connected to terminals.

Especially, when ground lead is broken or falsely connected to the terminal, the component under test may be charged at high potential.

5. HV Terminal

Prior to touching HV terminal, following three points should be confirmed:

- a - Confirm if illumination is turned off
- b - Confirm if meter indication is zero
- c - Confirm if high voltage retained at terminal has completely been discharged. This can be done by contacting ground lead to HV terminal.

FUNCTIONS OF CONTROLS, INDICATORS, AND TERMINALS

SENSITIVITY This is to adjust the sensitivity of the short circuit cutoff relay, and figures indicate approximate current level in milliamperes at which cutoff relay operates.

RESET HV OFF
MANUAL
AUTOMATIC This is a function switch as described previously. Refer to previous OPERATING PRECAUTIONS.

VOLTMETER This is to indicate the test voltage appearing at HV terminal. When the equipment is delivering AC test voltage, the meter is working as a voltage indicator but calibrated in RMS.

TIMER When function switch is placed in AUTOMATIC position, this timer is used to set the testing period. The timer has two scales for two power line frequencies, 50 Hz and 80 Hz. When timer is operating, time setting knob is hard to rotate.

Note - Do not rotate the time setting knob when timer is operating by force.

HV and GND These are test voltage output terminals. In DC operation, HV terminal delivers positive polarity and GND terminal negative polarity. GND terminal is connected to the chassis and cabinet of the equipment.

Note - Be careful when working on HV terminal.

Refer to foregoing OPERATING PRECAUTIONS.

AC and DC These are neon-lamps to indicate AC or DC operation.

1.5KV and 5 KV These are neon-lamps to indicate voltage ranges.

OK and NG These are neon-lamps to indicate test result. During test period, if current exceeds predetermined level set by SENSITIVITY knob, high voltage circuit is immediately cut off and lamp marked NG lights on.

If current does not exceed predetermined level for test period, lamp marked OK lights on and high voltage circuit is cut off.

The signals fed to these lamps can be obtained through connectors provided backside of the cabinet, and may be used to actuate external devices. For instance,

OK signal can be used to drive a chime and NG signal to drive a buzzer.

POWER This is a toggle switch to turn the power on or off. Before this switch is turned on, the precautions described in the foregoing section should be followed.

FUSE 3-amp fuses are used. Fuses are put in both lines of the power line.

OPERATION

Setting Test Voltage

Range switches to set test voltage are provided inside the cabinet. To operate these switches, the lid on the upper side of the cabinet is opened. While the lid is opened, the power line is cut off. However, filter capacitors in high voltage circuit may store a charge large enough to be hazardous (This can be seen on the meter). Therefore, high voltage circuit should be discharged before working. The one switch is to turn to AC or DC, and the other is to select the range 1.5 KV or 5 KV. Before turning switch, a plate is removed, and switch is turned to desired position, then, plate is placed so as to its markings direct same as markings on the chassis. If switch is turned in erroneous position, plate can not be placed in right direction. An idle nut located at the center of switch is used to keep the power line on when lid is opened for check and adjustment of the equipment.

Short Circuit Current and Waveform of Test Voltage

The high-voltage transformer used in this equipment is a leakage type transformer to avoid excessive current when

output is short circuited, thus, serves to prevent the damage of both equipment itself and component under test.

Short circuit current is approximately 25 mA when voltage is at maximum in both 1.5 KV and 5 KV ranges, and it decreases approximately in proportion to decrease in voltage. For example, if voltage is set at 500 volts in 5 KV range, short circuit current is approximately 2.5 mA, and in this condition, if sensitivity is set at more than 2.5 mA, the short circuit cutoff relay does not operate nor NG lamp light on even if output is short circuited. However, in such condition, meter indication drops and test result may be obtained by meter reading.

The AC test voltage of this equipment includes large amounts of harmonic components as illustrated in the figure below. This is due to leakage type transformer used in this equipment.

Therefore, the peak value of AC voltage applied to the component under test may not always be equal to $\sqrt{2}$ times, of the meter indication

Waveform of AC Test voltage

At no load



With 20 megohm load



Waveform does not vary as to voltage setting significantly. The current when output is short circuited is nearly sinusoidal.

Adjustment of Voltmeter Sensitivity

In adjustment of the sensitivity of voltmeter, chassis is pulled out from the cabinet. Then, a precision static voltmeter is connected between HV and GND terminals and screw driver adjustments are adjusted so that voltmeter on the panel indicates same value as precision voltmeter.

These adjustments are independent each other, and one adjustment completes adjustment of one range.

Note - High Voltage is exposed on the chassis.