

1 . GENERAL

Models TOS8650 and TOS8651 Withstanding Voltage Testers are AC-voltage testers with an output of 5kV, 100mA, 500VA, and can be used for withstanding voltage test in compliance with JIS, Electrical Appliance Control Ordinance, UL, CSA, BS and other major electrical standards and ordinances. They can be used for withstanding voltage test (dielectric strength test) of the various types of electrical and electronic equipment and components.

The Testers have a GO-NOGO judgement function, a test result output function, and a remote control function. The GO-NOGO judgement function is with a window comparator system. It generates an NG signal when a leak current larger than the judgement reference value set on the front panel has flowed and it also can generate an NG signal when the detected current is less than 1/10 of the set value. With these features, GO-NOGO judgement can be made including to some extent such abnormal states as open circuiting or imperfect contacting of test leads. Regarding the test result output function, the Testers deliver a test signal, a GOOD signal or an NG signal, all of which are contact signals. By employing the GO-NOGO judgement function in conjunction with the remote control function, an automated and labor-saving withstanding voltage test system can be realized.

In addition the sequence circuit is designed to be free from erroneous operations caused by noise, making the Testers highly reliable instruments.

Although many safety features are incorporated in the Testers, a deadly accident may occur when the operator touches the device under test (D.U.T.) or the probe.

Safety guards around D.U.T. should be considered for safe operation. Also, other precaution, which deemed necessary for the tester and the devices, shall be maintained under positive control.

This instruction manual is applicable to both TOS8650 and TOS8651. Read the items relevant to respective models.

2. SPECIFICATIONS

Model		TOS8650	TOS8651	
Test voltage	Applied voltage (AC)	0 - 1.5/0 - 5 kV		
	Output	500 VA (5 kV, 100 mA), when operated on 100-V AC line. (Note 1)		
	Waveform	AC line voltage waveform		
	Voltage regulation (with 100-V AC line)	20 % or better	15% or better (Note 2)	
		(For change from maximum rated load to no load)		
Switching	Zero-turn-on switch (zero-start switch) is used.			
Current limiting		<ul style="list-style-type: none"> ○ A limiting resistor is inserted in the primary circuit of high voltage transformer. ○ When cut-off current setting is 100 mA, current limiting is released unconditionally. When it is 0.5 - 10 mA, current limiting is selectable. 		
Output voltmeter	Scales	1.5/5 kV FS	2.5/5 kV FS	
	Class	JIS Class 1.5	JIS Class 1	
	Accuracy	±3% FS		
	Response/graduation	Mean-value response/rms-value graduation		
	Calibration		Can be calibrated from rear panel	
Judgement of test result (Shut-off of output by leak current detection)	Judgement system	<ul style="list-style-type: none"> ○ Window comparator system ○ NG judgement when current larger than the set value is detected ○ NG judgement when detected current is less than 1/10 of the set value ○ When NG judgement is made, the output is cut out and an NG alarm is generated. ○ If no abnormal state is found during the set period, the GOOD signal is generated. 		

	Model	TOS8650	TOS8651
Judgement of test result (Cont'd)	Reference value setting	0.5, 1, 2, 5, 10, or 100 mA	
	Multiplier	<ul style="list-style-type: none"> ○ Each of the above setting values can be multiplied up to 2.5 times continuously variably, except the 100 mA range. ○ The scales are non-calibrated. 	
	Accuracy of judgement (Note 3)	<ul style="list-style-type: none"> ○ With reference to high limit (set value): ±5% ○ With reference to low limit (1/10 of set value): ±(20% + 20 μA) 	
	Detection system	Absolute value of leakage current is integrated and compared with the reference value.	
	Calibration	Calibrated for rms value of sine wave, using pure resistive load.	
			Can be calibrated for individual ranges from the rear panel.
	No-load output voltage needed for detection (Note 4)	500 V when at 100-mA setting	300 V when at 100-mA setting
Dimensions (Maximum dimensions)	350 W × 200 H × 300 D mm (13.78 W × 7.87 H × 11.81 D in.) 360 W × 220 H × 355 D mm (14.17 W × 8.66 H × 13.98 D in.)		
Weight (Note 7)	Approx. 19 kg (42 lb)	Approx. 17 kg (38 lb)	

Note 1: The period during which the Testers can be continuously operated with their maximum rated currents are as follows:

- TOS8650: Up to 30 minutes
- TOS8651: Up to 60 minutes

Note 2: Model TOS8651 Tester is a special model for special voltage regulation specifications, which are as follows when the Tester is operated on a 100-V AC line with its current limiting switch set to the OFF state.

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- At 5-kV range, 5-kV output, for current change from 100 mA to no load: 15% or better
- At 5-kV range, 5-kV output, for current change from 10 mA to no load: 2% or better
- At 2.5-kV range, 1-kV output, for current change from 5 mA to no load: 3% or better

Note 3: When a test is actually done, the current which flows through the stray capacitances of the output circuit and measuring leads also causes measuring errors. The overall judgement error is the sum of this current and the above-mentioned judgement accuracy. Approximate values of such currents are shown in the following table. Note that, at high-sensitivity high-voltage test, the current which flows through the stray capacitances becomes larger than the low-limit judgement value and low-limit judgement may not be successfully made.

Output Voltage	1 kV	2 kV	3 kV	4 kV	5 kV
Main unit only (without measuring leads)	4 μ A	8 μ A	12 μ A	16 μ A	20 μ A
When 300-mm-long leads are used being suspended in air	6 μ A	12 μ A	18 μ A	24 μ A	30 μ A
When the accessory lead-wires (HTL-1.5W) are used	20 μ A	40 μ A	60 μ A	80 μ A	100 μ A

Note 4: Due to the internal resistance of the output circuit, to make NG judgement with the output terminals shorted, a certain level of no-load output voltage is needed. The values of such voltages are shown in the preceding table.

Common Items

Test voltage waveform:

When an AC voltage is applied to a capacitive load, the output voltage may become higher than that when in no load due to the capacitance component of the load. Especially when the load (specimen) is of a voltage-dependent capacitance type (such as ceramic capacitors), the voltage waveform may be distorted. When the test voltage is 1.5 kV, however, effects caused by a capacitance lower than 1000 pF is negligible.

Test time:

Timer setting time: 2 - 60 sec. (with timer OFF switch)

Remote control:

(1) The test/reset operation can be remote-controlled in the following cases:

- When the Remote Control Box (optional) is used.
- When the High Voltage Test Probe (optional) is used.
- When the instrument is controlled with a make-contact of a relay or a switch.
- When low-active control is made with logic elements. The input conditions of the Testers in this case are as follows:
 - HIGH level input voltage: 11 - 15 V
 - LOW level input voltage: 0 - 4 V
 - LOW level sweepout current: 2 mA or less

Note 5: The input terminals are pulled up to +15V supply voltage by a resistor. If the input terminals are made open, the state is identical with that a HIGH level input is applied.

(2) The Tester can be set to the protected state (the state that TEST ON is disabled) by making open the protection input terminals which normally are shorted with a shorting bar.

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Leak current monitor terminals:

When checking or calibrating the cutoff current, a milliammeter to monitor the current may be connected to these terminals.

Output signals:

The types of the output signals available and the conditions of their generation are as follows:

Name of signal	Conditions for signal generation	Type of signal
TEST signal	During the period the test is performed	Make-contact signal, lamp
GOOD signal	When GOOD judgement is made, 200 msec	Make-contact signal, lamp, buzzer
NG alarm	When NG judgement is made, continuous	Make-contact signal, lamp, buzzer

Note 6: (1) The rating of the contact signal are 100 V AC, 1 A, or 30 V DC, 1 A.

(2) Loudness of the buzzer sound is adjustable with a single knob in common for both GOOD and NG signals.

Note 7: Approx. 4kg increase when in line voltage modified.

Ambient conditions:

Temperature and humidity

to meet specified performance: 5 to 35°C (41 to 95°F), 20 to 80% RH

Operatable temperature and humidity: 0 to 40°C (32 to 104°F), 20 to 80% RH

Power Requirements:

Line voltage: 100 V \pm 10%, 50/60 Hz AC
(Can be factory-modified to nominal 110V, 115V,
120V, 200V, 220V, 230V and 240V.)

Power consumption: 10 VA or less when no load (in the reset state)
(Note 8)
Approx. 600 VA when with rated load

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

Withstanding voltage: 1000 V AC, 1 minute

Note 8: Power consumption of the instrument modified to operate on an AC
line voltage other than 100 V is as follows.

110/115/120 V : 25 VA or less
200/220/230/240 V: 45 VA or less

Accessories:

- High Voltage Test Leadwires, HTL-1.5W 1 set
- Shorting Bar to Remote Protection Terminal 1 (Installed on main unit)
- Shorting Bar for Current Monitor Terminals 1 (Installed on main unit)
- "HIGH VOLTAGE DANGER" label 1
- Instruction Manual 1
- 5P DIN Plug (assembly type) 1

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