Chapter 7 SPECIFICATIONS

This Chapter provides electric and mechanical specifications and descriptions of options.

7.1 Withstanding Voltage Tester

Table 7-1

WITHSTANDING VOLTAGE TESTER			
Test Voltage	Applied AC Voltage	0 V to 2.5 kV/0 V to 5 kV (tow ranges)	
	Output Rating	500 VA (5 kV, 100 mA with 100 V line voltage). *1	
	Waveform	AC line waveform	
	Voltage regulation	Better than 20% (for maximum rated load to no load, with 100 V line voltage)	
	Switching	With zero-start type switch	
Output Voltmeter	Scales	2.5 kV f.s / 5 kV f.s, two ranges linear scales	
	Class of meter	JIS Class 1	
	Accuracy	5 °C to 15 °C : ±3 % f.s 15 °C to 35 °C : ±1.5 % f.s (with a sine wave *2)	
	Indication	Mean-value response, effective-value scale graduation	
Judgment of Test Result PASS-FAIL judgment. Output cutoff by leakage current detection	Judgment	Window comparator system	
		FAIL judgment when leakage current larger than high limit reference value is detected.	
		FAIL judgment also when leakage current smaller than low limit reference value is detected.	
		When FAIL judgment is made, output is cutoff and FAIL alarm is generated.	
		If no FAIL judgment is made after preset period has elapsed, PASS signal is generated.	
	High limit reference value (CUTOFF CURRENT)	0.5/1/2/4/8/10/100 mA (7 values)	
		By combinations of above values, a range of 0.5 mA to 25.5 mA can be covered in 0.5 mA steps.	
	Low limit reference value (LOWER REFERENCE)	0 to one-half of high limit reference values (continuously variable)	
	Accuracy of judgment *3	±5 % of high limit	
		±20 % of low limit reference value (one-half of high limit reference values at maximum counterclockwise). (Other are non-calibrated.)	
	Judging method	Absolute value of leakage current is integrated and compared with preset limit reference value	
	Calibration	Calibrated with rms value of sine wave, using a pure resistance load.	
	No-load output voltage need for detection *4	2.5 kV range	Approx. 450 V when set at 100 mA
		5 kV range	Approx. 550 V when set at 100 mA
Test time		Timer :0.2 s to 99.9 s (× 0.1 range) ±50 ms 1 s to 999 s (× 1 range) ±0.5 s	
Terminals		Terminals for monitoring of leakage current	

*1. The heat radiation of the output section of the tester is designed to be 1/2 of the rated output, taking the size, weight, cost, etc., into consideration. Therefore, use it within the limitations shown in Table7-2. If it is used in excess of these limitations, the temperature of the output section rises excessively and the internal protection circuit may be activated. In this case, cancel the test for a while and wait until the normal temperature is restored.

*2. Crest factor of 1.35 to 1.41, distortion of 3% or less

*3. The current which flows due to stray capacitances of the output circuit and leadwires causes an error. The overall accuracy of judgement is the above-mentioned accuracy of judgement plus a factor caused by this current. Typical values of this type of currents are shown in the Table7-3. Note that, when a test is made with a high voltage and high sensitivity, the current which flows through the stray capacitances may become larger than the preset low limit reference value and low limit judgement may become unavailable.

*4. When making an FAIL judgement test with the output terminals shorted, a certain level of no-load output voltage is needed due to the internal resistance of the output circuit. The voltages shown here are this type of output voltages.

Table 7-2

Ambient temperature	Test current I (mA)	Suspension time	Maximum test time
t ≤ 40 °C	25.5 < I ≤ 100	Test time or longer	30 minutes or less
	I ≤ 25.5	Not required	Continuous test possible

Table 7-3

Output voltage	1 kV	2 kV	3 kV	4 kV	5 kV
Test alone (without leadwires)	4 μA	8 μA	12 μA	16 μA	20 μA
When 350mm long leadwires are hung in air	6 μA	12 μA	18 μA	24 μA	30 μA
When the accessory leadwire (TL01-TOS) are used	20 μA	40 μA	60 μA	80 μA	100 μA

Test Voltage Waveform

When an AC output voltage is applied to a capacitive load, it is possible that the voltage becomes higher than that when in the no-load state due to the capacitance of the load. Moreover, when the capacitance of the load is voltage dependent (typical examples are ceramic capacitors), the voltage waveform may be distorted. When the test voltage is 1.5 kV, however, effects caused by a capacitance of 1000 pF or less are negligible.

7.2 Insulation resistance Tester

Table 7-4

INSULATION RESISTANCE TESTER		
Measuring Voltage		500 V or 1 000 V
		DC, negative polarity (two ranges)
Measuring terminal voltage		0 % to + 5 % of rated measuring voltage (At rated measuring current or less)
Output current	Rated measuring current	1.0 mA
	Short circuit current	12 mA or less
Effective Measuring Ranges	500 V range	1 MΩ to 1 000 MΩ
	1 000 V range	2 MΩ to 2 000 MΩ
Values center of scale	500 V range	20 MΩ
	1 000 V range	50 MΩ
Accuracy		1st effective measuring range : ±5 % of the indicated value 2nd effective measuring range : ±10 % of the indicated value*1
Judgment of Test Result PASS-FAIL judgment	Judgment	Window comparator system (mutually independent settings of high limit and low limit)
		FAIL judgment when measured resistance is smaller than low limit reference value.
		FAIL judgment when measured resistance is larger than high limit reference value.
		When FAIL judgment is made, output is cutoff and FAIL alarm is generated.
		If no FAIL judgment is made after preset period has elapsed, PASS signal is generated.
	Limit reference value setting range	Low and high limit reference values can be set at any points within the effective measuring range of the Tester.
	Accuracy of judgment	1st effective measuring range : ±10 % of set value 2nd effective measuring range : ±15 % of set value*1
	Waiting-time for judgment	Approx. 0.3 s
Test time		Timer :0.5 s to 99.9 s (× 0.1 range) ±50 ms 1 s to 999 s (× 1 range) ±0.5 s

*1. At 25 ˚C ± 10 ˚C
The 1st effective measuring range is from 1/1000 to 1/2 of the maximum effective scale value. The 2nd effective measuring range is from the above to the maximum effective scale value.

7.3 Common Specifications

Table 7-5

Common Specifications			
Types of test	1.AUTO ACW→IR	Withstanding voltage test first and insulation resistance test next	
	2.AUTO IR→ACW	Insulation resistance test first and withstanding voltage test next	
	3.MANUAL ACW	Withstanding voltage test alone	
	4.MANUAL IR	Insulation resistance test alone	
Remote Control	Test / Reset control	Low active control Input conditions *1 • High level input voltage 11 V to 15 V • Low level input voltage 0 V to 4 V • Low level sweep out current 5 mA or less • Input pulse width 20 ms minimum	
	Interlock	Protection is effected when INTERLOCK terminal is made open (test is disabled).	
Output signals *2	Signal Name	Conditions for Signal Generation	Type of Signals
	TEST ON signal	Delivered during entire test-on period.	Make-contact signal and lamp
	PASS signal	Delivered when PASS judgment is made, for approximately 50 ms.	Make-contact signal, lamp and buzzer
	ACW/FAIL alarm	Delivered continuously when FAIL judgment of withstanding voltage test is made.	Make-contact signal, lamp and buzzer
	IR/FAIL alarm	Delivered continuously when FAIL judgment of insulation resistance test is made.	Make-contact signal, lamp and buzzer
	READY signal	Delivered when in the READY state.	Make-contact signal
Special Test Mode Selectable with DIP switches at rear of Tester	1.DOUBLE ACTION	Test starts only when the START switch is pressed within approximately 0.5 s after pressing the STOP switch.	
	2.PASS HOLD	The PASS state is held.	
	3.MOMENTARY	Test is executed only during the period the START switch is kept pressed.	
	4.FAIL ALARM	FAIL alarm and PROTECTION state cannot be reset by the remote-control STOP signal.	
Ambient Temperature and Humidity		Specification range	5 °C to 35°C (41°F to 95°F) / 20 % to 80 % RH
		Operable range	0 °C to 40 °C (32°F to 104°F) / 20 % to 80 % RH
		Storage range	-20 °C to 70 °C (-4°F to 158°F) / 80 % RH or less

*1. The input terminal is pulled up to +15 V supply voltage by resistor. Opening of the input terminals is equivalent to a high level input.

*2. The rating of the signal contacts is 125 VAC, 1 A, or 30 VDC, 1 A.
Loudness of the buzzer is adjustable with a knob in common for the PASS signal and FAIL alarm.

Table 7-6

Safety *1, *2	Conforms to the requirements of the following directive and standard. Low Voltage Directive 2006/95/EC EN 61010-1 Pollution degree 2		
EMC *1	Conforms to the requirements of the following directive and standard. EMC Directive 2004/108/EC EN 61326-1 EN 61000-3-2 EN 61000-3-3 Under following conditions 1. Used HV test leadwire TL01-TOS. 2. No discharge in testing.		
Power Requirements	Line voltage	100 VAC ± 10 %, 50/60 Hz *3	
	Power consumption	When no load (RESET state) : 15 VA or less *4 When with rated load : Approx. 600 VA	
	Insulation resistance	30 MΩ or more, 500 VDC	
	Withstanding voltage	1390 VAC (2 seconds), between AC line and chassis	
Dimensions		See the outline drawing.	
Weight		Approx. 23 kg (51 lb)	
Accessories		TL01-TOS High Voltage Test Leadwires, approx. 1.5 m long.	1
		AC Power cord	1
		Operation Manual	1
Options	RC01-TOS Remote Control Box		
	RC02-TOS Remote Control Box		
	HP01A-TOS High Voltage Test Probe, approx. 1.5 m long		
	HP02A-TOS High Voltage Test Probe, approx. 3 m long		
	TL02-TOS High Voltage Test Readwires, approx. 3 m long		
	KRB150-TOS Rackmount Bracket (for JIS)		
	KRB3-TOS Rackmount Bracket (for EIA)		

*1. Only on models that have CE marking on the panel.
Not applicable to custom order models.

*2. This instrument is a Class I equipment. Be sure to ground the protective conductor terminal of the instrument. The safety of the instrument is not guaranteed unless the instrument is grounded properly.

*3. Can be factory-modified to nominal 110 V, 120 V, 220 V, 230 V and 240 V.

*4. Power consumption of the instrument modified to operate on an AC line voltage other than 100 V is as follows.
110 V / 120 V: 25 VA or less
220 V / 230 V / 240 V: 45 VA or less

7.4 Outline Drawing

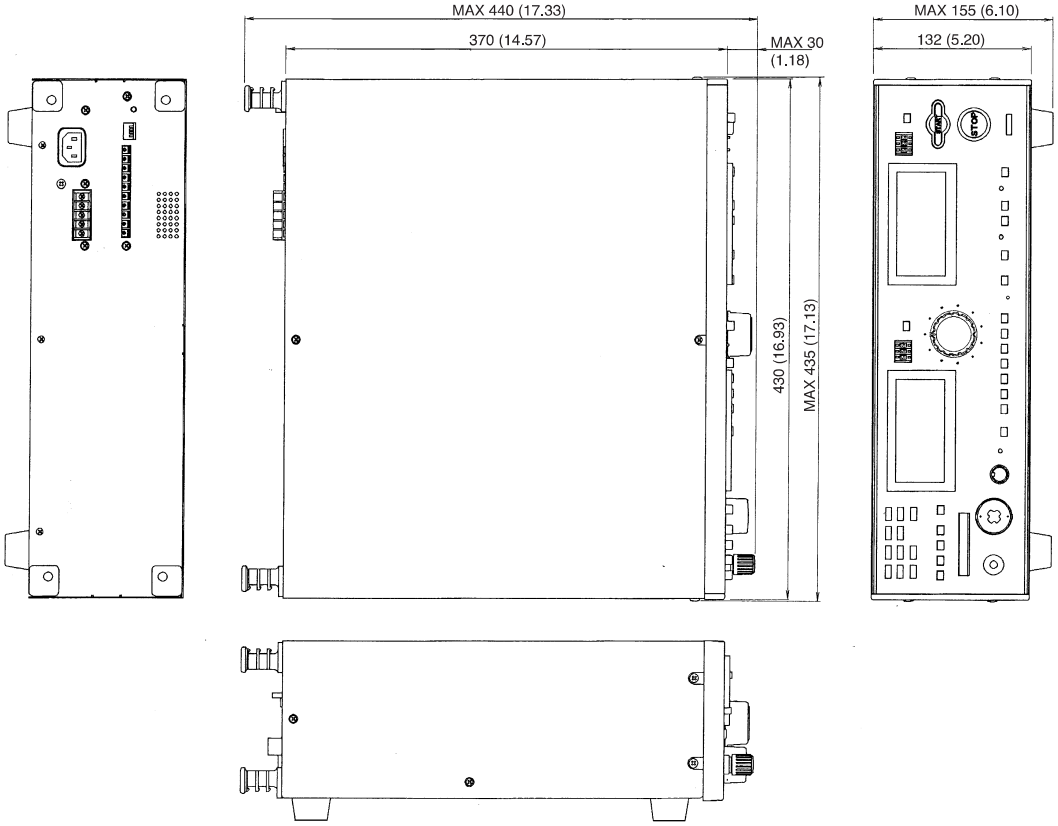

Fig.7-1

Unit : mm (inch)