

TOS7200

Insulation Resistance Tester

Complied with the test voltage -25 V to -1000 Vdc of the JIS C 1302-2002



TOS7200(IR)

RS232C

**Testing voltage range -25 V to -1,000 V,
Resistance measurement range 0.01 MΩ to 5,000 MΩ**

The TOS7200 is an insulation resistance tester available for a wide range of various electric and electronic components, as well as electric and electronic equipment. The output voltage can be set at desired value in the range of - 25 V to -1,000 V with a resolution of 1 V. (conforms with the output characteristics of the JIS C 1302-2002) . As it is fitted with a window comparator and timer function, the tester is capable of efficiently conducting insulation resistance tests based on various safety standards. In addition, this product is equipped with panel memory as standard feature, which can be recalled by remote control, SIGNAL I/O connector, and the RS-232C interface for easy automatic testing system construction.

- Provided with the discharge function
- Equipped with the window comparator
- Hold function
(which holds the measured resistance at the end of testing while PASS judgment is being output)
- Provided with the timer function
- Rear output terminals
- Measured-value monitoring terminals
- Equipped with the panel memory
(enabling 10 different settings to be stored)
- Equipped with the SIGNAL I/O connector and remote control terminal
- Equipped with the RS232C interface as standard

TOS7200

Insulation Resistance Tester

Output section																																							
Output voltage range	-25 V to -1000 V																																						
Resolution	1 V																																						
Accuracy	±(1.5 % of setting + 2 V)																																						
Maximum rated load	1 W (1 000 V/1 mA)																																						
Maximum rated current	1 mA																																						
Output terminals	Output type	Floating																																					
	Isolation voltage	±1000 VDC																																					
Ripple	1000 V / under no load	2 Vp-p or less																																					
	Maximum rated load	10 Vp-p or less																																					
Short-circuiting current	12 mA or less																																						
Output rise time	50 ms or less (10 % to 90 %) [no load]																																						
Discharge function	Forced discharge at the end of test (discharge resistance: 25 kΩ)																																						
Voltmeter																																							
Measurement range	0 V to -1200 V																																						
Resolution	1 V																																						
Accuracy	±(1 % of reading + 1 V)																																						
Resistance meter																																							
Measurement range	0.01 MΩ to 5000 MΩ (In the range of over 100 nA to a maximum rated current of 1 mA)																																						
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Measurement range	The current measurement range is selectable between AUTO and FIX.																																						
	AUTO	Automatically changes the current measurement range according to the measured current value.																																					
FIX	Fixes the current measurement range based on the output voltage set value and LOWER set value (in UPPER OFF status).																																						
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<ul style="list-style-type: none"> A PASS signal is output for approx. 200 ms. However, if the PASS HOLD function is set to "HOLD," the signal is continuously output until a STOP signal is input. An UPPER FAIL or LOWER FAIL signal is continuously output until a STOP signal is input. The FAIL and PASS buzzer volumes are adjustable. However, they cannot be adjusted individually, as they are set in common. 																																							
Setting range for the upper resistance (UPPER)	0.01 MΩ to 5000 MΩ [In the range of the maximum rated current or less]																																						
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[The lower judgment requires a test duration of 0.5 s or more after the wait time has expired. It also requires a wait time of 1.0 s or more for a lower judgment of 200 nA or less.]																																							
Time																																							
Setting range for the test duration (TEST TIME)	0.5 s to 999 s (TIMER OFF function provided)																																						
Setting range for the wait time (WAIT TIME)	0.3 s to 10 s [TEST TIME > WAIT TIME]																																						
Accuracy	±(100 ppm + 20 ms)																																						

Interface and Other Functions

REMOTE	6-pin mini-DIN connector on the front panel The optional remote controller RC01-TOS or RC02-TOS is connected to remotely control starting/stopping of a test (note that a DIN-mini DIN adapter is required).
SIGNAL I/O	D-SUB 25-pin connector on the rear panel For names and descriptions of connector signals.

No.	Signal name	I/O	Description of signal
1	PM0	I	LSB *
2	PM1	I	*
3	PM2	I	*
4	PM3	I	MSB *
5	N.C		
6	N.C		
7	N.C		
8	N.C		
9	STB	I	Input terminal for the strobe signal of the panel memory
10	N.C		
11	N.C		
12	N.C		
13	COM		Circuit common (chassis potential)
14	HV ON	O	ON during a test or while a voltage remains between the output terminals
15	TEST	O	ON during a test
16	PASS	O	ON for approx. 0.2 seconds when PASS judgment is made, or continuously ON while PASS HOLD is activated
17	U FAIL	O	Continuously ON if an insulation resistance equal to or exceeding the upper resistance is detected, resulting in FAIL judgment
18	L FAIL	O	Continuously ON if an insulation resistance equal to or falling below the lower resistance is detected, resulting in FAIL judgment
19	READY	O	ON during standby
20	N.C		
21	START	I	Input terminal for the START signal
22	STOP	I	Input terminal for the STOP signal
23	ENABLE	I	Remote control enable signal input terminal
24	N.C		
25	COM		Circuit common (chassis potential)

[Pin Configuration for the SIGNAL I/O Connector]

* 1-digit BCD active LOW input
Panel memory's selection signal input terminal
Memory recall by latching this selection signal at the rise of the strobe signal

Input specifications		All input signals are active Low controlled. The input terminal is pulled up to +12 V using a resistor. Opening the input terminal is equivalent to inputting a high-level signal.
High-level input voltage	11 V to 15 V	
Low-level input voltage	0 V to 4 V	
Low-level input current	-5 mA maximum	
Input time width	5 ms minimum	
Output specifications		
Output method	Open collector output (4.5 V to 30 V DC)	
Output withstand voltage	30 V DC	
Output saturation voltage	Approx. 1.1 V (at 25°C)	
Maximum output current	400 mA (TOTAL)	
ANALOG OUT		Outputs a logarithmically compressed voltage corresponding to the measured resistance value
+	$V_o = \log(1 + R_x / 1M\Omega)$ where R_x = measured resistance value (1 MΩ: 0.30 V; 10 MΩ: 1.04 V; 100 MΩ: 2.00 V; 1000 MΩ: 3.00 V; 10000 MΩ or more: 4.00 V). Output impedance: 1 kΩ	
COM	Analog output-circuit common	
Accuracy	±(2% of full scale)	
RS232C		D-SUB 9-pin connector on the rear panel (compliant with EIA-232-D) All functions other than the POWER switch and KEY-LOCK function are remotely controllable.
Baud rate	9600 bps / 19200 bps / 38400 bps (data: 8 bits; parity: none; stop bit: 2 bits fixed)	
Display	7-segment LED, 4-digit voltage display, 4-digit insulation resistance display, and 3-digit time display	
Memory function	A maximum of 10 types of test conditions can be stored in memory.	
Backup battery life	3 years or more (at 25 °C)	
TEST MODE		
MOMENTARY	A test is conducted only when the START switch is pressed.	
FAIL MODE	Disables cancellation of FAIL judgment using a stop signal via remote control.	
DOUBLE ACTION	Starts a test only when the STOP switch is pressed and the START switch is pressed within approximately a half-second.	
PASS HOLD	Allows the time of holding PASS judgment to be set to 0.2 s or HOLD.	
KEYLOCK	Places the tester in a state in which no keystroke other than the START/STOP switch is accepted.	

TOS7200

Insulation Resistance Tester

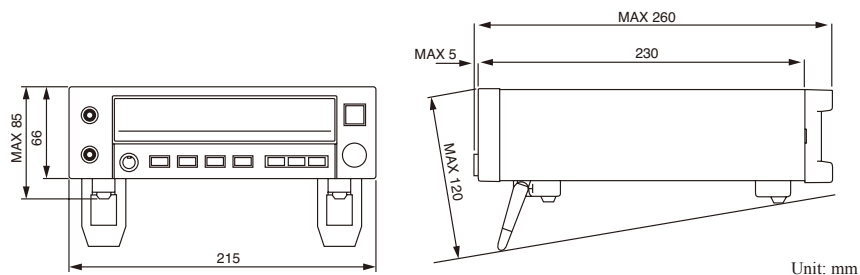
General Specifications

Environment	
Installation location	Indoors and at altitudes up to 2000 m
Warranty range	Temperature 5 °C to 35 °C
	Humidity 20 %rh to 80 %rh (no condensation)
Operating range	Temperature 0 °C to 40 °C
	Humidity 20 %rh to 80 %rh (no condensation)
Storage range	Temperature -20 °C to 70 °C
	Humidity 90 %rh or less (no condensation)
Power requirements	
Nominal voltage range (allowable voltage range)	100 V to 240 V AC (85 V to 250 V AC)
Power consumption at rated load	30 VA maximum
Allowable frequency range	47 Hz to 63 Hz
Insulation resistance	30 MΩ or more (500 V DC) [AC LINE to chassis]
Hipot	1390 V AC for 2 seconds, 10 mA or less [AC LINE to chassis]
Ground bond	25 A AC / 0.1 Ω or less
Electromagnetic compatibility (EMC) *1	
Conforms to the requirements of the following directive and standard. EMC Directive 2004/108/EC EN 61326-1 (Class A) EN 55011 (Class A, Group 1) EN 61000-3-2 EN 61000-3-3 Under following conditions 1. Used HV test leadwires TL08-TOS which is supplied. 2. No discharge occurs at outside of the tester. 3. Used the shielded cable which length is less than three meters when the SIGNAL I/O is used.	
Safety *1, *2	
Conforms to the requirements of the following directive and standard. Low Voltage Directive 2006/95/EC EN 61010-1 Class I Pollution degree 2	
Dimensions (maximum)	215[8.46 inch] W × 66[2.60 inch] (85[3.35 inch]) H × 230[9.06 inch] (260[10.24 inch]) D mm
Weight	Approx. 2 kg (Approx.4.41 lbs)
Accessories	AC power cable 1 pc. TL08-TOS high-voltage test leadwires (1.5 m) 1 set Operation Manual 1 copy

*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.

— External dimensional diagrams —



Test Lead

■ TL01-TOS

[cable length: 1.5 m/max. operating voltage: 5 kV]



■ TL02-TOS

[cable length: 3 m/max. operating voltage: 5 kV]



■ TL03-TOS

[cable length: 1.5 m/max. operating voltage: 10 kV]



■ TL04-TOS

[cable length: 1.5 m/max. operating voltage: 5 kV
(for TOS1200, RL01-TOS)]



■ TL05-TOS

[cable length: 1.5 m/max. operating voltage: 5 kV
(for 149-10A, RL01-TOS)]



■ TL06-TOS

[cable length: 0.5 m/max. operating voltage: 5 kV
(for parallel connection of TOS9220/9221)]



■ TL07-TOS

[cable length: 1.5 m/max. operating voltage: 5 kV
(for TOS9220/9221)]



■ TL08-TOS

[cable length: 1.5 m/max. operating voltage: 1 kV
(for TOS7200)]



■ TL11-TOS

[cable length: 1.5 m/max. operating current: 30 A
(for TOS6200A)]



■ TL12-TOS

[cable length: 1.5 m/max. operating current: 60 A
(for TOS6210)]



■ TL13-TOS

[cable length: 1.6 m/max. operating current: 40 A
(for TOS9302, 9303, 9303LC)]



■ TL21-TOS

[cable length: 1.5 m (for TOS3200)]



■ TL22-TOS

[cable length: 1.7 m/max. rated voltage: 1000 V
/max. rated current: 10 A (for TOS9303LC)]



■ TL31-TOS

[cable length: 1.5 m/max. operating voltage: 5 kV
(for TOS5300 Series)]



■ TL32-TOS

[cable length: 3 m/max. operating voltage: 5 kV
(for TOS5300 Series)]



■ TL33-TOS

[cable length: 0.5 m/max. operating voltage: 5 kV
(for TOS9320)]



■ TL51-TOS

[cable length: 1.5 m (for TOS7210S)]



■ HTL-2.5DH

[cable length: 1.5 m/max. operating voltage: 10 kV
(for 149-10A)]



Test Probe

■ HP01A-TOS*

[cable length: 1.8 m/max. operating voltage: 4 kV
AC(RMS), 5kV DC]

■ HP02A-TOS*

[cable length: 3.5 m/max. operating voltage: 4 kV
AC(RMS), 5kV DC]

* The optional Adaptor DD-5P/9P is required for the connection.



■ HP11-TOS

[cable length: 1.8 m/max. operating voltage: 1 kV DC/
max. operating current: 100 mA]



■ HP21-TOS

[cable length: 1.8 m/max. operating voltage: 250 Vrms/
max. operating current: 100 mA]



■ LP01-TOS

[cable length: 2 m/max. operating current: 30 A]



■ LP02-TOS

[cable length: 2 m/max. operating current: 60 A]



■ FP01-TOS

(flat probe for TOS3200, TOS9303LC)



Option

Remote Control Box

RC01-TOS*

[one-hand operation/dimensions: 200W×70H×39D mm]
Accessory cable length: 1.5 m

RC02-TOS*

[both-hands operation/dimensions: 330W×70H×39D mm]
Accessory cable length: 1.5 m



* The optional Adaptor DD-5P/6P is required for the connection.

Warning Light Unit

PL01-TOS (for 100 V AC)



PL02-TOS (for 24 V DC)



Buzzer Unit

BZ01-TOS (for 100 V AC)

* This can not be used with TOS9200/9201, TOS7200



DIN Cable

DD-3 5P

[cable length: 3 m/DIN plug to DIN plug]



Conversion Cable

DD-5P/6P

[Adapter /DIN to Mini DIN]



DD-5P/9P

[Adapter /DIN to Mini DIN]



The DD-5P/9P DIN adapter cable (5 pin to 9 pin) is for connecting the following option products to the TOS9300/TOS5300/TOS5200 series.

- Remote control box (RC01-TOS/RC02-TOS)
- High voltage test probe (HP01A-TOS/HP02A-TOS)
- Test probe for touch current test (HP21-TOS)

Multi Outlet

OT01-TOS (multi outlet for TOS3200)



Terminal Unit

TU01-TOS (for TOS5300/TOS5200 Series)



This is a terminal unit for converting a 25-pin SIGNAL I/O connector of TOS5300/5301/5302/5200 to a 14-pin SIGNAL I/O connector of TOS5050A/5051A.

By connecting via this product, the external control performed with TOS5050A/5051A can be performed with TOS5300/5301/5302/5200 at the same time.

Cross Reference of options for Electrical Safety Testers

Model	Remote Control		Warning Light Unit, Buzzer Unit, Terminal Unit				Test Probe					Test Lead															
	RC01/02-TOS	DD-3 5P	PL01-TOS	PL02-TOS	BZ01-TOS	TU01-TOS	HP01A/02A-TOS	HP11-TOS	HP21-TOS	LP01-TOS	LP02-TOS	FP01-TOS	TL01/02/03-TOS	TL04-TOS	TL05-TOS	TL06-TOS	TL07-TOS	TL08-TOS	TL11/12-TOS	TL13-TOS	TL21-TOS	TL22-TOS	TL31/32-TOS	TL33-TOS	TL51-TOS	HTL2.5-DH	
TOS9300	○			○			○																	○	○		
TOS9301	○			○			○																	○	○		
TOS9301PD	○			○			○																	○	○		
TOS9302	○			○			○													○				○	○		
TOS9303	○			○			○													○				○	○		
TOS9303LC	○			○			○		○		○									○		○		○	○		
TOS9320																	○							○	○		
TOS9213AS	○	○		○			○						○	○		○											
TOS5101	○	○	○		○								○														
TOS5302	○			○			○																	○			
TOS5301	○			○			○																	○			
TOS5300	○			○			○																	○			
TOS5200	○			○			○																	○			
TOS6200A	○	○								○	○									○							
TOS6210	○	○								○	○									○							
TOS7200	○							○										○									
TOS7210S	○	○																								○	
TOS3200									○			○										○					
TOS8030	○	○		○			○						○														
TOS1200														○				○									
149-10A															○												○
RL01-TOS														○	○	○											

○ : Required the converting adapter "DD-5p/6p" ○ : Allows to use within the cable rating ○ : Required the converting adapter "DD-5p/9p"