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





# TOS7200(IR)



# Testing voltage range -25 V to -1,000 V, Resistance measurement range 0.01 M $\Omega$ to 5,000 M $\Omega$

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															
		Lastri													
Output voltage rang		-25 V to -1000 V													
	Resolution	1 V													
	Accuracy	±(1.5 % of setting + 2 V)													
Maximum rated load	d	1 W (1 000 V/1 n	A)												
Maximum rated cur	rent	1 mA													
Output terminals	Output type	Floating													
Output terrimais	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 curr	rent	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: $25 \text{ k}\Omega$ )													
Voltmeter															
Measurement range		0 V to -1200 V													
Resolution		1 V													
Accuracy		±(1 % of reading	+1 V)												
Resistance meter		1 ( 111 111 8													
Measurement range		0.01 MΩ to 5000	$M\Omega$ (In the range of over 100	nA to a maximum r	ated current of 1 mA)										
		1													
Display				$0M\Omega \le R < 1000M$		——— K = measur	ed insula	ation resistance							
			$\square$												
		100 nA < i < 20	0 nA   200 nA < i < 1 uA   1	LuA < i < 1 mA											
Accuracy		$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$													
riceardey															
		[In the humidity range of 20 %rh to 70 %rh (no condensation), with no disturbance such as swinging of the test leadwire]													
Measurement range		+	rement range is selectable bet												
	AUTO	Automatically changes the current measurement range according to the measured current value.  Fixes the current measurement range based on the output voltage set value and LOWER set value (in UPPER OFF status).													
	FIX	<del> </del>	-			-	OFF stat	tus).							
Holding function		Holds the resistar	ce value obtained at the end of	f testing while a PAS	SS judgment is being	output.									
Judgment function															
		Judgement	Judgement method			Display	Buzzer	SIGNAL I/O							
						1 2		-							
		UPPER FAIL	If a resistance value equal or high	gher than the upper r	esistance is detected,	FAIL LED lights.	ON	Outputs an							
		UPPER FAIL	If a resistance value equal or high the tester shuts off the output a			FAIL LED lights. UPPER LED lights.	ON								
		UPPER FAIL  LOWER FAIL	the tester shuts off the output a If a resistance value equal or le	and returns an UPPI ess than the lower r	ER FAIL judgment.	UPPER LED lights. FAIL LED	ON	U FAIL signal Outputs a							
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## **Insulation Resistance Tester**

## **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	- 1	LSB *	
2	PM1	- 1	*	[Pin Configuration for the
3	PM2	I	*	SIGNAL I/O Connector]
4	PM3	Ţ	MSB *	
5	N.C			13 12 11 10 9 8 7 6 5 4 3 2 1
6	N.C			25 24 23 22 21 20 19 18 17 16 15 14 /
7	N.C			
8	N.C			
9	STB	I	Input terminal for the strobe s	ignal of the panel memory
_10	N.C			
11	N.C			
12	N.C			
_13	COM		Circuit common (chassis pote	ential)
14	HV ON	0	ON during a test or while a voterminals	oltage remains between the output
15	TEST	0	ON during a test	
16	PASS	0	ON for approx. 0.2 seconds wo	when PASS judgment is made, or continuously wated
17	U FAIL	0	Continuously ON if an insul upper resistance is detected,	ation resistance equal to or exceed-ing the resulting in FAIL judgment
18	L FAIL	0	Continuously ON if an insula lower resistance is detected,	ation resistance equal to or falling below the resulting in FAIL judg-ment
19	READY	0	ON during standby	
20	N.C			
21	START	I	Input terminal for the START	signal
22	STOP	I	Input terminal for the STOP s	ignal
23	ENABLE	ı	Remote control enable signal	input terminal
24	N.C			
25	COM		Circuit common (chassis pote	ential)
* 1-dic	it BCD active L	∩W in	put	

\* 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

nput specifications											
High-level input voltage	11 V to 15 V	All C. T. C. T. C. H. I.									
Low-level input voltage	0 V to 4 V	All input signals are active Low controlled.  The input terminal is pulled up to +12 V using a resistor.									
Low-level input current	-5 mA maximum	Opening the input terminal is equivalent to inputting a high-level signal.									
Input time width	5 ms minimum	opening the input terminal is equivalent to inputting a ingli-level signal.									
utput 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)										
NALOG OUT	Outputs a logarithmically	compressed voltage corresponding to the measured resistance value									
+	$V_0 = \log (1 + Rx / 1M\Omega)$										
	where $Rx$ = measured resistance value										
	(1 M $\Omega$ : 0.30 V; 10 M $\Omega$ : 1.04 V; 100 M $\Omega$ : 2.00 V; 1000 M $\Omega$ : 3.00 V; 10000 M $\Omega$ or more: 4.00 V).										
	Output impedance: $1 \text{ k}\Omega$										
COM	Analog output-circuit con	Analog output-circuit common									
Accuracy	±(2 % of full scale)										
S232C		D-SUB 9-pin connector on the rear panel (compliant with EIA-232-D)									
	All functions other than the	All functions other than the POWER switch and KEY-LOCK function are remotely controllable.									
Baud rate	9600 bps / 19200 bps / 38	9600 bps / 19200 bps / 38400 bps (data: 8 bits; parity: none; stop bit: 2 bits fixed)									
isplay		7-segment LED, 4-digit voltage display, 4-digit insulation resistance display, and 3-digit time display									
Iemory function	A maximum of 10 types of	A maximum of 10 types of test conditions can be stored in memory.									
ackup battery life	3 years or more (at 25 °C	3 years or more (at 25 °C)									
EST MODE											
MOMENTARY	A test is conducted only v	A test is conducted only when the START switch is pressed.									
FAIL MODE	Disables cancellation of F	Disables cancellation of FAIL judgment using a stop signal via remote control.									
DOLIDI E ACTIONI	Starts a test only when the	e STOP switch is pressed and the START switch is pressed within approximately a half-									
DOUBLE ACTION	second.										
PASS HOLD	Allows the time of holdin	Allows the time of holding PASS judgment to be set to 0.2 s or HOLD.									
EYLOCK	Places the tester in a state	Places the tester in a state in which no keystroke other than the START/STOP switch is accepted.									

## **Insulation Resistance Tester**

## **General Specifications**

Environment									
Installation location	Indoors and at altitudes up to 2000 m								
Wamanty range	Temperature 5 °C to 35 °C								
Warranty range	Humidity 20 %rh to 80 %rh (no condensation)								
On antina and a	Temperature 0 °C to 40 °C								
Operating range	Humidity 20 %rh to 80 %rh (no condensation)								
Character and the	Temperature -20 °C to 70 °C								
Storage range	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	$30 \text{ M}\Omega$ 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	$25 \text{ A AC} / 0.1 \Omega \text{ or less}$								
FI ( (F)(0) *1	•								

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

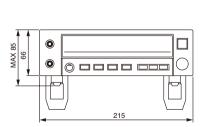
Class I

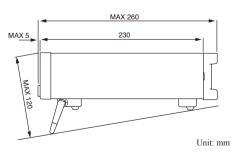
Pollution degree 2

Dimensions (maximum)	$215[8.46 \; inch] \;\; W \times 66[2.60 \; inch] \; (85[3.35 \; inch]) \; H \times 230[9.06 \; inch] \; (260[10.24 \; inch]) \; D \; \; mm$						
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 —





# **Option**

#### 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	Ren Con		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		HP21- TOS	LP01- TOS	LP02- TOS	FP01- TOS	TL01/02/ 03-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	0			0			0																0	0		
TOS9301	0			0			0																0	0		
TOS9301PD	0			0			0																0	0		
TOS9302	0			0			0													0			0	0		
TOS9303	0			0			0													0			0	0		
TOS9303LC	0			0			0		0			0								0		0	0	0		
TOS9320																	0						0	0		
TOS9213AS	0	0		0			0						0	0		0										
TOS5101	0	0	0		0								0													
TOS5302	0			0		0	0																0			
TOS5301	0			0		0	0																0			
TOS5300	0			0		0	0																0			
TOS5200	0			0		0	0																0			
TOS6200A	0	0								0	0								0							
TOS6210	0	0								0	0								0							
TOS7200	0	0						0										0								
TOS7210S	0	0																							0	
TOS3200									0			0									0					
TOS8030	0	0		0			0						0													
TOS1200														0		0										
149-10A															0											0
RL01-TOS														0	0	0										

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