TOS6210

Ground Bond Tester

Ground Bond tester supporting standard compliance tests up to 60A

TOS6210

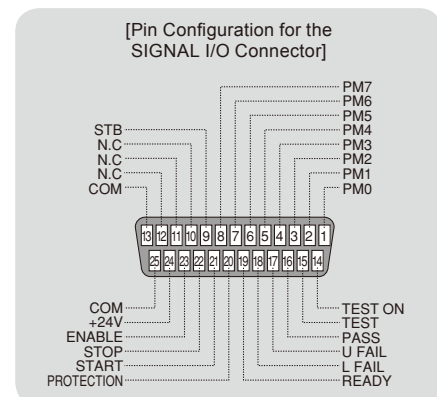GPIB RS232C DRIVERS CE

Test up to 60 A is possible!

While inheriting the basic performance and functions of its predecessor (TOS6200), such as a constant current driving system that provides current waveforms with little skew and high measurement accuracy, the TOS6210 tester extends the maximum test current from 30 A to 60 A, which is demanded by the new standard. In addition, the tester also lets you judge the acceptability of the device under test based on the drop in voltage, as required in the standard. What's more, you can preset test conditions of up to 20 different types of safety standards, such as those for information technology equipment, home appliances, medical devices, and measuring instruments, in the memory on the main unit's panel.

A simple memory call operation allows you to set up a protective earth or protective bonding continuity test as stipulated in UL60950-1 and other relevant specifications including IEC and JIS standards. The tester also features a set of functions that meet the specific needs of testing personnel, such as an offset cancellation function and a memo function that allows you to input calibration dates, production numbers, and other test-related information and read the input information later via the GPIB or RS232C interface.

- Test current value: 6 A to 60 A AC / Resistance value: 0.001 Ω to 0.600 Ω
- Voltage drop-based judgment function
- Offset cancelling function
- Stores 100 test conditions in memory
- Incorporates test conditions into program
- Contact check function
- Equipped with standard GPIB and RS232C interfaces
- Equipped with standard test lead (TL12-TOS)

[Pin Configuration for the SIGNAL I/O Connector]

Output block		
Current setting range (*1)		6.0 to 62.0 A AC (With respect to resistance resulting in output power of the maximum rated Output or less and an output terminal voltage of 5.4 V or less)
	Resolution	0.1A
	Accuracy	± (1% of setting + 0.4A)
Maximum rated output		220 VA (at the output terminals)
Distortion factor		2% or less (with respect to 0.1 Ω pure resistance load of 20 A or greater)
Frequency		50/60 Hz, sine wave (selectable)
	Accuracy	±200ppm
Open terminal voltage		6 Vrms or less
Output method		PWM switching method

Output ammeter	
Measurement range	0.0 to 66.0 A AC
Resolution	0.1A
Accuracy	± (1% of reading + 0.4A)
Response	Mean value response/rms value display (response time: 200 ms)
Holding function	The current measured at the end of test is held during the PASS or FAIL inteval

Output voltmeter	
Measurement range	0.00 to 6.00 V AC
Resolution	0.01V
Offset cancel function	0.00 to 5.40 V (Offset ON/OFF function provided)
Accuracy	± (1% of reading + 0.02V)
Response	Mean value response/rms value display (response time: 200 ms)
Holding function	The voltage measured at the end of test is held during the PASS or FAIL inteval

Ohmmeter (*2)	
Measurement range	0.001 to 0.600 Ω
Resolution	0.001 Ω
Offset cancel function	0.000 to 0.600 Ω (Offset ON/OFF function provided)
Accuracy	± (2% of reading + 0.003 Ω)
Holding function	The resistance measured at the end of test is held during the PASS or FAIL interval

Pass/fail judgement function (*3)		
Resistance value-based judgement		Window comparator system •If a resistance value equal to or greater than the upper reference value is detected, a FAIL determination is returned. •If a resistance value equal to or less than the lower reference value is detected, a FAIL determination is returned. •If a resistance value has been judged as FAIL, the tester shuts off the output and generates a FAIL signal. •If the set time elapses without abnormalities, the tester shuts off the output and generates a PASS signal.
	Setting range for the upper reference value (UPPER)	0.001 to 0.600 Ω
	Setting range for the lower reference value (LOWER)	0.001 to 0.600 Ω
	Resolution	0.001 Ω
	Judgement accuracy	± (2% of UPPER + 0.003 Ω)
Sampled voltage value-based judgement		Window comparator system •If a voltage value equal to or greater than the upper reference value is detected, a FAIL determination is returned. •If a voltage value equal to or less than the lower reference value is detected, a FAIL determination is returned. •If a voltage value has been judged as FAIL, the tester shuts off the output and generates a FAIL signal. •If the set time elapses without abnormalities, the tester shuts off the output and generates a PASS signal.
	Setting range for the upper reference value (UPPER)(*4)	0.01 to 5.40 V
	Setting range for the lower reference value (LOWER)	0.01 to 5.40 V
	Resolution	0.01 V
	Judgement accuracy	± (2% of UPPER + 0.05 V)
Calibration		Calibration is performed with the rms value of the sine wave, using a pure resistance load.
LED	PASS	Lights for approximately 0.2 sec when the measured value has been judged as PASS. It is lit continuously when the PASS holding time is set to HOLD.
	UPPER FAIL	Lights if a resistance or voltage value equal to or greater than the upper reference value is detected and judged FAIL.
	LOWER FAIL	Lights if a resistance or voltage value equal to or greater than the upper reference value is detected and judged FAIL.
Buzzer		•The buzzer sounds for the pass holding time has been set if the measured value has been judged as PASS. •The buzzer sounds continuously under the following condition: The measured value has been judged as PASS when the PASS holding time is set to HOLD. The measured value has been judged as UPPER FAIL. The measured value has been judged as LOWER FAIL. •The buzzer volume for FAIL or PASS judgment are adjustable. Note that it cannot be adjusted individually since setting is shared with the setting for PASS.

Time		
Test time	Setting range	0.3 to 999 s Timer ON/OFF function is available.
	Accuracy	± (100 ppm of setting + 20 ms)

Environment		
Operating environment		Indoor use, Overvoltage Category II
Warranty range	Temperature	5° to 35°C
	Humidity	20 %rh to 80 %rh (non condensing)
Operating range	Temperature	0° to 40°C
	Humidity	20 %rh to 80 %rh (non condensing)
Storage range	Temperature	-20° to 70°C
	Humidity	90 %rh or less (non condensing)
Altitude		Up to 2000 m

Power requirement		
Allowable voltage range		85 to 250 V AC
Power consumption	At no load (READY)	60 VA or less
	At rated load	420 VA max.
Allowable frequency range		47 Hz to 63 Hz
Insulation resistance		30 MΩ min. (500 V DC), between AC line and chassis
Hipot		1390 V AC (2 seconds), between AC line and chassis
Ground bond		25 A AC/0.1 Ω max.

Electromagnetic compatibility (EMC) (*5,6)
Conforms to the requirements of the following directive and standard. EMC Directive 2014/30/EU, EN61326, EN61000-3-2, EN61000-3-3 Under following conditions   1. Used test leadwire (TL12-TOS) which is supplied. 2. Used the shielded cable which length is less than three meters when the SIGNAL I/O is used.

Safety (*5)
Conforms to the requirements of the following directive and standard. Low Voltage Directive 2014/35/EU, EN61010-1, Class I, Pollution degree 2

Physical dimensions(maximum)	430[16.93 inch] (455[17.91 inch]) W × 88[3.46 inch] (140[5.51 inch]) H × 270[10.63 inch] (350[13.78 inch]) D mm
Weight	Approx. 11 kg(Approx.24.25 lbs)

Accessories
AC power cord: 1 piece, Test leadwire TL12-TOS: 1 set, Short bar: 2 pieces (These are inserted between the OUTPUT and SAMPLING terminals.), AC power fuse: 2 pieces (2, including one spare in the fuse holder), Operation manual: 1 copy

*1: Time limitation with respect to output. The heat radiation capacity at the output block of the tester is designed to be one-third of the rated output, accounting for size, weight, cost, and other factors.
Always use the tester within the limitation values given below. Use of the tester beyond these limits will cause the temperature of the output block to rise excessively, potentially tripping the internal protection circuit. In this case, suspend testing for approximately 30 minutes, then press the STOP switch. When temperatures fall to normal levels, the tester will revert to ready status.

Output time limitation			
Ambient temperature t (°C)	Test current I (A)	Pause time	Maximum allowable continuous test time
t ≤ 40°	40 < I ≤ 60	Equal to or greater than the test time	≤ 10 minutes
	20 < I ≤ 40	Equal to or greater than the test time	≤ 30 minutes
	I ≤ 20	Not required	Continuous output possible

*2: About ohmmeter's response time. A resistance value is instantaneously obtained, calculated using the measured voltage and current values. The response time of the ohmmeter complies with the response times of the voltmeter and ammeter.
*3: Resistance value-based and sampled voltage value-based judgments cannot be simultaneously conducted.
*4: Limited by the maximum rated output and the output terminal voltage. The tester can be used within the range shown below.
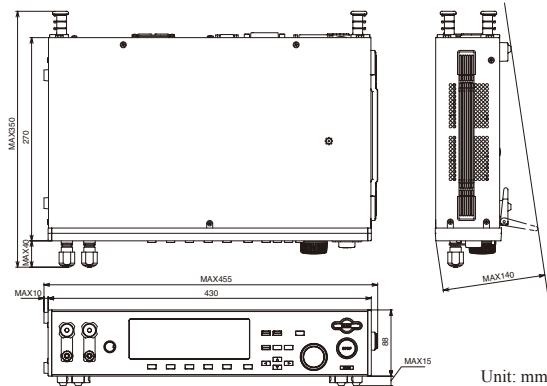
Allowable range in which to determine the test current value and upper reference value
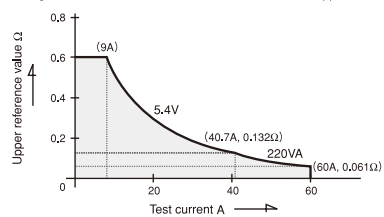
*5: Not applicable to custom order models.
*6: Only on models that have CE marking on the panel.

External dimensional diagrams

Unit: mm

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

RC01-T0S   RC02-T0S

* 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	O			O			O																O	O		
TOS9301	O			O			O																O	O		
TOS9301PD	O			O			O																O	O		
TOS9302	O			O			O													O			O	O		
TOS9303	O			O			O													O			O	O		
TOS9303LC	O			O			O		O			O								O		O	O	O		
TOS9320																	O						O	O		
TOS9213AS	O	O		O			O						O	O		O										
TOS5101	O	O	O			O							O													
TOS5302	O			O		O	O																O			
TOS5301	O			O		O	O																O			
TOS5300	O			O		O	O																O			
TOS5200	O			O		O	O																O			
TOS6200A	O	O								O	O								O							
TOS6210	O	O								O	O								O							
TOS7200	O	O			O													O								
TOS7210S	O	O																							O	
TOS3200									O			O									O					
TOS8030	O	O		O			O						O													
TOS1200														O		O										
149-10A															O											O
RL01-TOS													O		O	O										

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