MODEL 8522

Withstanding Voltage Tester

Instruction Manual

TSURUGA ELECTRIC CORPORATION

I-01771-1

FOR SAFE USE

For safe use of this product, please observe the following warning and caution. In order to help the users' safe use of the product, the following symbol marks are used in this manual.

⚠ WARNING This is the warning to avoid the danger when it is assumed that such danger as may cause fatal accident or severe injure to a user occurs in case that the product is mishandled.

⚠ CAUTION This is the caution to avoid the danger when it is assumed that such danger as may cause minor injure to a user or generate only physical obstacle occurs in case that the product is mishandled.

⚠ WARNING

This tester outputs high voltage. As there is danger of an electric shock, please strictly follow the directions below:

- **Do not touch high voltage cables or test samples during the test.**
  The places marked with ⚠ on the tester are the dangerous parts where the high voltage is generated.
- **Make sure to connect the protective ground terminal to the earth.**
- **When operating the tester, put on the rubber gloves for an electric operation.**
- **For the connection to the sample to be tested, use the attached high voltage cable or an electric cable appropriate to the operating voltage.**

⚠ CAUTION

- **To avoid break-down, malfunction or other troubles, do not use the tester in such places where:**
  - **exposed to rain, water drops or direct sunlight.**
  - **high temperature or humidity, heavy dust or corrosive gas.**
  - **affected by external noise, radio waves or static electricity.**
  - **unstable or of much mechanical vibration**
  - **high sensitivity measuring instruments or receiver locates nearby**
- **Do not open the case or modify the tester as it may cause a danger of an electric shock or other troubles.**
- **In case that abnormal operation occurs, turn off the power supply switch immediately and pull out the power supply cable from the plug socket.**

Contents

1. Preface

We thank you for your purchase of Model 8522.
For proper use of this tester, please carefully read these instructions before initial operation.
This tester is a compact, lightweight and basic Withstanding Voltage Tester with the capability of maximum output AC3kV and output capacity 30VA, which allow an operator to make a withstanding voltage test of various electronic equipment or components by easy and simple operations.
The model 8522 employs the zero-cross voltage application system which prevents the tester from applying unnecessarily higher voltage to the test sample. It is also it is provided with an upper limit comparator to perform an NG judgement for the leak current and, the NG judgement signal and the signal to indicate that the test voltage is in application are output from the rear panel.
It is equipped with a timer to set the test time, the remote control terminal blocks to allow a remote control by means of sequencer and so on. Also, the various optional accessories such as a rack mount panel, a remote control box to operate the remote start/stop and others are available for various applications.
The tester deals high voltage, so it is designed to provide many protective functions and various concerns to secure the operators' safety.

2. Confirmation prior to use

2.1 ●Unpacking

(1) Unpacking
When the tester is delivered, please check whether it has not been damaged in transit, and unpack it carefully. If any damage or inconvenience is found, please consult with the dealer whom you purchased the tester from for proper solution.
We also recommend that you keep the packaging materials in case you need to transport this product.

(2) Check of the contents
Please take out all items from the carton and do not leave in the carton any item of the contents listed below.

1. Main unit	1 piece
2. Standard accessories	1 set
Instruction manual	1 copy
Power supply cord 2.5m	1 piece
High voltage cable 2m	1 pair
Earth wire 3m	1 piece
5PDIN plug	1 piece

2.2 ●Cautions for handling

(1) Since this tester deals the high voltage, it is designed paying special attention to safety. However, it is still dangerous as it outputs high voltage of max.3kV. An erroneous handling may cause fatal accident. Never touch the output terminals, high voltage cable and test samples during the test. Please use it with the utmost care and attention at all times.

(2) Make sure to connect the protective grounding terminals to the earth.
If the grounding is insufficient, the tester housing is charged with high voltage when the output is short-circuited to the earth or the power source line, and is very dangerous.

⚠ WARNING
Insufficient grounding may cause the electric shock.

(3) When operating the tester, put a rubber glove for prevention of electric shock.

2.3 ●Place for installation

Do not use the tester in such places where it is:
- to receive direct sunlight or become high temperature
- the dump or dusty place
- on the inclined or unstable place
- in the flammable or corrosive gas

2.4 ●Storage

Do not store the tester for the long time in the high humidity and temperature or under the direct sunlight.

3. Name of parts and functions

In this paragraph, fig. 3.1 shows each switch on the front panel and fig 3.2 terminal blocks on the real panel. The letters closed with [ ] is the letter printed in the panel.

3.1 ●Front panel

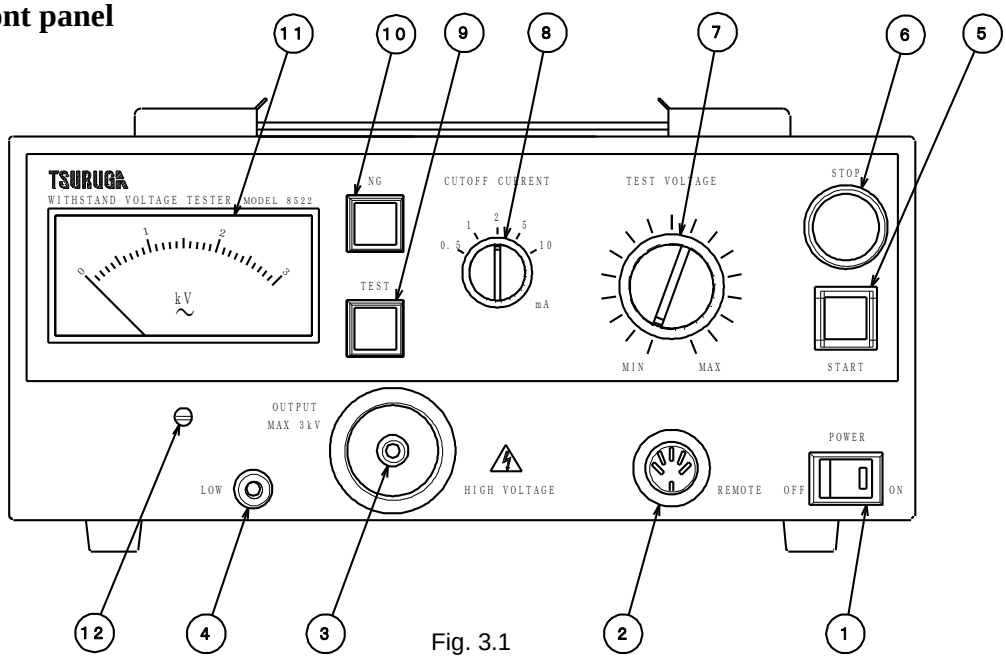


Fig. 3.1

① [POWER] Power supply switch.
When power is ON, LED is lit.

② [REMOTE] Connector for remote control box (5858-07).
Start/Stop operation can be remote-controlled.

③ [HIGH VOLTAGE] High-voltage side terminal of the test voltage output.
Connect with high voltage side measuring lead (red).

④ [LOW] Low-voltage side terminal of the test voltage output.
Connect with low voltage side measuring lead (black).

⑤ [START] Switch to start the test.
Under the remote-control operation, it is invalid.

⑥ [STOP] Switch to interrupt or end the test operation.
It is also used to reset a judgement.

⑦ [TEST VOLTAGE] Knob to adjust the voltage of withstanding voltage test.
When turned clockwise, output voltage increases.

⑧ [CUTOFF CURRENT] Knob to set the current value for the leak current detection.
5 kind of current value can be selected: 0.5/1/2/5/10mA
Set the current value for the detection in accordance with the specifications of the test object.

⑨ [TEST] Lamp to indicate that the test operation is carried out.

⑩ [NG] Lamp to indicate the NG judgement.

⑪ Voltmeter Electrical instrument to indicate the output voltage value.

⑫ Zero adjuster Knob to adjust the zero position of the withstanding voltage tester.

3.2 ●Rear panel

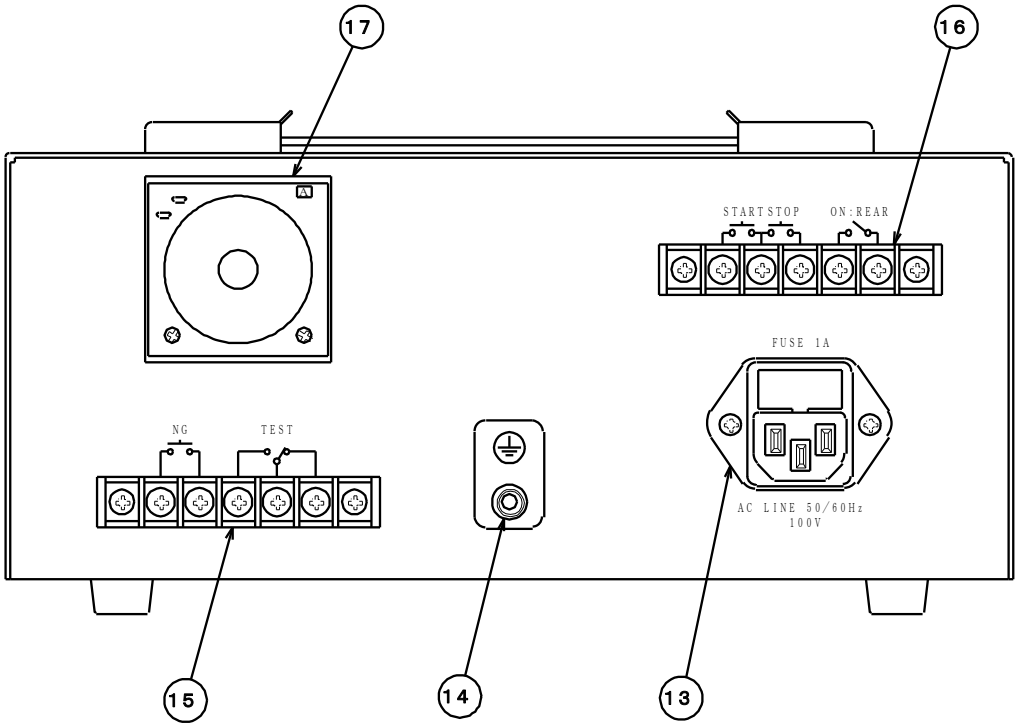


Fig. 3.2

⑬ FUSE AC LINE

Power supply line input connector.
Connect the attached power supply cord (3P).
It is also a fuse socket. Rate of fuse is 1A.
(In case of the optional power supply AC220V/240V, rate of fuse is 0.5A.)
Do not use the fuse other than rated one.

⑭ Grounding terminal

Terminal for grounding to the earth.
Make sure to ground to the earth using the attached earth cable (green).

⑮ Output terminal block

It outputs signals for NG judgement and during the test operation.
For the details, please refer to the paragraph 5.7 Output signal.

⑯ Remote control

Terminals for remote control to connect a control device such as a sequencer.
For the details, please refer to the paragraph 5.8 External control terminal.

⑰ Timer

Timer to set the test time.
For the setting details, please refer to the paragraph 5.3 Setting of timer.

4. Preparation prior to use

4.1 ●Zero adjustment of output voltmeter

Before turning ON the power source switch, please confirm that the pointer of the ⑪ output voltmeter indicates “0”. If it is deviated, make an adjustment turning the zero adjuster ⑫ with the screwdriver.

4.2 ●Confirmation of power supply voltage

Before turning ON the power supply switch ①, please confirm that the power supply voltage is 100V AC. Use the tester within the range of 90V~110V AC. Use of the tester out of this range causes a breakdown or incomplete operation. In case of optional non-standard power supply voltage, use the tester within ±10% of the nominal voltage.

4.3 ●Power supply cord

The plug of power supply cord attached to the tester is for 100V AC. In case of optional non-standard power source voltage such as 220V AC, please replace it with the adequate plug.
Connect the power supply cord to the power supply line input connector ⑬ on the real panel.
The plug of power supply cord has 3 pins and the round shape in the middle is earthing.

4.4 ●Confirmation of fuse rating

The fuse socket of the tester is in common to the power line input connector ⑬.
Before connecting the power cable, please remove the cap of the fuse socket and take out the fuse like the fig. 4.1, then confirm the fuse rating. Two pieces of fuse, including a spare, are stored under the cap. The fuse near the cap (a spare) can be detached by pushing out right and left, the other fuse at the back downwards.

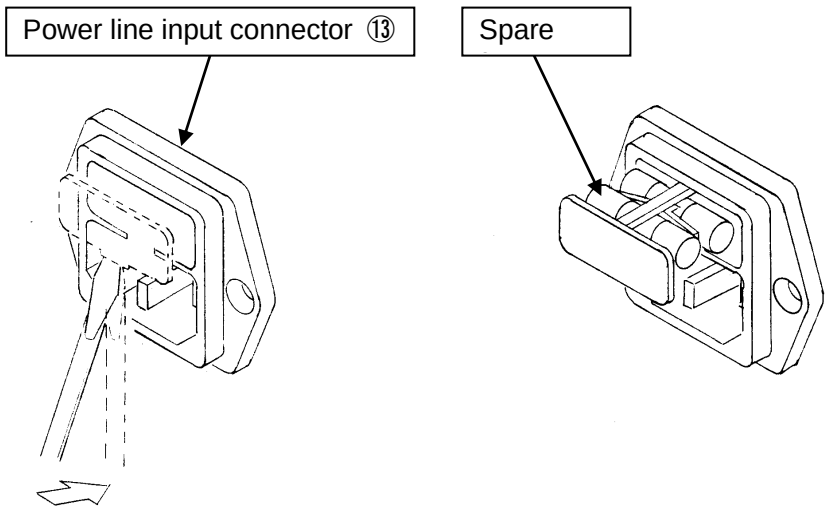


Fig. 4.1

The rate of fuse is as the following table shows.

Type	Power supply voltage	Rate of fuse
Standard	100V AC	250V 1A
Option	110V AC	
	120V AC	250V 0.5A
	220V AC	
	240V AC	

After confirming the fuse rating, store two pieces of fuse as they were and push back the cap until it clicks.
When the fuse is replaced, use a spare fuse under the cap. If another fuse is required, be sure to use the one with the same rate.

4.5 ●Earth connection

Make sure to ground the grounding terminal ⑭ to the earth. When the grounding is insufficient or the output is short-circuited to the earth or the power source line, the tester housing is charged with high voltage and it is very dangerous to touch the housing.
Please also check if the grounding cable is not broken when the tester is used.

4.6 ●Power-on of power supply switch

After completing the preparation from 4.1 to 4.5, confirm that the TEST VOLTAGE knob ⑦ is completely turned anti-clockwise to the end, then power ON the POWER switch ①.
The indication lamp at the switch is lit up, power is supplied and the tester becomes the operation mode.

4.7 ●Cautions during the test

(1) During the test, do not touch the test object, the measuring lead, output terminals and etc. Especially the vinyl insulation part of the crocodile clip is not insulated. Never touch it during the test.

(2) When the emergency situation may happen, switch off the power supply switch POWER ① immediately and pull out the power supply cord from the plug outlet. When the tester fails to operate properly, stop using it promptly and ask for the repair to our company.

(3) While the test is being performed, do not switch ON or OFF.

5. Method of operation

Please be sure to read carefully the paragraph "4. Preparation prior to use" in page 5 before initial operation. Proceed with operation in accordance with the following procedure.

5.1 ●Setting of current value for detecting leak current

With the knob to set the current value ⑧, set the current value for the leak current detection in accordance with the test object specifications.

5.2 ●Setting of test voltage

After confirming that the TEST VOLTAGE knob ⑦ is completely turned anti-clockwise to the end, press START switch ⑤. Looking at the indication of the voltmeter ⑪, set a specified test voltage with the knob ⑦ turned clockwise little by little. After the setting, press STOP switch ⑥ and cut the output off.

5.3 ●Setting of timer

The test time can be set with the timer ⑰ at the rear panel. When the test time is set and press START switch ⑤, the test will end after the test time elapses.
When the NG judgement occurs during the test, NG indicator ⑩ is lit up and at the same time the buzzer goes, then the tester interrupts the test. To release the NG judgement, press STOP switch ⑥. In case of interrupting the test during the test (within the test timer), press also STOP switch ⑥.
The test time from 0.5 sec~30 min can be selected.
Set the timer in accordance with the following procedure.

(1) This timer is a multi range type. With the rotary switch on the front of the timer, select one of four scale marks 0~1.2, 0~3, 0~12 or 0~30 and regarding the time unit select sec or min from sec, min, hrs or 10 h. Do not select the time unit of hrs or 10 h, otherwise the tester is prone to be damaged due to the over rated time of the tester.

(2) When changing over the scale mark or the time unit, turn the change over slot with the tip of the straight slot or cross slot screwdriver in each changeover slot put. (Refer to Fig5.1)

(3) Changing over the scale mark or the time unit when the power of the tester is OFF.

(4) Do not peel off the sticker at the MODE or change the setting.
If it is changed, the tester will not work properly.

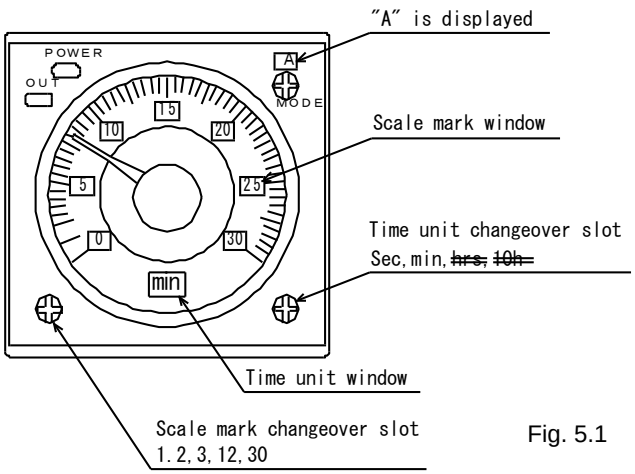
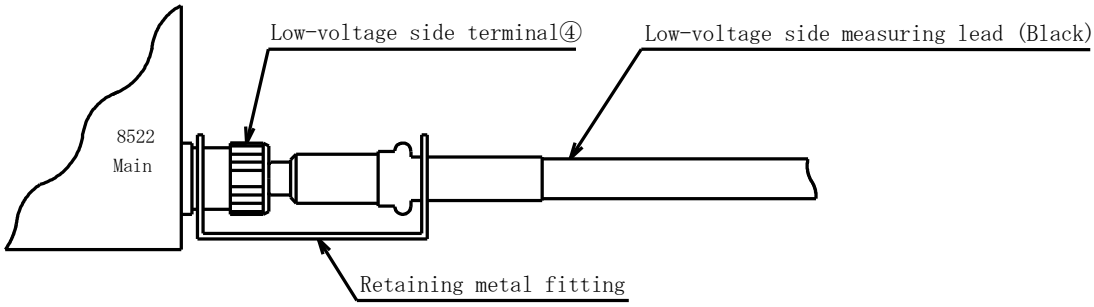


Fig. 5.1

5.4 ●Connection of test object

Upon confirming that the indication of the voltmeter ⑪ is 0V and [TEST] lamp ⑨ is off, connect the measuring lead of the low-voltage side to the low-voltage side terminal [LOW] ④. When connecting, fix at the terminal the retaining metal fitting attached to the lead like Fig. 5.2. If the measuring lead of the low-voltage side comes off, it is dangerous since the whole test object is charged with high-voltage.
Secondly, connect the measuring lead of the high-voltage side to the high-voltage side terminal [HIGH VOLTAGE] ③. Then, connect the measuring lead of the low-voltage side to the test object. After that, connect the measuring lead of the high-voltage side to the test object.

Note) Connect the measuring lead of the high-voltage to the test object after confirming the low-voltage side is grounded.



Fix the U-shape part of the retaining metal fitting at the low-voltage terminal of the tester.

Fig. 5.2

5.5 ●Test

(1) When [START] switch ⑤ is pressed, [TEST] lamp ⑨ lights up and the test starts.

(2) If the leak current to the test object during the test exceeds the current value set by the knob for setting the leak current value ⑧, the tester gives NG judgement and [NG] indicator ⑩ is lit, at the same time the buzzer goes, then the tester interrupts the test. To release the NG judgement, press [STOP] switch ⑥.

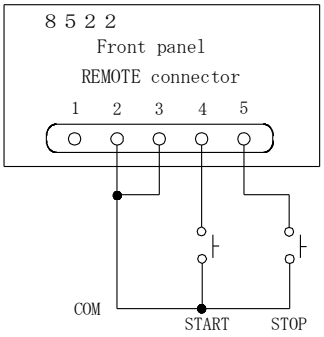
(3) In case that the tester does not give NG judgement after passing the timer setting time, the test object is judged as "PASSED" and the test ends.

(4) To interrupt the test during the test, press [STOP] switch ⑥.

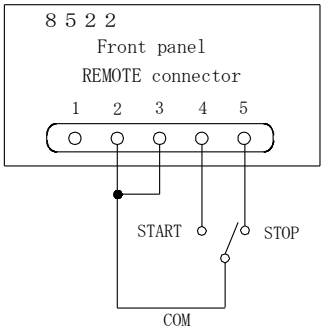
(5) When the test ends, turn the [TEST VOLTAGE] knob ⑦ anti-clockwise to the end (zero position), then switch off the power supply switch [POWER] ①.

5.6 ●Operation of remote control

(1) This tester can be remotely controlled a start/stop operation with the optional remote- control box. (Refer to Fig.5.3)
When the plug of the optional remote-control box (5858-07) is put into the REMOTE connector ② on the front panel, the operation switches from the front panel operation from the remote-control operation with the remote-control box.
When the remote-control is valid, START switch ⑤ becomes invalid. While, a stop operation can be done with both the STOP switch ⑥ on the front panel and the STOP switch on the remote-control box. The remote-control operation can be easily carried out with not only the remote-control box but also other controls (Refer to Fig.5.4). Please make the wiring with the control device with one of the accessories 5PDIN plug.
When the tester is remote-controlled, high voltage is switched ON/OFF by the external signal, so utmost care must be taken sot that the high voltage can not be erroneously generated and that no one never touches the output terminals, high voltage cable or test sample.
Please operate on the basis of safety-first



Remote-control box wiring diagram
Fig. 5.3

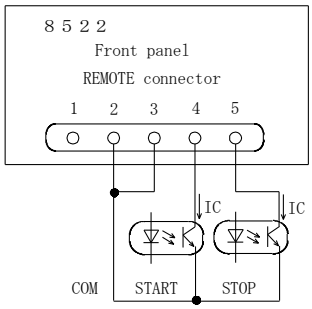


Example of wiring diagram with other controls
Fig. 5.4

(2) The remote-control of this tester can be controlled by a logic element such as transistor, photo-coupler, etc. other than voltage-free contact. (Refer to Fig. 5.5)

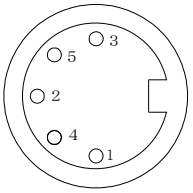
Input conditions:
○ Input level
"H"=16.8~24V
"L"=0~3.8V
○ Ic("L" level flow out current
Ic=10mA
○ "L" level min. pulse width
min. 20msec

No.4 and no.5 pins of REMOTE connector are pulled up about +24V, so they become "H" level at the input opening.



Example of wiring diagram with a logic element
Fig. 5.5

(3) The pin numbers of REMOTE connector ② laid out in accordance with DIN standard. Please see the pin position in the gif 5.6. In order to be enable the remote operation valid, please be sure to short-circuit no.2 and no.3 pins.



View of the socket from the panel

Fig. 5.6

5.7 ●Output signal

This tester outputs the following signal from the output terminal blocks ⑮ on the rear panel.

	Terminal name	Output condition	Contact capacity, structure
①	NG	TEST NG judgement	250V AC 3A 1a
②	TEST	During test operation	250V AC 3A 1 transfer

①NG signal　It is a judgement signal at Test NG.　It outputs a voltage-free make　contact.
It outputs until the STOP signal is input.
It can be used to drive a buzzer or a lamp outside.

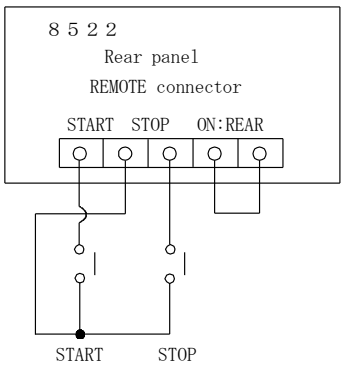
②TEST signal　When the START signal is ON and the tester becomes the test mode, TEST signal is output.
Output is a transfer (switching) contact.
It can be used for an alarm sound or a revolving light during the test and etc.

Note)　Both NG and TEST signals are no-voltage contact and do not have a power source. Please supply power when drive a buzzer, a revolving light and etc.
When use signals, please provide the adequate contact protective measures (surge absorber).

5.8 ●External control terminal

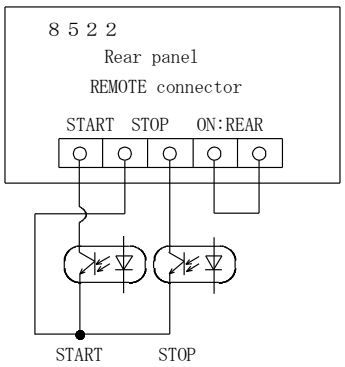
(1) The tester can be remote-controlled with the controls such as sequencer etc connected to the external control terminal ⑯ on the rear for the remote-control.　Please operate with the tester assembled in the rack. (Refer to Fig. 5.7)
Please be sure to short-circuit externally "ON:REAR" terminals.　Then, the operation switches from the front panel operation from the remote-control operation with the external control terminals.　However, STOP operation can be also controlled with the [STOP] switch ⑥ on the front panel.

(2) The remote-control of this tester can be controlled by a logic element such as transistor, photo-coupler, etc. other than the contact signal.　(Refer to Fig. 5.8)
Regarding the input conditions, please refer to the paragraph 5.6 (2).



Remote-control box wiring diagram

Fig. 5.7



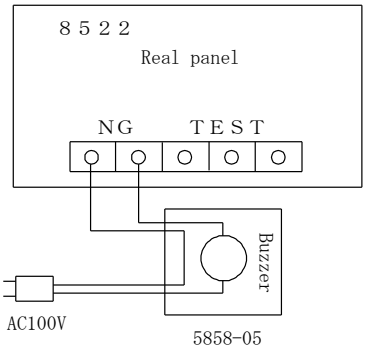
Example of wiring diagram with other controls

Fig. 5.8

6. Optional accessories (To be ordered separately)

6.1 ●Remote control box: 5858-07

This is a remote-control box to give remotely Start/Stop operation to the main unit.
It is connected to the REMOTE connector ② (Refer to Fig.5.3)
START switch: Switch ON to start the test
STOP switch: switch ON to stop the test
It is used to reset NG judgement.



Buzzer Unit connection

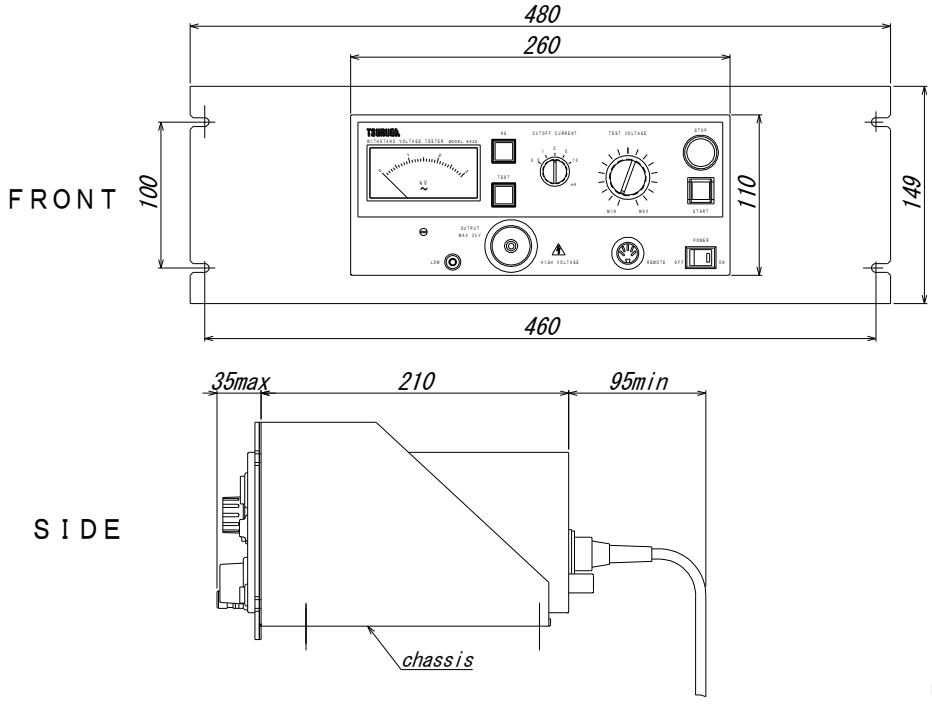
Fig. 6.1

6.2 ●Buzzer unit: 5858-05

It is used when the built-in sound volume is insufficient and the sound volume can be controlled. In order to make the buzzer go, connect it with the NG terminal at the output terminal block ⑮ on the rear panel. (Refer to Fig. 6.1)

6.3 ●Rack mounting panel: 5871-03-011

It is used when the main unit is built onto the JIS rack. Remove the rubber feet at the bottom of the main unit and fix it on the chassis with the screws of the rubber feet. (Refer to Fig. 6.2)



Unit: mm

Fig. 6.2

7. Specifications

7.1 ●Test voltage

(1) Applied voltage	0~3kV AC
(2) Output capacity	30VA (3kV 10mA), at power supply 100V AC (The continuous operation time at the maximum current output is within 30 minutes.)
(3) Wave shape	Shape of commercial power source
(4) Voltage fluctuation rate	15% or less (no load → max. load, at power supply 100V AC)
(5) Applied voltage system	Zero-cross throw switch
(6) Applied voltage setting	Volt slider setting
(7) Voltmeter	Class: JIS 1.5, rectification Scale: 0~3kV AC (Effective average rectification value indication)
(8) Test start/stop	START and STOP switches (Start and stop are remote-controlled with the optional remote control box.)

7.2 ●Detection of leak current

(1) Setting	Upper limit detection, Rotary switch setting
(2) Setting current value	0.5/1/2/5/10mA
(3) Accuracy of judgement	±(5% + 0.1mA) of setting value
(4) NG judgement	It cuts off the test voltage and outputs the NG alarm (lamp, buzzer and contact signal). NG alarm continues till STOP switch is pressed.

7.3 ●Test time

(1) Setting time	0.5sec~30min (4 scale markings, 2 units)

7.4 ●Output signal

(1) NG signal	Contact output during NG judgement 250V AC, 3A 1a
(2) TEST signal	Contact output during TEST operation 250V AC, 3A, 1 transfer

7.5 ●Remote control

When use a remote-control function, connect the separately ordered remote-control box to the connector on the front panel.
(During a remote-control mode, only STOP switch on the front panel is valid.)

7.6 ●General specifications

(1)	Power supply	100V AC±10% 50/60Hz (Non-standard power supply voltage 110V AC, 120V AC, 220V AC, 240V AC, Factory option)
(2)	Power consumption	Approx. 45VA at the rated load Approx, 3VA with no load (READY)※ (※In case of non-standard power supply voltage: 10VA and below)
(3)	Insulation resistance	500V DC 30MΩ and above
(4)	Withstand voltage	1000V AC for one minute
(5)	Operating ambient temp.	0~40℃
(6)	Storage temperature	-20~70℃
(7)	External dimensions	260(W) x 110H x 220D mm (Main unit)
(8)	weight	Approx. 6 kg. (Increased by about 1 kg., in case of the non-standard power supply voltage.)

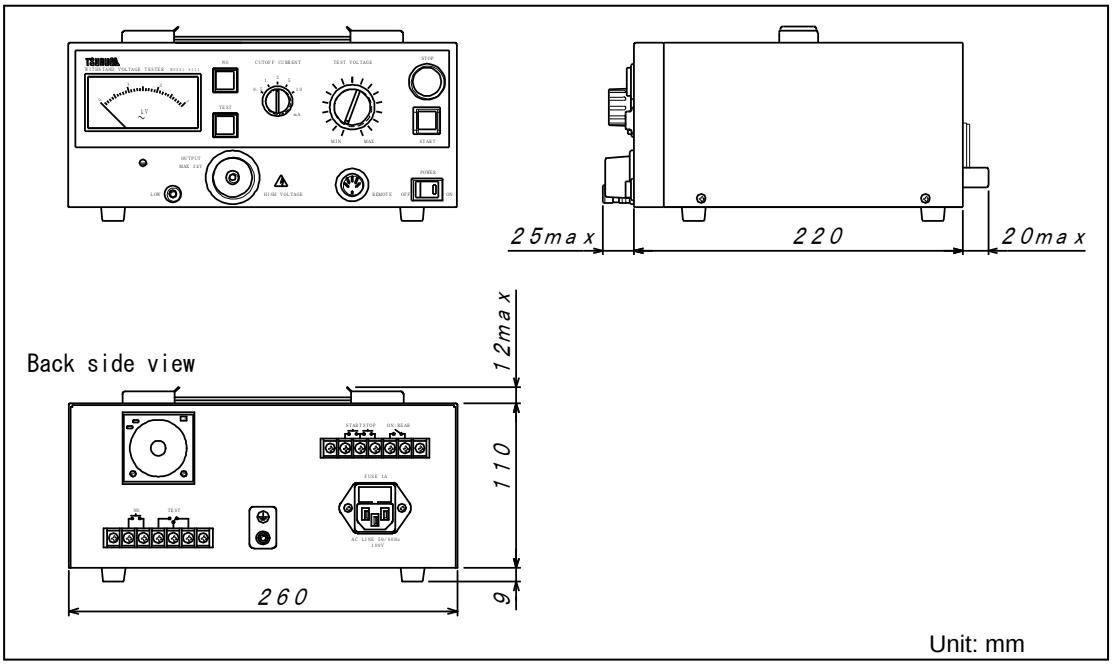
7.7 ●Optional specifications

(1) Non-standard power supply voltage 110V AC, 120V AC, 220V AC, 240V AC

7.8 ●Optional accessories (To be ordered separately)

(1)	Remote control box	5858-07
(2)	Buzzer unit	5858-05
(3)	Rack mounting panel	5871-03-011

7.9 ●Dimensions



8. Calibration and inspection

In order to keep the accuracy of the tester, it is necessary to give the tester regularly a calibration or a check. When a calibration or a check is required, please use our calibration service.

⚠ WARNING

- **This tester generates high voltage of 3kV. As there is danger of an electric shock, a calibration work can not be carried out by a customer. Please use our calibration service.**

Contact Information

Tsuruga Electrical Corporation
Osaka Sale office / Overseas Trade Department
Taiyo Seimei Osakaminami Building 5F
1-10-6, Abikohigashi, Sumiyoshi-ku, Osaka, Japan, 558-0013
Tel: + 81-(0)6-4703-3874 / Fax: + 81-(0)6-4703-3875
E-mail: ft.info@tsuruga.co.jp