TSURUGA

MODEL 8507

AC-W HIGH SPEED TESTER

Operation Manual

I-02414

Contents

This page is blank.

1．Preface

We would like to thank you for your purchase of our MODEL 8507. For safety and proper use of this product, please carefully read this operation manual before the use.

【Feature / Characteristics】

8507 is a withstand voltage tester with maximum output 1000V and output capacity 10VA.

The setting of upper and lower limit leakage current and the function of timer enable the test result more accurately.

8 sets of re-writable and readable memories of test conditions can be stored.

START/STOP operation can be done by external control using remote I/O connector.

Depending on measuring conditions, the test result like judgment can be obtained by open collector.

⚠ Caution

- To avoid break-down, malfunction or deterioration of life time, do not use this product 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.
  - ◆ Where there is constant vibration or shock.
- Do not open the case or modify the main body.

1.1 Preparations prior to use

• Unpacking

When the tester is delivered, please check whether it conforms to the required specifications and has not been damaged in transit. If there is any damage on the tester or it does no work in conformity with the specifications, please inform us of the model and product name.

• Storage

In case of storing the tester for a long time, store it at the place of low humidity and where it is not exposed to the direct sunlight.

1.2 Confirmation prior to use

• Power supply

Use the tester with the power source voltage within 90 to 250VAC and the frequency 50/60Hz.
When connecting the power supply cable, confirm that the power supply switch is turned OFF

• Power supply cable

The plug of power supply cable connected to the tester is for 100VAC use. When the tester is used with 200VAC, replace the plug with appropriate one for 200VAC use. Please connect the power supply cable to the power supply connector on the rear panel of the tester. The plug of power supply cable has 3 pins and the round shape pin in the center is for grounding.

1.3 Warning and caution during measurement

Electric shock accident or malfunction

⚠ Warning

- Check and confirm the cable condition and metal portion of the wire before use. There is a danger of electric shock if the measuring cable is broken or the metal portion of the wire is exposed. If some damage is found, stop using it immediately and replace the specified new one.
- In order to prevent the electric shock accident or the failure of this unit, do not apply voltage to the measurement terminal.
- In order to prevent the failure, conduct the measurement after turning off the power related to the measurement.
- A high voltage is passed through the measuring cable. Never touch the tip of the measuring cable to avoid the electric shock.

Connection of the control cable and communication cable

⚠ Caution

- Use the specified cable size to connect the control terminal.
- Make sure that communication cable and control cable are connected surely. If the connection is not undertaken correctly, it may cause of the failure to satisfy specification or malfunction.
- Power supply must be turned off on each device before connection of communication cable and control cable. Failure to turn of the electric power cause the electric shock or malfunction.

Other caution

⚠ Caution

If power supply is done by UPS(Uninterruptible power supply device) or DC-AC inverter, do not use rectangular wave or pseudo rectangular wave output of UPS or DC-AC inverter. If used, this may cause the malfunction of the instrument.

2. Preparation before use

2.1 Connection of power code

1 Make sure that the power switch POWER of this tester is turned off.

2 Connect the power cord to the inlet for the power supply of the rear panel.
The plug of the power cord that comes with this tester is for AC100V. If it exceeds AC125V, use the power cord suitable for the rating. 200V type power cord with a plug attached (European 2-pole with earth model name 5880-23-030) is optional.

3 Power cord plug (3P) is connected to the earthed outlet.
The plug of the power cord is 3- pin and the round shaped pin of the center is the earthing.

⚠ Warning

Use supply voltage AC100 to AC240V (AC90 to 250V) and power frequency 50/60Hz. Besides, when you connect the power cord, make sure that the power switch is turned off. Beyond this range could lead to the failure and incomplete operation of the tester.

2.2 Connection of protective earth terminal

Earth the protective earth terminal ⑨ to the ground using the supplied earthing wire. When the earthing is imperfect or when the output is short circuited to the ground or power line, the case of the tester is highly charged and it is dangerous to touch it. Besides, when using the tester, be sure to check that the earthing wire is not disconnected.

⚠ Warning

If the earthing is imperfect, there is a risk of an electric shock.

2.3 Connection of the external control equipment

External control equipment can be connected to the remote I/O connector ⑩
Ref. to “6. External control” for information about connection method.

2.4 Connection of high voltage cable

During the test, the high voltage output terminal is charged to a high voltage. Connect the supplied high voltage cable with the HIGH VOLTAGE terminal and LOW terminal. For high voltage cable, use the supplied cable or cable adaptable for the voltage used.

⚠ Warning
Make sure to confirm the power off before connecting the high voltage cable. There is a risk of an electrical shock.

⚠ Warning
When the low voltage side cable is disconnected, the whole tested equipment gets charged with high voltage and there is a risk of an electric shock.

2.5 Power on and off

After purchasing for the first time when POWER switch⑮ is on, the test begins and due to interlock function, the state becomes PROTECTION state. Connect the supplied remote I/O connector.
Use the supplied remote I/O connector only after the PROTECT state is released easily.
If you do the actual test, use the interlock function for the safety.
To guard the test area against the electric shock, use the interlock function like cut-off etc. when opening the door or cover.

1 Make sure that the power cord, connection cables etc. are connected properly.

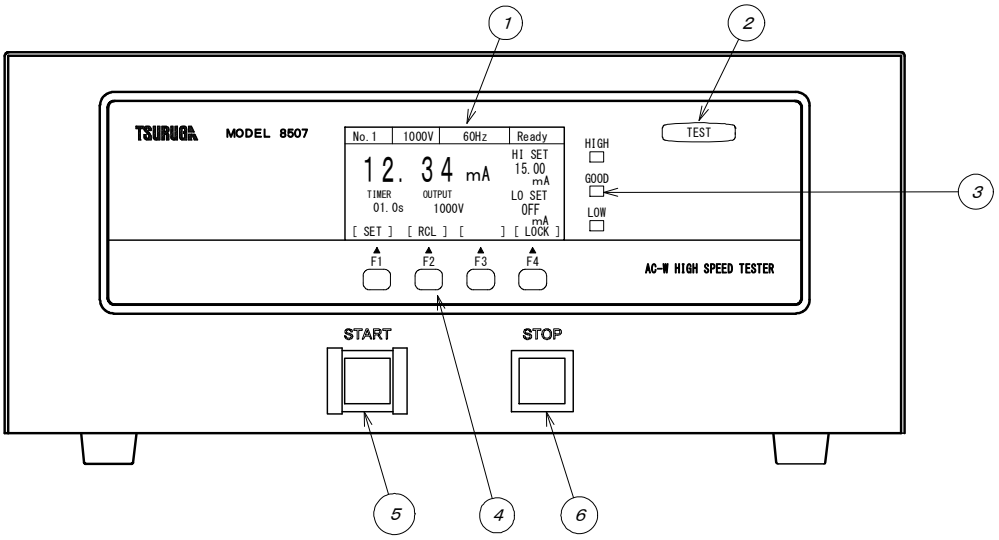
2 Press "—" side of POWER switch ⑬of rear panel to turn it on.

3 After turning on the power switch, all lights on display are on for few seconds (lamp test).
However, TEST VOLTAGE and CURRENT/RESISTANCE display firm version.
After a few seconds, the display would be of test mode when the previous power was turned off.

4 Press "○" side of the POWER switch of the rear panel to turn it off.

3. Name of parts

3.1 Front panel



① Display panel　This is green graphic display.
It displays the test results and various settings, etc.

② TEST lamp　Test lamp lights up during test.

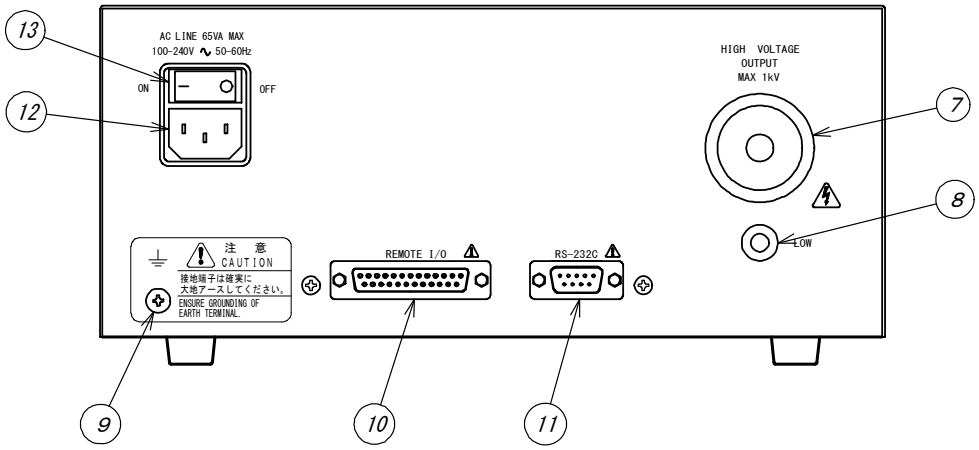
③ Judgment lamp　HIGT : Red lamp is lit up when the measured current value exceeds the high limit value.
GOOD : Yellowish green lamp is lit up with a good judgment.
LOW : Red lamp is lit up when the measured current value is below the low limit value.

④ Function key　F1 to F4 these keys are used to set various test conditions and comparators.

⑤ START switch　Switch to start the test during manual mode.

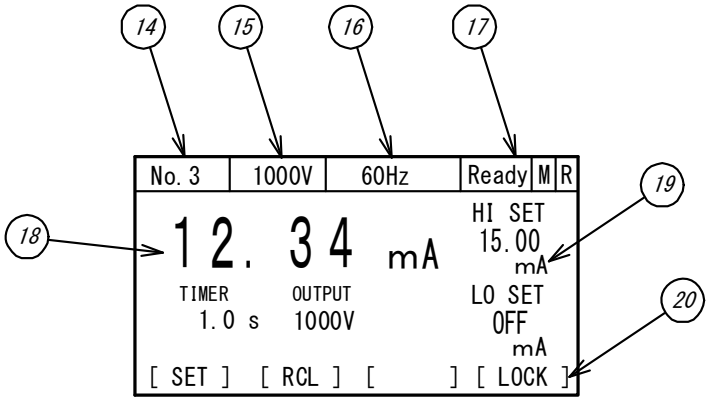
⑥ STOP switch　Switch to stop the test when test is undergoing.
It clears all waiting judgment.

3.2 Rear panel



⑦ HIGH VOLTAGE terminal	High voltage terminal where output of High voltage is obtained during test.
⑧ LOW terminal	Low voltage terminal where the electric potential same main case is obtained during test.
⑨ Protective earthing terminal	A terminal for earthing to ground having the same electric potential with main case.
⑩ REMOTE I/O connector	Connector for external control.
⑪ RS-232C connector	Connector for RS-232C communication.
⑫ Power inlet	Connect the supplied power supply cord. Use the power supply voltage and frequency within the specified range.
⑬ Power supply switch	Power supply ON/OFF switch.

3.3 Display panel



⑭Memory No. Displays memory No. (No.1 to No.8)

⑮Test voltage Displays the test voltage setting. (10V to 1100V)

⑯Frequency of the tested voltage

Displays the set frequency value of the tested voltage.

⑰Status Display the status of 8507.

Standby state : Ready

Under test : RUN

During Interlock (Open) : LOCK

REMOTE setting REMOTE : R

MEM.CTL setting REMOTE : M

ONLINE ON setting :

⑱Measured value Display the measured value of leak current.

This model displays Peak value. (Not effective value)

⑲Comparator Displays the set value of HIGH and LOW comparator.

⑳Function Displays the function guide of F1 to F4.

F4 displays the status of key lock.

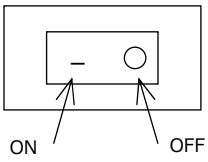
Key lock ON/OFF can be done by press for more than 3 s. Reverse display is shown during key lock condition.

4. Operation

4.1 Power supply

First confirm the power OFF of the switch located at the rear panel of the instrument and connect cord to the power supply. Then, ON the power supply switch. Which enables to operate immediately but it is preferred for preheating 30 minutes before the use.

As this model is equipped with a parameter holding function, following status can be memorized even though the power supply is turned OFF.



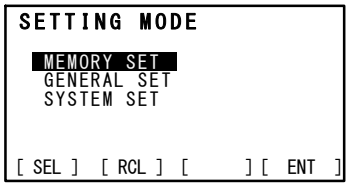
(1) 8 sets of memories (Test voltage, Frequency, Comparator setting, Timer etc.)

(2) Key lock state

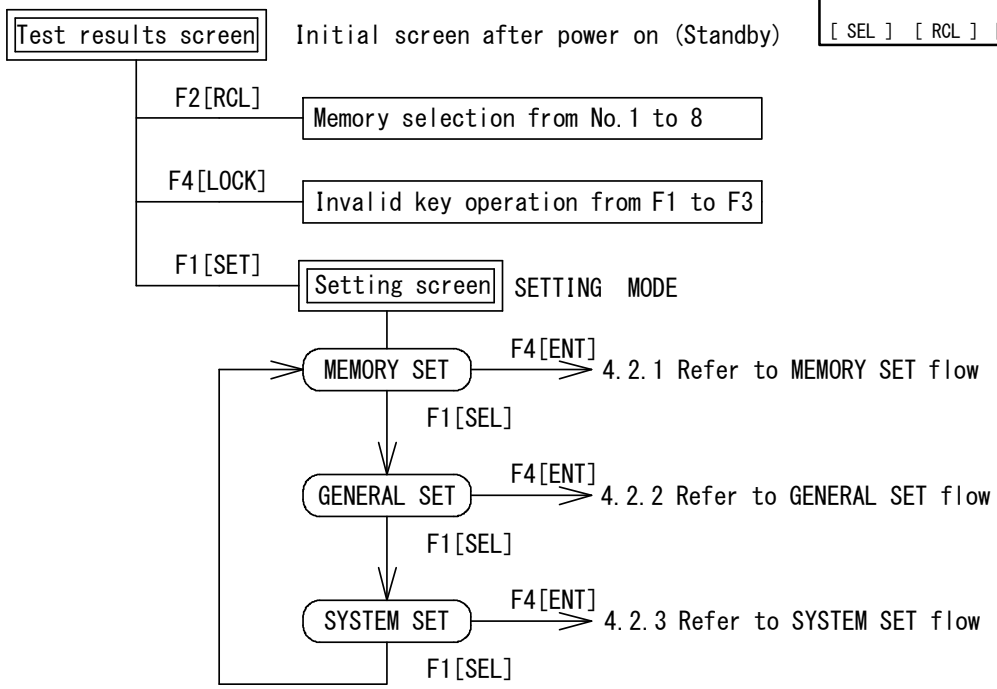
(3) Start input setting (REMOTE/MANUAL)

(4) Various types of setting

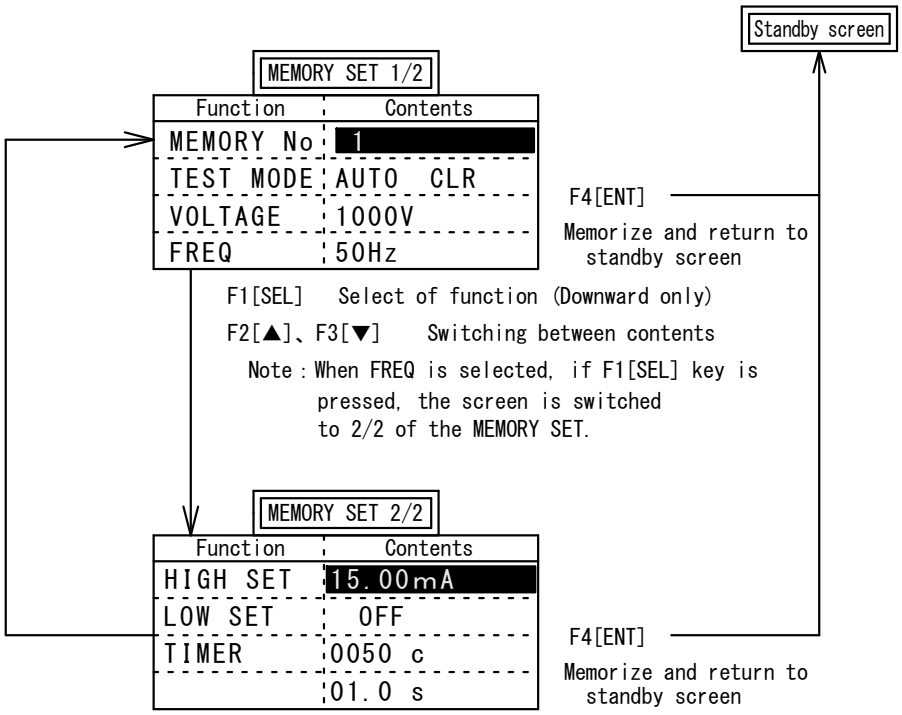
4.2 Setting flow



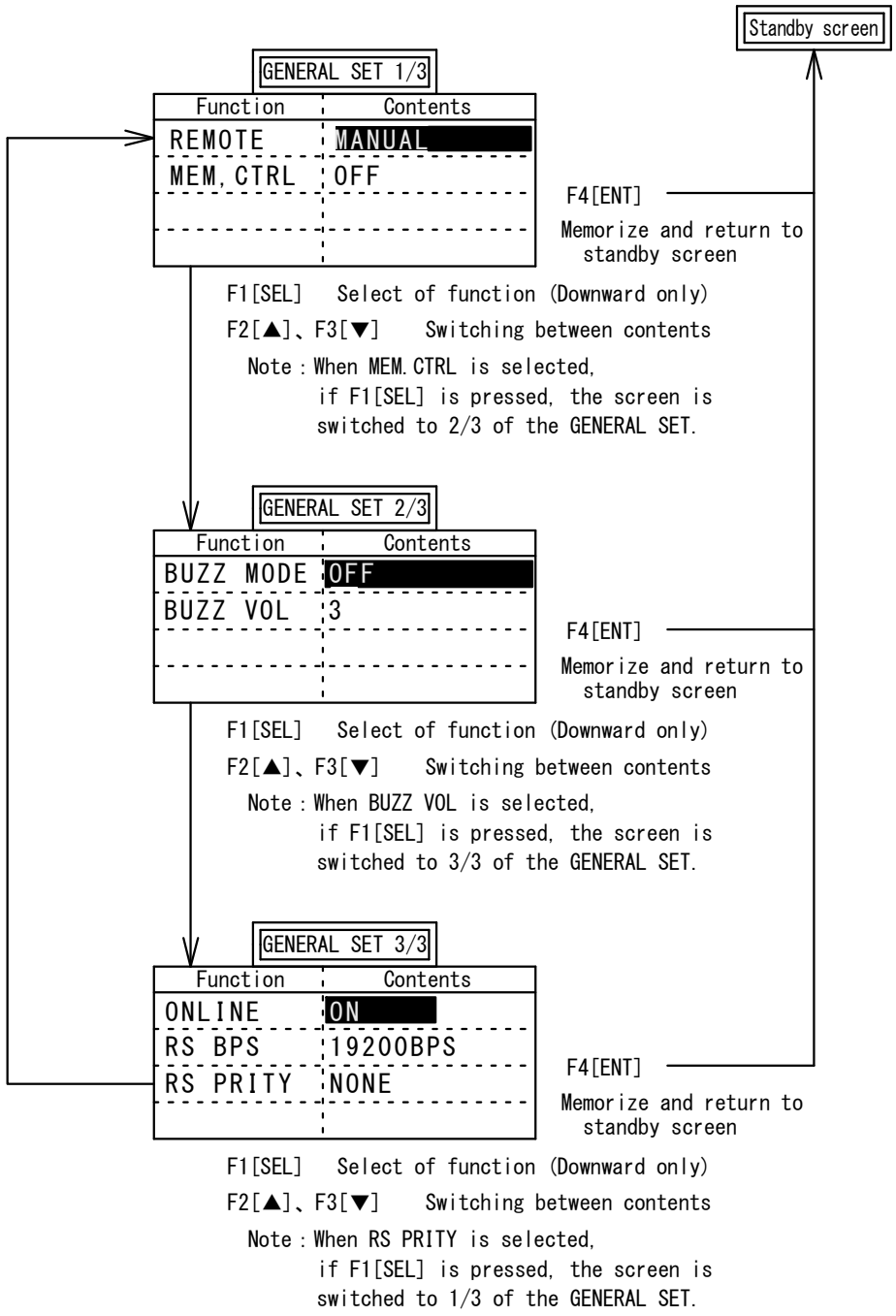
Test screen flow



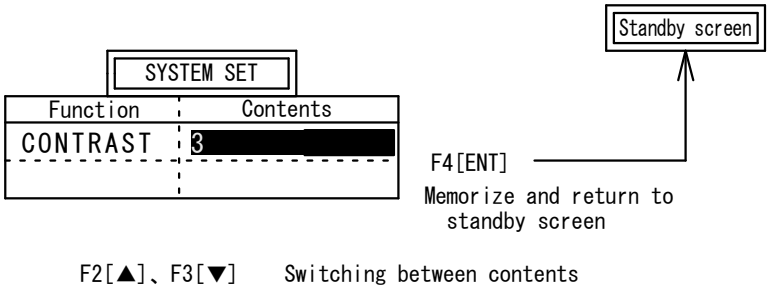
4.2.1 MEMORY SET flow



4.2.2 GENERAL SET flow

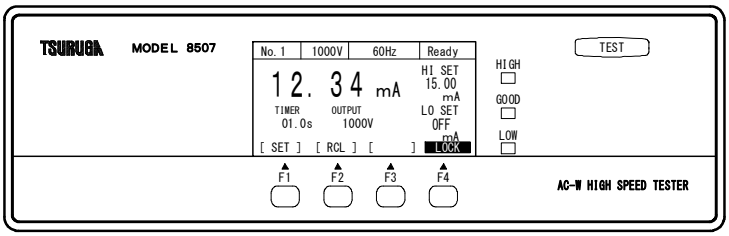


4.2.3 SYSTEM SET flow



4.3 Key lock

It is a switch that prohibits operation of the instrument from the front panel in order to avoid the measurement by unintentional change of setting. But, key lock can't be set in START switch, STOP switch. Display of the LOCK back ground changes during key lock condition. If other key are required to use during key lock condition, key lock must be released first to use the other keys.



●Key lock method

Press F4 [LOCK] key for more than 3 s.

Display of the back ground of LOCK changes which shows that instrument is in locked condition.

●Cancellation of key lock

During the key in locked condition, press F4 [LOCK] key for more than 3 s.

Key lock will be released.

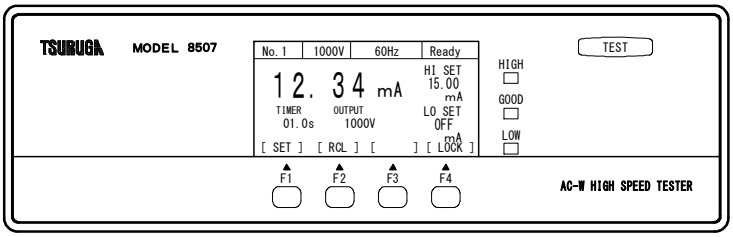
4.4 Memory

This model is equipped with 8 sets of memories that store comparator and test conditions. The following items are available for memory storage.

- Starting test start mode（AUTO CLR、MANUAL CLR）
- Setting of the test voltage
- Setting of the frequency
- Setting of the comparator（Upper and Lower value）
- Setting of timer

[Selection of memory]

●Front panel method



Call

When F2 [RCL] key is pressed in standby state, memory No. will increased and setting call will be displayed.

Memory from no. 1 to no. 8 can be selected.

●External control method

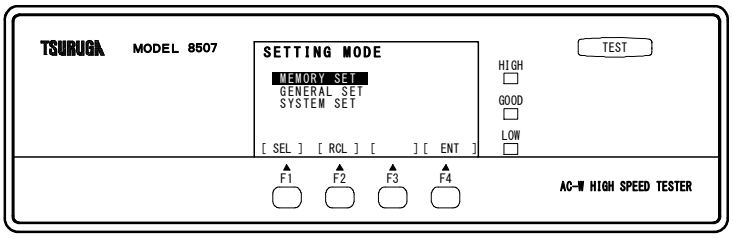
Refer to memory operation (6.1.3) for detail information.

[Memory registration]

After selecting the memory No. you want to register, select test mode, test voltage, frequency, comparator and timer with MEMORY SET.

4.5 Memory setting

Input of MEMORY SET

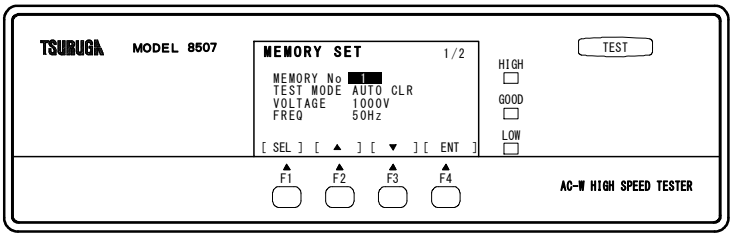


① Press F1 [SET] key in standby state.
Display changes to SETTING MODE.

② Press F1 [SEL] key to select MEMORY SET.
Memory setting can be changed by pressing F4 [ENT] key.

Basic operation

Memory No., test start mode, test voltage, frequency, comparator and timer can be set.



Operation key

F1 [SEL] : Selection of setting item.
The back ground of the display color of the selected item will be changed.

F2 [▲] : Change of setting values

F3 [▼] : Selection of setting from TEST MODE , FREQ setting value can be increased or decreased by numerical setting.

F4 [ENT] : Memorize the setting and the display returns to standby state.

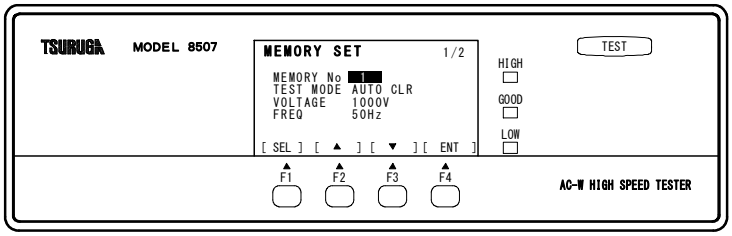
4.5.1 Selection of memory

① Press F1 [SEL] key to select the MEMORY No.

② Select the Memory No. by F2 [▲], F3 [▼] key.

③ Press F4 [ENT] to memorize the setting and the display returns to standby state.

To continue the other setting, select the items that you want to change by pressing F1 [SEL]key

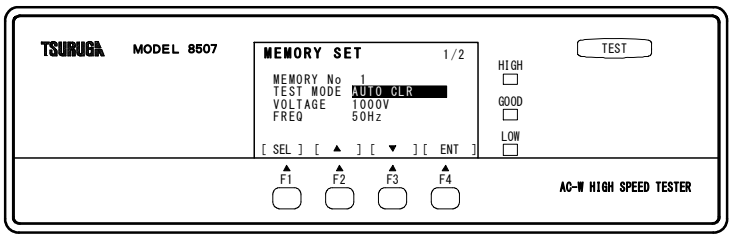


4.5.2 Setting of test start mode

Select the test start mode, MANUAL CLR mode or AUTO CLR mode.

・At MANUAL CLR mode, when the judgment is 'HIG'H or 'LOW', the start can't be started by pressing 'START'. Once clear the judgment by pressing 'STOP', 'START' can be active.

・At AUTO CLR mode, by pressing 'START', the test can be started, regardless of judgment.



① Press F1 [SEL] key to select the MEMEORY SET and press F4 [ENT] key to enter it.

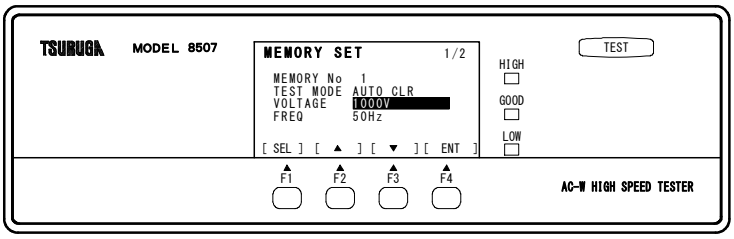
Select TEST MODE by F1 [SEL] key.

② Press F2 [▲], F3 [▼] key to select MANUAL CLR/AUTO CLR.

③ Press F4 [ENT]key to memorize the setting and the display returns to standby state.

To continue the other setting, select the items that you want to change by pressing F1 [SEL]key

4.5.3 Setting of the test voltage

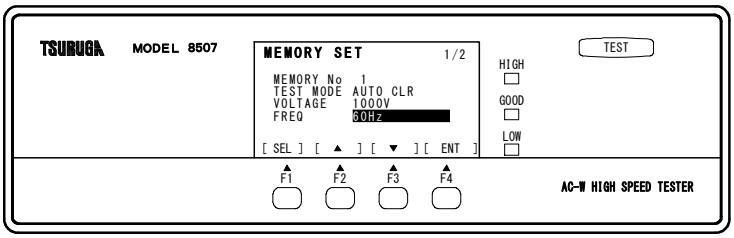


① Press F1 [SEL]key to select MEMEORY SET and press F4 [ENT]key to enter it.
Select VOLTAGE by F1 [SEL] key.

② Press F2 [▲], F3 [▼] key. to change the setting
If keys are kept pressed, the value is changed continuously.
Setting range 0V to 1100V (Resolution 10V)

③ Press F4 [ENT]key to memorize the setting and the display returns to standby state.
To set other values, select the item by pressing F1[SEL]key

4.5.4 Setting of the frequency



① Press F1 [SEL] key to select MEMORY SET by and press F4 [ENT] key to enter it.
Select FREQ by F1 [SEL] key.

② Press F2 [▲], F3 [▼] key to select 50Hz or 60Hz.

③ Press F4 [ENT]key to memorize the setting and the display returns to standby state.
To continue the other setting, select the items that you want to change by pressing F1 [SEL]key.

Note:

When the frequency is changed, the cycle timer is recalculated in order to keep test time unchanged. Recalculation is done in case the setting test time is more than 1.0s.

During 50 cycles at 50Hz (1.0s.), if 60Hz is set, it becomes 60 cycles (1.0s.).

Calculation error may occur when frequency setting is changed many times. Make sure that the timer setting is accurate when frequency setting is changed.

4.5.5 Setting of the comparator

This function is the digital comparator to compare the displayed value (Measured current value) and Upper and Lower values.

Comparison condition

Display value ≧Upper limit set value（HIGH）	HIGH(HI)	Output
Upper limit set value（HIGH）＞Display value ＞Lower limit set value（LOW）	GOOD(GO)	Output
Display value ≦Lower limit set value（LOW）	LOW(LO)	Output
During over display（OVER）	HIGH(HI)	Output

Comparison output

Open collector output can be obtained by Remote connector signal. （Ref. to 6.1）

Display HIGH, LOW : Red
GOOD : Yellowish green

Setting range

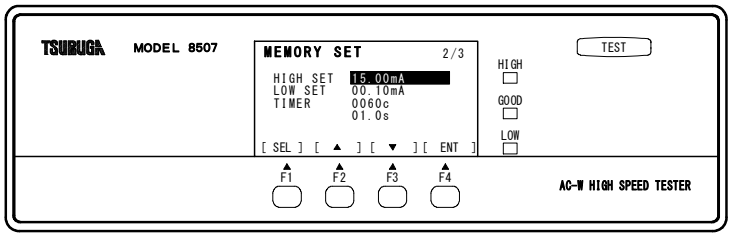
Setting value = The peak current value

Because of sinusoidal waveform output, the peak current value is calculated by multiplying RMS current value by $\sqrt{2}$.

HIGH 00.01 to 15.00mA

LOW 00.01 to 15.00mA, Comparison operation can't be performed if it is set to OFF.

Setting method



① Press F1 [SEL] key to select MEMORY SET and press F4 [ENT] key to enter it
Select HIGH SET and LOW SET by F1 [SEL] key.

② Press F2 [▲], F3 [▼] key to change the setting values
If the key is pressed continuously, speed can be changed in 3 stages.

③ Press F4 [ENT]key to memorize the setting and the display returns to standby state.
To continue the other setting, select the items that you want to change by pressing F1 [SEL]key

4.5.6 Setting of timer

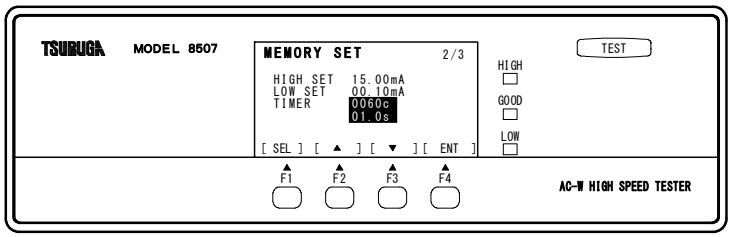
Timer is the function to set test time.

Setting range

During the setting of Frequency 50Hz: 0002 to 3000c（Cycle）, 0.1 to 60.0 s

During the setting of frequency 60Hz: 0002 to 3600c（Cycle）, 0.1 to 60.0 s

Setting method



① Press F1 [SEL] key to select MEMORY SET and press F4 [ENT] key to enter it.
Select TIMER by F1 [SEL] key.

② Press F2 [▲], F3 [▼] key to change the setting
If the key is pressed continuously, speed can be changed in 3 stages.

③ Press F4 [ENT]key to memorize the setting by displays returns to standby state.
To continue the other setting, select the items that you want to change by pressing F1 [SEL]key.

Note:

When the frequency is changed, the cycle timer is recalculated in order to keep test time unchanged. Recalculation is done in case the setting test time is more than 1.0s.

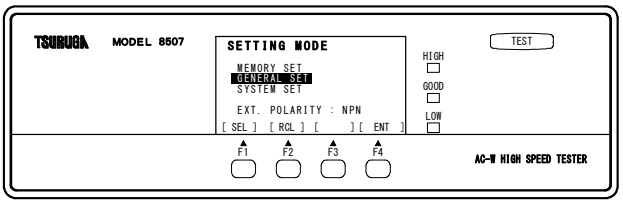
During 50 cycles at 50Hz (1.0s.), if 60Hz is set, it becomes 60 cycles (1.0s.).

Calculation error may occur when frequency setting is changed many times. Make sure that the timer setting is accurate when frequency setting is changed.

4.6 Equipment setting

External control, buzzer and communication can be set.

Select GENERAL SET



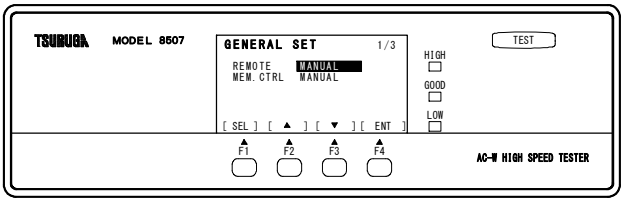
Press the F1 [SET] key in the standby state.

Display changes to SETTING MODE.

Press F1 [SEL] key. to select GENERAL SET

If F4 [ENT]key is pressed, display changes to equipment setting.

Basic operation



Operation key

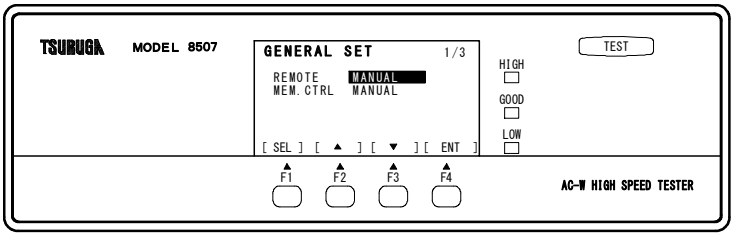
F1 [SEL] : Select setting items.
Back ground color of selected item is changed.

F2 [▲], F3 [▼] : Setting can be changed.

F4 [ENT] : Memorize the setting and display returns to standby state.

4.6.1 Start input setting

Test start methods are explained here.



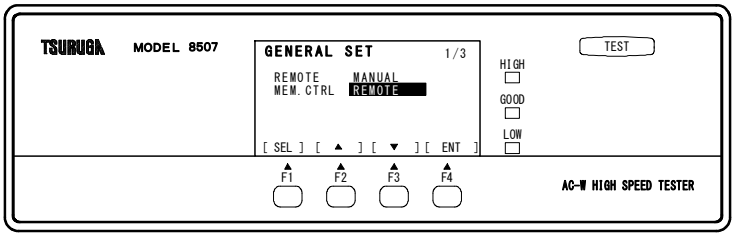
① Press F1 [SEL] key to select GENERAL SET and press F4 [ENT] key to enter it.
Select REMOTE by F1 [SEL] key.

② Press F2 [▲], F3 [▼] key to select MANUAL/ REMOTE
MANUAL : Test can be started by pressing START key located on front panel.
REMOTE : Test can be started by START input of REMOTE I/O.

③ Press F4 [ENT] key to memorize the setting and the display returns to standby state.
To continue the other setting, select the items that you want to change by pressing F1 [SEL] key

4.6.2 Selection of memory setting by REMOTE I/O

Enable/disable of the memory selection function can be set by REMOTE I/O.



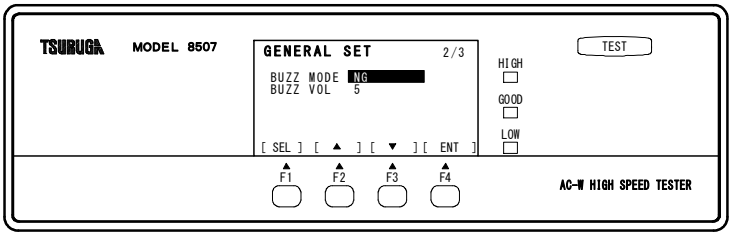
① Press F1 [SEL] key to select GENERAL and press F4 [ENT] key to enter it.
Select MEM CTRL by F1 [SEL] key.

② Press F2 [▲], F3 [▼] to select MANUAL/REMOTE
MANUAL: Memory is selected by operation of the front panel F2 [RCL] key.
REMOTE: MEM1, MEM2, MEM4, MEM8 SEL is selected by signals of REMOTE I/O.

③ Press F4 [ENT] key to memorize the setting and the display returns to standby state.
To continue the other setting, select the items that you want to change by pressing F1 [SEL] key

4.6.3 Buzzer setting

Buzzer operation and volume of sound setting are explained here.



① Press F1 [SEL] key to select GENERAL SET press F4 [ENT] key to and enter into GENERAL SET
Select BUZZ MODE or BUZZ VOL by F1 [SEL] key.

② Press F2 [▲], F3 [▼] key to select setting item.

BUZZ MODE

GOOD : Ring the buzzer during GOOD judgment

NG : Ring the buzzer during HIGH or LOW judgment

OFF : No judgment buzzer

BUZZ VOL

Setting range : 1 to 9

③ Press F4 [ENT] key to memorize the setting and the display returns to standby state.
To continue the other setting, select the items that you want to change by pressing F1 [SEL] key.

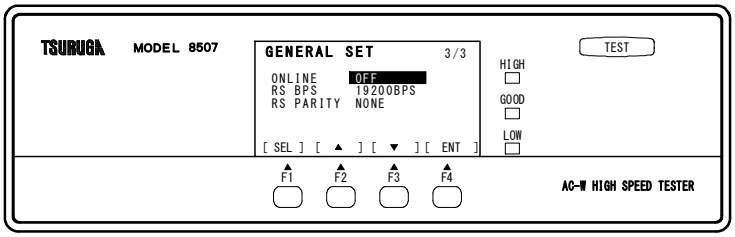
4.6.4 Communication setting

RS-232C communication setting is carried out here.

ON/OFF communication function is carried out by ONLINE setting.

Setting of communication speed by the RS BPS and setting of parity bit by RS PARITY are carried out here.

Communication speed and parity bit should be set according to the setting of host computer etc.



① Press F1 [SEL] key to select GENERAL SET and press F4 [ENT] key to enter into GENERAL SET
Selection of ONLINE, RS BPS, RS PARITY by F1 [SEL] key

② Press F2 [▲], F3 [▼] key to select setting of ONLINE, RS BPS, RS PARITY as below.

ONLINE : ON/OFF setting of the communication function
Output of RS-232C communication can be obtained with ON

RS BPS : Setting of communication speed
9600BPS, 19200BPS, 38400BPS, 115200BPS

RS PARITY : Setting of parity bit of communication data
NONE
EVEN
ODD

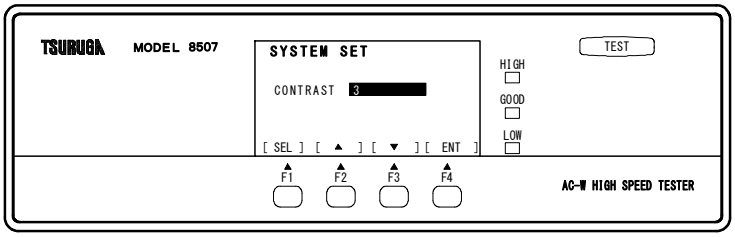
③ Press F4 [ENT] key to memorize the setting and display returns to standby state.
To continue the other setting, select the items that you want to change by pressing F1 [SEL] key.

4.7 System setting

Setting of display contrast is explained here.

4.7.1 Contrast setting

Adjustment of the brightness of the display panel is explained here.



① Press F1 [SEL] key to select SYSTEM SET and press F4 [ENT] key to enter into SYSTEM SET
Press F1 [SEL] key to select the CONTRAST

② Press F2 [▲], F3 [▼] key for setting
Setting range : 1 to 5

③ Press F4 [ENT] key to memorize the setting and the display panel returns to standby state.
To continue the other setting, select the items that you want to change by pressing F1 [SEL] key.

5. Testing

5.1 START/STOP of testing

5.1.1 Switching operation

Before the test start, set the GENERAL SET to manual mode (Ref. to 4.6.1),
and ON LINE to OFF (Ref. to 4.6.4).

Testing start

① When the START switch is pressed, the judgment output is turned OFF, TEST lamp is lit up, then the testing starts.

② During test of high voltage, TEST lamp is lit up and the timer counts down.

③ During test, TEST output becomes ON and READY output becomes OFF and such signal can be obtained from RENOTE I/O connector.

④ When the test is competed, TEST lamp is turned off, TEST output is turned off, and judgment outputs is obtained.

Test suspension

When the STOP switch is pressed, the test is suspended and the test condition returns to standby status. At this moment, all the judgments become OFF.

Test end / Stop

① The test is stopped with time-up of timer and the test condition returns to standby status.
When the judgment of GOOD or LOW is obtained, the test is stopped with time-up and the test condition returns to standby status.

② Stop at HIGH NG judgment
During test when HIGH judgment is done, the test is stopped and test condition returns to standby status.

③ Stop by Interlock
During test if the Interlock is activated, the test is stopped and test condition returns to standby status.

④ Stop by error
During test if an error is detected, the test is stopped.

If STOP switch is pressed at standby state, all judgments are cancelled.

5.1.2 REMOTE operation

Before the test start, set the GENERAL SET of REMOTE to REMODE mode (Ref. to 4.6.1)

From test start to end

① START is used which makes the judgment output OFF and TEST lamp is lit up, then the test is started.

② During the output of high voltage, TEST lamp is lit up.

③ During the test, ON signal of TEST output and OFF signal of READY output are obtained from REMOTE I/O connector.

④ When the test is completed, TEST lamp is turned off and OFF signal of TEST output, judgment result are obtained.

Test suspension

STOP is used to suspend the test and test condition turns to standby status. At this moment, all the judgments become OFF.

Test end / Stop

① The test is stopped with time-up of timer and the test condition returns to standby status.
When the judgment of GOOD or LOW is obtained, the test is stopped with time-up and the test condition returns to standby status.

② Stop at HIGH NG judgment
During test when HIGH judgment is done, the test is stopped and test condition returns to standby status.

③ Stop by Interlock
During test if the Interlock is activated, the test is stopped and test condition returns to standby status.

④ Stop by error
During test if an error is detected, the test is stopped.

If STOP is used at standby state, all judgments are cancelled.

5.1.3 Condition of display/output at the test end

Stop condition / Display/Output		Time-up			Stop during test		
		GOOD	LOW	HIGH	INTERLOCK	Error	STOP operation
Display	HIGH	—	—	○	○	○	—
	GOOD	○	—	—	—	—	—
	LOW	—	○	—	○	○	—
REMOTE	HIGH	—	—	○	○	○	—
	GOOD	○	—	—	—	—	—
	LOW	—	○	—	○	○	—
	NG	—	○	○	○	○	—
	PROTECTION	—	—	—	○	—	—
	INTENAL ERR	—	—	—	—	○	—

○ : Lamp on [ON]

— : Lamp off [OFF]

6. External control

Output signal of start / stop, memory selection, judgment and TEST etc. can be obtained from the REMOTE I/O connector.

When the start of the test is required to control externally, set the REMOTE in GENERAL SET to REMOTE mode. (Ref. to 4.6.1).

When memory selection is required to control externally, set the MEM.CTRL in the GENERAL SET to REMOTER (Ref. to 4.6.2).

6.1 Control terminal (REMOTE I/O)

6.1.1 Terminal arrangement

No.	Signal name	Input/ Output	Function
1	+24V(In)	—	DC24V outputs control power supply
2	NC	—	Not used
3	INTERLOCK	Input	Interlock signal No test starts at OPEN (under operation) Test starts by connecting with COM.
4	START	Input	Start input signal (when REMOTE in GENERAL SET is set.) Test starts by connecting with COM.
5	STOP	Input	Stop input signal Test stops by connecting with COM. At standby, judgment is cleared.
6	NC	—	Not used
7	MEM SEL	Input	Signal to read out memory At ON edge, memory No. is switched by the input of MEM1,2,4.
8 9 10	MEM1 MEM2 MEM4	Input	Memory is called by inputting memory No. Refer to the table of memory operation (Section 6.1.3) for selection of memory.
11,12	NC	—	Not used
13 14	COM	—	Common 0 V side of + 24 V is connected.。
15	TEST	Output	Test signal
16	READY	Output	Standby signal
17	INTERNAL ERR	Output	Internal error signal Test output drop, High internal temperature, trouble of 8507 etc.
18	PROTECTION	Output	Output ON, when Interlock is Open (under operation)
19	GOOD	Output	Output of GOOD judgment
20	NG	Output	HIGH or LOW judgment, and when INTERNAL ERR or PROTECTION is ON, outputs ON.
21	HIGH	Output	HIGH NG judgment output
22	LOW	Output	LOW NG judgment output
23,24	NC	—	Not used
25	COM	—	Common

6.1.2 Input/output signal

Input signal

Apply + 24 V to + 24 V (In)

Input ON : Less than 0 to 3.8 V（ON current :Less than 10 mA）

OFF : 16.8 to 24 V

Input ON time : Longer than 2 ms

Output signal

Signal : Open collector

Maximum load : DC30V 30mA

Residual voltage : Less than 1 V（During load current: 30mA）

6.1.3 Memory operation

①Set the MEM.CTRL to REMOTE at the setting of GENERAL setting.

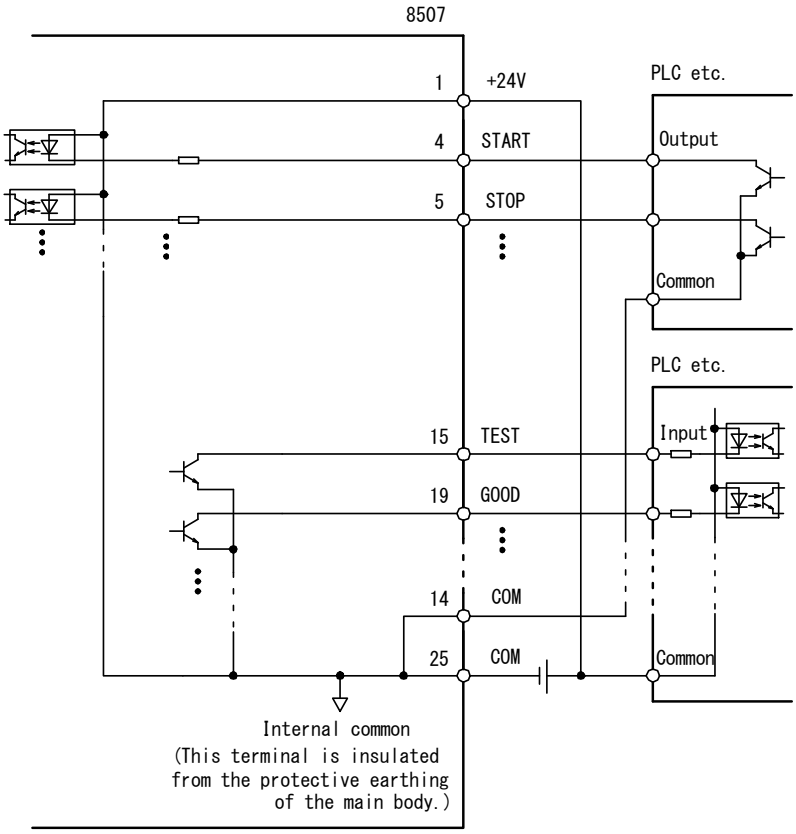
② Input the memory No. code.

MEM No.	MEM1	MEM2	MEM4
1	—	—	—
2	○	—	—
3	—	○	—
4	○	○	—
5	—	—	○
6	○	—	○
7	—	○	○
8	○	○	○

○ : ON（Connection with COM）

– : OFF（OPEN）

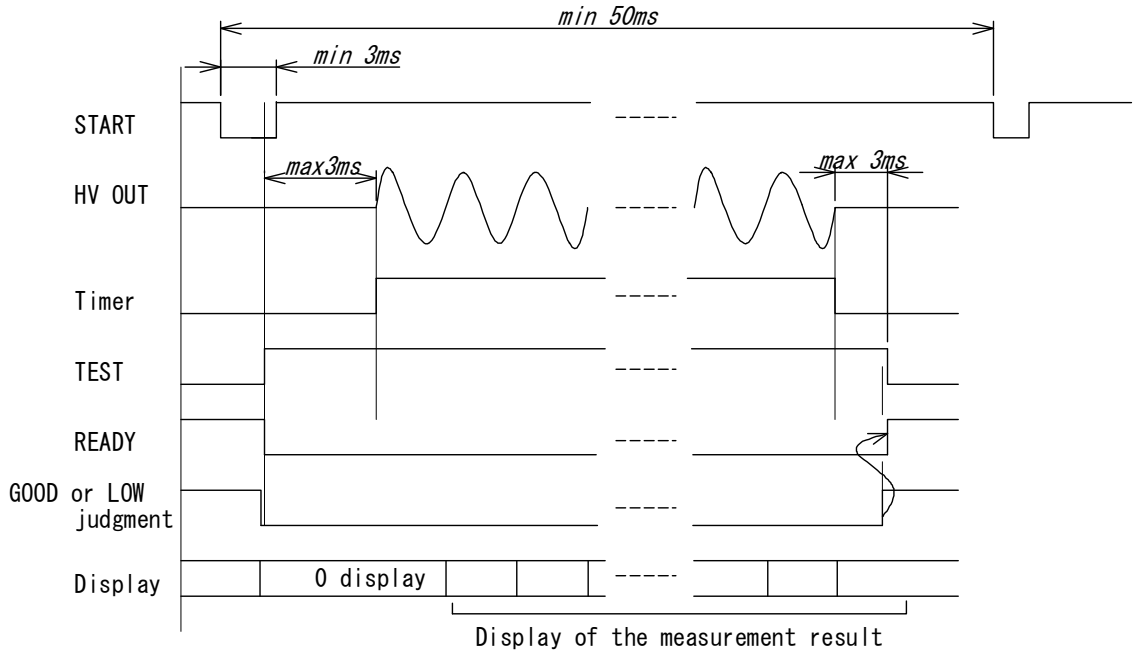
6.1.4 Internal circuit configuration



6.1.5 External control timing chart

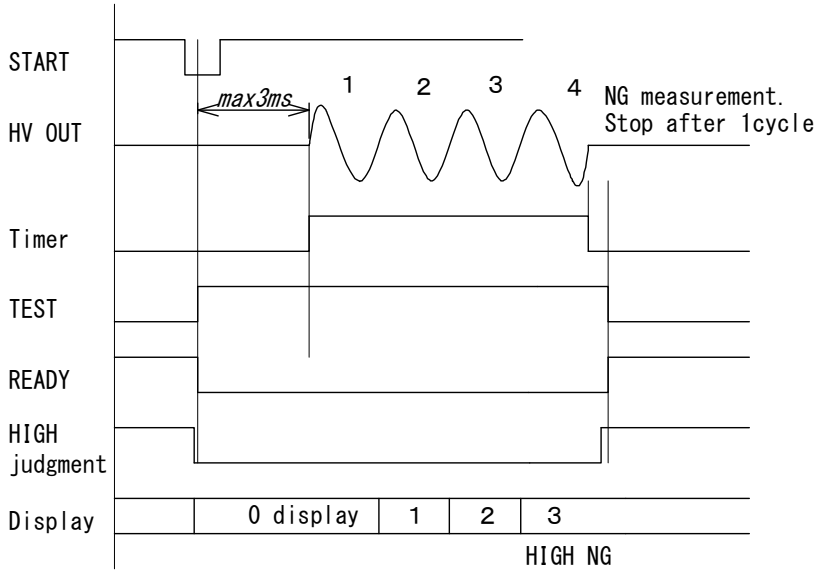
◆Test operation

During the judgment of GOOD/ LOW

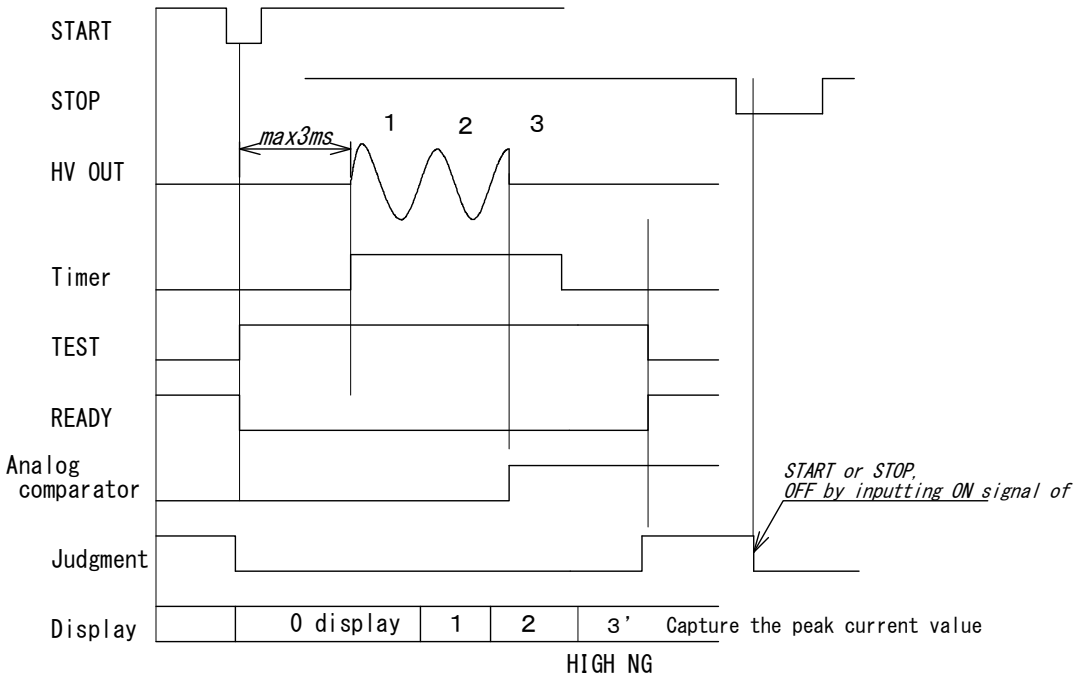


When test mode is in MANUAL CRL mode and if NG judgment is obtained, test can't be done by start signal. Releasing the NG judgment (OFF) by STOP signal, input the START.

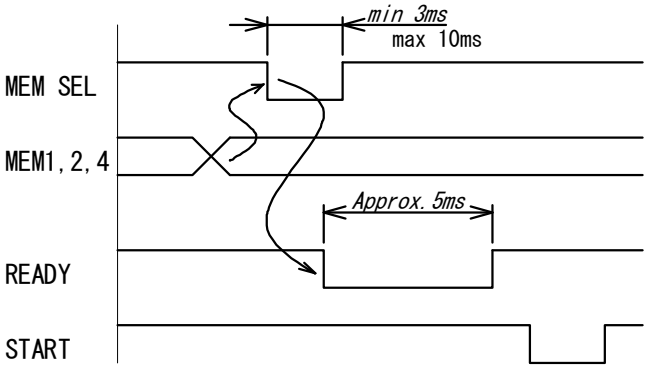
During HIGH NG digital judgment(the same as Interlock and Internal error)



Analog comparator(Detection over 20mA) During NG judgment



Switching of the memory



①Switching by Memory selection (MEM 1, 2, 4).
②Indicate the Memory switching by MEM SEL signal.
③8507 reads memory by MEM SEL signal and output OFF
of the 'Ready for Reading'.
④After READY is turned to ON, START signal is acceptable.

7．Communication (RS-232C)

Output of start / stop test, control of memory selection, test data and judgment result can be obtained by RS-232C communication.

7.1 Specification

7.1.1 Communication specification

Transmission system : Start-stop synchronization Full duplex

Transmission rate : 9600、19200, 38400, 115200bps

（Factory setting 9600bps during delivery）

Data bit length : 8 bit

Stop bit : 1 bit

Parity bit : None, even number, odd number

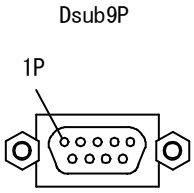
（During shipment, set: None）

Delimiter : CR（0DH）

Connector : D-sub9 ピン（Male）

7.1.2 Connector pin arrangement

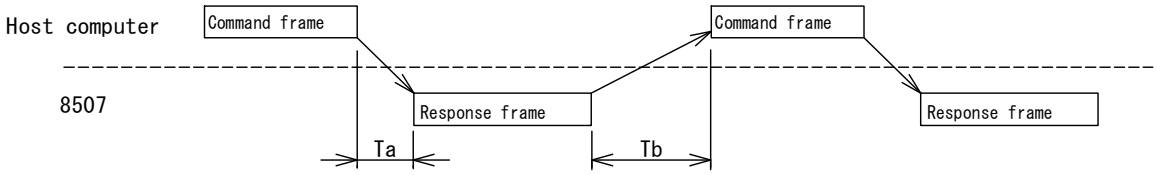
RS-232C Connector



RS-232C Connector arrangement

Pin No.	Instrument signal JIS (RS-232C)	Direction	Function
1			Not used
2	RD (RXD)	Input	Received data
3	SD (TXD)	Output	Transmission data
4			Not used
5	SG (GND)		Ground signal
6			Not used
7			
8			
9			

7.1.3 Operation



Ta Command Response time : MAX approx. 5ms

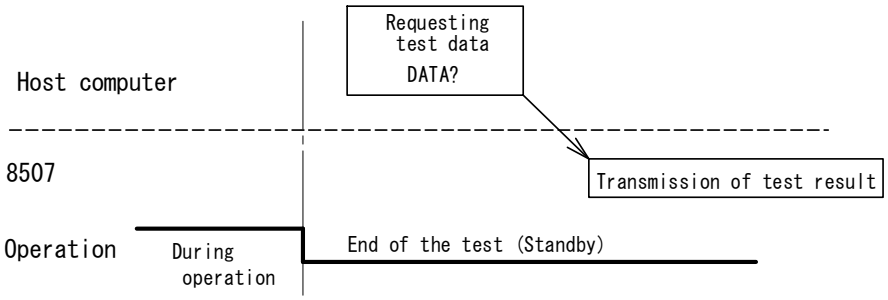
Tb After response, command prohibition time : MAX 2ms

Note) When data communication is undertaken, set ONLINE of GENERAL setting to ON. (Section 4.6.4)
If the communication is undertaken at OFF condition of ONLINE, an error message is obtained except in read command. (Read command : ex. Command with '?' like 'DATA?')
If the communication is undertaken at OFF condition of ONLINE, an error message is obtained except in setting command or unspecified command.

7.1.4 Test result output

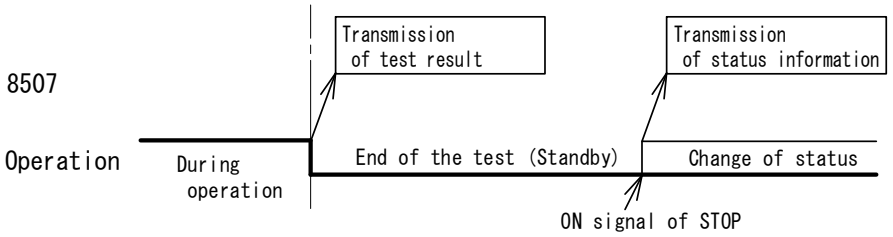
・When RESULT=OFF,

After receiving data request command from host computer, data is output.



・When RESULT=ON

When the test is completed or status is changed, output of test data and status information are obtained.



7.2 List of communication command and response

Command	Response	Contents
DATA? Cr	DATA=1000V,12.34mA,HIGH Cr	Read test data
	① ② ③ ④	①Response ②Measured voltage & current value③Judgment result ④Delimiter
	DATA=1000V,12.34mA, HIGH Cr	Measured value 1000V 12.34mA HIGH Judgment
	DATA=0250V,00.45mA, LOW Sp Cr	Measured value 250V 0.45mA LOW Judgment
	DATA=0100V,00.45mA, NONE Cr	Measured value 100V 0.45mA No Judgment（Judgment clear or during test, when power ON）
	DATA=0100V,00.45mA, LOCK Cr	Measured value 100V 0.45mA Suspended by interlock
	DATA=0100V,00.45mA, ERR Sp Cr	Measured value 100V 0.45mA Stop by error
STATUS? Cr	STATUS=READY Cr	Read operation condition
	① ② ③	①Response ②Operation condition ③Delimiter
	STATUS=READY Cr	Standby condition (Test end)
	STATUS=TEST Sp Cr	Under test
	STATUS=ILOCK Cr	Interlock in operation ･･･ Test unable
	STATUS=SETMU Cr	Setting mode･･･Test unable
	STATUS=NORDY Cr	Internal processing･･ Test unable
	STATUS=ERR1 Sp Cr	Error 1 Other internal error ･･･ Possibility of defect
	STATUS=ERR2 Sp Cr	Error 2 Internal heat up ･･･ Try again after power off and internal cooling
	STATUS=ERR3 Sp Cr	Error 3 Internal error and internal heat up
	STATUS=ERR4 Sp Cr	Error 4 Low voltage ･･･ Defect, test voltage is 50% lower than the setting
	STATUS=ERR5 Sp Cr	Error 5 Internal error and low voltage
	STATUS=ERR6 Sp Cr	Error 6 Internal Heat up and low voltage
	STATUS=ERR7 Sp Cr	Error 7 Internal error, internal heat up and low voltage

Command	Response	Contents
COMP? Cr	COMP=H12.34, L012.34Cr	Read the comparator of displayed memory No.
	① ② ③ ④	①Response ②HIGH set ③LOW set ④Delimiter
	COMP=H15.00 , L10.00Cr	H=15.00mA, L=10.00mA
	COMP=H1 0 .00 , LOFFSp Sp Cr	H=10.00mA, L=OFF
	COMP=H01.56, L01.00Cr	H=1.56mA, L=1.00mA
	COMP=H00.06 , L00.03Cr	H=0.06mA, L=0.03mA
COMP=H12.34,L01.23Cr	COMP=H12.34, L01.23Cr	Set the comparator of the displayed memory No.
	① ② ③ ④	①Response ②HIGH set ③LOW set ④Delimiter
COMP=H12.34 ,L01.23Cr	COMP=H12.34 ,L01.23 Cr	Set H=12.34mA, L=1.23mA
COMP=H01.00,L00.12Cr	COMP=H01.00,L00.12Cr	Set H=1.00mA, L=0.12mA
COMP=H00.34,L00.23Cr	COMP=H00.34,L00.23Cr	Set H=0.34mA, L=0.23mA
		H setting range: 00.01 to 15.00, L setting range: 00.01 to 15.00/OFF
	COMP=ERRSp Sp Sp Sp Sp Sp Sp Sp Sp Sp Cr	Setting can't be done during OFF Line.
BUZZ? Cr	BUZZ=GOOD, 03Cr	Set buzzer
	① ② ③ ④	①Response ②Operation condition ③Sound volume ④Delimiter
	BUZZ=GOOD, 01Cr	During GOOD Judgment operation. Sound volume 01 (Range of volume: 01 to 09)
	BUZZ=NGSp Sp , 08Cr	During HIGH or LOW judgment operation. Sound volume 08
	BUZZ=OFFSp , 03Cr	Buzzer OFF (No operation)
BUZZ=GOOD,03Cr	BUZZ=GOOD, 03Cr	Set buzzer
	① ② ③ ④	①Response ②Operation condition ③Sound volume ④Delimiter
BUZZ=GOOD, 01Cr	BUZZ=GOOD, 01Cr	During GOOD Judgment operation. Sound volume 01 (Sound volume range:01 to 09)
BUZZ=NGSp Sp , 08Cr	BUZZ=NGSp Sp , 08Cr	During HIGH or LOW Judgment operation. Sound volume 08
BUZZ=OFFSp , 03Cr	BUZZ=OFFSp , 03Cr	Buzzer OFF (No operation)
	BUZZ=ERRSp Sp Sp Sp Cr	Setting can't be done during OFF Line.

Command	Response	Contents
FREQ?Cr	FREQ=60Cr ①　②③	Read the testing frequency setting of displayed memory No. ①Response　②Frequency setting　③Delimiter
	FREQ=60Cr	Frequency 60Hz
	FREQ=50Cr	Frequency 50Hz
	FREQ=ERRCr	Setting can’t be done during OFF Line.
FREQ=60Cr	FREQ=60Cr ①　②③	Set the testing frequency setting of displayed memory No. ①Response　②Frequency　③Delimiter
FREQ=60Cr	FREQ=60Cr	Set frequency at 60Hz
FREQ=50Cr	FREQ=50Cr	Set frequency at 50Hz
VOLT? Cr	VOLT=1000VCr ①　②　③	Read the set testing voltage of the displayed memory No. ①Response　②Voltage setting　③Delimiter
	VOLT=0020VCr	Set voltage 20V
	VOLT=0100VCr	Set voltage 100V
	VOLT=0500VCr	Set voltage 500V
	VOLT=1000VCr	Set voltage 1000V
VOLT=1000VCr	VOLT=1000VCr ①　②　③	Set the testing voltage of the displayed memory No. ①Response　②Set Voltage　③Delimiter
VOLT=0020VCr	VOLT=0020VCr	Set voltage DC20V（Voltage setting range: 0000V to 1100V, Step 10V）
VOLT=0100VCr	VOLT=0100VCr	Set voltage DC100V
VOLT=0500VCr	VOLT=0500VCr	Set voltage DC500V
VOLT=1000VCr	VOLT=1000VCr	Set voltage DC1000V
	VOLT=ERRSp Sp Cr	Setting can’t be done during OFF Line.

Command	Response	Contents
TIMER? Cr	TIMER=3000C Cr ① ② ③	Read the timer setting of the displayed memory No. ①Response ②Setting of timer ③Delimiter
	TIMER=3000C Cr	Set timer 3000 cycle
	TIMER=0100C Cr	Set timer 100 cycle
	TIMER=0002C Cr	Set timer 2 cycle
TIMER=3000C Cr	TIMER=3000C Cr ① ② ③	Set the timer of the displayed memory No. ①Response ② Set timer ③Delimiter
TIMER=3000C Cr	TIMER=3000C Cr	Set timer 3000 cycle
TIMER=0100C Cr	TIMER=0100C Cr	Set timer 100 cycle
TIMER=0002C Cr	TIMER=0002C Cr	Set timer 2 cycle
		Setting range at 50Hz:0002 to 3000, at 60Hz:0002 to 3600
	TIMER=ERR Sp Sp Cr	Setting can't be done during OFF Line.

Timer setting is specified by the cycle no. of the output voltage.
When 2 cycle is set, testing application time equals 20ms X 2 =40ms at the frequency 50Hz, 16.6ms X2 = 33.3ms at the frequency 60Hz.
When timer setting is longer than 1.0s. and the frequency is changed, timer setting is recalculated so that testing time is unchanged.
When 50Hz is changed to 60Hz, the cycle time is changed from 50 cycle(1s.) to 60 cycle(1s.)
The frequency setting is changed several times, error might be caused.

Command	Response	Contents
MODE? Cr	MODE=AUTO Cr ① ② ③	Read the setting of mode of the displayed memory No. ①Response ②Set mode ③Delimiter
	MODE=MANU Cr	Manual clear mode
	MODE=AUTO Cr	Automatic clear mode
MODE=AUTO Cr	MODE=AUTO Cr ① ② ③	Read the setting of mode of the displayed memory No. ①Response ②Set mode ③Delimiter
MODE=MANU Cr	MODE=MANU Cr	Manual clear mode··· Pressing STOP can clear NG judgment, and the test starts.
MODE=AUTO Cr	MODE=AUTO Cr	Automatic clear mode···Test can start, when the judgment is NG.
	MODE=ERR Sp Cr	Setting can't be done during OFF Line.

Command	Response	Contents
MEM?	MEM=01Cr ① ②③	Read the displayed memory No. ①Response ②Memory No. ③Delimiter
	MEM=01Cr MEM=08Cr	Memory No.=01 Memory No.=08
MEM=01Cr	MEM=CALL01Cr ① ② ③	Read the setting of the designated memory No. ①Response ②Memory No. ③Delimiter
	MEM=CALL01Cr MEM=CALL08Cr MEM=ERRSp Sp Sp Cr	Memory No.=01 (Setting range: 01 to 08) Memory No.=08 Setting can't be done during OFF Line. (Setting can't be done during valid memory setting through REMOTE I/O.)
WRITEMEMORYCr		Write set memory 01 to 08.
	WRITE SUCCESSCr WRITE ERRORSp Sp Cr WRITE ERRSp Sp Sp Sp Cr	Successful writing Failure of writing Setting can't be done during OFF Line.
STARTCr	START=OKSp Sp Sp Sp Cr START=FAULT0Cr START=FAULT1Cr START=ERRSp Sp Sp Cr	Start the test When Interlock works, REMOTE or Error is shown. (Unable to test start) ···Confirm the cause by the STATUS command. When the TEST MODE is MANUAL, NG is judged. (Unable to test start) ···Release NG by pressing STOP and START again. When ONLINE setting is OFF. (Unable to test start)
STOPCr	STOPCr	Undergoing test cancellation During standby state, judgment result becomes clear (Make OFF)

Command	Response	Contents
ONLINE? Cr	ONLINE=ON Sp Cr ① ② ③	Read online status ①Response ②State ③Delimiter
	ONLINE=ON Sp Cr ONLINE=OFF Cr	Online is ON Online is OFF
ONLINE=ON Sp Cr	ONLINE=ON Sp Cr ① ② ③	Set online ①Response ②State ③Delimiter
ONLINE=ON Sp Cr ONLINE=OFF Cr	ONLINE=ON Sp Cr ONLINE=OFF Cr	Set online to ON Set online to OFF
RESULT? Cr	RESULT=ON Sp Cr ① ② ③	Read the condition of RS-232C data output operation. ①Response ②State ③Delimiter
	RESULT=ON Sp Cr RESULT=OFF Cr	RESULT is ON RESULT is OFF
RESULT=ON Sp Cr	RESULT=ON Sp Cr ① ② ③	Change the RS-232C data output operation. (Designate) ①Data output operation ②State ③Delimiter
RESULT=ON Sp Cr RESULT=OFF Cr	RESULT =ON Sp Cr RESULT =OFF Cr	Set ON of data output operation. Output once to RS-232C, when test ends or condition is changed. When test ends: Reply format of DATA? When condition is changed: Reply format of STATUS? Set OFF of data output operation. Output data, responding to data requesting command.

8. Error display, etc.

Display	Name	Description/ Countermeasure
OVER	Over	Beyond the measurement range.
LOCK	Interlock	Interlock is activating and test can't be started. Make sure the connection of Interlock.
ERR1	Internal error	If the same error repeats again after restarting, defect on PCB might have occurred. Send back to manufacturer or authorized dealer for checking.
ERR2	Heat up	Heat up of the test voltage output part. Power off and wait until the 8507 is cooled down. If 8507 is heated up frequently in spite not high surrounding temperature, it might be malfunctioning.
ERR4	Low test voltage	Testing voltage is 50% lower than set voltage. ERR4 can't be detected, when test voltage is under 100V. If the same error repeats again after restarting, defect on circuit failure might have occurred. Send back to manufacturer or authorized dealer for checking.

9. Maintenance

Cleaning

When the front panel or the case becomes dirty, wipe it with soft cloth.
For heavy dirt, wipe it lightly with the soft cloth wetted with the water thinned by neutral cleaner. Do not use cleaners containing thinner, benzene, alcohol, acetone, ketone, ether or petroleum-based detergent as they may deform or discolor the case.

Calibration

The regular calibration is needed to obtain correct test result within the range of specified accuracy. The cycle of calibration depends on actual usage condition and environment of customers. We recommend for regular calibration at TSURUGA ELECTRIC CORPORATION depending on the condition of tester used by customers.

Transportation

During transportation of this tester, be careful of not to damage it by using proper packing box. The damage on transportation cannot be guaranteed.
During repair request, attach the detail of trouble information.

10. Troubleshooting

When the tester is supposed to be faulty, please check the following points before requesting the repair of it.

Symptom	Check points
Display does not light up though the power is turned ON	・Is power supply connected to socket properly?
Key is not operable.	・Isn't the LOCK lamp lit up? Cancel the key lock referring to the section 4.3
Test cannot be started, though START switch is pressed.	・Is ONLINE set as ON (Ref. to 4.6.4) ? ・Is REMOTE option set as REMOTE (Ref. to 4.6.1)? During REMOTE control, START switch becomes ineffective. Regarding to REMOTE, refer to section 4.6.1. and confirm that the setting is in MANUAL mode. ・Is Interlock activated? After releasing Interlock, press START.

11. Specifications

11.1 Test conditions

Applied voltage : AC 0.05 to 1.00 kV

Output capacity : 10 VA (1 kV, 10mArms)

Continuous application time of the maximum current output within 60s.

Wave form : Sine wave（Rate of strain : Less than 5%　No-load）

Test frequency : 50/60Hz（Regardless of the power frequency 50/60Hz switchable）

Voltage fluctuation rate : Less than 10%（No-load → Maximum load）

Voltage application method

: Zero cross start, Zero cross end

After the time up and NG judgment, cut off applied voltage.

Applied voltage setting : Digital setting (Setting resolution 0.01 kV)

Setting range　0.00 to 1.10 kV

Setting accuracy　± (1.5% +20V) of the setting No-load

Abnormal output of test voltage

AMP Heat generation

: Detection of heat generation of output power AMP

Detection temperature is approx. 75℃

Output voltage lowering

: Detection 50% lower than test voltage setting

When voltage setting is over 100 V, it works.

Operation : AMP Heat generation and output voltage lowering are detected, test is suspended.

Under AMP Heat generation, test can't be started.

AMP Heat generation and output voltage lowering are detected, output of INTERNAL ERR is obtained.

Voltage measurement

Rectification method : Average rectified effective value display

Digital display :	Display range	0 to 1200 V, OVER
	Resolution	1 V
	Measurement accuracy	± (1.5% of rdg. + 20 V)
	Character	Aprrox.3 mm　Green OLED panel
	Operation	Display the applied voltage during test.
		At the end of the test, display is retained.
		The value after NG judgment doesn't necessarily reflect the NG value, because of response speed.

Current measurement

Rectification method : Peak value display

Digital display : Measurement range 0.00 to 15.00mA

Resolution 0.01mA

Measurement accuracy ± (2% of rdg. +0.05 mA)

Character Approx. 10mm Green OLED panel

Operation Display the peak leakage current value during the test

At the end of the test, the display of the end of the test is retained.

Over display OVER is displayed, when 15.00 mA is exceeded.

Response Response time 30 ms.

Current judgment method

: Upper limit Comparison of peak values with analog and digital comparator

Lower limit Digital comparator (Comparison at the time-up)

Setting : Setting range Upper limit 0.01 to 15.00 mA

Lower limit 0.01 to 15.00 mA/ OFF

Resolution 0.01 mA

Judgment conditions : Upper limit setting＞Leakage current＞Lower limit setting・・・GOOD

Upper limit setting≦Leakage current・・・・・・・・HIGH NG

Lower limit setting≧Leakage current・・・・・・・・LOW NG

Test time

Setting range (Cycle) : 2 cycle to 60s.

During the test, the remaining time is displayed.

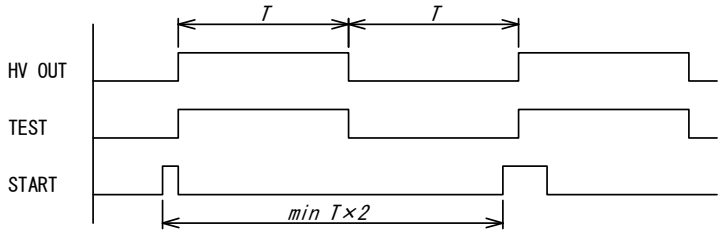
At the end of the test, the remaining time is displayed.

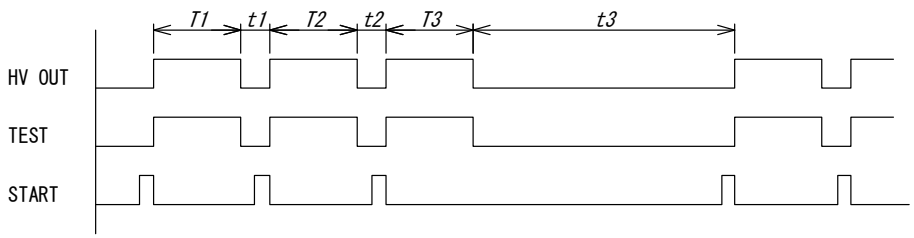
At the end of the test, the setting time is displayed by pressing STOP.

Accuracy : ± 2 ms.

Test repeat waiting time : Min. 10 ms.

The time of output applied voltage is within 50% of repeating cycle.





T1+T2+T3 <= t1+t2+t3

T1+T2+T3 <= 60sec

Setting value memory

Record contents	: The test conditions of this withstanding voltage tester are memorized.
No. of items	: 8 memories
Memory retained	: Kept in Non-volatile storage
	Memory preservation for 10 years
Read memory	: Key operation, In-output signals on the rear panel, communication
Setting method	: Key operation, communication

11.2 General specification

Power supply	: AC 100 V to 240 V 50/60 Hz		
Power supply voltage tolerance range			
	: AC 90 V to 250 V		
Power consumption	: Waiting Approx. 17 VA		
	Operating (Max. load) Approx. 65 VA		
Operating temperature range	: 0 to 40℃		
Operating humidity range	: 20 to 80% RH (Non-condensing)		
Storage temperature	: -20 to 70℃		
Withstand voltage	: Power supply terminal − External case AC 1350 V 1 minute		
Dimension	: 260 (W) 246 (D) × 110 (H) (excl. buttons and legs)		
Weight	: 4.5 kg		
Accessories	: High voltage cable	2m	1piece
	Low voltage cable	2m	1piece
	Earth wire	3m	1piece
	Power code	2.5m	1piece
	REMOTE I/O plug		1piece
	Operating manual (This book)		1part

11.3 Table of factory setting

Memory setting

Item	Setting range	Contents	Initial setting	User setting
MEMORY No.	01 to 08	Memory number	1	
TEST MODE	AUTO CLR	Clear NG judgment, and it STARTs.	AUTO CLR	
	MANUAL CLR	When NG judgment, it can't START Clear with pressing STOP, it STARTs.		
VOLTAGE	0000 to 1100V	Testing voltage	0000V	
FREQ	50Hz / 60Hz	Frequency of testing voltage	50Hz	
HIGH SET	00.01 to 15.00	Comparator, Upper limit	15.00	
LOW SET	00.01 to 15.00, OFF	Comparator, Lower limit	OFF	
TIMER	0002c to 3600c (60Hz) 0002c to 3000c(50Hz)	Timer	0002	

Initialize of memory : Keep pressing F2 and F3 for longer than 3s. at memory setting, memory settings are initialized and returns to waiting mode.

Tester setting

Item	Setting range	Contents	Initial setting	User setting
REMOTE	MANUAL	Manual mode	MANUAL	
	REMOTE	Remote (Terminal on rear panel)		
MEM.CTRL	MANUAL	Select memory on front-panel key	MANUAL	
	REMOTE	Select memory by terminal on rear panel		
BUZZ MODE	OFF	Buzzer off	OFF	
	GOOD	With buzzer GOOD judgment		
	NG	With buzzer NG judgment		
BUZZ VOL	1 to 9	Volume of buzzer	5	
ONLINE	OFF	Communication control disabled (Readout enabled)	OFF	
	ON	Communication control enabled		
RS BPS	9600bps	Baud rate setting of RS-232C	9600bps	
	19200bps			
	38400bps			
	115200BPS			
RS PARITY	NONE	OFF: RS-232C parity	NONE	
	EVEN	Even: RS-232C parity		
	ODD	Odd: RS-232C parity		

System setting

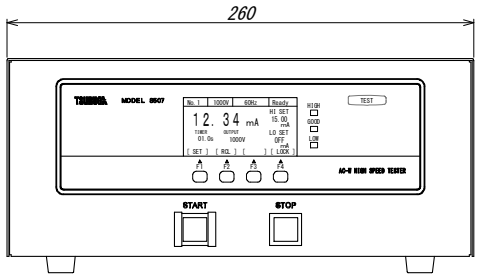
Item	Setting range	Contents	Initial setting	User setting
CONTRAST	1 to 5	Brightness of front panel	3	

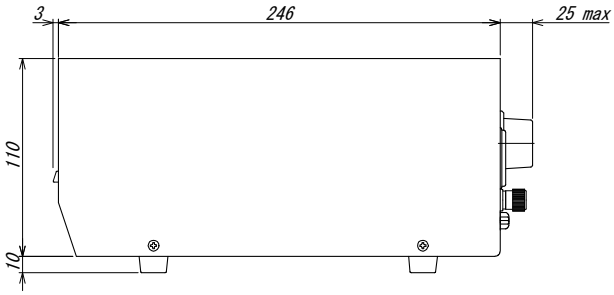
Other setting

Item	Setting range	Contents	Initial setting	User setting
LOCK	ON, OFF	Key locking, Enable/Disable of front keys	OFF	

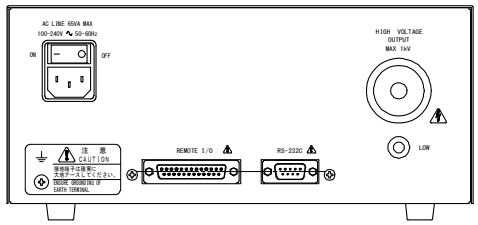
11.4 External dimensions

FRONT





REAR



Unit : mm

Installation condition :

- Keep more than 50 mm open space on the top and side of 8507.
- Covering on top and bottom ventilation surface leads to damage or shorten the product life.
- When this tester is mounted in a system rack etc., arrange heat exchange fan so that the temperature do not exceed the usage condition.

Tsuruga Electric Corporation

Osaka Headquarters
1-3-23, Minamisumiyoshi, Sumiyoshi-ku, Osaka, Japan, 558-0041
TEL 81-6-6692-6700, FAX 81-6-6609-8115
E-mail: ft.info@tsuruga.co.jp

Yokohama Office
1-29-15, Shinyokohama, Kohoku-ku, Yokohama, Kanagawa, Japan,
222-0033

Tokyo Office
5-25-16, Higashigotanda, Shinagawa-ku, Tokyo, Japan, 141-0022

Nagoya Office
Sun Park Higashi Betsuin Bld. 2F
5-19, Oicho, Naka-ku, Nagoya, Aichi, Japan, 460-0015

Osaka Plant
1-3-23, Minami Sumiyoshi, Sumiyoshi-ku, Osaka, Japan, 558-0041

Shiga Plant
122, Kawasaki-Cho, Nagahama, Shiga, Japan, 526-0846

www.tsuruga.co.jp