TH2683 Insulation Resistance Meter

User's Mannual

CONTENTS

Chapter 1   Genernal Information

Thanks very much for choosing and using our product. If you have any questions after reviewing this manual, please contact your local representative or call directly to our application engineers for further consultation.

1.1   Feature Overview

The TH2683 Insulation Resistance Meter is designed for measuring very high resistance and related parameters of insulation materials, electronic components, and electro-mechanical components.

The TH2683's measurement range is from $1.0×10^5\Omega$ to $10^{13}\Omega$. This broad measurement range allows accurate high resistance measurements of capacitors, relays, switches, connectors, materials, cables, and PCBs.

Main features:
- Either resistance or current can be measured and displayed.
- Digital display for IR, I, Voltage and Range. Measurement results are displayed with four effective digits.
- All functions and measurement are controlled by MPU.
- Measurement configurations can be stored in the non-volatile memory for later use.
- Basic accuracy: ±2%
- Bulit-in comparator
- Handler interface
- Optional RS232C interface

1.2   Operating Environment

Line Voltage: 220Vac ±10%
Line frequency: 47Hz to 66Hz
Power consumption: <30VA
Operating temperature: 0℃ to 40℃
Humidity: ≤ 95% RH at 40℃

1.3   Dimensions and Weight

Dimensions（W×H×D）：273mm×110mm×330mm
Net weight: Around 3.5Kg

1.4   Unpacking Inspection

Inspect the shipping container for damage. If the shipping container is damaged, it should be kept until the contents of the shipment have been checked for completeness and the TH2683 has been checked mechanically and electrically. The contents of shipment are listed in the packing list. If the contents are incomplete, if there is mechanical damage or defeat, or if the meter doesn't pass the power-on self tests, notify the nearest Tonghui office. If the shipping container is damaged, or the cushioning material shows signs of unusual stress, notify the carrier as well as the Tonghui office. Keep the shipping materials for the carrier's inspection.

1.5   Warranty

This Tonghui instrument product is warranted against defects in material and workmanship for a period of one year from the date of shipment. During the warranty period, we will, at out option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by Tonghui. Purchaser shall prepay shipping charges to Tonghui and Tonghui shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to Tonghui from another country.

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

Chapter 2   TH2683 Overview

2.1   Front Panel Summary

The front panel of the TH2683 is shown in Figure 2-1. This figure includes some important abbreviated information that should be reviewed before operating the instrument.
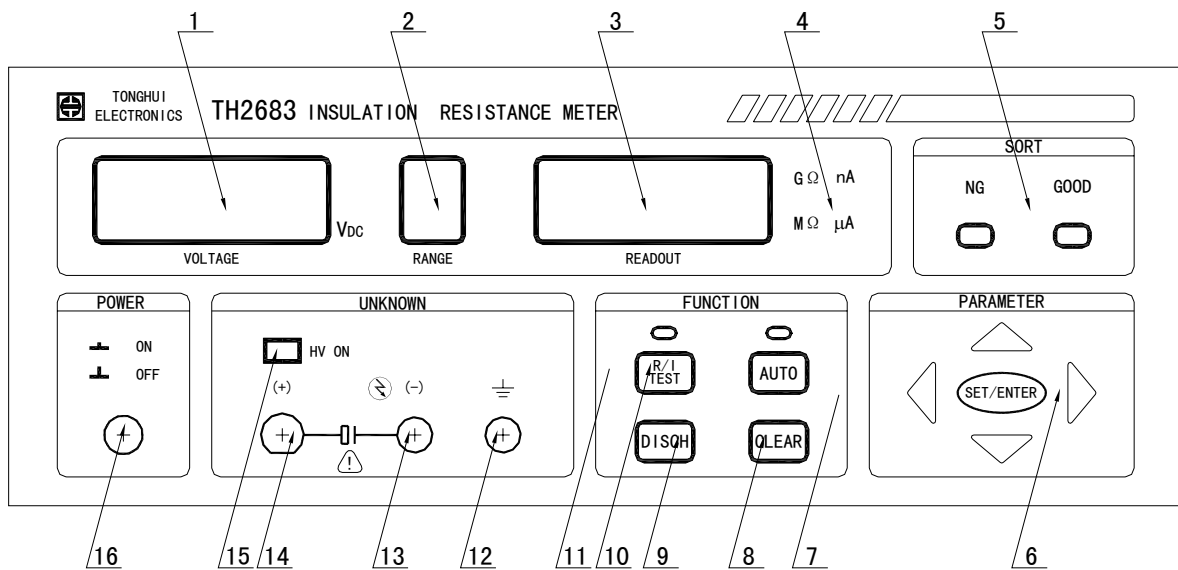

Figure 2-1   TH2683 Front Panel

1. **Voltage Window**
    Display the current test voltage, when TH2683 is in the measurement or discharge status. Menu items will also be displayed in this window when TH2683 is in the setup menu.

2. **Range Window**
    Display the current measurement range.

3. **Readout Window**
    Display the measurement results of Resistance or Current with four effective digits. Parameters and options will also be displayed in this window when TH2683 is in the setup menu.

4. **Unit Indicator**
    Indicate the current IR unit: MΩ, GΩ or current I unit: nA, μA.

5. **Comparator Indicator**
    - NG: This indicator turns on when comparison result is HIGH or LOW.
    - GOOD: This indicator turns on when comparison reslutl is IN.

6. **SET/ENTER key**
   - SET/ENTER: Press SET/ENTER key in the discharge status to enter the main setup menu and the current menu item will be blinking in the voltage window. Use the ▲ or ▼ key to select a menu item to be set.
   - SET/ENTER: Press SET/ENTER key within the main setup menu to enter the submenu and enable the modification of the current displayed menu item, the current value of the item will be blinking. Use the ◄ or ► key to choose a numerical position and use the ▲ or ▼ key to increase or decrease the digit value.
   Press SET/ENTER key again to confirm the change and return back to the main setup menu from the submenu.

7. **AUTO key**
   - Press AUTO key to toggle the range mode between AUTO and HOLD.
   - When AUTO indicator is ON, the instrument selects the measurement range automatically according to the insulation resistance of the DUT (device under test).
   - When AUTO indicator is OFF, you can change the measurement range by pressing the ▲ or ▼ key in the measurement or discharge status.

8. **CLEAR key**
   Press CLEAR key to perform open correction when TH2683 is in the discharge status.

9. **DISCH key**
   - Press DISCH key to enter the discharge status from the measurement status.
   - Press DISCH key to return to the discharge status from the main setup menu or submenu directly.

10. **R/I TEST key**
    - Press the R/I TEST key to enter the measurement status, when the TH2683 is in the discharge status or in the main setup menu.
    - Press the R/I TEST key to toggle the display parameter between insulation Resistance and Current when TH2683 is in the measurement status.

11. **TEST indicator**
    The TEST indicator blinks during each sampling operation. The measurement speed is about 3 times per second.

12. **Ground Terminal**
    Connect to the shielding ground terminal.

13. **"-" Test Terminal**
    Measurement voltage output terminal

14. **"+" Test Terminal**
    Sampling input terminal

15. **HV ON Indicator**
    HV ON indicator which indicates that high voltage is present on the "-" test terminal.

16. **Line Switch**
    Turn ON/OFF the power supply.

2.2   Rear Panel Summary

The rear panel of TH2683 is shown in Figure 2-2. This section includes important information that should be reviewed before operating the instrument.
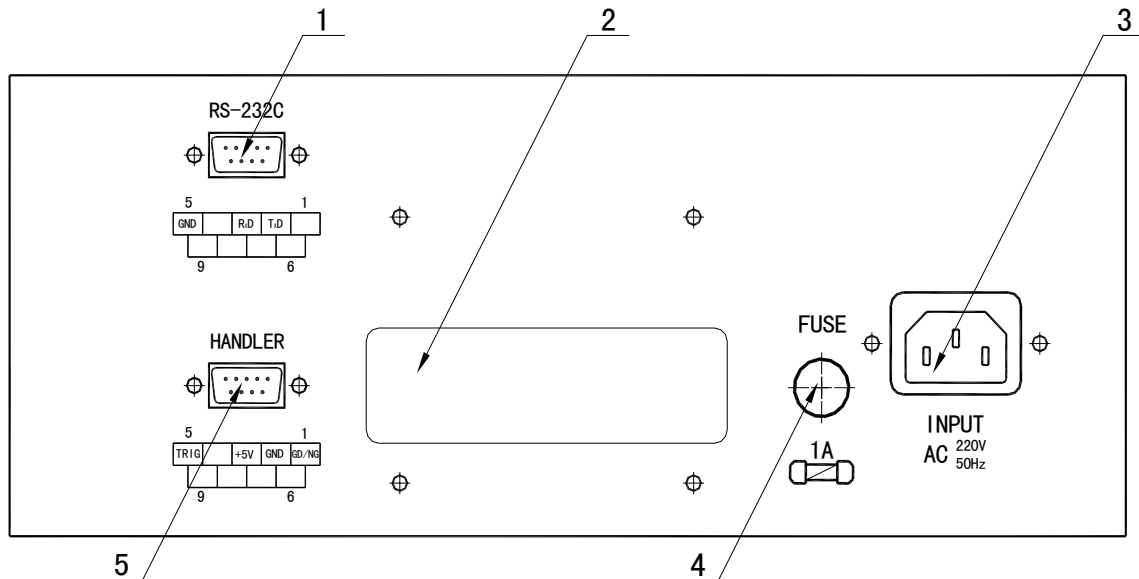

Figure 2-2   TH2683 Rear Panel

1. **RS-232C Connector**
   Optional connector for RS-232 operation. Use a standard DB-9 cable.

2. **Label**
   Prodcution Date and serial number for this instrument

3. **Power Cord Receptacle**
   AC power line receptacle. TH2683 can be configured for line voltage of 220±10% AC at line frequency of 50Hz±5%.

4. **Fuse Holder**
   Power-line fuse for instrument protection. (220/1A)

5. **Handler Interface**
   This interface is used to synchronize timing with an external handler and trigger a measurement using an external Trigger signal.

2.3   Power up

2.3.1   Power Line Connection

Follow the procedure below to connect the TH2683 to line power and turn on the instrument.
1.   Check to make sure that the line voltage is in the range of 198V to 242V and line frequency is in the range of 47 Hz to 66Hz before conneting the power cord.

CAUTION: Operating the instrument on an incorrect voltage may cause damage to the instrument, possibly voiding the warranty.

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2.   Before plugging in the power cord, make sure that the front panel power switch is in the off position.
3.   Connect the femail end of the supplied power cord to the AC receptacle on the rear panel. Connect the other end of the power cord to a grounded AC outlet.

WARNING: The power cord supplied with the Model TH2683 contains a separate ground wire for use with grounded outlets. When proper connections are made, instrument chassis is connected to power line ground through the ground wire in the power cord. Failure to use a grounded outlet may result in personal injury or death due to electric shock.

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4.   Turn on the instrument by pressing the front panel power switch and get ready for measuring.

2.3.2   Power-up Sequence

Connect the power cable to Power Cord Receptacle on the rear panel. Push the line switch in. The TH2683 will emit a beep and following messages will be displayed.
1)   All digital LEDs and indicators are turned on for a second.
2)   Display the name of the manufacturer.
3)   Display the model of the Insulation Resistance meter.
4)   Display the version number of the software.
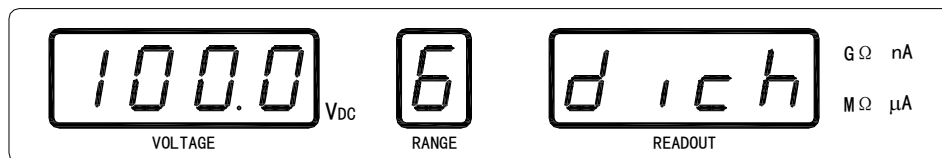5)   Finally TH2683 enters the default discharge status as shown in Figure 2-3.

Figure 2-3   The Default Discharge Status

Power on default status:
● Test voltage: The voltage used late time
● Measurement Range: Range 6
● Range Mode: AUTO
● Discharge status, here "dich" is the abbreviate form of discharge.
● Sorting Limits: Previously stored limits

2.3.3   Warm-up time

Model TH2683 is ready for use as soon as the power-up sequence has completed. However, to achieve rated accuracy and stability, allow the instrument to warm up for half an hour. If the instrument has been subjected to extreme temperatures, allow additional time for internal temperatures to stabilize.

Chapter 3   Basic Operation

This chapter provides step-by-step instructions for using the TH2683 Insulation Resistance Meter. Read this chapter carefully before using the TH2683, so you can quickly and efficiently learn the TH2683's operation.

3.1   Test Voltage Setup

Perform the following steps to set the DC test voltage
1) Press SET/ENTER key in the discharge status to enter the main setup menu as shown in the following figure 3-1. Voltage menu item "*1.VOL*" will be blinking in the voltage window and the current voltage value will be displayed in the readout window.
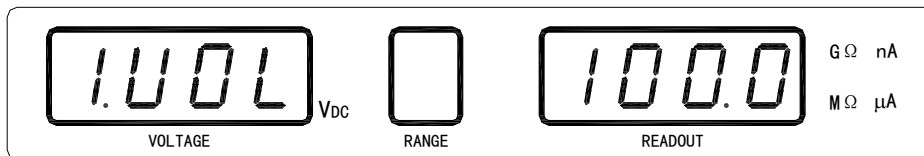

Figure 3-1 Test Voltage Setup

2) Press SET/ENTER to enter the voltage setup submenu from the main setup menu, and the current displayed voltage value will be blinking.
3) Press ▲ or ▼ key to select the test voltage desired. Ten test voltages are available: 10V, 25V, 50V, 75V, 100V, 125V, 250V, 500V, 750V, 1000V.
4) Press SET/ENTER to confirm the voltage you selected and to return to the main setup menu. The current test voltage value will be stored in the non-volatile memory automatically; it does not change when power has been off.
5) Press ▲ or ▼ key to scroll through the main setup items, until "*ESC*" is flashing in the voltage window as shown in Figure 3-2. Press SET/ENTER key to exit the main setup menu and return back to the discharge status.
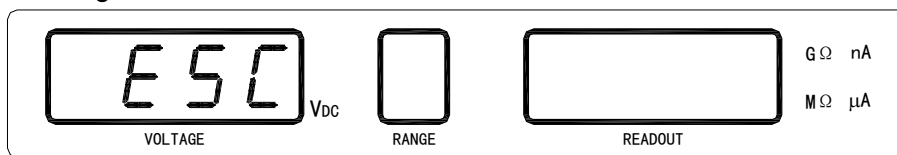

Figure 3-2 Exit The Main Setup Menu

6) Press DISCH key to exit the main setup menu or even submenu directly and return back to the discharge status. The current test voltage value will be stored in the non-volatile memory automatically; it does not change when power has been off.
7) Press R/I TEST key to exit the main setup menu directly and return back to the measurement status.

3.2   Low Limit Setup

Perform the following steps to input the low limit.

1) Press **SET**/ENTER key in the discharge status to enter the main setup menu as shown in the following figure 3-3.
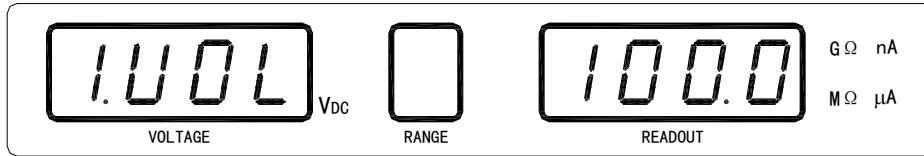

Figure 3-3   Main Setup Menu

2) Press ▲ or ▼ key to scroll through the main setup items, until "*2. Lo*" is flashing in the voltage window as shown in the following figure 3-4.
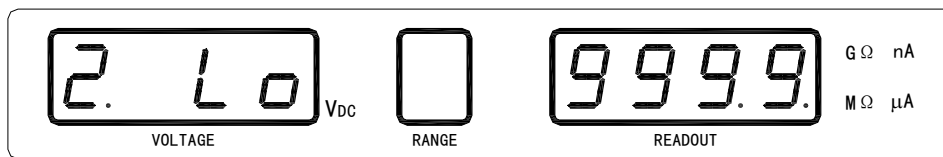

Figure 3-4   Low Limit Setup

3) Press SET/**ENTER** to enter the low limit setup submenu from the main setup menu, and the least significant digit of current low limit value will be blinking in the readout window.
4) Use the ◀ or ▶ key to choose a numerical digit or decimal point position. Use ▲ or ▼ key to increase or decrease the digit value or move the decimal point (choose the unit). Enter a low limit value from 0.1MΩ to 9999GΩ.
5) Press SET/**ENTER** to confirm the low limit value and return to the main setup menu. The current low limit value will be stored in the non-volatile memory automatically; it does not change when power has been off.
6) Press ▲ or ▼ key to scroll through the main setup items, until "*ESC*" is blinking in the voltage window. Press SET/**ENTER** key to exit the main setup menu and return back to the discharge status.
7) Press DISCH key to exit the main setup menu or even submenu directly and return back to the discharge status. The current low limit value will be stored in the non-volatile memory automatically; it does not change when power has been off.
8) Press R/I TEST key to exit the main setup menu directly and return back to the measurement status.

3.3　High Limit Setup

Perform the following steps to input the high limit.
1) Press SET/ENTER key in the discharge status to enter the main setup menu as shown in the following figure 3-5.

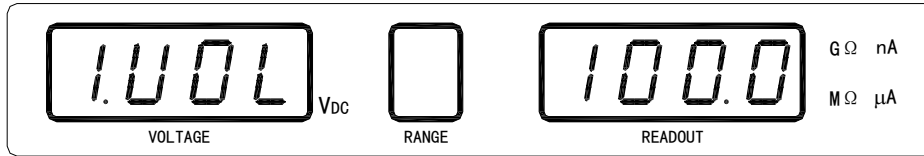**Figure 3-5　Main Setup Menu**

2) Press ▲ or ▼ key to scroll through the main setup items, until "*3. Hi*" is blinking in the voltage window as shown in the following figure 3-6.

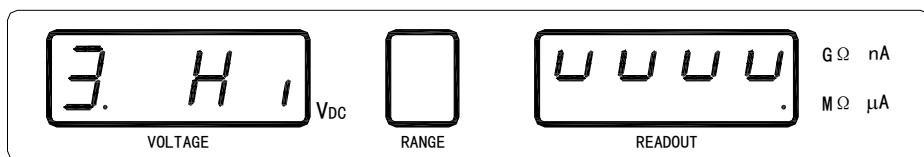**Figure 3-6 High Limit Setup**

3) Press SET/ENTER to enter the high limit setup submenu from the main setup menu, and the least significant digit of current high limit value will be blinking in the readout window.
4) Use the ◀ or ▶ key to choose a numerical digit or decimal point position. Use ▲ or ▼ key to increase or decrease the digit value or move the decimal point (choose the unit). Enter a high limit value from 0.1MΩ to 9999GΩ .

NOTE:　If you want to disable the high limit, just enter UUUUG for high limit. Then the high limit will not be used for sorting function. So a device whose insulation resistance is high than the low limit will be sorted into GOOD bin and a device whose insulation resistance is lower than the low limit will be sorted into NG bin.

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5) Press SET/ENTER to confirm the high limit value and return to the main setup menu. The current high limit value will be stored in the non-volatile memory automatically; it does not change when power has been off.
6) Press ▲ or ▼ key to scroll through the main setup items, until "*ESC*" is blinking in the voltage window. Press SET/ENTER key to exit the main setup menu and return back to the discharge status.
7) Press DISCH key to exit the main setup menu or even submenu directly and return back to the discharge status. The current high limit value will be stored in the non-volatile memory automatically; it does not change when power has been off.
8) Press R/I TEST key to exit the main setup menu directly and return back to the measurement status.

3.4   Charge Time Setup

Perform the following steps to set the voltage charge time.

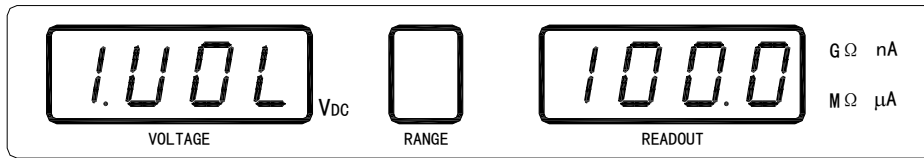1) Press SET/ENTER key in the discharge status to enter the main setup menu as shown in the following figure 3-7.

Figure 3-7   Main Setup Menu

2) Press ▲ or ▼ key to scroll through the main setup items, until "*4.tin*" is blinking in the voltage window as shown in the following figure 3-8.
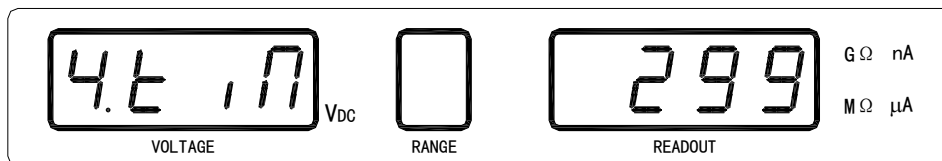

Figure 3-8   Charge Time Setup

3) Press SET/ENTER to enter the charge time setup submenu from the main setup menu, and the least significant digit of current charge time will be blinking in the readout window.

4) Use the ◀ or ▶ key to choose a numerical digit position. Use ▲ or ▼ key to increase or decrease the digit value. Enter a charge time value from 000s to 999s.

5) Press SET/ENTER to confirm the charge time and return to the main setup menu. The current charge time will be stored in the non-volatile memory automatically; it does not change when power has been off.

6) Press ▲ or ▼ key to scroll through the main setup items, until "*ESC*" is blinking in the voltage window. Press SET/ENTER key to exit the main setup menu and return back to the discharge status.

7) Press DISCH key to exit the main setup menu or even submenu directly and return back to the discharge status. The current charge time will be stored in the non-volatile memory automatically; it does not change when power has been off.

8) Press R/I TEST key to exit the main setup menu directly and return back to the measurement status.

3.5   Beeper Mode Setup

Perform the following steps to set the beeper mode from the discharge status.
1) Press SET/ENTER key in the discharge status to enter the main setup menu as shown in the following figure 3-9.

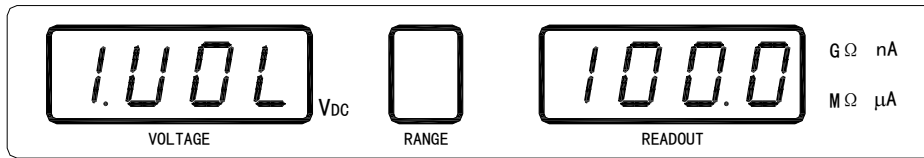**Figure 3-9   Main Setup Menu**

2) Press ▲ or ▼ key to scroll through the main setup items, until "**5.bEP**" is blinking in the voltage window as shown in the following figure 3-10.

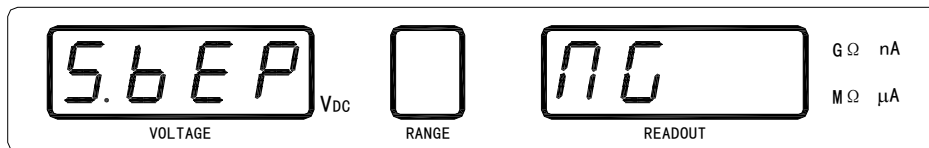**Figure 3-10 Beeper Mode Setup**

3) Press SET/ENTER to enter the beeper mode setup submenu from the main setup menu, and the current beeper mode will be blinking in the readout window.
4) Use ▲ or ▼ key to choose one of the three beeper modes:
   - OFF: Beeper is turned off.
   - NG: Beep when the comparator result is High or Low (NOT GOOD).
   - GOOD: Beep when the comparator result is IN (GOOD).
5) Press SET/ENTER to confirm the beeper mode and return to the main setup menu. The current beeper mode will be stored in the non-volatile memory automatically; it does not change when power has been off.
6) Press ▲ or ▼ key to scroll through the main setup items, until "**ESC**" is blinking in the voltage window. Press SET/ENTER key to exit the main setup menu and return back to the discharge status.
7) Press DISCH key to exit the main setup menu or even submenu directly and return back to the discharge status. The current beeper mode will be stored in the non-volatile memory automatically; it does not change when power has been off.
8) Press R/I TEST key to exit the main setup menu directly and return back to the measurement status.

Perform the following steps to set the beeper mode from the measurement status.
1) Press SET/ENTER key in the measurement status to enter the beeper mode setup submenu directly, and the current beeper mode will be blinking in the readout window as shown in the following figure 3-11.
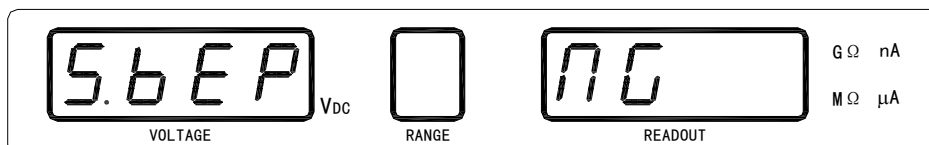

Figure 3-11 Beeper Mode Setup

2) Use ▲ or ▼ key to choose one of the three beeper modes:
   - OFF: Beeper is turned off.
   - NG: Beep when the comparator result is High or Low (NOT GOOD).
   - GOOD: Beep when the comparator result is IN (GOOD).
3) Press SET/ENTER to confirm the beeper mode and return to the measurement status. The current beeper mode will be stored in the non-volatile memory automatically; it does not change when power has been off.

NOTE: ***If you don't press the SET/ENTER key to teminate the operation, the TH2683 will return back to the measurement status after a few seconds. The current beeper mode will also be confirmed and stored in the non-volatile memory automatically; it does not change when power has been off.***

3.6   External Trigger ON/OFF Setup

Perform the following steps to enable or disable the external trigger.
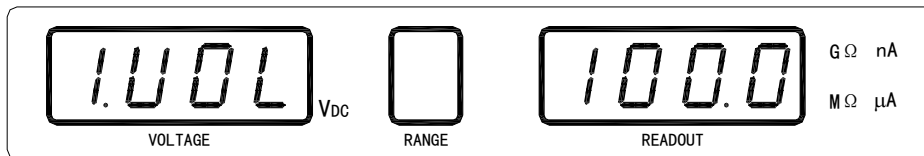1) Press SET/ENTER key in the discharge status to enter the main setup menu as shown in the following figure 3-12.

Figure 3-12 Main Setup Menu

2) Press ▲ or ▼ key to scroll through the main setup items, until "***6.tRG***" is blinking in the voltage window as shown in the following figure 3-13.
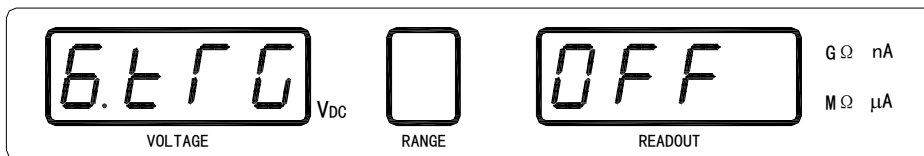

Figure 3-13 External Trigger Setup

3) Press SET/ENTER to enter the trigger setup submenu from the main setup menu, and the current trigger ON/OFF state will be blinking in the readout window.
4) Use ▲ or ▼ key to set the external trigger to ON or OFF.
5) Press SET/ENTER to confirm the selection and return to the main setup menu. The current ON/OFF state will be stored in the non-volatile memory automatically; it does not change when power has been off.
6) Press ▲ or ▼ key to scroll through the main setup items, until "***ESC***" is blinking in the voltage window. Press SET/ENTER key to exit the main setup menu and return back to the discharge status.
7) Press DISCH key to exit the main setup menu or even submenu directly and return back to the discharge status. The current external trigger ON/OFF state will be stored in the non-volatile memory automatically; it does not change when power has been off.
8) Press R/I TEST key to exit the main setup menu directly and return back to the measurement status.

Note: ***For more information about the external trigger, please refer to chapter 5.***

3.7 Range Mode Setup

TH2683 provides 6 different measurement ranges as shown in the following Table 3-1. The measuring range for different voltages and ranges are listed in Table 3-2.

Table 3-1 Range Resistance

Range No.	Range Resistance
1	1kΩ
2	10kΩ
3	100kΩ
4	1MΩ
5	10MΩ
6	100MΩ

TH2683 provides two range modes: AUTO range mode and HOLD range mode.
- AUTO range mode: the TH2683 selects the correct range automatically.
- HOLD range mode: the measurement range will be fixed at the current displayed range.

Perform the following steps to set the range mode and change the measurement range.
1) Press AUTO key to toggle the measurement range mode between "AUTO" and "HOLD". The range mode indicator turns on in AUTO range mode and turns off in HOLD range mode.
2) Press ▲ or ▼ key to change the current range when the TH2683 is in the discharge status or measurement status. Pressing ▲ or ▼ key will turn the range mode indicator off, and HOLD range mode will be selected.

Table 3-2 Measuring Range for Different Voltages and Ranges

（M = 10^6, G = 10^9）unit：Ω

Range / Voltage	1	2	3	4	5	6
10V	100K ~ 1.111M	1M ~ 11.11M	10M ~ 111.1M	100M ~ 1.111G	1G ~ 11.11G	10G ~ 111.1G
25V	250K ~ 2.778M	2.5M ~ 27.78M	25M ~ 277.8M	250M ~ 2.778G	2.5G ~ 27.78G	25G ~ 277.8G
50V	500K ~ 5.555M	5M ~ 55.55M	50M ~ 555.5M	500M ~ 5.555G	5G ~ 55.55G	50G ~ 555.5G
75V	750K ~ 8.333M	7.5M ~ 83.33M	75M ~ 833.3M	750M ~ 8.333G	7.5G ~ 83.33G	75G ~ 833.3G
100V	1M ~ 11.11M	10M ~ 111.1M	100M ~ 1.111G	1G ~ 11.11G	10G ~ 111.1G	100G ~ 1111G
125V	1.25M ~ 13.89M	12.5M ~ 138.9M	125M ~ 1.389G	1.25G ~ 13.89G	12.5G ~ 138.9G	125G ~ 1389G
250V	2.5M ~ 27.78M	25M ~ 277.8M	250M ~ 2.778G	2.5G ~ 27.78G	25G ~ 277.8G	25G ~ 2778G
500V	5M ~ 55.55M	50M ~ 555.5M	500M ~ 5.555G	5G ~ 55.55G	50G ~ 555.5G	500G ~ 5555G
750V	7.5M ~ 83.33M	75M ~ 833.3M	750M ~ 8.333G	7.5G ~ 83.33G	75G ~ 833.3G	750G ~ 8333G
1000V	10M ~ 111.1M	100M ~ 1.111G	1G ~ 11.11G	10G ~ 111.1G	100G ~ 1111G	1000G ~ 9999G

3.8   Correction Function

NOTE: Warm up the TH2683 for 30 minutes before correction operation. Make sure that environment requirements described in the chapter 1 are fully satisfied.

The open correction cancels measurement errors caused by residuals and stray capacitance of the test fixture.

Perform following steps for open correction operation.
1)   Separate each electrode of the test leads, make sure that nothing is connected to the leads.
2)   Press CLEAR key in the discharge status, and following information will be displayed as shown in the figure 3-14. "OPEN" message will be blinking in the voltage window, and the open correction measurement value (mV) of the current range will be measured and displayed in the readout window.
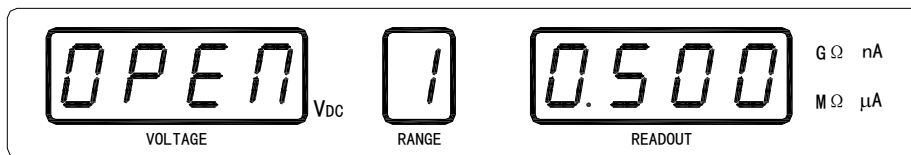

Figure 3-14 Open Correction Measurement Value

3)   Press ▲ or ▼ key to change the measurement range and view the open correction measurement value for each measurement range.
4)   Press CLEAR key again to start the open correction operation. "*CLr*" message will be displayed in the voltage window, all ranges will be corrected in turn and open correction measurement value for each range will be displayed in the readout window as shown in the Figure 3-15.
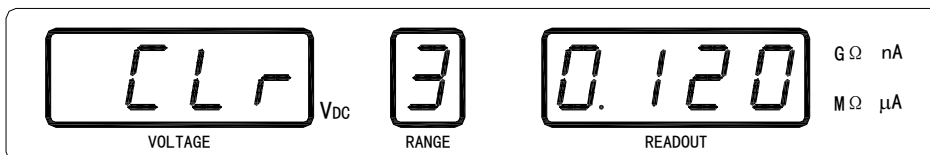

Figure 3-15 Open Correction

5)   If TH2683 passes the open correction for all measurement ranges, "PASS" message will be displayed for a second as shown in Figure 3-16. TH2683 returns back to the discharge status.
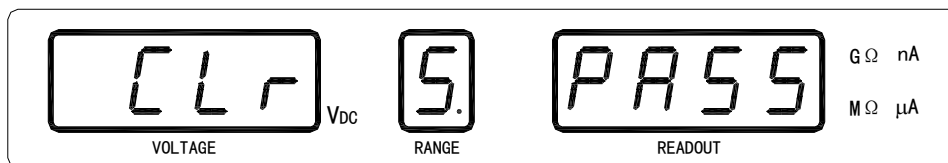

Figure 3-16 Open Correction Succeeded

6)   The open correction fails when one of the open correction measurement value is more than 1 mV. "FAIL" message will be displayed for a second as shown in Figure 3-17. TH2683 returns back to the discharge status.
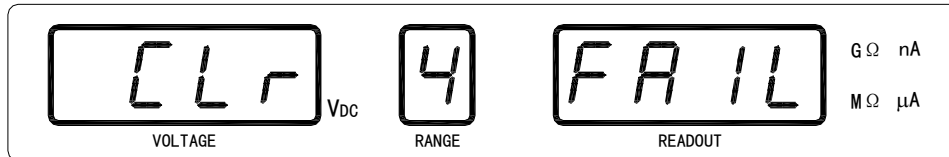
Figure 3-17 Open Correction Failed

7) All open correction measurement values are stored in the non-volatile memory automatically; it does not change when power has been off.

8) After the open correction is completed, you can connect the DUT to the test fixture.

Chapter 4   Application Measurement

This paragraph gives an actual example for how to perform an insulation resistance measurement.

1)   Connect the test leads to the TH2683 connector as shown in the following figure 4-1.

Figure 4-1 Connect the Test Leads

2)   Turn on the power.
3)   Set the test voltage value referring to section 3.1.
4)   Perform the OPEN correction to eliminate the errors caused by residuals and stray capacitance of the test fixture referring to section 3.8.
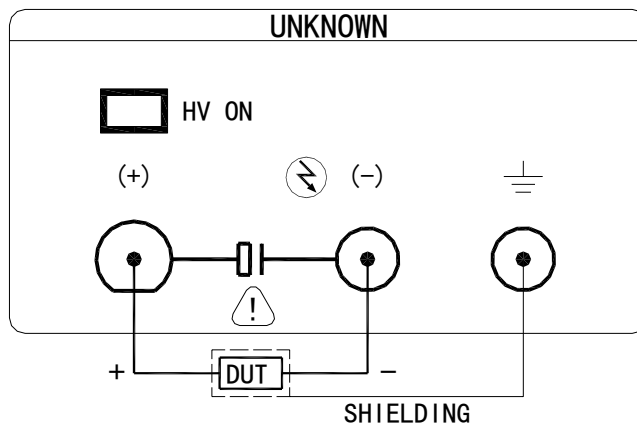5)   Connect the DUT to the UNKNOWN terminals as shown in the following figure 4-2

Figure 4-2 Measurement Connection

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*NOTE: **Make sure that the polarity is correctly connected, when a polarity sensitive DUT is measured.***

---

6) Press R/I TEST key to start the measurement procedure as shown in the following figure 4-3. TH2683 outputs the test voltage up to 1000Vdc.
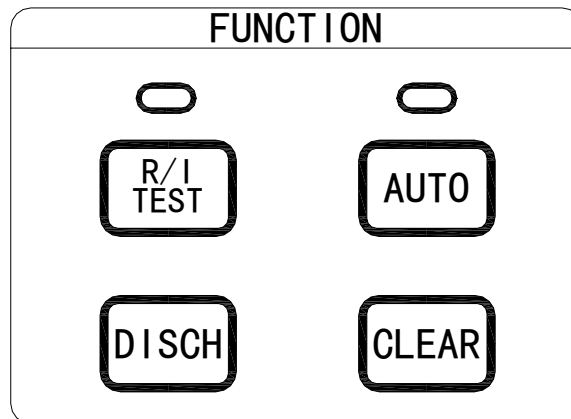

Figure 4-3   Function Keys

NOTE: Do not touch the UNKNOWN terminals or the electrodes of the accessory, when the HV indicator is ON, TH2683 outputs dangerous voltage levels up to 1000Vdc. Before connecting or disconnecting the DUT, turn OFF the test voltage by pressing the DISCH key and confirm that the HV indicator is OFF.

---

7) Press R/I TEST key to toggle the display parameter between Resistance (R) and Current (I).

NOTE: Do not short the test terminals for a long time; doing this may destroy the instrument. TH2683 will return to the discharge status automatically when the test terminals are shorted for more than ten measurements (approx. 3 seconds) in the range AUTO mode. But this protective function is not available during the charge time or when TH2683 is set to the range HOLD mode.

---

8) You can press SET/ENTER key to set the beeper mode in the measurement status, referring to section 3.6.
9) Press DISCH key to end the measurement and return to the discharge status. In the discharge status the test high voltage will be turned OFF.

Chapter 5   Remote Operation

5.1   Handler Interface

Handler interface is used to synchronize timing with an external handler. The schematic circuit diagram of the handler interface is shown in the following figure 5-1. The contact assignment for comparator function is listed in table 5-1. Figure 5-2 shows the timing diagram of Handler operation.
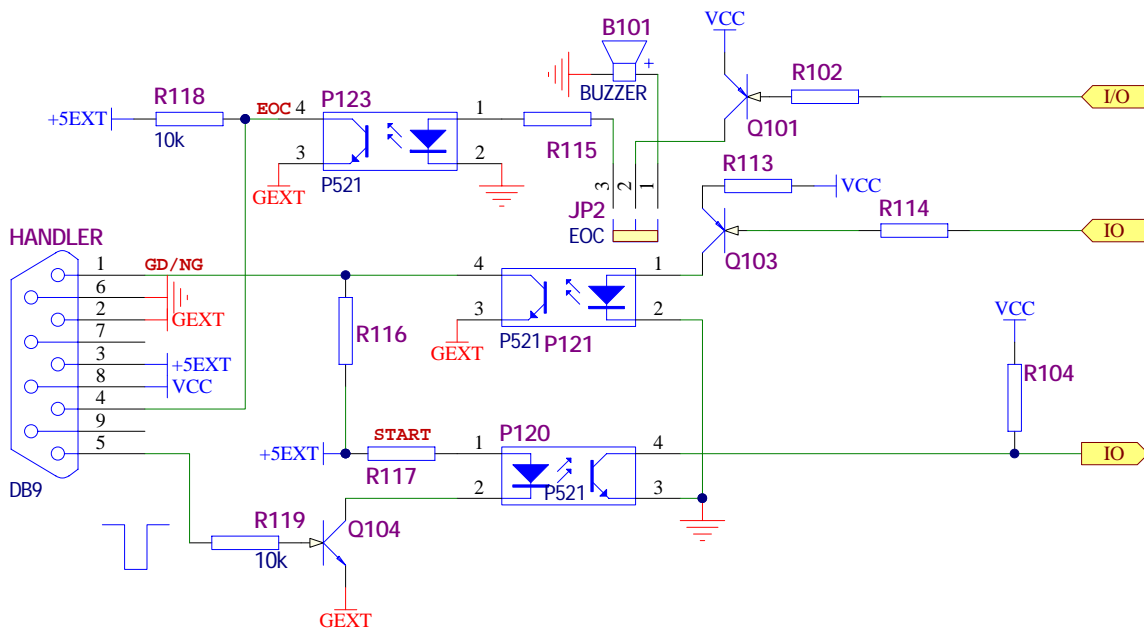

Figure 5-1   Handler Interface Schematic Circuit Diagram

Table 5-1   Contact Assignment for Comparator Function

| Pin No.	Signal Name	Description
1	GOOD /NG	This signal is high, when the comparison result is GOOD. This signal is low, when the comparison result is NG.
2	GEXT	Common for external DC supply: +5EXT
3	+5EXT	External DC voltage: DC voltage supply pin for isolated outputs.
4	/EOC	End of Calculation: This signal is asserted when the measurement data and comparison results are valid.
5	/EXT TRIG	External Trigger: TH2683 is triggered on the rising edge of a pulse applied to this pin when the external trigger is enabled in the main setup menu.
6	GND	Common for internal DC supply VCC
7	NC	Not connected
8	VCC	Internal voltage supply
9	NC	Not connected
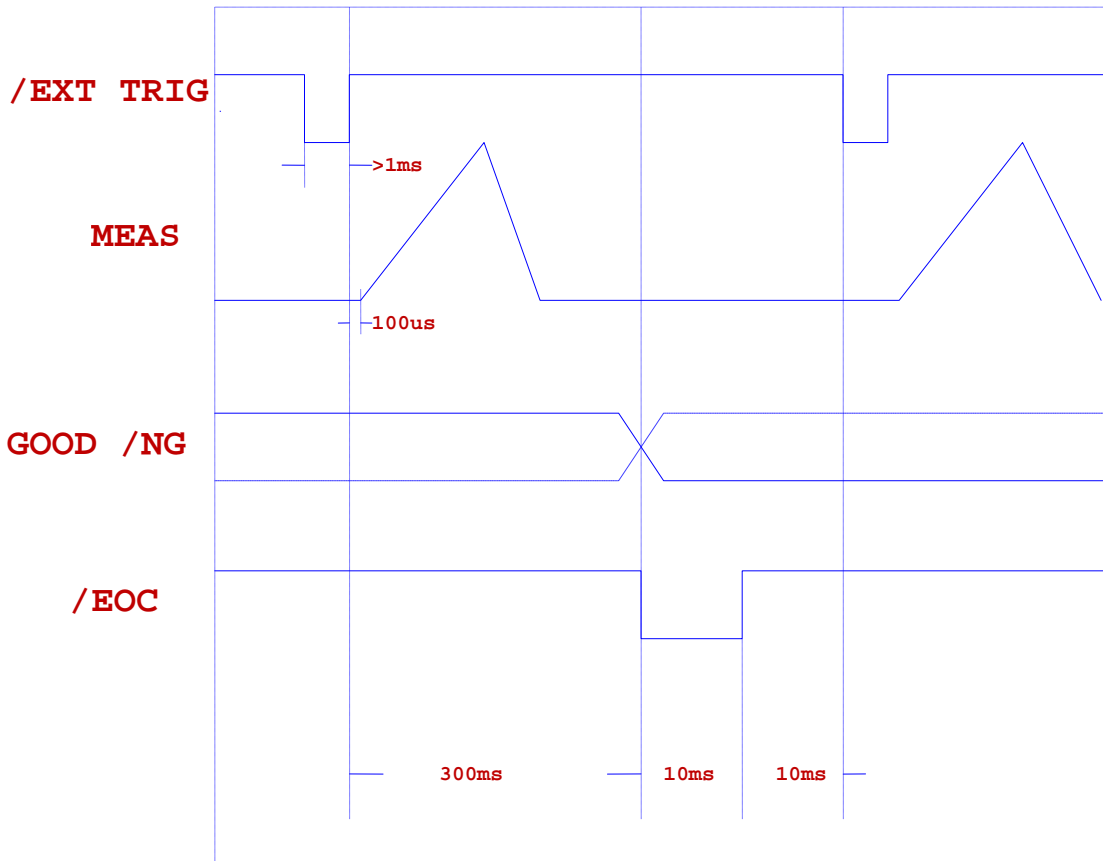
Figure 5-2   Timing Diagram

NOTE: All the signals are available only when the external trigger is turned on in the main setup menu.

5.2   RS232 Interface (optional)

The instrument provides various remote commands. All operatons from the front panel can be performed by a computer via the RS-232 interface.

5.2.1   RS-232 Connection

RS232C standard now is widely used as the serial communication standard. RS232 stands for Recommend Standard number 232 and C is the lastest revision of the standard.

The serial ports on most instruments use a subset of the RS232C standard. The full RS232c standard specifies a 25-pin "D" connector of which 22 pins are used. Most of these pins are not needed for normal serial communications, and the common RS232 signals are listed in Table 5-2:

Table 5-2   Signal Definition for 9 Pin Connector

Function	Code	9 Pin Connector Pin Number
Request To Send	RTS	7
Clear To Send	CTS	8
Data Set Ready	DSR	6
Data Carrier Detect	DCD	1
Data Terminal Ready	DTR	4
Transmitted Data	TXD	3
Received Data	RXD	2
Signal Ground Common	GND	5

TH2683's serial port uses the transmit (TXD), receive (RXD), and signal ground (GND) lines of the RS232 standard. It does not use the hardware handshaking lines CTS and RTS. TH2683 only uses the smallest subset of the RS232C standard, the signal are listed in Table 5-3.

Table 5-3   Signal Definition for 9 Pin Connector

Function	Code	9 Pin Connector Pin Number
Transmitted Data	TXD	3
Received Data	RXD	2
Signal Ground Common	GND	5

Figure 5-3 shows the rear panel connector for the RS232 interface.

Figure 5-3   Rear Panel RS232 Interface

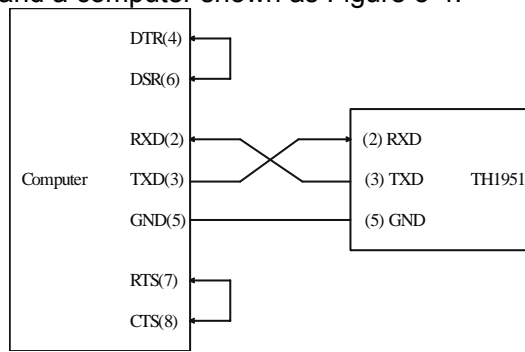Connection between TH2683 and a computer shown as Figure 5-4:

Figure 5-4 RS-232 Connection Sketch

There may be some difference between TH2683 RS232 interface and a standard RS232C interface. You can make the connection cable by yourself according the diagram or order one from our company.

Note: Pin 4 and 6, pin 7 and 8 are shorted respectively at the end of controller.

5.2.2   Software Protocol

Please refer to the RS232C operation manual delivered with RS232C interface.

Chapter 6 Specifications

This chapter contains a list of specifications for reference and performance verifications. When shipped from the factory, the TH2683 meets the specifications listed in this chapter.

6.1 Measurement Parameters

- R (dc resistance)
- I (dc current)

6.2 DC Test Voltage

Voltage Range:
    10V, 25V, 50V, 75V, 100V, 125V, 250V, 500V, 750V, 1000V
Voltage accuracy: $\pm2\%$

6.3 Ranging

AUTO and HOLD (manual)

6.4 Trigger Mode

Internal, Manual, External

6.5 Trigger Delay Time

0 to 999 seconds

6.6 Measurement Range

R: $1.0\times10^{5}\Omega$ to $10^{13}\Omega$
I: 0 to 100μA

6.7 Measurement Accuracy

- 2%, when R<10GΩ
- 5%, when 10GΩ <R<1000GΩ
- 10%, when R> 1000GΩ

6.8　　Open Correction

Eliminates measurement errors due to stray capacitance in the test cable and residual resistance in the test fixture.

6.9　　Display

4 effective LED digits

6.10　　Measurement Speed

Approx. 3 meas/sec.

6.11　　Limit Range

0.100MΩ to 9999GΩ

6.12　　Comparator

NG, GOOD for the measurement parameter.

6.13　　Interface

Handler interface and RS232C communication interface (optional)

6.14　　Power Requirements

220V ±10%, 47 to 66Hz

6.15　　Weight

Approximately 4 kg

6.16　　Dinensions

Approximately 273(W) by 110(H) by 330(D)

6.17　　Operating Temperature, Humidity

0 to 40℃
≤95% RH@ 40℃

6.18　　Storage Temperature, Humidity

-40℃ to 70℃
≤95% RH@ 40℃

6.19　　Warm-up Time

More than 30 minutes

Chapter 7　　Message Reference

■ **Discharge status：**

d ich　　**Dich**

■ **Open Correction：**

OPEN　　**Open**

CLr　　**Clearing**

PASS　　**PASS**

FAIL　　**FAIL**

■ **Main Setup Items：**

1.UOL　　1.VOLtage

2. Lo　　2.Low limit

3. Hi　　3.High limit

4.t in　　4.Timer

5.bEP　　5.BEeP

6.trG　　6.TRiG

ESC　　ESCape