Electrical Safety Analyzer

19032-P

Quick Start Guide

Chroma

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Electrical Safety Analyzer
19032-P
Quick Start Guide

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Material Contents Declaration

The recycling label shown on the product indicates the Hazardous Substances contained in the product as the table listed below.


: See **<Table 1>**.


: See **<Table 2>**.

<Table 1>

Part Name	Hazardous Substances					
	Lead	Mercury	Cadmium	Hexavalent Chromium	Polybrominated Biphenyls	Polybromodiphenyl Ethers
	Pb	Hg	Cd	Cr^{6+}	PBB	PBDE
PCBA	O	O	O	O	O	O
CHASSIS	O	O	O	O	O	O
ACCESSORY	O	O	O	O	O	O
PACKAGE	O	O	O	O	O	O

“O” indicates that the level of the specified chemical substance is less than the threshold level specified in the standards of SJ/T-11363-2006 and EU 2005/618/EC.

“×” indicates that the level of the specified chemical substance exceeds the threshold level specified in the standards of SJ/T-11363-2006 and EU 2005/618/EC.

Disposal

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being. When replacing old appliances with new one, the retailer is legally obligated to take back your old appliances for disposal at least for free of charge.

<Table 2>

Part Name	Hazardous Substances					
	Lead	Mercury	Cadmium	Hexavalent Chromium	Polybrominated Biphenyls	Polybromodiphenyl Ethers
	Pb	Hg	Cd	Cr^{6+}	PBB	PBDE
PCBA	×	O	O	O	O	O
CHASSIS	×	O	O	O	O	O
ACCESSORY	×	O	O	O	O	O
PACKAGE	O	O	O	O	O	O

"O" indicates that the level of the specified chemical substance is less than the threshold level specified in the standards of SJ/T-11363-2006 and EU 2005/618/EC.

"×" indicates that the level of the specified chemical substance exceeds the threshold level specified in the standards of SJ/T-11363-2006 and EU 2005/618/EC.

1. Chroma is not fully transitioned to lead-free solder assembly at this moment; however, most of the components used are RoHS compliant.
2. The environment-friendly usage period of the product is assumed under the operating environment specified in each product's specification.

Disposal

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being. When replacing old appliances with new one, the retailer is legally obligated to take back your old appliances for disposal at least for free of charge.

Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or specific WARNINGS given elsewhere in this manual will violate safety standards of design, manufacture, and intended use of the instrument. *Chroma* assumes no liability for the customer's failure to comply with these requirements.

BEFORE APPLYING POWER

Verify that the power is set to match the rated input of this power supply.

PROTECTIVE GROUNDING

Make sure to connect the protective grounding to prevent an electric shock before turning on the power.

NECESSITY OF PROTECTIVE GROUNDING

Never cut off the internal or external protective grounding wire, or disconnect the wiring of protective grounding terminal. Doing so will cause a potential shock hazard that may bring injury to a person.

FUSES

Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuse holders. To do so could cause a shock or fire hazard.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the instrument in the presence of flammable gases or fumes. The instrument should be used in an environment of good ventilation.

DO NOT REMOVE THE COVER OF THE INSTRUMENT

Operating personnel must not remove the cover of the instrument. Component replacement and internal adjustment can be done only by qualified service personnel.

Safety Symbols

	**DANGER –** High voltage.
	**Explanation:** To avoid injury, death of personnel, or damage to the instrument, the operator must refer to an explanation in the instruction manual.
	**High temperature:** This symbol indicates the temperature is now higher than the acceptable range of human. Do not touch it to avoid any personal injury.
	**Protective grounding terminal:** To protect against electrical shock in case of a fault. This symbol indicates that the terminal must be connected to ground before operation of equipment.
⚠WARNING	The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a **WARNING** sign until the indicated conditions are fully understood and met.
CAUTION	The **CAUTION** sign denotes a hazard. It may result in personal injury or death if not noticed timely. It calls attention to procedures, practices and conditions.

Inspection and Examination

Before the instrument exit the factory, we have a series of inspection and measurement on mechanical and electrical characteristics. Make sure its function of operating for the quality warranty of the product. As soon as the instrument is unpacked, inspect for any damage that may have occurred in transit. Save all packing materials in case that the instrument has to be returned. If damage is found, please file claim with carrier immediately. Do not return the instrument to Chroma without prior approval.

Standard Accessory

Item	Q'ty	Description
USA-type power cord	1	90° elbow USA-type power cord, length 1.8m
Power adapter	1	USA-type power cord 3P – 2P adapter
HV terminal used test cable	2	Alligator clip – cross HV head, red HV test cable, wire length 1m
GB test cable	1	The cable used for GB test, wire length 1m – Max. 40A (one pair, 2 of cables in total).
Power connector test cable	1	Test cable used only for connecting power plug, wire length 1.5m.
Power wire	2	For power connector test cable used male-female wire, length 0.21m.
10A fuse	2	10A SLOW 250VAC
GB test fixture	1	Test fixture for GB zero
Quick Start Guide	2	One English version and one Traditional Chinese version.
User's Manual CD	1	CD for user's manuals in English and Traditional Chinese

Note When additional item is required, just inform Chroma the item name.

The Danger of Operating

1. When the instrument is under output voltage, please don't touch test area or you may shock hazard and result in death.
   Please obey the following items.
   - Make sure the grounding cable is connected correctly and using the standard power cord.
   - Don't touch the output terminal.
   - Don't touch test cable of connecting test termination.
   - Don't touch test termination object.
   - Don't touch any charge component of connecting output terminal.
   - As the instrument end the test or turn off output, please don't touch test unit immediately.

2. The shock accidents are usually occurred on the following conditions.
   - The grounding terminal of the instrument doesn't connect correctly.
   - The insulation glove for testing is not used.
   - After test is completed to touch test unit immediately.

3. Remote control for the instrument: This instrument provided with remote control, normally using the external signal to control high voltage output. For safety reasons and prevent from hazards, please exactly follow instructions below while using remote control.
   - Unexpected high voltage output may exist. Make sure if this instrument is under testing/remote controlling before access to the probes.
   - When the instrument is under testing/operating, any access to DUT, test cable and probe output terminal are prohibited, both for the operator/service personnel.
   - Normally remote control of this instrument is controlled by the high voltage test bar. However, using of other control circuit is also possible. For safety reasons and prevent from hazards, please notice that unintentional access to the control test bar or bridging the control circuit to high voltage terminal and test cables may cause hazards. Please keep this terminal/control from unintentional bridging/access to avoid danger.

⚠WARNING Do not tie up the high voltage cable with RS232, Handler and GPIB control cables or other low voltage

side wires. If so, it could cause the product or PC to be down or damaged.

Storage, Freight, Maintenance & Cleaning

Storage
When don't use the device, please pack it properly and store under a good environment. (The packing is no needed when the device under appropriate environment.)

Freight
Please use the original packing material when move the device. If the packing material is missing, please use the equivalent buffer material to pack and mark it fragile and waterproof etc to avoid the device damage during movement. The device belongs to precise equipment, please use-qualified transportation as possible. And avoid heavy hitting etc to damage the device.

Maintenance
The device is without any maintenance operation for the general user. (Except for the notice in the manual.) Please contact our company or agent when the device occurred the user judgment abnormal. Don't maintain by yourself to avoid occurred unnecessary danger and serious damage to the device.

Cleaning
Remove all connected wires and cables on the instrument before cleaning. Use a brush gently to clean the dust on it. For internal cleaning, use a low-pressure air gun to vacuum the dust inside or send it back to the distributors or agents of Chroma for cleaning.

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1. Introduction

1.1 An Overview of Product

Automatic withstand / insulation / grounding testers of the instrument are designed for automatic withstand, insulation resistance, grounding resistance, short/open circuit detection and dynamic leakage current test of electromechanical and electronic equipments.

The aspect of withstand voltage testing, the output power is AC: 500VA(5kV, 100mA), DC: 150VA(6kV, 25mA). Therefore, it is for withstand test of electronic and electromechanical and component.

Testing aspect of insulation resistance, the measurement range is 0.1MΩ ~ 50GΩ and test voltage range is 50V ~ 1000V can be set arbitrary.

Testing aspect of grounding resistance, the grounding resistance range can be measured is 10 ~ 150mΩ, under 10A can up to 510mΩ. The output test current range is 3 ~ 40A can be set arbitrary.

Testing aspect of dynamic leakage current, the measurement range is 0.01mA ~ 50.0mA (rms). The output test voltage range is 90V ~ 280VAC. The test rule matches to IEC950, UL544, UL2601 etc.

In the testing aspect of short/open circuit detection, please test if capacitance is short or open before testing high voltage. Please make sure the DUT good contact then processes high voltage test.

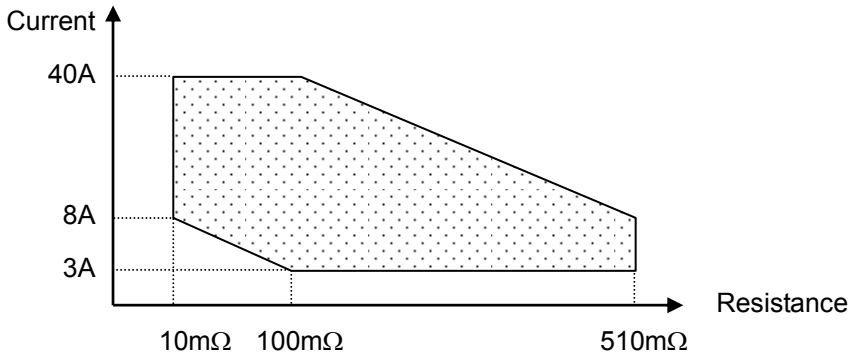
All of setting status, time, current, voltage, resistance value, memory number etc are list on the display, it is unnecessary to remember any parameter status which be set.

The tester equipped with Good and No Good judgment machinery and signal output of testing result and remote control. It is also for GPIB interface, SCANNING interface, RS232 interface of automatic test system. The above equipments makes high efficient and accurate test.

2. Specification (18°C ~ 28°C RH ≤ 70%)

■ **AC/DC Withstanding Test**	
❑ Output Voltage	AC: 0.05-5.0 kV, steps 0.001kV, DC: 0.05-6.0 kV, steps 0.001kV.
❑ Load Regulation	≤ (2% of setting + 0.1% of full scale), Rated load
❑ Voltage Accuracy	± (2% of setting + 0.1% of full scale)
❑ Cutoff Current (Note 1)	AC: 0.1mA ~ 100mA, DC: 0.01mA ~ 25mA 0.1uA DC resolution
❑ V-display Accuracy	± (1% of reading + 0.1% of full scale), 2V resolution
❑ Leakage Current Meter	AC current: 3mA range: 0.001mA - 2.999mA, 0.001mA resolution 30mA range: 0.01mA - 29.99mA, 0.01mA resolution 100mA range: 0.1mA - 100.0mA, 0.1mA resolution Measurement Accuracy: ± (2% of reading + 0.5% of range) DC current: 300uA: 0.1uA– 299.9uA, 0.1uA resolution 3mA range: 0.001mA – 2.999mA, 0.001mA resolution 25mA range: 0.01mA – 25.00mA 0.01mA resolution Measurement Accuracy: ± (2% of reading + 0.5% of range)
❑ Output Waveform	50Hz, 60Hz ± 0.1%, sine wave**.** sinewave, Crest Factor:1.3~1.5
❑ Test Time(Note 2)	0.3 ~ 999 Sec. Continue
❑ Ramp Time	0 ~ 999 Sec. off
❑ Fall Time	0 ~ 999 Sec. off
❑ DWELL Time	0 ~ 999 Sec. Off (WDC only)
❑ Maximum Short Current	Up to 4kV 200mAac only
■ **Flashover (ARC) Detection (SPC) (Note 3)**	

❑ Detection Current	AC: 1mA – 20mA, DC: 1mA – 10mA, resolution 0.1mA
❑ Min. pulse width	40us 20us 10us 4us Approx.
■ **TwinportTM function (SPC)**	
❑ Functions	WV and GB test can be performed at the same time. (ON/OFF)
■ **Insulation Resistance Test (Note 4)**	
❑ Test Voltage	DC: 0.05kV ~ 1kV, Constant Voltage
❑ V-display Accuracy	± (2% of reading + 0.5% of full scale)
❑ Resistance Range	0.1MΩ ~ 50GΩ
❑ Measuring Accuracy	≥ 500V: 1 ~ 1000MΩ: ± (5% of reading + 0.5% of full scale) 1001 ~ 9999MΩ: ±(10% of reading + 0.5% of full scale) 10GΩ ~ 50GΩ: ±(15% of reading + 1% of full scale) < 500V: 0.1 ~ 1000MΩ: ±(10% of reading + 0.5% of full scale) < 100V: 0.1 ~ 1000MΩ: ±(15% of reading + 0.5% of full scale)
❑ Test Time(Note 2)	0.3 ~ 999 Sec. Continue
■ **Ground Bond Test (Note 5)**	
❑ Output Current	3.00 ~ 40.00Aac. Constant Current, 0.01A step
❑ Current Accuracy	± (2% of setting + 0.1% of full scale)
❑ Output Waveform	50Hz, 60Hz ± 0.1%, sine wave
❑ Current Meter	0.00 ~ 40.00A
❑ Meter Accuracy	± (1% of reading + 0.17% of full scale)
❑ Resistance Range	10.0 ~ 510.0mΩ (with offset value)
❑ Resistance Accuracy	± (2% of reading + 0.1% of full scale) at ≥ 10A ± (2% of reading + 1% of full scale) at <10A(<210mΩ) ± (3% of reading + 2% of full scale) at <10A(>210mΩ)



❑ Limit Value Setting	HI - LIMIT 0.1 ~ 510.0mΩ
❑ Offset Range	0 ~ 500.0mΩ
❑ Test Time(Note 6)	0.3 ~ 999 sec. Continue
■ **Secure Protection Function**	
□ Ground Fault Interrupt Leakage Current (for WVAC only)	AC:0.25mA~0.75mA, ON/OFF selectable
□ H.V Floating Output	Front panel H.V output only
□ Fast Discharge	Approx. 0.2S (Discharge Voltage 5.1kV)
□ Panel Operation Lock	YES, with password On/Off
■ **Floating Output(Note 7)**	
□ Function	Wac, Wdc, IR
□ Leakage Current	Less than 3.5mAac or dc
■ **Memory Storage**	
□ Memories, Steps	100 groups of memory, each memory includes max.50 Steps (TOTAL 500 steps)
■ **PASS/FAIL Judgment Window**	
□ Indication, Alarm	PASS: (Short Sound) FAIL: W-Arc, W-Hi, W-Lo, IR-Lo, IR-Hi, GR-Hi , GR-Lo, GFI, GBVO (Long Sound)

■ **Remote Connector**	
□ Rear Panel	9-Pins connector: START, RESET, UNDER TEST, PASS, FAIL
□ Start/Reset Control	TTL Low Level Active, minimum 20mS
■ RS232 Interface	Baud rate 300 ~ 19200, data bits: 8. stop bit: 1
■ USB	The programming language is SCPI.
■ **Ambient Temperature and Relative Humidity**	
❑ Specifications range	18 to 28°C (64 to 82°F), 20 to 70% RH.
❑ Operable range	0 to 40°C (32 to 104°F), 20 to 80% RH.
❑ Storage range	-10 to 50°C (14°C to 122°F), ≤ 80% RH.
■ **Power Requirement(Note 8)**	
❑ Line Input	90Vac ~ 250Vac , 50 or 60 Hz
❑ Power Consumption	No load: < 100W, Rated load:1000W, Maximum load:1200W
❑ Dimension	430 W x 133 H x 500 D mm
❑ Weight	<24 kg

Ground Bond Floating

Rear Panel Output Only	
HV Output (Fixed port 3)	HV output can set to HV, Low or Off. Maximum Voltage is 5kVac, 6kVdc Maximum Current is 100mA ac or peak dc Wac maximum add 10 counts extra error Wdc maximum add 2 counts extra error
Ground Bound Output (Floating Ground)	Ground Bound can set to Close or Open (Floating Voltage 1000Vrms or 1400Vpeak ac maximum) Ground Bond Close, the maximum current is 40Amp. Maximum add a 2mΩ extra error.

Note

1. Twin Port ON for 50mAac, 6mAdc maximum.
   Twin Port ON for less than 1/2 duty cycle output only.
   Less than 1/2 duty cycle of 120sec when output power is greater than 300VA.

The current resolution is 1.2count for WAC, and 1.6count for WDC calculated value.

2. The minimum testing time arrives at 90% output voltage specification(NO load).
3. Design in Specifications. Validation point is 1.25kV with a 250kΩ resistor.
4. 10GΩ~50GΩ without scan unit only.
5. Twin Port ON for 40Amps output maximum.
   Twin Port ON for less than 1/2 duty cycle output only.
   GB Scanner output add extra 2mΩ error.
   For reaching optimal accuracy, please use the standard four-wires type for measuring.
   When offset lower than 10mΩ, it is over test specification.
   By using offset can add extra 5mΩ error.
6. The minimum testing time arrives at 90% output current specification(NO load).
7. Except TWIN-PORT ON, GFI ON/OFF, Scanner installed.
8. Except GB-F 4kV option, Scanner installed.

3. Precaution before Use

The analyzer is with high voltage output up to 6KV sending to external test. It may occur injury and death result from error operation. Please peruse notice item of this chapter and remember to avoid accident.

1. Shock Hazard

For preventing shock be occurred. Before using the tester, put on insulation glove firstly and then running function related to electricity.

2. Grounding

There is a ground terminal on the rear panel cover of the tester. Please use appropriate implement to connect the ground terminal to earth actually. If not, there may be high voltage existed on the cover of the tester. It is very danger whatever touches the machine under the above statuses. It may cause shock hazard, therefore please make sure to connect ground terminal to earth. As Figure 3-1 arrow shown.

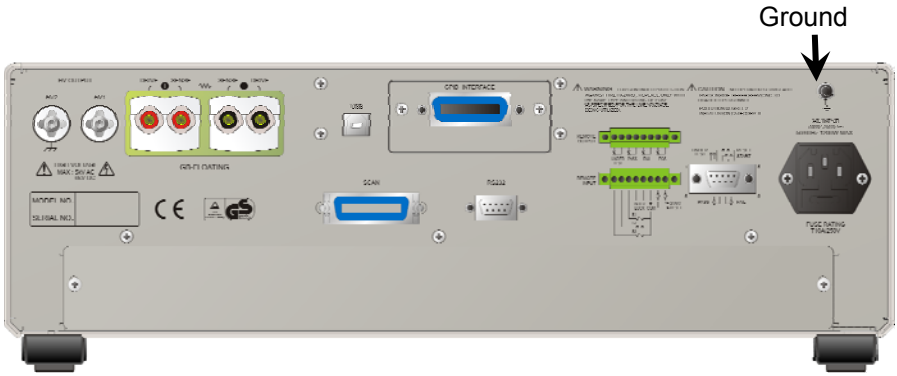


Figure 3-1

3. Connect test cable to HV1/HV2 terminal

It is necessary to check if there is loosen or drop occurred in test cables of HV1 and HV2 terminals under operating condition at any time. If you want to connect DUT by test cable, please connect test cable of HV2 terminal to DUT(Device Under Test). The uncompleted connection of test cable of HV2 terminal or drop is very danger, as there is full of high voltage on DUT. After plugging high voltage jack in HV1 and HV2 and then rotate 90° to screw up clockwise for avoiding the drop of test cable.

4. Connection test of high voltage output terminal

After the test cable of HV2 terminal has been connected. Then follow the below procedures to connect high voltage output cable.

- Press [STOP] key firstly.
- Confirm DANGER indication LED does not light.
- The test cable of HV2 terminal with HV1 terminal is short; confirm there is no voltage output.
- Plug high voltage test cable in HV1 terminal.
- Connect the test cable of HV2 terminal to DUT finally, and then HV1 high voltage test cable also be connected.

5. Test stop

When the test is over the and no need to use, or the tester is not run status or needs to exit during use, please be sure power switch is on OFF (that is turn off power). As Figure 3-2 shown.

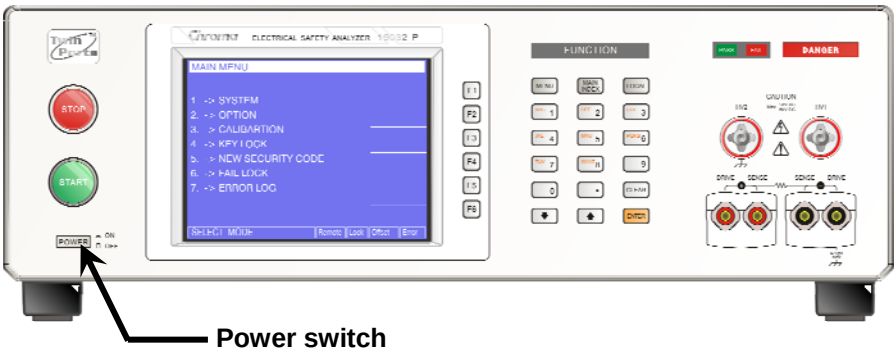


Figure 3-2

6. The dangerous area under test mode

It is very danger to touch high voltage area under operation status. Such as touch DUT, test cable, probe and output terminal.

CAUTION When the main unit is under test status, please don't touch alligator clip on test cable. Because the insulation of plastic layer is not enough, touch it may cause hazard. As Figure 3-3 shown.

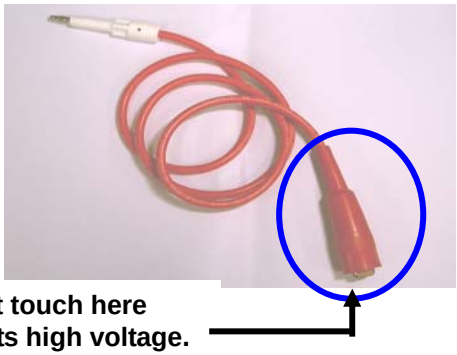


Figure 3-3

<<< Warning ! When the output terminal is cut off >>>

7. Test complete confirmation

You may touch DUT, high voltage test cable or output terminal etc high voltage areas under modifying circuit or others test requested conditions. Please confirm the following at the first.

※ Power switch is turned off.

※ As the insulation resistance test unit, DUT may full of high voltage when test is completed. In the meantime, you need to pay attention to obey descriptions of item 8 and 9 in this section. Please follow the described procedures to execute.

<<< Notice! When testing insulation resistance is charging. >>>

8. Charge

When the insulation resistance is testing, DUT, capacitor, test cable, probe and output terminal even includes the tester are full of high voltage. After turning off the power switch, it needs a period of time to discharge. Please obeys the above descriptions, don't touch any place may cause shock especially on power just turn off.

9. Confirm charging voltage has been discharged completely

The discharged time of charging voltage depends on testing voltage and DUT characteristic. To assume that high voltage add to DUT is equivalent to high voltage add to 0.01uF capacity parallel 100MΩ resistance circuit. After turning off power, the voltage which add on testing and DUT decrease to lower than 30V and its' needed time about 3.5 seconds. When test voltage is 500V needs about 2.8

seconds. To assume the time constant of DUT is known, if you want to know the voltage decrease to below 30V needed time. Please follow the above procedures, multiply decrease to below 30V needed time-by-time constant. As Figure 3-4 shown.

Formula: $Vo\, e^{-t/RC} = V_{IL}$

Ex.: $1000V \times e^{-t/RC} = 30V$

$e^{-t/RC} = 0.03$

$-t/RC = \ln 0.03 \quad \therefore\ t = 3.5$ Sec

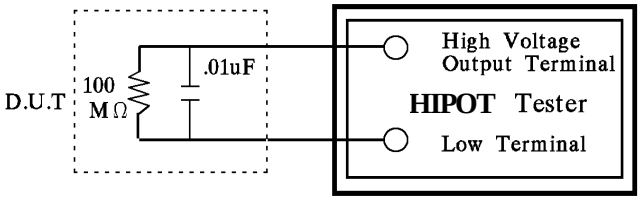


Figure 3-4

10. Remote control the main unit

The instrument with remote control, high voltage output control by external control signal usually. For your safety and prevent from hazard, please obeys the following rules.

- Don't allow any unexpected high voltage output that may cause danger.
- When the main unit output high voltage, don't permit the operator or others personnel to contact DUT, test cable and probe output terminal.

※ Notice ※

11. Turn on or turn off power switch

When power switch is cut off, it needs a few seconds to re-turn on. Please don't turn on and turn off continuously. It is very danger to do that under high voltage output. **When turn on or turn off power, don't connect any object to high voltage output terminal to avoid hazard that result from abnormal high voltage output.**

12. Others notice items

Don't make short-circuited of output cable, grounding cable, transmission cable or AC power to prevent from the analyzer is full of

voltage. Please connect the cover of the analyzer to earth firstly when high voltage output terminal HV1 is short-circuited with HV2 terminal.

<<< Dangerous Event >>>

13. **The danger management**
    Under any danger circumstances, such as shock, DUT burning or the main unit burning. Please obey the following procedures to avoid the more danger.
    - Cut off power switch firstly.
    - Then pull off the plug of power cord.

<<< Solution >>>

14. **Problems**
    Under the below circumstances, the occurred problem are very danger. Even press [STOP] key, the output terminal may output high voltage.
    - When press [STOP] key, DANGER indication LED is still light.
    - The voltage meter without voltage reading but DANGER LED is still light. When the above conditions are occurred, please turn off power and pull off AC power plug immediately. Don't use any more, please send to our company or office for reparation.

15. **DANGER indication LED error**
    When press [START] key, there is already reading on the voltage meter and DANGER LED is still not light. In the meantime, the indication LED may be error please turn off immediately. Please send it to our company or office for reparation.

16. **If the analyzer needs long time using under normal operation. Please notice the following items.**
    If the high limit setting value is 100.0mA(withstand voltage test), please notice its ambient temperature. When the ambient temperature is higher than 40°C, please stop operation until it cools down to normal temperature.

17. **The used AC INPUT power of analyzer is** 90Vac ~ 250Vac, 50 or 60 Hz.
    Only can replace fuse under power-disconnected status, remove fuse stand from power socket and press new fuse slightly into fuse stand then plug in the power socket.

⚠WARNING Please use correct specification when replace fuse or may cause hazard.

18. Normal operation of the unit is AC power

If power is unstable, it may cause the unit function is not actual or abnormal. Therefore, please use appropriate equipment turn to suitable power such as power stabilizer.

19. Output power is 500VA

When DUT drawing mass current before deadline of fail judgment and output current, it may flows mass current (about ten amperes) up to ten milliseconds. Before processing test may be the same condition. Please notice the capacity of power cord and the current cable of linking with other instrument or equipment.

20. Storage

The unit normal operation temperature humidity range is 5°C ~ 40°C, 80% RH. If over this range then function may malfunction. Please don't position the equipment so that it is difficult to operate the disconnecting device. The unit storage temperature range is -10°C ~ 50°C, 80% RH. If you don't use it for a long time, please use original material packing and then store it. For correct test and safety, please keep it from direct sunlight or high temperature, vibration, humidity and dusty place.

21. Warm up

All functions of the analyzer are activated when the power switch is turned on. However, to attain the precision in the specification, please warm the instrument over 15 minutes.

22. Warning signal of testing

"DANGER – HIGH VOLTAGE TEST IN PROGRESS, UNAUTHORIZED PERSON KEEP AWAY"

23. TWIN PORT

The unit process twin port measurement mode with AC withstand, DC withstand or IR (insulation impedance) on GB (grounding impedance). When process the maximum AC or DC output current of this measurement mode, please don't work over 1/2 the maximum specification continuously.

24. Descriptions of ground bond lead wiring

The maximum output current of this unit is 40amp AC, a no good connection will cause temperature rising and ground bond output terminal may be burned down. Please follow the below steps to make good wiring connection.

- Using box spanner to tighten up test cable of DRIVE+ and DRIVE-.

25. Keep test cable away from the panel

Please keep the high voltage cable or the DUT away from the panel at least 30 cm during operation to avoid the display interference caused by high-voltage discharge.

26. Notices for connecting automated device

- The grounding system of the device and the automated station should be connected together.
- Add anti-interference iron core to the high voltage cable and the 2 ends (device output and DUT) of RTN/LOW test cable with winding at least 1 circle.
- The high voltage and RTN/LOW test cable must be separated from the control cable.
- The high voltage and RTN/LOW test cable must keep proper distance from the analyzer panel.

4. Description of Panel

4.1 Front Panel

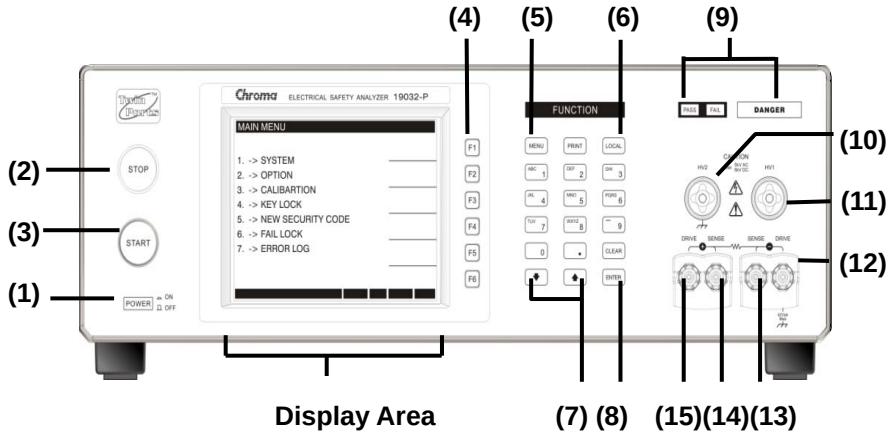
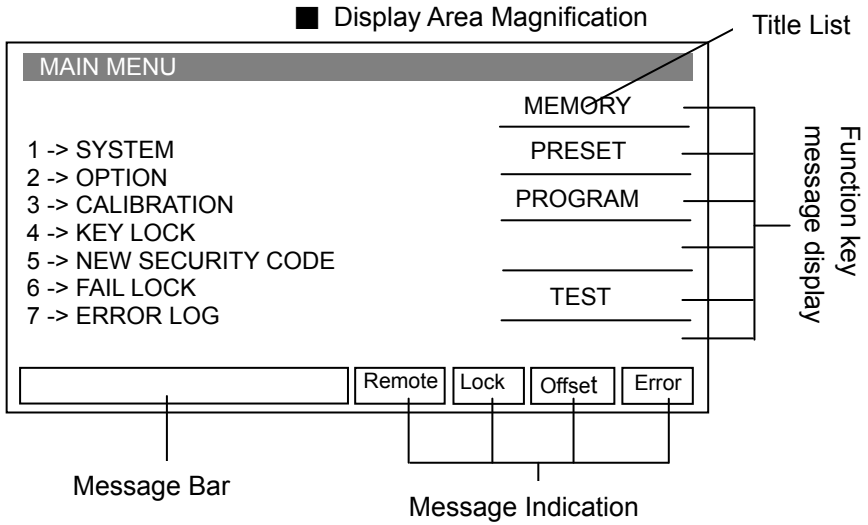


Figure 4-1

Front panel includes several function areas which easy to use. This paragraph will introduce each control and information on screen to you.



Display Area

Title List: This list displays the current setting of main unit or testing mode.

Function key message display area:

Under different display menus, there are different function descriptions. The right side of display has corresponding function keys. If the description is blank or gray scale font, it means corresponding function is invalid.

Message Bar: This list indicates the setting method, the range of setting value and the testing time.

Message Indication Diagram:

Remote: When this area is highlighted, it means the main unit is under Remote status. That is the main unit controlled by PC through RS232 or GPIB connect to PC. At the same time, all of keys are malfunction except for [STOP] and [LOCAL] keys.

Lock: When this area is highlighted, it means the main unit is under setting parameter-protected mode. Other keys are malfunction except for "MEMORY", "TEST" and "KEY LOCK" modes.

Offset: When this area is highlighted, it means the main unit zeroed the leakage current of test cable and test lead currently.

Error: When this area is highlighted, it means there is error message produced.

Key Area

(1) Power Switch: The switch provides AC power source that the analyzer is needed. Before starting, please read Chapter 3 " Precaution before Use" firstly.

(2) STOP Key: Reset key, after pressing this key the main unit returns to standby testing status immediately. That is cut output and clear all of judgments simultaneously.

(3) START Key: After pressing this key, the main unit is under testing status. The testing terminal has output and each judgment function starts simultaneously.

(4) Function Keys: Function key. Under different display menus, there

are different functions. The right side of display has corresponding function description. If the description is blank, it means corresponding function is invalid.

(5) MENU Key: Under each main display mode, press this key to return to "MAIN MENU" mode.

(6) LOCAL Key: When the main unit under Remote status, return the control right to main unit by pressing this key.

(7) Cursor Keys: The [△] and [▽] keys are for moving highlighted cursors.

(8) Data Entry Keys/Program Keys

[[0][.] ~ [9]: Numeral/character key, for inputting each test parameter data (numeral or alphabet). Under "MAIN MENU" display mode, [1], [2], [3], [4], [5] keys can enter various display modes.

[ENTER]: Confirmation key. After inputting test parameter, press this confirmation key. Then the value of inputting will be confirmed.

[CLR]: Clear key. When input test parameter, if there is any error can press this key to cancel error data and then input again.

(9) Indicator: With UNDER TEST to indicate LED and judge/display LED.

(10) HV2: This terminal includes two states. (1) High voltage output terminal (when GFI setting is FLOAT) (2) Reference terminal of high voltage output terminal (HV1) is low potential terminal (when GFI setting is ON or OFF).

(11) HV1: High electric potential terminal of high voltage output. This terminal belongs to high electric potential output, usually is high voltage output. Therefore, this terminal is very dangerous. Don't touch it when DANGER LED is light, there is high voltage outputting.

(12) DRIVE (-): Ground Bond current test terminal

(13) SENSE (-): The grounding impedance test negative, Sense negative terminal.

(14) SENSE (+): The grounding impedance testing positive terminal, Sense positive terminal.

(15) DRIVE (+): High electric potential terminal of mass current output. When the terminal is grounding resistances test, the high electric potential terminal of mass current output.

4.2 Rear Panel

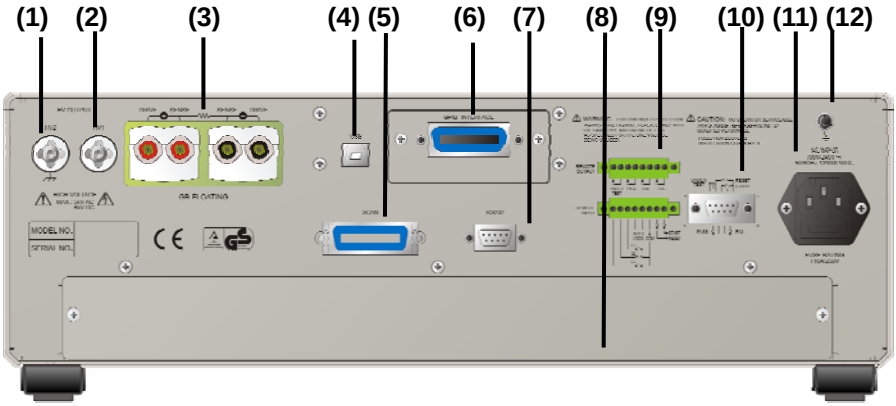


Figure 4-2

(1) HV2: Reference terminal of high voltage output terminal (HV1) is low electric potential terminal.

(2) HV1: High electric potential terminal of high voltage output.

(3) Rear Panel GB Output Terminal: This terminal Floating status is selectable, that is open-circuited with front panel GB terminal.

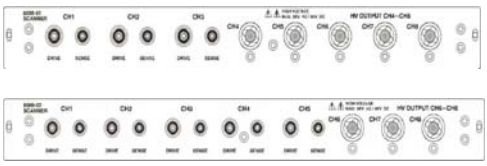
(4) USB: USB terminal

(5) SCAN Interface: This interface can connect with 9030A Scanning Box (Option).

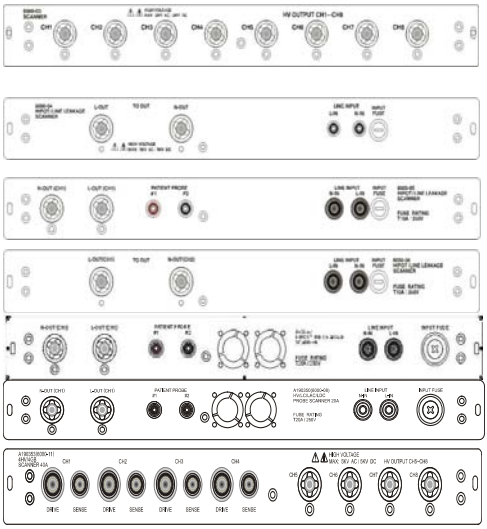
(6) GPIB Interface(Option): This socket is for optional GIPB interface (IEEE-488-1978).

(7) RS232 Interface: This socket is for RS232 interface of the instrument. GPIB and RS232 interface can't be used simultaneously.

(8) Plug in SCANNER Insert Hole (Option):



Option (6000-01): 5 points of HV output & 3 (UL approval) sets of grounding terminals.
Option (6000-02): 3 points of HV output & 5 (UL approval) sets of grounding terminals.



Option (6000-03): 8 points of HV output. (UL approval)

Option (6000-04): HV / LC scanner

Option (6000-05): HV / LC scanner with probe

Option (6000-06): L-N Scanner & Leakage Current Scanner

Option (6000-07): HV / LC scanner with probe 20A

Option (6000-08): HV / LC / LAC / LDC probe scanner 20A

Option (6000-11): 4 points of HV output & 4 sets of grounding terminals

Figure 4-3

(9) REMOTE I/O : The test result signal input/output terminal.

START: Start test signal input terminal.

RESET: Stop test signal input terminal.

INTER LOCK: The high voltage can be outputted when the two terminals are short-circuited.

UNDER TEST: When the analyzer is under test status, this output terminal will short circuit. Control external signal is by using this short condition. The junction specification 125V AC current is lower than 1A action time. This analyzer is under testing status until STOP is stopped.

PASS: When the analyzer judges DUT as pass, this output terminal will short circuit. Control external signal is by using this short circuit condition. The junction specification 125V AC current is lower than 1A. The action time is from judged as pass to be stopped.

FAIL: When the analyzer judges DUT as fail, this output terminal will short circuit. Control external signal is by using this short circuit condition. The junction specification 125V AC current is lower than 1A. The action time is from judged as fail to be stopped.

EOS: When the tester is performing the test in test step, the output terminal will be short-circuited. By using this short-circuited condition to control external signal. The connection point

specification 125V AC current is lower than 1A.

S1: The terminal is short-circuited with COM, recall/read test setting in the first group memory.

S2: The terminal is short-circuited with COM, recall/read test setting in the second group memory.

S3: The terminal is short-circuited with COM, recall/read test setting in the third group memory.

(10) 9Pin Connector: All of 9 pin D-Sub connector functions are the same as (9) Remote I/O.

(11) AC LINE: AC power socket and fuse holder.
A tri-cord power and fuse holder. Input AC power, which the analyzer is needed from AC power socket. The detailed specification of using fuse please refers “Chapter 3 – Precaution before Use” or descriptions of rear panel in this manual.

(12) GND Terminal: Safety GND terminal, please use adaptable implement to connect this grounding terminal actually. If there is no grounding actually, the circuit with GND terminal or other instruments connecting cable with GND terminal is short circuit. The cover of analyzer may exist high voltage. This is very dangerous, anyone touch the analyzer under the above status may cause damage. Therefore, it is necessary to connect safety GND terminal to ground.

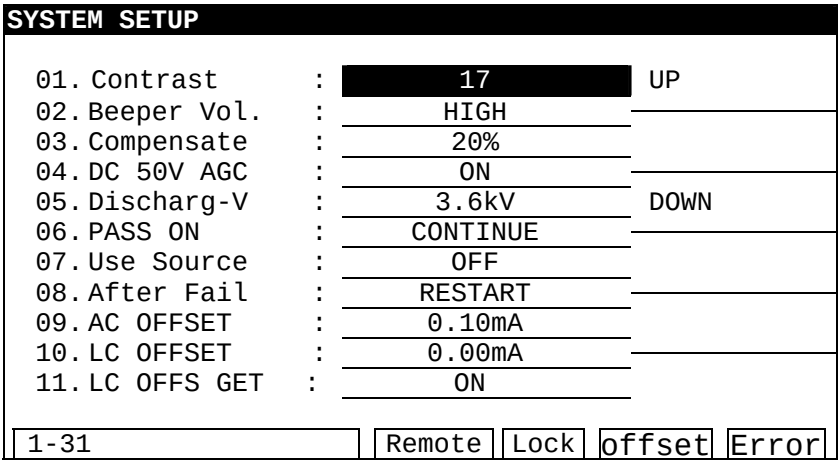
4.3 Notice Items and Procedures before Operating

1. Before plugging AC power cable, please confirm power that use firstly and description of rear panel is match or not and power switch is OFF status.
2. Before turning on power, please peruse “Chapter 3 – Precaution before Use” and remember it.
3. When turns on power, the analyzer will self-test. If there is abnormal condition, please turns off switch and pulls off power cord immediately.

4.4 System Parameter Setting

Operation methods:

1. When title shows “SYSTEM SETUP”, press [△], [▽] keys to move the highlighted cursor to the parameter item which want to set.
2. Press numeral/character key or Function Keys to set this item parameter data.
3. If shows blinking cursor, it means parameter data is not completed. When data input is error, can press [CLR] to clear and input again. Please press [ENTER] to confirm parameter data is correct finally.



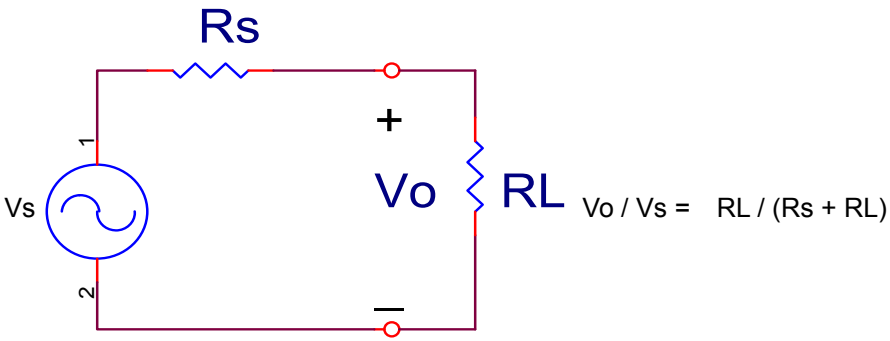
System parameter setting data description:

Setting Item	Range	Initial Setting	Description
Contrast	1~31	17	Adjust LCD brightness
Beeper Volume	LOW /MEDIUM/ HIGH/OFF	HIGH	Adjust the buzzer volume
Compensate	5% - 50%	20%	LC input voltage compensation
DC 50V AGC	ON/OFF	ON	Hardware compensation for above DC 50V
Discharg-V	0.05-5.1KV	3.60KV	DC discharge setting
Pass ON	0.1~99.9s, continue	CONTINUE	When DUT judged as Good, PASS signal shorted time of REMOTE terminal on rear panel.
Use Source	ON/OFF	OFF	This instrument connects with AC

			Source, please set it as ON.
After Fail	CONTINUE / RESTART / STOP	RESTART	(1) When set as CONTINUE, and any one among STEPs judged as No Good. It will continue until all STEPs are tested. (2) When set as START, and any one among STEPs judged as No Good press START to restart directly. (3) When set as STOP, and any one among STEPs judged as No Good. It is necessary to press STOP then can restart test by pressing START.
AC OFFSET	0 ~ 2.5mA	0.10mA	(1) When Offset value is higher than **AC OFFSET** value, Current reading = Current real measurement value – Offset value. (2) When Offset value is lower than **AC OFFSET** value, Current value = $\sqrt{(\text{Real measurement value})^2 - (\text{Offset})^2}$
LC OFFSET	0 ~ 2.5mA	0.00mA	(1) When Offset value is higher than **LC OFFSET** value, Current reading = Current real measurement value – Offset value. (2) When Offset value is lower than LC OFFSET value, Current value = $\sqrt{(\text{Real measurement value})^2 - (\text{Offset})^2}$
LC OFFS GET	ON/OFF	ON	(1) When the setting is ON, LC Mode will be included as processing OFFSET GET. (2) When the setting is OFF, LC Mode won't be included as processing OFFSET GET.

4.4.1 Hardware/Software AGC

The output voltage is changed by load effect, and then executing AGC function.
ACV: 50V~5KV (Hardware AGC is always ON, software AGC initial setting is ON and also can be set as OFF.)
DCV: 50V~499V (Hardware AGC initial setting is ON and also can be set as OFF. Software AGC initial setting is ON and also can be set as OFF.)
DCV: 500V~6KV (Hardware AGC is always ON, software AGC initial setting is ON and also can be set as OFF.)
IR: 50V~1kV (Hardware AGC is always OFF, software AGC initial setting is ON and also can be set as OFF.)



1. Hardware AGC: Because Vo<Vs is result from load effect, Vo using hardware comparison circuit. Vo voltage compensation is the same as Vs within 0.1sec.
2. Software AGC: This analyzer using software AGC under DC 50V-500V and IR 50V-1000V. Software compensation speed is more slowly so it won't cause voltage shock to DUT. The general IR RL is larger than Rs of this analyzer, so Vo=Vs approximately.

4.4.2 Discharg-V

Discharg-V: The high limit setting of DC discharge, the range is 0.05 ~ 5.1kV. The voltage below Discharg-V setting will be discharged quickly in 0.2sec.

4.4.3 OFFSET

1. DC OFFSET: Before testing WDC mode, please connects test cable first. After the fixture is tested, then processes OFFSET for ensure test value accuracy. The current calculation formula: Current reading = Current real measurement value – Offset value.
2. AC OFFSET: Before testing WAC mode, please connects test cable firstly. After the fixture is tested, then processes OFFSET for ensure test value accuracy. Especially when test voltage is higher and leakage current of test fixture and instrument is more increase. The happened of Offset current is often caused by capacitance feature. According to mathematics, when test a resistive load, its' current value = $\sqrt{(\text{Resistance load value})^2 + (Offset)^2}$. Therefore, when measured out resistive load current value, current reading = $\sqrt{(\text{Real measurement value})^2 - (Offset)^2}$. When tests a capacitive load, current reading = (real measurement value) – (Offset).
3. LC OFFSET: Before testing dynamic leakage current mode, please connects test cable first. After the fixture is tested, then processes OFFSET for ensure test value accuracy especially when measures small current. The leakage current of general test fixture, isolation transformer and the instrument are mostly caused by capacitance feature. According to mathematics, when test a resistive load, its current value = $\sqrt{(\text{Resistance load value})^2 + (Offset)^2}$. Therefore, when measured out resistive load current value, current reading = $\sqrt{(\text{Real measurement value})^2 - (Offset)^2}$. When tests a capacitive load, current reading = (real measurement value) – (Offset).
4. GB OFFSET: Please use the standard 4-wires test cable to process standard resistance test, doesn't need additional OFFSET operation. If using with our grounding accessories, the maximum test error is possible increased to 2mohm. Before Offset test is done, please be sure offset resistance. When Offset resistance value is lower than 5mohm, do Offset is not recommended. Incorrect Offset may influence error of real test value.
5. OSC OFFSET: There is stray capacitance on wire or fixture, please does OFFSET elimination again on changing wire or fixture every time for ensure the accuracy of testing.

4.5 Memory Management of Test Parameter and Test Preset Parameter

When title display “MAIN MENU”, press Function Key [MEMORY] and then title will display “MEMORY SETUP”. At the same time, the memory can be read, stored or deleted. Each memory includes test parameter, test preset parameter and memory name.

4.5.1 Read Memory

1. If there are many sets of test parameter value, which be saved in main memory. Follow the below procedures to recall test parameter.
2. When title display “MEMORY SETUP”, press [△], [▽] keys or Function Key [NEXT PAGE] to move the highlighted cursor to the memory name which want to recall.
3. Press Function Key [RECALL] and then show confirm window.
4. Press [ENTER] to confirm or press Function Key [EXIT] to cancel.

4.5.2 Store Memory

1. If you want to save testing parameter data which be set in memory. Please follows the below procedures to process. When title display “MEMORY SETUP”, press [△], [▽] keys or Function Key “NEXT PAGE” to move the cursor highlight to the memory number position which want to store.
2. Press Function Key [STORE], the highlighted cursor become underscore blinking cursor. At the same time, input the memory name by using numeral/character keys. Press the same numeral/character keys repeatedly can circle switch display between numeral and alphabet. If you want to input name, can use Function Key [NEXT CHAR.] to move the underscore blinking cursor to next character.
3. Press [ENTER] to confirm or press Function Key [EXIT] to cancel.

4.5.3 Delete Memory

1. If you want to delete test parameter data which be stored in memory.

Please follows the below procedures to process.

2. When title display “MEMORY SETUP”, press [△], [▽] keys or Function Key [NEXT PAGE] to move the highlighted cursor to the memory name which want to delete.
3. Press Function Key [DELETE] and then show confirm window.
4. Press [ENTER] to confirm or press Function Key [EXIT] to cancel.

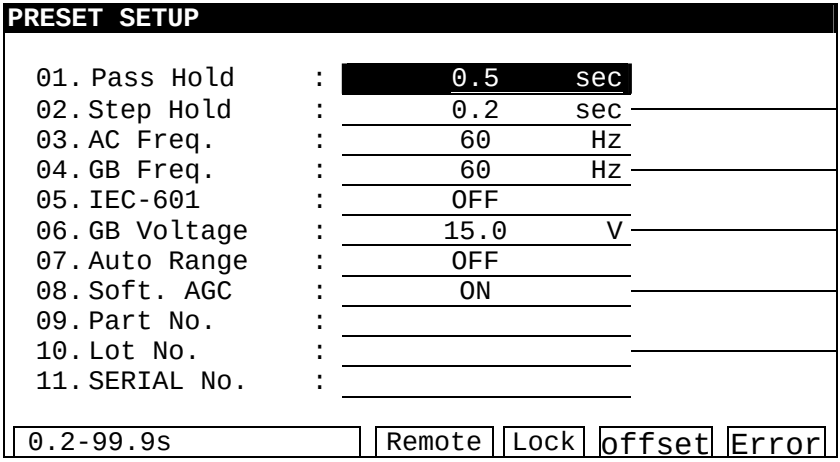
4.6 Test for Preset Setting

4.6.1 Operation Method

1. When title shows “PRESET SETUP”, press [△], [△] keys to move the highlight cursor to the parameter item which want to set.
2. Press numeral key/character key or Function Keys to set this item parameter data.
3. Press [ENTER] to confirm or press [CLR] to reset.

4.6.2 Simple Setting Wizard

1. When title shows ”PRESET SETUP”, press [ENTER] key to move the highlight cursor to the parameter item which want to set.
2. Press numeral key/character key or Function Keys to set this item parameter data.
3. When the highlighted cursor on the last parameter, press [ENTER] key will go to test parameter setting menu directly for user continuous setting.

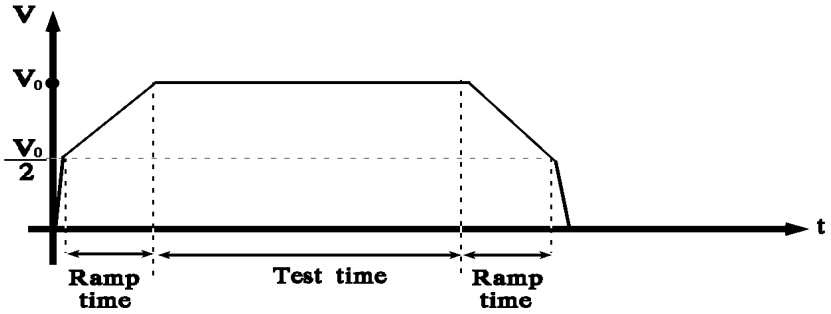


Test preset parameter function description table:

No.	Setting Item	Range	Initial Setting	Description
01	Pass Hold	0.2~99.9	0.5	It sets PASS buzzer sound continuous time
02	Step Hold	0.1~99.9 / KEY	0.2	It sets interval time between test procedures. Key: It sets test procedure interrupted (Please press [START] to continue when test stop.)
03	AC Freq.	50-600Hz	60	It sets the frequency of outputting voltage when tests AC withstanding.
04	GB Freq.	50, 60	60	It sets the frequency of outputting current when tests grounding impedance.
05	IEC-601	ON/OFF	OFF	The setting is ON: When begin the test, outputting voltage until it is 1/2 of setting value and then execute RAMP TIME until the output voltage is equal to setting value. When end the test, execute RAMP TIME until the output voltage is 1/2 of setting value and then fast

				discharge until the test is ended as waveform shown in Note 1.
06	GB Voltage	6.0~15.0	15.0	It sets open voltage when ground impedance testing.
07	Auto Range	ON/OFF	OFF	It sets withstand voltage auto-range function is open or not.
08	Soft. AGC	ON/OFF	ON	It sets software auto gain compensation function is open or not.
09	Part No.	Not over 13 characters	Blank	It sets Part No. of product.
10	Lot No.	Not over 13 characters	Blank	It sets Lot No.of product.
11	Serial No. (註 2)	Not over 13 characters	Blank	It sets serial No. format of product, * means changeable character.
12	Start Wait	0.1~99.9s/ OFF	OFF	Waiting time of Ground Bond Smart Start.
13	Ramp Judg.	ON / OFF	OFF	When set Ramp. Judg. to ON, it will judge if the current value is over High Limit setting value as DC mode executes Ramp time. When set Ramp. Judg. to OFF, it won't judge if the current value is over High Limit setting value as DC mode executes Ramp time.
14	GFI (Ground Fault Interrupt)	ON / OFF/ FLOAT	ON	It sets the function of GFI.

Note 1. When IEC601-1 set as On, the output voltage waveform is as the below shown:



Note 2. The device will start test when it receives a string command, and the format is as same as Serial No. Please refer the description for remote interface.

4.6.3 Auto Range

(1) **Auto Range** function sets as **ON**.
(2) The current range sets to high range *i.e.* 40mA as Figure 4-4 shown.

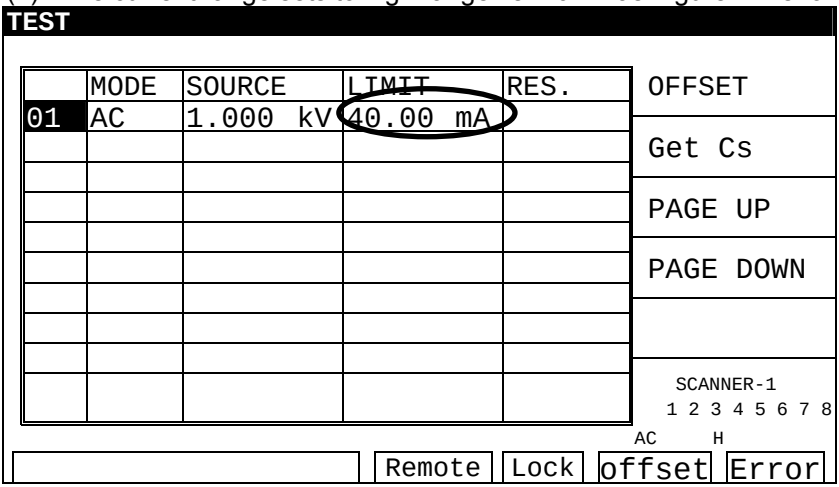


Figure 4-4

Before ending the test 0.6 sec, if the tested current can be represented by low current range then auto range to low as Figure 4-5 shown.

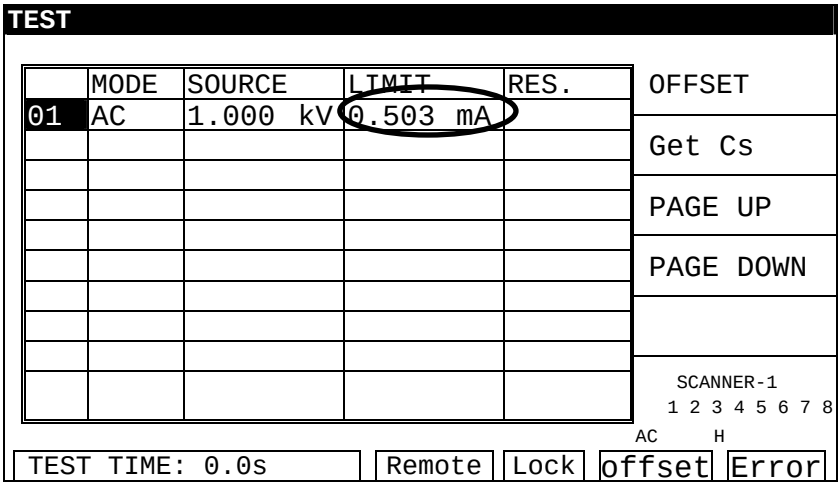


Figure 4-5

4.6.4 Start Wait Function

1. It sets Start Wait time, for example: the setting is 3 seconds.
2. According to paragraph 4.8.2 for setting various parameters of GB MODE. Take for example: CURRENT set as 25.00A, HIGH LIMIT: 100mΩ, TEST TIME: 3.0sec. TEST screen is as Figure 4-6 shown.

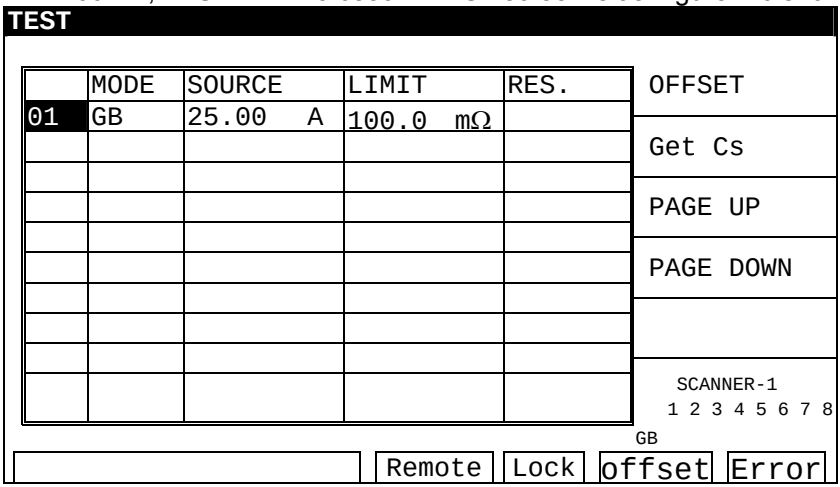


Figure 4-6

3. After DUT is connected, press [Stop] [Test] to start test, meanwhile, GB CONTACT counts down as Figure 4-7 shown.

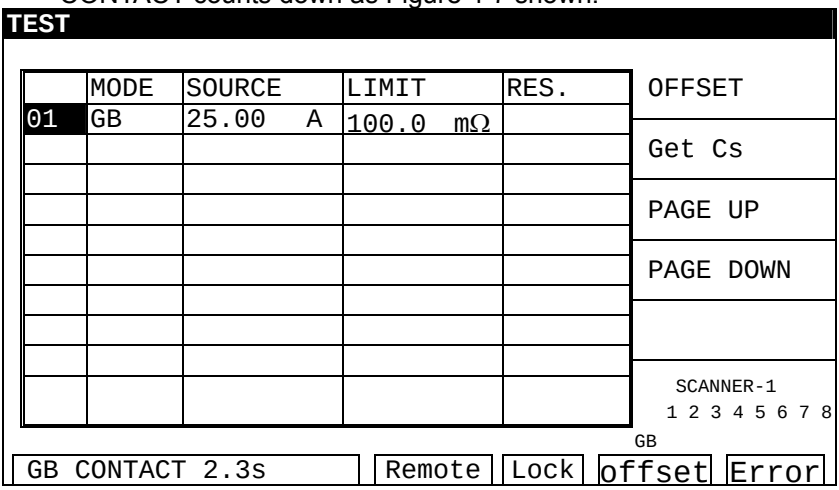


Figure 4-7

4. After GB CONTACT counting down for three seconds (Start Wait setting time), then process test as Figure 4-8 shown.

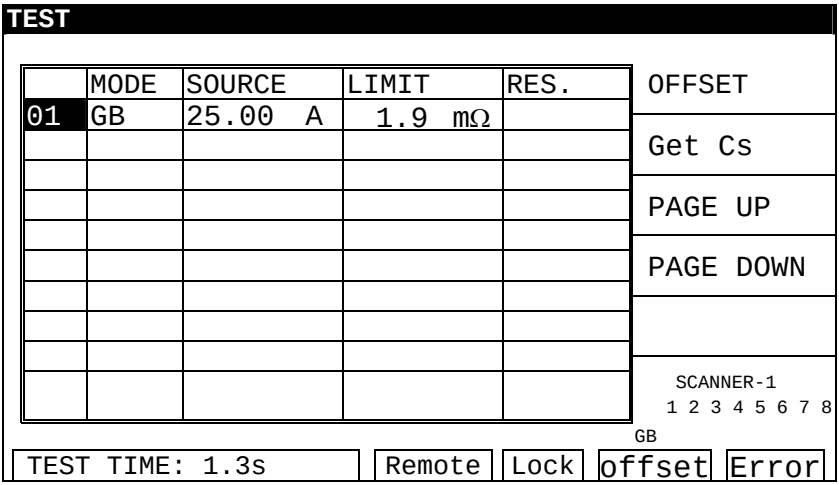


Figure 4-8

5. When the test is end, if it judged as PASS, the screen as Figure 4-9 shown.

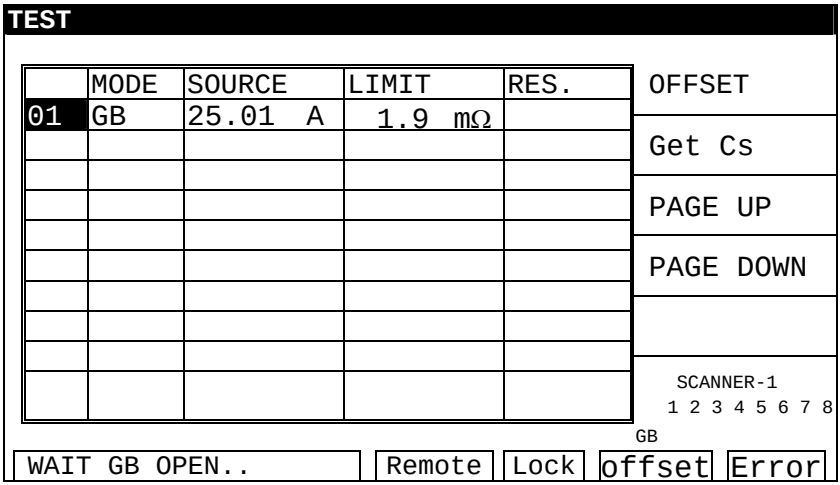


Figure 4-9

6. Meanwhile, the output is stopped and DUT can be changed. When the test cable exits from DUT, the screen as Figure 4-10 shown.

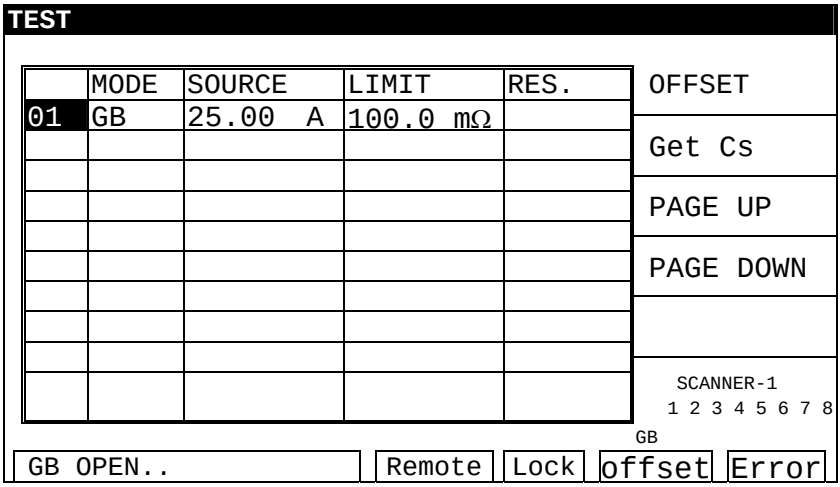


Figure 4-10

7. When the test cable contacts new DUT, it is no need to press [START] key, process GB CONTACT count down for 3 seconds at once (Start Wait setting time). As the figure of item 3 shown.

8. After GB CONTACT counting down for 3 seconds (Start Wait setting time), then process test is the same as item 4 description.

4.7 Description of GB-Floating Board

4.7.1 Notice Items before Operating

1. Before turning on power, please peruse “Chapter 3 – Precaution before Use” and remember it.
2. When turns on power, the analyzer will self-test. LCD shows “Find GB-Float board”, it means the analyzer detected this function.

4.7.2 Description of GB-Floating Function

1. When the test mode is WAC, WDC or IR, capable of setting HV1 terminal on the rear panel is high voltage output terminal, grounding terminal or Floating; HV2 terminal is grounding or Floating.
2. When the test mode is GB or LC (option):
   Drive- on rear panel connects with Drive- on front panel.
   SENSE- on rear panel connects with SENSE- on front panel.
   Drive+ on rear panel connects with Drive+ on front panel.
   SENS+- on rear panel connects with SENSE+ on front panel.
3. The rear panel is equipped with another set of HV1 (Channel 3). When the test mode is WAC, WDC or IR, capable of setting High, Low terminal or Disable. When the test mode is LC (option), HV1 on rear panel only can be set as Low terminal or Disable.
   i. When GFI setting is FLOAT under PRESET option, connection diagram of front panel and rear panel terminal is as Figure 4-11 shown:

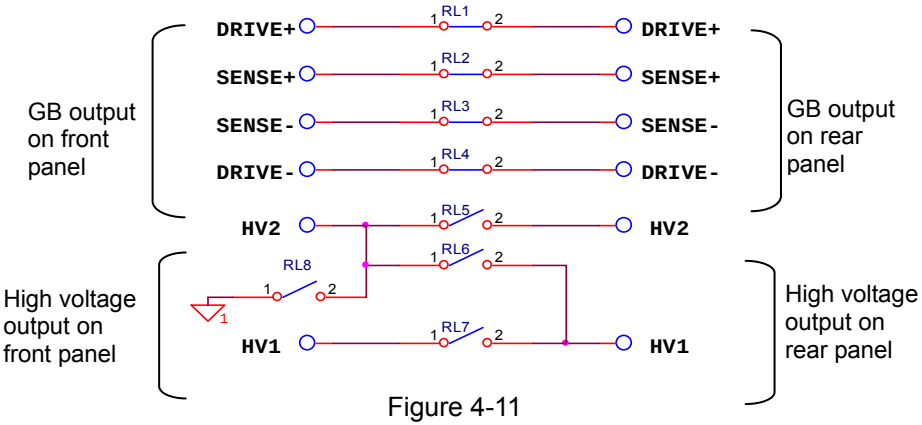


Figure 4-11

RELAY states:

RL1, RL2, RL3, RL4 = ON
RL5, RL6, RL7, RL8 = OFF

ii. When Channel 3 set to H and HV1 terminal on rear panel set to high voltage output, connection diagram of front panel terminal and rear panel terminal is as Figure 4-12 shown:

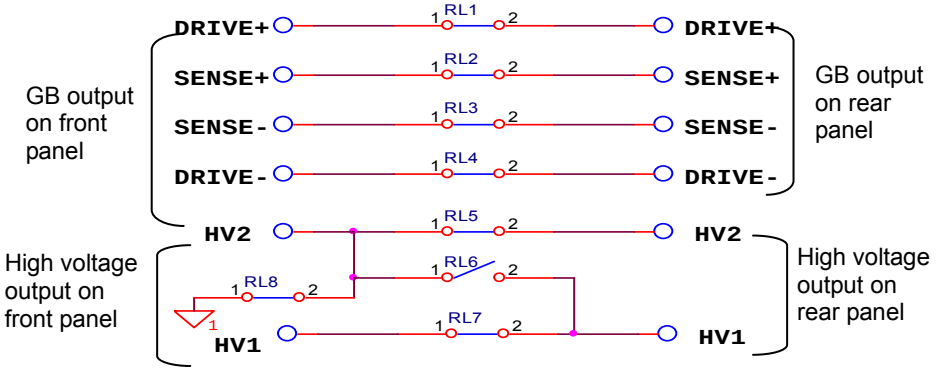


Figure 4-12

RELAY states:

RL1, RL2, RL3, RL4 = ON
RL5, RL7, RL8 = ON
RL6 = OFF

iii. When Channel 3 set to L and HV1 terminal on rear panel set to low voltage terminal, connection diagram of front panel terminal and rear panel terminal is as Figure 4-13 shown:

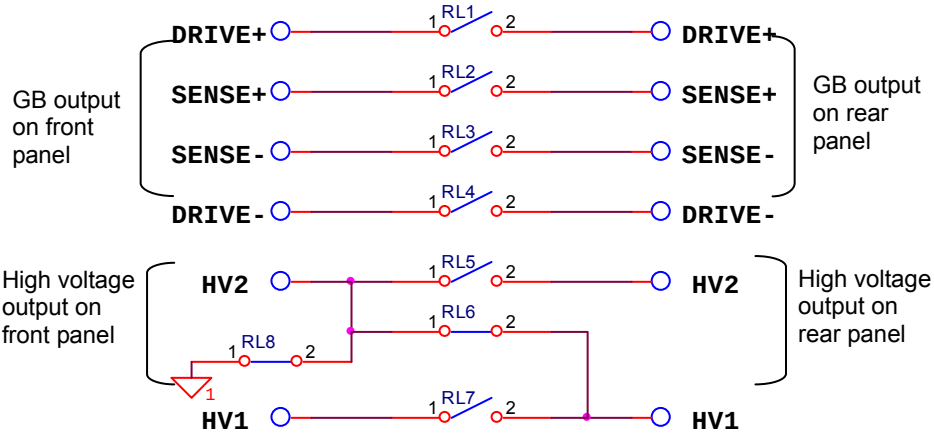


Figure 4-13

RELAY states:

RL1, RL2, RL3, RL4 = OFF
RL5, RL7 = OFF
RL6, RL8 = ON

iv. When Channel 3 set to × and HV1 terminal on rear panel set to Floating, connection diagram of front panel terminal and rear panel terminal is as Figure 4-14 shown:

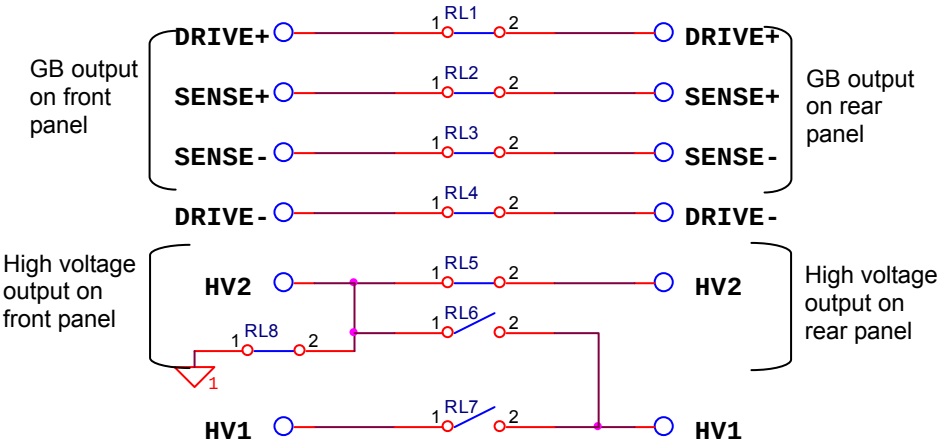


Figure 4-14

RELAY states:

RL1, RL2, RL3, RL4 = ON
RL5, RL8 = ON
RL6, RL7= OFF

4.8 Program Setting

4.8.1 Operation Method

1. When title shows “STEP SETTING”, press [△], [▽] keys to move the highlight cursor to the parameter item which want to set.
2. Press numeral/character keys or Function Keys to set this item parameter data.
3. Press [ENTER] to confirm or press [CLR] to reset.

4.8.2 Various Parameter Settings

TEST STEP: It sets test step.
TEST MODE: Test mode selection. There are GB/AC/DC/IR/LC(option) /PA/OSC test modes can be selected. The following describedparameter settings of various test modes.

Ground Resistance Test Mode (GB)

CURRENT: It sets ground resistance test needed current.

Notice: Because the high limit of multiplying test current by resistance can't higher than 6.3V. High limit of resistance will auto modify to adaptable value when it isn't correspondence with the above conditions.

HIGH LIMIT: It sets ground resistance judgment high limit value. The high limit value is 510mΩ or 6.3V/CURRENT.

LOW LIMIT: It sets ground resistance judgment low limit value, the range is from 0 to high limit of resistance. Input 0 means OFF.

TEST TIME: It sets test needed time. Input 0 means continuous test.

TWIN PORT: It selects twin port, can select ON / OFF. When set as ON, and next STEP is AC/DC or IR, the two steps can operate simultaneously. The highest AC rated current when twin port can't over 5kV 50mA and GB current can't over 20A, or it may cause output voltage, current distortion.

CHNL (H-L): It sets scan test point (please set with optional device, for example 6000-01).

Withstand Voltage Test Mode (AC)

VOLTAGE: It sets withstand voltage test needed voltage

FREQ.: It sets AC withstand test signal frequency, input 0 to indicate DEFAULT that is to follow the frequency which set in section 4.6 for testing.

HIGH LIMIT: It sets high limit value of leakage current.

LOW LIMIT: It sets low limit value of leakage current. The range is lower than high limit value of leakage current or OFF.

ARC LIMIT: It sets high limit value of arc.

ARC FILTER: It selects frequency range of detection arc. There are four frequency ranges of 3~23 kHz/3~50 kHz/3~100 kHz/3~230 kHz can be selected.

TEST TIME: It sets test needed time. It inputs 0 means continuous test.

RAMP TIME: The needed time which rises to setting voltage. It inputs 0 means OFF.

FALL TIME: The needed time which falls from setting voltage value to zero, 0 means OFF.

CHNL (H-L): It sets GB-Floating test selection point.

(1) When set CHANNEL 3 to H (high):

(a) Start test: HV1 terminal on front panel and that on rear panel are short-circuited with high voltage output. HV2 terminal on front panel and that on rear panel are short-circuited with low voltage terminal. DRIVE and SENSE terminals on front panel and that on

rear panel are short-circuited as Figure 4-15 shown.

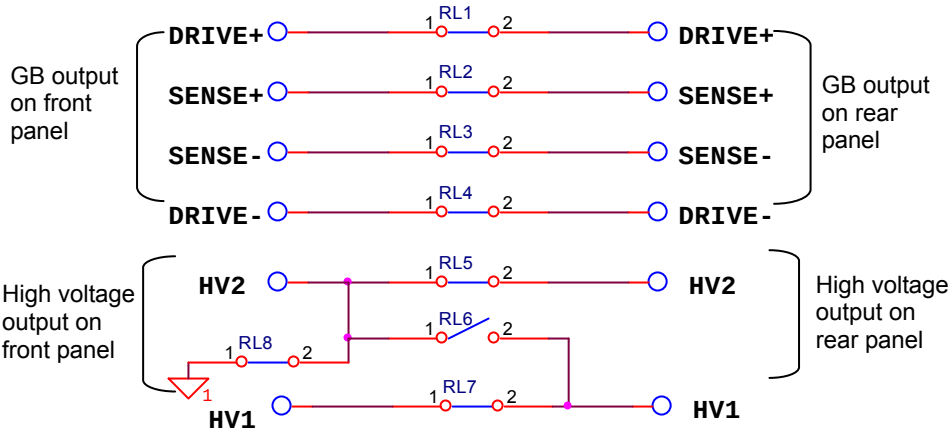


Figure 4-15

(b) End test: HV1 terminal on front panel and that on rear panel are also short-circuited. When [STOP] key is pressed, HV1 terminal on front panel and that on rear panel are open-circuited.

(2) When set CHANNEL 3 as L (low):

(a) Start test: HV1 terminal on rear panel and HV2 on front panel are short-circuited with low voltage terminal. DRIVE, SENSE terminals on front panel and DRIVE, SENSE terminals on rear panel are open-circuited as below Figure 4-16 shown.

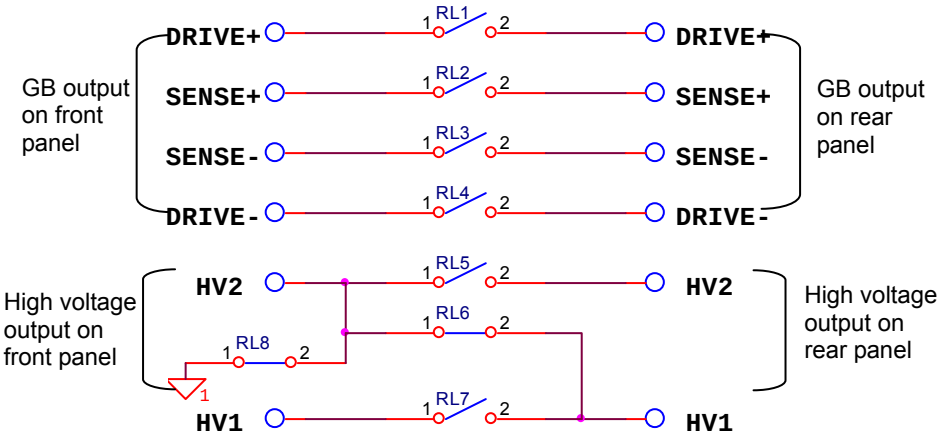


Figure 4-16

(b) End test: HV1 terminal on rear panel and HV2 terminal on front panel are also short-circuited. When [STOP] key is pressed, HV1 terminal on rear panel and HV2 terminal on front panel are open-circuited. DRIVE, SENSE terminals on front panel are short-circuited with DRIVE, SENSE terminals on rear panel.

(3) When set CHANNEL 3 as ×(disable):

(a) HV1 terminal on rear panel and that on front panel are open-circuited. HV2 terminal on rear panel and that on front panel are short-circuited.

(b) DRIVE and SENSE terminals on front panel are short-circuited with DRIVE, SENSE terminals on rear panel as below Figure 4-17 shown(GFI=ON).

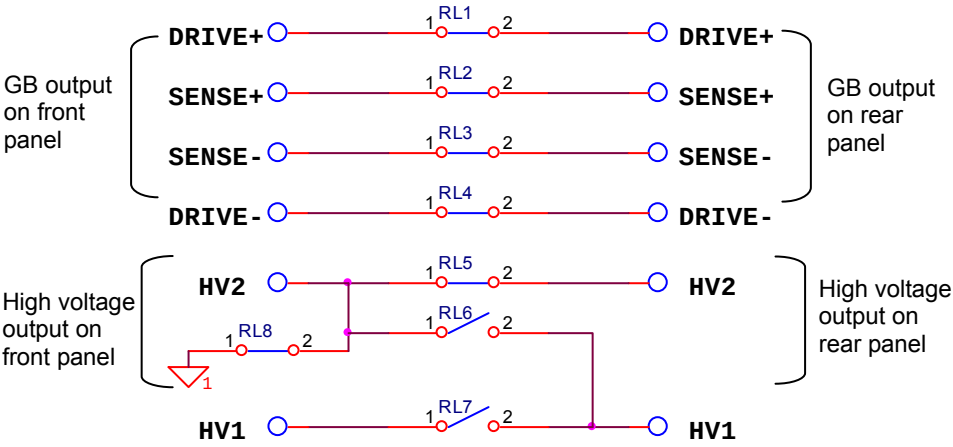
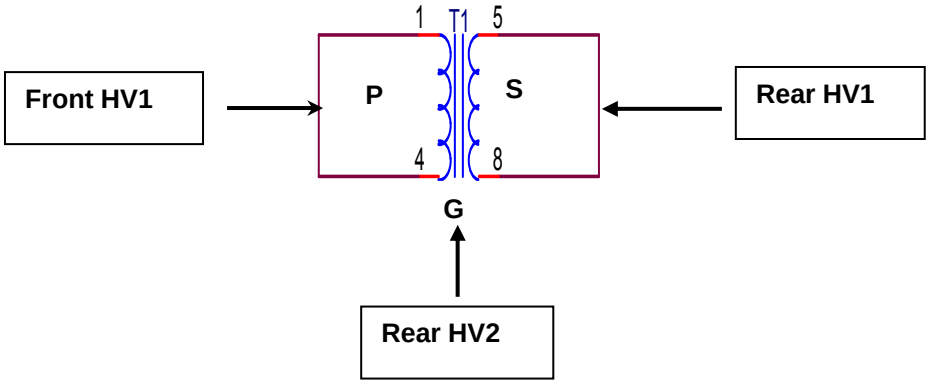


Figure 4-17

Example:



(1) P – S: It sets CHANNEL 3 to **L.**
(2) P – G: It sets CHANNEL 3 to **×.**
(3) (P+S) – G: It sets CHANNEL 3 to **H.**

Or scanning test selection point (please use with optional device, for example: 6000-03)

Withstand Voltage Test Mode (DC)
VOLTAGE: It sets withstand voltage test needed voltage.
HIGH LIMIT: It sets high limit value of leakage current.
LOW LIMIT: It sets low limit value of leakage current. The range is lower

than high limit value of leakage current or OFF.

DWELL TIME: It sets DWELL needed time, 0 means OFF. (During DWELL TIME, don't judge the high and low limit value of leakage current. The limitation is not over 1.5 multiples of high limit of setting range or high limit of leakage current.)

ARC LIMIT: It sets high limit value of arc.

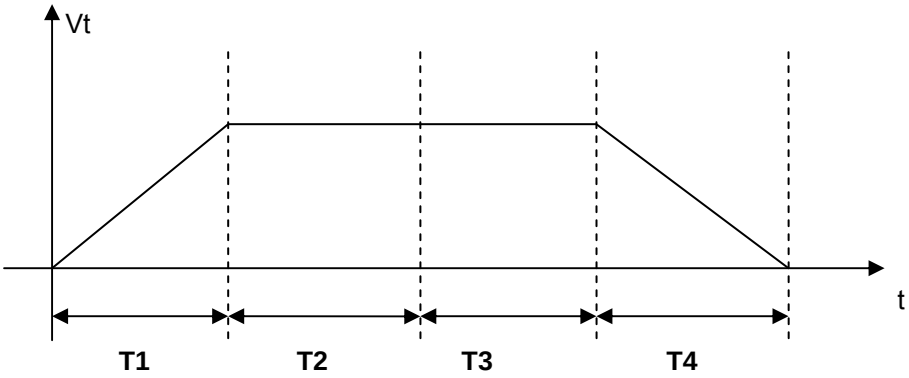
ARC FILTER: It selects frequency range of detection arc. There are four ranges of 3~23 kHz/3~50 kHz/3~100 kHz/3~230 kHz can be selected.

TEST TIME: It sets test needed time. It inputs 0 means continuous test.

RAMP TIME: The needed time which rises to setting voltage. It inputs 0 to indicate it is OFF.

FALL TIME: The needed time which falls from setting voltage value to zero, 0 means OFF.

CHNL (H-L): The setting is the same as AC CHANNEL.



Vt: TEST VOLTAGE
T1: RAMP TIME (Voltage Ramping Time)
T2: DWELL TIME (Judgment Delay Time)
T3: TEST TIME
T4: FALL TIME (Voltage Falling Time)

Insulation Resistance Test Mode (IR)

VOLTAGE: It sets insulation resistance test needed voltage.

LOW LIMIT: It sets low limit value of insulation resistance.

HIGH LIMIT: It sets high limit value of insulation resistance. The value is higher than low limit value of insulation resistance or OFF.

TEST TIME: It sets test needed time. It inputs 0 means continuous test.

RAMP TIME: The needed time which rises to setting voltage. It inputs 0 to indicate it is OFF.
FALL TIME: The needed time which falls from setting voltage value to zero, 0 means OFF.
RANGE: It sets the test file of insulation resistance, AUTO means auto range. The relationship between current range and resistance measurement scope are shown as below table.

Range	IR Value	
	Setting Voltage 50V ~ 499V	Setting Voltage 500V ~ 1000V
10mA(3~10mA)	0.1MΩ~1MΩ	0.1MΩ~4.5MΩ
3mA(0.3~3mA)	0.5MΩ~4.5MΩ	3.0MΩ~15.0MΩ
300uA(30~300uA)	3.0MΩ~15.0MΩ	10.0MΩ~45MΩ
30uA(3~30uA)	10.0MΩ~45MΩ	35.0MΩ~450MΩ
3uA(0.3~3uA)	45MΩ~0.45GΩ	0.40GΩ~4.5GΩ
300nA(20~300nA)	0.40GΩ~4.9GΩ	4.0GΩ~50.0GΩ

Note Please follow test voltage and insulation impedance of DUT to calculate the value of current thus follow this to choose suitable current range.

CHNL (H-L): The setting is the same as AC/DC CHANNEL.
Or scanning test selection point (please use with optional device, for example 6000-03).

Leakage current test mode (LC) ---- Option

Pause test mode (PA)
MESSAGE: Message hint string. The string are inputted by alphabet, Arabic numerals or symbol [-]. The max. is 13 characters.
UNDER TEST: It sets as ON or OFF.
(1) When set as ON: UNDER TEST terminal on rear panel is short-circuited condition under pause mode.
(2) When set as OFF: UNDER TEST terminal on rear panel is open-circuited condition under pause mode.
TEST TIME: It sets the action method of pause mode.
(1) When set to CONTINUE, pause mode will be ended till

press **START** on panel or re-trigger START signal on rear panel.

(2) The setting is 0.3 ~ 999sec: When the setting time is up then end the pause mode.

Short/Open Circuit Detection Mode (OSC)

OPEN CHK: It sets the judgment test result to open condition(compare the test reading with the read standard capacitance value [Cs]).

SHORT CHK: It sets the judgment test result to short condition(compare the test reading with the read standard capacitance value [Cs]).

CHNL (H-L): The setting is the same as AC/DC CHANNEL.

4.9 CALIBRATION Function

4.9.1 Enter Calibration Method

1. Open the upper cover, press **SW402** and then powered the analyzer on.
2. When the title bar shows “MAIN MENU”, press numerical key which is corresponding to **CALIBRATION** then will show “ENTER CALIBRATION PASSWORD” window.
3. By using numerical keys to input PASSWORD [7] [9] [3] [1].
4. Press **ENTER**, select **[DEVICE]** and then enter calibration procedure.

4.9.2 Clear Memory

1. When title list shows “MAIN MENU”, press numerical key that corresponds to **CALIBRATION** then it will show “ENTER CALIBRATION PASSWORD” window.
2. By using numerical keys to input PASSWORD [8] [5] [2] [4] [6].
3. After pressing [ENTER] key, “MESSAGE” window will be appeared. Users can select if clear memory by Function Keys [YES], [NO] or press [EXIT] to abort memory clearance.
4. If Function Key [YES] is selected, all of saved data will be cleared, all setting parameters will be reset as initial value.
5. After clearing the memory, Option parameter needs to be reset.

4.10 KEY LOCK Function

KEY LOCK setting method:

1. When title list shows “MAIN MENU”, if text block “LOCK” isn’t highlighted to press numerical key which corresponds to KEY LOCK then “KEY LOCK” window will be appeared.
2. By using numerical key to input PASSWORD (please input 0000, when NEW SECURITY CODE is not set).
3. Press [ENTER] key will show “MESSAGE” window, “LOCK” text block will be highlighted. Users can select if to LOCK “MEMORY RECALL” function together by Function Keys [YES], [NO].
4. Press Function Keys [EXIT] to complete KEY LOCK function.

Note When 19032 set as KEY LOCK ON then to restart, and enter TEST menu directly.

KEY LOCK release method:

1. When title list shows “MAIN MENU”, if text block “LOCK” is highlighted to press numerical key which corresponds to KEY LOCK then “RELEASE KEY LOCK” window will be appeared.
2. By using numerical key to input PASSWORD (please input 0000, when NEW SECURITY CODE is not set).
3. Press [ENTER] key, text block “LOCK” won’t be highlighted and it means KEY LOCK Function had been cancelled.

4.11 Setting User Password

1. When title bar shows “MAIN MENU”, press numerical key that corresponds to NEW SECURITY CODE, it will show “ENTER USER PASSWORD” window.
2. By using numerical key to input PASSWORD (please input 0000, when PASSWORD is not set). Press [ENTER] key to show “ENTER NEW PASSWORD” window.
3. By using numerical key to input NEW PASSWORD (the maximum is twelve characters), press [ENTER] key to show “ENTER CONFIRM PASSWORD” window.
4. Using numerical key to input CONFIRM PASSWORD (is the same as NEW PASSWORD), press [ENTER] key to show “MESSAGE” window. At the same time, the setting has been done and can press any key to exit.

Note If uershave forgotten password, please follow paragraph 4.9.2 “Clear Memory” to clear memory, PASSWORD will be reset to initial value, *i.e.* 0000.

4.12 FAIL LOCK Function

4.12.1 FAIL LOCK Setting and Usage

1. When title bar shows “MAIN MENU”, press numerical key which is corresponding to FAIL LOCK then “FAIL LOCK” window will be appeared.
2. By using numerical keys to input PASSWORD [0] [0] [0] [0] (when NEW SECURITY CODE is not set).
3. After pressing [ENTER] key, message indication [LOCK] will be highlighted. All keys are invalid temporary except for [STOP], [START], Function Key [TEST] and FAIL LOCK until FAIL LOCK function is unlocked.
4. When FAIL LOCK function activated, if DUT judged as FAIL then Figure 4-18 will be shown.

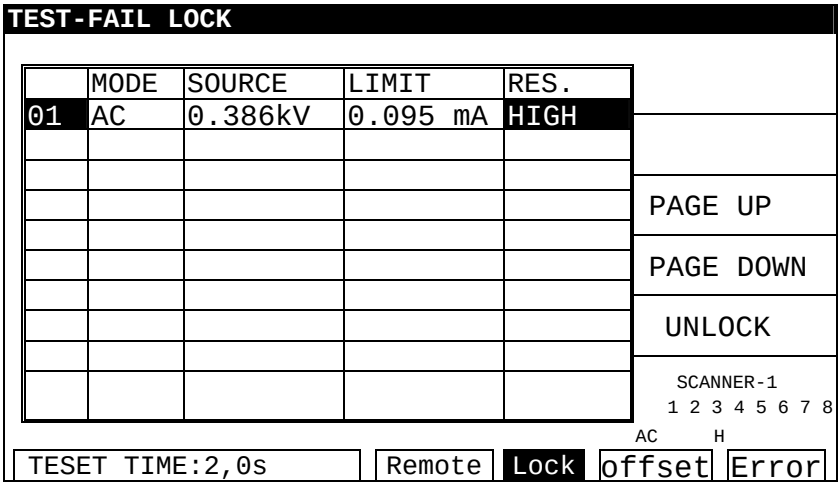


Figure 4-18

5. Meanwhile, press [STOP] and Function Key [UNLOCK] to clear buzzer sound, then “UNLOCK” window will be appeared.
6. By using numerical keys to input PASSWORD [0] [0] [0] [0] (when

NEW SECURITY CODE is not set). Press [START] key for restarting the test.

7. Press [MENU] to return to MAIN MENU.

Note When 19032 is set as FAIL LOCK ON then to restart, and enter TEST menu directly.

4.12.2 Release FAIL LOCK

1. When title bar shows “MAIN MENU”, press numerical key which is corresponding to FAIL LOCK, “RELEASE FAIL LOCK” window will be appeared.
2. By using numerical keys to input PASSWORD [0] [0] [0] [0] (when NEW SECURITY CODE is not set).
3. Press ENTER] key, FAIL LOCK function will be released and message indication box “LOCK” highlight also will be released.

4.13 Remote Control

This analyzer has REMOTE socket of remote switch on rear panel. When you want to control this analyzer by external signal, plug the control cable in the socket. Please don’t touch high voltage terminal or it may cause dangerous. Remote control by high voltage test bar usually. You can use other control circuit instead of high voltage bar. Please notice that is switch of controlling high voltage output. Be careful that the control cables don’t close high voltage terminal and test cables to avoid dangerous.

1. If users desire to single control START and STOP can refer to as this Figure 4-20 described method to connect to REMOTE position on rear panel.

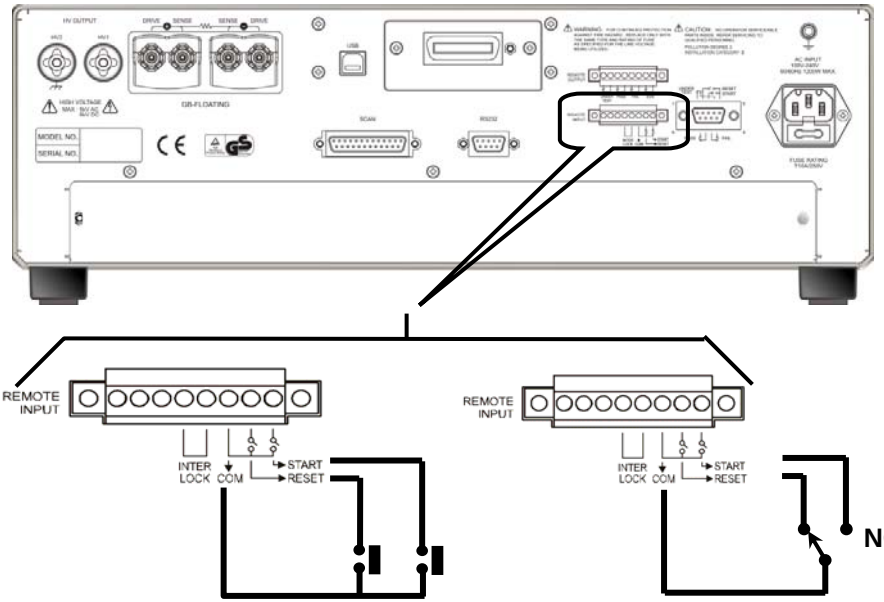


Figure 4-19

Figure 4-20

2. As Figure 4-20, the main unit is under STOP status. NC point is connecting to STOP and NO point connecting to START.
3. Some logical components such as transistor, FET, coupler. Also can be used to connect as control circuit as Figure 4-21. The connecting signal and circuit as Figure 4-21. Only the circuit includes the following statuses, it can control the main unit.
   (1) The signal voltage of HIGH should between 4.5 and 5V.
   (2) The signal voltage of LOW should between 0 and 0.6V.
   (3) The signal of LOW flowing current is 2mA or fewer.
   (4) The action time of inputting signal should be over 20mS.

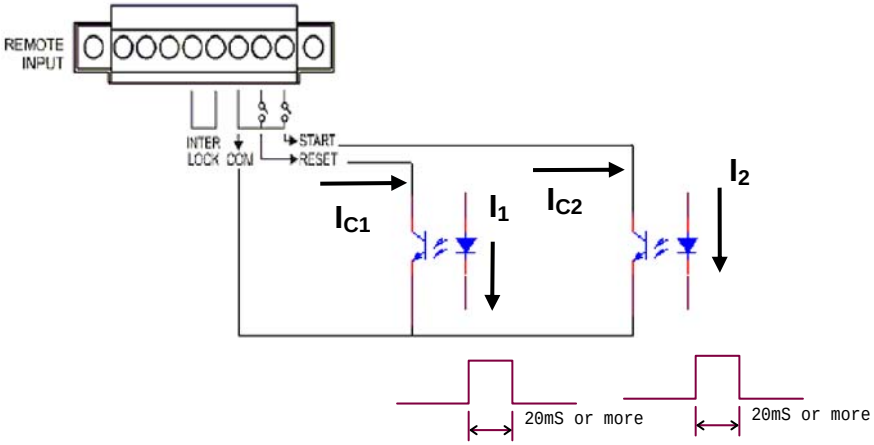


Figure 4-21

4. The relay switch control as Figure 4-19 and photo-coupler control as Figure 4-21 are controlled by component contact. It is effective to avoid error operation system which caused by interference. Although the main unit has a lot of preventions, it is necessary to be careful that interferences result from setting measurement system.
5. Pin diagram of REMOTE CONTROL as Figure 4-22. When users desire to control by external, please remember this pin diagram.

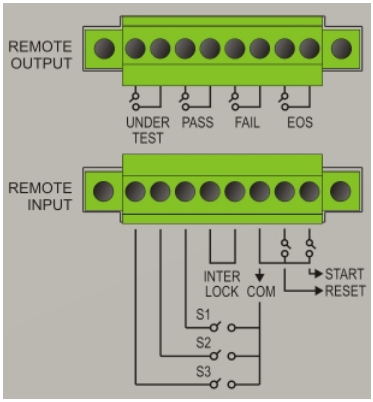


Figure 4-22

4.14 Output Signal

The analyzer includes LED and buzzer two kinds of indication signals. The rear panel of analyzer has the following output signals.

UNDER TEST: When the analyzer is under test, the output terminal will short circuit. Be able to use this short circuit condition to control external signal. The junction specification 125VAC current is lower than 1A.

PASS: When the analyzer judge DUT is good, the output terminal will short circuit. Be able to use this short circuit condition to control external signal. The junction specification 125VAC current is lower than 1A. Operating time is from DUT judged as pass to be stopped or restart.

FAIL: When the analyzer judge DUT as no good, the output terminal will short circuit. Be able to use this short circuit condition to control external signal. The junction specification 125VAC current is lower than 1A. Operating time is from DUT judged as fail to be stopped or restart.

EOS: When the analyzer performs the test in test step, the output terminal will be short-circuited. Be able to use this short circuit condition to control external signal. The junction specification 125VAC current is lower than 1A.

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