



# Operation & Service Manual

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## Model 264, 266 • V1.07

Model 264 (40 Amperes Ground Bond Tester)  
Model 266 (60 Amperes Ground Bond Tester)

***Item 99-10760-01***

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Printed November 17, 2021



Model 266



Model 264



# DECLARATION OF CONFORMITY



**Manufacturer:** SCI An Ikonix Brand

**Address:** 28105 N. Keith Drive  
Lake Forest, IL 60045  
USA

**Product Name:** SCI 260 Series

**Model Number:** 264

## Conforms to the following Standards:

**Safety:** UL 61010-1:2012  
CAN/CSA-C22.2 NO. 61010-1-12  
IEC 61010-1:2010  
IEC 61010-2-30:2010  
EN 61010-1:2010  
EN 61010-2-30:2010  
EN 61010-31:2002+A1:2008

**EMC:** EN 61326-1:2013 Class A  
EN 55011:2009+A1:2010 Group 1, Class A,  
EN 61000-3-3:2013/ IEC 61000-3-3 :2013,  
EN 61000-4-2:2008/IEC 61000-4-2 :2008  
EN 61000-4-3:2006+A1 :2006+A2 :2010,  
IEC 61000-4-3:2006+A1 :2007+A2 :2010,  
EN 61000-4-4:2012/IEC 61000-4-4:2012,  
EN 61000-4-5:2014 /IEC 61000-4-5 :2014  
EN 61000-4-6:2014/IEC 61000-4-6:2013,  
EN 61000-4-8:2010/IEC 61000-4-8 :2009,  
EN 61000-4-11 :2004/IEC 61000-4-11 :2004

## Supplementary Information:

*The product herewith complies with the requirements of the **Low Voltage Directive 2014/35/EU** and the **EMC Directive 2014/30/EU** and the **RoHS Directive 2015/863/EU** with respect to the following substances: Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent chromium (Cr (VI)), Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE), Deca-BDE, Bis(2-ethylhexyl) phthalate, Dibutyl phthalate, Benzyl butyl phthalate, Diisobutyl phthalate included."*

**Last two digits of the year the CE mark was first affixed: 16**

*The technical file and other documentation are on file with Ikonix.*

Joseph Guerriero  
President  
SCI An Ikonix Brand  
Lake Forest, Illinois USA  
May 20, 2020

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EN 55011:2009+A1:2010 Group 1, Class A,  
EN 61000-3-2:2014/IEC 61000-3-2 :2014,  
EN 61000-3-3:2013/ IEC 61000-3-3 :2013,  
EN 61326-1 :2013(Industrial Locations)  
EN 61000-4-2:2009/IEC 61000-4-2 :2008  
EN 61000-4-3:2006+A1 :2008+A2 :2010,  
IEC 61000-4-3:2006+A1 :2007+A2 :2010,  
EN 61000-4-4:2012/IEC 61000-4-4:2012,  
EN 61000-4-5:2006 /IEC 61000-4-5 :2005  
EN 61000-4-6:2014/IEC 61000-4-6:2013,  
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May 20, 2020

# Warranty Policy

Ikonix, certifies that the tester listed in this manual meets or exceeds published manufacturing specifications. This tester was calibrated using standards that are traceable to the National Institute of Standards and Technology (NIST).

Your new tester is warranted to be free from defects in workmanship and material for a period of (5) years from date of shipment. We aim to provide an amazing experience and quality testers that last a long time. If you're not satisfied with your tester, return it within 45 days for a full refund. Calibrate annually with us, or one of our authorized partners, and we'll extend your warranty an additional year for the service life of your tester, and at least five years after discontinuation. If it breaks during that time, we promise to fix it for free (unless abuse or excessive damage is present). When your tester reaches the end of its service life, we'll responsibly recycle it and give you a discount on a replacement. Annual calibration and inspection must be made in each successive year starting one year after the original purchase date in order to remain eligible for extended warranty coverage beyond the standard warranty period (five years).

Ikonix recommends that your tester be calibrated on a twelve-month cycle. A return material authorization (RMA) must be obtained from Ikonix. To obtain an RMA please contact our Customer Support team at 1-847-932-3662 or visit [hipot.com](http://hipot.com). Damages sustained as a result of improper packaging will not be honored. Transportation costs for the return of the tester for warranty service must be prepaid by the customer. Ikonix will assume the return freight costs when returning the tester to the customer. The return method will be at the discretion of Ikonix.

Except as provided, herein Ikonix makes no warranties to the purchaser of this tester and all other warranties, expressed or implied (including, without limitation, merchantability or fitness for a particular purpose), are hereby excluded, disclaimed and waived.

Any non-authorized modifications, tampering or physical damage will void your warranty. Elimination of any connections in the earth grounding system or bypassing any safety systems will void this warranty. This warranty does not cover accessories not of Ikonix manufacture. Parts used must be parts that are recommended by Ikonix as an acceptable specified part. Use of non-authorized parts in the repair of this tester will void the warranty.

\*5 year warranty is valid on any model purchased in 2021 or after.

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# Safety Precautions

## GENERAL

This product and its related documentation must be reviewed for familiarization with safety markings and instructions before operation. This product is a Safety Class I tester (provided with a protective earth terminal).

Before applying power verify that the tester is connected to the correct line voltage and the correct fuse is installed.



INSTRUCTION MANUAL SYMBOL. PLEASE REFER TO THE INSTRUCTION MANUAL FOR SPECIFIC WARNING OR CAUTION INFORMATION TO AVOID PERSONAL INJURY OR DAMAGE TO THE PRODUCT.



INDICATES HAZARDOUS VOLTAGES MAY BE PRESENT.



CHASSIS GROUND SYMBOL.

### WARNING

**CALLS ATTENTION TO A PROCEDURE, PRACTICE, OR CONDITION, THAT COULD POSSIBLY CAUSE BODILY INJURY OR DEATH.**

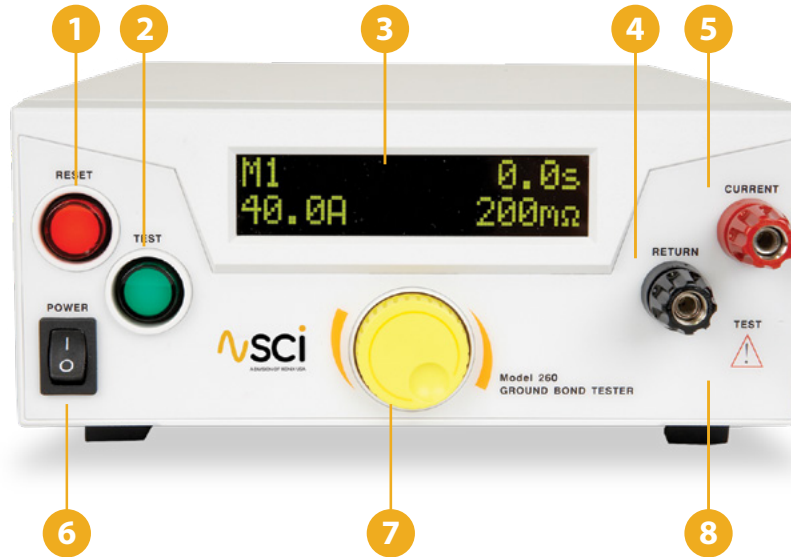
### CAUTION

**Calls attention to a procedure, practice, or condition that could case damage to equipment or permanent loss of data.**

### WARNING

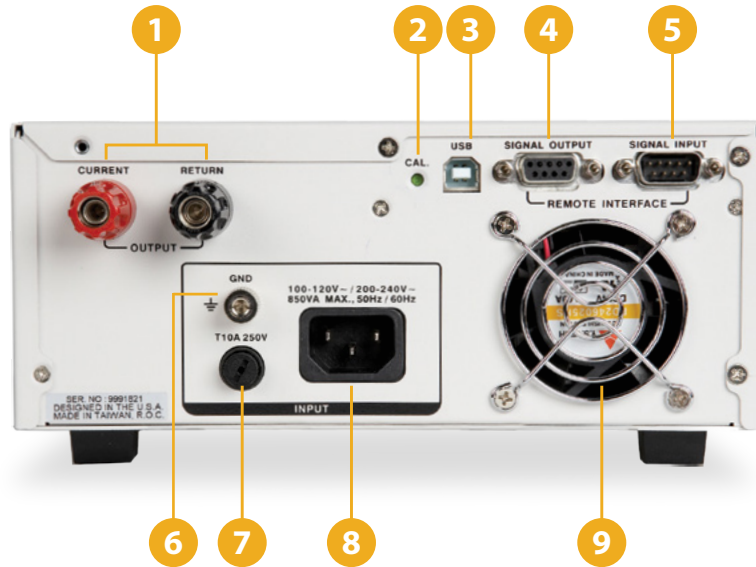
**A TEST PRODUCES VOLTAGES AND CURRENTS WHICH CAN CAUSE HARMFUL OR FATAL ELECTRIC SHOCK. TO PREVENT ACCIDENTAL INJURY OR DEATH, THESE SAFETY PROCEDURES MUST BE STRICTLY OBSERVED WHEN HANDLING AND USING THE TESTER.**

## Front Panel Controls



- 1 RESET BUTTON** - This is a momentary contact switch used to reset the tester. If an out-of-range reading is detected during a test, the red failure lamp within the button will light. To reset the system for the next test, press and release this button. This button may also be used to abort a test in progress.
- 2 TEST BUTTON** - This is a momentary contact switch used to start a test. Press the green button to turn on the high current output when in test mode. The indicator lamp within the button will light when test expires with pass condition.
- 3 LCD DISPLAY** - The Liquid Crystal Display is the main readout for the operator and programmer of the test settings and test results.
- 4 RETURN OUTPUT JACK** - For the connection of the detachable 5 foot (1.52 m) black return test lead or three-prong receptacle adapter box. This jack is always used when performing a Ground Bond test.
- 5 CURRENT OUTPUT JACK** - Use this jack for the connection of the detachable 5-foot (1.52 m) red high current test lead or adapter box. This jack is used when performing a Ground Bond test.
- 6 POWER SWITCH** - Use this to turn instrument ON or OFF.
- 7 PUSH BUTTON** - Use this knob to advance forward/backward through the setup menus and to setup system and test parameters.
- 8 HIGH CURRENT LED INDICATOR** - This indicator flashes to warn the operator that high current is present at the high current output terminal.

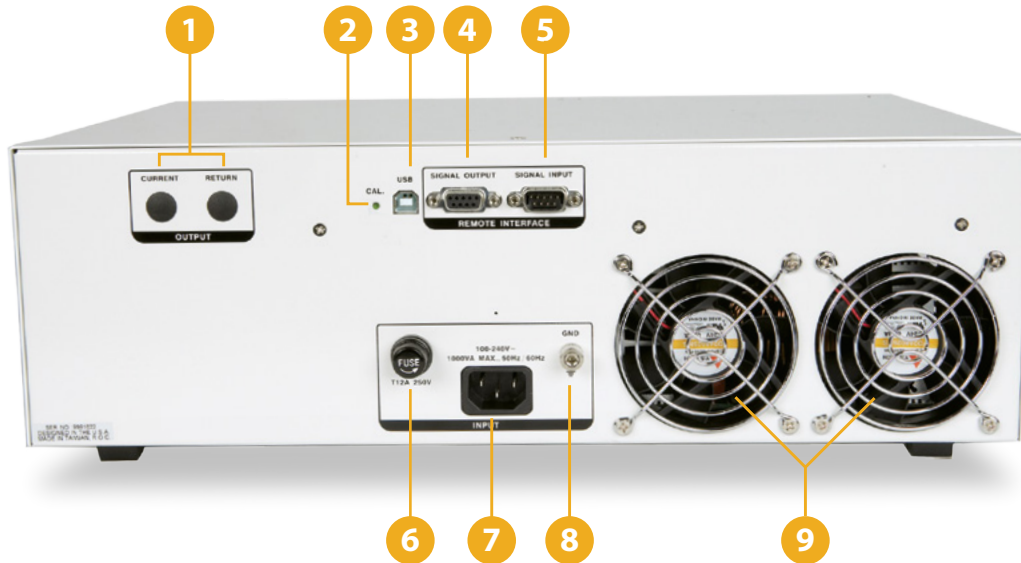
## 264 Rear Panel Controls



- 1 POSITION FOR OPTIONAL REAR OUTPUT JACKS** Please refer section Optional Rear Panel Controls for details.
- 2 CALIBRATION ENABLE KEY** - To enter the calibration mode press this key while the tester is being powered ON.
- 3 USB INTERFACE** - Optional USB port for serial communication. Refer to Option 03 in Options Section of this manual.
- 4 REMOTE OUTPUT** - 9 pin D subminiature female connector for monitoring PASS, FAIL, and PROCESSING output relay signals.
- 5 REMOTE INPUT** - 9 pin D subminiature male connector for sending TEST, RESET, Hardware INTERLOCK, and Withstand Processing signals.
- 6 CHASSIS GROUND (EARTH) TERMINAL** - This safety terminal should be connected to a good earth ground before operation.
- 7 FUSE RECEPTACLE** - To change the fuse unplug the power (mains) cord and turn the fuse cap counter clockwise to remove the fuse.
- 8 INPUT POWER RECEPTACLE** - Standard IEC 320 connector for connection to a standard NEMA style line power (mains) cord.
- 9 THERMAL FAN** - To cool the tester.



## 266 Rear Panel Controls



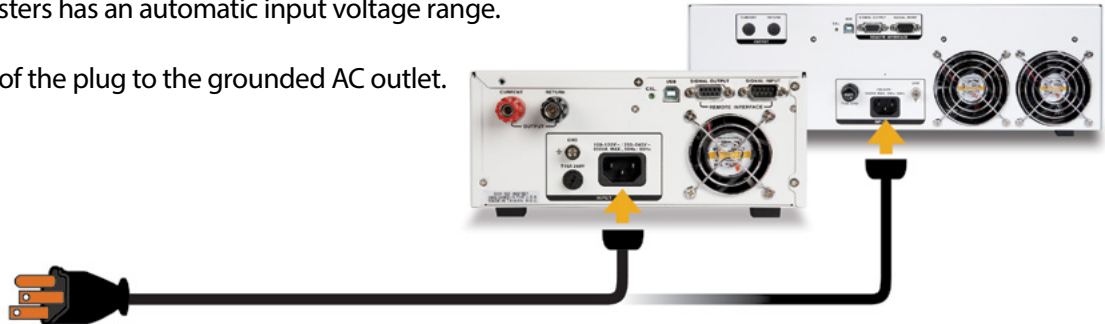
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- 9 THERMAL FAN** - To cool the tester.

## Setup Instructions for Model 264/266

### Power-Up Sequence:

1. Check to be sure the correct input line cord is used.
2. Connect the power input plug into its socket on the rear panel of the tester.  
The SCI 260 series of testers has an automatic input voltage range.
3. Connect the male end of the plug to the grounded AC outlet.

Grounded  
Power  
Source



### WARNING

PLEASE BE SURE THAT THE SAFETY GROUND ON THE POWER LINE CORD IS NOT DEFEATED AND THAT YOU ARE CONNECTING TO A GROUND POWER SOURCE. ALSO, CONNECT THE REAR PANEL CHASSIS GROUND FOR ADDITIONAL SAFETY

4. Connect the Interlock Disable key to the Remote Input connector on the back panel of the tester. This is required in order to run a test. For more information on the interlock, see section Using the Remote I/O.



5. Turn on the POWER switch located on the lower left hand side of the front panel. Upon powering the tester up, a POWER ON SELF TEST (POST) will automatically be performed. This test will check for the condition of the ram chips, PCB's and other critical components. In addition the display will show the following message, with the actual model number and software version number.



6. The tester will recall the last memory program that was active and the display will show the parameters that were programmed into that memory. The tester is now ready for operation.

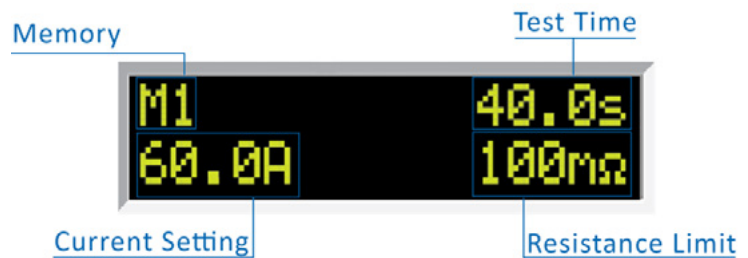
# Getting to Know Your Tester

## 1. Working with Memories

The model 264/266 is equipped with 5 memory locations numbered M1 through M5. Each memory location contains one step that can be connected sequentially to the next consecutive step.

## 2. Perform Test Screen

The Perform Test Screen displays 4 parameters

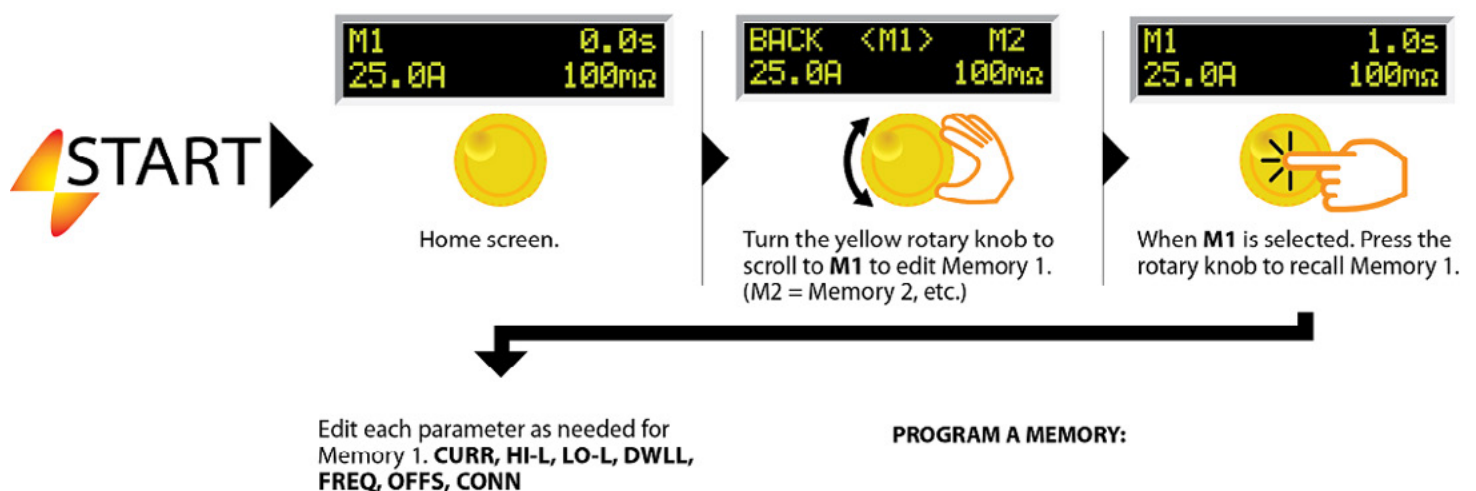


Follow the setup procedures to set the desired parameters. The display will show the Ground Bond test settings depending:

| Display* | Description              |
|----------|--------------------------|
|          | Ground Bond test display |

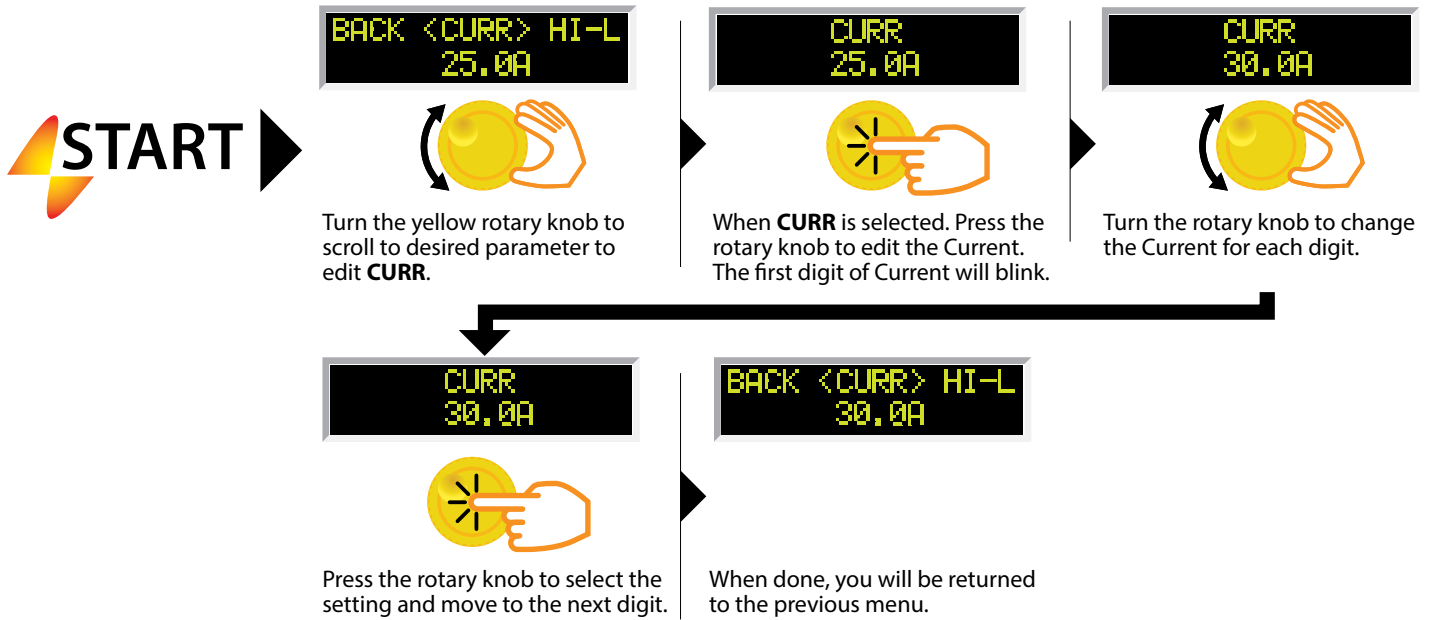
\*The underscore character may be displayed after the Memory Location number, i.e. M1\_. This indicates that another configured test will execute after the displayed test has completed.

## 3. Programming Memory Location

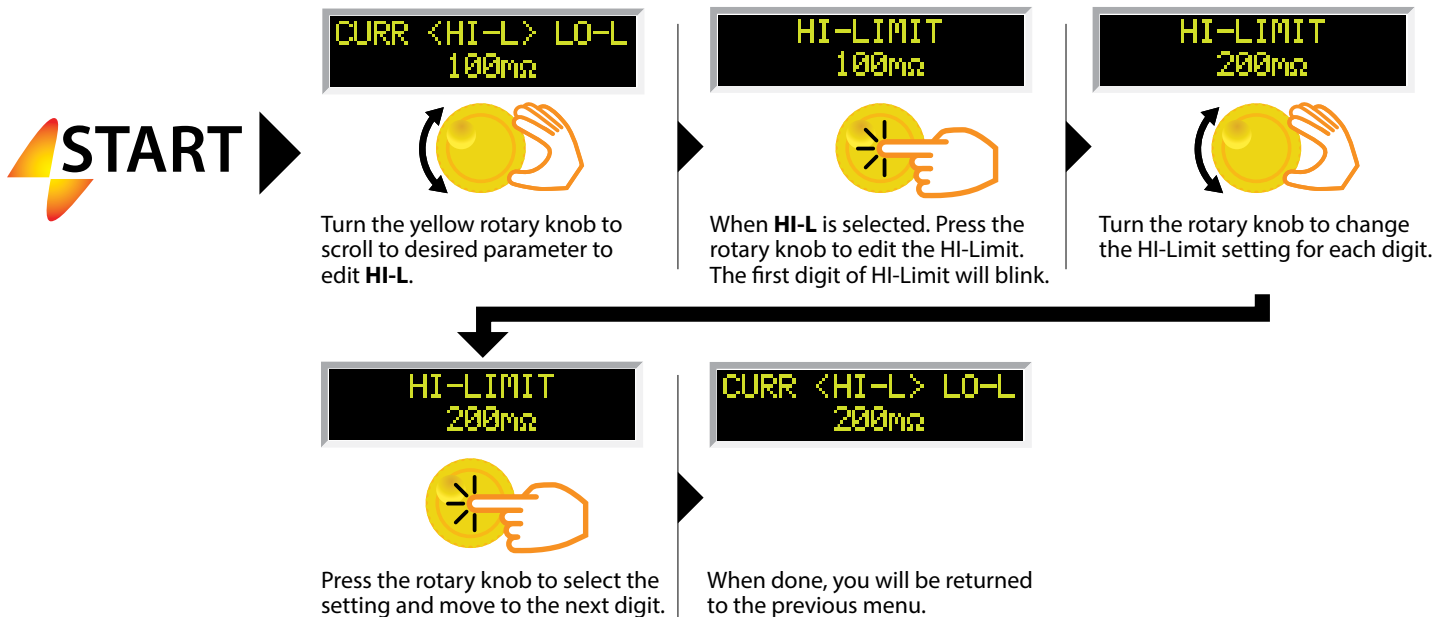


#### 4. Setting up a GND Bond Test

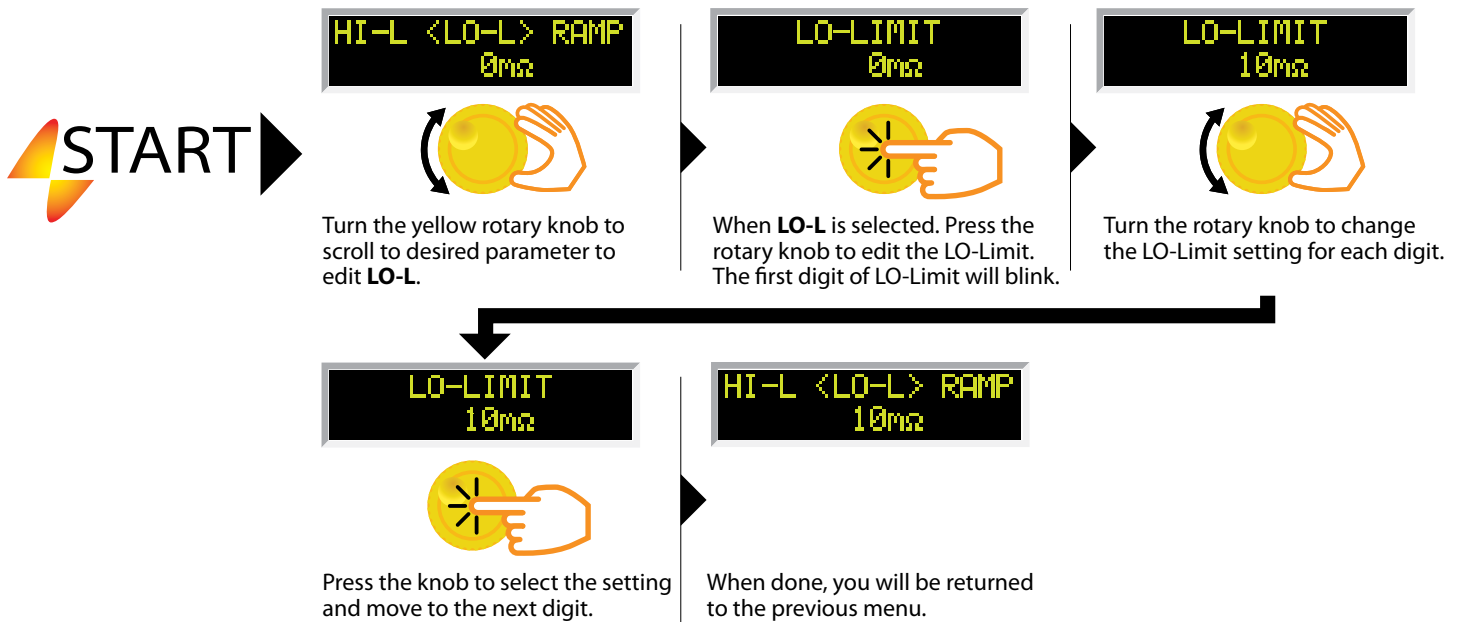
### PROGRAM A MEMORY: CHANGE CURRENT



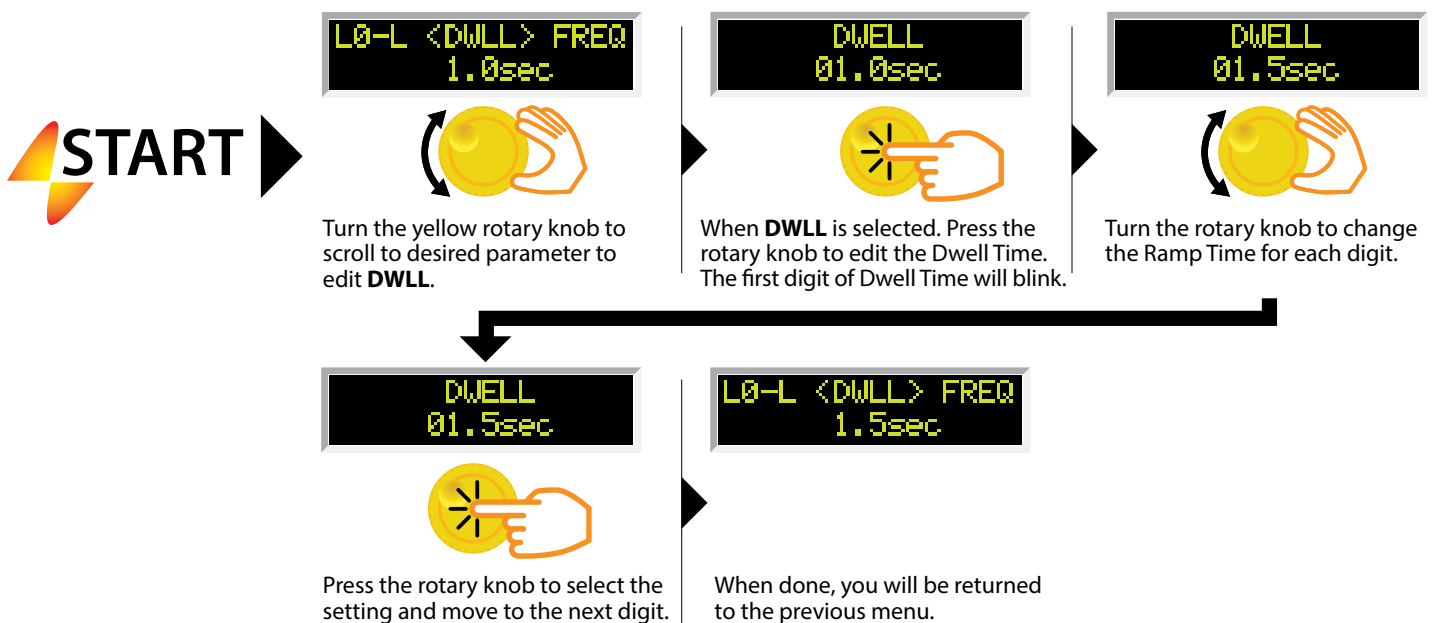
### PROGRAM A MEMORY: CHANGE HI-LIMIT



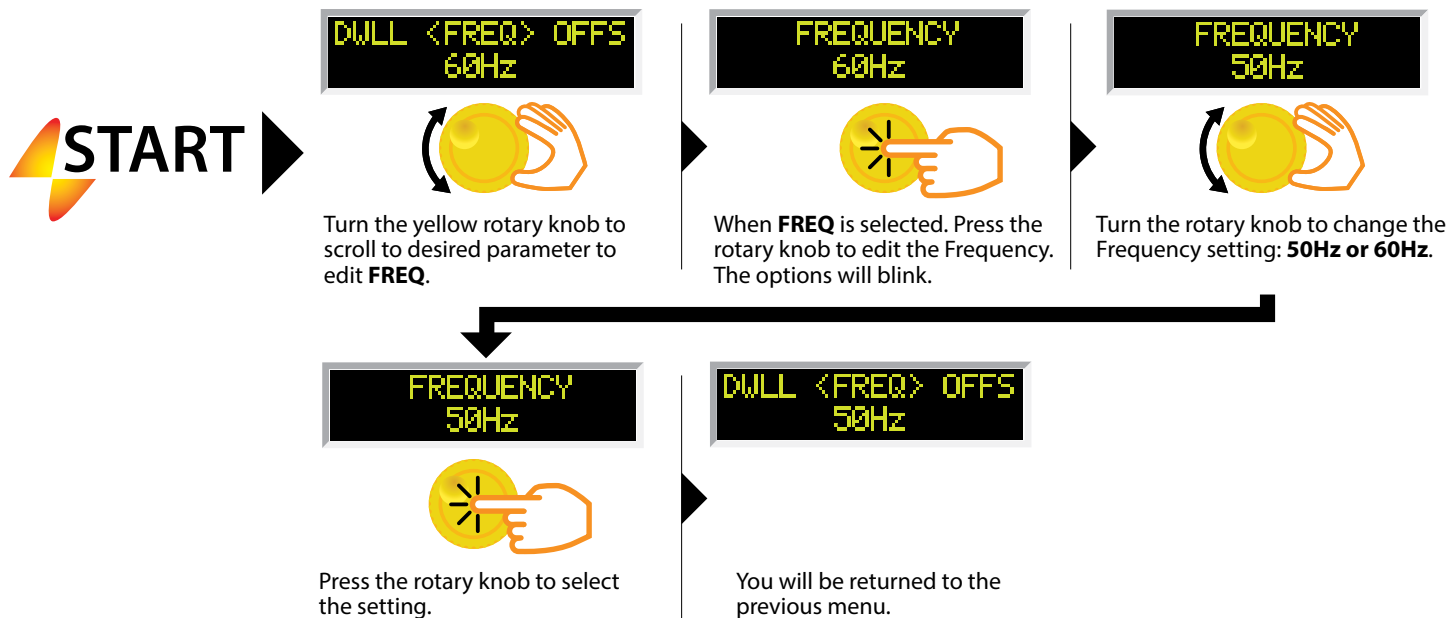
## PROGRAM A MEMORY: CHANGE LO-LIMIT



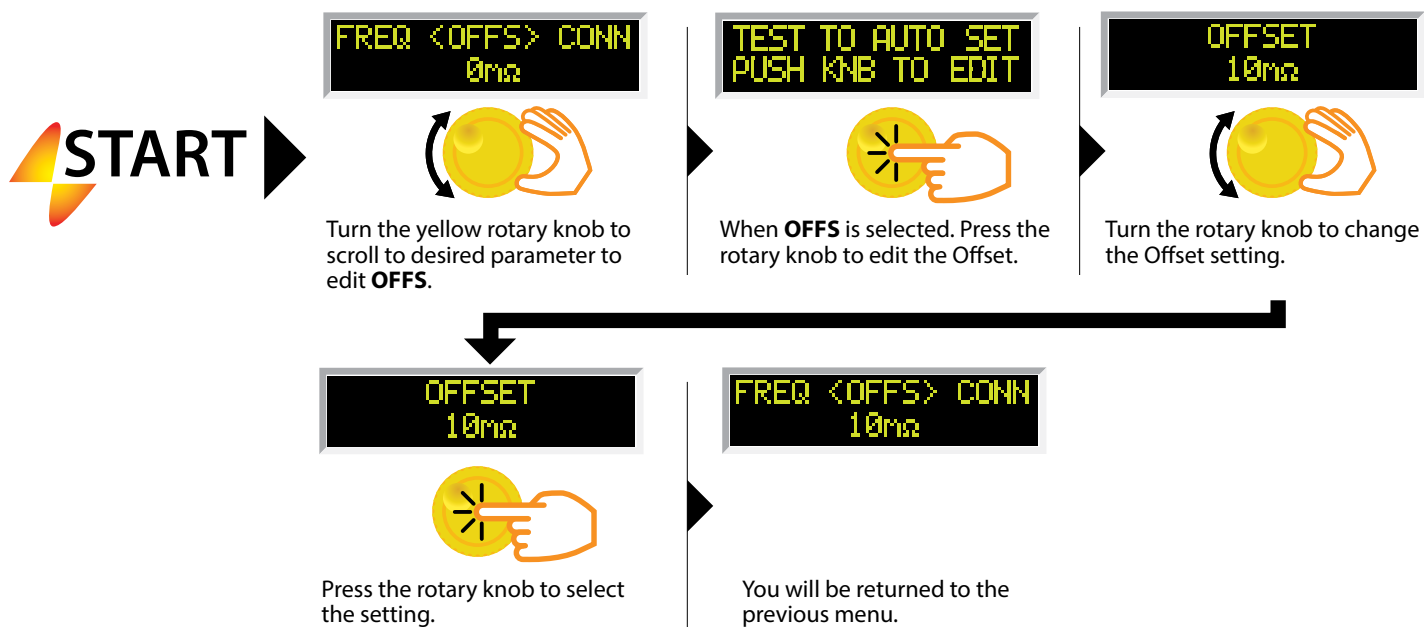
## PROGRAM A MEMORY: CHANGE DWELL



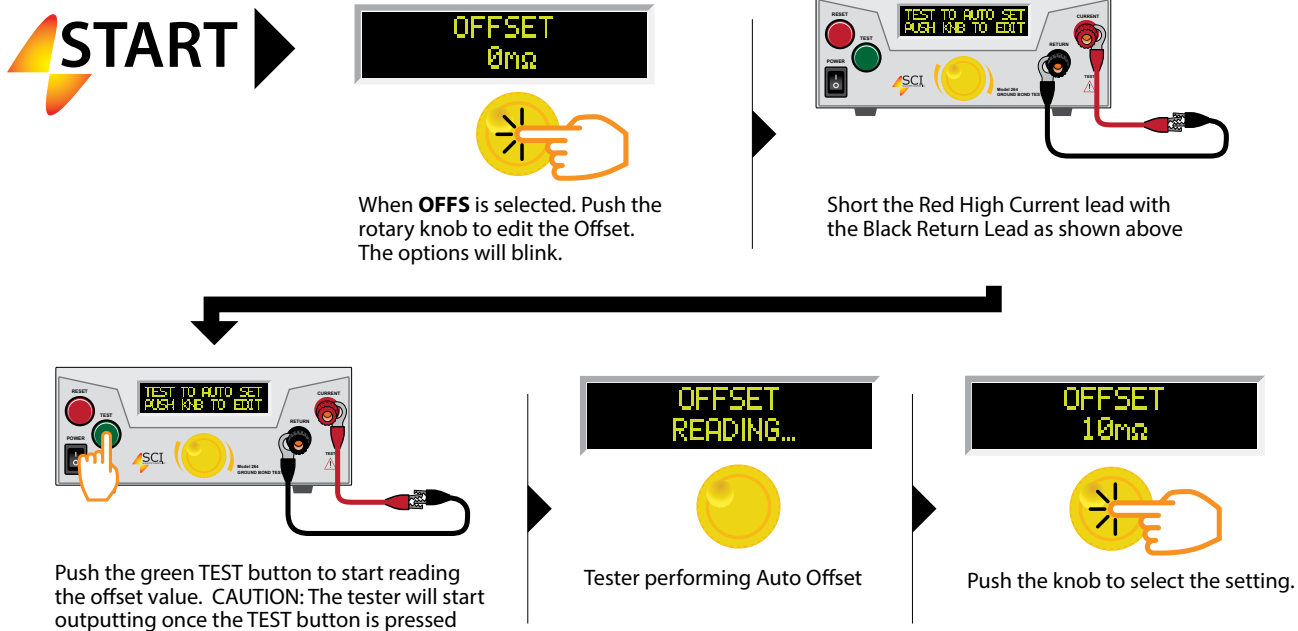
## PROGRAM A MEMORY: CHANGE FREQUENCY



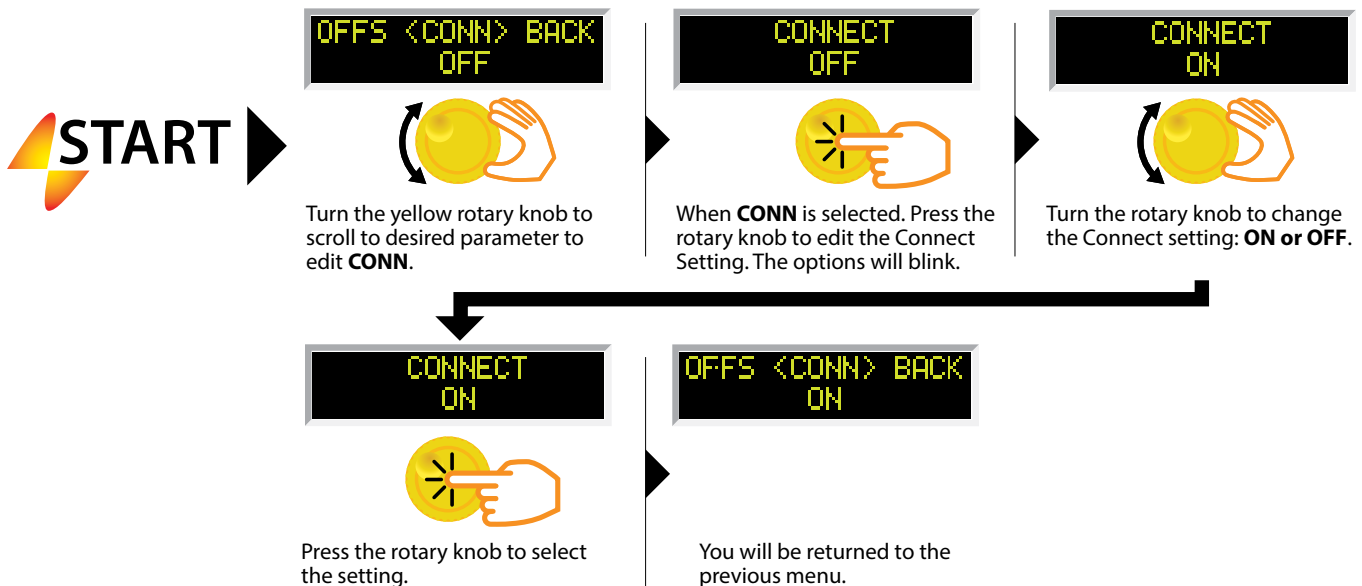
## PROGRAM A MEMORY: CHANGE OFFSET (MANUAL)



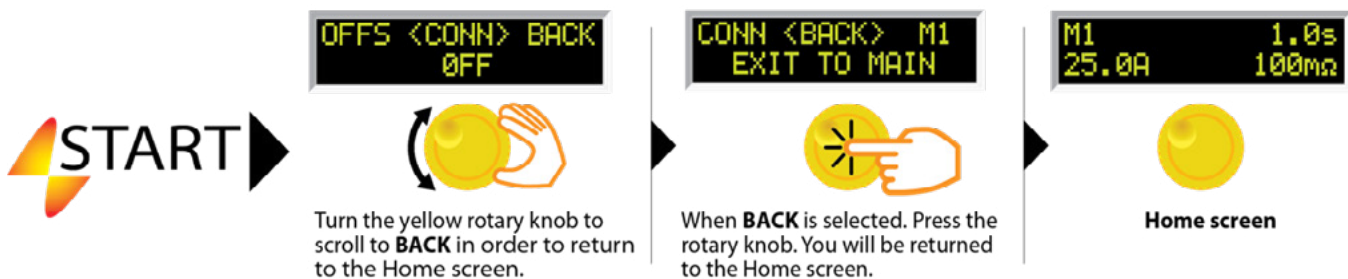
## PROGRAM A MEMORY: CHANGE OFFSET (AUTO)



## PROGRAM A MEMORY: CHANGE CONNECT



## GO BACK TO THE HOME SCREEN



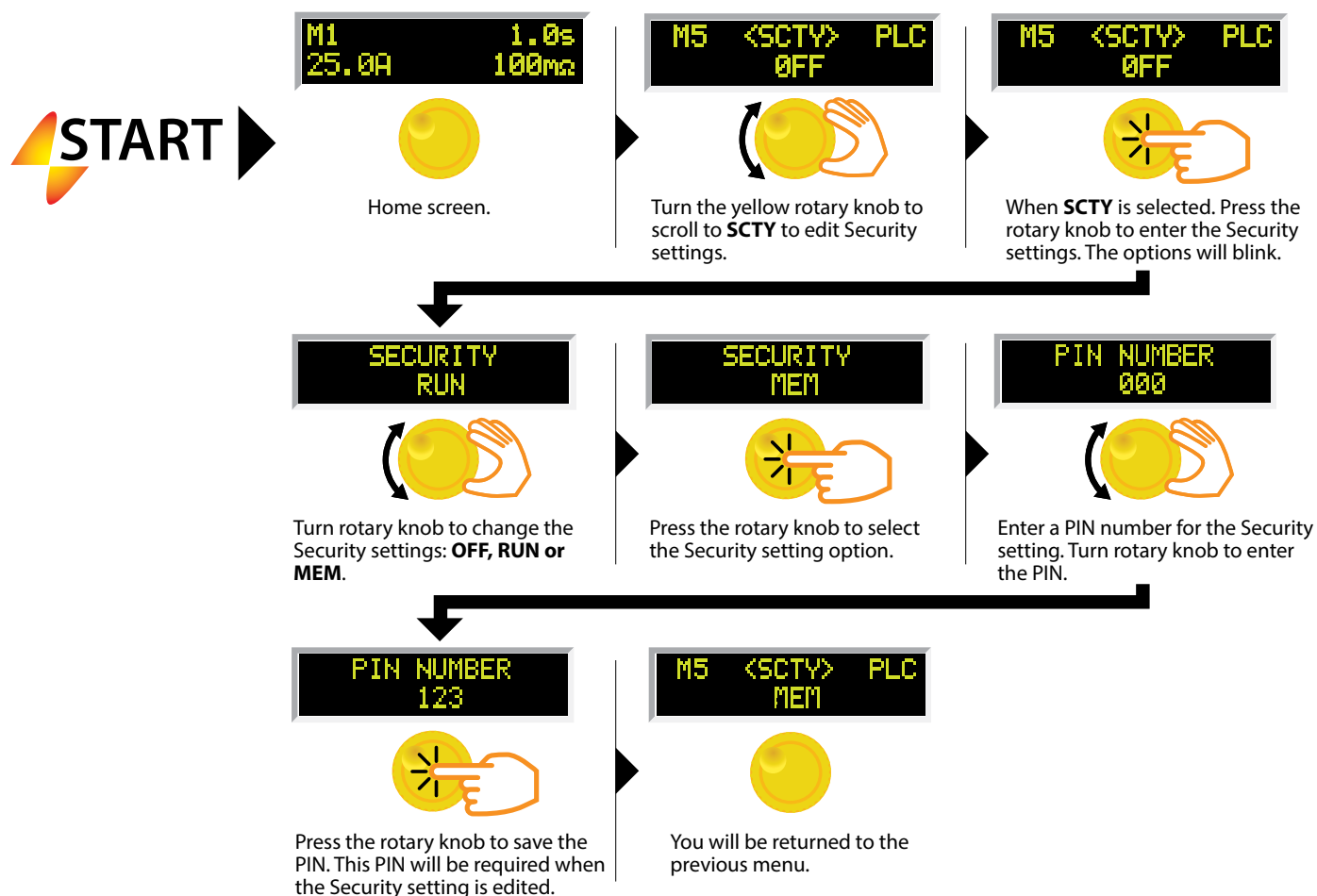
## System Parameter Descriptions

| System Parameter | Setting | Description                                                                                                                                                                                                                                                                                         |
|------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PLC Remote       | ON/OFF  | Allows the user to initiate a test through the REMOTE INPUT on the rear panel of the tester. If PLC Remote = ON the front panel TEST button is disabled and a test may only be started through the rear panel I/O. If PLC Remote = OFF, the test must be initiated via the front panel TEST button. |
| SCTY (security)  | OFF     | With SCTY set to OFF all test and system parameters can be edited.                                                                                                                                                                                                                                  |
|                  | RUN     | With SCTY set to RUN the user will not be able to recall any of the memory locations or edit any of the test and system parameters. With this setting if the user attempts to edit any test or system parameter the following message will be displayed, "Security is RUN, can't be edited."        |
|                  | MEM     | With SCTY set to MEM the user will be able to recall any of the 5 available memory locations. The user will not be able to edit any test or system parameters.                                                                                                                                      |

*\*Anytime the Security setting is changed the user will be asked to enter a PIN number. This PIN will be required again if the Security parameter needs to be set to a different setting. Refer to the Edit Security flow chart for instructions on setting the PIN.*

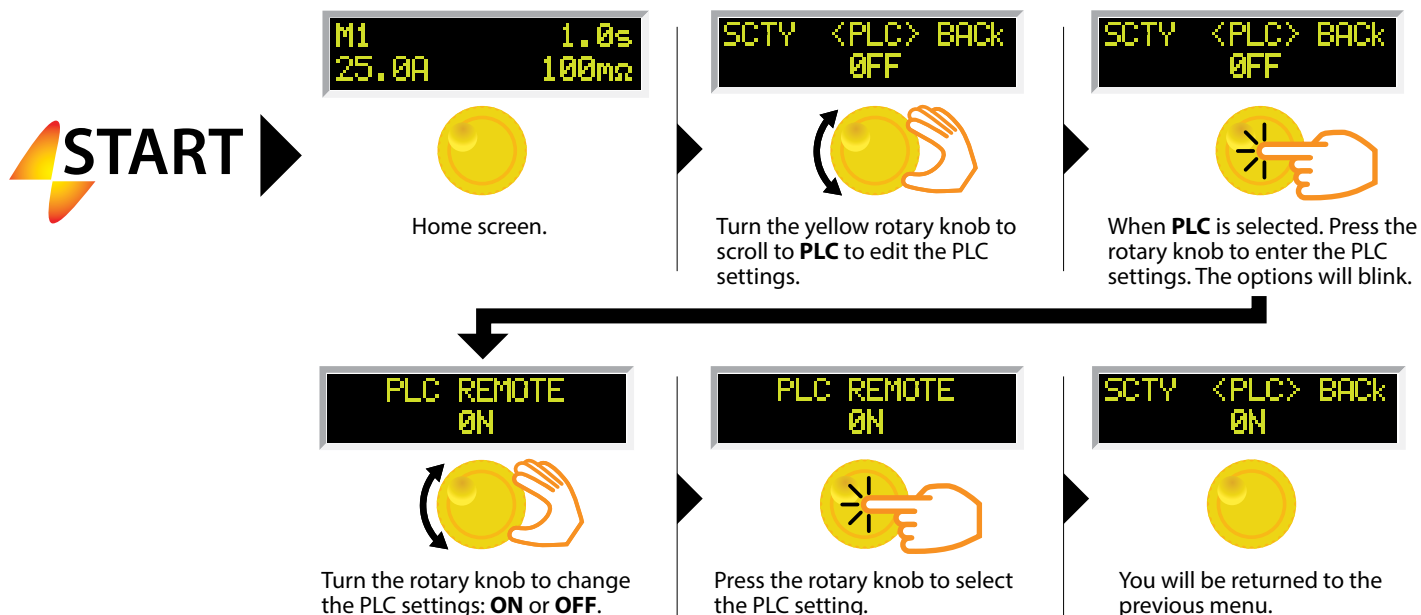
## Setting System Parameters

### EDIT SECURITY SETTINGS





## EDIT PLC REMOTE SETTINGS

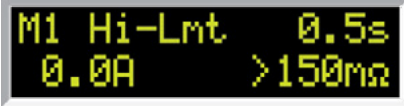
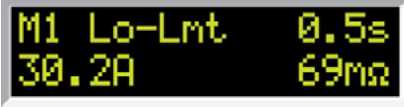


## Using the Display

### Test Mode Displays

| Test Mode Display | Description                                                                                                                        |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------|
|                   | Displayed when the test current is ramping up from 0.0 A to full test current. The ramp is fixed at 0.1 second.                    |
|                   | Displayed when the test current has reached full potential. Dwell is the amount of time the current is held at the set value.      |
|                   | Displayed when a test sequence has passed. The green TEST button will illuminate and a short audible beep tone will be activated.  |
|                   | Displayed if the operator elects to stop a test in process. This can be accomplished by pressing the RESET button during the test. |

## Failure Mode Displays

| Failure Mode Display**                                                           | Description                                                                                                                                   |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Displayed if the resistance exceeds the metering range.</p> <p>For current range 3.0 – 10.0A (Model 264)<br/>3.0 – 15.0A (Model 266)</p>   |
|  | <p>Displayed if the resistance exceeds the metering range.</p> <p>For current range 10.1 – 30.0A (Model 264)<br/>15.1 – 30.0A (Model 266)</p> |
|  | <p>Displayed if the resistance exceeds the metering range.</p> <p>For current range 30.1 – 40.0A (Model 264)<br/>30.1 – 60.0A (Model 266)</p> |
|  | <p>Displayed if the resistance exceeds the high limit trip setting, but do not exceed the metering range.</p>                                 |
|  | <p>Displayed if the resistance does not exceed the low limit setting.</p>                                                                     |

\*\* For all failures, the red RESET button will illuminate and an alarm will be activated. To stop the alarm, please press the RESET button once. The alarm will stop and the display will retain the failure information. The tester is now ready for the next test. If the RESET button is pressed again, the failure information will be cleared and the display will indicate the setting data of the executed test.

## Error Messages

| Display                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                  | <p>All of the buttons are not active in this situation. This type of failure permanently locks the tester in the Fatal Error mode and required that the tester be serviced by a SCI authorized service center. Contact the SCI Customer Support Center at 1-800-504-0055 to receive further instruction.</p> <p><b>FATAL ERROR 9002</b> will appear on the display, if the tester's System data or the Model/Option data are corrupted and do not match the setting.</p> <p><b>FATAL ERROR 9003</b> will appear on the display, if the tester's Calibration data is corrupted.</p> |
|  | <p>This message appears on the display, if the tester detects internal over temperature conditions. This message indicates the tester is heating up beyond the specified operating conditions.</p>                                                                                                                                                                                                                                                                                                                                                                                 |

## Reviewing Test Results for Multistep Sequences

After the test is performed, the test results will be indicated on the front panel display.

Pass: If the DUT passes the test, you will hear a short audible beep and the display will indicate the test result.

Fail: If a failure occurs, you will hear a long audible alarm and the red flashing indicator will light up. To stop the alarm, press the RESET button.

The test results from the memories that are executed can be reviewing by turning the rotary knob left or right. Successive rotation of the knob will continue advancing to the next result. The results of the last step in the process will be followed by the first step when scrolling through the results. Results can be reviewed at any time before the next test is executed. All results are cleared at the start of the next test cycle.

## Using the Remote I/O

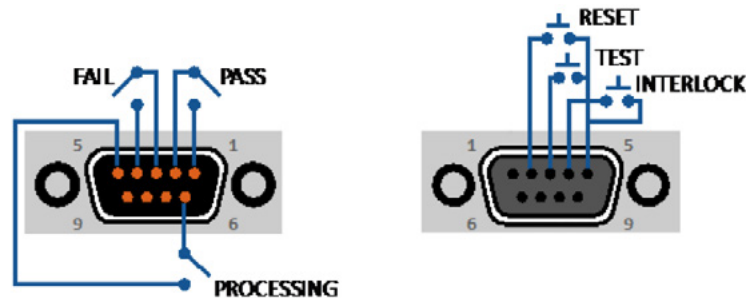
Two 9-pin “D” type connectors are mounted on the rear panel that provides REMOTE-INPUT-OUTPUT control and information.

- These connectors mate with standard 9 pin D-sub-miniature connector provided by the user.
- The output mates to a male (plug) connector while the input mates to a female (receptacle) connector.
- For best performance, a shielded cable should be used. To avoid ground loops the shield should not be grounded at both ends of the cable.

### Suggested AMP part numbers for interconnecting to the Remote I/O

| Part Number | Description                                          |
|-------------|------------------------------------------------------|
| 205204-4    | PLUG SHELL WITH GROUND INDENTS                       |
| 205203-3    | RECEPTACLE SHELL                                     |
| 745254-7    | CRIMP SNAP-IN PIN CONTACT (for plug)                 |
| 745253-7    | CRIMP SNAP-IN SOCKET CONTACT (for receptacle)        |
| 745171-1    | SHIELDED CABLE CLAMP (for either plug or receptacle) |
| 747784-3    | JACKSCREW SET (2)                                    |

### REMOTE I/O Pinouts



## Signals on Remote I/O

### REMOTE INPUT/OUTPUT

#### Remote Output

| Output Signal | Pins    | Description                                                                                                                                                                        |
|---------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PASS          | 1 and 2 | The relay contact closes after detecting that the device under test passed all tests. The connection is opened when the next test is initiated or the reset function is activated. |
| FAIL          | 3 and 4 | The relay contact closes after detecting that the device under test failed any test. The connection is opened when the next test is initiated or the reset function activated.     |
| PROCESSING    | 5 and 6 | The relay contact closes while the tester is performing a test. The connection is opened at the end of the test.                                                                   |

*These are normally open free contacts and will not provide any voltage or current. The ratings of the contacts are 1 AAC/250 VAC (0.5 ADC). When a terminal becomes active, the relay closes thereby allowing the external voltage to operate an external device.*

#### Remote Input

| Output Signal | Pins    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TEST          | 3 and 5 | A normally open momentary switch can be wired across pins 3 and 5 to allow remote operation of the TEST function.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| REST          | 2 and 5 | A normally open momentary switch can be wired across pins 2 and 5 to allow remote operation of the RESET function. For safety, the front panel RESET button remains active even when a remote reset switch is connected so that high current can be shut down from either location.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| INTERLOCK     | 4 and 5 | <p>Remote Interlock utilizes a set of closed contacts to enable the tester's output. The output of the tester will be disabled under the following conditions:</p> <ul style="list-style-type: none"><li>• If the Interlock contacts are open and the TEST button is pushed</li><li>• If the interlock contacts are opened during a test (test will automatically abort)</li></ul> <p>A pop-up message will be displayed on the screen:</p>  <p>The tester can still be used without the external interlock device as long as the Interlock Connector (P/N # 99-10040-01 provided with unit) is plugged into the Remote Interface, Signal Input port. If there is nothing connected to the Remote Interface, Signal Input port to provide a connection to the interlock, the tester will not perform tests.</p> |

*When the PLC Remote mode is ON, the tester will respond to simple switch or relay contacts closures. When the PLC Remote function is ON the TEST button on the front panel will be disabled.*

### WARNING

**ACTIVATING TEST PROGRAM FUNCTIONS THROUGH THE REMOTE CONNECTOR SELECTS THE MEMORY AND STARTS THE TEST THAT IS PRE-PROGRAMMED INTO THAT MEMORY.**

### CAUTION

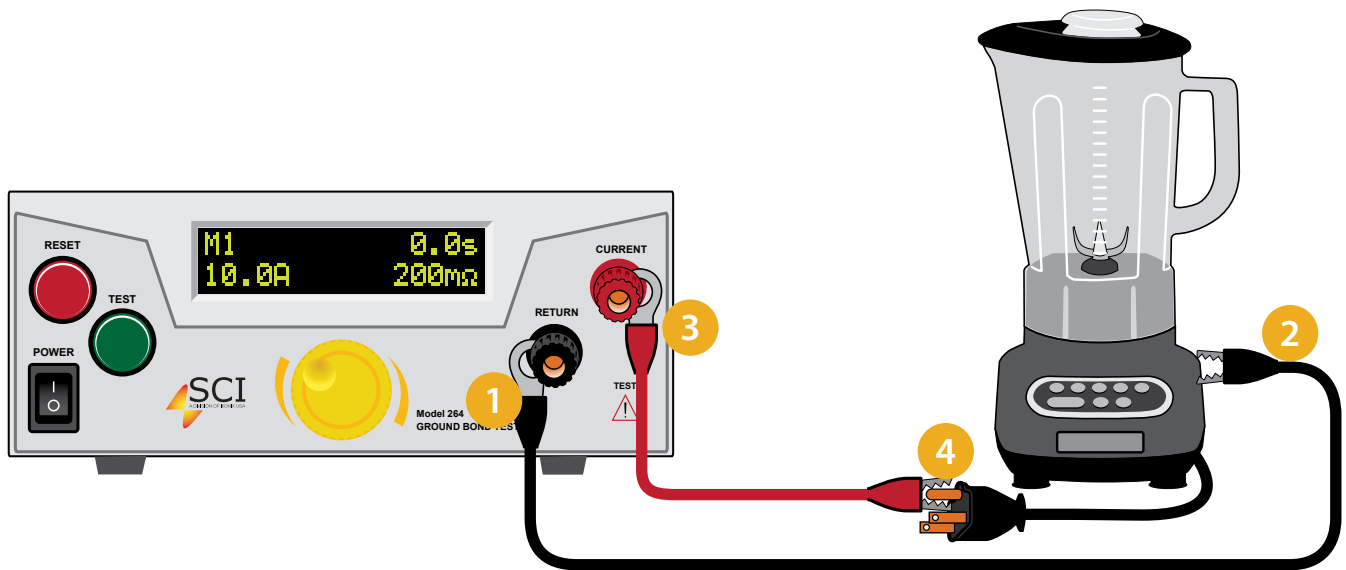
**Do not connect voltage or current to the signal inputs. Applying voltage to the signal input could result in damage to the control circuitry.**

## Using the Tester Accessories

### WARNING

NEVER CONNECT THE ADAPTER BOX OR TEST LEADS TO THE TESTER WHILE THE HIGH CURRENT OUTPUTS ARE ENERGIZED.

### Using the Test Leads



- 1 Hook the black return lead 99-10725-01 (Model 264) or 99-10238-01 (Model 266) to the black return terminal on the front panel of the tester.
- 2 Clip the other end of the black return lead to the chassis of the DUT.
- 3 Hook one end of the red high current test lead 99-10724-01 (Model 264) or 99-10239-01 (Model 266) to the red current terminal on the front panel of the tester.
- 4 Clip the other end of the red high current test lead to ground pin of the DUT's power cord.

## Installation

### 1. Unpacking and Inspection

Your tester was shipped in a custom foam insulated container that complies with ASTM D4169-92a Assurance Level II Distribution Cycle 13 Performance Test Sequence.

If the shipping carton is damaged, inspect the contents for visible damage such as dents, scratches, or broken meters. If the tester is damaged, notify the carrier and the SCI customer support department immediately. Please save the shipping carton and packing material for the carrier's inspection. Our customer support department will assist you in the repair or replacement of your tester. Please do not return your product without first notifying us and receiving an RMA (return materials authorization) number.

### 2. Safe Lifting and Carrying Instructions

Proper methods of lifting and carrying can help to protect against injury. Follow the recommendations below to ensure that testers are handled in a safe manner.

- Determine if the tester can be lifted by one individual or requires additional support.
- Make sure that your balance is centered and your feet are properly spaced, shoulder width apart behind the tester.
- Bend at the knees and make sure your back is straight.
- Grip the tester with your fingers and palms and do not lift unless your back is straight.
- Lift up with your legs, not your back.
- Keep the tester close to your body while carrying.
- Lower the tester by bending your knees. Keep your back straight.

### 3. Contents of the Carton

Inside the carton will be the following:

| Description              | SCI Part Number                              |
|--------------------------|----------------------------------------------|
| 264 Series Tester        | 264 Ground Bond Tester                       |
| High Current Return Lead | 99-10725-01                                  |
| High Current Output Lead | 99-10724-01                                  |
| Fuse                     | 99-10783-01, 10 Amp, slow blow, 250VAC, 20mm |
| Interlock Connector      | 99-10040-01                                  |
| Line Cord*               | 125-013-001 Standard                         |

| Description              | SCI Part Number                              |
|--------------------------|----------------------------------------------|
| 266 Series Tester        | 266 Ground Bond Tester                       |
| High Current Return Lead | 99-10238-01                                  |
| High Current Output Lead | 99-10239-01                                  |
| Fuse                     | 99-10791-01, 12 Amp, slow blow, 250VAC, 30mm |
| Interlock Connector      | 99-10040-01                                  |
| Line Cord*               | 99-10164-01 Standard                         |

*\*The Line Cord listed is American. Other combinations of the Line Cord are available upon request.*

## WARNING

ONLY ACCESSORIES WHICH MEET THE MANUFACTURER'S SPECIFICATION SHALL BE USED.

### 4. Preparation for Use

Power Requirements and Line Voltage Selection

## CAUTION

This tester requires a power source of either 100 – 120 / 200 – 240 volts AC  $\pm 10\%$ , 47-63 Hz single phase (Model 264) or 100 - 240 volts AC  $\pm 10\%$ , 47-63 Hz single phase (Model 266). In addition, please be sure the correct fuse is selected and installed while the tester is in the off position.

#### NOTE

For operation at 115 Volts AC and 230 Volts AC use a 10 A slow blow fuse (model 264).

For operation at 115 Volts AC and 230 Volts AC use a 12 A slow blow fuse (model 266).

### 5. Power Cable

## WARNING

BEFORE CONNECTING POWER TO THIS TESTER, THE PROTECTIVE GROUND (EARTH) TERMINALS OF THIS TESTER MUST BE CONNECTED TO THE PROTECTIVE CONDUCTOR OF THE LINE (MAINS) POWER CORD. THE MAIN PLUG SHALL ONLY BE INSERTED IN A SOCKET OUTLET (RECEPTACLE) PROVIDED WITH A PROTECTIVE GROUND (EARTH) CONTACT. THIS PROTECTIVE GROUND (EARTH) MUST NOT BE DEFEATED BY THE USE OF AN EXTENSION CORD (POWER CABLE) WITHOUT A PROTECTIVE CONDUCTOR (GROUNDING).

This tester is shipped with a three-wire power cable. When this cable is connected to an appropriate AC power source, this cable connects the chassis to earth ground. The type of power cable shipped with each tester depends on the country of destination.

## Operating Environment

This equipment is intended for indoor use only. The equipment has been evaluated according to Installation Category II and Pollution Degree 2 as specified in IEC 664.

This tester may be operated within the following environmental conditions:

Temperature.....41° - 104° F (5° - 40° C)

Relative humidity ..... 0 - 80%

Altitude.....6,560 feet (2,000 meters)

## WARNING

DO NOT BLOCK ANY VENTILATION OPENINGS TO PREVENT OVER HEATING OF THE EQUIPMENT. KEEP THE VENTILATION SLITS UNCOVERED DURING OPERATION. FAILURE TO DO SO COULD CAUSE THE TESTER TO OVERHEAT AND MAY DAMAGE INTERNAL COMPONENTS.

If the tester is used in a matter not specified by the manufacturer, the protection provided by the tester may be impaired.



# Storage and Shipment

## Environment

This tester may be stored or shipped in environments with the following limits:

Temperature.....-40° - 167° F (-40° - 75°C)

Altitude..... 50,000 feet (15,240 meters)

The tester should also be protected against temperature extremes which may cause condensation within the tester.

## Packaging

Contact our customer support department (1-847-932-3662) for an RMA (return materials authorization) number. Please enclose the tester with all options, accessories, and test leads. Indicate the nature of the problem or type of service needed. Also, please mark the container "FRAGILE" to insure proper handling. Please refer to the RMA number for all correspondence.

Packaging Instructions:

1. Be sure to REMOVE ALL ACCESSORIES and the INTERLOCK DISABLE from the tester.
2. Wrap the tester in a bubble pack or similar foam. Enclose the same information as above.
3. Use a strong double-wall container that is made for shipping instrumentation. 350 lb. test material is adequate.
4. Use a layer of shock-absorbing material 70 to 100 mm (3 to 4 inch) thick around all sides of the tester. Protect the control panel with cardboard.
5. Seal the container securely.
6. Mark the container "FRAGILE" to insure proper handling.
7. Please ship models 264/266 via Federal Express or UPS air.
8. Please refer in all correspondence to your RMA number.

# Test Operator and Safety Considerations

## 1. Qualifications

This tester generates voltages and currents which can cause harmful or fatal electric shock and must only be operated by a skilled worker trained in its use.

The operator should understand the electrical fundamentals of voltage, current, and resistance.

## 2. Safety Procedures

Operators should be thoroughly trained to follow these and all other applicable safety rules and procedures before they begin a test. Defeating any safety system should be treated as a serious offense and should result in severe penalties, such as removal from the Ground Bond testing job. Allowing unauthorized personnel in the area during a test should also be dealt with as a serious offense.

## 3. Dress

Operators should not wear jewelry which could accidentally complete a circuit.

## 4. Medical Restrictions

This tester should not be operated by personnel with heart ailments or devices such as pacemakers.

## 5. Test Procedures

### **WARNING**

**NEVER PERFORM A TEST ON ENERGIZED CIRCUITRY OR EQUIPMENT!**

If the tester has an external safety-ground connection, be sure that this is connected. Then connect the return lead first for any test regardless of whether the device under test is a sample of insulating material tested with electrodes, a component tested with the high current test lead, or a cord-connected device with a two or three-prong plug.

Plug in the high current test lead only when it is being used. Handle its clip only by the insulator---never touch the clip directly. Be certain that the operator has control over any remote test switches connected to the tester. Double-check the return and high current connections to be certain that they are proper and secure.

### **WARNING**

**NEVER TOUCH THE ITEM UNDER TEST OR ANYTHING CONNECTED TO IT WHILE HIGH CURRENT IS PRESENT DURING THE GROUND BOND TEST.**

## 6. Test Station

### Location

Select an area away from the main stream of activity which employees do not walk through in performing their normal duties. If this is not practical because of production line flow, then the area should be roped off and marked for **HIGH CURRENT TESTING**. No employees other than the test operators should be allowed inside. If benches are placed back-to-back, be especially careful about the use of the bench opposite the test station. Signs should be posted: "**DANGER - HIGH CURRENT TEST IN PROGRESS - UNAUTHORIZED PERSONNEL KEEP AWAY**".

### Power

Test Equipment must be connected to a good ground. Be certain that the power wiring to the test bench is properly polarized and that the proper low resistance bonding to ground is in place.

Power to the test station should be arranged so that it can be shut off by one prominently marked switch located at the entrance to the test area. In the event of an emergency, anyone can cut off the power before entering the test area to offer assistance.

#### WARNING

THE MAINS PLUG IS USED AS THE DISCONNECTING DEVICE AND SHALL REMAIN READILY OPERABLE. THE SOCKET-OUTLET SHALL BE INSTALLED NEAR THE EQUIPMENT AND SHALL BE EASILY ACCESSIBLE.

#### CAUTION

Do not replace the power supply cord with an improperly rated cord. For North American: A UL listed and CSA labeled power cord must be used with the tester in the United States and Canada. The power cord must include a NEMA5-15 style male plug, SVT or SJT cord sets, and be rated for at least 125VAC, 10A, number 16 gauge (or 125VAC, 15A, number 14 gauge) wire or larger, and the length of the cord does not exceed 2 m must be used. For European: A certified power supply cord not lighter than light PVC sheathed flexible cord according to IEC 60227, designation H03 VV-F or H03 VVH2-F (for equipment mass not exceeding 3 kg), or H05 VV-F or H05 VVH2-F2 (for equipment mass exceeding 3 kg), and be rated for at least 3G 0.75 mm<sup>2</sup> (for rated current up to 10 A) or 3G 1.0mm<sup>2</sup> (for rated current over 10 A up to 16 A) wire or larger, and the length of the cord does not exceed 2 m must be used.

### Work Area

Perform the tests on a non-conducting table or workbench, if possible. There should not be any metal in the work area between the operator and the location where products being tested will be positioned.

Position the tester so the operator does not have to reach over the product under test to activate or adjust the tester. If the product or component being tested is small, it may be possible to construct guards or an enclosure, made of a non-conducting material such as clear acrylic, such that the item being tested is within the guards or enclosure during the test, and fit them with switches so that the tester will not operate unless the guards are in place or the enclosure closed. The outlet which is used to provide power to the tester should be easily accessible.

Keep the area clean and uncluttered. All test equipment and test leads not absolutely necessary for the test should be removed from the test bench and put away. It should be clear to both the operator and to any observers which product is being tested, and which ones are waiting to be tested or have already been tested. If the tester is used in a manner not specified by SCl, the protection provided by the tester may be impaired.

Do not perform tests in a combustible atmosphere or in any area where combustible materials are present.

#### KEY SAFETY POINTS TO REMEMBER

- Keep unqualified and unauthorized personnel away from the test area.
- Arrange the test station in a safe and orderly manner.
- Never touch the product or connections during a test.
- In case of any problem, turn off the power first.

## Appendix B - 260 Series Tester Specifications

### Why use the term “Counts”?

SCI publishes some specifications using COUNTS which allows us to provide a better indication of the tester’s capabilities across measurement ranges. A COUNT refers to the lowest resolution of the display for a given measurement range. For example, if the resolution for voltage is 1V then 2 counts = 2V.

### Model 264 Functional Specifications

Unless otherwise stated, accuracy’s are relative to a laboratory standard measurement.

| INPUT                  |                                                     |                                                                                                                                            |
|------------------------|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage                | 100 – 120V / 200 - 240V ± 10% variation, Auto Range |                                                                                                                                            |
| Frequency              | 50 / 60 Hz ± 5%                                     |                                                                                                                                            |
| Fuse                   | 10A / 250 VAC Slow Blow                             |                                                                                                                                            |
| GROUND BOND TEST MODE  |                                                     |                                                                                                                                            |
| Output Voltage         | Range:                                              | 8 V AC, Fixed                                                                                                                              |
| Output Frequency       | Range:<br>Accuracy:                                 | 60 or 50 Hz, User Selectable<br>± 0.1 %                                                                                                    |
| Output Current         | Range:<br>Resolution:<br>Accuracy:                  | 3.0 – 40.0 A AC<br>0.1 A<br>± (2 % of setting + 1 count)                                                                                   |
| Current Display        | Range:<br>Resolution:<br>Accuracy:                  | 0.0 – 40.0 A AC<br>0.1 A<br>± (3 % of reading + 1 count)                                                                                   |
| Resistance Display     | Range:<br>Resolution:<br>Accuracy:                  | 0 – 600 mΩ<br>1<br>± (2% of setting + 3 counts) for 3 – 5.9 A<br>± (2% of setting + 2 counts) for 6 – 40.0 A                               |
| HI and LO-Limit        | Range:<br><br>Accuracy:                             | 0 – 600 mΩ      for 3.0 - 10.0 A<br>0 – 200 mΩ      for 10.1 - 30.0 A<br>0 – 150 mΩ      for 30.1 - 40.0 A<br>± (2% of setting + 2 counts) |
| Dwell Timer            | Range:<br>Resolution:<br>Accuracy:                  | 0, 0.5 – 240.0 sec (0 = Continuous)<br>0.1 sec<br>± (0.1% + 0.05 sec)                                                                      |
| Ramp Timer             | Range:                                              | 0.1 sec, Fixed                                                                                                                             |
| Milliohm Offset        | Range:<br>Resolution:<br>Accuracy:                  | 0 – 100 mΩ<br>1 mΩ<br>± (2% of setting + 2 counts)                                                                                         |
| GENERAL SPECIFICATIONS |                                                     |                                                                                                                                            |
| Safety Agency Listing  | 264                                                 | CE, TUV SUD, RoHS2                                                                                                                         |
|                        | 266                                                 | CE, cTUVus, RoHS2                                                                                                                          |
| PLC Remote Control     | Input:<br>Output:                                   | Test, Reset, Hardware Interlock<br>Pass, Fail, Test-in-Process                                                                             |

|               |                                                                                                                                                                                                                                                                                                        |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Memory        | 5 memories, All memories are linkable                                                                                                                                                                                                                                                                  |
| Security      | <p>Run Only Mode (RUN) - To avoid unauthorized access to test parameters and memory locations.</p> <p>Memory Mode (MEM)- Allows access to memory locations but restricts any changes in test parameters.</p>                                                                                           |
| Line Cord     | Detachable 6 ft. (1.8 m) power cable terminated in a three-prong grounding plug.                                                                                                                                                                                                                       |
| Terminations  | 6 ft. (1.8 m) ground bond test and return leads (2) with clips. An optional remote receptacle box may be purchased for testing items terminated with a line cord. International receptacles are also available.                                                                                        |
| Dimensions    | 8.5 x 3.5 x 11.81 inches (215 x 88 x 300 mm) (WxHxD)                                                                                                                                                                                                                                                   |
| Weight        | 9.25 lbs. (4.2 Kg)                                                                                                                                                                                                                                                                                     |
| Mechanical    | Tilt up front feet                                                                                                                                                                                                                                                                                     |
| Environmental | <p>Operating Temperature : 32° - 104°F (0° - 40°C)</p> <p>Relative Humidity: 20 to 80%</p>                                                                                                                                                                                                             |
| Calibration   | Calibrated using standards with accuracies traceable to the National Institute of Standards and Technology (NIST). Calibration controlled by software. Adjustments are made through front panel keypad in a restricted access calibration mode. Calibration information stored in non-volatile memory. |

## Model 266 Functional Specifications

Unless otherwise stated, accuracy's are relative to a laboratory standard measurement.

| INPUT                  |                                        |                                                                                                                                                                                                       |
|------------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage                |                                        | 100 - 240V $\pm$ 10% variation                                                                                                                                                                        |
| Frequency              |                                        | 50 / 60 Hz $\pm$ 5%                                                                                                                                                                                   |
| Fuse                   |                                        | 12A / 250V AC Slow Blow                                                                                                                                                                               |
| GROUND BOND TEST MODE  |                                        |                                                                                                                                                                                                       |
| Output Voltage         | Range:                                 | 12 V AC, Fixed                                                                                                                                                                                        |
| Output Frequency       | Range:<br>Accuracy:                    | 60 or 50 Hz, User Selectable<br>$\pm$ 0.1%                                                                                                                                                            |
| Output Current         | Range:<br>Resolution:<br>Accuracy:     | 3.0 – 60.0 A AC<br>0.1 A<br>$\pm$ (2% of setting + 1 count)                                                                                                                                           |
| Current Display        | Range:<br>Resolution:<br>Accuracy:     | 0.0 – 60.0 A AC<br>0.1 A<br>$\pm$ (3% of reading + 1 count)                                                                                                                                           |
| Resistance Display     | Range:<br>Resolution:<br>Accuracy:     | 0 – 600 m $\Omega$<br>1<br>$\pm$ (3% of setting + 3 counts) for 3 – 5.9 A<br>$\pm$ (2% of setting + 2 counts) for 6 – 60.0 A                                                                          |
| HI and LO-Limit        | Range:<br><br>Resolution:<br>Accuracy: | 0 – 600 m $\Omega$ for 3.0 - 15.0 A<br>0 – 300 m $\Omega$ for 15.1 - 30.0 A<br>0 – 150 m $\Omega$ for 30.1 - 60.0 A<br>1 m $\Omega$<br>$\pm$ (2% of setting + 2 counts)                               |
| Dwell Timer            | Range:<br>Resolution:<br>Accuracy:     | 0, 0.5 – 240.0 sec (0 = Continuous)<br>0.1 sec<br>$\pm$ (0.1% + 0.05 sec)                                                                                                                             |
| Ramp Timer             | Range:                                 | 0.1 sec, Fixed                                                                                                                                                                                        |
| Milliohm Offset        | Range:<br>Resolution:<br>Accuracy:     | 0 – 100 m $\Omega$<br>1 m $\Omega$<br>$\pm$ (2% of setting + 2 counts)                                                                                                                                |
| GENERAL SPECIFICATIONS |                                        |                                                                                                                                                                                                       |
| PLC Remote Control     | Input:<br>Output:                      | Test, Reset, Hardware Interlock<br>Pass, Fail, Test-in-Process                                                                                                                                        |
| Memory                 |                                        | 5 available memory locations                                                                                                                                                                          |
| Security               |                                        | Run Only Mode (RUN) - To avoid unauthorized access to test parameters and memory locations.<br><br>Memory Mode (MEM)- Allows access to memory locations but restricts any changes in test parameters. |

|               |                                                                                                                                                                                                                                                                                                        |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Line Cord     | Detachable 6 ft. (1.8 m) power cable terminated in a three-prong grounding plug.                                                                                                                                                                                                                       |
| Terminations  | 6 ft. (1.8 m) ground bond test and return leads (2) with clips. An optional remote receptacle box may be purchased for testing items terminated with a line cord. International receptacles are also available.                                                                                        |
| Dimensions    | 16.93 x 5.20 x 11.81 inches (430 x 132 x 300 mm) (WxHxD)                                                                                                                                                                                                                                               |
| Weight        | 20.25 lbs. (9.2 Kg)                                                                                                                                                                                                                                                                                    |
| Mechanical    | Tilt up front feet                                                                                                                                                                                                                                                                                     |
| Environmental | Operating Temperature : 32° - 104°F (0° - 40°C)<br>Relative Humidity: 20 to 80%                                                                                                                                                                                                                        |
| Calibration   | Calibrated using standards with accuracies traceable to the National Institute of Standards and Technology (NIST). Calibration controlled by software. Adjustments are made through front panel keypad in a restricted access calibration mode. Calibration information stored in non-volatile memory. |

## Appendix C - 264/266 Options

### Introduction

This section contains a list and descriptions of available factory installed options at the time of this printing. The list of options contains an option code number which can be referenced on the model option label on the rear panel of the unit when options are present.

### Model Option Label

On the rear panel of the tester, you will find a label that contains the option code.

For example, your options code will appear as follows:

fitted with option 01..OPT: 01

fitted with option 01 and 02..OPT: 0102

MODEL: 266

OPT: 0102

### 264/266 Options

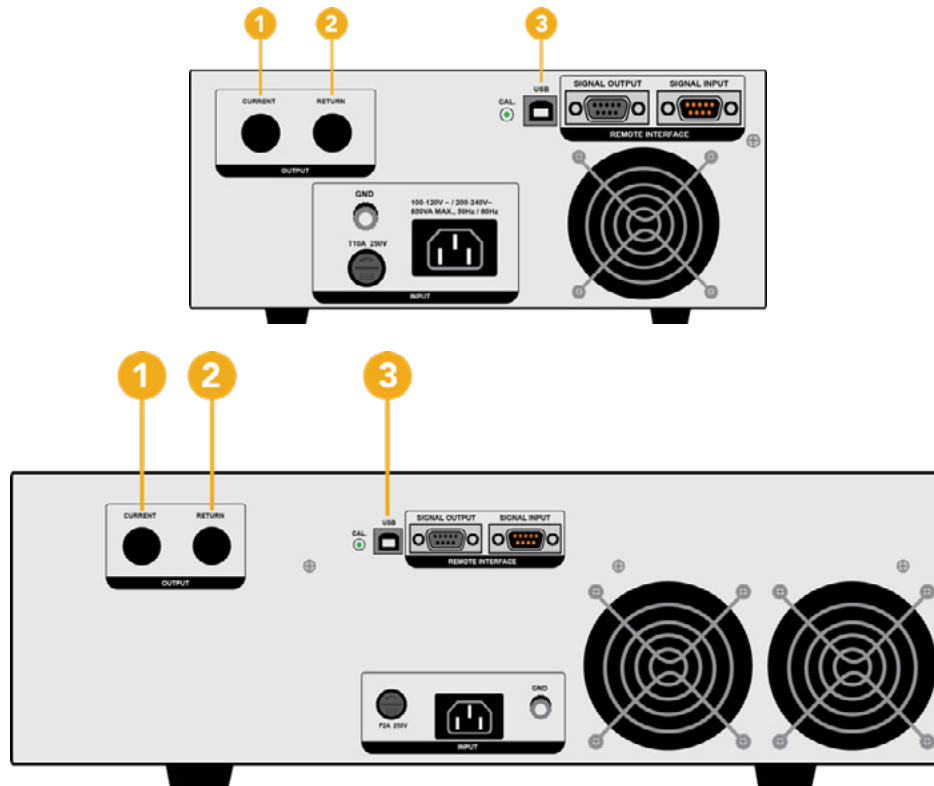
#### Option List

| Code | Description          |
|------|----------------------|
| 01   | Rear Outputs         |
| 03   | USB Port             |
| 09   | Display Voltage Drop |



## Optional Rear Outputs

This section contains a list and descriptions of available factory installed options at the time of this printing. The list of options contains an option code number which can be referenced on the model option label on the rear panel of the unit when options are present.



### Option 01

1. **HIGH CURRENT OUTPUT JACK:** For the connection of the detachable 5-foot (1.52 m) red high current test lead. This jack is always active when performing a test
2. **RETURN OUTPUT JACK:** For the connection of the detachable 5 foot (1.52 m) black return test lead or three-prong receptacle adapter box. This jack is always active when performing a test.

### Option 03

3. **USB Port:** This option may be added as a serial type communication protocol. This option provides all of the function control of the USB interface. The Type B USB connector labeled "USB" is for connection of the 264/266 to any compatible PC. When selecting USB Interface, the protocol for interfacing and communicating with a PC can be found on Appendix D: Remote Bus Interface: RS232 of this manual.

### Option 09

With this option installed the tester will display the voltage drop across the load instead of the measured resistance. New test parameters and BUS commands are available to edit the Hi-Limit, Lo-Limit and Offset for voltage.

Following additional specification apply with this installed option (see tables on next page).

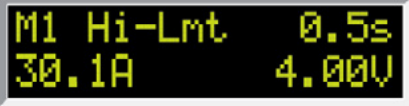
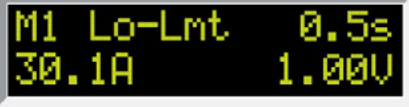
## Model 264

| SETTINGS             |                                    |                                                                                               |
|----------------------|------------------------------------|-----------------------------------------------------------------------------------------------|
| Offset               | Range:<br>Resolution:<br>Accuracy: | 0.00 – 4.00 VAC<br>0.01 V<br>$\pm (2\% \text{ of setting} + 2 \text{ count})$                 |
| Hi and LO-Limit Volt | Range:<br>Resolution:<br>Accuracy: | 0.00 – 6.00 V AC (3.0 - 40.0 A)<br>0.01 V<br>$\pm (2\% \text{ of setting} + 2 \text{ count})$ |
| Dwell Timer          | Range:<br>Resolution:<br>Accuracy: | 0, 0.5 - 240.0 sec<br>0.1 sec<br>$\pm (0.1\% + 0.05 \text{ sec})$                             |
| MEASUREMENT          |                                    |                                                                                               |
| Current Display      | Range:<br>Resolution:<br>Accuracy: | 0.0 – 40.0 A<br>0.01 A<br>$\pm (3\% \text{ of reading} + 1 \text{ count})$                    |
| Voltage Display      | Range:<br>Resolution:<br>Accuracy: | 0.00 – 6.00 V AC<br>0.01 V<br>$\pm (2\% \text{ of reading} + 2 \text{ count})$                |

## Model 266

| SETTINGS             |                                    |                                                                                                                                                             |
|----------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Offset               | Range:<br>Resolution:<br>Accuracy: | 0.00 – 6.00 V AC<br>0.01 V<br>$\pm (2\% \text{ of setting} + 2 \text{ count})$                                                                              |
| Hi and LO-Limit Volt | Range:<br>Resolution:<br>Accuracy: | 0.00 – 9.00 V AC (3.0 - 60.0 A)<br>0.01 V<br>$\pm (2\% \text{ of setting} + 2 \text{ count})$                                                               |
| Dwell Timer          | Range:<br>Resolution:<br>Accuracy: | 0, 0.5 - 240.0 sec<br>0.1 sec<br>$\pm (0.1\% \text{ of setting} + 0.05 \text{ sec})$                                                                        |
| MEASUREMENT          |                                    |                                                                                                                                                             |
| Current Display      | Range:<br>Resolution:<br>Accuracy: | 0.0 – 60.0 A<br>0.1 A<br>$\pm (3\% \text{ of reading} + 1 \text{ count})$                                                                                   |
| Voltage Display      | Range:<br>Resolution:<br>Accuracy: | 0.00 – 9.00 V AC<br>0.01 V<br>$\pm (3\% \text{ of reading} + 3 \text{ count})$ for 3 – 5.9A<br>$\pm (2\% \text{ of reading} + 2 \text{ count})$ for 6 – 60A |

## Optional Additional Parameter

|                                                                                  | Description                                                                                         |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
|  | Adjust the high limit setting for the applied voltage.                                              |
|  | Displayed if the voltage exceeds the high limit trip setting, but do not exceed the metering range. |
|  | Displayed if the voltage does not exceed the low limit setting.                                     |

## Optional Updated BUS Commands

The following commands are used to create or modify Test Setup at each Memory Locations.

| Command                   | Description                     | Value                                                                  |
|---------------------------|---------------------------------|------------------------------------------------------------------------|
| ADD <GND,p,p,p,p,p,p,p,p> | Add all parameters for one Test | <GND,Current,Hi-Limit,Lo-Limit,Dwell,Frequency,Offset,Connect(ON/OFF)> |

## ADD

Add all the test parameters at one time.

ADD GND,Current(A),HI-Limit(V),LO-Limit(V),Dwell(s),Frequency(Hz),Offset(V),Connect(ON/OFF)

| Command             | Name                  | Value                                              |
|---------------------|-----------------------|----------------------------------------------------|
| EH {1 0}<br>EH?     | Edit HI-Limit (Volts) | 0.00 – 6.00 (264 Model)<br>0.00 – 9.00 (266 Model) |
| EL < value ><br>EL? | Edit LO-Limit (Volts) | 0.00 – 6.00 (264 Model)<br>0.00 – 9.00 (266 Model) |
| EO < value ><br>EO? | Edit Offset (Volts)   | 0.00 – 4.00 (264 Model)<br>0.00 – 6.00 (266 Model) |

## Optional Updated Query Commands

These query commands will retrieve data from the tester. These commands include functions for retrieving test data, test results and remote hardware.

| Command               | Name                                    | Value                                                                                          |
|-----------------------|-----------------------------------------|------------------------------------------------------------------------------------------------|
| TD?                   | List Testing Data                       | Data from test in Process                                                                      |
| RD <memory location>? | Result Data Query by memory location    | 1-5                                                                                            |
| LS?                   | List Step Parameters                    | Memory, GND, Current(A), HI-Limit(V), LO-Limit(V), Dwell(s), Frequency(Hz), Offset(V), Connect |
| LS <memory location>? | List Step Parameters by memory location | Memory Location = 1-5                                                                          |

**TD?** - Read the active data being displayed on the LCD display while the test is in process. It will also read the last data taken when the test sequence has completed. Each parameter is separated by commas and includes memory location, test type, test status, and metering. The syntax for this command response is {memory - step, test type, status, meter 1, meter 2, meter 3}.

**{Memory, GND, Status, Current(A), Voltage(V), Time(s)}**

**RD <step number>?** - Read the results for an individual memory location. Each parameter is separated by commas and includes memory location, test type, test status, and metering. The syntax for this command response is {memory - step, test type, status, meter 1, meter 2, meter 3}.

**{Memory, GND, Status, Current(A), Voltage(V), Time(s)}**

**LS?** - Lists all the Parameters for the individual step that is currently selected.

The response will be formatted as follows;

**{Memory, GND, Current(A), HI-Limit(V), LO-Limit(V), Dwell(s), Frequency(Hz), Offset(V), Connect}**

**LS <memory location>?** - Lists all the Parameters for the individual step indicated by step number = 1-5.

The response will be formatted as follows;

**{Memory, GND, Status, Current(A), Voltage(V), Time(s)}**

## Appendix D - Remote BUS Interface: USB

This section provides information on the proper use and configuration of bus remote interface. The USB remote interface is optional on all 260 models. Please see the OPTIONS section of the manual for details.

### USB Interface

This interface provides all of the control commands and parameter setting commands. All commands can be found in the command list of this manual.

The USB interface card requires you to download a driver in order for the instrument to recognize the USB interface. The driver can be found on the SCI website:

[www.hipot.com/products/260.aspx](http://www.hipot.com/products/260.aspx)

Click on "USB Driver" to download the driver. This link contains an automatic extract and install program. Follow the instructions of the installation program to initialize the driver install. NOTE: The USB port acts as a USB to RS-232 converter. As a result, the PC will recognize the USB port as a virtual COM port.

The COM port should have the following configuration. 9600 baud, 8 data bits, 1 stop bit, no parity. This interface does not support XON/XOFF protocol or any hardware handshaking.

When sending command over the USB bus, the tester will send a response string of 06 hex or 6 decimal, the Acknowledge (ACK) ASCII control code if the transfer was recognized and completed by the tester. If there is an error with the command string that is sent, the tester will respond with 15 hex or 21 decimal, the Not Acknowledge (NAK) ASCII control code. The ACK or NAK response allows for software handshaking, to monitor and control data flow. When requesting data from the tester, it will automatically send the data back to the controller input buffer. The controller input buffer will accumulate data being sent from the tester including the ACK and NAK response strings, until it has been read by the controller.

### USB Interface Command List

The USB bus will automatically send any response back to the controller's input buffer. Note that the commands are case sensitive and must be typed in capital letters. Each command string should be terminated by the ASCII control code, New Line <NL>, or OAh.

The following conventions are used to describe the commands syntax for the 264/260. Braces ( { } ) enclose each parameter for a command string. Triangle brackets ( < > ) indicate that you must substitute a value for the enclosed parameter. The Pipe ( | ) is used to separate different parameter options for a command. The command and the parameter data must be separated with a space. All commands that end with a question mark ( ? ) are query commands and require an IEEE-488 read command to retrieve the data from the device's output buffer.

### Test Execution Commands

The following commands are used to control actual output voltage and current from the tester. Please observe all safety precautions.

| Command | Description                               |
|---------|-------------------------------------------|
| TEST    | Execute a Test                            |
| RESET   | Abort a Test in Process or Reset Failures |
| SAO     | Set Auto Offset                           |

**TEST** - Starts the test sequence at the selected step loaded into memory (RAM).

**RESET** - Stop or abort a test. Also used to reset a latched failure condition.

**SAO** - Set the offset for the Ground bond test. The cables and any test fixture should be connected before executing the command. This command will perform an actual test and all safety precautions should be observed when using this command.

## Memory Location Edits and Companion Queries

The following commands are used to create or modify Test Setup at each Memory Locations.

| Command                     | Description                          | Value                                                                  |
|-----------------------------|--------------------------------------|------------------------------------------------------------------------|
| FL <memory location number> | Load Test Located at Memory Location | Memory location number = 1-5                                           |
| FL?                         | Query Memory Location                | 1-5                                                                    |
| SAG                         | Add GND Test With Default Parameters |                                                                        |
| ADD <GND,p,p,p,p,p,p,p>     | Add all parameters for one Test      | <GND,Current,Hi-Limit,Lo-Limit,Dwell,Frequency,Offset,Connect(ON/OFF)> |

**FL <memory location number>** - Load a memory location from non-volatile memory into random access memory RAM.

The parameter values should use complete text and not use the coded values that are associated with the individual parameter setting commands. Such as "ON" and "OFF" and any toggle field that use words or phrases like "OPEN", "CLOSE". The LS? companion command will also list all parameters in complete text as they appear on the setting screen.

**FL?** - Query the memory location of the current selection.

**SAG** - Set test mode to Ground Bond with default test parameters.

**ADD** - Add all the test parameters at one time.

ADD GND,Current(A),HI-Limit(m $\Omega$ ),LO-Limit(m $\Omega$ ),Dwell(s),Frequency(Hz),Offset(m $\Omega$ ),Connect(ON/OFF)

|   | GND              |
|---|------------------|
| 1 | Current          |
| 2 | HI-Limit         |
| 3 | LO-Limit         |
| 4 | Dwell            |
| 5 | Offset           |
| 6 | Frequency        |
| 7 | Connect (ON/OFF) |

## Test Parameter Editing Commands

These commands are used to modify the test parameter within each memory. These commands require a parameter value to be included with the command. The companion query command will read the parameter. The writing of the parameter requires that the unit not be included with the value, only the numeric value should be included with the command. Also when the query commands are used the response will not include the units characters. Many of the commands will function the same way for multiple test types however the input range may be different and therefore used a different possible set of values.

| Command               | Name           | Value                                                                                                                     |
|-----------------------|----------------|---------------------------------------------------------------------------------------------------------------------------|
| EC < value ><br>EC?   | Edit Current   | 3.0 - 40.0 (264 Model)<br>3.0 - 60.0 (266 Model)                                                                          |
| EH {1 0}<br>EH?       | Edit HI-Limit  | 0 – 150 mΩ Current Range 30.1 – 40.0 A<br>0 – 200 mΩ Current Range 10.1 – 30.0 A<br>0 – 600 mΩ Current Range 3.0 – 10.0 A |
| EL < value ><br>EL?   | Edit LO-Limit  | 0 – 150 mΩ Current Range 30.1 – 40.0 A<br>0 – 200 mΩ Current Range 10.1 – 30.0 A<br>0 – 600 mΩ Current Range 3.0 – 10.0 A |
| EDW < value ><br>EDW? | Edit Dwell     | 0, 0.5 – 240 sec (0 = Continuous)                                                                                         |
| EF {1 0}<br>EF?       | Edit Frequency | 1=60Hz, 0=50Hz                                                                                                            |
| EO < value ><br>EO?   | Edit Offset    | 0 - 100mΩ                                                                                                                 |
| ECC{1 0}<br>ECC?      | Edit Connect   | 1=ON, 0=OFF                                                                                                               |

## System Parameter Editing Commands and Companion Queries

These commands are used to modify the system parameters for the tester. These commands require a parameter value to be included with the command.

| Command                   | Name                       | Value                                    |
|---------------------------|----------------------------|------------------------------------------|
| SPR {1 0}<br>SPR?         | PLC Remote ON/OFF          | 1=On, 0=Off                              |
| SEC < 0 >                 | Edit Security OFF          | 0=Off                                    |
| SEC < value, mmm><br>SEC? | Edit Security ON, Passcode | 1=RUN, 2=MEM, mmm = 000 – 999 (Passcode) |

## Query Commands

These query commands will retrieve data from the tester. These commands include functions for retrieving test data, test results and remote hardware.

| Command                        | Name                                    | Value                                                                                                    |
|--------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------|
| TD?                            | List Testing Data                       | Data from test in Process                                                                                |
| RD < <b>memory location</b> >? | Result Data Query by memory location    | 1-5                                                                                                      |
| RR?                            | Read Reset Query                        | 1=Open, 0=Closed                                                                                         |
| RI?                            | Read Interlock Query                    | 1=Open, 0=Closed                                                                                         |
| LS?                            | List Step Parameters                    | <i>Memory, GND, Current(A), HI-Limit(mΩ), LO-Limit(mΩ), Dwell(s), Frequency(Hz), Offset(mΩ), Connect</i> |
| LS < <b>memory location</b> >? | List Step Parameters by memory location | <i>Memory Location = 1-5</i>                                                                             |
| SFW?                           | System Firmware                         | <i>Firmware Version</i>                                                                                  |

**TD?** - Read the active data being displayed on the LCD display while the test is in process. It will also read the last data taken when the test sequence has completed. Each parameter is separated by commas and includes memory location, test type, test status, and metering. The syntax for this command response is {memory - step, test type, status, meter 1, meter 2, meter 3}.  
{Memory, GND, Status, Current(A), Resistance(mΩ), Time(s)}

**RD <step number>?** - Read the results for an individual memory location. Each parameter is separated by commas and includes memory location, test type, test status, and metering. The syntax for this command response is {memory - step, test type, status, meter 1, meter 2, meter 3}.  
{**Memory, GND, Status, Current(A), Resistance(mΩ), Time(s)**}

**RR?** - Read the remote Reset input signal. When the remote reset has been activated by closing the contacts the query will return a value of 0 to indicate the tester is being Reset.

**RI?** - Read the remote Interlock input signal. When the remote Interlock has been activated by opening the contacts the query will return a value of 1 to indicate the tester is in the Interlock state and will not be able to generate output voltage or current.

**LS?** - Lists all the Parameters for the individual step that is currently selected.

The response will be formatted as follows;

**{Memory, GND, Current(A), HI-Limit(mΩ), LO-Limit(mΩ), Dwell(s), Frequency(Hz), Offset(mΩ), Connect}**

**LS <memory location>?** - Lists all the Parameters for the individual step indicated by step number = 1-5.

The response will be formatted as follows;

**{Memory, GND, Status, Current(A), Resistance(mΩ), Time(s)}**

**SFW?** - Return the current firmware version of the tester.



## IEEE 488.2 Common Commands

These commands are required by the IEEE-488.2 standard with the exception of \*PSC, \*PSC?. Most of these commands are not available over the RS-232 bus except for the \*IDN? command which can be used to retrieve the tester identification information, and the four status reporting commands \*ESR?, \*ESE, \*ESE? and \*STB?.

| Command      | Name                                 | Description                                                                                                                                                                                                                                            |
|--------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| *IDN?        | Identification Query                 | SLA, Model Number, Serial Number, Firmware Revision                                                                                                                                                                                                    |
| *RST         | Reset Command                        | Resets 264/266                                                                                                                                                                                                                                         |
| *TST?        | Self-Test Query                      | 00H=OK<br>01H=TEST EEPROM ERROR                                                                                                                                                                                                                        |
| *CLS?        | Clear Status Command                 | Clear Standard Event Status Register<br>Clear Service Request Register                                                                                                                                                                                 |
| LS?          | Operation Complete Command           | <i>When TEST command ok setting ESR BIT0 =1</i>                                                                                                                                                                                                        |
| *OPC         | Operation Complete Command           | When TEST command ok setting ESR BIT0 =1                                                                                                                                                                                                               |
| *OPC?        | Operation Complete Query             | 1 = TEST completed ok<br>0 = TEST in process                                                                                                                                                                                                           |
| *WAI         | Wait-to-Continue Command             |                                                                                                                                                                                                                                                        |
| *PSC {1 0}   | Power-on Status Clear Command        | 1 = Power-on clear enable registers<br>0 = Power-on load previous enable registers                                                                                                                                                                     |
| *PSC?        | Power-on Status Clear Query          |                                                                                                                                                                                                                                                        |
| *ESR?        | Standard Event Status Register Query | BIT 0, 01H,(1) Operation Complete<br>BIT 1, 02H,(2) Not Used<br>BIT 2, 04H,(4) Query Error<br>BIT 3, 08H,(8) Device Error<br>BIT 4, 10H,(16) Execution Error<br>BIT 5, 20H,(32) Command Error<br>BIT 6, 40H,(64) Not Used<br>BIT 7, 80H,(128) Power On |
| *ESE <value> | Standard Event Status Enable Command | <i>value = 0 - 255</i>                                                                                                                                                                                                                                 |
| *ESE?        | Standard Event Status Enable Query   | 0 - 255                                                                                                                                                                                                                                                |
| *STB?        | Read Status Byte Query               | BIT 0, 01H,(1) ALL PASS<br>BIT 1, 02H,(2) FAIL<br>BIT 2, 04H,(4) ABORT<br>BIT 3, 08H,(8) PROCESS<br>BIT 4, 10H,(16) Message Available<br>BIT 5, 20H,(32) Standard Event (ESB)<br>BIT 6, 40H,(64) Request Service (MSS)<br>BIT 7, 80H,(128) PROMPT      |
| *SRE <value> | Service Request Enable Command       | <i>value = 0 - 255</i>                                                                                                                                                                                                                                 |
| *SRE?        | Service Request Enable Query         | 0 - 255                                                                                                                                                                                                                                                |

- \***IDN?** - Read the tester identification string. Company =SLA.
- \***RST** - Reset the tester to original power on configuration. Does not clear Enable register for Standard Summary Status or Standard Event Registers. Does not clear the output queue. Does not clear the power-on-status-clear flag.
- \***TST?** - Performs a self test of the tester data memory. Returns 0 if it is successful or 1 if the test fails.
- \***CLS** - Clears the Status Byte summary register and event registers. Does not clear the Enable registers.
- \***OPC** - Sets the operation complete bit (bit 0) in the Standard Event register after a command is completed.
- \***OPC?** - Returns an ASCII "1" after the command is executed.
- \***WAI** - After the command is executed, it prevents the tester from executing any further query or commands until the no-operation-pending flag is TRUE.
- \***PSC {1|0}** - Sets the power-on status clear bit. When set to 1 the Standard Event Enable register and Status Byte Enable registers will be cleared when power is turned ON. 0 setting indicates the Enable registers will be loaded with Enable register masks from non-volatile memory at power ON.
- \***PSC?** - Queries the power-on status clear setting. Returns 0 or 1.
- \***ESR?** - Queries the Standard Event register. Returns the decimal value of the binary-weighted sum of bits.
- \***ESE <value>** - Standard Event enable register controls which bits will be logically ORed together to generate the Event Summary bit 5 (ESB) within the Status Byte.
- \***ESE?** - Queries the Standard Event enable register. Returns the decimal value of the binary-weighted sum of bits.
- \***STB?** - Read the Status Byte. Returns the decimal value of the binary-weighted sum of bits.
- \***SRE <value>** - Service Request enable register controls which bits from the Status Byte should be use to generate a service request when the bit value = 1.
- \***SRE?** - Queries the Service Request enable register. Returns the decimal value of binary-weighted sum of bits.

## Appendix E - Replacement Parts List - Model 264/266

| Part Number                 | QTY | Reference Designator | Description                                    |
|-----------------------------|-----|----------------------|------------------------------------------------|
| <b>Supplied Accessories</b> |     |                      |                                                |
| 99-10040-01                 | 1   |                      | Interlock Connector                            |
| 99-10783-01                 | 1   |                      | Fuse 10A Slow-Blow 20mm <sup>1</sup>           |
| 99-10791-01                 | 1   |                      | Fuse 12A Slow-Blow 30mm <sup>2</sup>           |
| 99-10724-01                 | 1   |                      | Cable Assembly High Current Red <sup>1</sup>   |
| 99-10725-01                 | 1   |                      | Cable Assembly High Current Black <sup>1</sup> |
| 99-10239-01                 | 1   |                      | Cable Assembly High Current Red <sup>2</sup>   |
| 99-10238-01                 | 1   |                      | Cable Assembly High Current Black <sup>2</sup> |
| 125-013-001                 | 1   |                      | Cable Input Cord USA <sup>1</sup>              |
| 99-10164-01                 | 1   |                      | Cable Input Cord USA <sup>2</sup>              |
| <b>Panel Components</b>     |     |                      |                                                |
| 99-10016-01                 | 1   |                      | Earth Connector                                |
| 99-10312-01                 | 1   |                      | Power Switch                                   |
| 330-113-001                 | 1   |                      | Test Switch                                    |
| 330-113-002                 | 1   |                      | Reset Switch                                   |
| 99-10671-01                 | 1   |                      | LED bulb Green                                 |
| 99-10672-01                 | 1   |                      | LED bulb Red                                   |
| 99-10763-01                 | 1   |                      | Feet Kit w/o Rubber Inserts                    |
| 99-10762-01                 | 2   |                      | Rubber Inserts for rear Feet                   |
| 175-974-002                 | 2   |                      | Rubber Inserts for front Feet                  |
| 99-10203-01                 | 1   |                      | Jack Banana Black                              |
| 99-10204-01                 | 1   |                      | Jack Banana Red                                |
| 99-10735-01                 | 1   |                      | Rotary Knob                                    |
| 99-10736-01                 | 1   |                      | LCD Display                                    |
| 99-10788-01                 | 2   |                      | Hole Plug                                      |
| 175-936-002                 | 1   |                      | Plastic Handy Band <sup>1</sup>                |
| <b>PCB Assemblies</b>       |     |                      |                                                |
| 99-10757-01                 | 1   | CONSG7100            | Main Control Board                             |
| 99-10758-01                 | 1   | AMPSJ7314            | Amplifier board <sup>1</sup>                   |
| 99-10759-01                 | 1   | AMPSJ7316            | Amplifier board <sup>2</sup>                   |
| 99-10761-01                 | 1   | FLYSJ7314            | Fly Back Board <sup>1</sup>                    |
| 99-10748-01                 | 1   | EVRSJ7100            | Encoder Board                                  |
| 99-10750-01                 | 1   | LEDM001              | LED Indicator Board                            |

<sup>1</sup>264 Only

<sup>2</sup>266 Only

## Appendix F - Service and Maintenance

### User Service

To prevent electric shock do not remove the tester cover. There are no user serviceable parts inside. Routine maintenance or cleaning of internal parts is not necessary. Any external cleaning should be done with a clean dry or slightly damp cloth. Avoid the use of cleaning agents or chemicals to prevent any foreign liquid from entering the cabinet through ventilation holes or damaging controls and switches, also some chemicals may damage plastic parts or lettering. Schematics, when provided, are for reference only. Any replacement cables and high voltage components should be acquired directly from SCI. Refer servicing to a SCI authorized service center.

SCI  
28105 N. Keith Drive  
Lake Forest, IL 60045-4546  
USA

**Phone** 1 (847) 932-3662 or 1 (800) 504-0055  
**Fax** 1 (847) 932-3665  
**Email** support@hipot.com  
**Online** hipot.com

### Service Interval

The tester and its power cord, test leads, and accessories must be returned at least once a year to a SCI authorized service center for calibration and inspection of safety related components. SCI will not be held liable for injuries suffered if the tester is not returned for its annual safety check and maintained properly.

### User Modifications

Unauthorized user modifications will void your warranty. SCI will not be responsible for any injuries sustained due to unauthorized equipment modifications or use of parts not specified by SCI. Testers returned to SCI with unsafe modifications will be returned to their original operating condition at your expense.

## Appendix G – Calibration Procedure

This tester has been fully calibrated at the factory in accordance to our published specifications. It has been Calibrated using standards with accuracies traceable to the National Institute of Standards and Technology (NIST). You will find in this manual a copy of the “Certificate of Calibration”. It is recommended that you have this tester recalibrated and a safety check done at least once per year. SCI recommends you use “Calibration Standards” that are NIST traceable, or traceable to agencies recognized by NIST to keep this tester within published specifications.

End user metrology standards or practices may vary. These metrology standards determine the measurement uncertainty ratio of the calibration standards being used. Calibration adjustments can only be made in the Calibration mode and calibration checks or verification can only be made while operation in Test mode.

### For Model 264

#### Calibration Equipment Required:

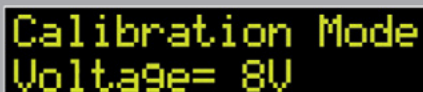
The following standard equipment will be needed to properly calibrate your tester.

A Standard AC Voltmeter with 8 Volts range

A Standard AC Ammeter with 40 A range

#### 1. Calibration Initialization

To enter the calibration mode the tester must be in the OFF position. Using a pen or small screwdriver, press and hold the recessed calibration key on the rear panel, then turn on the input POWER switch. The display will show:



Calibration Mode  
Voltage= 8V

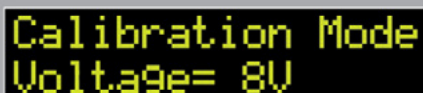
To calibrate AC voltage please follow procedure on next paragraph, to calibrate other parameters use rotary knob to scroll to the desired calibration point, then follow procedure on relative paragraph below.

When the calibration process is completed successfully and the tester accepts the entered calibration data it will output one short “beep” and advance to the next calibration point, otherwise the tester will output two short “beeps” and will not advance to the next calibration point.

#### 2. To calibrate Ground Bond test voltage

Please connect a standard 8V AC Voltmeter across the CURRENT and RETURN connectors of the tester.

Rotate the yellow knob until the display shows:



Calibration Mode  
Voltage= 8V

Then press the TEST button on the front panel. The tester will generate an output of about 8 VAC and the display will show:



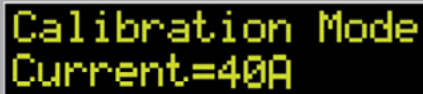
Voltage = ----V

Then the display will show a value around 8 Volts.

Turn and press the rotary knob to enter the reading of the standard AC Voltmeter into the tester. Once all digits are entered the tester will advance to the next calibration point

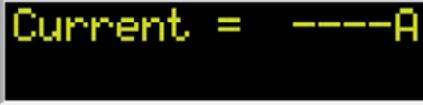
### 3. To calibrate Ground Bond test current

Please connect the standard 40A AC Ammeter across the CURRENT and RETURN connectors of the tester. Rotate the yellow knob until the display shows:



Calibration Mode  
Current=40A

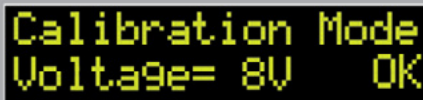
Then press the TEST button on the front panel. The tester will generate an output of about 40 A and the display will show:



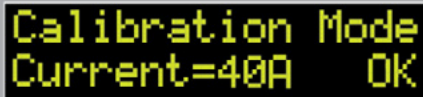
Current = ----A

Then the display will show a value around 40 A.

Turn and press the rotary knob to enter the reading of the standard AC Voltmeter into the tester. Once all digits are entered the tester will return to the calibration menu and display will show OK next to the calibration step.



Calibration Mode  
Voltage= 8V OK



Calibration Mode  
Current=40A OK

### 4. Exit Calibration Mode

When all calibration parameters are completed successfully POWER cycle the tester to exit from the calibration mode and to return to the test mode.

### For Model 266

#### Calibration Equipment Required:

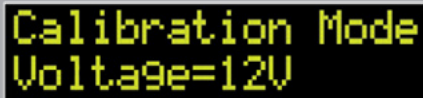
The following standard equipment will be needed to properly calibrate your tester.

A Standard AC Voltmeter with 12 Volts range

A Standard AC Ammeter with 60 A range

#### 1. Calibration Initialization

To enter the calibration mode the tester must be in the OFF position. Using a pen or small screwdriver, press and hold the recessed calibration key on the rear panel, then turn on the input POWER switch. The display will show:



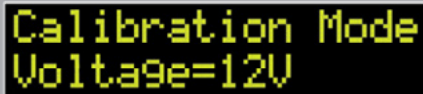
Calibration Mode  
Voltage=12V

To calibrate AC voltage please follow procedure on next paragraph, to calibrate other parameters use rotary knob to scroll to the desired calibration point, then follow procedure on relative paragraph below.

When the calibration process is completed successfully and the tester accepts the entered calibration data it will output one short “beep” and advance to the next calibration point, otherwise the tester will output two short “beeps” and will not advance to the next calibration point.

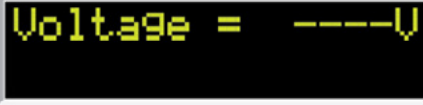
## 2. To calibrate Ground Bond test voltage

Please connect a standard 12V AC Voltmeter across the CURRENT and RETURN connectors of the tester.  
Rotate the yellow knob until the display shows:



Calibration Mode  
Voltage=12V

Then press the TEST button on the front panel. The tester will generate an output of about 12 VAC and the display will show:



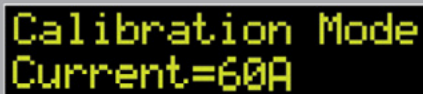
Voltage = ----V

Then the display will show a value around 12 Volts.

Turn and press the rotary knob to enter the reading of the standard AC Voltmeter into the tester. Once all digits are entered the tester will advance to the next calibration point.

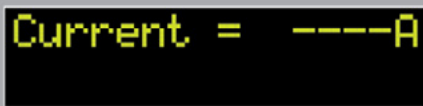
## 3. To calibrate Ground Bond test current

Please connect the standard 60A AC Ammeter across the CURRENT and RETURN connectors of the tester.  
Rotate the yellow knob until the display shows:



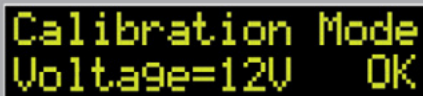
Calibration Mode  
Current=60A

Then press the TEST button on the front panel. The tester will generate an output of about 12 VAC and the display will show:

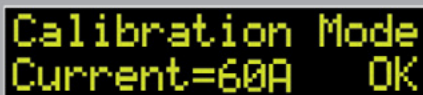


Current = ----A

Then the display will show a value around 60 A.



Calibration Mode  
Voltage=12V OK



Calibration Mode  
Current=60A OK

## 4. Exit Calibration Mode

When all calibration parameters are completed successfully POWER cycle the tester to exit from the calibration mode and to return to the test mode.