OPERATION AND SERVICE MANUAL

Model 2630 and 2660

MODEL 2630 GROUND BOND TESTER
MODEL 2660 GROUND BOND TESTER

SERIAL NUMBER

Model

2630, 2660

Item 99-10125-01 Ver 2.18

28105 N. Keith Drive
Lake Forest, Illinois, 60045-4546
U.S.A.

Printed April 18, 2016

DECLARATION OF CONFORMITY

Manufacturer: Slaughter Company, Inc.

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

Product Name: Ground Bond Tester

Model Number: 2630

Conforms to the following Standards:

Safety:
UL 61010-1:2012
UL 61010-2-030:2012
CAN/CSA-C22.2 NO. 61010-1-12
CAN/CSA-C22.2 NO. 61010-2-030-12
EN 61010-1:2010, EN 61010-2-030:2010
EN 61010-031:2002+A1
IEC 61010-1:2010, IEC 61010-2-030:2010
IEC 61010-31:2002+A1

EMC:
EN61326-1:2013
EN55011:2009/A1

Supplementary Information

*The product herewith complies with the requirements of the **Low Voltage Directive 2014/35/EU** and the **EMC Directive 2014/130/EU**.*

Last two digits of the year the CE mark was first affixed: 02

The technical file and other documentation are on file with Associated Research, Inc.

Joseph Guerriero
President / General Manager

Slaughter Company, Inc.
Lake Forest, Illinois USA
April 18, 2016

DECLARATION OF CONFORMITY

Manufacturer: Associated Research, Inc.

Address: 13860 W. Laurel Dr.
Lake Forest, IL 60045
USA

Product Name: 2660 Ground Bond Tester

Model Number: 2660

Conforms to the following Standards:

Safety:
UL 61010-1:2012
UL 61010-2-030:2012
CAN/CSA-C22.2 NO. 61010-1-12
CAN/CSA-C22.2 NO. 61010-2-030-12
EN 61010-1:2010, EN 61010-2-030:2010
EN 61010-031:2002+A1
IEC 61010-1:2010, IEC 61010-2-030:2010
IEC 61010-31:2002+A1

EMC:
EN61326-1:2013
EN55011:2009/A1

Supplementary Information

*The product herewith complies with the requirements of the **Low Voltage Directive 2006/95/EC** and the **EMC Directive 2004/108/EC**.*

Last two digits of the year the CE mark was first affixed: 03

The technical file and other documentation are on file with Associated Research, Inc.

Joseph Guerriero
Vice President / General Manager
Slaughter Company, Inc.
Lake Forest, Illinois USA
November 07, 2014

Warranty Policy

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

Your new instrument is warranted to be free from defects in workmanship and material for a period of (1) year from date of shipment. You must return the "Owners Registration Card" provided within (15) days from receipt of your instrument.

Slaughter Company recommends that your instrument be calibrated on a twelve-month cycle. A return material authorization (RMA) must be obtained from Slaughter Company. Please contact our Customer Support Center at 1-800-504-0055 to obtain an RMA number. Damages sustained as a result of improper packaging will not be honored. Transportation costs for the return of the instrument for warranty service must be prepaid by the customer. Slaughter Company will assume the return freight costs when returning the instrument to the customer. The return method will be at the discretion of Slaughter Company.

Except as provided herein, Slaughter Company makes no warranties to the purchaser of this instrument and all other warranties, express 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 batteries or accessories not of Slaughter Company manufacture. Parts used must be parts that are recommended by Slaughter Company as an acceptable specified part. Use of non-authorized parts in the repair of this instrument will void the warranty.

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SECTION 1
OPERATORS MANUAL

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 instrument (provided with a protective earth terminal).

Before applying power verify that the instrument is set to the correct line voltage (115 or 230) 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.

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

CALLS ATTENTION TO A PROCEDURE, PRACTICE, OR CONDITION, THAT COULD POSSIBLY CAUSE DAMAGE TO EQUIPMENT OR PERMANENT LOSS OF DATA.

WARNING A Hipot 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 test instrument.

SERVICE AND MAINTENANCE

User Service

To prevent electric shock do not remove the instrument 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 Slaughter Company, Inc. Refer servicing to a Slaughter Company, Inc. authorized service center.

SLAUGHTER COMPANY, INC.
28105 N. KEITH DRIVE
LAKE FOREST, IL 60045-4546 U.S.A.

☎PHONE: 1 (847) 932-3662
1 (800) 504-0055
FAX: 1 (847) 932-3665
E-MAIL : support@hipot.com
www.hipot.com

Service Interval

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

User Modifications

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

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 **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 - TEST IN PROGRESS - UNAUTHORIZED PERSONNEL KEEP AWAY."**

Power

Ground Bond 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.

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.

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 instrument 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^2 (for rated current up to 10 A) or 3G 1.0mm^2 (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. The item being tested is then within the guards or enclosure during the test, and may be fitted with switches so that the tester will not operate unless the guards are in place or the enclosure closed.

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 what product is being tested, and which products are waiting to be tested or have already been tested.

Do not perform Ground Bond Tests in a combustible atmosphere or in any area where

combustible materials are present.

TEST OPERATOR

Qualifications

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

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.

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

DO NOT TOUCH THE FRONT PANEL WHEN TESTING OR AFTER A MALFUNCTION HAS OCCURRED.

Dress

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

Medical Restrictions

Personnel with heart ailments or devices such as pacemakers should not operate this instrument.

GLOSSARY OF TERMS

(As used in this manual)

Alternating Current, AC: Current that reverses direction on a regular basis, commonly in the U.S.A. 60 times per second, in other countries 50 times per second.

Conductive: Having a volume resistivity of no more than 10^3 ohm-cm or a surface resistivity of no more than 10^5 ohms per square.

Conductor: A solid or liquid material which has the ability to let current pass through it, and which has a volume resistivity of no more than 10^3 ohm-cm.

Current: The movement of electrons through a conductor. Current is measured in amperes, milliamperes, microamperes, nanoamperes, or picoamperes. Symbol = **I**

Dielectric: An insulating material that is positioned between two conductive materials in such a way that a charge or voltage may appear across the two conductive materials.

Direct Current, DC: Current that flows in one direction only. The source of direct current is said to be polarized and has one terminal that is always at a higher potential than the other.

Hipot Tester: Common term for dielectric-withstand test equipment.

Insulation: Gas, liquid or solid material which has a volume resistivity of at least 10^{12} ohm-cm and is used for the purpose of resisting current flow between conductors.

Resistance: That property of a substance that impedes current and results in the dissipation of power in the form of heat. The practical unit of resistance is the *ohm.* Symbol = **R**

Trip Point: The minimum resistance required causing an indication of unacceptable performance during a ground bond test.

Voltage: Electrical pressure, the force which causes current through an electrical conductor. Symbol = **V**

INTRODUCTION

The importance of testing... User safety
In an era of soaring liability costs, original manufacturers of electrical and electronic products must make sure every item is as safe as possible. All products must be designed and built to prevent electric shock, even when users abuse the equipment or by-pass built in safety features.

To meet recognized safety standards, one common test is the "dielectric voltage-withstand test". Safety agencies which require compliance safety testing at both the initial product design stage and for routine production line testing include: Underwriters Laboratories, Inc. (UL), the Canadian Standards Association (CSA), the International Electrotechnical Commission (IEC), the British Standards Institution (BSI), the Association of German Electrical Engineers (VDE), the Japanese Standards Association (JSI). These same agencies may also require that an insulation resistance test and high current ground bond test be performed.

The Dielectric Withstand (Hipot) Test....
The principle behind a dielectric voltage - withstand test is simple. If a product will function when exposed to extremely adverse conditions, it can be assumed that the product will function in normal operating circumstances.

The most common applications of the dielectric-withstand test are:

- Design (performance) Testing.... determining design adequacy to meet service conditions.

- Production Line Testing.... detecting defects in material or workmanship during processing.

- Acceptance Testing.... proving minimum insulation requirements of purchased parts.

- Repair Service Testing.... determine reliability and safety of equipment repairs.

The specific technique varies with each product, but basically, during a dielectric voltage withstand test, an electrical devise is exposed to a voltage significantly higher than it normally encounters. The high voltage is continued for a given period of time.

If, during the time the component is tested, stray current flow remains within specified limits, the device is assumed safe under normal conditions. The basic product design and use of the insulating material will protect the user against electrical shock.

The equipment used for this test, a dielectric-withstand tester, is often called a "hipot" (for high potential tester). The "rule of thumb" for testing is to subject the product to twice its normal operating voltage, plus 1,000 volts.

However, specific products may be tested at much higher voltages than 2X operating

voltages + 1,000 volts. For example, a product designed to operate in the range between 100 to 240 volts can be tested between 1,000 to 4,000 volts or higher. Most "double insulated" products are tested at voltages much higher than the "rule of thumb".

Testing during development and prototype stages is more stringent than production run tests because the basic design of the product is being evaluated. Design tests usually are performed on only a few samples of the product. Production tests are performed on each and every item as it comes off the production line.

The hipot tester must also maintain an output voltage between 100% and 120% of specification. The output voltage of the hipot must have a sinusoidal waveform with a frequency between 40 to 70 Hz and has a peak waveform value that is not less than 1.3 and not more than 1.5 times the root-mean-square value.

Why Perform a Ground Bond Test.....

Ground bond testing is done to insure that a low resistance path exists between the safety ground pin of a three-wire line cord and exposed metal of the item under test. If a live wire inside the item under test came loose and contacted the chassis, the fault current would flow through the low resistance safety ground, and protect the user.

The need for high current bonding (i.e. 30A or 60A) as apposed to low current go-no go type testers, results from the nature of line voltage breakers' high current characteristics. Safety Grounding circuits must withstand the line voltage breaker' current rating in order to maintain safe voltage potentials on the chassis of the faulty device. Verifying the integrity of the grounding circuit at high currents insures that the line breaker will open before the grounding circuit wires fail. This insures that the power will be de-energized at the device while maintaining safe voltage levels on the chassis.

IF YOU SHOULD HAVE ANY QUESTIONS RELATING TO THE OPERATION OF YOUR INSTRUMENT CALL 1 (800) 504-0055 IN THE U.S.A.

Model 2630 Functional Specifications

GROUND BOND TEST MODE

Unless otherwise stated, accuracies are relative to a laboratory standard measurement.

INPUT		
Input voltage	115 / 230V ± 10%, user selectable	
Frequency	50/60 Hz ± 5%	
Fuse	6.3A slow blow 250VAC	
TEST MODE		
Output Rating	Current:	3.0 – 30.0 Amps AC
	Resolution:	0.1Amp
	Regulation	± (2% of setting + 0.02 Amps)
	Voltage:	6 Volts AC, fixed
Output Frequency	50 / 60 Hz user selectable	
Dwell Time Setting	Range:	0 and 0.5 – 999.9 seconds, 0 for continuous running
	Resolution:	0.1 second
	Accuracy:	± (0.1% of setting + 0.05 seconds)
High Limit Setting*	Range:	0 – 510 mΩ
	Current:	0 – 510 mΩ for 0.0 – 10.0 Amps 0 – 200 mΩ for 10.1 – 25.0 Amps 0 – 150 mΩ for 25.1 – 30.0 Amps
	Resolution:	1 mΩ
	Accuracy:	±(2% of setting + 2mΩ)
Offset Capability	Range:	0 – 100 mΩ
	Resolution:	1 mΩ
	Accuracy:	± (2% of setting + 2 mΩ)
Current Display	Range:	0.0 – 30.0 Amps
	Resolution:	0.1 Amp
	Accuracy:	± (3% of reading + 0.03 Amps)
Ohmmeter Display	Range:	0 – 510 mΩ
	Resolution:	1 mΩ
	Accuracy:	± (2% of reading + 2 mΩ)
Timer Display	Range:	0.0 – 999.9 seconds
	Resolution:	0.1 seconds
	Accuracy:	± (0.1% of reading + 0.05 seconds)

*Even though it is possible to set the High Limit trip point to the maximum of 510 mΩ for all current settings, the usable resistance range will be reduced according to the test current that has been selected due to the limits on the output voltage.

GENERAL	
Remote Control And Signal Output	The following input and output signals are provided through two 9 pin D type connectors; 1. Remote control: Test, Reset, and Withstand Processing. 2. Outputs: Pass, Fail, Test-in-Process, Start Out, and Reset Out.
Program Memory	5 sets
Security	Key Lock capability to avoid unauthorized access to all test parameters. Memory Lock capability to avoid unauthorized access to memory locations.
Line Cord	Detachable 6 ft. (1.80m) power cable terminated in a three prong grounding plug.
Terminations	5ft. (1.52m) high current and return leads with clips.
Mechanical	Tilt up front feet. Dimensions: (w x h x d) 11 x 3.5 x 14.56 in. (280 x 89 x 370mm) Weight: 20 lbs. (9 kg)
Environmental	Operating Temperature: 32° - 104°F (0° - 40°C) Relative Humidity - 20 to 80%
Calibration	Traceable to 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 2660 Functional Specifications

GROUND BOND TEST MODE

Unless otherwise stated, accuracies are relative to a laboratory standard measurement.

INPUT		
Input voltage	115 / 230V ± 10%, user selectable	
Frequency	50/60 Hz ± 5%	
Fuse	15A slow blow 250VAC	
TEST MODE		
Output Rating	Current:	3.0 – 60.0 Amps AC
	Resolution:	0.1 Amp
	Regulation	± (2% of setting + 0.02 Amps)
	Voltage:	12 Volts AC, fixed
Output Frequency	50 / 60 Hz user selectable	
Dwell Time Setting	Range:	0 and 0.5 – 999.9 seconds, 0 for continuous running
	Resolution:	0.1 second
	Accuracy:	± (0.1% of setting + 0.05 seconds)
High Limit Setting*	Range:	0 – 600 mΩ
	Current:	0 – 600 mΩ for 0.0 – 15.0 Amps 0 – 300 mΩ for 15.1 – 30.0 Amps 0 – 150 mΩ for 30.1 – 60.0 Amps
	Resolution:	1 mΩ
	Accuracy:	±(2% of setting + 2mΩ)
Offset Capability	Range:	0 – 100 mΩ
	Resolution:	1 mΩ
	Accuracy:	± (2% of setting + 2 mΩ)
Current Display	Range:	0.0 – 60.0 Amps
	Resolution:	0.1 Amp
	Accuracy:	± (3% of reading + 0.03 Amps)
Ohmmeter Display	Range:	0 – 600 mΩ
	Resolution:	1 mΩ
	Accuracy:	± (3% of reading + 3 mΩ) for 3 – 5.9 Amps
	Accuracy:	± (2% of reading + 2 mΩ) for 6 – 60 Amps
Timer Display	Range:	0.0 – 999.9 seconds
	Resolution:	0.1 seconds
	Accuracy:	± (0.1% of reading + 0.05 seconds)

*Even though it is possible to set the High Limit trip point to the maximum of 600 mΩ for all current settings, the usable resistance range will be reduced according to the test current that has been selected due to the limits on the output voltage.

GENERAL	
Remote Control And Signal Output	The following input and output signals are provided through two 9 pin D type connectors; 3. Remote control: Test, Reset, and Withstand Processing. 4. Outputs: Pass, Fail, Test-in-Process, Start Out, and Reset Out.
Program Memory	5 sets
Security	Key Lock capability to avoid unauthorized access to all test parameters. Memory Lock capability to avoid unauthorized access to memory locations.
Line Cord	Detachable 6 ft. (1.80m) power cable terminated in a three prong grounding plug.
Terminations	5ft. (1.52m) high current and return leads with clips.
Mechanical	Tilt up front feet. Dimensions: (w x h x d) 16.875 x 5.25 x 15.625 in. (430 x 130 x 400mm) Weight: 44.1 lbs. (20 kg)
Environmental	Operating Temperature: 32° - 104°F (0° - 40°C) Relative Humidity - 20 to 80%
Calibration	Traceable to 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.

KEY FEATURES & BENEFITS OF 2630 and 2660

1. All parameters for the setups can be adjusted through a simple menu driven program by using front panel keys.
   The easy to follow setup screens ensure that the operator correctly sets up all test parameters.

2. Tamper proof front panel controls.
   This makes it possible to limit user access to the setup screens.

3. Milliohm offset capability.
   The milliohm offset function allows the use of longer test leads and test fixtures without compromising the test results.

4. Storage of up to 5 different test programs.
   A real benefit for manufacturers that test different products. This makes it possible to store all the various test parameters required and quickly recall them for each of the different products that needs to be tested.

5. Versatile PLC control.
   Interconnection of the 2630 or 2660 to one of the 2900 family of Hipots makes a true semi-automated test system. The test system can be configured to test Ground Bond first and then advance to the Dielectric Withstand test and Insulation Resistance tests.

6. Line and load regulation.
   This system maintains the output voltage to within 1% from no load to full load and over the line voltage range to ensure that test results remain consistent and within safety agency requirements.

7. User selectable output voltage frequencies of 50 or 60 hertz.
   2630 and 2660 were designed for the global market. This feature makes it simple for the user to select the output frequency in the Ground Bond mode so that products can be tested at the same frequency they will be used.

8. Adjustable output current and milliohm trip ranges.
   This capability makes the 2630 and 2660 versatile enough to meet all safety agency specifications for ground bond test requirements.

9. Front panel LCD displays test parameters and results.
   A front panel LCD allows the operator to monitor the test. The display holds the results after a test item failure so that the operator can easily review the test results.

10. PLC remote inputs and outputs.
    The standard 9 pin interfaces provide outputs for Pass, Fail, and Test in Process, Start Out and Reset Out. Inputs include Test, Reset, and Withstand Processing.

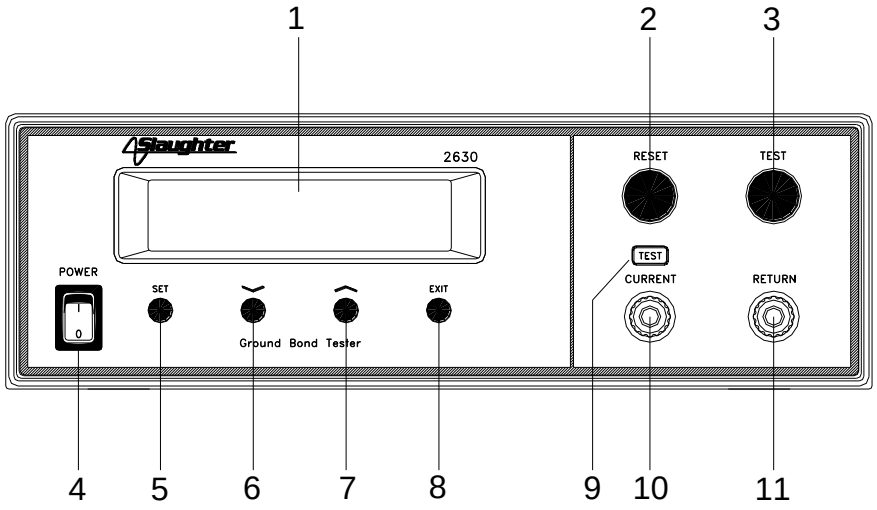
11. Test indicator.

An LED located directly over the high current terminal clearly indicates when high current is active to provide maximum operator safety.

12. Withstand processing indicator.
    The front panel display indicates when the high voltage from a hipot is being applied to the item under test for greater operator safety.

13. Software calibration control.
    2630 and 2660 are calibrated through the front panel keypad. All calibration information is stored in non-volatile memory. This allows 2630 and 2660 to be completely calibrated without removing any covers and exposing the technician to hazardous voltages.

2630 2630FRONT PANEL CONTROLS



1. **LCD DISPLAY:** The Liquid Crystal Display is the main readout for the operator and programmer of the test settings and test results.

2. **RESET SWITCH:** This is a momentary contact switch. To reset the system for the next test, press and release the red Reset switch (1). This switch may also be used to abort a Test in Progress.

3. **TEST SWITCH:** This is a momentary contact switch. Press the green switch to turn on the high current output when in the test mode.

4. **POWER SWITCH:** Rocker-style switch with international ON (l) and OFF (0) markings.

5. **SET KEY:** Use this key to advance forward through the setup menus.

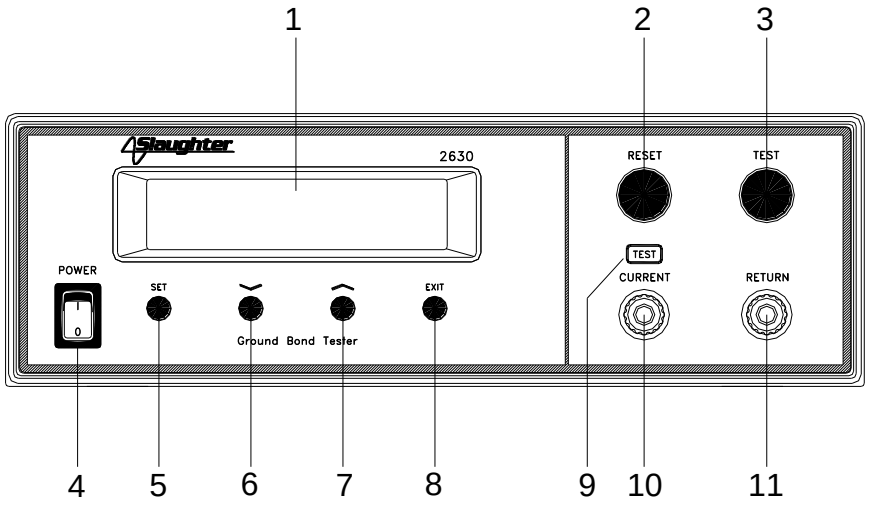
6. **DOWN ARROW (∨):** Use this key to decrement numeric values in the setup mode. This key may also be used to toggle ON/OFF functions.

7. **UP ARROW (∧):** Use this key to increment numeric values in the setup mode. This key may also be used to toggle ON/OFF functions.

8. **EXIT KEY:** Use this key when you desire to enter the **Run Mode** to initiate a test. This key may also be used to save settings into memory.

9. **TEST LED INDICATOR:** This red LED lights to indicate to the operator that a test is in process.

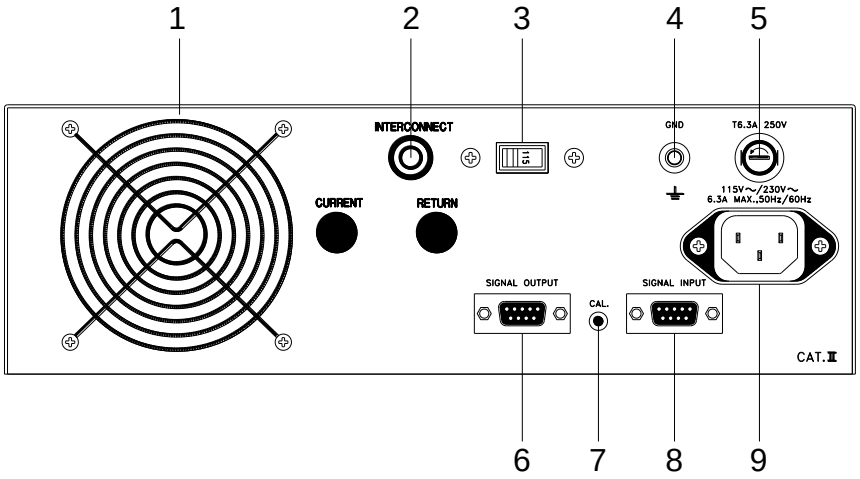
2630 FRONT PANEL CONTROLS



10. CURRENT OUTPUT JACK: For the connection of the detachable 5-foot (1.52 m) red high current test lead or adapter box. This jack is always used when performing a Ground Bond test. Please refer section F. Adapter Box connection for details on connecting the adapter box between the instrument and the device under test.

11. RETURN OUTPUT JACK: For the connection of the detachable 5-foot (1.52 m) black return test lead. This jack is always used when performing a test.

2630 REAR PANEL CONTROLS



1. **THERMAL FAN:** Runs continuously to cool the instrument.

2. **INTERCONNECT JACK:** For the connection of the return lead from the hipot tester used when performing both Hipot and Ground Bond tests on the same test item.

3. **INPUT POWER SWITCH:** Line voltage selection is set by the position of the switch. In the left position it is set for 115-volt operation, in the right position it is set for 230-volt operation.

4. **CHASSIS GROUND (EARTH) TERMINAL:** This safety terminal should be connected to a good earth ground before operation.

5. **FUSE RECEPTACLE:** To change the fuse unplug the power (mains) cord and unscrew the fuse cap counter clockwise to remove the fuse.

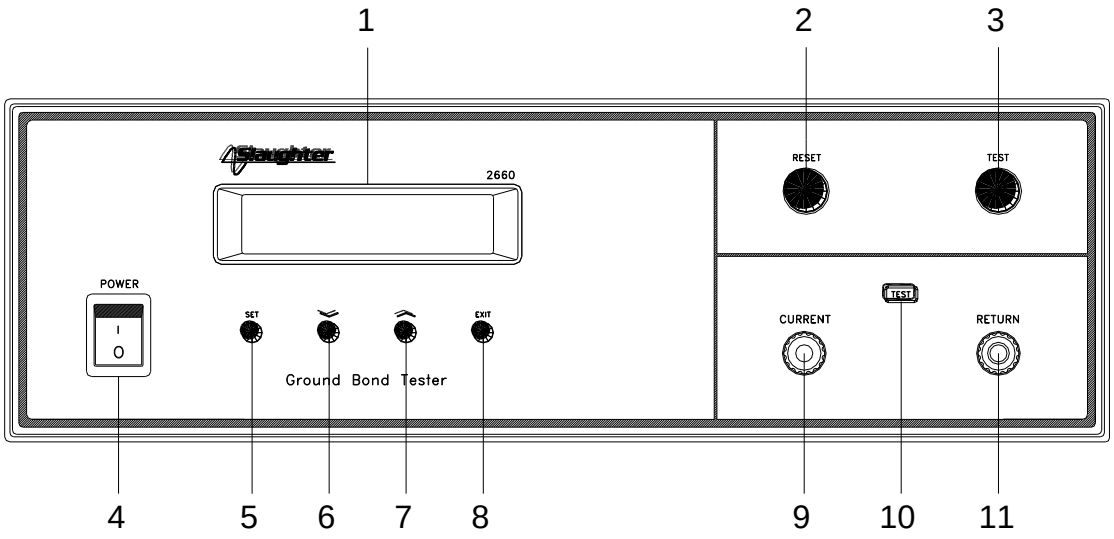
6. **REMOTE OUTPUT:** 9 pin D subminiature female connector for monitoring PASS, FAIL, and PROCESSING output relay signals, as well as remote START and RESET outputs.

7. **CALIBRATION ENABLE:** This recessed switch when depressed allows access to the calibration control program.

8. **REMOTE INPUT:** 9 pin D subminiature male connector for remote control of test and reset functions as well as withstand processing input.

9. **INPUT POWER RECEPTACLE:** Standard IEC 320 connector for connection to a standard NEMA style line power (mains) cord.

2660 FRONT PANEL CONTROLS



1. **DISPLAY:** The Liquid Crystal Display is the main readout for the operator and programmer of the test settings and test results.

2. **RESET SWITCH:** This is a momentary contact switch. To reset the system for the next test, press and release the red Reset switch (1). This switch may also be used to abort a Test in Progress.

3. **TEST SWITCH:** This is a momentary contact switch. Press the green switch to turn on the high current output when in the test mode.

4. **POWER SWITCH:** Rocker-style switch with international ON (l) and OFF (0) markings.

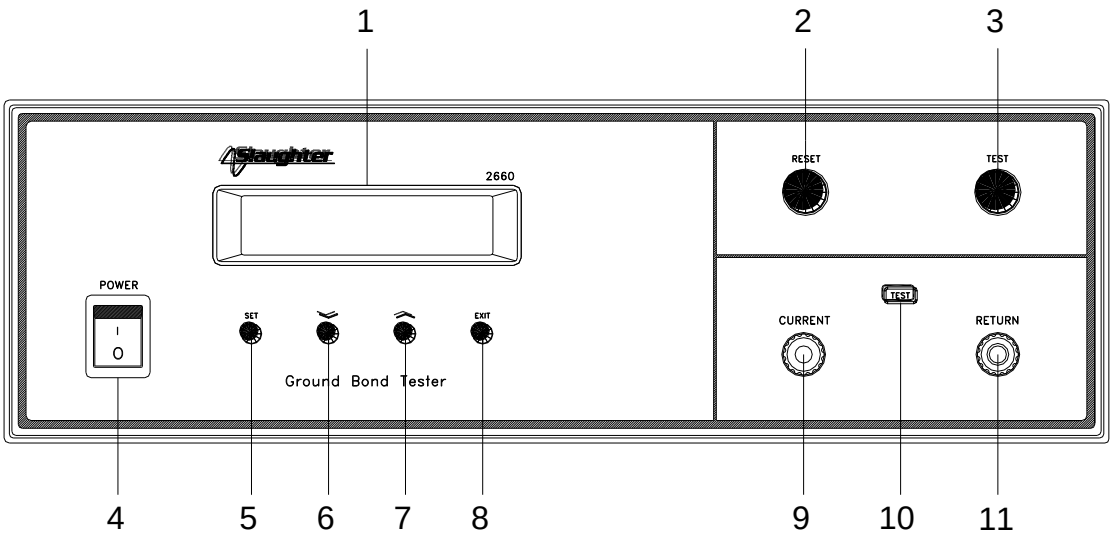
5. **SET KEY:** Use this key to advance forward through the setup menus.

6. **DOWN ARROW (∨):** Use this key to decrement numeric values in the setup mode. This key may also be used to toggle ON/OFF functions.

7. **UP ARROW (∧):** Use this key to increment numeric values in the setup mode. This key may also be used to toggle ON/OFF functions.

8. **EXIT KEY:** Use this key when you desire to enter the **Run Mode** to initiate a test. This key may also be used to save settings into memory.

2660 FRONT PANEL CONTROLS

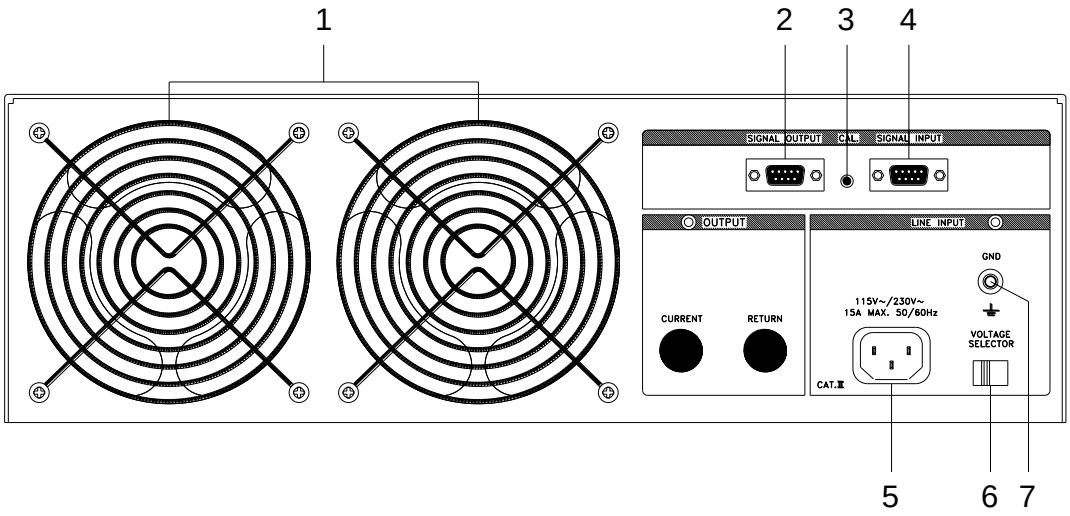


9. CURRENT OUTPUT JACK: For the connection of the detachable 5-foot (1.52 m) red high current test lead or adapter box. This jack is always used when performing a Ground Bond test.

10. TEST LED INDICATOR: This red LED lights to indicate to the operator that a test is in process.

11. RETURN OUTPUT JACK: For the connection of the detachable 5-foot (1.52 m) black return test lead. This connector may also be used to interconnect a Hipot to this instrument. This jack is always used when performing a test.

2660 REAR PANEL CONTROLS



1. **THERMAL FAN:** Thermally switched fans provide cooling when needed.

2. **REMOTE OUTPUT:** 9 pin D subminiature female connector for monitoring PASS, FAIL, and PROCESSING output relay signals, as well as remote START and RESET outputs.

3. **CALIBRATION ENABLE:** This recessed switch when depressed allows access to the calibration control program.

4. **REMOTE INPUT:** 9 pin D subminiature male connector for remote control of test and reset functions as well as withstand processing input.

5. **INPUT POWER RECEPTACLE:** Standard IEC 320 connector for connection to a standard NEMA style line power (mains) cord.

6. **INPUT POWER SWITCH:** Line voltage selection is set by the position of the switch. In the left position it is set for 115-volt operation, in the right position it is set for 230-volt operation.

7. **CHASSIS GROUND (EARTH) TERMINAL:** This safety terminal should be connected to a good earth ground before operation.

INSTALLATION

Introduction

This section contains information for the unpacking, inspection, preparation for use and storage of your Slaughter Company, Inc., product.

Unpacking and Inspection

Your instrument 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 instrument is damaged, notify the carrier and the Slaughter Company 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 instrument. Please do not return your product without first notifying us and receiving an RGA (return goods authorization) number.

Safe Lifting and Carrying Instructions

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

- Determine if the instrument 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 instrument.
- Bend at the knees and make sure your back is straight.
- Grip the instrument with your fingers and palms and do not lift unless your back is straight.
- Lift up with your legs, not your back.
- Keep the instrument close to your body while carrying.
- Lower the instrument by bending your knees. Keep you back straight.

CONTENTS OF THE CARTON

Inside the carton should be the following:

Description	SLA Part Number
26XX Series Instrument	26XX Ground Bond Tester
99-10008-01	High Current Return Lead (2630)
99-10009-01	High Current Output Lead (2630)
125-013-001*	Input Power Cable (6ft.) (2630)
99-10238-01	Cable Assy High Current Return Lead (2660)
99-10239-01	Cable Assy High Current Output Lead (2660)
99-10458-01 (qty 2)	3U Handle Rack Mount (2660)
99-10459-01 (qty 2)	3U Bracket Rack Mount (2660)
99-10164-01*	Line Cord (2660)
99-10210-01	Fuse (2660)

*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.

Preparation for Use

Power Requirements and Line Voltage Selection

CAUTION This instrument requires a power source either 115 volts AC ± 10%, 50/60 Hz ± 5% single phase or 230 volts AC ±10%, 50/60 Hz ± 5% single phase. Please check the rear panel to be sure the proper switch setting is selected for your line voltage requirements before turning your instrument on. In addition, please be sure the correct fuse is selected and installed while the instrument is in the off position.

Do not switch the line voltage selector switch located on the rear panel while the instrument is on or operating. This may cause internal damage and represents a safety risk to the operator.

NOTE

2630: For operation at 115 Volts AC and 230 Volts AC, use a 6.3A 250VAC slow blow fuse.

2660: For operation at 115 Volts AC and 230 Volts AC, use a 15A 250VAC slow blow fuse.

Power Cable

WARNING **BEFORE CONNECTING POWER TO THIS INSTRUMENT, THE PROTECTIVE GROUND (EARTH) TERMINALS OF THIS INSTRUMENT 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 instrument 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 instrument depends on the country of destination.

Test Leads
The test leads provided are designed specifically for use with this instrument. The red High Current lead will mate with the red Current jack. The black Return lead will connect to the black Return jack.

The test lead ratings are as follows:

2630 Test Leads		
Description	Part Number	Rating
Return lead	99-10008-01	30 A, 600V
High Current lead	99-10009-01	30 A, 600V

2660 Test Leads		
Description	Part Number	Rating
Return lead	99-10238-01	60 A, 600V
High Current lead	99-10239-01	60 A, 600V

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 instrument 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 instrument to overheat and may damage internal components.

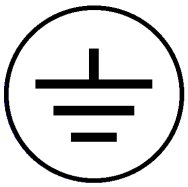
If the instrument is used in a matter not specified by the manufacturer, the protection provided by the instrument may be impaired.

STORAGE AND SHIPMENT
Environment
This instrument 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 instrument should also be protected against temperature extremes, which may cause condensation within the instrument.

Field Installation of Options

There are no field installable options on the model 2630 or 2660.

QUICK START



This quick start guide assumes the operator has some familiarity with automated Ground Bond testing and desires to use the **default** settings on the instrument. The default settings shown will remain in memory unless you choose to override them with your own test program. The instrument default settings are as follows:

DEFAULTS

- **Memory Position:** 1
- **Input Voltage:** 115 volts AC (rear panel switch selectable)
- **Current Output:** 25.00 Amps
- **Resistance Trip (High):** 100mΩ
- **Dwell Timer:** 1 second
- **Frequency:** 60Hz
- **Offset:** 20mΩ for 2630, 4mΩ for 2660
- **Lock:** Key Unlock

a). Unpack this instrument from its special shipping container.

b). Locate a suitable testing area and be sure you have read all safety instructions for the operation of the instrument and suggestions on the test area set-up in the SAFETY section of this manual. Locate a three prong grounded outlet. Be sure the outlet has been tested for proper wiring before connecting the instrument to it.

c). Check to be sure that the correct input line voltage has been selected on the rear panel, either 115 volts AC or 230 volts AC. Connect the power-input plug into its socket on the rear panel of the instrument. Connect the male end of the plug to the outlet receptacle.

Please be sure that the safety ground on the power line cord is not defeated and that you are connecting to a grounded power source.

d). Turn on the POWER switch located on the lower left hand side of the front panel. Upon powering the instrument up a POWER ON SELF TEST (POST) will automatically be performed. This test will check for the condition of the ram chips, led indicators,

PCB's, and other critical components. In addition, you will see the Slaughter Company name and Model Number briefly appear on the LCD readout and then clear itself.

SLAUGHTER 2630 VERXX	or	SLAUGHTER 2660 VERXX

You should then see the default parameters on the LCD meter as follows:

Set	M1	1.0s
25.00A		100mΩ

These abbreviated parameters stand for the following:

Set: This is the parameter settings review screen.
M1: The instrument is using the default set ups contained in memory 1.
1.0s: The dwell timer is set to test duration of 1 second.
25.00A: The test current is set to 25.00 Amps.
100mΩ: The high resistance trip point is set to 100 milliohms.

If you wish to not use any one of these parameters, you must overwrite the memory 1 position or change your parameters and save them in a different memory such as memory position 2.

e). If the instrument defaults are acceptable then be sure to connect the appropriate test leads to the device under test (DUT) or test fixture. Be sure to connect this safety ground to a suitable known good ground before energizing this instrument, and then connect the Return lead first (black) to the test fixture or item followed by the High Current output lead (red).

WARNING

f). Please check your connections to be sure they are making good contact. Clear the area of any debris that may create a hazardous situation and ask any unnecessary personnel to leave the area. DO NOT TOUCH THE DEVICE UNDER TEST ONCE THE TEST HAS BEEN STARTED. To initiate the test press the GREEN test button on the front panel. This is a momentary button and does not need to be held in the pressed position during the test. The instrument will then cycle ON and begin the automated test sequence using the defaults. If a failure occurs, you will HEAR an audible alarm. To stop the alarm you must depress the RED button marked RESET. This will silence the alarm and reset the instrument to begin another test. This RESET button may also be used as a safety button to quickly ABORT a test and cut off the HIGH CURRENT.
When HIGH CURRENT is present, a green TEST indicator located to the left of the CURRENT receptacle will light until the HIGH CURRENT is shut OFF. If the device under test PASSED, then a single beep will sound. In the case of a FAIL condition, the

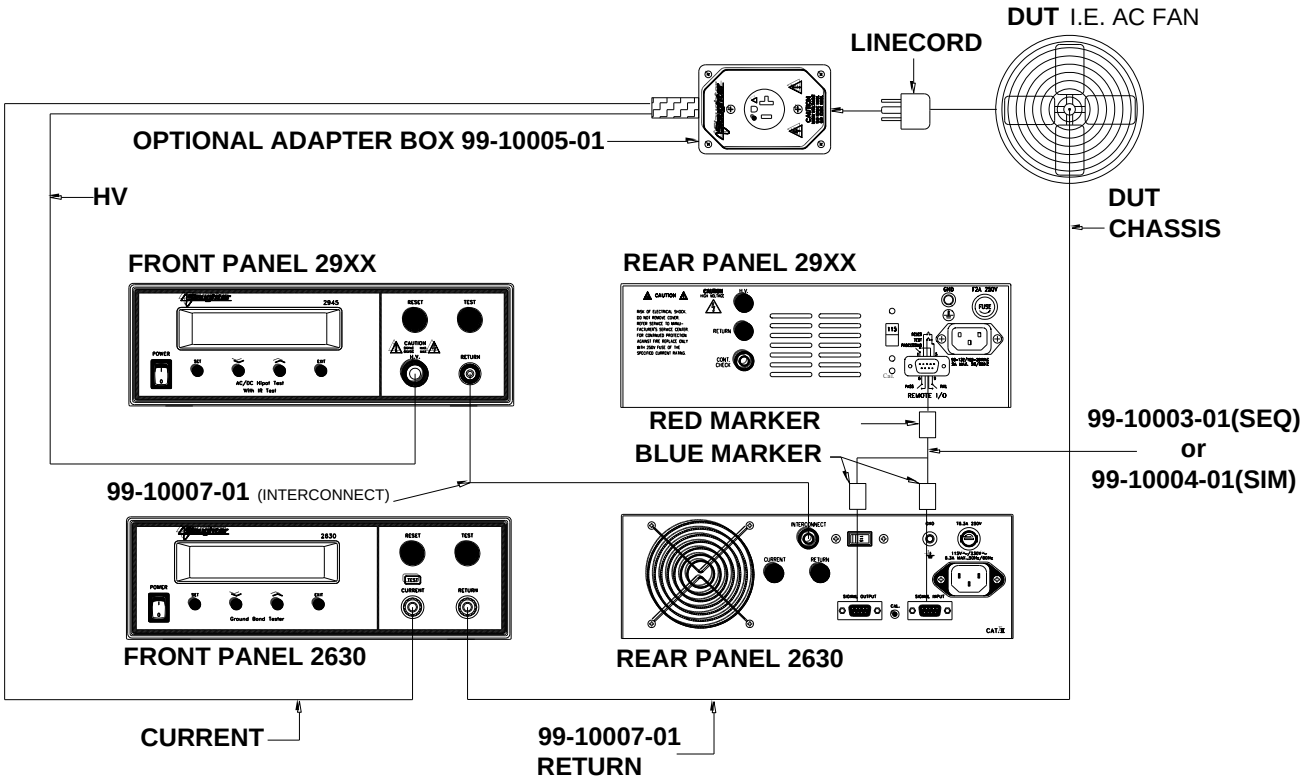
TEST

RESET SWITCH will illuminate and the LCD will display a failure condition along with an audible alarm. The instrument will provide a memory of the test condition results on the LCD display that will remain until the next test is initiated. Depressing the reset button will reset the instrument alarm

while keeping the last test results on the display. Depressing the reset button a second time will clear the display.

Quick Guide to Interconnecting 2630 to the 2900 Family of Hipots
Using the optional Interface Cable Kit part number 99-10006-01.

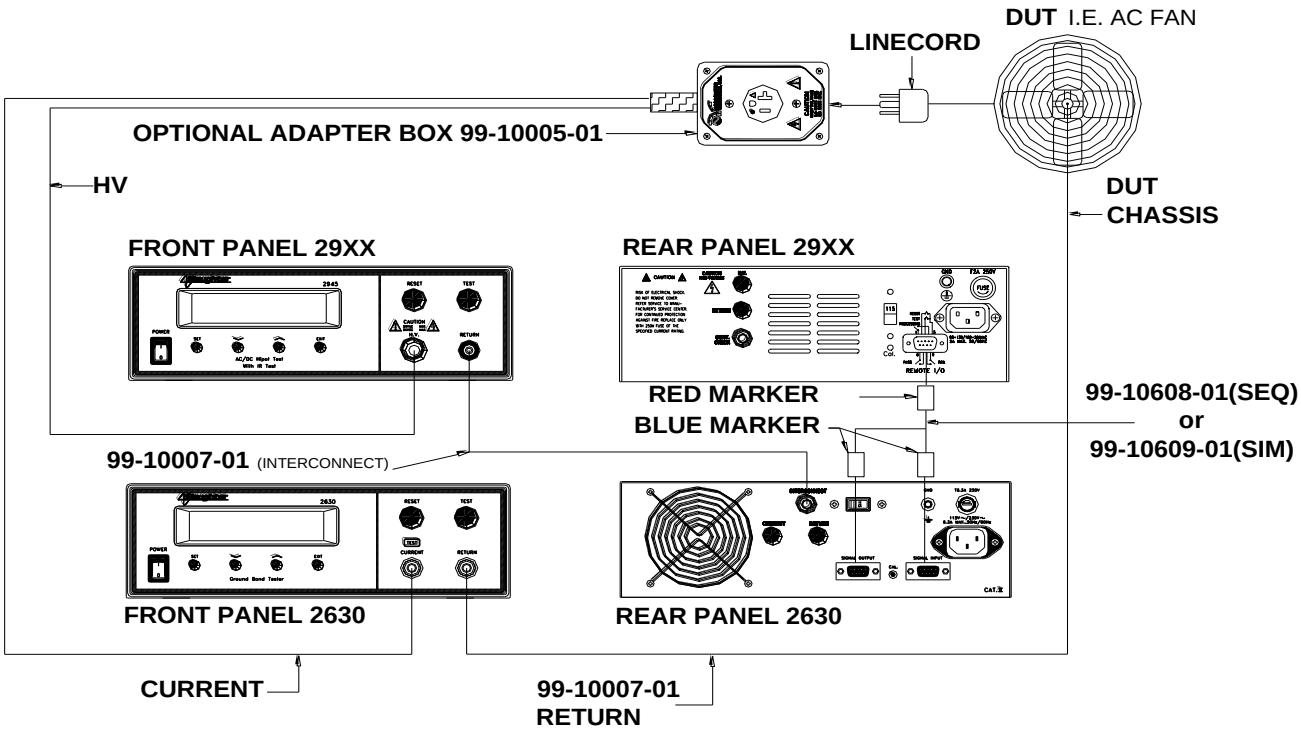
The following illustrations should be used to configure the 2630 for integrated operation with a 2925, 2935 or 2945 series Hipot:



Cable number	Method	Operation
99-10003-01	Sequential	2630 first then 2925,2935,2945
99-10004-01	Simultaneous	2630 and 2925,2935,2945 at the same time.

For a more detailed description on interconnecting your system, see page 36.

The following illustrations should be used to configure the 2630 for integrated operation with a 2955, 2965 or 2975 series Hipot:



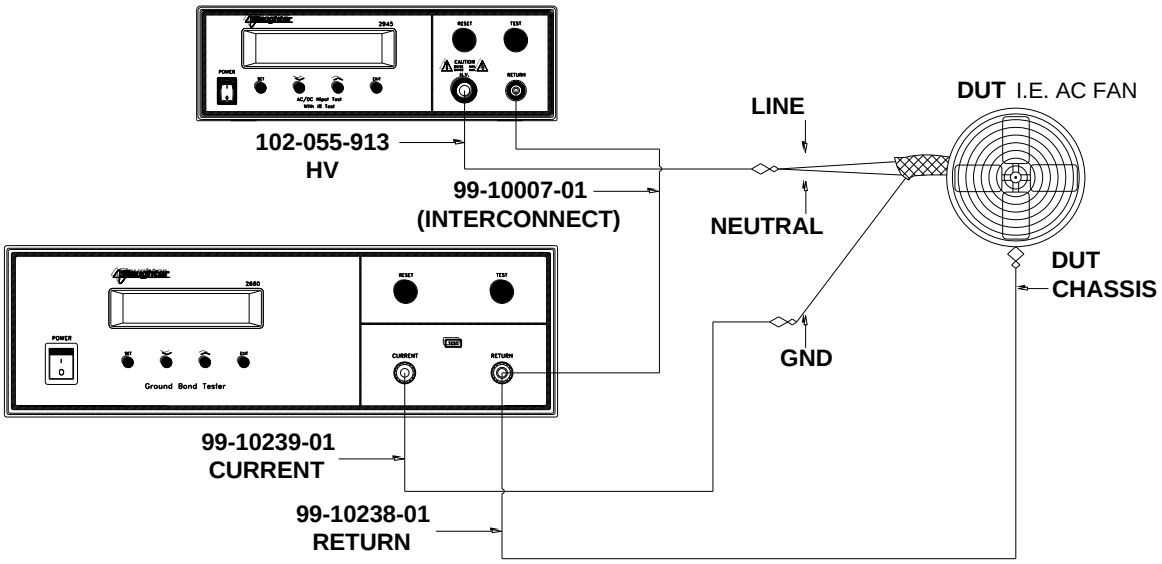
Cable number	Method	Operation
99-10608-01	Sequential	2630 first then 2955,2965,2975
99-10609-01	Simultaneous	2630 and 2955,2965,2975 at the same time.

For a more detailed description on interconnecting your system, see page 36.

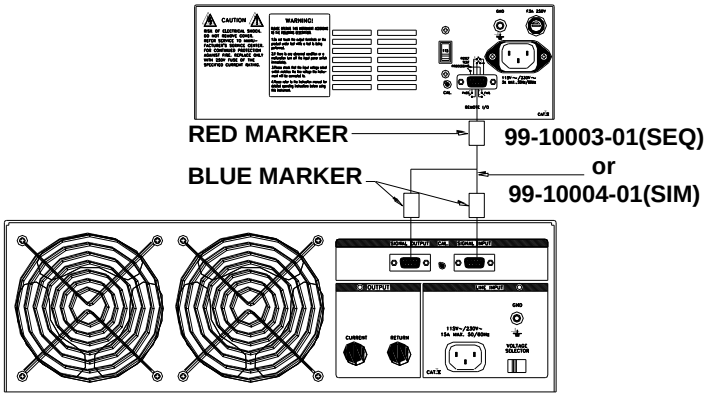
Quick Guide to Interconnecting 2660 to the 2900 Family of Hipots
Using the optional Interface Cable Kit part number 99-10006-01.

The following illustrations should be used to configure the 2660 for integrated operation with a 2925, 2935 or 2945 series Hipot:

Front Panel Connections



Rear Panel Connections

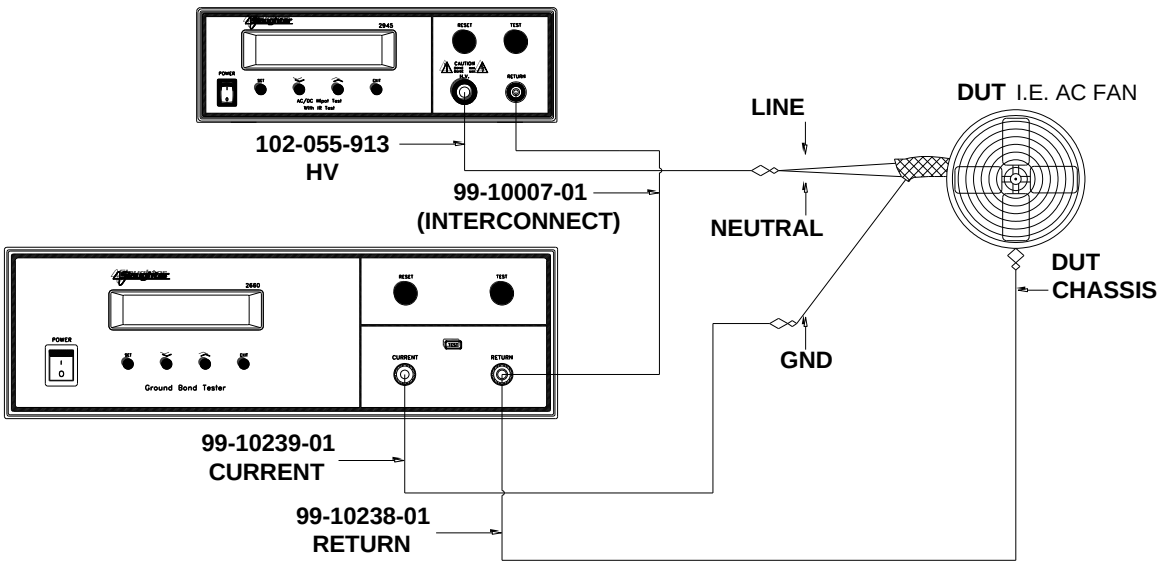


Cable number	Method	Operation
99-10003-01	Sequential	2630 first then 2925, 2935,2945
99-10004-01	Simultaneous	2630 and 2925, 2935,2945 at the same time.

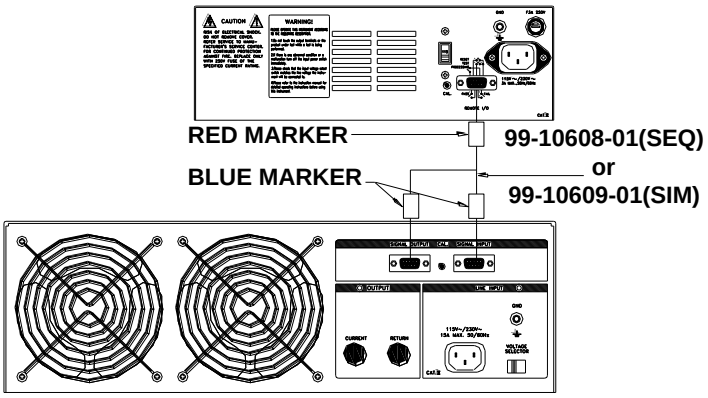
The optional adapter box 99-10005-01 is not designed to be used with 2660.

The following illustrations should be used to configure the 2660 for integrated operation with a 2955, 2965 or 2975 series Hipot:

Front Panel Connections



Rear Panel Connections



Cable number	Method	Operation
99-10608-01	Sequential	2630 first then 2955, 2965,2975
99-10609-01	Simultaneous	2630 and 2955, 2965,2975 at the same time.

The optional adapter box 99-10005-01 is not designed to be used with 2660.

NOTE: When interconnecting 2630/2660 to one of the 2900 family Hipots, 2630/2660 will automatically sense when high voltage is active. The display on the 2630/2660 will change to show a "W-On" indicating that the Dielectric Withstand test is processing. An example of this display is shown below. The initialization of the AC or DC Dielectric Withstand test will now be controlled by the 2630/2660 through the interconnect cables.

Set	M1	1.0s
25.00A	W-On	0mΩ

OPERATION INSTRUCTIONS FOR 2630 and 2660

A. POWER UP:

Check to be sure that the correct input line voltage has been selected on the rear panel, either 115 volts AC or 230 volts AC. Connect the power-input plug into its socket on the rear panel of the instrument. Connect the male end of the plug to the outlet receptacle.

CAUTION

Please be sure that the safety ground on the power line cord is not defeated and that you are connecting to a grounded power source. Also, connect the rear panel chassis ground for additional safety.

Turn on the POWER switch located on the lower left-hand side of the front panel. Upon powering the instrument up a POWER ON SELF-TEST (POST) will be automatically performed. This test will check for the condition of the ram chips, led indicators, PCBs and other critical components. In addition, the display will show the following message.

SLAUGHTER 2630 VERXX	or	SLAUGHTER 2660 VERXX

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

B. SETUP PROCEDURE:

1. Output Current Setting

Please press the SET key, the display will show:

CURRENT = XX.XA

Please use the Up (∧) or Down (∨) arrow keys to adjust the Current setting, then press the EXIT key to store the current setting and return to the Run mode, or press the SET key to advance to the next parameter. The maximum current which may be entered is 30.0 Amps for 2630 and 60.0Amps for 2660. Any value above this will produce an ERROR message.

2. High Limit Setting

Please press the SET key until arriving at the HI-LMT setting. The display will show:

HI-LMT = XXX mΩ

Please use the Up (∧) or Down (∨) arrow keys to adjust the value of the High Limit resistance trip point then press the EXIT key to store the setting and return to the Run mode, or press the SET key to advance to the next parameter. The unit of measure is in milliohms with a range from 0-510mΩ for 2630 and 0-600mΩ for 2660 .

3. Dwell Time Setting
Please press the SET key until arriving at the Timer setting. The display will show:

Timer = XXX.X s

Use the Up (∧) or Down (∨) arrow keys to adjust the Timer setting, then press the EXIT key to store the Timer setting and return to the Run mode, or press the SET key to advance to the next parameter. The range is 0 to 999.9 seconds, if the Timer is set to 0, the instrument will operate in a continuous ON mode when the test button is depressed and released. It will stop when the DUT (Device Under Test) goes into failure or the manual reset button is pressed.

4. Frequency Setting
Please press the SET key until arriving at the Frequency setting. The display will show:

Freq = 50 HZ

or

Freq = 60 HZ

Use the Up (∧) or Down (∨) arrow keys to change the Frequency setting to 50Hz or 60Hz, then press the EXIT key to store the frequency setting and return to the Run mode, or press the SET key to advance to the next parameter.

5. Offset Setting
Please press the SET key until arriving at the Offset setting. The display will show:

Offset = XXX mΩ TEST to Auto Set

Please use the Up (∧) or Down (∨) arrow keys to adjust the setting of the offset manually, then press the EXIT key to store the setting and return to the Run mode, or press the SET key to advance to the next parameter. To automatically set the Offset, press the TEST button when the test leads or test fixture is connected across the 2630/2660 outputs. The 2630/2660 will measure the resistance that is present and enter this value into the Offset setting. This offset will be automatically subtracted from the actual resistance reading before the reading is displayed. The unit of measure is in milliohms with a range from 0-100mΩ.

6. Memory Storage and Recall

2630 and 2660 are equipped with 5 memory programs numbered 1 through 5. This makes it possible to store all the various test parameters required, and quickly recall them for each of the different products that need to be tested.

(A). Storage of a Memory Program

Please press the SET key until the display shows

M e m o r y = X

Use the Up (∧) or Down (∨) arrow keys to select memory locations 1 through 5. After selecting the memory, press the Set key to view the settings that have been recalled from memory or to make any changes to these settings. Once you have entered all the test parameters such as Current, Hi-Limit Trip Resistance, Dwell Time, etc., as outlined in the above procedures, press the Exit key to store any changes to the settings. The parameters are automatically updated into the memory location that was selected, when exiting to the test mode.

S e t	MX XXX . X s
XX . XA	XXX mΩ

(B). Recall of a Memory Program

Please press the SET key until the Memory Program is displayed then press the Up (∧) or Down (∨) arrow keys until the specific memory you wish to recall is displayed. Pressing the EXIT key will activate this memory position. To start a test, press the TEST button.

7. To Set Key Lock or Memory Lock

The 2630 and 2660 are equipped with two different lockout selections. The first selection is Key Lock. Within this selection, you can lockout all front panel control functions except TEST and RESET. The second selection is Memory lock and is used in conjunction with the Key Lock. Within this selection, you can lockout all front panel control functions except TEST, RESET and memory select.

You can toggle this selection only from a power OFF state. Please turn the power switch to the off position then press and hold the SET key, then turn the power ON. Momentarily you will see one of the following screens to indicate if the keys are locked or unlocked:

Key Lock = ON	or	Key Lock = OFF

To toggle the Key Lock function on and off use the up or down arrow keys, then press exit to select, or press the set key again to reach the Memory Lock screens.
The memory lock screens appear as follows:

Memory Lock = ON	or	Memory Lock = OFF

To toggle the Memory Lock function on and off use the up or down arrow keys, then press exit to select, or press the set key again to reach the Key Lock screens.

Use the following chart to set the Key Lock and Memory Lock for your application.

Key Lock	Memory Lock	Accessible keys
Off	Off	All
Off	On	All
On	Off	TEST, RESET, and up-down arrows for memory selection
On	On	TEST and RESET

C. OPERATING PROCEDURES:

1. If the defaults are acceptable then be sure to connect the appropriate test leads to the device under test (DUT) or test fixture. Be sure to connect the safety ground (on the rear panel) to a suitable known good ground before energizing this instrument. Then connect the return lead first to the test fixture or the DUT followed by the high current lead. Check your connections to be sure they are making good contact and that the test station or area is clear of debris or other personnel.

WARNING **DO NOT TOUCH THE DEVICE UNDER TEST ONCE THE TEST HAS BEEN STARTED.**

2. Please follow the setup procedures to set or recall setups from memory programs. The display will show the number of the Memory Program and the value of Dwell time, Test Current and High Limit resistance trip point as follows:

S e t M __ XXX. Xs XX . XA XXX mΩ	or	S e t MX XXX . X s XX . XA XXX mΩ

If the set data is to be stored in the memory program, please follow the procedure outlined in the setup procedures on **Storage of Memory Program**.

3. To initiate a test press the TEST switch on the front panel.
The instrument will output the set current for the length of time set on the dwell timer.
The display will show:

D w e l l MX XXX . X s X X.XX A XXX mΩ

4. If the resistance exceeds the high limit trip setting but does not exceed the metering range, the red RESET switch will illuminate and the alarm will be activated.

The display will show:

HI - LMT MX XXX . X s
XX . XA XXX mΩ

If the resistance exceeds the high limit trip setting and exceeds the metering range, the red RESET switch will illuminate and the alarm will sound. The display will show:

HI - LMT MX XXX . X s
XX . XA OFL mΩ

To stop the alarm, please press the RESET switch once. The alarm will stop and the display will retain the failure information. If the RESET switch is pressed again, the data on the display screen will be cleared and the display will indicate the setting data from the last test. The instrument is now ready for the next test.

5. If the test leads are left open or the resistance is so large that the test current generates more that the maximum limit of 6VAC for 2630 or 12VAC for 2660, then the red RESET switch will illuminate and the alarm will sound. The display will show:

2630

V-OVLD MX XXX . X s
XX . XA >6VAC

or

2660

V-OVLD MX XXX . X s
XX . XA >12VAC

To stop the alarm, please press the RESET switch once. The alarm will stop and the display will retain the failure information. If the RESET switch is pressed again, the data on the display screen will be cleared and the display will indicate the setting data from the last test. The instrument is now ready for the next test.

6. If the DUT passed all of the tests, the LCD will indicate a pass condition and the instrument will output a short audible beep tone to indicate the DUT has passed the tests. The instrument is now ready to perform another test.
The display will show:

Pass MX XXX . X s
XX . XA XXX mΩ

7. If the operator elects to abort a test in process this can be accomplished by pressing the RESET switch at anytime. The instrument will stop the test process immediately.
The display will show:

Abort MX XXX . X s
XX . XA XXX mΩ

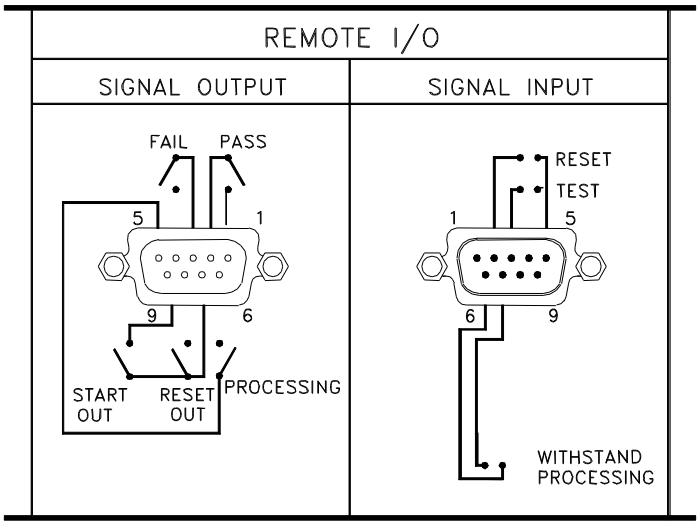
Please press the TEST switch to initiate another test.

D. CONNECTION OF REMOTE I/O:

Two 9-pin D type connectors are mounted on the rear panel that provide REMOTE-INPUT-OUTPUT control and information. These connectors mate with standard 9 pin D subminiature 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 are shown below.

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 INTERFACE REAR PANEL:



SIGNAL OUTPUTS ON REMOTE I/O

The rear panel connector provides three output signals to remotely monitor PASS, FAIL, and PROCESSING conditions, and it also provides a RESET OUT pulse signal and a START OUT pulse signal. The monitoring signals are provided by three normally open internal relays that switch on to indicate the current condition of the tester. The RESET OUT signal and the START OUT pulse signal are also provided by a normally open internal relay. The RESET OUT gives a signal whenever the reset function is activated. This can be used to abort a Dielectric Withstand test while the units are interfaced as a test system. The START OUT gives a momentary output pulse at the end of the Ground Bond test that can be used to start the Hipot test. These are normally open free contacts and will not provide any voltage or current. The ratings of the contacts are 1A / 250 VAC (0.5 ADC). The signal outputs are provided on the 9-pin female type D connector.

Below is a listing that indicates what conditions activate each pin. When a terminal becomes active, the relay closes thereby allowing the external voltage to operate an external device.

Pins 1 and 2 provide the PASS signal.
Pins 3 and 4 provide the FAIL signal.
Pins 5 and 6 provide the PROCESSING signal.
Pins 7 and 8 provide the RESET OUT signal.
Pins 7 and 9 provide the START OUT pulse signal.

The following describes how the relays operate for each test condition.

PROCESSING - The relay contact closes the connection between pin (5) and pin (6) while the instrument is performing a test. The connection is opened at the end of the test.

PASS - The relay contact closes the connection between pin (1) and pin (2) after detecting that the item under test passed all tests. The connection is opened when the next test is initiated or the reset function is activated.

FAIL - The relay contact closes the connection between pin (3) and pin (4) after detecting that the item under test failed any test. The connection is opened when the next test is initiated or the reset function is activated.

RESET OUT - The relay contact closes the connection between pin (7) and pin (8) while the reset function is activated. This is only a continuous closure dependent on the length of time the reset button is held in an active state.

START OUT - The relay contact closes the connection between pin (7) and pin (9) momentarily after the completion and pass of the Ground Bond test. This is only a momentary closure, and therefore, the contact does not stay closed.

With the 2630/2660 and one of the 2900 series Hipots being used as a test system, the processing signal from the Hipot tester will be sent across pin (6) and pin (7) of the 2630 remote input. This signal will add to the LCD display a W-On Withstand Processing indicator that notifies the operator that high voltage is enabled.

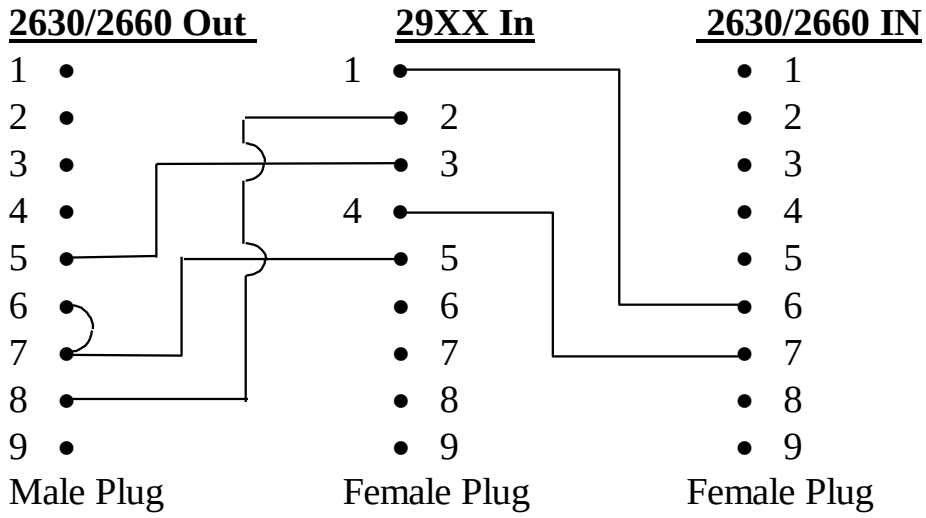
E. 2630/2660 AND 2900 FAMILY HIPOT INTERCONNECTION:
The two instruments have been designed to interface and work as one test system. The tests may be performed in sequence, where the Ground Bond test is run to verify the ground integrity and then the Hipot test is run after a good ground is indicated. The two tests can also be run simultaneously. Instructions regarding connections are provided in the next section. Also, refer to the end of section **E** for a complete diagram of a basic test setup.

After configuring the required test parameters for both instruments and connecting the cables, the test cycle can be initiated by activating the front panel test button on 2630/2660. The Hipot test will be controlled by the 2630/2660 automatically, through

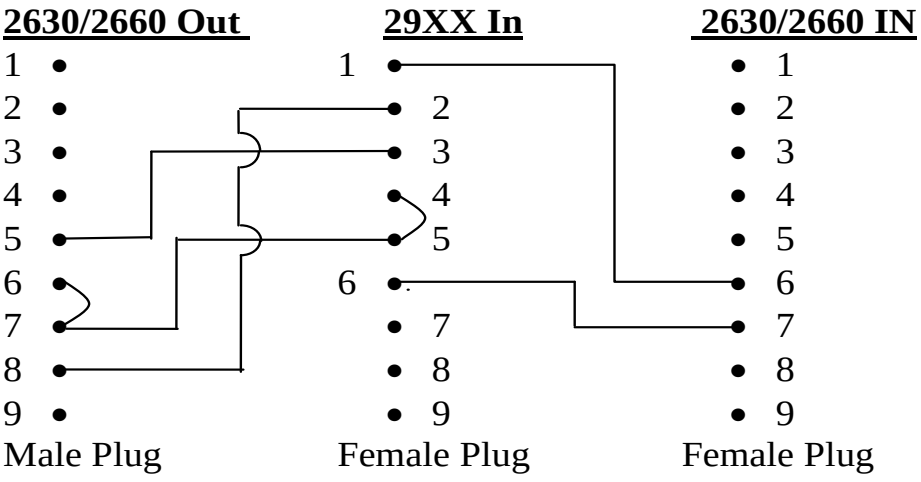
the interconnecting control cables.

1. INSTRUCTIONS FOR USER-FABRICATED INTERCONNECT CABLES.
The following diagrams show how to connect to the Remote I/O of both units. The associated pin numbers are given for the connectors on both units and the pins to be wired
together. Refer to section **D** of this manual for the required parts to make these cables.

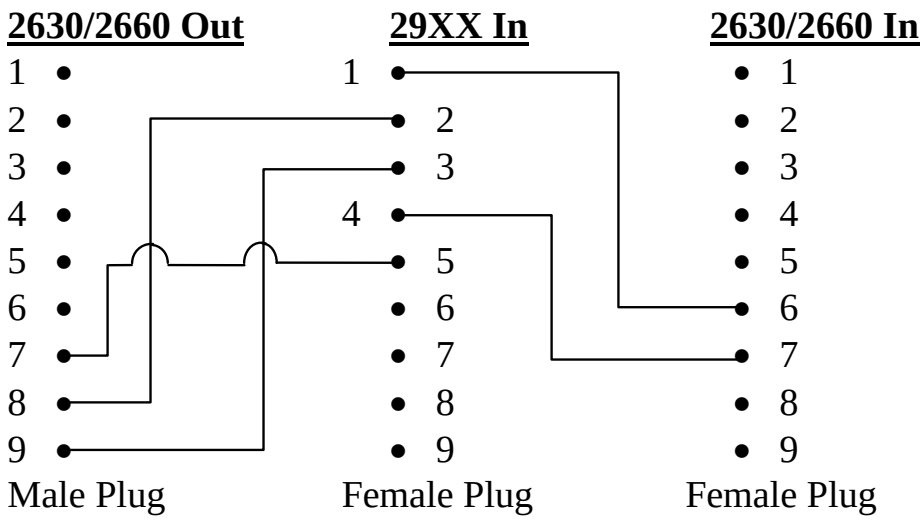
A. Simultaneous Testing 2925, 2935 and 2945
2630/2660 to 29XX Simultaneous Connection



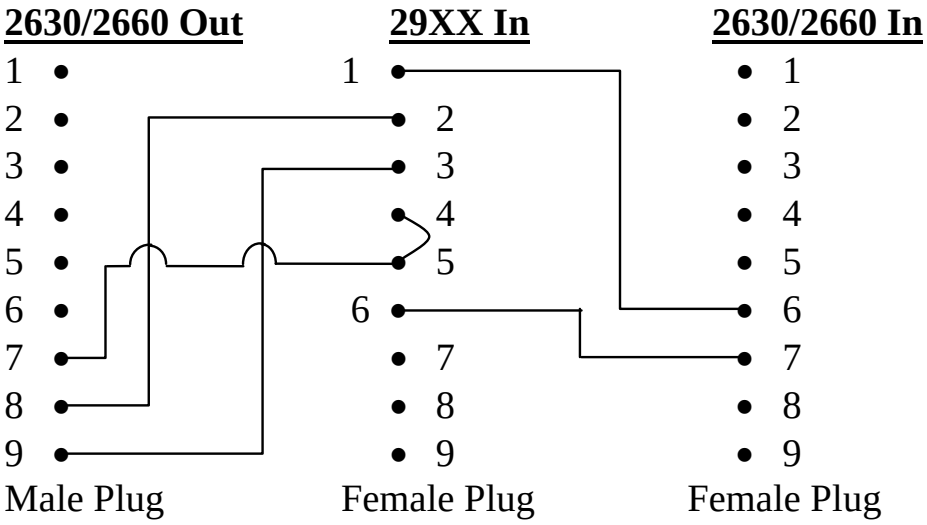
B. Simultaneous Testing 2955, 2965 and 2975
2630/2660 to 29XX Simultaneous Connection



C. Sequential Testing 2925, 2935, 2945
2630/2660 to 29XX Sequential Connections



D. Sequential Testing 2955, 2965, 2975
2630/2660 to 29XX Sequential Connections



RETURN CABLE CONNECTION

For the return cable connection, it is suggested that two insulated banana plugs be used with 18AWG stranded wire. For proper connection, one end of the return cable should be connected to the RETURN jack on the front panel of the Hipot and the other end connected to the INTERCONNECT jack on the rear panel of the 2630 or the RETURN jack in the case of the 2660. The suggested E.F. Johnson part number for the banana plug is as follows:

108-0303-001 Banana Plug Insulated (2)

2. INTERCONNECTING WITH THE 99-10006-01 ACCESSORY CABLES

Accessory kit 99-10006-01 includes the rear interface cables needed for interfacing the 2630/2660 with the 2900 family Hipot. The following table lists the kit contents.

Part Number	Description	Qty.
99-10007-01	Cable Assembly Return Interconnect	1
99-10003-01 (2925, 2935 and 2945)	Cable Assembly R/P Interface Sequential	1
99-10004-01 (2925, 2935 and 2945)	Cable Assembly R/P Interface Simultaneous	1
99-10608-01 (2955, 2965 and 2975)	Cable Assembly R/P Interface Sequential	1
99-10609-01 (2955, 2965 and 2975)	Cable Assembly R/P Interface Simultaneous	1

The following sections describe the procedures for interconnecting your units. Please refer to the test method you require for specific cable connection instructions.

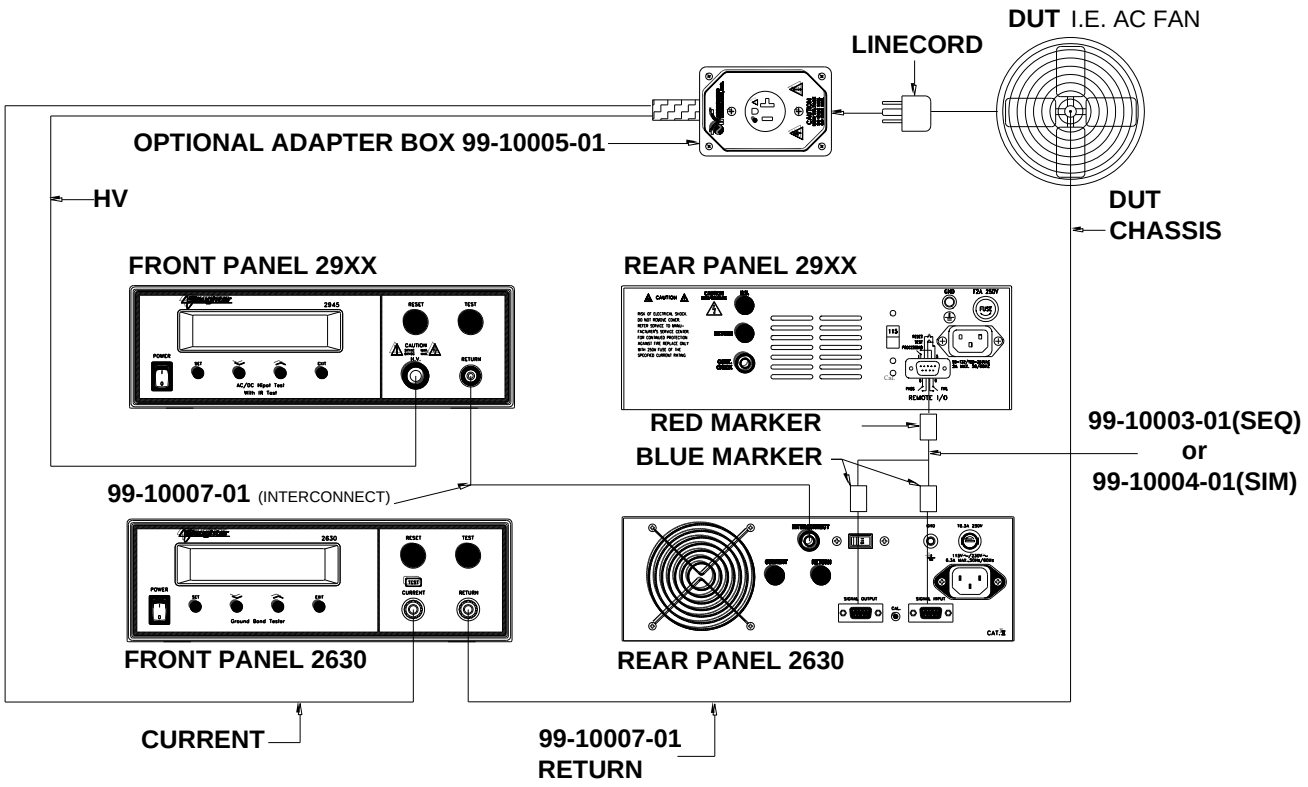
Cable Connections.
First, locate the 99-10007-01 return cable, identified by its double banana plug connectors. Connect one end to the RETURN jack on the front panel of the Hipot and the other end to the INTERCONNECT jack on the rear panel of the 2630 or the RETURN jack on the 2660.

Determine whether you want to run the Ground Bond and Hipot test simultaneously or sequentially then select the appropriate cable assembly for your needs, using the descriptions in the table above.

1. For sequential testing, use the following cable connections. Locate the cable marked "99-10003-01 SEQUENTIAL" for the 2925, 2935 and 2945 units. Locate the cable marked "99-10608-01" for the 2955, 2965 and 2975 units. Attach the male connector (male connector with blue tubing) with two cables coming from it, to the female input connector of the 2630/2660. Attach the shorter of the two remaining cables with female connectors (female connector with blue tubing), to the male output connector of the 2630/2660 and the longer cable to the male signal input/output connector (female connector with red tubing) on the rear panel of the Hipot.

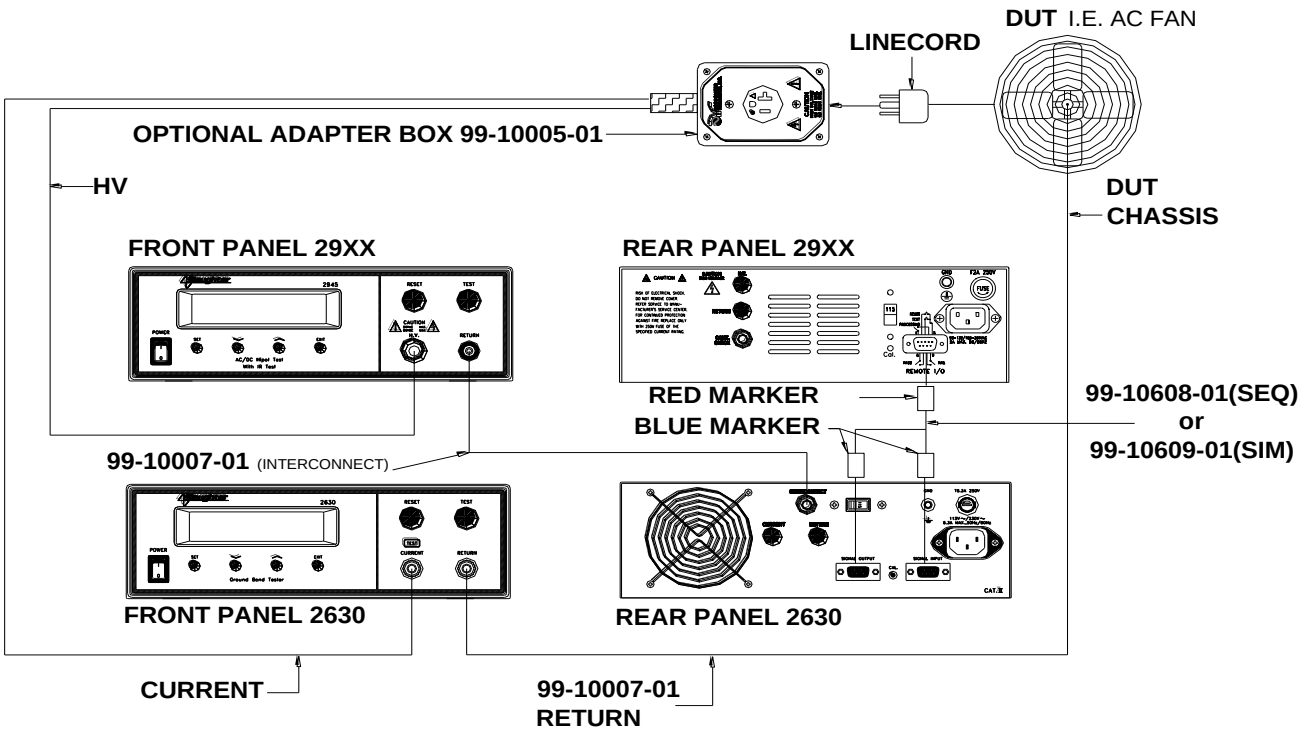
2. For simultaneous testing, use the following cable connections. Locate the cable marked "99-10004-01 SIMULTANEOUS" for the 2925, 2935 and 2945 units. Locate the cable marked "99-10609-01" for the 2955, 2965 and 2975 units. Attach the male connector (male connector with blue tubing) with two cables coming from it, to the female input connector of the 2630/2660. Attach the shorter of the two remaining cables with female connectors (female connector with blue tubing), to the male output connector of the 2630/2660 and the longer cable to the male signal input/output connector (female connector with red tubing) on the rear panel of the Hipot.

Interconnecting 2630 to the 2945 Family of Hipots
The following illustrations should be used to configure the 2630 for integrated operation with a 2925, 2935 or 2945 series Hipot:


DUT I.E. AC FAN
LINECORD
OPTIONAL ADAPTER BOX 99-10005-01
HV
DUT
CHASSIS
FRONT PANEL 29XX
REAR PANEL 29XX
RED MARKER
BLUE MARKER
99-10003-01(SEQ)
or
99-10004-01(SIM)
99-10007-01 (INTERCONNECT)
FRONT PANEL 2630
REAR PANEL 2630
CURRENT
99-10007-01
RETURN

Interconnecting 2630 to the 2975 Family of Hipots

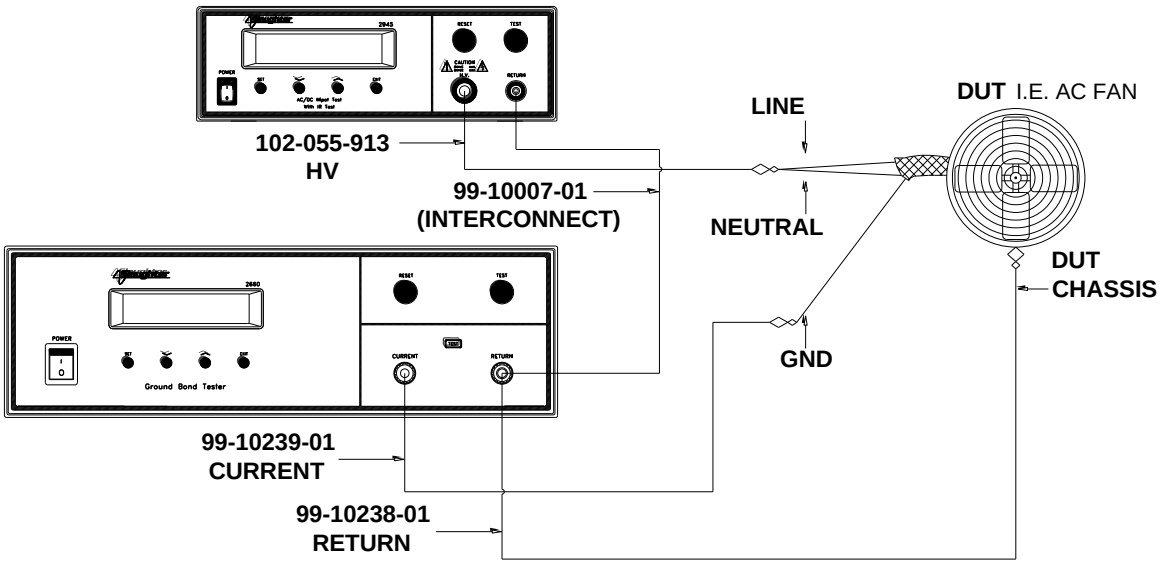
The following illustrations should be used to configure the 2630 for integrated operation with a 2955, 2965 or 2975 series Hipot:



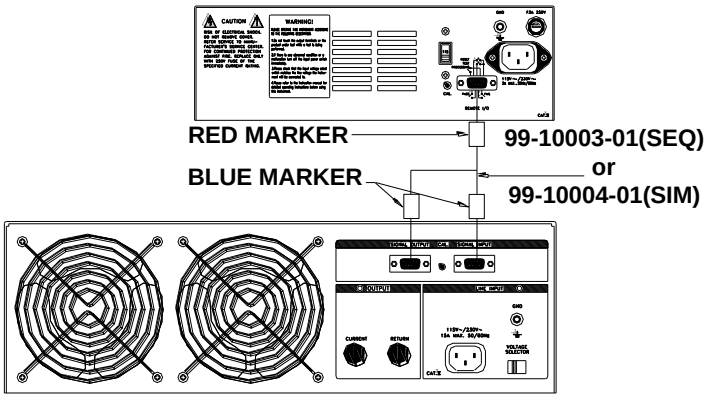
Interconnecting 2660 to the 2945 Family of Hipots

The following illustrations should be used to configure the 2660 for integrated operation with a 2925, 2935 or 2945 series Hipot:

Front Panel Connections



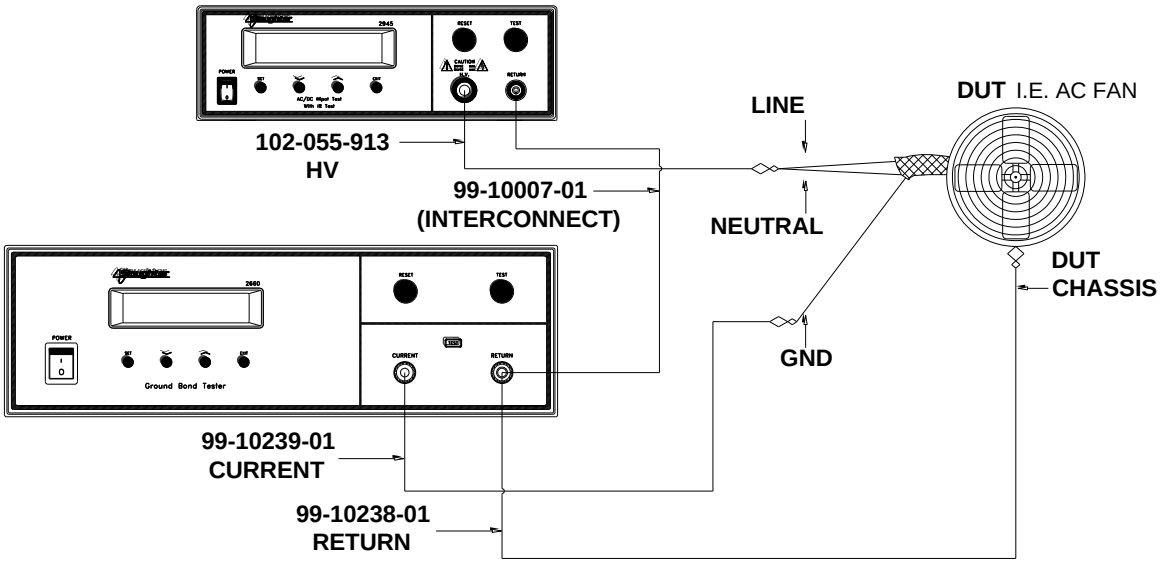
Rear Panel Connections



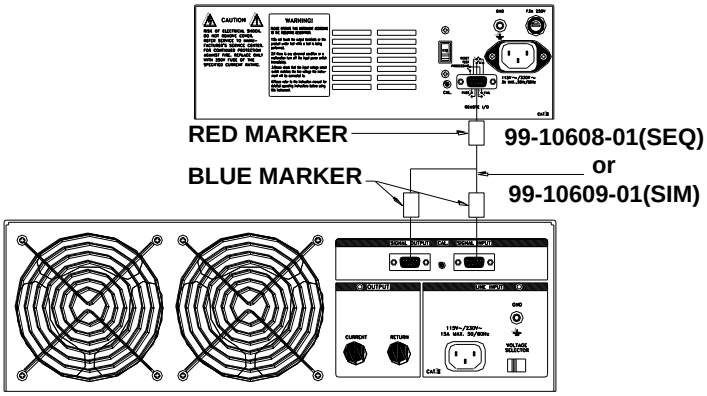
Interconnecting 2660 to the 2975 Family of Hipots

The following illustrations should be used to configure the 2660 for integrated operation with a 2955, 2965 or 2975 series Hipot:

Front Panel Connections



Rear Panel Connections



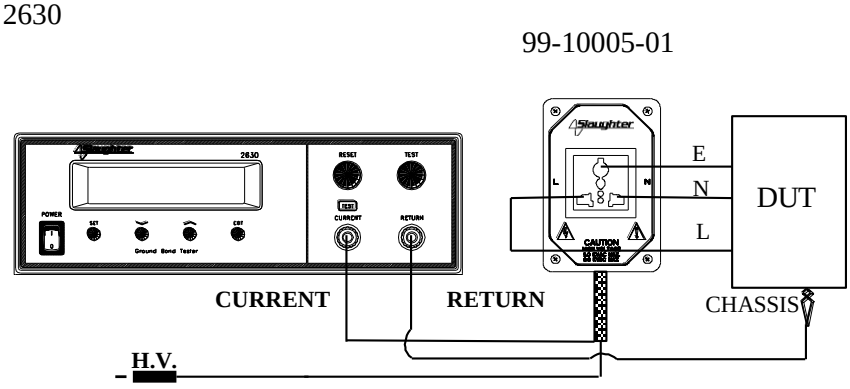
F. ADAPTER BOX CONNECTION (For connecting to 2630 only)
The adapter box is an optional accessory and is not provided as standard equipment with the 2630. If you would like to acquire an adapter box for use with your 2630, please contact The Slaughter Company using the contact information provided in the Safety section of this manual.

The following diagram shows how to connect the adapter box to the 2630 and the Device Under Test. This adapter box allows the user an easy way to connect an item that is terminated in a three-prong line cord. The high current is wired to the ground pin of the

receptacle box and from there the test is performed on the ground conductor of the DUT to the chassis or dead metal of the product. If the high voltage lead is not used, it should be secured out of the way.

If the 2630 and a 2900 family Hipot are being used as a test system, the high voltage lead should be plugged into the high voltage jack on the front panel of the 29XX. The return lead from the 29XX should be connected to the 2630 as described in the previous section (Cable Connections). This configuration would allow you to do both the Ground Bond and Hipot tests by pushing a single test button on the 2630 once all connections are made and the test parameters are set up.

The optional adapter box 99-10005-01 is not designed to be used with 2660.



Test Connections

MODEL 2630/2660 OPTIONS

Introduction
This section contains a list with descriptions of available factory installed options at the time of this printing.

Option Label
If your instrument has been modified with options, there will be an option label on the rear panel of the unit. The option label contains an option(s) code that may be cross-referenced to the 2630/2660 Options List.

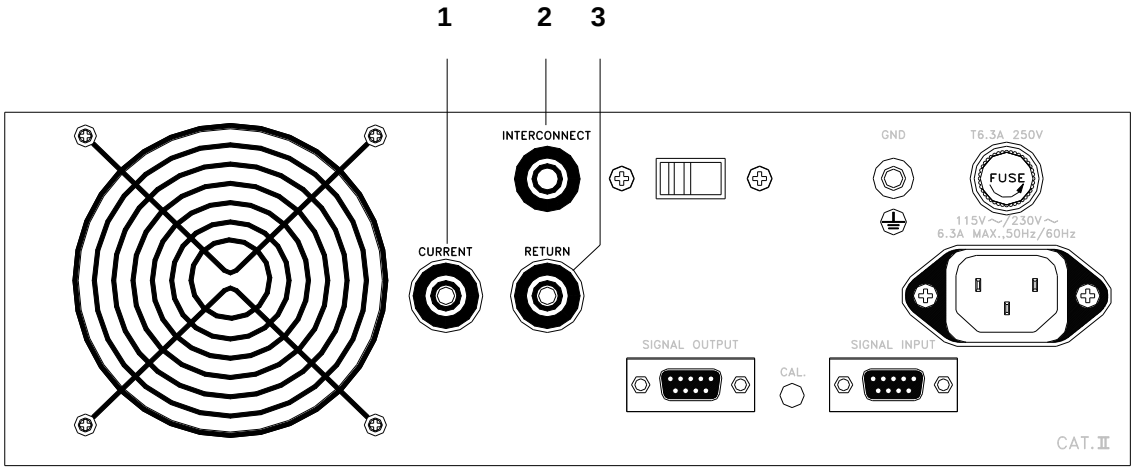
The option(s) code would appear as follows:
fitted with option 02 ..... OPT: 02
fitted with option 02 and 03..... OPT: 0102

2630/2660 Options List

Code	Description
01	Rear Outputs

Description
01 Rear Outputs
The Rear Outputs option gives the user the capability to access the High Current and Return in addition to the existing Interconnect outputs from the rear panel for use in automated systems. The configuration and descriptions are as follows.

2630 OPTIONAL REAR PANEL CONTROLS

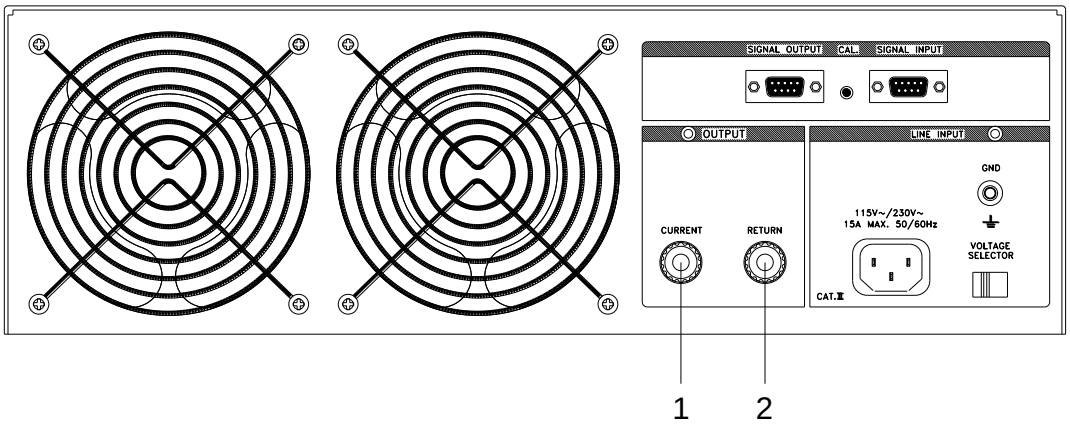


1. **CURRENT OUTPUT JACK:** For the connection of the detachable 5-foot (1.52 m) red test lead or adapter box. This jack is always used when performing a Ground Bond test. Please refer section F. Adapter Box connection for details on connecting the adapter box between the instrument and the device under test.

2. **INTERCONNECT JACK:** For the connection of the return lead from the Hipot tester used when performing both Hipot and Ground Bond tests on the same test item.

3. **RETURN OUTPUT JACK:** For the connection of the detachable 5-foot (1.52 m) black return test lead. This jack is always used when performing a test.

2660 OPTIONAL REAR PANEL CONTROLS



1. **CURRENT OUTPUT JACK:** For the connection of the detachable 5-foot (1.52 m) red test lead. This jack is always used when performing a Ground Bond test.

2. **RETURN OUTPUT JACK:** For the connection of the detachable 5-foot (1.52 m) black return test lead. This connector may also be used to interconnect a Hipot to this instrument. This jack is always used when performing a test.

The optional adapter box 99-10005-01 is not designed to be used with 2660.

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SECTION 2
SERVICE MANUAL

CALIBRATION PROCEDURES

This instrument has been fully calibrated at the factory in accordance to our published specifications. It has been calibrated with standards traceable to NIST. You will find in this manual a copy of the Certificate of Calibration. It is recommended that you have this instrument recalibrated and a safety check done at least once per year. Slaughter Company, Inc. recommends you use Calibration Standards that are NIST traceable, or traceable to agencies recognized by NIST to keep this instrument 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, calibration checks can only be made in the Test mode of operation.

Calibration Equipment Required:
The following equipment will be needed to properly calibrate your instrument.

A Standard AC Voltmeter and a Standard AC Ammeter with the minimum ranges specified in the table:

Required Meters	2630 min range	2660 min range
Standard AC Voltmeter	Voltage 6VAC	Voltage 12VAC
Standard AC Ammeter	Current 30AAC	Current 60AAC

CALIBRATION PROCEDURE:
To enter the calibration mode the instrument must be in the OFF position. Using a pen or small screwdriver, press and hold the rear panel recessed calibration key, then turn on the Input Power Switch. The display will show:

```
Calibration Mode
    Set: V   v: A
```

Press the SET key for volts calibration or the Down (∨) arrow key for amps.

1. Calibration of Voltage
Equipment needed: Standard AC Voltmeter.

Please connect the standard ac voltmeter to the current and return connectors. Then press the SET key on the front panel. The instrument will provide approximately 6.0VAC for the 2630 or 12.0VAC for the 2660 on the output connectors and the display will show:

```
Voltage =__          V
```

Please use the Up (∧) or Down (∨) arrow keys to enter the reading from the ac voltmeter into the instrument, then press the SET key to store the voltage setting. To exit without changing the calibration, press the EXIT key.

2. Calibration of Current

Equipment needed: Standard AC Ammeter.

Please connect the standard ac ammeter across the output leads of the instrument. Press the Down (∨) arrow key. The instrument will provide around 30A for the 2630 or 60Amps for the 2660 on the output and the display will show:

Current =__ A

Please use the Up (∧) or Down (∨) arrow keys to enter the reading of the standard ac ammeter into the instrument, then press the SET key to store the current setting. To exit without changing the calibration, press the EXIT key.

3. Exit Calibration Mode

After the calibration is complete, turn the input power switch to OFF (0) to exit the Calibration Mode. Turn the power switch to ON (I) to return to standard operating test mode for calibration verification.

2630 Replacement Parts List

Rev. D ECO 5782

Part Number	Qty	Reference Designator	Description
99-10014-01	1	CSW-01	PCB Assy Input Protection Board
99-10222-01	1	CKB-06	PCB Assy Keyboard Assembly
99-10115-01	1	3030	PCB Assy Main Control Board
99-10117-01	1	AMP-260	PCB Assy Main Power Amplifier Board
99-10118-01	1	REC-18	PCB Assy Rectifier Board
99-10016-01	1	-	Earth Connector
99-10103-01	2	-	Diode Rectify Bridge 50V/50A
99-10031-01	1	-	IC 89C52 Microcontroller 8-bit
175-974-002	4	-	Rubber Insert
175-946-013	1	-	Feet Kit w/o Rubber Inserts
99-10057-01	1	-	LCD Display 16 x 2 Characters
125-013-001	1	-	Line Cord (Mains)
99-10312-01	1	-	Power Switch 2P 10A/250V
99-10017-01	1	-	Return Connector Black Banana Jack
330-113-002	1	-	Switch Reset, Red
330-113-001	1	-	Switch Test, Green
99-10122-01	1	T1	Transformer Input, Toroidal
99-10106-01	1	-	Fuse 6.3A 250V, Slow Blow, 20mm
150-135-003	1	-	Fuse Holder, 20mm
99-10008-01	1	-	Cable Assy High Current Return Lead
99-10009-01	1	-	Cable Assy High Current Output Lead
99-10671-01	1	Test/Pass	Replacement Bulb
99-10672-01	1	Reset/Fail	Replacement Bulb
99-10673-01	1	-	Return Terminal
99-10674-01	1	-	Current Terminal

Accessory Kit 99-10006-01

Part Number	Qty.	Description
99-10007-01	1	Cable Assembly Return Interconnect
99-10003-01	1	Cable Assembly R/P Interface Sequential (2925, 2935, 2945)
99-10004-01	1	Cable Assembly R/P Interface Simultaneous (2925, 2935, 2945)
99-10608-01	1	Cable Assembly R/P Interface Sequential (2955, 2965, 2975)
99-10609-01	1	Cable Assembly R/P Interface Simultaneous (2955, 2965, 2975)

Optional Adapter Box

Part Number	Qty.	Description

99-10005-01	1	Adapter Box High Voltage High Current

2660 Replacement Parts List

Rev. ECO

Part Number	Qty	Reference Designator	Description
99-10221-01	1	PWR-2660	PCB Assy Input Power Select Board
99-10222-01	1	CKB-06	PCB Assy Keyboard Assembly
99-10240-01	1	3030	PCB Assy Main Control Board
99-10220-01	1	AMP-3160	PCB Assy Main Power Amplifier Board
99-10016-01	1	-	Earth Connector
99-10031-01	1	-	IC 89C52 Microcontroller 8-bit
175-974-002	4	-	Rubber Insert
175-946-013	1	-	Feet Kit w/o Rubber Inserts
99-10057-01	1	-	LCD Display 16 x 2 Characters
99-10164-01	1	-	Line Cord (Mains)
99-10312-01	1	-	Power Switch 2P 10A/250V
330-113-002	1	-	Switch Reset, Red
330-113-001	1	-	Switch Test, Green
99-10230-01	1	T1	Transformer Input, Toroidal
99-10210-01	1	-	Fuse 15A 250V, Slow Blow, 20mm
99-10238-01	1	-	Cable Assy High Current Return Lead
99-10239-01	1	-	Cable Assy High Current Output Lead
99-10203-01	1	-	High Current Return Jack
99-10204-01	1	-	High Current Output Jack
99-10458-01	2	-	3U Handle Rack Mount
99-10459-01	2	-	3U Bracket Rack Mount

Accessory Kit 99-10006-01

Part Number	Qty.	Description
99-10007-01	1	Cable Assembly Return Interconnect
99-10003-01	1	Cable Assembly R/P Interface Sequential (2925, 2935, 2945)
99-10004-01	1	Cable Assembly R/P Interface Simultaneous (2925, 2935, 2945)
99-10608-01	1	Cable Assembly R/P Interface Sequential (2955, 2965, 2975)
99-10609-01	1	Cable Assembly R/P Interface Simultaneous (2955, 2965, 2975)